A318/A319/A320/A321

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FLIGHT CREW OPERATING MANUAL

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TRANSMITTAL LETTER

Issue date: 17 OCT 17

This is the FLIGHT CREW OPERATING MANUAL major event publication at issue date 17 OCT 17 for the A318/A319/A320/A321 and replacing last issue dated 05 SEP 17

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FILING INSTRUCTIONS

Please incorporate this major event revision as follow:

Localization Subsection Title	Remove	Insert Rev. Date
PLP-LESS **LIST OF EFFECTIVE SECTIONS/SUBSECTIONS**	ALL	17 OCT 17
OEB-PLP-LEOEB **LIST OF EFFECTIVE OPERATIONS ENGINEERING BULLETIN**	ALL	17 OCT 17
OEB - Modification of the AFTER START Normal Procedure	ALL	

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PRELIMINARY PAGES

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M(1)	Localization	Subsection Title	Rev. Date
R	PLP-LESS	LIST OF EFFECTIVE SECTIONS/SUBSECTIONS	17 OCT 17
	GEN-PLP-LETDU	LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS	31 OCT 12
	GEN	General Information	05 SEP 17
	DSC-PLP-LETDU	LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS	31 OCT 12
	DSC-20-10	Overview	19 JUN 17
	DSC-20-20	Description	19 JUN 17
	DSC-20-30	Ground Handling	19 JUN 17
	DSC-20-40	Ground Clearance Diagram	19 JUN 17
	DSC-20-50	Landing Geometry	19 JUN 17
	DSC-20-60	Visual Ground Geometry	19 JUN 17
	DSC-21-10-10	General	19 JUN 17
	DSC-21-10-20	Main Components	19 JUN 17
	DSC-21-10-30	Temperature and Flow Regulation	19 JUN 17
	DSC-21-10-40	System Operation under Failure Condition	19 JUN 17
	DSC-21-10-50	Controls and Indicators	19 JUN 17
	DSC-21-20-10	General	22 MAR 16
	DSC-21-20-20	Main Components	22 MAR 16
	DSC-21-20-30	System Operation	22 MAR 16
	DSC-21-20-40	Controls and Indicators	19 JUN 17
	DSC-21-30-10	General	22 MAR 16
	DSC-21-30-20	Avionics Ventilation	22 MAR 16
	DSC-21-30-40	Battery Ventilation	22 MAR 16
	DSC-21-30-50	Lavatory and Galley Ventilation	15 FEB 13
	DSC-21-30-60	Controls and Indicators	19 JUN 17
	DSC-21-40-10	General	19 JUN 17
	DSC-21-40-20	System Operation	22 MAR 16
	DSC-21-40-30	Controls and Indicators	22 MAR 17
	DSC-21-40-35	ECAM Cond Page	19 JUN 17
	DSC-22_10-10	Description	19 JUN 17
	DSC-22_10-20	System Interface Diagram	15 FEB 13
	DSC-22_10-30	FMGS Modes of Operation	19 JUN 17
	DSC-22_10-40-05	Management of the Displays	20 AUG 10
	DSC-22_10-40-10	MCDU	19 JUN 17
	DSC-22_10-40-20	FCU	05 SEP 17
	DSC-22_10-40-30	Thrust Levers	30 MAY 12
	DSC-22_10-40-40	Primary Flight Display	19 JUN 17
	DSC-22_10-40-50	Navigation Display	18 MAR 15
	DSC-22_10-50-10	General	22 MAR 17
	DSC-22_10-50-20	Characteristic Speeds	19 JUN 17
	DSC-22_10-50-30	Limit Speeds	22 MAR 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	DSC-22_10-50-40	Protection Speeds	22 MAR 17
	DSC-22_10-50-50	Other Speeds	19 JUN 17
	DSC-22_20-10	General	20 AUG 10
	DSC-22_20-20-05	General	20 AUG 10
	DSC-22_20-20-10	Position Computation	20 SEP 16
	DSC-22_20-20-20	Evaluation of Position Accuracy	22 MAR 17
	DSC-22_20-20-30	Radio Navigation Tuning	05 SEP 17
	DSC-22_20-20-40	Alignment of Inertial Reference System	19 JUN 17
	DSC-22_20-20-50	Navigation Database	18 MAR 15
	DSC-22_20-30-05	General	20 AUG 10
	DSC-22_20-30-10-05	General	12 APR 17
	DSC-22_20-30-10-15	FMS2 HONEYWELL	22 MAR 16
	DSC-22_20-30-20-05	General	22 MAR 16
	DSC-22_20-30-20-25	FMS2 Honeywell	19 JUN 17
	DSC-22_20-40-10	Optimization	17 JUL 15
	DSC-22_20-40-20	Cost Index	20 AUG 10
	DSC-22_20-40-30	Predictions	20 SEP 16
	DSC-22_20-50-10-25	FMS2 Honeywell	05 SEP 17
	DSC-22_20-50-20-35	FMS2 Honeywell	19 JUN 17
	DSC-22_20-50-30	MCDU - Data Format List	19 JUN 17
	DSC-22_20-60-10	Effect of Baro Reference Setting	15 FEB 13
	DSC-22_20-60-20	Clear Key (Clearing Function)	07 APR 11
	DSC-22_20-60-30	How to Execute a Diversion	07 APR 11
	DSC-22_20-60-40	Engine Out	05 SEP 17
	DSC-22_20-60-50	Secondary Flight Plan	30 MAY 12
	DSC-22_20-60-60	Pilots/Stored Route Function	15 FEB 13
	DSC-22_20-60-70	Report Page	26 JAN 16
	DSC-22_20-60-80	Closest Airports	07 APR 11
	DSC-22_20-60-90	Time Marker	15 FEB 13
	DSC-22_20-60-100	Step ALTS	12 APR 17
	DSC-22_20-60-110	Required Time of Arrival (RTA)	17 JUL 15
	DSC-22_20-60-120	Equitime Point	15 FEB 13
	DSC-22_20-60-130	MCDU Back Up Navigation	06 JUL 16
	DSC-22_20-60-150	Descent Profile Optimization (if installed)	06 JUL 16
	DSC-22_20-70	AOC Functions	17 JUL 15
	DSC-22_20-80	Print Functions	17 JUL 15
	DSC-22_20-90-10	FMGC Reset	19 JUN 17
	DSC-22_20-90-20	"CHECK GW" or "CHECK WEIGHT" Message	22 MAR 17
	DSC-22_20-100-20	FMS2 HONEYWELL Temporary Abnormal Behaviors	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	DSC-22_20-100-40	**All FMS Temporary Abnormal Behaviors**	22 MAR 17
	DSC-22_30-10	**General**	19 JUN 17
	DSC-22_30-20	**Flight Director**	06 MAR 14
	DSC-22_30-30	**Autopilot (AP)**	05 SEP 17
	DSC-22_30-40	**Speed/Mach Control**	18 MAR 15
	DSC-22_30-50	**AP/FD Modes General**	17 JUL 15
	DSC-22_30-60	**AP/FD Lateral Modes**	19 JUN 17
	DSC-22_30-70-10	**Principles**	20 AUG 10
	DSC-22_30-70-20	**Climb Mode**	19 JUN 17
	DSC-22_30-70-30	**Open Climb Mode**	19 JUN 17
	DSC-22_30-70-50	**Descent Mode**	19 JUN 17
	DSC-22_30-70-60	**Open Descent Mode**	19 JUN 17
	DSC-22_30-70-65	**Altitude Acquire Mode**	19 JUN 17
	DSC-22_30-70-70	**Altitude Hold Mode**	17 JUL 15
	DSC-22_30-70-80	**Vertical Speed Mode - Flight Path Angle Mode (V/S - FPA)**	05 SEP 17
	DSC-22_30-70-90	**Expedite**	19 JUN 17
	DSC-22_30-75	**Mode Reversions**	19 JUN 17
	DSC-22_30-80-10	**General**	19 JUN 17
	DSC-22_30-80-20	**Takeoff**	19 JUN 17
	DSC-22_30-80-30-05	**General**	19 JUN 17
	DSC-22_30-80-30-10	**Precision Approach**	19 JUN 17
	DSC-22_30-80-30-20	**Non Precision Approach**	05 SEP 17
	DSC-22_30-80-40	**Go Around (GA)**	19 JUN 17
	DSC-22_30-90	**Autothrust**	22 MAR 17
	DSC-22_30-100	**Flight Mode Annunciator (FMA)**	19 JUN 17
	DSC-22_30-110	**Temporary Abnormal Behaviors**	05 SEP 17
	DSC-22_40-10	**General**	18 MAR 15
	DSC-22_40-20	**Yaw Functions**	19 JUN 17
	DSC-22_40-30	**Flight Envelope Function**	05 SEP 17
	DSC-22_40-40	**Windshear Detection Function**	17 JUL 15
	DSC-22_40-50	**Controls and Indicators**	07 APR 11
	DSC-22_45	**Auto Flight - AOC Functions**	15 FEB 13
	DSC-22_46	**Auto Flight - Print Interface**	07 APR 11
	DSC-23-10-10	**Introduction**	22 MAR 17
	DSC-23-10-20	**Radio Tuning**	19 JUN 17
	DSC-23-10-30	**Intercommunication Systems**	19 JUN 17
	DSC-23-10-40	**Cockpit Voice Recorder**	22 MAR 17
	DSC-23-10-50	**Controls**	19 JUN 17
	DSC-23-20-10	**Flight Crew Interphone System**	22 MAR 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	DSC-23-20-20	Cabin Interphone System	05 SEP 17
	DSC-23-20-30	Service Interphone System	05 SEP 17
	DSC-23-20-40	Passenger Address	05 SEP 17
	DSC-23-30-10	Radio Communication	05 SEP 17
	DSC-23-40-10	Emergency Evacuation	19 JUN 17
	DSC-23-40-30	Emergency Locator Transmitter	19 JUN 17
	DSC-23-50	Memo Display	05 SEP 17
	DSC-24-10-10	General	22 MAR 16
	DSC-24-10-20	Generation of Electrical Power	22 MAR 16
	DSC-24-10-30-10	General	22 MAR 16
	DSC-24-10-30-20	Normal Configuration	19 JUN 17
	DSC-24-10-30-30	Abnormal Configurations	19 JUN 17
	DSC-24-10-30-40	Distribution Table	22 MAR 16
	DSC-24-20	Controls and Indicators	19 JUN 17
	DSC-25-10-10	General	22 MAR 17
	DSC-25-10-20	Cockpit Plan	22 MAR 17
	DSC-25-10-30	Seats	22 MAR 17
	DSC-25-10-40	Main Instrument Panels	22 MAR 17
	DSC-25-10-50	Pedestal	22 MAR 17
	DSC-25-10-60	Overhead Panel	22 MAR 17
	DSC-25-10-70	C/B Panels	22 MAR 17
	DSC-25-10-80	Foot Warmer (If Installed)	22 MAR 17
	DSC-25-20	Emergency Equipment	22 MAR 17
	DSC-26-10	General	22 MAR 17
	DSC-26-20-10	System Description	05 SEP 17
	DSC-26-20-20	Controls and Indicators	22 MAR 17
	DSC-26-30-10	System Description	22 MAR 17
	DSC-26-30-20	Controls and Indicators	22 MAR 17
	DSC-26-40-10	System Description	22 MAR 17
	DSC-26-50-10	System Description	22 MAR 17
	DSC-26-50-20	Controls and Indicators	22 MAR 17
	DSC-27-10-10	General	22 MAR 16
	DSC-27-10-20	Architecture	19 JUN 17
	DSC-27-20-10-10	General	22 MAR 17
	DSC-27-20-10-20	Pitch Control	19 JUN 17
	DSC-27-20-10-30	Lateral Control	22 MAR 17
	DSC-27-20-10-50	Sideslip Target	22 MAR 17
	DSC-27-20-10-70	Aircraft Trimming	22 MAR 17
	DSC-27-20-20	Reconfiguration Control Laws	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	DSC-27-20-30	**Controls and Indicators**	19 JUN 17
	DSC-27-30-10	**Description**	20 SEP 16
	DSC-27-30-20	**Controls and Indicators**	19 JUN 17
	DSC-28-10-10	**General**	06 MAR 14
	DSC-28-10-20	**Tanks**	19 JUN 17
	DSC-28-10-30	**Engine Feed**	22 MAR 17
	DSC-28-10-50	**APU Feed**	07 APR 11
	DSC-28-10-60	**Fuel Recirculation System**	22 MAR 17
	DSC-28-10-70	**Refueling and Defueling**	22 MAR 17
	DSC-28-10-80	**Fuel Quantity Indication and Level Sensing**	18 MAR 15
	DSC-28-10-90	**Fuel Tank Inerting System**	12 APR 17
	DSC-28-20	**Controls and Indicators**	19 JUN 17
	DSC-29-10-10	**General**	22 MAR 16
	DSC-29-10-20	**Generation**	22 MAR 16
	DSC-29-10-30	**Distribution**	19 JUN 17
	DSC-29-20	**Controls and Indicators**	19 JUN 17
	DSC-30-10-10	**Description**	22 MAR 16
	DSC-30-20-10	**Description**	22 MAR 16
	DSC-30-20-20	**Controls And Indicators**	19 JUN 17
	DSC-30-30-10	**Description**	22 MAR 16
	DSC-30-30-20	**Controls and Indicators**	19 JUN 17
	DSC-30-40-10	**Description**	22 MAR 16
	DSC-30-40-20	**Controls and Indicators**	22 MAR 16
	DSC-30-50-10	**Description**	22 MAR 16
	DSC-30-50-20	**Controls and Indicators**	22 MAR 16
	DSC-30-60-10	**Description**	19 JUN 17
	DSC-30-60-20	**Controls and Indicators**	22 MAR 16
	DSC-30-70-10	**Description**	19 JUN 17
	DSC-31-05-10	**Introduction**	22 MAR 16
	DSC-31-05-20	**Cockpit Arrangement**	15 FEB 13
	DSC-31-05-30	**Architecture**	05 SEP 17
	DSC-31-05-40	**Controls and Switching**	22 MAR 16
	DSC-31-05-50	**Reconfiguring the DMC**	19 JUN 17
	DSC-31-05-60	**Reconfiguring DUs**	06 JUL 16
	DSC-31-10	**ECAM Description**	05 SEP 17
	DSC-31-15	**Indications on E/WD**	19 JUN 17
	DSC-31-20	**Indications on SD**	19 JUN 17
	DSC-31-25-10	**General**	22 MAR 16
	DSC-31-25-20	**Example**	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	DSC-31-27	OEB Reminder	22 MAR 16
	DSC-31-30	ECAM Controls	05 SEP 17
	DSC-31-40	Indications on PFD	05 SEP 17
	DSC-31-45	Indications on ND	19 JUN 17
	DSC-31-50	EFIS Controls	15 FEB 13
	DSC-31-55-10	General	22 MAR 16
	DSC-31-55-20	Controls and Indicators	22 MAR 17
	DSC-31-60-10	Flight Data Recording System	15 FEB 13
	DSC-31-60-20	Controls and Indicators	15 FEB 13
	DSC-31-60-30	Aircraft Integrated Data System	15 FEB 13
	DSC-32-10-10	Description	22 MAR 16
	DSC-32-10-20	Landing Gear System/Interface	22 MAR 16
	DSC-32-10-30	Interactions between Landing Gear and Aircraft Systems	19 JUN 17
	DSC-32-10-40	Controls and Indicators	19 JUN 17
	DSC-32-20-10	Description	19 JUN 17
	DSC-32-20-20	Controls and Indicators	05 SEP 17
	DSC-32-30-10	Description	19 JUN 17
	DSC-32-30-20	Controls and Indicators	19 JUN 17
	DSC-33-10-10	General	22 MAR 16
	DSC-33-10-20	Description	22 MAR 16
	DSC-33-10-30	Controls and Indicators	22 MAR 16
	DSC-33-20-10	General	22 MAR 16
	DSC-33-20-20	Controls and Indicators	19 JUN 17
	DSC-33-30-10	Description	05 SEP 17
	DSC-33-30-20	Controls and Indicators	19 JUN 17
	DSC-33-40-10	Controls and Indicators	22 MAR 16
	DSC-34-NAV-10-10	Description	22 MAR 16
	DSC-34-NAV-10-20	Controls and Indicators	19 JUN 17
	DSC-34-NAV-15-10	Description	22 MAR 16
	DSC-34-NAV-20	Standby Instruments	19 JUN 17
	DSC-34-NAV-30-10	Tuning	22 MAR 16
	DSC-34-NAV-30-20	Navaids	22 MAR 16
	DSC-34-NAV-30-30	Controls and Indicators	22 MAR 16
	DSC-34-NAV-40-10	Description	22 MAR 16
	DSC-34-SURV-10-10	Description	19 JUN 17
	DSC-34-SURV-10-20	Controls and Indicators	19 JUN 17
	DSC-34-SURV-30-10	Description	19 JUN 17
	DSC-34-SURV-30-20	Predictive Windshear System	19 JUN 17
	DSC-34-SURV-30-30	Controls and Indicators	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	DSC-34-SURV-40-10	**Description**	22 MAR 17
	DSC-34-SURV-40-20	**GPWS Basics Modes**	05 SEP 17
	DSC-34-SURV-40-35	**Predictive GPWS Functions**	19 JUN 17
	DSC-34-SURV-40-40	**Controls and Indicators**	19 JUN 17
	DSC-34-SURV-50-10	**General**	19 JUN 17
	DSC-34-SURV-50-20	**Description**	19 JUN 17
	DSC-34-SURV-50-30	**Controls and Indicators**	19 JUN 17
	DSC-34-SURV-60-10	**Description**	22 MAR 17
	DSC-34-SURV-60-20	**Controls and Indicators**	19 JUN 17
	DSC-35-10	**General**	07 APR 11
	DSC-35-20-10	**Description**	22 MAR 16
	DSC-35-20-20	**Controls and Indicators**	19 JUN 17
	DSC-35-30-10	**Description**	06 JUL 16
	DSC-35-30-20	**Controls and Indicators**	22 MAR 17
	DSC-35-40-10	**Description**	19 JUN 17
	DSC-36-10-10	**General**	22 MAR 17
	DSC-36-10-20	**Engine Bleed System**	19 JUN 17
	DSC-36-10-30	**APU Bleed Air Supply**	22 MAR 17
	DSC-36-10-40	**Crossbleed**	19 JUN 17
	DSC-36-10-50	**Leak Detection**	22 MAR 17
	DSC-36-10-60	**Operation Following Failures**	22 MAR 16
	DSC-36-20	**Controls and Indicators**	19 JUN 17
	DSC-38-10	**Description**	19 JUN 17
	DSC-45-10	**Description**	22 MAR 16
	DSC-45-20	**System Operation**	22 MAR 16
	DSC-45-25	**Data Loading**	15 FEB 13
	DSC-45-30	**Printer**	22 MAR 16
	DSC-46-10-10	**General System Description**	22 MAR 17
	DSC-46-10-20-10	**General**	22 MAR 17
	DSC-46-10-40-30	**MCDU Datalink Pages**	22 MAR 17
	DSC-46-10-40-40	**MCDU Scratchpad Messages**	22 MAR 17
	DSC-46-10-40-60	**ECAM**	22 MAR 17
	DSC-46-10-50	**How To**	22 MAR 17
	DSC-46-20-20	**Applications**	05 SEP 17
	DSC-46-30	**Electronic QRH (eQRH)**	22 MAR 17
	DSC-46-40-10	**General**	22 MAR 16
	DSC-46-40-20	**In Seat Power Supply System**	26 JAN 16
	DSC-46-40-30	**Controls and Indicators**	19 JUN 17
	DSC-49-10-10	**General**	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	DSC-49-10-20	**Main Components**	19 JUN 17
	DSC-49-20	**Controls and Indicators**	19 JUN 17
	DSC-52-10-10	**General**	19 JUN 17
	DSC-52-10-20	**Passenger Doors**	22 MAR 16
	DSC-52-10-30	**Emergency Exits**	19 JUN 17
	DSC-52-10-40	**Cargo Doors**	22 MAR 17
	DSC-52-10-50	**Avionics Compartment Access Door**	22 MAR 16
	DSC-52-10-60	**Cockpit Door**	22 MAR 17
	DSC-52-10-80	**Escape Slides/Rafts**	19 JUN 17
	DSC-52-20	**Controls and Indicators**	22 MAR 16
	DSC-52-40-10	**Description**	22 MAR 17
	DSC-52-40-20	**Cockpit Door Locking System (CDLS)**	22 MAR 17
	DSC-52-40-30	**Cockpit Door Surveillance System (CDSS)**	19 JUN 17
	DSC-52-50	**How to**	22 MAR 17
	DSC-56-10	**General**	22 MAR 17
	DSC-56-20	**Fixed Windows**	22 MAR 17
	DSC-56-30	**Sliding Windows**	22 MAR 17
	DSC-56-40	**Description**	22 MAR 17
	DSC-70-05	**Overview**	22 MAR 16
	DSC-70-10	**System Description**	22 MAR 17
	DSC-70-20	**FADEC**	19 JUN 17
	DSC-70-30-10	**General**	22 MAR 17
	DSC-70-30-20	**Thrust Levers**	22 MAR 17
	DSC-70-30-30	**Thrust Rating Limit**	22 MAR 16
	DSC-70-30-40	**Thrust Control**	22 MAR 17
	DSC-70-40	**Fuel System (CFM56)**	22 MAR 17
	DSC-70-50	**Oil System**	22 MAR 16
	DSC-70-60	**Airbleed System (CFM56)**	22 MAR 17
	DSC-70-70	**Thrust Reverser System**	22 MAR 17
	DSC-70-80-10	**General**	22 MAR 17
	DSC-70-80-20	**Architecture**	22 MAR 16
	DSC-70-80-30	**Ignition System**	22 MAR 17
	DSC-70-80-40	**Engine Starting System**	22 MAR 17
	DSC-70-90-10	**Overhead Panel**	06 JUL 16
	DSC-70-90-20	**Pedestal**	22 MAR 17
	DSC-70-90-30	**Maintenance Panel**	24 OCT 16
	DSC-70-90-40	**Engine Display**	05 SEP 17
	DSC-70-90-50	**Memo Display**	06 JUL 16
	PRO-PLP-LETDU	**LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS**	05 SEP 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	PRO-ABN-ABN-00	**INTRODUCTION**	05 SEP 17
	PRO-ABN-ABN-ADV	**[ADV] ECAM ADVISORY**	05 SEP 17
	PRO-ABN-ABN-MEM	**[MEM] MEMORY ITEMS**	19 JUN 17
	PRO-ABN-ABN-QRH	**[QRH] PROCEDURES**	19 JUN 17
	PRO-ABN-ABN-RESET	**[RESET] SYSTEM RESET**	05 SEP 17
	PRO-ABN-A-ICE	**A-ICE**	19 JUN 17
	PRO-ABN-AIR	**AIR**	19 JUN 17
	PRO-ABN-APU	**APU**	22 MAR 17
	PRO-ABN-APUF	**APU FIRE**	22 MAR 17
	PRO-ABN-AUTO_FLT	**AUTO FLT**	05 SEP 17
	PRO-ABN-AVNCS	**AVIONICS SMOKE**	22 MAR 17
	PRO-ABN-BLEED	**BLEED**	12 APR 17
	PRO-ABN-BRAKES	**BRAKES**	19 JUN 17
	PRO-ABN-NWS	**BRAKES-N/WS**	22 MAR 17
	PRO-ABN-CAB_PR	**CAB PR**	22 MAR 17
	PRO-ABN-CRG_SMOKE	**CARGO SMOKE**	05 SEP 17
	PRO-ABN-C_B	**C/B**	22 MAR 17
	PRO-ABN-COM	**COM**	22 MAR 17
	PRO-ABN-COND	**COND**	19 JUN 17
	PRO-ABN-CONFIG	**CONFIG**	12 APR 17
	PRO-ABN-DATALINK	**DATALINK**	22 MAR 17
	PRO-ABN-DOOR	**DOOR**	19 JUN 17
	PRO-ABN-EIS	**EIS**	19 JUN 17
	PRO-ABN-ELEC	**ELEC**	05 SEP 17
	PRO-ABN-ENG	**ENG**	05 SEP 17
	PRO-ABN-F_CTL	**F/CTL**	05 SEP 17
	PRO-ABN-FUEL	**FUEL**	12 APR 17
	PRO-ABN-FWS	**FWS**	19 JUN 17
	PRO-ABN-HYD	**HYD**	05 SEP 17
	PRO-ABN-LG	**L/G**	05 SEP 17
	PRO-ABN-MISC	**MISC**	19 JUN 17
	PRO-ABN-NAV	**NAV**	19 JUN 17
	PRO-ABN-OVERSPEED	**OVERSPEED**	19 JUN 17
	PRO-ABN-RECORDER	**RECORDER**	22 MAR 17
	PRO-ABN-SEVERE_ICE	**SEVERE ICE**	19 JUN 17
	PRO-ABN-SMOKE	**SMOKE**	05 SEP 17
	PRO-ABN-SURV	**SURV**	19 JUN 17
	PRO-ABN-VENT	**VENT**	22 MAR 17
	PRO-ABN-WHEEL	**WHEEL**	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	PRO-ABN-W_A_ICE	WING A.ICE	22 MAR 17
	PRO-ABN-90	Detailed Cabin / Cockpit Evacuation Procedure	05 SEP 17
	PRO-NOR-SOP-01	General Information	19 JUN 17
	PRO-NOR-SOP-02	Flight Preparation	19 JUN 17
	PRO-NOR-SOP-03	Safety Exterior Inspection	06 MAR 14
	PRO-NOR-SOP-04	Preliminary Cockpit Preparation	05 SEP 17
	PRO-NOR-SOP-05	Exterior Walkaround	05 SEP 17
	PRO-NOR-SOP-06	Cockpit Preparation	19 JUN 17
	PRO-NOR-SOP-07	Before Pushback or Start	19 JUN 17
	PRO-NOR-SOP-08	Engine Start	05 SEP 17
	PRO-NOR-SOP-09	After Start	22 MAR 17
	PRO-NOR-SOP-10	Taxi	05 SEP 17
	PRO-NOR-SOP-11	Before Takeoff	19 JUN 17
	PRO-NOR-SOP-12	Takeoff	19 JUN 17
	PRO-NOR-SOP-13	After Takeoff	22 MAR 17
	PRO-NOR-SOP-14	Climb	19 JUN 17
	PRO-NOR-SOP-15	Cruise	19 JUN 17
	PRO-NOR-SOP-16	Descent Preparation	19 JUN 17
	PRO-NOR-SOP-17	Descent	05 SEP 17
	PRO-NOR-SOP-18-A	Approach General	19 JUN 17
	PRO-NOR-SOP-18-B	Aircraft Configuration Management	19 JUN 17
	PRO-NOR-SOP-18-C	Aircraft Guidance Management	05 SEP 17
	PRO-NOR-SOP-19	Landing	05 SEP 17
	PRO-NOR-SOP-20	Go-Around	19 JUN 17
	PRO-NOR-SOP-21	After Landing	05 SEP 17
	PRO-NOR-SOP-22	Parking	05 SEP 17
	PRO-NOR-SOP-23	Securing the Aircraft	19 JUN 17
	PRO-NOR-SOP-90	Standard Callouts	05 SEP 17
	PRO-NOR-SUP-SUP	Supplementary Procedures Menu	19 JUN 17
	PRO-NOR-SUP-ADVWXR	Adverse Weather	22 MAR 17
	PRO-NOR-SUP-COM	Communication	22 MAR 17
	PRO-NOR-SUP-ENG	Engines	19 JUN 17
	PRO-NOR-SUP-FUEL	Fuel	05 SEP 17
	PRO-NOR-SUP-LG-LG_DN	Flight with Landing Gear Down	05 SEP 17
	PRO-NOR-SUP-LG-LG	Operation with Nosewheel Steering Offset	05 SEP 17
	PRO-NOR-SUP-MISC-D	Pushback with Power Push Unit	19 JUN 17
	PRO-NOR-SUP-MISC-A	Hight Altitude Airport Operations	22 MAR 17
	PRO-NOR-SUP-MISC-C	Operations at QNH Above 1050 hPa	19 JUN 17
	PRO-NOR-SUP-NAV	Navigation	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	PRO-NOR-SUP-SURV	Surveillance	19 JUN 17
	PRO-NOR-SRP-01-05	Introduction	15 FEB 13
	PRO-NOR-SRP-01-10	Cockpit Preparation	19 JUN 17
	PRO-NOR-SRP-01-15	Before Pushback or Start	30 MAY 12
	PRO-NOR-SRP-01-20	Taxi	18 MAR 15
	PRO-NOR-SRP-01-30	Takeoff	19 JUN 17
	PRO-NOR-SRP-01-40	Climb	19 JUN 17
	PRO-NOR-SRP-01-50	Cruise	19 JUN 17
	PRO-NOR-SRP-01-60	Descent	19 JUN 17
	PRO-NOR-SRP-01-70	Approach	19 JUN 17
	PRO-NOR-SRP-01-80	Go-Around	19 JUN 17
	PRO-SPO-20	Flight Without Cabin Pressurization	19 JUN 17
	PRO-SPO-40-10	General	17 JUL 15
	PRO-SPO-40-20	Operational Limitations	22 MAR 17
	PRO-SPO-40-30	Dispatch Consideration	17 JUL 15
	PRO-SPO-40-40	Diversion During Extended Range Operations	22 MAR 17
	PRO-SPO-40-50	Procedures	05 SEP 17
	PRO-SPO-40-60	Performance	19 JUN 17
	PRO-SPO-45	Engine Intermix Operations	19 JUN 17
	PRO-SPO-50	Reduced Vertical Separation Minimum - RVSM	22 MAR 17
	PRO-SPO-51	Required Navigation Performance (RNP)	05 SEP 17
	PRO-SPO-60	Operations on Narrow Runways	19 JUN 17
	PRO-SPO-85	ILS PRM Approach	22 MAR 17
	LIM-PLP-LETDU	LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS	19 JUN 17
	LIM-INT	Introduction	05 SEP 17
	LIM-AG-F_CTL	Flight Maneuvering Load Acceleration Limits	22 MAR 17
	LIM-AG-OPS	Operational Parameters	05 SEP 17
	LIM-AG-SPD	Speeds	19 JUN 17
	LIM-AG-WGHT	Weights	19 JUN 17
	LIM-AIR	Air Bleed/Cond/Press/Vent	22 MAR 17
	LIM-AFS-10	General	05 SEP 17
	LIM-AFS-20	Automatic Approach, Landing and Rollout	19 JUN 17
	LIM-APU	Auxiliary Power Unit	05 SEP 17
	LIM-CAB	Cabin Systems	12 APR 17
	LIM-COM	Communication	19 JUN 17
	LIM-ENG	Engines	19 JUN 17
	LIM-F_CTL	Flight Controls	22 MAR 17
	LIM-FUEL	Fuel	22 MAR 17
	LIM-ICE_RAIN	Ice and Rain Protection	22 MAR 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	LIM-LG	**Landing Gear**	19 JUN 17
	LIM-NAV	**Navigation**	22 MAR 17
	LIM-OXY	**Oxygen**	22 MAR 17
	LIM-ROW_ROP	**ROW/ROP**	19 JUN 17
	LIM-SURV	**Surveillance**	22 MAR 17
	OEB-PLP-LETDU	**LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS**	31 OCT 12
R	OEB-PLP-LEOEB	**LIST OF EFFECTIVE OPERATIONS ENGINEERING BULLETIN**	17 OCT 17
	PER-PLP-LETDU	**LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS**	31 OCT 12
	PER-LOD-GEN	**GENERAL**	20 AUG 10
	PER-LOD-CGO	**CARGO LOADING**	22 MAR 17
	PER-LOD-FUL	**FUEL**	19 JUN 17
	PER-LOD-WBA-LTS	**LOAD AND TRIM SHEET**	19 JUN 17
	PER-LOD-WBA-FIT-10	**FUEL INDEX TABLE**	19 JUN 17
	PER-OPD-GEN	**GENERAL**	07 APR 11
	PER-OPD-CON-AEO	**ALL ENGINES OPERATIVE**	19 JUN 17
	PER-OPD-CON-OEI	**ONE ENGINE INOPERATIVE**	19 JUN 17
	PER-THR-GEN	**GENERAL**	07 APR 11
	PER-THR-MTO	**MAXIMUM TAKEOFF**	19 JUN 17
	PER-THR-MGA	**MAXIMUM GO AROUND**	19 JUN 17
	PER-THR-FLX	**FLEXIBLE TAKEOFF**	19 JUN 17
	PER-THR-MCT	**MAXIMUM CONTINUOUS**	19 JUN 17
	PER-THR-MCL	**MAXIMUM CLIMB**	19 JUN 17
	PER-THR-MCR	**MAXIMUM CRUISE**	19 JUN 17
	PER-TOF-THR-FLX-10	**DEFINITION OF FLEXIBLE TAKEOFF**	07 APR 11
	PER-TOF-THR-FLX-20	**USE OF FLEXIBLE TAKEOFF**	07 APR 11
	PER-TOF-THR-FLX-30	**REQUIREMENTS**	05 SEP 17
	PER-TOF-THR-FLX-40	**RECOMMENDATION**	26 JAN 16
	PER-TOF-TOC-05	**INTRODUCTION**	07 APR 11
	PER-TOF-TOC-10-10	**TAKEOFF PERFORMANCE**	07 APR 11
	PER-TOF-TOC-10-20	**TAKEOFF CHART DESCRIPTION**	19 JUN 17
	PER-TOF-TOC-10-30	**ADDITIONAL INFORMATION**	19 JUN 17
	PER-TOF-TOC-12-10	**DETERMINATION OF MAXIMUM TAKEOFF WEIGHT AND SPEEDS**	20 SEP 16
	PER-TOF-TOC-12-30	**EXTRAPOLATION**	06 JUL 16
	PER-TOF-TOC-12-40	**MAXIMUM STRUCTURAL TAKEOFF WEIGHT**	07 APR 11
	PER-TOF-TOC-12-50	**SUMMARY**	07 APR 11
	PER-TOF-TOC-14-10	**DETERMINATION OF FLEXIBLE TAKEOFF TEMPERATURE AND SPEEDS**	19 JUN 17
	PER-TOF-TOC-14-20	**FLEXIBLE TAKEOFF NOT POSSIBLE**	06 MAR 14

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	PER-TOF-TOC-14-25	FLEXIBLE TAKEOFF POSSIBLE BUT NOT USED	06 MAR 14
	PER-TOF-TOC-14-30	SUMMARY	07 APR 11
	PER-TOF-TOC-16-10	TAKEOFF PERFORMANCE	17 JUL 15
	PER-TOF-TOC-16-20	TAKEOFF CHART DESCRIPTION	19 JUN 17
	PER-TOF-TOC-16-30	ADDITIONAL INFORMATION	19 JUN 17
	PER-TOF-TOC-18-10	DETERMINATION OF MAXIMUM TAKEOFF WEIGHT AND SPEEDS	20 SEP 16
	PER-TOF-TOC-18-20	EXTRAPOLATION	07 APR 11
	PER-TOF-TOC-18-30	MAXIMUM STRUCTURAL TAKEOFF WEIGHT	07 APR 11
	PER-TOF-TOC-18-40	SUMMARY	07 APR 11
	PER-TOF-TOC-20-10	DETERMINATION OF FLEXIBLE TAKEOFF TEMPERATURE AND SPEEDS	19 JUN 17
	PER-TOF-TOC-20-20	FLEXIBLE TAKEOFF NOT POSSIBLE	07 APR 11
	PER-TOF-TOC-20-30	SUMMARY	07 APR 11
	PER-TOF-TOD-24	QNH/BLEEDS CORRECTION	19 JUN 17
	PER-TOF-TOD-25-10	SPEEDS LIMITED BY VMCG/VMCA	19 JUN 17
	PER-TOF-TOD-25-20	V2 LIMITED BY VMU/VMCA	19 JUN 17
	PER-TOF-CTA-10	GENERAL	31 JUL 14
	PER-TOF-CTA-20	DEFINITIONS	31 JUL 14
	PER-TOF-CTA-30	OPERATIONAL CONDITIONS	20 AUG 10
	PER-TOF-CTA-40-10	TAKEOFF PERFORMANCE	19 JUN 17
	PER-TOF-CTA-40-20	TAKEOFF FROM A WET RUNWAY	19 JUN 17
	PER-TOF-CTA-40-30	TAKEOFF FROM A CONTAMINATED RUNWAY	19 JUN 17
	PER-TOF-CTA-40-40	EXAMPLE	20 SEP 16
	PER-FPL-GEN-MFR	MINIMUM RECOMMENDED FUEL REQUIREMENTS	19 JUN 17
	PER-FPL-GEN-FPL	FLIGHT PLAN	07 APR 11
	PER-FPL-FLP-QFP-10	INTRODUCTION	19 JUN 17
	PER-FPL-FLP-QFP-20	CORRECTION FOR DEVIATION FROM REFERENCE LANDING WEIGHT	07 APR 11
	PER-FPL-FLP-QFP-30	EXAMPLE	05 SEP 17
	PER-FPL-FLP-QFP-40	FLIGHT PLANNING AT A GIVEN MACH NUMBER	19 JUN 17
	PER-FPL-FLP-QFP-50	FLIGHT PLANNING AT LONG RANGE SPEED	19 JUN 17
	PER-FPL-FLP-ALN-20	ALL ENGINES OPERATIVE	19 JUN 17
	PER-CLB-GEN	GENERAL	07 APR 11
	PER-CLB-CLT	CLIMB TABLES	19 JUN 17
	PER-CRZ-ALT-10	OPTIMUM AND MAXIMUM ALTITUDES	22 MAR 17
	PER-CRZ-ALT-20	WIND ALTITUDE TRADE FOR CONSTANT SPECIFIC RANGE	19 JUN 17
	PER-CRZ-CRT-10	GENERAL	18 MAR 15
	PER-CRZ-CRT-20	CRUISE AT M.78	19 JUN 17
	PER-CRZ-CRT-30	CRUISE AT LONG RANGE	19 JUN 17

Continued on the following page

Continued from the previous page

M(1)	Localization	Subsection Title	Rev. Date
	PER-CRZ-ICQ-10	**GENERAL**	19 JUN 17
	PER-CRZ-ICQ-20	**EXAMPLE**	22 MAR 17
	PER-HLD-GEN	**GENERAL**	18 MAR 15
	PER-HLD-HLD	**HOLDING TABLES**	19 JUN 17
	PER-DES-GEN	**GENERAL**	20 AUG 10
	PER-DES-STD	**STANDARD**	19 JUN 17
	PER-DES-EMG	**EMERGENCY**	19 JUN 17
	PER-GOA-GEN	**GENERAL**	19 JUN 17
	PER-GOA-ACG-NOR	**NORMAL**	19 JUN 17
	PER-GOA-ACG-CAT	**CAT II**	19 JUN 17
	PER-LDG-GEN	**GENERAL**	19 JUN 17
	PER-LDG-CTA-10	**GENERAL**	31 JUL 14
	PER-LDG-CTA-20	**DEFINITIONS**	05 SEP 17
	PER-LDG-DIS-MAT	**Runway Condition Assessment Matrix for Landing**	22 MAR 17
	PER-LDG-DIS-RLD	**REQUIRED LANDING DISTANCES / MANUAL LANDING**	19 JUN 17
	PER-LDG-DIS-RLA	**REQUIRED LANDING DISTANCES**	19 JUN 17
	PER-OEI-GEN	**GENERAL**	22 MAR 17
	PER-OEI-ALT-10	**CEILINGS**	22 MAR 17
	PER-OEI-CRT-10	**STANDARD AND OBSTACLE STRATEGIES**	19 JUN 17
	PER-OEI-CRT-20	**FIXED SPEED STRATEGIES**	19 JUN 17
	PER-OEI-ICQ-10	**STANDARD STRATEGIES**	19 JUN 17
	PER-OEI-ICQ-20	**FIXED SPEED STRATEGIES**	19 JUN 17
	PER-OEI-HLD	**HOLDING**	19 JUN 17
	PER-OEI-DES-10	**STANDARD STRATEGY**	19 JUN 17
	PER-OEI-DES-15	**OBSTACLE STRATEGY**	19 JUN 17
	PER-OEI-DES-20	**FIXED SPEED STRATEGIES**	19 JUN 17
	PER-OEI-DES-30	**DESCENT TO LANDING**	19 JUN 17

(1) Evolution code : N=New, R=Revised, E=Effectivity, M=Moved

This table gives, for each delivered aircraft, the cross reference between:

- The Manufacturing Serial Number (MSN).
- The Fleet Serial Number (FSN) of the aircraft as known by AIRBUS S.A.S.
- The registration number of the aircraft as known by AIRBUS S.A.S.
- The aircraft model.

M(1)	MSN	FSN	Registration Number	Model
	1882		HC-CKN	319-112
	2078		HC-CLF	319-112
	3408		HC-CRU	320-214
	3467		HC-CSB	319-115
	3518		HC-CSA	319-115
	4100		HC-CSF	320-214
	4379		HC-CJM	320-214
	4487		HC-CJW	320-214
	4547		HC-CJV	320-214

(1) Evolution code : N=New, R=Revised

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M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	J0006		20 AUG 10	FUEL SYSTEM - ADDITIONAL TREATMENT OF CENTRE TANK STRUCTURE AND INSTALLATION OF CENTRE TANK SYSTEM
	Applicable to: ALL			
	J0012		20 AUG 10	NAVIGATION LIGHTS SYSTEM - INSTALLATION OF A SECOND NAVIGATION LIGHT SYSTEM
	Applicable to: ALL			
	J0022		20 AUG 10	INSTALLATION OF A FUEL QUANTITY SELECTOR IN THE FLIGHT COMPARTMENT
	Applicable to: ALL			
	J0071		20 AUG 10	WING STRUCTURE-INTRODUCTION OF A WING TIP INCORPORATING A TIP FENCE FOR 72T MTOW A/C
	Applicable to: ALL			
	J0664		20 AUG 10	FUEL SYSTEM-TO IMPROVE LOW LEVEL WARNING
	Applicable to: ALL			
	J0689		20 AUG 10	WING-TO DELETE L/E VENTILATION SYSTEM (PICCOLO TUBE)
	Applicable to: ALL			
	J1255		20 AUG 10	FUEL - TANK LEVEL SENSING - CHANGE TO LOW PRESSURE WARNING
	Applicable to: ALL			
	J1334		20 AUG 10	LANDING GEAR-MLG-LGCIU-INTRODUCTION OF A NEW STANDARD FOR IMPROVED PROXIMITY SENSOR FAULT MONITORING FUNCTION
	Applicable to: ALL			
	J1617		20 AUG 10	FLIGHT CONTROLS - GENERAL - DELETE LAF FEATURE FROM A320 DEFINITION (PRODUCTION SOLUTION)
	Applicable to: MSN 3408, 4100-4547			
	J2190		20 AUG 10	FUEL - MAIN FUEL PUMPS SYSTEMS - CENTRE TANK PUMPS AUTO FEED FAULT.ADAPT PUMP CONTROL LATCH FOR FLIGHT DECK REFUEL CABABILITY
	Applicable to: ALL			
	J2257		20 AUG 10	FUEL - MANUAL MAGNETIC INDICATORS - ATTITUDE MONITOR DELETION
	Applicable to: MSN 2078-4547			
	J2360		20 AUG 10	FUEL - QUANTITY INDICATION - INTRODUCE FUEL LEAK DETECTION ASSOCIATED WITH FQIC - 13 - 9
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	J2361		20 AUG 10	FUEL - QUANTITY INDICATION - REMOVAL OF FUEL LEAK DETECTION FUNCTION ASSOCIATED WITH THE FQIC 13 - 9
	Applicable to: MSN 3408-4547			
	J2527		20 AUG 10	FUEL - QUANTITY INDICATING - INTRODUCE NEW STANDARD OF FUEL QTY INDICATING COMPUTER 13-10
	Applicable to: MSN 3408-4547			
	J2662		15 FEB 13	FUEL - QUANTITY INDICATING - INTRODUCE NEW STANDARD OF FQIC (P/N SIC5059 14-20)
	Applicable to: MSN 3408-4547			
	J2816		07 APR 11	WING - FIXED PARTITION - INTRODUCED A STANDARD OF BOX WITHOUT DRY BAY
	Applicable to: MSN 3408-4547			
	J2963		07 APR 11	REDUCTION IN QUANTITY OF MAGNETIC LEVEL INDICATORS
	Applicable to: MSN 4100-4547			
	K0024		20 AUG 10	INSTALLATION OF ADDITIONAL CARGO DOOR (BULK DOOR)
	Applicable to: MSN 3408, 4100-4547			
	K0026		20 AUG 10	LIGHTS - LOGOLIGHTS - INSTALLATION OF LOGOLIGHTS SYSTEM
	Applicable to: ALL			
	K0035		20 AUG 10	FIRE PROTECTION - FWD LOWER HOLD - INSTALLATION OF SMOKE DETECTION SYSTEM
	Applicable to: ALL			
	K0036		20 AUG 10	FIRE PROTECTION - AFT LOWER HOLD - INSTALLATION OF SMOKE DETECTION SYSTEM
	Applicable to: ALL			
	K0037		20 AUG 10	FIRE PROTECTION - FWD AND AFT LOWER HOLD INSTALLATION OF A SINGLE SHOT FIRE EXTINGUISHING SYSTEM
	Applicable to: ALL			
	K0052		20 AUG 10	INSTALLATION OF AN AIDS
	Applicable to: ALL			
	K0064		20 AUG 10	LIGHTS - INSTALLATION OF STROBE LIGHTS SYNCHRONISED MODE
	Applicable to: ALL			
	K0066		20 AUG 10	AIR CONDITIONING - VENTILATION SYSTEM FOR FWD CARGO COMPARTMENT
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	K0070		07 APR 11	AIR CONDITIONING - VENTILATION SYSTEM FOR AFT CARGO COMPARTMENT
	Applicable to: MSN 1882-2078			
	K0082		20 AUG 10	WATER WASTE-INSTALL VACUUM TOILET SYSTEM
	Applicable to: ALL			
	K0151		20 AUG 10	EQUIPMENT FURNISHINGS ESCAPE FACILITIES INSTALL SLIDE RAFTS (AIRCRUISERS)
	Applicable to: MSN 3408, 4100-4547			
	K10003		07 APR 11	AIRBORNE AUXILIARY POWER - CONTROL AND MONITORING INTRODUCE SOFTWARE VERSION 06.00.000
	Applicable to: MSN 3408-4547			
	K10009		20 AUG 10	EQUIPMENT/FURNISHINGS - CURTAINS AND PARTITIONS INTRODUCE IMPROVED STRIKES FOR COCKPIT DOOR
	Applicable to: MSN 3408-4547			
	K1014		20 AUG 10	WATER/WASTE-RELOCATION OF POT.WATER TANK FROM SECTION 18 TO SECTION 15 AND REDESIGN OF POT.WATERSYSTEM
	Applicable to: ALL			
	K10359		20 AUG 10	LIGHTS - EMERGENCY LIGHTING - DEFINE FLOOR MOUNTED LUFTHANSA TECHNIK 900 SERIES EEPMS
	Applicable to: MSN 3408-4547			
	K10405		24 OCT 16	AIR CONDITIONING - AIR COOLING SYSTEM INTRODUCE MODIFIED AIR CONDITIONING PACK P/N 1802A0000-03(AIV DELETION) FOR A318/A319
	Applicable to: MSN 3467-3518			
	K10463		25 NOV 11	AIR CONDITIONING PACK TEMPERATURE CONTROL INTRODUCE IMPROVED AIR CONDITIONING CONTROLLER P/N 1803B0000-02
	Applicable to: MSN 3408-4547			
	K10494		20 AUG 10	AIRBORNE AUXILIARY POWER - CHANGE STANDARD APU HONEYWELL GTCP36-300 TO APIC APS3200
	Applicable to: MSN 3408-4547			
	K11047		20 AUG 10	COMMUNICATION - ANTI HIJACK CAMERA MONITORING - INSTALL COCKPIT DOOR SURVEILLANCE SYSTEM DISPLAYEDON SD
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	K1119		20 AUG 10	EQUIPMENT FURNISHINGS-C.C-REARRANGE COMPARTMENT 4 INTO TWO ZONES
	Applicable to: ALL			
	K11694		07 APR 11	EQUIPMENT/FURNISHINGS-MISCELLANEOUS EMERGENCY EQUIPMENT-INSTALLATION OF ELT(406AFN) WITH RCP IN COCKPIT AND NAV PROVISIONS-HONEYWELL
	Applicable to: MSN 3408-4547			
	K12405		07 APR 11	COMMUNICATIONS-CIDS-INTRODUCE HANDSET SERIES N40A FROM VENDOR HOLMBERG
	Applicable to: MSN 4100-4547			
	K12824		20 OCT 11	COMMUNICATIONS - CIDS - INSTALL CIDS AND SDF OBRM SOFTWARE P/N -33A AND CAM UPDATE
	Applicable to: MSN 4487-4547			
	K12825		20 OCT 11	COMMUNICATIONS - CIDS - INSTALL CIDS DIRECTOR P/N -333B
	Applicable to: MSN 4487-4547			
	K13078		07 APR 11	OXYGEN - PASSENGER OXYGEN - INTRODUCE OPTIONAL CHEMICAL OXYGEN HYBRID CONTAINER 22 MIN (DAE SYSTEMS)
	Applicable to: MSN 4379-4547			
	K1420		20 AUG 10	DOORS-FWD/AFT CARGO DOOR-INTRODUCTION OF LOCKING INDICATION
	Applicable to: ALL			
	K1806		20 AUG 10	AIR CONDITIONING SYSTEM POWER SUPPLY - MODIFY POWER TO FLOW CONTROL VALVE
	Applicable to: ALL			
	K2335		20 AUG 10	LAVATORY SMOKE DETECTION - IMPROVEMENT OF SMOKE DETECTION
	Applicable to: ALL			
	K2393		20 AUG 10	AIR COND.-CABIN PRESSURE CONTROL-IMPROVE CONTROLLER TO ENABLE USE OF EXTERNAL MODE
	Applicable to: ALL			
	K2450		20 OCT 11	AUXILIARY POWER UNIT - INTRODUCTION OF APIC APS-3000
	Applicable to: MSN 3408-4547			
	K2938		20 AUG 10	DOORS - C.C.DOOR HYDRAULIC SYSTEM - INTRODUCE MODIFIED ELECTRICAL (MANUAL) SELECTOR VALVE -
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	K2962		20 AUG 10	HYDRAULIC POWER - MAIN BLUE HYDRAULIC POWER - IMPROVE MAINTENACE STATUS OF BLUE HYDRAULIC RESERVOIR -
	Applicable to: ALL			
	K3118		20 AUG 10	AUXILIARY POWER UNIT - CONTROL AND MONITORING - INTRODUCTION OF NEW ECB P/N 304817-1
	Applicable to: ALL			
	K3154		07 APR 11	FUSELAGE - REAR FUSELAGE - ADAPT STRUCTURE OF SECTION 17 TO 19 TO A319 DEFINITION
	Applicable to: MSN 1882-2078, 3467-3518			
	K3279		20 AUG 10	AUXILIARY POWER UNIT - CONTROL AND MONITORING - MODIFIED WIRE HARNESSES TO NEW ECB
	Applicable to: ALL			
	K3471		20 AUG 10	GENERAL - INCREASE DESIGN WEIGHT TO 61T MZFW
	Applicable to: MSN 3408, 4100-4547			
	K3566		07 APR 11	WATER/WASTE - ADAPT WATER/WASTE SYSTEM TO A319 DEFINITION
	Applicable to: MSN 1882-2078, 3467-3518			
	K3599		20 AUG 10	AIR CONDITIONING - COCKPIT AND CABIN TEMPERATURE CONTROL - INTRODUCE IMPROVED ZONE TEMPERATURE CONTROLLER -03
	Applicable to: ALL			
	K3901		20 AUG 10	COMMUNICATIONS - CIDS - MODIFICATION OF DIRECTOR POWER SUPPLY PRINCIPLE
	Applicable to: ALL			
	K4391		07 APR 11	GENERAL - DESIGN WEIGHTS - INCREASE MAXIMUM TAKE-OFF WEIGHT (MTOW) TO 70.0T (MTOW) TO 70,0 T
	Applicable to: MSN 1882-2078			
	K4402		07 APR 11	LIGHTS - EMERGENCY LIGHTING - INSTALL EMERGENCY ESCAPE PATH MARKING SYSTEM , FLOOR MOUNTED -LSI-
	Applicable to: MSN 1882-2078			
	K4457		07 APR 11	INTRODUCTION OF NEW ALLIED SIGNAL APU GTCP 131-9 (A)
	Applicable to: MSN 1882-2078			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	K4574		20 AUG 10	AIR CONDITIONING-FLOW CONTROL AND INDICATING- INTRODUCE IMPROVED AIR CONDITIONING PACKAGE FOR FLOW CONTROL
	Applicable to: ALL			
	K4670		24 OCT 16	EQUIPMENT/FURNISHINGS - PAX COMPARTMENT - INSTALL SLIDE RAFTS ON A319 A/C
	Applicable to: MSN 3467-3518			
	K4705		24 OCT 16	GENERAL-INCREASE DESIGN WEIGHTS TO- 75.5T MTOW, 62,5 T MLW 58,5 MZFW
	Applicable to: MSN 3467-3518			
	K4724		07 APR 11	OXYGEN-PASSENGER OXYGEN-INTRODUCE IMPROVED CHEMICAL OXYGEN CONTAINER SERIES 15 MIN (DRAEGER)
	Applicable to: MSN 1882-2078			
	K4725		06 JUL 16	DOORS - CARGO COMPARTMENT DOOR FWD AND AFT - MODIFY CARGO DOORS
	Applicable to: ALL			
	K4726		20 AUG 10	WATER/WASTE-TOILET SYSTEM-INTRODUCE IMPROVED TOILET ASSY
	Applicable to: ALL			
	K4787		20 AUG 10	LIGHTS - INTRODUCTION OF A COMMON EPSU
	Applicable to: ALL			
	K4793		20 AUG 10	AIR CONDITIONING-AIR COOLING SYSTEM-INTRODUCE AN IMPROVED RAM OUTLET (RAO)
	Applicable to: ALL			
	K4913		20 AUG 10	HYDRAULIC POWER - AUXILIARY HYDRAULIC POWER - INSTALL A319 RAM AIR TURBINE ON A320
	Applicable to: MSN 3408, 4100-4547			
	K5157		20 AUG 10	OXYGEN-PASSENGER OXYGEN-INTRODUCE IMPROVED OPTIONAL CHEMICAL OXYGEN CONTAINER (22 MIN) TO REPLACE "HIGH FLOW" CONTAINER
	Applicable to: MSN 3408-4547			
	K5213		20 AUG 10	AIR CONDITIONING - PACK TEMPERATURE CONTROL - INTRODUCE IMPROVED PACK TEMPERATURE CONTROLLER
	Applicable to: ALL			
	K5382		07 APR 11	OXYGEN - PASSENGER OXYGEN SYSTEM - INTRODUCE O2-CONTAINER WITH IMPROVED FUNCTION (DRAEGER, 15 MIN.)
	Applicable to: MSN 1882-2078			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	K5446		20 AUG 10	INDICATING/RECORDING SYSTEMS - INSTALLATION OF A COMBINED FDIU/DMU
	Applicable to: ALL			
	K5549		20 AUG 10	OXYGEN - PASSENGER OXYGEN - INTRODUCE CHEMICAL OXYGEN CONTAINER (15MIN) WITH IMPROVED ACTUATOR (VENDOR PURITAN)
	Applicable to: ALL			
	K5638		07 APR 11	EQUIPMENT/FURNISHINGS - MISCELLANEOUS EMERGENCY EQUIPMENT - INSTALL ELT CEIS A06V2 WITH CONTROL PANEL IN COCKPIT
	Applicable to: MSN 1882-2078			
	K5801		20 AUG 10	AIR CONDITIONING-PRESSURE CONTROL AND MONITORING- INTRODUCE MODIFIED PRESSURE CONTROLLER P/N 9022-15702-10
	Applicable to: ALL			
	K6156		20 AUG 10	AIR CONDITIONING-PACK TEMPERATURE CONTROL- INTRODUCE MODIFIED PACK TEMPERATURE CONTROLLER
	Applicable to: ALL			
	K6164		20 AUG 10	GENERAL-INCREASE A320 DESIGN WEIGHTS TO 77,0T MTOW; 66,0T MLW AND 62.5T MZFW
	Applicable to: MSN 3408, 4100-4547			
	K6318		20 OCT 11	APU-CONTROL AND MONITORING-INTRODUCE APIC ECB SOFTWARE VERSION 5
	Applicable to: MSN 3408-4547			
	K6443		20 AUG 10	AIR CONDITIONING_AIR COOLING INSTALL A NEW ECS
	Applicable to: MSN 3408-4547			
	K6936		20 AUG 10	AUXILIARY POWER UNIT (APU)-GENERAL- INCREASE OPERATION ENVELOPE TO 39800 FT. FOR GTCP36-300
	Applicable to: ALL			
	K7072		20 AUG 10	LIGHTS-EMERGENCY LIGHTING- EPSU LOAD DISTRIBUTION IMPROVEMENT
	Applicable to: ALL			
	K7755		20 AUG 10	EQUIPMENT/FURNISHINGS PAX COMPARTMENT INTRODUCE A MODIFIED INTRUSION AND PENETRATION RESISTANCE COCKPIT DOOR
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	K7790		20 AUG 10	DOORS PASSENGER COMPARTMENT FIXED PARTITIONS INTERIOR DOOR-ELECTRICAL COCKPIT DOOR RELEASE SYSTEM
	Applicable to: ALL			
	K7847		25 NOV 11	EQUIPMENT/FURNISHINGS PASSENGER COMPARTMENT DEFINITION OF A PED POWER SUPPLY SYSTEM PROVIDING 110/60 HZ FROM VENDOR THALES
	Applicable to: MSN 4100-4547			
	K8400		20 AUG 10	COMMUNICATIONS CABIN INTERCOMMUNICATION MODIFY CABIN INTERCOMMUNICATION DATA SYSTEM ON A319
	Applicable to: MSN 3408-4547			
	K8734		25 NOV 11	AIR CONDITIONING - AIR COOLING ADAPT A318 ECS TO A320
	Applicable to: MSN 3408, 4100-4547			
	K8905		20 AUG 10	EQUIPMENT/FURNISHINGS -CURTAINS AND PAR INSTALL A DEADBOLT FOR THE REINFORCED COCKPIT DOOR
	Applicable to: MSN 3408-4547			
	K9458		25 NOV 11	AIR CONDITIONING - PACK TEMPERATURE CONTROL IMPROVED AIR CONDITIONING SYSTEM CONTROLLER P/N 1803B0000-01
	Applicable to: MSN 3408-4547			
	K9473		20 AUG 10	AIR CONDITIONING-PRESSURE CONTROL AND MONITORING-INTRODUCE RESIDUAL PRESSURE CONTROL UNIT (RPCU)
	Applicable to: MSN 3408-4547			
	K9877		20 AUG 10	EQUIPMENT / FURNISHINGS - CURTAINS AND PARTITIONS - MODIFY DEADBOLT FOR REFORCED COCKPIT DOOR
	Applicable to: MSN 3408-4547			
	P0033		07 APR 11	COMMUNICATIONS - HF1 SYSTEM PROVISION FOR HF1 SYSTEM
	Applicable to: ALL			
	P0034		07 APR 11	SINGLE HF SYSTEM
	Applicable to: ALL			
	P0040		20 AUG 10	4TH OCCUPANT SEAT
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P0091		20 AUG 10	ALTERNATIVE FLIGHT CREW OXYGEN BOTTLE (77.1CU/FT) IN COMPOSITE MATERIAL FOR FIXED SYSTEM
	Applicable to: ALL			
	P0143		20 AUG 10	COMMUNICATIONS - INSTALLATION OF A 3RD RMP
	Applicable to: ALL			
	P0147		20 AUG 10	DESIGN WEIGHT-MTOW 72T-STRUCTURAL REINFORCEMENT
	Applicable to: ALL			
	P0197	23-1365 15	07 APR 11	COMMUNICATIONS-SINGLE HF SYSTEM INSTALLATION
	Applicable to: ALL			
	P0287		07 APR 11	NAVIGATION-REPLACE EXISTING VOR DDRMI WITH A COMBINED VOR ADF DDRMI COLLINS
	Applicable to: MSN 3408-4547			
	P0415		20 AUG 10	COMMUNICATIONS-HOT MIKE RECORDING
	Applicable to: ALL			
	P0435		07 APR 11	ICE AND RAIN PROTECTION-WINDSHIELD WIPER SYSTEM- ADDITION OF AN INTERMITTENT FUNCTION
	Applicable to: MSN 1882			
	P10022		07 APR 11	ENGINE FUEL AND CONTROL FADEC SYSTEM INTRODUCE NEW "5BO" ECU SOFTWARE STD ON CFM56-5B ENGINES - CNF CFM 109B -
	Applicable to: MSN 3408-4547			
	P10098	24-1120 04	20 AUG 10	ELECTRICAL POWER AC ESSENTIAL GENERATION SWITCHING INSTALL AUTO SWITCHING SYSTEM FOR AC&DC ESS BUS.
	Applicable to: ALL			
	P10267		20 AUG 10	NAVIGATION - RADIO MAGNETIC INFORMATION SWITCHING AND INDICATING : RE-INSTALL THALES DDRMI VOR/DME INDICATORS (ANTI-MOD 33503)
	Applicable to: MSN 3408-4547			
	P10321	22-1289 01	07 APR 11	AUTO-FLIGHT - GENERAL - REMOVE AFM LIMITATION ON NON PRECISION APPROACHES WITH ONE ENGINE OUT
	Applicable to: MSN 3408, 4100-4547			
	P10383	31-1334 04 31-1414 03	20 AUG 10	INDICATING/RECORDING SYSTEMS FLIGHT WARNING COMPUTER (FWC) INSTALL FWC STANDARD H2-F5
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P10439	22-1248 01	20 AUG 10	AUTO-FLIGHT FMGC INSTALL FMGC HNWL STD P1C12 ON CFM A/C
	Applicable to: ALL			
	P10443	27-1182 04	07 APR 11	FLIGHT CONTROL - ELAC SYSTEM - INTRODUCE ELAC "L93" SOFTWARE STANDARD
	Applicable to: ALL			
	P10493		07 APR 11	FLIGHT CONTROL - ELAC - ACTIVATE HIGH ALTITUDE UPSETS VMO/MMO OVERSHOOT PROTECTION FUNCTION ON ELAC
	Applicable to: MSN 4100-4547			
	P10527	31-1433 01	20 AUG 10	INDICATING/RECORDING SYSTEM - ELECTRONIC INSTRUMENT SYSTEM (EIS)- INSTALL DISPLAY MANAGEMENT COMP. SOFTW. EIS2 S8-1
	Applicable to: MSN 3467, 4379-4547			
	P10660		01 DEC 15	NAVIGATION - ADIRU - INSTALL HONEYWELL ADIRU BLOCK III STANDARD L3.5
	Applicable to: MSN 4487-4547			
	P10686	22-1266 03	07 APR 11	AUTO-FLIGHT - FMGC INSTALL HONEYWELL PERFORMANCE DATABASE RELEASE 1A (PS4087592-901)
	Applicable to: ALL			
	P10694	22-1296 06	20 AUG 10	AUTO-FLIGHT - FMGC ACTIVATE "MOD NAV IN GO AROUND" ON FMGC
	Applicable to: MSN 3467, 4379-4547			
	P10762	22-1269 05	20 AUG 10	AUTO FLIGHT - FMGC INSTALL FMGC HWL H2C12 (RELEASE 1A) ON CFM A/C
	Applicable to: ALL			
	P11146		07 APR 11	LANDING GEAR - PARKING/ULTIMATE EMERGENCY BRAKING ACTIVATE PARKING BRAKE MONITORING FUNCTION ON SA A/C
	Applicable to: MSN 4487-4547			
	P11325	73-1095 02	18 MAR 15	ENGINE FUEL AND CONTROL - FADEC SYSTEM INTRODUCE ECU SOFTWARE STANDARD "5BR" ON CFM56-5B ENGINES
	Applicable to: ALL			
	P11473	22-1315 05	22 MAR 16	AUTO FLIGHT - FLIGHT MANAGEMENT SYSTEM (FMS) ACTIVE BARO RADIO SETTING FUNCTION
	Applicable to: ALL			
	P11620		07 APR 11	INDICATING/RECORDING SYSTEMS - FWC - ACQUISITION/INTERFACE - ACTIVATE MONITORING OF ATC / XPDR
	Applicable to: MSN 4487-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P11744		07 APR 11	FLIGHT CONTROLS - SEC SYSTEM - INTRODUCE NEW SPOILER ELEVATOR COMPUTER (SEC) SOFTWARE STD 120 WITH HARD B'
	Applicable to: MSN 4487-4547			
	P11807	31-1433 01	31 JUL 14	INDICATING/RECORDING SYSTEM ELECTRONIC INSTRUMENT SYSTEM (EIS) INSTALL NEW EIS2 SOFTWARE S9
	Applicable to: MSN 3467, 4487-4547			
	P11856	22-1315 05	07 APR 11	AUTO - FLIGHT FMGC: ACTIVATE NO AP DISCONNECTION BELOW MDA/MDH UNTIL MISSED APPROACH POINT
	Applicable to: ALL			
	P1237		20 AUG 10	INDICATING RECORDING SYSTEM-TOGGLE SWITCHES RELOCATED IN 25VU ON OVERHEAD PANEL
	Applicable to: MSN 3408-4547			
	P1302		20 AUG 10	LANDING GEAR-POST EIS STANDARD 4 OF BSCU EQUIPMENT
	Applicable to: ALL			
	P1312		07 APR 11	LIGHTS-COCKPIT-INTEGRALLY LIGHTED PLACARD 25VU,ANTI ICE PART MODIFIED
	Applicable to: ALL			
	P1390		20 AUG 10	ELECTRICAL GENERATION-BCL'S CHANGE
	Applicable to: ALL			
	P1450		20 AUG 10	NAVIGATION - ATC MODE "S" - ACTIVATION OF SELECTIVE INTERROGATION FUNCTION
	Applicable to: ALL			
	P1485		20 AUG 10	ELECTRICAL POWER-"BAT OFF"INDICATOR LIGHT POWER SOURCE MODIFIED
	Applicable to: ALL			
	P1631		20 AUG 10	NAVIGATION - MODIFY GPWC WARNINGS
	Applicable to: MSN 2078-4547			
	P1669		20 AUG 10	AIR CONDITIONING-AVIONICS VENTILATION ADD A NON RETURN VALVE AT AIR INLET
	Applicable to: ALL			
	P1752		20 AUG 10	HYDRAULICS-MODIFICATION OF ELECTRICAL ROUTING OF GREEN LEAKAGE MEASUREMENT ELECTROVALVE CONTROL
	Applicable to: ALL			
	P1850		20 AUG 10	FLIGHT CONTROLS-ELAC SYSTEM-EFCS ELAC -SOFTWARE L62
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P1872		07 APR 11	AIR CONDITIONING-INSTALLATION OF CIRCUIT BREAKER FOR REAR CARGO COMPARTMENT VALVE SUPPLY
	Applicable to: MSN 1882-2078			
	P1873		20 AUG 10	AIR CONDITIONING-ESSENTIAL DC SUPPLY FOR FORWARD CARGO COMPARTMENT SHUT-OFF VALVES
	Applicable to: MSN 3408-4547			
	P1883		20 AUG 10	FLIGHT CONTROLS-FCDC L 40
	Applicable to: ALL			
	P1906		20 AUG 10	ENGINES FUEL AND CONTROL-EIU FOR CFMI POWERPLANT (SOFTWARE VERSION 11)
	Applicable to: ALL			
	P1970	23-1365 15	20 AUG 10	COMMUNICATIONS-INSTALL HF1 IN EMERGENCY CONFIG. (ETOPS)
	Applicable to: ALL			
	P2040		20 AUG 10	OXYGENE-COCKPIT-MODIFY LP VALVE
	Applicable to: ALL			
	P2196		20 AUG 10	BATCH OF MINOR IMPROVEMENTS OF SERIES A/C DESIGN (AS ZONE) FROM A/C N 268
	Applicable to: ALL			
	P2205		20 AUG 10	FIRE PROTECTION - REPLACE ENGINE/APU FIRE PANEL
	Applicable to: ALL			
	P2218		20 AUG 10	NAVIGATION - TCAS II COMPLETE PROVISIONS
	Applicable to: ALL			
	P2223		20 AUG 10	NAVIGATION - INSTALLATION OF GPWC MARK V WITH INTERFACE WITH CFDS
	Applicable to: ALL			
	P2294		20 AUG 10	ENGINE FUEL AND CONTROL - CFM 56 POWERPLANT EIU VERSION 12
	Applicable to: ALL			
	P2316		20 AUG 10	AUTOFLIGHT - ACTIVATE WINDSHEAR FUNCTION
	Applicable to: ALL			
	P2493		20 AUG 10	COCKPIT - INSTALL A340 TYPE PILOT SEATS
	Applicable to: ALL			
	P2546		20 AUG 10	INDICATING/RECORDING SYSTEMS - INSTRUMENTS - DEFINE SDAC STANDARD FOR A321 COF A
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P2547		07 APR 11	INDICATING/RECORDING SYSTEMS - INSTRUMENTS - DEFINE DMC STANDARD FOR A321 COF A
	Applicable to: ALL			
	P2588		20 AUG 10	OXYGEN - COCKPIT - REPLACE BASIC AIR LIQUIDE PBE BY DRAEGER
	Applicable to: ALL			
	P2590		20 AUG 10	NAVIGATION - INSTALL A TCAS II COLLISION AVOIDANCE SYSTEM
	Applicable to: MSN 3408-4547			
	P2650		07 APR 11	ICE AND RAIN DETECTION - DUAL ADVISORY - ICE DETECTION SYSTEM INSTALLATION
	Applicable to: MSN 1882			
	P2842		06 JUL 16	GENERAL - EXTEND FLIGHT ENVELOPE FOR IAE V2500
	Applicable to: MSN 3408			
	P2878		07 APR 11	INDICATING RECORDING SYSTEM - SDAC - DEFINE A PIN PROGRAM FOR REAR C.C. VENTILATION
	Applicable to: MSN 1882-2078			
	P2879		20 AUG 10	INDICATING RECORDING SYSTEM - SDAC - DEFINE A PIN PROGRAM FOR FWD C.C VENTILATION
	Applicable to: MSN 3408-4547			
	P2960		20 AUG 10	CERTIFICATION DOCUMENTS - GENERAL - CERTIFICATION FOR TAKING OFF WITH 15 KNOT TAILWING
	Applicable to: MSN 3408-4547			
	P2963		20 AUG 10	AIR CONDITIONING - IMPROVE CABIN PRESSURIZATION CONTROL ON 25VU -
	Applicable to: ALL			
	P3004		20 AUG 10	LIGHTS-COCKPIT LIGHTING-IMPROVE COCKPIT LIGHTING
	Applicable to: ALL			
	P3011		20 AUG 10	FMS - FMS CROSS LOAD
	Applicable to: ALL			
	P3040		07 APR 11	NAVIGATION - INSTALL 4MCU ADIRS CAPABLE OF A321 A/C FITTED WITH IAE ENGINES
	Applicable to: MSN 1882-2078, 3467-3518			
	P3044		20 AUG 10	NAVIGATION -ADAPT SHELVES FOR INSTALLATION OF 4MCUADIRS -
	Applicable to: ALL			
	P3102		20 AUG 10	AUTO FLIGHT - FCU-CPIP1 STANDARD
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P3105		20 AUG 10	ENGINE FUEL AND CONTROL - CFM 56 - EIU VERSION 13
	Applicable to: ALL			
	P3112		07 APR 11	NAVIGATION - INSTALLATION OF TCAS II COLLINS SYSTEM
	Applicable to: MSN 1882-2078			
	P3197		20 AUG 10	GENERAL - OPERATION FROM HIGH ALTITUDE AIRPORTS (CFM ENGINES) (PRESSURE ALTITUDE LIMIT 9200 FT)
	Applicable to: MSN 3408, 4100-4547			
	P3202		20 AUG 10	AUTOFLIGHT - FCU - CPIP 2 STANDARD M10
	Applicable to: ALL			
	P3204		20 AUG 10	AUTO FLIGHT - FMGC - A320/A321 STANDARD WITH SOFTWARE OPTIONS + 400 KILOWORDS DATA BASE OPTION + ACARS HARDWARE PROVISION (B1 CFM VERSION)
	Applicable to: ALL			
	P3365		20 AUG 10	ICE PROTECTION - ICING INDICATOR ILLUMINATION
	Applicable to: ALL			
	P3379		20 AUG 10	INDICATING/RECORDING SYSTEMS - GENERAL - DEFINE PIN PROGRAMMING FOR STD VERSIONS
	Applicable to: ALL			
	P3401		07 APR 11	AUTOFLIGHT - FCU - DELETE "EXPEDITE" FUNCTION FROM FCU
	Applicable to: MSN 1882-2078			
	P3420		22 MAR 16	A320/321 ENERGY MANAGEMENT FUNCTIONS - ACTIVATION BY PIN PROGRAMMING FOR IAE AND CFM ENGINES
	Applicable to: ALL			
	P3510		20 AUG 10	NAVIGATION - ADIRS - IMPROVED STANDARD OF A320 ADIRU
	Applicable to: MSN 3408, 4100-4547			
	P3511		20 AUG 10	AUTO FLIGHT - FLIGHT AUGMENTATION - AFS COMPUTER A320/A321 FAC CFM/IAE
	Applicable to: ALL			
	P3524		20 AUG 10	ELECTRICAL GENERATION - APU GENERATOR NEW STANDARD
	Applicable to: ALL			
	P3588		20 AUG 10	LANDING GEAR - A320/A321 TWIN WHEELS BSCU STANDARD 7 (70B VERSION)
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P3594		20 AUG 10	INDICATING/RECORDING SYSTEMS - ELECTRICAL CLOCK - INSTALLATION OF A CLOCK SMITHS TYPE 2610
	Applicable to: ALL			
	P3660		20 AUG 10	FLIGHT CONTROLS - EFCS EQUIPMENT - MODIFY SEC STANDARD FOR A320 AND A321
	Applicable to: ALL			
	P3686		20 AUG 10	AUTO FLIGHT: FLIGHT AUGMENTATION COMPUTER INTRODUCE FAC POST CDN ON A320/321.
	Applicable to: ALL			
	P3694		20 OCT 11	AUTO FLIGHT-FMGC-A320/321-FG STANDARD FOR A321 CFM CAT III
	Applicable to: ALL			
	P3756		20 AUG 10	AUTO FLIGHT - GENERAL - EXTEND CAT III B AUTOMATICLANDING CAPABILITY (FOR CFM ENGINES)
	Applicable to: MSN 3408, 4100-4547			
	P3790		20 AUG 10	NAVIGATIOIN-AIRS-IMPROVED STANDARD OF HONEYWELL 4 MCU ADIRU
	Applicable to: MSN 3408, 4100-4547			
	P3830		20 AUG 10	FLIGHT CONTROLS-PARTIAL LIFT DUMPING FUNCTION ACTIVATION
	Applicable to: ALL			
	P3878		20 AUG 10	FLIGHT CONTROL-ELAC SYSTEM-INSTALL ELAC 69J
	Applicable to: ALL			
	P3955		07 APR 11	NACELLES/PYLONS-IAE/CFM-ADAPT PYLON PRIMARY STRUCTURE FOR A321 GROWTH VERSION
	Applicable to: ALL			
	P3957		06 JUL 16	ATA 2900 HYDRAULIC POWER-GENERAL INSTALL AN HYDRAULIC SHUT-OFF VALVE ON THE CFM THRUST REVERSER SYSTEM
	Applicable to: ALL			
	P3964		20 AUG 10	NAVIGATION-WEATHER RADAR SYSTEM-NEW SEXTANT ATC/TCAS CONTROL PANEL -SFE WITH FULL TIME AND ABOVE BELOW FUNCTIONS
	Applicable to: ALL			
	P3996		07 APR 11	NAVIGATION - ADIRS - INSTALLATION OF HONEYWELL ADIRS CAPABLE OF A319 A/C FITTED WITH CFM ENGINES
	Applicable to: MSN 1882-2078, 3467-3518			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P4023	35-1025 07	20 AUG 10	GENERAL - HIGH ALTITUDE CERTIFICATION UP TO 14.500 FT
	Applicable to: ALL			
	P4054		20 AUG 10	AUTOFLIGHT-FCU-INSTALL M11 STANDARD
	Applicable to: ALL			
	P4055		07 APR 11	AUTOFLIGHT-FCU-INSTALL M11 STANDARD WITH EXPEDITE FUNCTION DELETED
	Applicable to: MSN 1882-2078			
	P4087		20 AUG 10	NAVIGATION-ADIRS-INSTALL HONEYWELL ADIRS PROVIDING THE GPS PRIMARY NAVIGATION CAPABILITY
	Applicable to: MSN 3408, 4100-4547			
	P4089		20 AUG 10	AUTO-FLIGHT - FMGC - REDUCE VAPP FOR A320 CFM/IAE
	Applicable to: MSN 3408, 4100-4547			
	P4121		20 AUG 10	EXHAUST - THRUST REVERSER CONTROL AND INDICATING -ACTIVATE ADDITIONAL THRUST REVERSER LOCK CONTROL
	Applicable to: ALL			
	P4151		20 AUG 10	INDICATING/RECORDING SYSTEMS - UP AND DOWN DATA LOADING SYSTEM - INSTALL A "PORTABLE DATA LOADER" CONNECTOR AND DISK STOWAGE.
	Applicable to: ALL			
	P4155		20 AUG 10	AUTOFLIGHT - FLIGHT MANAGEMENT AND GUIDANCE COMPUTER - ACTIVATION OF ACARS AND PRINTER INTERFACES IN F.M.S (CFM ENGINES)
	Applicable to: ALL			
	P4170		20 AUG 10	FLIGHT CONTROLS - FCDC - PROVIDE A VISUAL INDICATION FOR SIMULTANEOUS SIDE STICK ACTION
	Applicable to: ALL			
	P4191		20 AUG 10	NAVIGATION AND COMMUNICATIONS REPLACE BFE EQUIPMENT BY SFE EQUIPMENT
	Applicable to: ALL			
	P4205		20 AUG 10	AUTOFLIGHT - FMGC - ACTIVATE PRINTER INTERFACE IN FMS (CFM AND IAE ENGINES)
	Applicable to: ALL			
	P4230		20 AUG 10	POWER PLANT-GENERAL INTRODUCTION OF CFM56-5B/P
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P4234		20 AUG 10	ICE AND RAIN PROTECTION-WINDSHIELD RAIN PROTECTION DESACTIVATION OF RAIN REPELLENT SYSTEM.
	Applicable to: ALL			
	P4271		07 APR 11	NAVIGATION - RMI - INSTALLATION OF VOR/ADF/DDRMI (SEXTANT) P/N 63543-253-2
	Applicable to: MSN 1882-2078			
	P4281		20 AUG 10	ENGINE FUEL AND CONTROL-CONTROLLING INTRODUCE OF A NEW ECU SOFTWARE STANDARD 5BE-1 FOR CFM56-5B SAC ENGINES
	Applicable to: ALL			
	P4287	31-1264 04	20 AUG 10	INDICATING-RECORDING SYSTEM FWC DEFINE OEB REMINDER NEW FUNCTION IN FWC
	Applicable to: ALL			
	P4319		20 AUG 10	AUTO FLIGHT/FCU DEFINE FD ENGAGEMENT IN CROSSED BARS AT GO AROUND
	Applicable to: ALL			
	P4320		20 AUG 10	AUTO FLIGHT - ACTIVATE GLOBAL SPEED PROTECTION AND FD DISENGAGEMENT UPON SPEED CONDITIONS
	Applicable to: ALL			
	P4378	00-1054 19	20 AUG 10	CERTIFICATION - GENERAL - CERTIFICATION FOR HIGH ALTITUDE AIRPORT OPERATION
	Applicable to: ALL			
	P4395		20 AUG 10	INDICATING/RECORDING SYSTEMS.EIS.UNITS OF UNITS OF INDICATION "RUNWAY LENGHTS"IN FEET.
	Applicable to: MSN 3408-4547			
	P4419		25 NOV 11	NAVIGATION - ADIRS - INSTALL HONEYWELL ADIRU 4 MCU STANDARD WITH OPTIMIZED HARDWARE P/N "AD09"
	Applicable to: MSN 1882-3408, 4100-4547			
	P4425		25 NOV 11	NAVIGATION-ADIRS-INSTALL HONEYWELL ADIRU 4 MCU STANDARD, CAPABLE OF A319 IAE AIRCRAFT
	Applicable to: MSN 1882-3408, 4100-4547			
	P4495		20 AUG 10	INDICATING/RECORDING SYSTEMS- DISPLAY MANAGEMENT COMPUTER (DMC) DEFINE DMC V32 STANDARD
	Applicable to: ALL			
	P4497		20 AUG 10	DOORS-EMERGENCY ESCAPE SLIDE RELEASE AND OVERPRESSURE WARNING SYSTEMS-MODIFY

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
				CONTROL LOGIC OF THE OVERPRESSURE WARING SYSTEM
	Applicable to: ALL			
	P4502		20 AUG 10	INFORMATION SYSTEMS - ATIMS - INSTALL ATSU COMPUTER FOR PRE-FANS CONFIGURATION
	Applicable to: ALL			
	P4528		20 AUG 10	ENGINE FUEL AND CONTROL -CONTROLLING- INTRODUCE AN ECU SOFTWARE STD 5BH FOR CFM56-5B SAC ENGINES.
	Applicable to: ALL			
	P4539		20 AUG 10	AUTO FLIGHT-GENERAL/FLIGHT CONTROL UNIT- DEFINE AND INSTALL SEXTANT MODULAR FCU
	Applicable to: ALL			
	P4576		20 AUG 10	LANDING GEAR-GENERAL WHEELS AND BRAKES EQUIPMENT COST REDUCTION ELECTRICAL ALTERNATE BRAKING
	Applicable to: MSN 3408-4547			
	P4647		20 AUG 10	NAVIGATION - WEATHER RADAR SYSTEM - COLLINS DUAL PWS ACTIVATOR
	Applicable to: MSN 3408-4547			
	P4706		22 MAR 16	NAVIGATION - ADF - INSTALLATION OF 1 ADF QUANTUM LINE P/N 066-50014-0202
	Applicable to: ALL			
	P4709	00-1043 56	20 AUG 10	LANDING WITH A 15 KNOT TAILWIND
	Applicable to: MSN 3408-4547			
	P4766		07 APR 11	NAVIGATION - SINGLE PWS - COLLINS SINGLE PWS ACTIVATION
	Applicable to: MSN 1882-2078			
	P4770		20 AUG 10	NAVIGATION - WEATHER RADAR SYSTEM. INSTALL FULL PROVISION FOR THE SECOND TRANSCEIVER.
	Applicable to: ALL			
	P4773		20 AUG 10	NAVIGATION - INSTALL DUAL COLLINS ADF 700 - P/N 622-5222-020
	Applicable to: MSN 3408-4547			
	P4786		07 APR 11	COCKPIT PROTECTIVE BREATHING EQUIPMENT (PBE)-SCOTT AVIATION
	Applicable to: MSN 3408-4547			
	P4789		20 AUG 10	NAVIGATION-MMR-INSTALLATION OF SEXTANT MULTICI-MODE RECEIVERS PROVIDING ILS (FM IMMUNE) AND GPS PRIMARY FUNCTION
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P4801		20 AUG 10	ELECTRICAL POWER - GENERATION SYSTEM - DEFINE AND INSTALL ON A320 FAMILY NEW ELECTRICAL GENERATION CONCEPT (WIRING/EQUIPMENT)
	Applicable to: MSN 2078-4547			
	P4808		20 AUG 10	LANDING GEAR - GENERAL - WHEELS AND BRAKES - EQUIPMENT COST REDUCTION BSCU REDESIGN
	Applicable to: MSN 3408-4547			
	P4859		22 MAR 16	NAVIGATION - ADF - INSTALL AN ADF 900 RECEIVER P/N 822-0299-020
	Applicable to: ALL			
	P4867		22 MAR 17	NAVIGATION - EGPWS - INSTL. NEW SPECIFICATION INSTALLATION OF EGPWC (NEW SPECIFICATION)
	Applicable to: ALL			
	P4885		20 AUG 10	NAVIGATION - EGPWS - ACTIVATION OF ENHANCED FUNCTIONS OF THE EGPWS
	Applicable to: ALL			
	P4916		20 AUG 10	FLIGHT CONTROL - GENERAL - ELAC-SYSTEM - INSTALL ELAC COMPATIBLE A320/321/319 (EM2 PROGRAM)
	Applicable to: ALL			
	P4954		20 AUG 10	AUTO FLIGHT - FMGC - DEFINE AND INSTALL FMGC B546CAM0102 FOR A319 AUTOLAND CFM ENGINES (CAPABLE OF GPS/ACARS FUNCTION)
	Applicable to: ALL			
	P4977	31-1264 04	20 AUG 10	INDICATING/RECORDING SYSTEMS - FWC - PROVIDE NEW SYNTHETIC VOICE "DUAL INPUT"
	Applicable to: ALL			
	P4983		20 AUG 10	AUTO FLIGHT - FLIGHT AUGMENTATION - DEFINE FAC STANDARD B0513
	Applicable to: ALL			
	P5020		20 AUG 10	NAVIGATION - ATC - INSTALL GABLES ATC/TCAS CONTROL PANEL P/N G6990-40
	Applicable to: MSN 3408-4547			
	P5071		20 AUG 10	ICE AND RAIN PROTECTION-WINDSHIELD RAIN PROTECTIONREACTIVATE RAIN REPELLENT SYSTEM WITH FLUID COMPATIBLE WITH OZONE PROTECTION RULES
	Applicable to: ALL			
	P5088		24 JAN 17	NAVIGATION - SENSORS - INSTALL ROSEMOUNT ANGLE OF ATTACK SENSOR
	Applicable to: MSN 3467-3518			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P5138		20 AUG 10	FLIGHT CONTROLS-GENERAL-ELAC SYSTEM- INSTALL ELAC STANDARD L80
	Applicable to: ALL			
	P5168		20 AUG 10	NAVIGATION-MMR-INSTALLATION OF COLLINS MULTI-MODE RECEIVERS PROVIDING ILS (FM IMMUNE) AND GPS PRIMARY FUNCTION
	Applicable to: ALL			
	P5224		20 AUG 10	NAVIGATION - EGPWS - INTRODUCE OPTIONAL AURAL WARNINGS FOR EGPWS
	Applicable to: MSN 3408-4547			
	P5228	31-1118 20	07 APR 11	INDICATING/RECORDING SYSTEM-FWC-ACTIVATE THE HI ALT SET" RIGH MEMO FOR HIGH ALTITUDE AIRPORT OPERATION
	Applicable to: ALL			
	P5239		20 AUG 10	NAVIGATION-ATC MODE "S"-INSTALL ATC/TCAS CONTROL UNIT P/N C12240B02
	Applicable to: ALL			
	P5241		20 AUG 10	NAVIGATION-WEATHER RADAR SYSTEMS-INSTALL COLLINS SINGLE WITH PROVISION FOR THE SECOND SYSTEM
	Applicable to: ALL			
	P5253		20 AUG 10	NAVIGATION ADIRS REMOVE ADIRS CDU
	Applicable to: MSN 3408-4547			
	P5314		20 AUG 10	AUTO FLIGHT - GENERAL - MULTIPURPOSE CONTROL AND DISPLAY UNIT (MCDU) - INSTALL MCDU HONEYWELL 2ND GENERATION P/N : 4077880-980
	Applicable to: ALL			
	P5429		20 AUG 10	ENGINE FUEL AND CONTROL - GENERAL FADEC SYSTEM A320/CFM56-5B - INTRODUCE ECU SOFTWARE STANDARD 5BI
	Applicable to: ALL			
	P5451		20 AUG 10	ELECTRICAL POWER - GENERAL AC & DC MAIN DISTRIBUTION - INSTALL A/C AND DC SHEDDABLE BUSBARS
	Applicable to: ALL			
	P5459		20 AUG 10	POWER PLANT - GENERAL - ADD RELAY LOGIC FOR CONTROL PACK CLOSURE AT ENGINE START
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P5465		20 AUG 10	INDICATING/RECORDING SYSTEMS - CLOCKS - INSTALL AIR PRECISION CLOCK P/N APE5100 CAPABLE OF GPS TIME
	Applicable to: ALL			
	P5518	32-1336 01	20 AUG 10	LANDING GEAR - GENERAL - NORMAL BRAKING - INTRODUCE STD 8 BSCU TWIN VERSION
	Applicable to: ALL			
	P5567		20 AUG 10	INDICATING/RECORDING SYSTEM - DMC - DEFINE DMC V40 STANDARD
	Applicable to: ALL			
	P5583		20 AUG 10	NAVIGATION - ADIRS - REDUCED VERTICAL SEPARATION MINIMUM (RVSM) USING ADR 1 AND ADR 2 ONLY (A319/A320/A321 APPLICABLE)
	Applicable to: ALL			
	P5613		07 APR 11	NAVIGATION - TCAS - INSTALL COLLINS TCAS TTR921 WITH COLLINS ATC TPR901
	Applicable to: MSN 1882-2078			
	P5622		07 APR 11	AUTO FLIGHT - MCDU - INSTALL AN MCDU 2ND GENERATION HONEYWELL FMS (MCDU WITH A340 KEYBOARD)
	Applicable to: MSN 1882-2078			
	P5638		20 AUG 10	NAVIGATION - STANDBY DATA : ALTITUDE AND HEADING -INSTALL ISIS (INTEGRATED STANDBY INSTRUMENT SYSTEM) - SERIAL SOLUTION -
	Applicable to: MSN 3408-4547			
	P5669		20 AUG 10	NAVIGATION - TCAS - INSTALL ALLIED SIGNAL TCAS COMPUTER P/N 066-50000-2220 (WITH CHANGE 7.0) (BFE)
	Applicable to: MSN 3408-4547			
	P5706	31-1257 01	20 AUG 10	INDICATING/RECORDING SYSTEMS- FLIGHT WARNING COMPUTER (FWC) INSTALL FWC STD H2/E3
	Applicable to: ALL			
	P5768		20 AUG 10	ELECTRICAL POWER - AC EMERGENCY GENERATION - ACTIVATE ON A320 SAME ELECTRICAL EMERG. CONFIGURATION THAN A321
	Applicable to: MSN 3408, 4100-4547			
	P5834	34-1444 01	24 JAN 17	NAVIGATION - SENSORS - INSTALL MODIFIED SEXTANT ANGLE OF ATTACK SENSORS P/N C16291AA
	Applicable to: MSN 1882-2078, 3467-3518			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P5895		20 AUG 10	NAVIGATION-GPWS-INSTALL EGPWS P/N-206-206 & INHIBIT AUTOMATIC DEACTIVATION OF ENHANCED FUNCTIONS.
	Applicable to: ALL			
	P5981		07 APR 11	ICE AND RAIN PROTECTION - GENERAL - ICE DETECTION INSTALL ICE DETECTOR P/N 0871DP4
	Applicable to: MSN 1882			
	P6030		05 SEP 17	ELECTRICAL POWER - AC GENERATION - INSTALL ELECTRICAL OUTLETS IN COCKPIT
	Applicable to: MSN 3408-4547			
	P6044		20 AUG 10	ICE AND RAIN PROTECTION - GENERAL - WINDSHIELD RAIN PROTECTION INSTALL IMPROVED GAGE ASSY P/N 4020W35-2
	Applicable to: ALL			
	P6071		07 APR 11	INDICATING/RECORDING SYSTEMS - DMC - DISPLAY THE ALTITUDE IN METRES ON THE PRIMARY FLIGHT DISPLAY (PFD)
	Applicable to: MSN 1882-2078			
	P6125		25 NOV 11	NAVIGATION - ADIRU - INSTALL HNWL ADIRU 4 MCU AD11 (NEW HARD) WITH 4 TRIMS OF ANEMO CORRECTION LAWS POSSIBILITIES AND MAGVAR TABLES UPDATED
	Applicable to: MSN 1882-3408, 4100-4547			
	P6142		20 AUG 10	NAVIGATION -STANDBY BY DATA-ATTITUDE AND HEADING-COMPLETE PROVISIONS FOR ISIS ELECTRICAL SUPPLY
	Applicable to: MSN 1882, 3408-4547			
	P6146		20 AUG 10	INDICATING/RECORDING SYSTEM - FWC - INTRODUCE "F/CTL FLAP LVR NOT ZERO" RED WARNING
	Applicable to: ALL			
	P6201		20 AUG 10	GENERAL-FLIGHT ENVIRONMENTAL ENVELOPE-EXTENSION TO 12100 M
	Applicable to: ALL			
	P6251		20 AUG 10	ICE AND RAIN PROTECTION - GENERAL - WINDSHIELD RAIN PROTECTION - INSTALL NEW GAGE ASSYWITHOUT INPUT VALVE FUNCTION P/N 4020W35-3
	Applicable to: ALL			
	P6319		07 APR 11	COMMUNICATIONS - AUDIO MANAGEMENT - INSTALL TEAM DIGITAL AMU P/N 4031-SA-01
	Applicable to: MSN 2078			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P6375		20 AUG 10	LANDING GEAR-PARKING/ULTIMATE EMERGENCY BRAKING -INSTALL A PRESSURE SWITCH (PARKING BRAKE SYSTEM IMPROVEMENT
	Applicable to: ALL			
	P6544		20 AUG 10	INDICATING RECORDING SYSTEM - FWC ACTIVATE SPECIFIC FWC PROCEDURE
	Applicable to: ALL			
	P6578		20 AUG 10	INDICATING/RECORDING SYSTEMS - ELECTRONIC INSTRUMENT SYSTEM INSTALL DMC, DU AND DISKETTES FOR EIS2
	Applicable to: MSN 3408-4547			
	P6588		20 AUG 10	INFORMATION SYSTEM - ATIMS IMPROVE ATSU AIRCRAFT INTERFACE SOFTWARE TO UPDATE SERVICE PROVIDERS LIST AND MANAGEMEN
	Applicable to: ALL			
	P6589		20 AUG 10	INDICATING/RECORDING SYSTEMS - CFDIU INTRODUCE CFDIU STANDARD 9B
	Applicable to: ALL			
	P6630	00-1058 97	20 AUG 10	CERTIFICATION DOCUMENTS - GENERAL - CERTIFY AIRCRAFT FOR OPERATION ON RUNWAYS LESS THAN 45 M WIDTH
	Applicable to: ALL			
	P6687		20 AUG 10	COMMUNICATION - RADIO MANAGAMENT INTRODUCE NEW RMP STANDARD 2 P/N C12848AB02
	Applicable to: MSN 2078-4547			
	P6688		07 APR 11	COMMUNICATIONS - RADIO MANAGEMENT INSTALL A THIRD RADIO MANAGEMENT PANEL
	Applicable to: MSN 2078-4547			
	P6703	22-1079 08 22-1102 02 22-1226 04	20 AUG 10	AUTO FLIGHT - FLIGHT AUGMENTATION COMPUTER INSTALL NEW FAC SOFTWARE STANDARD P/N B397BAM0515
	Applicable to: MSN 2078-4547			
	P6766		26 JAN 16	NAVIGATION - ILS (MMR) - INSTALL HONEYWELL MMR PROVIDING ILS (FM IMMUNE) AND GPS PRIMARY FUNCTIONS (HYBRID ARCHITECTURE)
	Applicable to: MSN 3408-4547			
	P6777		07 APR 11	INFORMATION SYSTEM - ATIMS UPGRADE ATSU HARDWARE FOR NEW ARINC 429 I/O BOARD
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P6801	31-1257 01	20 AUG 10	INDICATING RECORDING SYSTEM - FWC INSTALL FWC STANDARD H2E4
	Applicable to: ALL			
	P6832		20 AUG 10	INFORMATION SYSTEMS - ATIMS - DEFINE AND INSTALL NEW SOFTWARE ATSU A/C INTERFACE UPGRADED
	Applicable to: ALL			
	P6901	27-1160 01	20 AUG 10	FLIGHT CONTROLS - ELAC SYSTEM - INTRODUCE ELAC SOFTWARE "L90" CAPABLE OF A318
	Applicable to: ALL			
	P6911		20 AUG 10	INDICATING/RECORDING SYSTEM : FROM FWC-F1 PIN-PROGRAMMING FOR IMPROVING THE MONITORING ABOUT THE NORMAL BRAKING SYSTEM
	Applicable to: MSN 3408-4547			
	P6954	22-1102 02 22-1226 04	20 AUG 10	AUTO FLIGHT - FLIGHT AUGMENTATION COMPUTER (FAC SYSTEM) - INTRODUCE FAC SOFTWARE "BAM0516" CAPABLE OF A318
	Applicable to: MSN 2078-4547			
	P6985		20 AUG 10	NAVIGATION - ADIRS - INSTALL HONEYWELL ADIRU 4MCU CAPABLE OF A318 A/C
	Applicable to: MSN 3408-4547			
	P6987		20 AUG 10	AUTO FLIGHT - FMGC INSTALL FMGC P/N B546CAM0103 (CFM GPS/ACARS)
	Applicable to: ALL			
	P7004	31-1286 01	07 APR 11	INDICATING/RECORDING SYSTEM - DMC - INSTALL DMC V50 STANDARD
	Applicable to: MSN 1882-2078			
	P7005	32-1336 01	20 AUG 10	LANDING GEAR - NORMAL BRAKING - INTRODUCE STD 9 BSCU (TWIN VERSION)
	Applicable to: ALL			
	P7092		20 AUG 10	INDICATING/RECORDING SYSTEM - EIS - ACTIVATE FUEL FLOW/DELTA ISA FUNCTION BY PIN PROGRAMMING ON DMC
	Applicable to: MSN 3408-4547			
	P7125	31-1257 01	20 AUG 10	INDICATING/RECORDING SYSTEMS - FWC - INSTALL FWC STANDARD H2 F1 ON A318 PW
	Applicable to: ALL			
	P7148		20 AUG 10	COMMUNICATIONS - HF SYSTEM - ACTIVATE DATA LINK FUNCTION FOR HFDR 1
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P7175		20 AUG 10	ELECTRICAL POWER - GENERAL - INSTALL A COMMERCIAL SHEDDING PUSH-BUTTON SWITCH IN COCKPIT
	Applicable to: ALL			
	P7185		19 JUN 17	NAVIGATION - EGPWS INSTALL ENHANCED GPWS P/N 965-1676-001
	Applicable to: MSN 2078-4547			
	P7186		20 AUG 10	NAVIGATION - EGPWS ACTIVATE PEAKS MODE OF EGPWS IN CONJUNCTION WITH THE TERRAIN DISPLAY
	Applicable to: MSN 3408-4547			
	P7187		20 AUG 10	NAVIGATION - EGPWS ACTIVATE GEOMETRIC ALTITUDE FUNCTION IN THE EGPWS
	Applicable to: MSN 3408-4547			
	P7188		20 AUG 10	NAVIGATION - EGPWS ACTIVATE OBSTACLE OPTION ON THE EGPWS
	Applicable to: MSN 3408-4547			
	P7218		22 MAR 16	AUTOFLIGHT - FLIGHT MANAGEMENT AND GUIDANCE COMPUTER (FMGC) DEVELOP FMS 2ND GENERATION HONEYWELL STEP1
	Applicable to: ALL			
	P7247		20 AUG 10	FLIGHT CONTROLS - ELAC SYSTEM - INSTALL ELAC STANDARD L81
	Applicable to: ALL			
	P7268		20 AUG 10	NAVIGATION - ADIRU RESTORE RVSM 3 CIRCUITS CAPABILITIES - SERIAL SOLUTION
	Applicable to: ALL			
	P7278		20 AUG 10	INDICATING RECORDING SYSTEM - EIS2 INSTALL EIS2 SOFTWARE CAPABLE OF A318 A/C
	Applicable to: MSN 3408-4547			
	P7300		05 SEP 17	ELECTRICAL POWER - AC GENERATION - INSTALL ELECTRICAL OUTLETS IN COCKPIT 4MM AND 4.8MM DIA. PLUGS
	Applicable to: MSN 3408-4547			
	P7397		01 DEC 15	NAVIGATION - ADIRS INSTALL HONEYWELL ADIRU 4MCU CAPABLE OF A318
	Applicable to: MSN 3408-4547			
	P7407		07 APR 11	COMMUNICATION - RADIO MANAGEMENT INSTALL RMP STANDARD 3 WITH MLS AND GLS FUNCTION CAPABILITY
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P7425		06 JUL 16	NAVIGATION - ATC - INSTALL HONEYWELL ATC TRA67A INCORPORATING EUROPEAN MODE S REGULATIONS
	Applicable to: MSN 3408-4547			
	P7455		20 AUG 10	ELECTRICAL POWER - GENERAL IN FLIGHT ENTERTAINMENT (IFE) POWER SUPPLY ON SHEDDABLE BUSBARS CONTROLED BY "GALY & CAB" SW
	Applicable to: ALL			
	P7519		20 AUG 10	AUTOFLIGHT - FMGC - INSTALL FMGC CFM C13042AA01 (EQUIPPED WITH FMS2 HONEYWELL)
	Applicable to: ALL			
	P7635	27-1160 01	20 AUG 10	FLIGHT CONTROLS - ELAC SYSTEM INTRODUCE ELAC SOTWARE L82
	Applicable to: ALL			
	P7721	32-1247 02	20 AUG 10	LANDING GEAR - WHEELS AND BRAKES REMOVE THE TEMPORARY REVISIONS 5.02.00/23 AND 5.03.00/23 ON FLIGHT MANAL
	Applicable to: ALL			
	P7790		20 AUG 10	AUTO FLIGHT FLIGHT MANAGEMENT AND GUIDANCE SYSTEM ACTIVATE FMA ENHANCEMENT FUNCTION
	Applicable to: MSN 2078-4547			
	P7919		20 AUG 10	ENGINE FUEL AND CONTROL - FADEC SYSTEM - INTRODUCE NEW FADEC SOFTWARE "5BK" ON SAC CFM56-5B ENGINES
	Applicable to: ALL			
	P7929		20 AUG 10	NAVIGATION - WEATHER RADAR SYSTEM INSTALL COLLINS DUAL CONTROL PANEL TO ACTIVATE MULTISCAN FUNCTION
	Applicable to: MSN 3408-4547			
	P8069	73-1080 01	20 AUG 10	ENGINE FUEL AND CONTROL - FADEC SYSTEM INTRODUCE NEW ECU SOFTWARE STANDARD "5BL" FOR CFM56-5B ENGINES CAPABLE OF A318 CFM A/C
	Applicable to: ALL			
	P8076		20 AUG 10	LANDING GEAR NORMAL BRAKING INSTALL BSCU STD L4.5
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P8175		20 AUG 10	INDICATING/RECORDING SYSTEMS - SDAC - ACTIVATE IAS DISCREPANCY MONITORING BY PIN PROGRAMMING
	Applicable to: MSN 3408-4547			
	P8176		07 APR 11	INDICATING/RECORDING SYSTEMS - SDAC - ACTIVATE DUAL PITOT MONITORING BY PIN PROGRAMMING
	Applicable to: MSN 3408-4547			
	P8194		20 AUG 10	NAVIGATION - ADIRS ACTIVATE ALIGNMENT IMPROVEMENT FUNCTION ON ADIRU
	Applicable to: MSN 3408-4547			
	P8232	31-1266 02	20 AUG 10	INDICATING/RECORDING SYSTEMS - FWC - INTRODUCE IAS DISCREPANCY AND DUAL PITOT MONITORING ON FWC H2F1
	Applicable to: ALL			
	P8241		07 APR 11	PLACARDS AND MARKINGS - CABIN - CONFIGURATE THE CABIN FOR NON SMOKING FLIGHT
	Applicable to: MSN 3408-4547			
	P8243		20 AUG 10	CERTIFICATION DOCUMENTS / EXTEND OPERATING FLIGHT ENVELOPE TO MINUS 2000FT PRESSURE ALTITUDE
	Applicable to: MSN 3408-4547			
	P8256	22-1102 02 22-1226 04	20 AUG 10	AUTO FLIGHT FLIGHT AUGMENTATION COMPUTER INSTALL FAC STANDARD BAM0617 FOR A318 EIS
	Applicable to: MSN 2078-4547			
	P8274	31-1257 01	20 AUG 10	INDICATING RECORDING SYSTEM FWC INSTALL FWC STANDARD H2F2
	Applicable to: ALL			
	P8303		20 AUG 10	NAVIGATION DDRMI REMOVE DDRMI VOR/ADF/DME INDICATORS
	Applicable to: MSN 3408-4547			
	P8310		07 APR 11	NAVIGATION - GPWS RE-INSTALL EGPWS P/N -206-206 (ANTI-MOD 31374+26935+21391)
	Applicable to: MSN 2078			
	P8440	32-1291 01	20 AUG 10	LANDING GEAR - WHEELS AND BRAKES INTRODUCE GOODRICH DURACARB CARBON BRAKES WITH ANTI - OXYDAN "M1"
	Applicable to: ALL			
	P8564		20 AUG 10	INDICATING/RECORDING SYSTEM EIS ACTIVATE ENGINE AVAIL DISPLAY
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P8626		20 AUG 10	NAVIGATION - STANDBY DATA (ISIS) - INSTALL ISIS STANDARD VA01 WITH CORRECTION OF "OUT OF ORDER" MESSAGE & "NEW IMU STANDARD"
	Applicable to: MSN 3408-4547			
	P8671		20 AUG 10	INDICATING RECORDING SYSTEM EIS INSTALL DMC SOFTWARE EIS2 S4-2 TO CORRECT TEMPORARY LOSS OF ALL EIS2 IMAGES
	Applicable to: MSN 3408-4547			
	P8708	22-1168 01	20 AUG 10	AUTOFLIGHT - FMGC INSTALL FMS2 HONEYWELL P1C11 ON A/C FITTED WITH CFMI PPS
	Applicable to: ALL			
	P8710		20 AUG 10	NAVIGATION - WEATHER RADAR SYSTEM - INSTALL COLLINS TRANSCEIVER FULLY COMPLIANT WITH MULTISCAN FUNCTION
	Applicable to: MSN 3408-4547			
	P8751		20 AUG 10	NAVIGATION - EGPWS - INSTALL AN EGPWC CAPABLE OF PEAKS/OBSTACLE FUNCTIONS WITH EIS1 & OF USING GPS LATERAL POSITION
	Applicable to: MSN 3408-4547			
	P8799		20 AUG 10	NAVIGATION - EGPWS - INSTALL AN EGPWC CAPABLE OF PEAKS/OBSTACLE FUNCTIONS WITH EIS1 & OF USING GPS LATERAL POSITION
	Applicable to: MSN 3408-4547			
	P8850		20 AUG 10	PNEUMATIC - ENGINE BLEED AIR SUPPLY - INTRODUCE BMC STD 9 CAPABLE OF A318 PW
	Applicable to: MSN 3408-4547			
	P8863		20 AUG 10	INDICATING/RECORDING SYSTEM FWC ACQUISITION INTERFACE CONNECT FWC TO RPWS TO PREVENT DOOR OPENING WITH RESIDUAL CABIN PRESSURE
	Applicable to: MSN 3408-4547			
	P8866		20 AUG 10	LANDING GEAR NORMAL BRAKING INSTALL BSCU STD L4.8 (EM2)
	Applicable to: MSN 3408-4547			
	P9038		20 AUG 10	AUTO FLIGHT MCDU INSTALL LCD MCDU HONEYWELL
	Applicable to: MSN 3408-4547			
	P9107	31-1267 03 31-1300 02	20 AUG 10	INDICATING/RECORDING SYSTEM FLIGHT WARNING COMPUTER - FWC - INSTALL FWC STANDARD H2 F3
	Applicable to: ALL			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P9171		20 AUG 10	NAVIGATION - ADIRS INTRODUCE AIR DATA MONITORING FUNCTION
	Applicable to: MSN 4487-4547			
	P9196		07 APR 11	NAVIGATION - STANDBY DATA (ISIS) INSTALL ISIS STD WB01 WITH CORRECTION OF "OUT OF ORDER" MESSAGE
	Applicable to: MSN 3408-4547			
	P9207		20 AUG 10	NAVIGATION - ATC / MODE S - CERTIFY EHS FUNCTION
	Applicable to: MSN 3408-4547			
	P9225		20 AUG 10	INDICATING / RECORDING SYSTEM : ELECTRONIC INSTRUMENT SYSTEM (EIS) - INSTALL DISPLAY MANAGEMENT COMPUTER SOFTWARE EIS2 S6-1
	Applicable to: MSN 3408-4547			
	P9332		24 OCT 16	NAVIGATION - ADIRU - INSTALL NORTHROP GRUMAN ADIRU P/N 465020-0303-0316
	Applicable to: MSN 3467-3518			
	P9333		01 DEC 15	NAVIGATION - AIR DATA/INERTIAL REFERENCE SYSTEM - INSTALL HONEYWELL ADIRU P/N HG2030-AE23
	Applicable to: MSN 3408, 4100-4547			
	P9508		20 AUG 10	INDICATING/RECORDING SYSTEMS - SDAC - ACQUISITION/INTERFACE CONFIGURATION CABIN FOR NO PED FLIGHTS
	Applicable to: MSN 3408-4547			
	P9522		20 AUG 10	AUTO FLIGHT - MCDU ACTIVATE BACK UP NAV FUNCTION
	Applicable to: MSN 3408-4547			
	P9552	73-1086 00	20 AUG 10	ENGINE FUEL AND CONTROL - FADEC SYSTEM INSTALL "5BM" STANDARD ECU SOFTWARE FOR CFM 56-5B ENGINES
	Applicable to: ALL			
	P9594		07 APR 11	PNEUMATIC LEAK DETECTION ACTIVATE PYLON LEAK DETECTION MONITORING
	Applicable to: MSN 4100-4547			
	P9655		07 APR 11	LANDING GEAR NORMAL BRAKING INSTALL BSCU SOFTWARE STD "L4.9" (EM2)
	Applicable to: MSN 4100-4547			
	P9824		20 AUG 10	INDICATING / RECORDING SYSTEMS NSTALL DISPLAY MANAGEMENT COMPUTER SOFTWARE EIS2 S7 ELECTRONIC INSTRUMENT SYSTEM
	Applicable to: MSN 3408-4547			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	P9873		20 AUG 10	POWER PLANT - GENERAL INTRODUCE CFM56-5BX/3 ENGINE (SAC) "TECH INSERTION PROGRAM"
	Applicable to: MSN 3408-4547			
	P9894		07 APR 11	AUTO FLIGHT - FLIGHT AUGMENTATION COMPUTER - INTRODUCE TAIL STRIKE INDICATION ON PFD FOR A320 & A321 A/C
	Applicable to: MSN 4100-4547			
	P9895		20 AUG 10	AUTO FLIGHT - FLIGHT AUGMENTATION COMPUTER - INTRODUCE TAIL STRIKE "PITCH-PITCH" CALL-OUT FOR A320 & A321 AIRCRAFT
	Applicable to: MSN 4100-4547			
	P9902		07 APR 11	NAVIGATION - WEATHER RADAR SYSTEM - INSTALL COLLINS WXR MULTISCAN WRT -2100 P/N 822-1710-213
	Applicable to: MSN 4100-4547			
	P9920		07 APR 11	GENERAL - TECHNICAL DOCUMENTATION EXTENSION OF FLEX TEMPERATURE - UPDATE FM & FCOM DOCUMENTATION
	Applicable to: MSN 3408-4547			
	22-1359 05		22 MAR 16	AUTO-FLIGHT-FLIGHT MANAGEMENT AND GUIDANCE COMPUTER (FMGC)-INSTALL FMGC HONEYWELL H2C13 ON CFM A/C
	Applicable to: MSN 1882-2078, 3467, 4379-4547			
	22-1375 00		12 APR 17	AUTO FLIGHT - FLIGHT AUGMENTATION COMPUTER (FAC) - INTRODUCE FAC SOFTWARE STANDARD BAM0621 (ROPS FUNCTION).
	Applicable to: MSN 2078, 3467-4100			
	22-1480 03		12 APR 17	AUTO FLIGHT-FLIGHT AUGMENTATION (FAC) DEFINE STOP RUDDER INPUT WARNING FUNCTION ON AIRCRAFT
	Applicable to: MSN 2078, 3467-4100			
	22-1553 00		12 APR 17	AUTO FLIGHT - FLIGHT AUGMENTATION COMPUTER (FAC) - INTRODUCE FAC B624 (ROPS AND SHARKLET)
	Applicable to: MSN 2078, 3467-4100			
	22-1559 02		19 JUN 17	AUTO FLIGHT - GENERAL - ACTIVATE ROPS FUNCTION
	Applicable to: MSN 3467			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	23-1638 00		19 JUN 17	COMMUNICATIONS - ANTI HIJACK CAMERA MONITORING - INSTALL UNITS FOR A COCKPIT DOOR SURVEILLANCE SYSTEM (CDSS)
	Applicable to: MSN 2078			
	25-1444 02		07 APR 11	EQUIPMENT/FURNISHINGS - CURTAINS AND PARTITIONS - INTRODUCE PPTC FOR COCKPIT DOOR STRIKE PROTECTION
	Applicable to: MSN 1882-2078			
	27-1230 01		31 JUL 14	FLIGHT CONTROLS - SPOILER AND ELEVATOR COMPUTER (SEC) - INSTALL SEC 123 HARDWARE B
	Applicable to: MSN 1882-4379			
	27-1234 01		19 JUN 17	FLIGHT CONTROL - ELEVATOR AILERON COMPUTER SYSTEM (ELAC)-INSTALL L97 STANDARD ON ELAC B WITH DATA LOADING CAPABILITY
	Applicable to: MSN 4379-4547			
	27-1238 00		06 JUL 16	FLIGHT CONTROLS - ELAC - INSTALL L97 STANDARD ON ELAC B WITHOUT DATALOADING CAPABILITY
	Applicable to: MSN 1882-4100			
	27-1243 01		22 MAR 16	FLIGHT CONTROLS - ELEVATOR AILERON COMPUTER SYSTEM (ELAC) - INSTALL ELAC B L97+ WITH DATA LOADING CAPABILITY
	Applicable to: MSN 4379-4547			
	27-1244 00		24 JAN 17	FLIGHT CONTROLS - ELEVATOR AILERON COMPUTER SYSTEM (ELAC) - INSTALL ELAC B L97+ WITHOUT DATALOADING
	Applicable to: MSN 1882-2078, 3467-3518			
	31-1286 01		31 JUL 14	INDICATING/RECORDING SYSTEMS - DMC - INTRODUCE DMC EIS1 V60 STANDARD.
	Applicable to: MSN 1882-2078			
	31-1373 00		31 JUL 14	INDICATING/RECORDING SYSTEMS - FLIGHT WARNING COMPUTER (FWC) - INSTALL FWC STANDARD H2-F6
	Applicable to: ALL			
	31-1414 03		18 MAR 15	INDICATING RECORDING SYSTEMS - FWC - INTRODUCE FWC STANDARD H2-F7
	Applicable to: MSN 4487-4547			
	33-1057 03		07 APR 11	LIGHTS - INSTRUMENT AND PANEL INTEGRAL LIGHTING - ENSURE EMERGENCY LIGHTING FOR STAND-BY INSTRUMENTS.
	Applicable to: MSN 1882-2078			

Continued on the following page

Continued from the previous page

M(1)	MODIFICATION	Linked SB	Incorp. Date	Title
	34-1275 00		22 MAR 17	NAVIGATION - TCAS - INSTALL ROCKWELL-COLLINS TCAS TTR921 PN 822-1293-322.
	Applicable to: MSN 1882			
	34-1412 06		22 MAR 17	NAVIGATION - EGPWS - INSTALL EGPWC PN 965-1676-003.
	Applicable to: MSN 3408-4100			
	34-1443 03		06 JUL 16	NAVIGATION - WEATHER RADAR SYSTEM - INSTALL COLLINS TRANSCEIVER FULLY COMPLIANT WITH MULTISCAN FUNCTION PN 822-1710-203.
	Applicable to: MSN 3408-3518			
	34-1506 34		22 MAR 17	NAVIGATION - TCAS - INSTALL A NEW HONEYWELL TCAS TPA-100B
	Applicable to: MSN 3408-4547			
	34-1538 31		05 SEP 17	NAVIGATION - TCAS - INSTALL ROCKWELL COLLINS TCAS CHANGE 7.1 (-332)
	Applicable to: MSN 1882-2078			
	34-1578 07		19 JUN 17	NAVIGATION - EGPWS - INSTALL EGPWC P/N 965-1676-006
	Applicable to: MSN 3467			
	34-1610 01		24 JAN 17	NAVIGATION - AOA - INSTALL AOA PROBES IN MIXED CONFIGURATION (THALES FOR CAPTAIN AND FIRST OFFICER AND UTAS ON STANDBY)
	Applicable to: MSN 3467-3518			
	34-1662 00		19 JUN 17	NAVIGATION - GENERAL- FLIGHT MANUAL EXTENSION TO RNP STEP 3
	Applicable to: MSN 3467			
	35-1077 01		09 SEP 15	OXYGEN - PASSENGER OXYGEN - REPLACE PASSENGER CHEMICAL OXYGEN CONTAINERS OF 15 MINUTES DURATION BY 22 MINUTES DURATION
	Applicable to: MSN 1882-2078			
	47-1026 10		19 JUN 17	INERT GAS SYSTEM - INSTALLATION OF FUEL TANK INERTING SYSTEM (FTIS)
	Applicable to: MSN 4379-4547			
	47-1035 08		19 JUN 17	INERT GAS SYSTEM - INSTALLATION OF FUEL TANK INERTING SYSTEM (FTIS)
	Applicable to: MSN 3518			

(1) Evolution code : N=New, R=Revised, E=Effectivity

GENERAL INFORMATION

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AIRCRAFT CONFIGURATION SUMMARY

Ident.: GEN-ACS-00016449.0001001 / 26 JUN 15
Applicable to: ALL

For awareness and for the specified aircraft, the following table provides the flight crew with a list of optional aircraft systems and functions related to flight and aircraft operations.

Ident.: GEN-ACS-00018963.0001001 / 04 MAR 16
Applicable to: ALL

Item	System	Installed
Ident.: GEN-ACS-00015613.0001001 / 23 JUN 15 **Applicable to: ALL**		
ADS-B OUT	SURV	No
Ident.: GEN-ACS-00016448.0001001 / 23 JUN 15 **Applicable to: ALL**		
AP Automatic Disconnection at Minima	AUTO FLT	No
Ident.: GEN-ACS-00015927.0001001 / 26 JUN 15 **Applicable to: ALL**		
AP/FD TCAS	AUTO FLT	No
Ident.: GEN-ACS-00015892.0002001 / 19 FEB 16 **Applicable to: ALL**		
Automatic FD Bar Engagement	AUTO FLT	Yes
Ident.: GEN-ACS-00016009.0001001 / 23 JUN 15 **Applicable to: MSN 1882-2078**		
Backup Navigation Function of the MCDU	AUTO FLT	No
Ident.: GEN-ACS-00016009.0002001 / 23 JUN 15 **Applicable to: MSN 3408-4547**		
Backup Navigation Function of the MCDU	AUTO FLT	Yes
Ident.: GEN-ACS-00016014.0001001 / 23 JUN 15 **Applicable to: MSN 1882-4379**		
BUSS	NAV	No
Ident.: GEN-ACS-00016014.0002001 / 23 JUN 15 **Applicable to: MSN 4487-4547**		
BUSS	NAV	Yes
Ident.: GEN-ACS-00016010.0001001 / 23 JUN 15 **Applicable to: ALL**		
CPDLC	DATALINK	No

Ident.: GEN-ACS-00015917.0001001 / 23 JUN 15 **Applicable to: ALL**		
Derated Takeoff	ENG	No
Ident.: GEN-ACS-00019728.0002001 / 06 JUN 16 **Applicable to: ALL**		
Descent Profile Optimization (DPO)	AUTO FLT	No
Ident.: GEN-ACS-00015912.0001001 / 23 JUN 15 **Applicable to: ALL**		
FLS Function in the FMS	AUTO FLT	No
Ident.: GEN-ACS-00015913.0005001 / 23 JUN 15 **Applicable to: ALL**		
FMS2 Release 1A	AUTO FLT	Yes
Ident.: GEN-ACS-00015899.0001001 / 23 JUN 15 **Applicable to: ALL**		
GLS	AUTO FLT	No
Ident.: GEN-ACS-00015924.0002001 / 23 JUN 15 **Applicable to: ALL**		
GPS	NAV	Yes
Ident.: GEN-ACS-00016553.0002001 / 23 JUN 15 **Applicable to: ALL**		
GPS PRIMARY Function	NAV	Yes
Ident.: GEN-ACS-00015926.0001001 / 23 JUN 15 **Applicable to: MSN 3408-4547**		
Metric Altitude Indications on the PFD	EIS	No
Ident.: GEN-ACS-00015926.0002001 / 23 JUN 15 **Applicable to: MSN 1882-2078**		
Metric Altitude Indications on the PFD	EIS	Yes
Ident.: GEN-ACS-00015900.0001001 / 23 JUN 15 **Applicable to: ALL**		
MLS	AUTO FLT	No
Ident.: GEN-ACS-00015923.0001001 / 19 FEB 16 **Applicable to: MSN 1882-3408, 3518-4100**		
NAV Mode automatically Engaged (Armed) in Go-Around	AUTO FLT	No
Ident.: GEN-ACS-00015923.0002001 / 19 FEB 16 **Applicable to: MSN 3467, 4379-4547**		
NAV Mode automatically Engaged (Armed) in Go-Around	AUTO FLT	Yes

Ident.: GEN-ACS-00016013.0002001 / 23 JUN 15
Applicable to: ALL

PWS	SURV	Yes

Ident.: GEN-ACS-00015920.0001001 / 23 JUN 15
Applicable to: ALL

QFE BARO Setting	NAV	No

Ident.: GEN-ACS-00019573.0001001 / 10 MAY 16
Applicable to: ALL

RAAS	SURV	No

Ident.: GEN-ACS-00015897.0001001 / 23 JUN 15
Applicable to: MSN 1882-3408, 3518-4547

RNP AR	AUTO FLT	No

Ident.: GEN-ACS-00015897.0002001 / 23 JUN 15
Applicable to: MSN 3467

RNP AR	AUTO FLT	Yes

Ident.: GEN-ACS-00016008.0001001 / 23 JUN 15
Applicable to: MSN 1882-3408, 3518-4547

ROW/ROPS	SURV	No

Ident.: GEN-ACS-00016008.0002001 / 23 JUN 15
Applicable to: MSN 3467

ROW/ROPS	SURV	Yes

Ident.: GEN-ACS-00016015.0001001 / 22 MAR 17
Applicable to: ALL

Soft Go-Around	ENG	No

IF INSTALLED TABLE

Ident.: GEN-IFIT-00016590.0001001 / 23 JUN 15
Applicable to: ALL

The "If Installed Table" provides a list of optional systems and functions of the aircraft.
For most of the optional systems or functions associated with the "if installed" ◁ symbol in the FCOM, the table indicates if the optional systems or functions are installed, or not installed.

Note: Highly customized options such as cabin installations are not covered in the following table.

Ident.: GEN-IFIT-00018965.0001001 / 22 MAR 16
Applicable to: ALL

Item	System	Installed

Ident.: GEN-IFIT-00015896.0002001 / 17 MAR 17
Applicable to: ALL
L13

4th Occupant Folding Seat 4th Occupant Fourth Occupant	EQUIPMENT	Yes

Ident.: GEN-IFIT-00016012.0002001 / 21 MAR 16
Applicable to: ALL
L13

4th Oxygen Mask Four	OXY	Yes

Ident.: GEN-IFIT-00018779.0002001 / 21 MAR 16
Applicable to: ALL

AC ESS FEED Auto Switching	ELEC	Yes

Ident.: GEN-IFIT-00016516.0001001 / 21 MAR 17
Applicable to: ALL
L13

ACT 1 ACT 2 ACTs ACT 1 ACT 2 ACT 1 OR 2 ACT PUMP ACT PUMP LO PR ACT XFR FAULT ACT1 ACT2 ACTs Additional center tank	FUEL	No

Ident.: GEN-IFIT-00020299.0001001 / 13 SEP 16
Applicable to: MSN 1882-2078
L13

1 ADF ADF 1 ADF1	NAV	Yes

Ident.: GEN-IFIT-00020299.0002001 / 13 SEP 16
Applicable to: MSN 3408-4547
L13

1 ADF ADF 1 ADF1	NAV	No

Ident.: GEN-IFIT-00020300.0001001 / 13 SEP 16
Applicable to: MSN 1882-2078

L13

2 ADFs 2 ADF ADF1 ADF 1 ADF2 ADF 2 ADFs	NAV	No

Ident.: GEN-IFIT-00020300.0002001 / 13 SEP 16
Applicable to: MSN 3408-4547

L13

2 ADFs 2 ADF ADF1 ADF 1 ADF 2 ADF2 ADFs	NAV	Yes

Ident.: GEN-IFIT-00016641.0001001 / 23 JUN 15
Applicable to: ALL

ADS-B OUT	SURV	No

Ident.: GEN-IFIT-00015891.0001001 / 21 MAR 16
Applicable to: ALL

L13

AFT Cargo Heating AFT CRG HOT AIR temperature selector HOT AIR pb AFT CRG HEAT AFT CARGO HEAT AFT CARGO DUCT OVHT AFT Cargo heat controller Cargo Heat Cargo Temperature Regulation CRG HEAT Forward (aft) cargo heat controller HOT AIR	COND	No

Ident.: GEN-IFIT-00015901.0002001 / 21 MAR 16
Applicable to: ALL
L13

AFT Cargo Smoke Detector SMOKE AFT CARGO SMOKE SMOKE AFT CRG DET FAULT AFT CRG DET AFT CARGO SMOKE AFT CRG DET FAULT	FIRE	Yes

Ident.: GEN-IFIT-00015931.0001001 / 21 MAR 16
Applicable to: MSN 3408-4547
L13

AFT Cargo Ventilation Cargo Ventilation AFT ISOL VALVE AFT CRG VENT AFT CRG VENT FAULT AFT Cargo isol valves FWD(AFT) CARGO DUCT OVHT FWD(AFT) CRG HEAT FWD(AFT) CRG HEAT FAULT FWD(AFT) CRG ISOL VALVE FWD(AFT) CRG VENT FAULT FWD(AFT) CRG VENT Forward (aft) cargo isolation valves isolation valves	VENT	No

Ident.: GEN-IFIT-00015931.0002001 / 21 MAR 16
Applicable to: MSN 1882-2078
L13

AFT Cargo Ventilation Cargo Ventilation AFT ISOL VALVE AFT CRG VENT AFT CRG VENT FAULT AFT Cargo isol valves FWD(AFT) CARGO DUCT OVHT FWD(AFT) CRG HEAT FWD(AFT) CRG HEAT FAULT FWD(AFT) CRG ISOL VALVE FWD(AFT) CRG VENT FAULT FWD(AFT) CRG VENT Forward (aft) cargo isolation valves isolation valves	VENT	Yes

Ident.: GEN-IFIT-00016522.0001001 / 23 JUN 15
Applicable to: ALL

Aileron Anti Droop	F/CTL	No

Ident.: GEN-IFIT-00015919.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

L13

Air Conditioning System Controller (ACSC) ACSC ACSC 1 ACSC 2 Air Conditioning System Controllers	COND	No

Ident.: GEN-IFIT-00015919.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

L13

Air Conditioning System Controller (ACSC) ACSC ACSC 1 ACSC 2 Air Conditioning System Controllers	COND	Yes

Ident.: GEN-IFIT-00016523.0001001 / 23 JUN 15
Applicable to: ALL

AP/FD TCAS	AUTO FLT	No

Ident.: GEN-IFIT-00016640.0001001 / 21 MAR 16
Applicable to: ALL

L13

ATSAW ADS-B IN	SURV	No

Ident.: GEN-IFIT-00016524.0002001 / 23 JUN 15
Applicable to: ALL

Automatic FD Bar Engagement	AUTO FLT	Yes

Ident.: GEN-IFIT-00018780.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

L13

Avail Indication During Engine Start AVAIL Indication	ENG	No

Ident.: GEN-IFIT-00018780.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

L13

Avail Indication During Engine Start AVAIL Indication	ENG	Yes

Ident.: GEN-IFIT-00016681.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

L13

Backup Navigation Function of the MCDU BACK UP NAV	AUTO FLT	No

Ident.: GEN-IFIT-00016681.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

L13

Backup Navigation Function of the MCDU BACK UP NAV	AUTO FLT	Yes

Ident.: GEN-IFIT-00016525.0002001 / 21 MAR 16
Applicable to: ALL

L13

BARO/RADIO Instead of MDA/MDH/DH BARO BARO/RADIO	NAV	Yes

Ident.: GEN-IFIT-00016526.0001001 / 21 MAR 16
Applicable to: ALL

L13

Brake Fans Brake cooling fans BRK FAN Brake Fan Brake fans 1, 2, 3 and 4 Brake fans 5, 6, 7 and 8	BRAKE	No

Ident.: GEN-IFIT-00015875.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078, 3467-3518

L13

Bulk Cargo Door Bulk Cargo Compartment Door Bulk Door	DOORS	No

Ident.: GEN-IFIT-00015875.0002001 / 21 MAR 16
Applicable to: MSN 3408, 4100-4547

L13

Bulk Cargo Door Bulk Cargo Compartment Door Bulk Door	DOORS	Yes

Ident.: GEN-IFIT-00018781.0001001 / 21 MAR 16
Applicable to: MSN 1882-4379

L13

BUSS Backup Speed/Altitude Scale Backup Speed Scale	NAV	No

Ident.: GEN-IFIT-00018781.0002001 / 21 MAR 16
Applicable to: MSN 4487-4547
L13

BUSS Backup Speed/Altitude Scale Backup Speed Scale	NAV	Yes

Ident.: GEN-IFIT-00021488.0002001 / 17 MAR 17
Applicable to: ALL
L13

Cargo ventilation system Cargo isolation valves Extraction fan	VENT	Yes

Ident.: GEN-IFIT-00016535.0001001 / 22 MAR 17
Applicable to: ALL
L13

Center Fuel Tank Transfer Valves Center Tank Transfer Valves L CTR TK XFR valve CTR TK XFR valve R	FUEL	No

Ident.: GEN-IFIT-00021220.0001001 / 22 MAR 17
Applicable to: ALL
L13

Center Fuel Tank Pumps CTR TK PUMP 1 CTR TK PUMP 2	FUEL	Yes

Ident.: GEN-IFIT-00015930.0002001 / 21 MAR 16
Applicable to: ALL
L13

Chemical Oxygen System 22 min Chemical Oxygen System 22 min	OXY	Yes

Ident.: GEN-IFIT-00016625.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078
L13

CIDS-SDF CIDS 1 SMOKE DETECT Smoke Detection Function (SDF)	SMOKE	No

Ident.: GEN-IFIT-00016625.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547
L13

CIDS-SDF CIDS 1 SMOKE DETECT Smoke Detection Function (SDF)	SMOKE	Yes

Ident.: GEN-IFIT-00015929.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

L13

Cockpit Door Deadbolt Deadbolt	EQUIPMENT	No

Ident.: GEN-IFIT-00015929.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

L13

Cockpit Door Deadbolt Deadbolt	EQUIPMENT	Yes

Ident.: GEN-IFIT-00018782.0002001 / 21 MAR 16
Applicable to: ALL

Cockpit Door Escape Panel	DOOR	Yes

Ident.: GEN-IFIT-00016690.0001001 / 21 MAR 16
Applicable to: ALL

L13

Cockpit Fixed Second Oxygen Bottle Two	OXY	No

Ident.: GEN-IFIT-00016612.0001001 / 23 JUN 15
Applicable to: ALL

Cockpit Foot Heater	COND	No

Ident.: GEN-IFIT-00016639.0001001 / 17 MAR 17
Applicable to: ALL

L13

Cockpit Foot Warmer Foot Warmer System Foot Warmer ON/OFF Control Switch	EQUIPMENT	No

Ident.: GEN-IFIT-00021875.0001001 / 25 JUL 17
Applicable to: MSN 1882-2078

L13

Cockpit Power Outlet Power Outlet	EQUIPMENT	No

Ident.: GEN-IFIT-00021875.0002001 / 25 JUL 17
Applicable to: MSN 3408-4547

L13

Cockpit Power Outlet Power Outlet	EQUIPMENT	Yes

Ident.: GEN-IFIT-00016614.0002001 / 21 MAR 16
Applicable to: ALL
L13

COMMERCIAL pb COMMERCIAL	ELEC	Yes

Ident.: GEN-IFIT-00016615.0001001 / 23 JUN 15
Applicable to: ALL

CVR Datalink Function	COM	No

Ident.: GEN-IFIT-00016626.0001001 / 23 JUN 15
Applicable to: ALL

CVR ERASE pb	COM	No

Ident.: GEN-IFIT-00016647.0001001 / 21 MAR 17
Applicable to: ALL
L13

DC BUS Entertainment TR Entertainment DC BUS Ent DC BUS Entertainment TR Ent TR Ent.	ELEC	No

Ident.: GEN-IFIT-00016527.0002001 / 21 MAR 16
Applicable to: ALL
L13

DDRMI Digital Distance and Radio Magnetic Indicator	NAV	Yes

Ident.: GEN-IFIT-00016528.0001001 / 21 MAR 16
Applicable to: ALL
L13

Derated Takeoff DERATE	ENG	No

Ident.: GEN-IFIT-00019730.0002001 / 06 JUN 16
Applicable to: ALL
L13

Descent Profile Optimization DPO	AUTO FLT	No

Ident.: GEN-IFIT-00016580.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078
L13

Display of Delta ISA Delta ISA	EIS	No

Ident.: GEN-IFIT-00016580.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547
L13

Display of Delta ISA Delta ISA	EIS	Yes

Ident.: GEN-IFIT-00016529.0001001 / 23 JUN 15
Applicable to: MSN 2078-4547

Dual Ice Detection System	ICE	No

Ident.: GEN-IFIT-00016529.0002001 / 23 JUN 15
Applicable to: MSN 1882

Dual Ice Detection System	ICE	Yes

Ident.: GEN-IFIT-00016574.0002001 / 23 JUN 15
Applicable to: ALL

Dual Navigation Lights	LIGHTS	Yes

Ident.: GEN-IFIT-00016628.0002001 / 17 MAR 17
Applicable to: ALL
L13

EGPWS	SURV	Yes

Ident.: GEN-IFIT-00016530.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078

Electrical Alternate Braking	L/G	No

Ident.: GEN-IFIT-00016530.0002001 / 23 JUN 15
Applicable to: MSN 3408-4547

Electrical Alternate Braking	L/G	Yes

Ident.: GEN-IFIT-00016575.0002001 / 23 JUN 15
Applicable to: ALL

ELT sw	COM	Yes

Ident.: GEN-IFIT-00020758.0002001 / 18 MAY 17
Applicable to: ALL
L13

EVAC Panel COMMAND PB (guarded) COMMAND PB Evacuation (EVAC) signalling EVAC HORN HORN SHUT OFF PB CAPT and PURS/CAPT SW	COM	Yes

Ident.: GEN-IFIT-00021713.0002001 / 03 AUG 17
Applicable to: MSN 1882-2078

Expedite	AUTO FLT	No

Ident.: GEN-IFIT-00021713.0001001 / 03 AUG 17
Applicable to: MSN 3408-4547

Expedite	AUTO FLT	Yes

Ident.: GEN-IFIT-00015918.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078

Extended FLEX Takeoff	ENG	No

Ident.: GEN-IFIT-00015918.0002001 / 23 JUN 15
Applicable to: MSN 3408-4547

Extended FLEX Takeoff	ENG	Yes

Ident.: GEN-IFIT-00016531.0002001 / 21 MAR 16
Applicable to: ALL
L13

External Ice Detector Light ICE IND	ICE	Yes

Ident.: GEN-IFIT-00021527.0001001 / 17 MAR 17
Applicable to: ALL

FANS A+ DCDU ATC MSG pb	FANS	No

Ident.: GEN-IFIT-00021529.0001001 / 17 MAR 17
Applicable to: ALL

FANS B DCDU ATC MSG pb	FANS	No

Ident.: GEN-IFIT-00021530.0001001 / 17 MAR 17
Applicable to: ALL

FANS B+ DCDU ATC MSG pb	FANS	No

Ident.: GEN-IFIT-00015909.0001001 / 21 MAR 16
Applicable to: ALL
L13

Fan Speed Controller (FSC) Two Operating Speeds	VENT	No

Ident.: GEN-IFIT-00016629.0003001 / 21 MAR 16
Applicable to: ALL

L13

Fire Extinguishing in the AFT Cargo SMOKE FWD(AFT) CRG BTL 1(2) FAULT Forward (aft) cargo fire extinguishing	FIRE	Yes

Ident.: GEN-IFIT-00016630.0005001 / 21 MAR 16
Applicable to: ALL

L13

Fire Extinguishing in the FWD Cargo SMOKE FWD(AFT) CRG BTL 1(2) FAULT Forward (aft) cargo fire extinguishing	FIRE	Yes

Ident.: GEN-IFIT-00016578.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078, 3467-3518

Fixed Cabin Gaseous Oxygen System	OXY	No

Ident.: GEN-IFIT-00015898.0001001 / 21 MAR 17
Applicable to: ALL

L13

FLS F-G/S F-G/S BASED ON ISA F-G/S-F-LOC F-G/S-LOC F-LOC F-LOC*/F-LOC FLS 1 FLS 2 FLS function NO FLS FOR THIS APPR	AUTO FLT	No

Ident.: GEN-IFIT-00016579.0002001 / 23 JUN 15
Applicable to: ALL

FMS Crossload	AUTO FLT	Yes

Ident.: GEN-IFIT-00016589.0004001 / 23 JUN 15
Applicable to: ALL

HONEYWELL FMS2 Release 1A H2	AUTO FLT	Yes

Ident.: GEN-IFIT-00015617.0001001 / 23 JUN 15
Applicable to: MSN 1882-3467, 4100

FTIS	FUEL	No

Ident.: GEN-IFIT-00015617.0002001 / 23 JUN 15
Applicable to: MSN 3518, 4379-4547

FTIS	FUEL	Yes

Ident.: GEN-IFIT-00016532.0001001 / 23 JUN 15
Applicable to: ALL

Fuel Leak Detection	FUEL	No

Ident.: GEN-IFIT-00016533.0001001 / 23 JUN 15
Applicable to: ALL

Fuel Tank Overflow Alert	FUEL	No

Ident.: GEN-IFIT-00015893.0001001 / 21 MAR 16
Applicable to: ALL
L13

FWD Cargo Heating Temperature Selector FWD(AFT) CARGO DUCT OVHT FWD(AFT) CRG HEAT FWD(AFT) CRG HEAT FAULT FWD CRG HEAT Cargo Heat Cargo Temperature Regulation CRG HEAT Forward (aft) cargo heat controller HOT AIR Fwd cargo heat controller	COND	No

Ident.: GEN-IFIT-00015925.0002001 / 21 MAR 16
Applicable to: ALL
L13

FWD Cargo Smoke Detector SMOKE FWD CARGO SMOKE FWD CARGO SMOKE SMOKE FWD CRG DET FAULT FWD CRG DET	FIRE	Yes

Ident.: GEN-IFIT-00015932.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078
L13

FWD Cargo Ventilation FWD Cargo Outlet Isolation Valve Cargo Ventilation FWD ISOL Valve FWD CRG VENT FWD CARGO ISOL VALVE Forward (aft) cargo isolation valves isolation valves Fwd cargo isol valves	VENT	No

Ident.: GEN-IFIT-00015932.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

L13

FWD Cargo Ventilation FWD Cargo Outlet Isolation Valve Cargo Ventilation FWD ISOL Valve FWD CRG VENT FWD CARGO ISOL VALVE Forward (aft) cargo isolation valves Fwd cargo isol valves	VENT	Yes

Ident.: GEN-IFIT-00016617.0001001 / 21 MAR 16
Applicable to: ALL

L13

Galley Bus Automatic Shedding Galley Load Automatic Shedding	ELEC	No

Ident.: GEN-IFIT-00016618.0001001 / 21 MAR 16
Applicable to: MSN 1882

L13

GAPCU Ground and Auxiliary Power Control Unit	ELEC	No

Ident.: GEN-IFIT-00016618.0002001 / 21 MAR 16
Applicable to: MSN 2078-4547

L13

GAPCU Ground and Auxiliary Power Control Unit	ELEC	Yes

Ident.: GEN-IFIT-00019705.0001001 / 13 MAY 16
Applicable to: ALL

L13

Gaseous Oxygen Generators in lavatories Gaseous Generators	OXY	No

Ident.: GEN-IFIT-00016534.0001001 / 21 MAR 16
Applicable to: ALL

L13

GLS GLS Autoland GLS1 GLS2	AUTO FLT	No

Ident.: GEN-IFIT-00016649.0002001 / 21 MAR 16
Applicable to: ALL
L13

GPS FM/GPS POS DISAGREE GPS 1(2) FAULT GPS 1 GPS 2 GPS 1+2	NAV	Yes

Ident.: GEN-IFIT-00016650.0002001 / 21 MAR 16
Applicable to: ALL
L13

GPS PRIMARY Function GPS PRIMARY	NAV	Yes

Ident.: GEN-IFIT-00020297.0001001 / 17 MAR 17
Applicable to: ALL

GSM Onboard	COM	No

Ident.: GEN-IFIT-00015911.0001001 / 21 MAR 17
Applicable to: MSN 1882-2078
L13

HF Datalink HF 1(2) DATA FAULT HF DATA LINK	COM	No

Ident.: GEN-IFIT-00015911.0002001 / 21 MAR 17
Applicable to: MSN 3408-4547
L13

HF Datalink HF 1(2) DATA FAULT HF DATA LINK	COM	Yes

Ident.: GEN-IFIT-00020132.0002001 / 22 MAR 17
Applicable to: ALL
L13

HF System HF HF1 HF2	COM	Yes

Ident.: GEN-IFIT-00016644.0002001 / 21 MAR 16
Applicable to: ALL

L13

HIALT pb Operation on High Altitude Airfields HI ALT LANDING pb-sw HI ALT LANDING pb-sw	OXY	Yes

Ident.: GEN-IFIT-00018783.0001001 / 21 MAR 16
Applicable to: ALL

HUD	SURV	No

Ident.: GEN-IFIT-00016651.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078

IRS Alignment Based on GPS Position	NAV	No

Ident.: GEN-IFIT-00016651.0002001 / 23 JUN 15
Applicable to: MSN 3408-4547

IRS Alignment Based on GPS Position	NAV	Yes

Ident.: GEN-IFIT-00015618.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078

ISIS	NAV	No

Ident.: GEN-IFIT-00015618.0002001 / 23 JUN 15
Applicable to: MSN 3408-4547

ISIS	NAV	Yes

Ident.: GEN-IFIT-00020693.0001001 / 17 MAR 17
Applicable to: ALL

L13

ITP ATSA ITP ITP TRAFFIC LIST page IN TRAIL PROCEDURE IN TRAIL PROCEDURE page	SURV	No

Ident.: GEN-IFIT-00016594.0002001 / 23 JUN 15
Applicable to: ALL

LAF	F/CTL	No

Ident.: GEN-IFIT-00016596.0001001 / 21 MAR 16
Applicable to: MSN 1882-3408, 3518-4547

L13

LAT DEV SCALE pb L/DEV deviation scale	NAV	No

Ident.: GEN-IFIT-00016596.0002001 / 21 MAR 16
Applicable to: MSN 3467
L13

LAT DEV SCALE pb L/DEV deviation scale	NAV	Yes

Ident.: GEN-IFIT-00016600.0001001 / 23 JUN 15
Applicable to: ALL

LOC B/C	AUTO FLT	No

Ident.: GEN-IFIT-00016602.0002001 / 21 MAR 16
Applicable to: ALL
L13

Logo Light LOGO Logo Lights	LIGHTS	Yes

Ident.: GEN-IFIT-00020306.0001001 / 17 MAR 17
Applicable to: MSN 3408-4547

Man-made Obstacle Function	SURV	Yes

Ident.: GEN-IFIT-00020306.0002001 / 17 MAR 17
Applicable to: MSN 1882-2078

Man-made Obstacle Function	SURV	No

Ident.: GEN-IFIT-00016604.0002001 / 23 JUN 15
Applicable to: ALL

Manual Flush Control	WATER	Yes

Ident.: GEN-IFIT-00016605.0002001 / 21 MAR 16
Applicable to: ALL

Manual Shutoff Valves	WATER	Yes

Ident.: GEN-IFIT-00016688.0001001 / 23 JUN 15
Applicable to: MSN 3408-4547

Metric Altitude Indications on the PFD	EIS	No

Ident.: GEN-IFIT-00016688.0002001 / 23 JUN 15
Applicable to: MSN 1882-2078

Metric Altitude Indications on the PFD	EIS	Yes

Ident.: GEN-IFIT-00016536.0001001 / 21 MAR 16
Applicable to: ALL
L13

MLS MLS1 MLS2	AUTO FLT	No

Ident.: GEN-IFIT-00016603.0001001 / 23 JUN 15
Applicable to: MSN 1882-3408, 3518-4100

NAV Mode automatically Engaged (Armed) in Go-Around	AUTO FLT	No

Ident.: GEN-IFIT-00016603.0002001 / 23 JUN 15
Applicable to: MSN 3467, 4379-4547

NAV Mode automatically Engaged (Armed) in Go-Around	AUTO FLT	Yes

Ident.: GEN-IFIT-00016645.0002001 / 23 JUN 15
Applicable to: ALL

OEB Reminder	EIS	Yes

Ident.: GEN-IFIT-00021528.0001001 / 17 MAR 17
Applicable to: ALL

Optional Applications: DCL OCL D-ATIS	FANS	No

Ident.: GEN-IFIT-00016597.0002001 / 21 MAR 16
Applicable to: MSN 1882-2078, 3467-3518
L13

1 Pair of Overwing Emergency Exit Overwing Escape Route FWD EMER EXIT	DOORS	Yes

Ident.: GEN-IFIT-00016597.0003001 / 21 MAR 16
Applicable to: MSN 3408, 4100-4547
L13

2 Pairs of Overwing Emergency Exit Overwing Escape Route FWD EMER EXIT	DOORS	Yes

Ident.: GEN-IFIT-00016538.0001001 / 21 MAR 16
Applicable to: MSN 1882-4379
L13

Parking Brake Monitoring PARK BRK FAULT	BRAKE	No

Ident.: GEN-IFIT-00016538.0002001 / 21 MAR 16
Applicable to: MSN 4487-4547
L13

Parking Brake Monitoring PARK BRK FAULT	BRAKE	Yes

Ident.: GEN-IFIT-00021553.0002001 / 17 MAR 17
Applicable to: ALL

Predictive GPWS	SURV	Yes

Ident.: GEN-IFIT-00016608.0002001 / 22 MAR 16
Applicable to: ALL
L13

Printer Function in FMS PRINT FUNCTION PRINTER NOT AVAILABLE	AUTO FLT	Yes

Ident.: GEN-IFIT-00016609.0002001 / 21 MAR 16
Applicable to: ALL

Push to Level Off	AUTO FLT	Yes

Ident.: GEN-IFIT-00016648.0002001 / 17 MAR 17
Applicable to: ALL
L13

PWS Windshear DET WINDSHEAR DETECTION PRED W/S DET FAULT W/S AHEAD WINDSHEAR AHEAD Windshear PRED W/S DET predictive windshear system PWS SCAN	SURV	Yes

Ident.: GEN-IFIT-00016695.0001001 / 23 JUN 15
Applicable to: ALL

QAR	RECORDING	No

Ident.: GEN-IFIT-00016643.0001001 / 21 MAR 16
Applicable to: ALL
L13

QFE BARO Setting QFE OPTION	NAV	No

Ident.: GEN-IFIT-00016610.0001001 / 23 JUN 15
Applicable to: ALL

RAAS	SURV	No

Ident.: GEN-IFIT-00016539.0003001 / 21 MAR 16
Applicable to: ALL
L13

Rain Repellent System Rain Repellent RAIN RPLNT pb RAIN RPLNT	RAIN	Yes

Ident.: GEN-IFIT-00016737.0001001 / 23 JUN 15
Applicable to: ALL

RMP Load Function	COM	No

Ident.: GEN-IFIT-00016581.0001001 / 23 JUN 15
Applicable to: MSN 1882-3408, 3518-4547

RNP pb	NAV	No

Ident.: GEN-IFIT-00016581.0002001 / 23 JUN 15
Applicable to: MSN 3467

RNP pb	NAV	Yes

Ident.: GEN-IFIT-00016582.0001001 / 21 MAR 16
Applicable to: MSN 1882-3408, 3518-4547
L13

ROW/ROPS ROW/ROP	SURV	No

Ident.: GEN-IFIT-00016582.0002001 / 21 MAR 16
Applicable to: MSN 3467
L13

ROW/ROPS ROW/ROP	SURV	Yes

Ident.: GEN-IFIT-00016583.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078

RPCU	CAB PR	No

Ident.: GEN-IFIT-00016583.0002001 / 23 JUN 15
Applicable to: MSN 3408-4547

RPCU	CAB PR	Yes

Ident.: GEN-IFIT-00016642.0001001 / 22 MAR 17
Applicable to: ALL
L13

SATCOM SATCOM DATA FAULT SATCOM FAULT Satellite Communications (SATCOM) SATCOM System	COM	No

Ident.: GEN-IFIT-00016646.0001001 / 17 MAR 17
Applicable to: MSN 3408-4547
L13

SDCU Smoke Detection Control Unit SDCU	SMOKE	No

Ident.: GEN-IFIT-00016646.0002001 / 17 MAR 17
Applicable to: MSN 1882-2078
L13

SDCU Smoke Detection Control Unit SDCU	SMOKE	Yes

Ident.: GEN-IFIT-00016584.0001001 / 23 JUN 15
Applicable to: ALL

Second Fire Extinguishing Bottle	FIRE	No

Ident.: GEN-IFIT-00018784.0001001 / 22 MAR 17
Applicable to: ALL
L13

Soft Go-Around SOFT GA Go-Around soft	ENG	No

Ident.: GEN-IFIT-00018785.0001001 / 21 MAR 16
Applicable to: ALL
L13

Steep Approach Capability STEEP APPR	NAV	No

Ident.: GEN-IFIT-00016586.0001001 / 23 JUN 15
Applicable to: ALL

T2CAS	SURV	No

Ident.: GEN-IFIT-00016587.0001001 / 23 JUN 15
Applicable to: ALL

T3CAS	SURV	No

Ident.: GEN-IFIT-00016588.0001001 / 21 MAR 17
Applicable to: MSN 1882-3518
L13

Tail Strike Pitch Limit Indicator Tailstrike Pitch Limit Indicator	EIS	No

Ident.: GEN-IFIT-00016588.0002001 / 21 MAR 17
Applicable to: MSN 4100-4547
L13

Tail Strike Pitch Limit Indicator Tailstrike Pitch Limit Indicator	EIS	Yes

Ident.: GEN-IFIT-00018786.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

Temperature Control Panel	COND	No

Ident.: GEN-IFIT-00018786.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

Temperature Control Panel	COND	Yes

Ident.: GEN-IFIT-00016541.0001001 / 23 JUN 15
Applicable to: ALL

Thrust Bump	ENG	No

Ident.: GEN-IFIT-00016011.0001001 / 21 MAR 16
Applicable to: ALL

L13

TPIS TYRE LO PR	WHEEL	No

Ident.: GEN-IFIT-00017055.0001001 / 17 MAR 17
Applicable to: ALL

HZD switch ON Weather Hazard Prediction Function WX+T+H WX+T+HZD	SURV	No

Ident.: GEN-IFIT-00020783.0001001 / 20 DEC 16
Applicable to: ALL

Weight and Balance System (WBS)	EIS	No

Ident.: GEN-IFIT-00016543.0001001 / 21 MAR 16
Applicable to: MSN 2078-4547

L13

Wiper Intermittent Position Intermittent Sweep Function Intermittent Sweeping	RAIN	No

Ident.: GEN-IFIT-00016543.0002001 / 21 MAR 16
Applicable to: MSN 1882

L13

Wiper Intermittent Position Intermittent Sweep Function Intermittent Sweeping	RAIN	Yes

MAIN FCOM CHANGES

Ident.: GEN-00012867.0001001 / 03 AUG 17
Applicable to: ALL

The purpose of the Main FCOM Changes is to provide operators with general information about the most significant changes that are introduced in the current revision of the manual.

The main FCOM changes are available on the Airbus World portal, under the path: Content Library / Flight Operations / Manuals / Main FCOM - FCTM - MMEL Changes.

In addition, every revised Documentary Unit (DU) has a revision highlight (HL) that:
- Indicates the change(s) made to the DU
- Can be found in the associated "Preliminary Pages – Summary of Highlights" subchapter.

In addition to the Main FCOM Changes, the Modification Operational Impact (MOI) documents available on the Airbus World portal provide the operational impact linked to a MOD number.

FCOM PURPOSE

Ident.: GEN-00012627.0001001 / 17 MAR 17
Applicable to: ALL

FCOM PURPOSE

The Flight Crew Operating Manual (FCOM) is a support documentation for flight crew.

The purpose of the FCOM is to:
- Provide all necessary operating limitations, procedures, performance and system information the flight crew needs to safely and efficiently operate A320 family aircraft during normal, abnormal, and emergency situations
- Serve directly as Flight Crew Operating Manual, or as a basis for Operators to develop their own customized Airline Operations Manual, in accordance with applicable requirements
- Serve as a comprehensive reference guide during initial and refresher flight crew training.

Note: *This manual is not designed:*

- *To teach basic piloting skills*
- *To provide basic piloting techniques applicable to jet aircraft, or information, that are considered as basic airmanship for trained flight crews who are familiar with that type of aircraft and its general handling characteristics.*

The Flight Crew Operating Manual (FCOM) complements the Airplane Flight Manual (AFM).
If the FCOM data differs from the AFM data, the AFM remains the reference.
As a supplement to the FCOM, the FCTM may provide additional information that the flight crew should read in conjunction with the FCOM. For more information, *Refer to FCTM/GI FCTM Purpose*.
For any questions or comments related to this manual, the Operator's Flight Operations Management can contact the Airbus Flight Operations Support & Training Standards department.

FCOM CONTENTS

The FCOM has five sections:

- Aircraft Systems : This section is divided into ATA chapters for each aircraft system. This section includes a specific description of each system and its associated cockpit interfaces.
- Procedures : This section contains the following chapters:
  - Normal Procedures that include the SOP, the SRP, and the Supplementary Procedures
  - Abnormal and Emergency Procedures
  - Special Operations.
- Limitations : This section provides the aircraft and system limitations that the flight crew must know or refer to in operations.
- Operations Engineering Bulletins (OEB)
- Performance : This section includes the aircraft performance for each flight phase.

DOCUMENTARY UNITS

The FCOM is made of Documentary Units (DU). The DU is the smallest part of information with a technical content.
The DUs are listed on a separate "List of Effective Documentary Units" (LEDU). *Refer to the General section*.

Note: 1. DUs can be grouped into Group of DU (GDU)
2. Temporary information may be provided via Temporary DU (TDU).

IDENTIFICATION STRIP

Below the title of the DU, the identification strip provides:

- The list of MSN the DU is applicable to
- For TDU, the reference to the DU impacted by the TDU.

LIST OF EFFECTIVE SECTIONS/SUBSECTIONS (LESS) - PAPER ONLY

Ident.: GEN-00013786.0001001 / 23 JUN 15
Applicable to: ALL

The List of Effective Sections/Subsections (LESS) summarizes all the sections and subsections contained in the FCOM. For each revision, a new LESS is issued when at least one DU of the section/subsection is changed.

The LESS consists of:
- The "M" field that may provide the following evolution code:
  - The "N" letter indicates a new section introduced by the revision
  - The "R" letter indicates a section in which the content has been revised
  - The "E" letter indicates an aircraft validity change within the section
  - The "M" letter indicates a section that have move within the FCOM
- The “Localization” field that allows localizing the section within the manual with the product structure
- The “Subsection title” field
- The “Rev. Date” field that indicated the date at which the section was changed.

LIST OF EFFECTIVE OPERATIONS ENGINEERING BULLETINS (LEOEB)

Ident.: GEN-00013787.0001001 / 17 MAR 17
Applicable to: ALL

Refer to OEB-GEN OEB Content and Management

LIST OF EFFECTIVE DOCUMENTARY UNITS (LEDU) - PAPER ONLY

Ident.: GEN-00013789.0001001 / 23 MAR 11
Applicable to: ALL

For each revision, a new List of Effective Documentary Units (LEDU) is issued at the section level. The LEDU provides information about the DU localization, applicability, identification and issue date.

The LEDU consists of:
- The "M" field that may provide the following Evolution Code:
  - The "N" letter indicates a new DU introduced by the revision
  - The "R" letter indicates a revised DU: The content of the DU is updated by the revision. A vertical line in the margin of the DU locates the modified part
  - The "E" letter indicates an aircraft validity change for the DU: The list of MSNs for which the DU is effective has been changed compared to the previous LEDU, by addition or deletion of one or several MSN
- The “Localization” field that allows localizing the DU in the manual with the product structure of the manual
- The "T" field (Temporary Information) that contains a cross if the associated DU is a TDU
- The "DU title" that provides the title of the DU
- The “DU identification” that identifies the DU with its own unique identification number or the GDU with its own unique code.
- The “DU date” that indicates when the DU has been released

- The DU criteria which lists the technical or operational criteria for which the DU and solution is applicable to.
- The “Applicable to” which provides the list of aircraft this DU and solution is applicable to
- The “Impacted by TDU” which is the identification of the TDU superseding the DU

LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS (LETDU) - PAPER ONLY

Ident.: GEN-00013803.0001001 / 23 JUN 15
Applicable to: ALL

The List of Effective Temporary Documentary Units (LETDU) provides a summary of the Temporary DU impacting the section.

The LETDU consists of:
- The "M" field that may provide the following Evolution Code:
  - The "N" letter indicates a new TDU introduced by the revision
  - The "R" letter indicates a revised TDU: The content of the TDU is updated by the revision. A vertical line in the margin of the TDU locates the modified part
  - The "E" letter indicates an aircraft validity change for the TDU: The list of MSNs the TDU is applicable to has been changed compared to the previous LETDU, by addition or deletion of one or several MSN
- The “Localization” field that allows localizing the TDU in the manual with the product structure of the manual
- The “TDU Title” that provides the title of the TDU
- The “TDU identification” that identifies the TDU with its identification number with its own unique code
- The “TDU date” that indicates when the TDU has been released
- The TDU criteria which lists the technical or operational criteria, the it is applicable to
- The “Applicable to” which provides the list of aircraft this TDU is applicable to
- The “Impacted DU” which is the Identification of DU superseded by the TDU
- The “Reason for issue” of the TDU

Note: *1. TDU is displayed on a yellow background*
2. within the QRH the TDU replaces the impacted DU

AIRCRAFT ALLOCATION TABLE (AAT) - PAPER ONLY

Ident.: GEN-00013804.0001001 / 23 JUN 15
Applicable to: ALL

The Aircraft Allocation Table (AAT) provides a view of the fleet covered in the FCOM. For each aircraft, the AAT provides its MSN, its registration number and the model.

LIST OF MODIFICATIONS (LOM) - PAPER ONLY

Ident.: GEN-00013805.0001001 / 23 JUN 15
Applicable to: ALL

The List of Modifications (LOM) lists the criteria (Modification Proposal (MP) or Service Bulletins (SB)) which the installation on the aircraft affects the FCOM.

Note: *Each MP has one or more associated MODs. The MP/MOD correlation is available in AirN@v / Engineering.*

The LOM also indicates:
- The title of the criteria
- The date of incorporation of the criteria in the FCOM
- The list of aircraft that have the criteria
- The "M" field that may indicate the following evolution code
  - The "E" letter indicates an aircraft validity change of the criteria. The list of aircraft to which the criteria applies has changed compared to the previous FCOM revision, by addition or deletion of one or several aircraft.
  - The "N" letter indicates new criteria added by this FCOM revision
  - The "R" letter indicates a change in the criteria title or associated SB

FCOM USE AND ORGANIZATION

Ident.: GEN-00012688.0001001 / 21 MAR 16
Applicable to: ALL

DEFINITIONS OF WARNINGS, CAUTIONS AND NOTES

The following are the official definitions of warnings, cautions and notes taken directly from the JAR25/CS-25 and applicable to Airbus flight operation documentation:

WARNING	An operating procedure, technique, etc. that may result in personal injury or loss of life if not followed.
CAUTION	An operating procedure, technique, etc. that may result in damage to equipment if not followed.
NOTE	An operating procedure, technique, etc. considered essential to emphasize. Information contained in notes may also be safety related.

INFORMATION TYPE AND LAYERS

The FCOM has technical information that may be used for:
- Flight crew operations in flight, or on ground
- Airlines operations on ground
- Training.

To take the above-noted objectives into account, the FCOM is organized in three layers as follows:
- Layer 1: "Need to know"
  Layer 1 presents information that is necessary in the cockpit.
- Layer 2: "Nice to know"
  Layer 2 presents information that is used as a reference, in order to fully understand the logic of the aircraft and pilot interfaces.
- Layer 3: Detailed information
  Layer 3 provides more detailed explanations, that are not necessarily needed in flight.

Note: *For paper only, the following examples show the visual characteristics of each kind of layer*

EXAMPLE	- Text in layer 1 Layer 1 is the default layer. No symbology when not following layer 2 or layer 3 information.

L2

EXAMPLE	- Text in layer 2

L3

EXAMPLE	- Text in layer 3

L1

EXAMPLE	- Text in layer 1 (as this text follows a text in layer 2 or 3, symbology "L1")

OPTIONAL EQUIPMENT

The legend ◁ (if installed) indicates that a paragraph or an illustration is applicable only if the related optional equipment is installed.

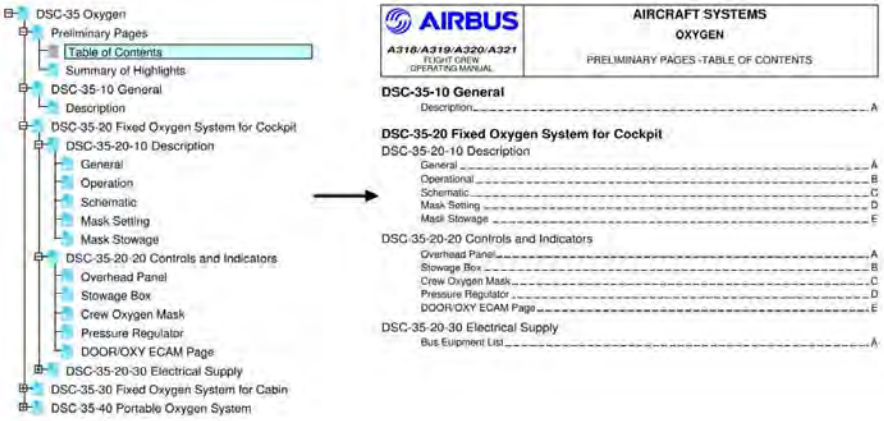
FCOM FORMAT AND STYLE INFORMATION - PAPER ONLY

Ident.: GEN-00013793.0001001 / 21 MAR 16
Applicable to: ALL

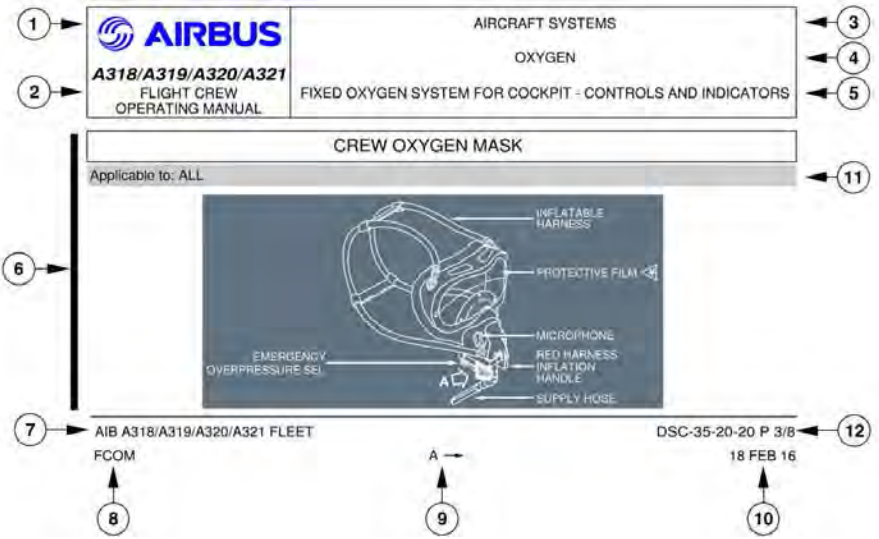
TABLE OF CONTENTS

Each TOC entry has an alphabetical index that identifies this TOC entry within its subsection. The manual user can easily find a TOC entry content within the manual thanks to this alphabetical

index and the subsection identification. Both are indicated in the TOC and both cross-refer to the paper page footer (see the TOC indexing part below).



HEADER AND FOOTER



1. Airline logo
2. Aircraft types and manual
3. Level 2 chapter (PSL level 2 : GEN, DSC, PRO, LIM, OEB, PER)
4. Level 3 chapter
5. Level 4 chapter
6. Revision mark
7. Key product (document identification and aircraft designation)
8. Key product (manual code)
9. Page index
10. Last evolution date
11. Identification strip (list of impacted aircraft)
12. PSL path

REVISION MARK

In the paper format, a vertical bar in the margin of the DU identifies the modified part. Each vertical bar has a numerical index that refers to the associated reason of the change in the Summary of Highlight.
This Summary of Highlight lists all the changes and associated reasons of the change (if necessary) that the revision has introduced.

TOC INDEXING

In the paper page footer, the TOC indexing is of the following type:

A	:	The paper page contains the whole "A" TOC entry content
A to B	:	The paper page contains the whole "A" and "B" TOC entries contents
A →	:	The "A" TOC entry content starts on this paper page and continues on the following paper page
← A	:	The "A" TOC entry content starts on a previous paper page and finishes on this paper page
← A →	:	The "A" TOC entry content starts on a previous paper page and continues on the following paper page
A to C→	:	The paper page contains the whole "A" and "B" TOC entries contents but the "C" TOC entry content starts on this paper page and continues on the following paper page

← A to C : The paper page contains the whole "B" and "C" TOC entries contents but the "A" TOC entry content starts on a previous paper page and finishes on this paper page

← A to C → : The paper page contains the whole "B" TOC entry content but the "A" TOC entry content starts on a previous paper page and finishes on this paper page and the "C" TOC entry content starts on this paper page and continues on the following paper page

Note: *1. The indexes follow the alphabetical order: A, B, C, ..., Z, AA, AB, AC, ..., AZ, BA, BB, BC, ...*
2. For each subsection, the index starts again from A.
3. When a TOC entry content continues on the following paper page, the text "Continued on the following page" is also indicated.

FCOM REVISIONS

Ident.: GEN-00012634.0001001 / 24 OCT 14
Applicable to: ALL

FCOM REVISION

FCOM revisions are issued to add, update, or revise information. The Operator determines the revision periodicity.
When necessary, a revision may be issued in between the defined periodicity (e.g. need for urgent update).
A vertical bar appears to the left of all revised parts of the manual.

TEMPORARY INFORMATION

Some FCOM sections may need a temporary update (e.g. to explain a system behavior that will be modified by a future standard). In such cases, the applicable FCOM section is updated with a Temporary Documentary Unit (TDU).
Information contained in the TDU is highlighted in the manual and the initial content of the FCOM remains available for consultation and comparison and is highlighted (identification strip) as being impacted by the TDU.
A List of Effective Documentary Units (LEDU) is provided in the FCOM

OPERATIONS ENGINEERING BULLETINS

Operations Engineering Bulletins (OEB) are issued, when it is necessary, to rapidly transmit technical and procedural information.
The OEB chapter provides a list of all applicable OEBs.

ABBREVIATIONS

Ident.: GEN-00012598.0001001 / 05 SEP 17
Applicable to: ALL

A

Abbreviation	Term
A>B	A is greater than B
A≥B	A is greater than or equal to B
A<B	A is less than B
A≤B	A is less than or equal to B
A/BRK	Autobrake
A/C	Aircraft
A/P	Autopilot
AP	Autopilot
A/S	Airspeed
A/SKID	Anti-skid
A/THR	Auto Thrust
AA	Airworthiness Authorities
AAL	Above Aerodrome Level
AAT	Aircraft Allocation Table
AB	Abort
ABCU	Alternate Braking Control Unit
ABN	Abnormal
ABV	Above
AC	Alternating Current
ACARS	ARINC Communication Addressing and Reporting System
ACAS	Airbrone Collision Avoidance System
ACCEL	Acceleration
ACC	Active Clearance Control
ACCU	Accumulator
ACP	Audio Control Panel
ACS	Aircraft Configuration Summary
ACSC	Air Conditioning System Controller
ACT	Additional Center Tank
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADIRS	Air Data Inertial Reference System
ADIRU	Air Data Inertial Reference Unit
ADM	Air Data Module
ADR	Air Data Reference
ADS-B	Automatic Dependent Surveillance - Broadcast
ADS-C	Automatic Dependent Surveillance - Contract

Continued on the following page

Continued from the previous page

Abbreviation	Term
ADV	Advisory
AEVC	Avionic Equipment Ventilation Controller
AFM	Airplane Flight Manual
AFS	Auto Flight System
AGL	Above Ground Level
AIDS	Aircraft Integrated Data System
AIL	Aileron
AIME	Autonomous Integrity Monitoring Extrapolation
AIP	Attendant Indication Panel
AIU	Audio Interface Unit
ALT	Altitude
ALTN	Alternate
AMC	Acceptable Means of Compliance
AMI	Airline Modifiable Information
AMU	Audio Management Unit
ANT	Antenna
AOA	Angle of Attack
AOC	Airline Operational Control
APP	Approach
APPR	Approach
APPU	Assymetry Position Pick-off Unit
APU	Auxiliary Power Unit
AR	Authorization Required
ARINC	Aeronautical Radio Incorporated
ARN	Aircraft Registration Number
ARP	Aerospace Recommended Practice
ARPT	Airport
ASAP	As Soon As Possible
ASD	Accelerate Stop Distance
ASI	Air Speed Indicator
ASP	Audio Selector Panel
ATC	Air Traffic Control
ATM	Air Traffic Management
ATN	Aeronautical Telecommunications Network
ATE	Automatic Test Equipment
ATIS	Automatic Terminal Information System
ATS	Auto Thrust System
ATSAW	Airborne Traffic Situational Awareness
ATSU	Air Traffic Service Unit
ATT	Attitude

Continued on the following page

Continued from the previous page

Abbreviation	Term
AUTO	Automatic
AVNCS	Avionics
AWY	Airway

B

Abbreviation	Term
B/C	Back Course
BARO	Barometric
BAT	Battery
BCL	Battery Charge Limiter
BCDS	Bite Centralized Data System
BCU	Backup Control Unit
BDDV	Brake Dual Distribution Valve
BITE	Built-In Test Equipment
BIU	BITE Interface Unit
BFE	Buyer Furnished Equipment
BFO	Beat Frequency Oscillator
BMC	Bleed Monitoring Computer
BNR	Binary
BRG	Bearing
BRK	Brake
BRT	Bright
BSCU	Braking Steering Control Unit
BTC	Bus Tie Contactor
BTL	Bottle
BTS	Bleed Temperature Sensor
BUS	Busbar
BUSS	Back Up Speed Scale

C

Abbreviation	Term
C/B	Circuit Breaker
CB	Circuit Breaker
C/L	Checklist
CL	Checklist
CAB	Cabin
CAPT	Captain, Capture
CAS	Calibrated Airspeed
CAT	Category
CBMS	Circuit Breaker Monitoring System

Continued on the following page

Continued from the previous page

Abbreviation	Term
CCD	Cursor Control Device
CDL	Configuration Deviation List
CDLS	Cockpit Door Locking System
CDSS	Cockpit Door Surveillance System
CDU	Control Display Unit
CF	Cost of Fuel
CFDIU	Centralized Fault Display Interface Unit
CFDS	Centralized Fault Display System
CFP	Computerized Flight Plan
CG	Center of Gravity
CHAN	Channel
CHG	Change
CHK	Check
CI	Cost Index
CIDS	Cabin Intercommunication Data System
CIDS-SDF	Cabin Intercommunication Data System - Smoke Detection Function
CKPT	Cockpit
CIS	Commonwealth of Independent States
CLB	Climb
CLR	Clear
CLSD	Closed
CM1(2)	Crewmember 1 (left seat) or 2 (right seat)
CM1	Crewmember 1 (left seat)
CM2	Crewmember 2 (right seat)
CMPTR	Computer
CMS	Constant Mach Segment
CMS	Centralized Maintenance System
CNSU	Cabin Network Server Unit
CO	Company
CO RTE	Company Route
COND	Conditioning
CONF	Configuration
CONT	Continuous
CPC	Cabin Pressure Controller
CPCU	Cabin Pressure Controller Unit
CPDLC	Controller-Pilot Data Link Communication
CRC	Continuous Repetitive Chime
CRG	Cargo
CRS	Course
CRT	Cathode Ray Tube

Continued on the following page

Continued from the previous page

Abbreviation	Term
CRZ	Cruise
CSAS	Conditioned Service Air System
CSCU	Cargo Smoke Control Unit
CSD	Constant Speed Drive
CSM/G	Constant Speed Motor/Generator
CSTR	Constraint
CT	Cost of Time
CTL	Control
CTL PNL	Control Panel
CTR	Center
CVR	Cockpit Voice Recorder

D

Abbreviation	Term
DA	Drift Angle
DAC	Digital to Analog Converter
DAC	Double Annular Combustor
DAR	Digital AIDS Recorder
DC	Direct Current
DCDU	Datalink Control and Display Unit
DCL	Digital Cabin Logbook
DDRMI	Digital Distance and Radio Magnetic Indicator
DECEL	Deceleration
DES	Descent
DEST	Destination
DET	Detection, Detector
DEV	Deviation
DFA	Delayed Flap Approach
DFDR	Digital Flight Data Recorder
DH	Decision Height
DIR	Direction
DIR TO	Direct To
DISC	Disconnect
DISCH	Discharge
DIST	Distance
DITS	Digital Information Transfer System
DIV	Diverter
DMC	Display Management Computer
DME	Distance Measuring Equipment
DMU	Data Management Unit (Aids)

Continued on the following page

Continued from the previous page

Abbreviation	Term
DN	Down
DPO	Descent Profile Optimization
DSDL	Dedicated Serial Data Link
DTG	Distance To Go
DTO	Derated Takeoff
DU	Display Unit
DU	Documentary Unit

E

Abbreviation	Term
EWD	Engine/Warning Display
ECAM	Electronic Centralized Aircraft Monitoring
ECAS	Emergency Cockpit Alerting System
ECB	Electronic Control Box (APU)
ECM	Engine Condition Monitoring
ECON	Economic
ECP	ECAM Control Panel
ECS	Environmental Control System
ECU	Engine Control Unit
EDP	Engine-Driven Pump
EEC	Electronic Engine Computer
EFB	Electronic Flight Bag
EFCS	Electronic Flight Control System
EFIS	Electronic Flight Instruments System
EFF	Electronic Flight Folder
EFOB	Estimated Fuel On Board
EGPWS	Enhanced Ground Proximity Warning System
EGT	Exhaust Gas Temperature
EIS	Electronic Instruments System
EIU	Engine Interface Unit
ELAC	Elevator Aileron Computer
ELEC	Electrics
ELT	Emergency Locator Transmitter
ELEV	Elevator
ELV	Elevation
EMER	Emergency
EMER GEN	Emergency Generator
ENG	Engine
EO	Engine-Out
EOSID	Engine-Out Standard Instrument Departure

Continued on the following page

Continued from the previous page

Abbreviation	Term
EPE	Estimated Position Error (equal to EPU)
EPR	Engine Pressure Ratio
EPU	Emergency Power Unit
EPU	Estimated Position Uncertainty (equal to EPE)
EQPT	Equipment
EROPS	Extended Range Operation
ESS	Essential
EST	Estimated
ETA	Estimated Time of Arrival
ETE	Estimated Time Enroute
ETOPS	Extended Twin Operations
ETP	Equal Time Point
EVMU	Engine Vibration Monitoring Unit
E/WD	Engine/Warning Display
EXP	Expedite
EXT PWR	External Power
EXTN	Extension

F

Abbreviation	Term
F	Fuel
FAA	Federal Aviation Administration
FAP	Forward Attendant Panel
F/C	Flight Crew
F/O	First Officer
FO	First Officer
FAC	Flight Augmentation Computer
FADEC	Full Authority Digital Engine Control System
FAF	Final Approach Fix
FANS	Future Air Navigation System
FAP	Forward Attendant Panel
FAR	Federal Aviation Regulations
FAV	Fan Air Valve
FCDC	Flight Control Data Concentrator
FCMS	Fuel Control and Monitoring System
FCOM	Flight Crew Operating Manual
FCTM	Flight Crew Techniques Manual
FCU	Flight Control Unit
FD	Flight Director
FDGJ	Fan Drive Gear System

Continued on the following page

Continued from the previous page

Abbreviation	Term
FDIMU	Flight Data Interface and Management Unit
FDIU	Flight Data Interface Unit
FDU	Fire Detection Unit
FEP	Final End Point
FF	Fuel Flow
FG	Flight Guidance
FGC	Flight Guidance Computer
F-G/S	FLS Glide Slope
FIDS	Fault Isolation and Detection System
FL	Flight Level
FLEX	Flexible
FLHV	Fuel Lower Heating Value
F-LOC	FLS Localizer
FLP	Flap
FLS	FMS Landing System
FLSCU	Fuel Level Sensing Control Unit
FLT	Flight
F/CTL	Flight Control
FLT CTL	Flight Control
FLXTO	Flexible Takeoff
FM	Flight Management
FMA	Flight Mode Annunciator
FMGC	Flight Management and Guidance Computer
FMGS	Flight Management and Guidance System
FMS	Flight Management System
FMV	Fuel Metering Valve
FNL	Final
FOB	Fuel On Board
FOHE	Fuel Oil Heat Exchanger
FOM	Figure Of Merit
FPA	Flight Path Angle
F-PLN	Flight Plan
FPD	Flight Path Director
FPPU	Feedback Position Pick-off Unit
FPV	Flight Path Vector
FQ	Fuel Quantity
FQI	Fuel Quantity Indication
FQIC	Fuel Quantity Indication Computer
FQU	Fuel Quantity Unit
FREQ	Frequency

Continued on the following page

Continued from the previous page

Abbreviation	Term
FRT	Front
FRV	Fuel Return Valve
FTIS	Fuel Tank Inerting System
FU	Fuel Used
FWC	Flight Warning Computer
FWD	Forward
FWS	Flight Warning System

G

Abbreviation	Term
G/S	Glideslope
GA	Go-Around
GAPCU	Ground and Auxiliary Power Control Unit
GBAS	Ground Based Augmentation System
GCU	Generator Control Unit
GDU	Group of Documentary Unit
GEN	Generator
GES	Ground Earth Station
GLC	Generator Line Contactor
GLS	GBAS Landing System
GLS	GNSS Landing System
GMT	Greenwich Mean Time
GND	Ground
GND TEMP	Ground Temperature
GNSS	Global Navigation Satellite System
GPCU	Ground Power Control Unit
GPIRS	Global Positioning and Inertial Reference System
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
GRND	Ground
GRP	Geographic Reference Point
GRVTY	Gravity
GS	Ground Speed
GSM	Global System for Mobile Communication
GW	Gross Weight

H

Abbreviation	Term
HC	Harness Connector
HCU	Hydraulic Control Unit

Continued on the following page

Continued from the previous page

Abbreviation	Term
HDG	Heading
HDG/S	Heading Selected
HDL	Handle
HF	High Frequency
HI	High
HLD	Hold
HM	Holding Pattern with a Manual Termination
HMU	Hydrau-Mechanical Unit
HMS	Heat Management System
HP	High Pressure
HPA	Hectopascal
HPC	High Pressure Compressor
HPSOV	High Pressure Shut-off Valve
HPT	High Pressure Turbine
HPV	High Pressure Valve
HUD	Head Up Display
HUDC	Head Up Display Computer
HYD	Hydraulic

I

Abbreviation	Term
I/O	Inputs/Outputs
I/P	Input or Intercept Profile
IAF	Initial Approach Fix
IAS	Indicated Airspeed
IATA	International Air Transport Association
ICAO	International Air Transport Organization
IDENT	Identification
IDG	Integrated Drive Generator
IFE	In Flight Entertainment
IFPC	Integrated Fuel Pump and Control
IFR	Instrument Flight Rules
IGGS	Inert Gas Generation System
IGN	Ignition
INHIB	Inhibited
ILS	Instrument Landing System
IM	Inner Marker
IMC	Instrument Meteorological Conditions
IMM	Immediate
INB	Inbound

Continued on the following page

Continued from the previous page

Abbreviation	Term
INBO	Inboard
INCREM	Increment
IND	Indicator
INIT	Initialization
INOP	Inoperative
INR	Inner
INST	Instrument
INTCPT	Intercept
INV	Inverter
IP	Intermediate Pressure
IPC	Intermediate Pressure Check valve
IPPU	Instrumentation Position Pick-off Unit
IR	Inertial Reference
IRS	Inertial Reference System
ISA	International Standard Atmosphere
ISDU	Initial System Display Unit
ISIS	Integrated Standby Instrument System
ISOL	Isolation
ISPSS	In Seat Power Supply System
ITP	In-Trail Procedure

J

Abbreviation	Term
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements

K

Abbreviation	Term

L

Abbreviation	Term
L/G	Landing Gear
LAF	Load Alleviation Function
LAT	Lateral
LAT	Latitude
LAT REV	Lateral Revision
LAV	Lavatory
LCD	Liquid Crystal Display
LCN	Load Classification Number

Continued on the following page

Continued from the previous page

Abbreviation	Term
LDA	Landing Distance Available
	Localizer Directional Aid
L DEV	Lateral Deviation
LDG	Landing
LDS	Laptop Docking Station
LED	Light Emitting Diode
LEDU	List of Effective Documentary Units
LEOEB	List of Effective Operations Engineering Bulletins
LESS	List of Effective Section/Subsections
LF	Low Frequency
LGCIU	Landing Gear Control Interface Unit
LGPIU	Landing Gear Position Indicator Unit
LH	Left-Hand
LIM	Limitation
LIS	Localizer Inertial Smoothing
LK	Lock
LL	Latitude/Longitude
LLS	Left-Line Select key
LO	Low
LOC	Localizer
LONG	Longitude
LP	Low Pressure
LPC	Low Pressure Compressor
LPT	Low Pressure Turbine
LRRA	Low Range Radio Altimeter
LRU	Line Replaceable Unit
LS	Loudspeaker
LSK	Line Select Key
LT	Light
LTS	Load and Trim Sheet
LVL	Level
LVL/CH	Level Change
LVR	Lever
LW	Landing Weight

M

Abbreviation	Term
MABH	Minimum Approach Break-off Height
MAC	Mean Aerodynamic Chord
MAG	Magnetic

Continued on the following page

Continued from the previous page

Abbreviation	Term
MAG DEC	Magnetic Declination
MAG VAR	Magnetic Variation
MAINT	Maintenance
MAN	Manual
MAP	Missed Approach Point
MAX	Maximum
MAX CLB	Maximum Climb
MAX DES	Maximum Descent
MAX END	Maximum Endurance
MC	Master Caution
MCDU	Multipurpose Control and Display Unit
MCT	Maximum Continuous Thrust
MCU	Modular Concept Unit
MDA	Minimum Descent Altitude
MDDU	Multifunction Disk Drive Unit
MDH	Minimum Descent Height
MECH	Mechanic
MEA	Minimum En Route Altitude
MED	Medium
MEL	Minimum Equipment List
MFA	Memorized Fault Annunciator
MGB	Main Gearbox
MIN	Minimum
MKR	Marker
MLA	Maneuver Load Alleviation
MLG	Main Landing Gear
MLS	Microwave Landing System
MLW	Maximum Landing Weight
MM	Middle Marker
MMEL	Master Minimum Equipment List
MMO	Maximum Operating Mach
MMR	Multi Mode Receiver
MN	Mach number
MORA	Minimum Off Route Altitude
MP	Modification Proposal
MRIU	Maintenance and Recording Interface Unit
MSA	Minimum Safe Altitude
MSG	Message
MSL	Mean Sea Level
MSU	Mode Selector Unit

Continued on the following page

Continued from the previous page

Abbreviation	Term
MTBF	Mean Time Between Failure
MTC	Modulated Turbine Cooling
MTOW	Maximum Takeoff Weight
MZFW	Maximum Zero Fuel Weight

N

Abbreviation	Term
N/A	Not Applicable
NA	Not Applicable
N1	Low Pressure Rotor Speed (in %)
N2	High Pressure Rotor Speed (in %)
NACA	National Advisory Committee for Aeronautics
NAI	Engine Nacelle Anti-Ice
NAV	Navigation
NAVAID	Navigation Aid
NCD	Non Computed Data
ND	Navigation Display
NDB	Non Directional Beacon
NLG	Nose Landing Gear
NORM	Normal
NPA	Non Precision Approach
NW	Nosewheel
NWS	Nosewheel Steering

O

Abbreviation	Term
O/P	Output
OANS	On-board Airport Navigation System
OAT	Outside Air Temperature
OBRM	On Board Replaceable Module
OEB	Operations Engineering Bulletin
OFF/R	Off Reset
OFST	Offset
OIS	Onboard Information System
OIT	Onboard Information Terminal
OLB	OPS Library Browser
OM	Outer Marker
OP	Open
OPP	Opposite
OPS	Operations

Continued on the following page

Continued from the previous page

Abbreviation	Term
OPT	Optimum
OUTB	Outbound
OUTR	Outer
OVBD	Overboard
OVHD	Overhead
OVHT	Overheat
OVRD	Override
OVSPD	Overspeed
OXY	Oxygen

P

Abbreviation	Term
P/N	Part Number
PN	Part Number
PA	Passenger Address
P-ALT	Profile Altitude
PAX	Passenger
PAR	Precision Approach Radar
PBCS	Performance-Based Communication and Surveillance
PBE	Portable Breathing Equipment
PBN	Performance Based Navigation
P-CLB	Profile Climb
PCU	Power Control Unit
P-DES	Profile Descent
PDB	Performance Data Base
PDU	Pilot Display Unit
PED	Portable Electronic Device
PERF	Performance
PES	Passenger Entertainment System
PF	Pilot Flying
PFC	Porous Friction Course
PFD	Primary Flight Display
PHC	Probes Heat Computer
P-MACH	Profile Mach
PM	Pilot Monitoring
PNL	Panel
POB	Pressure Off Brake
POS	Position
PPOS	Present Position
PPU	Position Pick-off Unit

Continued on the following page

Continued from the previous page

Abbreviation	Term
PR	Pressure
PRED	Prediction
PRESS	Pressure, Pressurization
PROC	Procedure
PROC T	Procedure Turn
PROF	Profile
PROG	Progress
PROTEC	Protection
P-SPEED	Profile Speed
PSL	Product Structure Level
PSU	Passenger Service Unit
PT	Point
PTR	Printer
PTT	Push To Talk
PTU	Power Transfer Unit (Hydraulic)
PVI	Paravisual Indicator
PWR	Power
PWS	Predictive Windshear System

Q

Abbreviation	Term
QAR	Quick Access Recorder
QFE	Field Elevation Atmosphere Pressure
QFU	Runway Heading
QNE	Sea Level Standard Atmosphere Pressure (1013 hPa)
QNH	Sea Level Atmosphere Pressure
QRH	Quick Reference Handbook
QT	Quart (US)
QTY	Quantity

R

Abbreviation	Term
R/I	Radio/Inertial
RA	Radio Altimeter, Resolution Advisory
RAAS	Runway Awareness and Advisory System
RACC	Rotor Active Clearance Control
RAD	Radio
RAIM	Receiver Autonomous Integrity Monitoring
RAT	Ram Air Turbine
RATC	Remote ATC Box

Continued on the following page

Continued from the previous page

Abbreviation	Term
RCDR	Recorder
RCL	Recall
RCP	Required Communication Performance
RCVR	Receiver
REAC	Reactive
REC	Recommended
RED	Reduction
REG	Regulation
REL	Release
REV	Reverse
RH	Right-Hand
RLD	Required Landing Distance
RLSK	Right Line Select Key
RMI	Radio Magnetic Indicator
RMP	Radio Management Panel
RNAV	Area Navigation
RNG	Range
RNP	Required Navigation Performance
ROP	Runway Overrun Protection
ROPS	Runway Overrun Prevention System
ROW	Runway Overrun Warning
RPCU	Residual Pressure Control Unit
RPM	Revolution Per Minute
RPTG	Repeating
RQRD	Required
RSP	Required Surveillance Performance
RSV	Reserves
RSVR	Reservoir
RTA	Required Time of Arrival
RTE	Route
RTL	Rudder Travel Limit
RTO	Rejected Takeoff
RTOW	Regulatory Takeoff Weight
RUD	Rudder
RVSM	Reduced Vertical Separation Minimum
RWY	Runway

S

Abbreviation	Term
S	South
S/C	Step Climb
S/D	Step Descent
S/D	Shut Down
S/F	Slats/Flaps
S/N	Serial Number
SN	Serial Number
SAAAR	Special Aircrew and Aircraft Authorization Required
SAC	Single Annular Chamber
SAT	Static Air Temperature
SATCOM	Satellite Communication
SC	Single Chime
SCP	Software Control Panel
SD	System Display
SDAC	System Data Acquisition Concentrator
SDCU	Smoke Detection Control Unit
SDF	Smoke Detection Function, Simplified Directional Facility
SEC	Spoiler Elevator Computer
SEL	Selector
SFCC	Slat/Flap Control Computer
SFE	Seller-Furnished Equipment
SID	Standard Instrument Departure
SIM	Simulation
SLT	Slat
SOP	Standard Operating Procedure
SPD	Speed
SPD LIM	Speed Limit
SPLR	Spoiler
SRS	Speed Reference System
STAR	Standard Terminal Arrival Route
STAT	Static
STAT INV	Static Inverter
STBY	Standby
STD	Standard
STEER	Steering
STRG	Steering
STS	Status
SWTG	Switching
SYNC	Synchronize
SYS	System

T

Abbreviation	Term
T.O	Takeoff
T/O	Takeoff
TO	Takeoff
T/C	Top of Climb
T/D	Top of Descent
TA	Traffic Advisory
TAC	Taxiing Aid Camera
TACAN	Tactical Air Navigation
TACT	Tactical
TAS	True Air Speed
TAT	Total Air Temperature
TAU	Time to intercept
TAWS	Terrain Awareness and Warning System
TBC	To Be Confirmed
TBD	To Be Determined
T2CAS	Traffic and Terrain Collision Avoidance System
T3CAS	Traffic and Terrain Collision Avoidance System
TCA	Turbine Cooling Air
TCAS	Traffic Alert and Collision Avoidance System
TCC	Turbine Case Cooling
TCM	Thrust Control Malfunction
TDU	Temporary Documentary Unit
TEMP	Temperature
TFTS	Terrestrial Flight Telephon System
TGT	Target
THR	Thrust
THS	Trimmable Horizontal Stabilizer
TK	Tank
TK	Track angle
TKE	Track Angle Error
TLA	Throttle Lever Angle
TLU	Travel Limitation Unit
TMR	Timer
TOC	Table of Contents
TOD	Takeoff Distance
TOGA	Takeoff - Go-Around
TOGW	Takeoff Gross Weight
TOR	Takeoff Run
TOW	Takeoff Weight

Continued on the following page

Continued from the previous page

Abbreviation	Term
T-P	Turn Point
TPIS	Tire Pressure Indicating System
TR	Transformer Rectifier
T-R	Transmitter-Receiver
TRANS	Transition
TRK	Track
TROPO	Tropopause
TRU	Transformer Rectifier Unit
TRV	Travel
TSM	Trouble Shooting Manual
TTG	Time to Go
TVMC	Minimum Control Speed Temperature
TWY	Taxiway

U

Abbreviation	Term
UFD	Unit Fault Data
ULB	Underwater Locator Beacon
UNLK	Unlock
UP	Up, Upper
USB	Universal Serial Bus
UTC	Universal Coordinated Time

V

Abbreviation	Term
V/S	Vertical Speed
V1	Decision Speed
V2	Takeoff Safety Speed
VAPP	Approach Speed
VBV	Variable Bypass Valve
VC	Calibrated airspeed
VDEV	Vertical Deviation
VEL	Velocity
VERT	Vertical
VERT REV	Vertical Revisor
VFE	Maximum Speed for each Flap configuration
VFEN	VFE Next
VFTO	Final Takeoff Speed
VHF	Very High Frequency
VHV	Very High Voltage

Continued on the following page

Continued from the previous page

Abbreviation	Term
VIB	Vibration
VIP	Vertical Intersection Point
VLE	Maximum Landing Gear Extended Speed
VLS	Lowest Selectable Speed
VLV	Valve
VM	Maneuvering Speed
VMAX	Maximum Allowable Speed
VMC	Visual Meteorological Conditions
VMCA	Minimum Control Speed in the Air
VMCG	Minimum Control Speed on Ground
VMCL	Minimum Control Speed at Landing
VMIN	Minimum Operating Speed
VMO	Maximum Operating Speed
VMU	Minimum Unstick Speed
VOR	VHF Omnidirectional Range
VOR-D	VOR-DME
VR	Rotation Speed
VREF	Landing Reference Speed
VSC	Vacuum System Controller
VSI	Vertical Speed Indicator
VSV	Variable Stator Vane
VU	Visual Unit

W

Abbreviation	Term
W/S	Wind Shear
WAI	Wing Anti-Ice
WARN	Warning
WBm	Weight and Balance Manual
WBS	Weight and Balance System
WBS	Weight and Balance System
WD	Warning Display
WGD	Windshield Guidance Display
WHC	Window Heat Computer
WNDW	Window
WPT	Waypoint
WSHLD	Windshield
WT	Weight
WTB	Wing Tip Brake
WXR	Weather Radar

X

Abbreviation	Term
XBLD	Crossbleed
XCVR	Transceiver
XFR	Transfer
XMTR	Transmitter
XPDR	Transponder
XTK	Crosstrack Error

Y

Abbreviation	Term

Z

Abbreviation	Term
ZFCG	Zero Fuel Center of Gravity
ZFW	Zero Fuel Weight
ZFWCG	Zero Fuel Weight Center of Gravity field
Zp	Pressure Altitude

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AIRCRAFT SYSTEMS

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M	Localization	DU Title	DU identification	DU date

No Temporary Documentary Unit

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AIRCRAFT SYSTEMS

AIRCRAFT GENERAL

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GENERAL

Ident.: DSC-20-10-00000284.0001001 / 22 MAR 16
Applicable to: MSN 3408, 4100-4547

The A320 is a subsonic, medium-range, civil transport aircraft.

GENERAL

Ident.: DSC-20-10-00000284.0003001 / 13 DEC 10
Applicable to: MSN 1882-2078, 3467-3518

The A319 is a subsonic, medium-range, civil transport aircraft.

ENGINES

Ident.: DSC-20-10-00000285.0001001 / 13 DEC 10
Applicable to: ALL

The aircraft has two high bypass turbofan engines mounted under the wings.

COCKPIT

Ident.: DSC-20-10-00000286.0002001 / 13 DEC 10
Applicable to: ALL

The cockpit is designed for a two-member crew. It also has a place for 2 observers.

CABIN

Ident.: DSC-20-10-00000287.0007001 / 05 FEB 15
Applicable to: ALL

The passenger seating layout may vary, depending on operating requirements.

CARGO

Ident.: DSC-20-10-00000289.0001001 / 13 DEC 10
Applicable to: ALL

Two cargo compartments are under the cabin floor.

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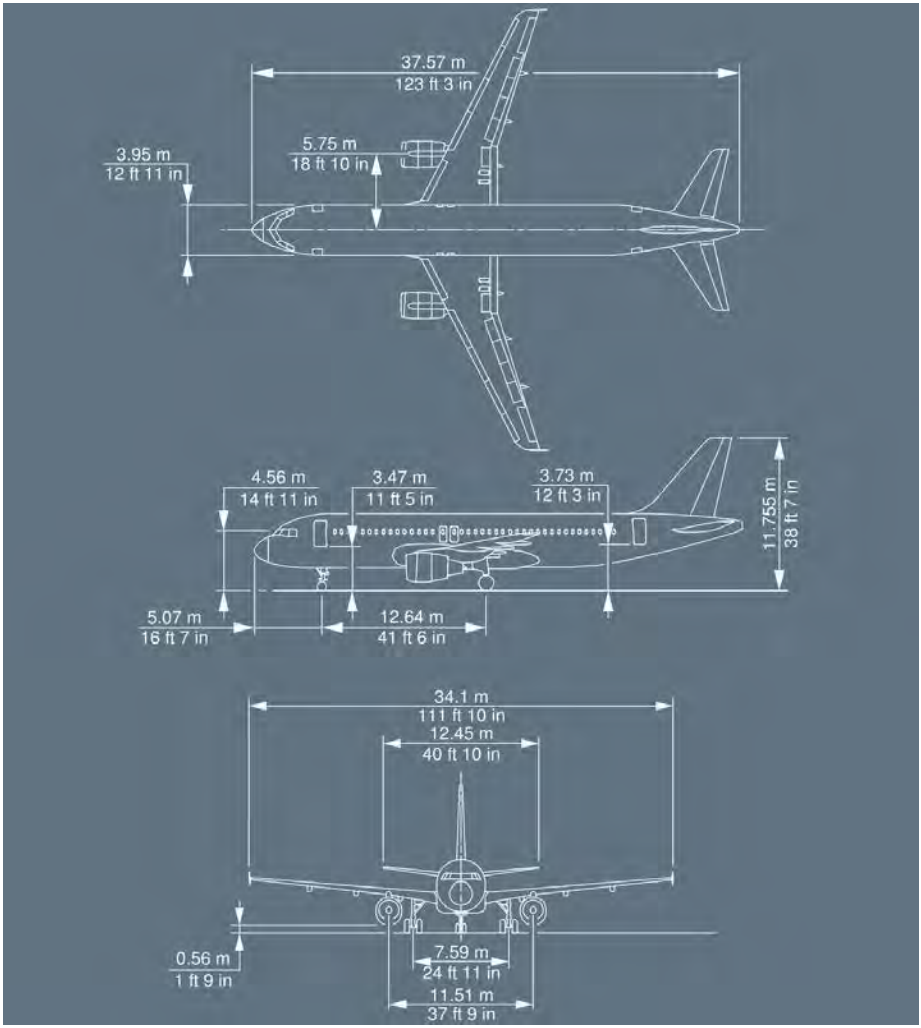
GENERAL ARRANGEMENT

Ident.: DSC-20-20-00000290.0001001 / 21 MAR 16
Applicable to: ALL

This subchapter gives the principal aircraft dimensions, location of unpressurized areas, antennas, ground service connections, and ground maneuvering characteristics.

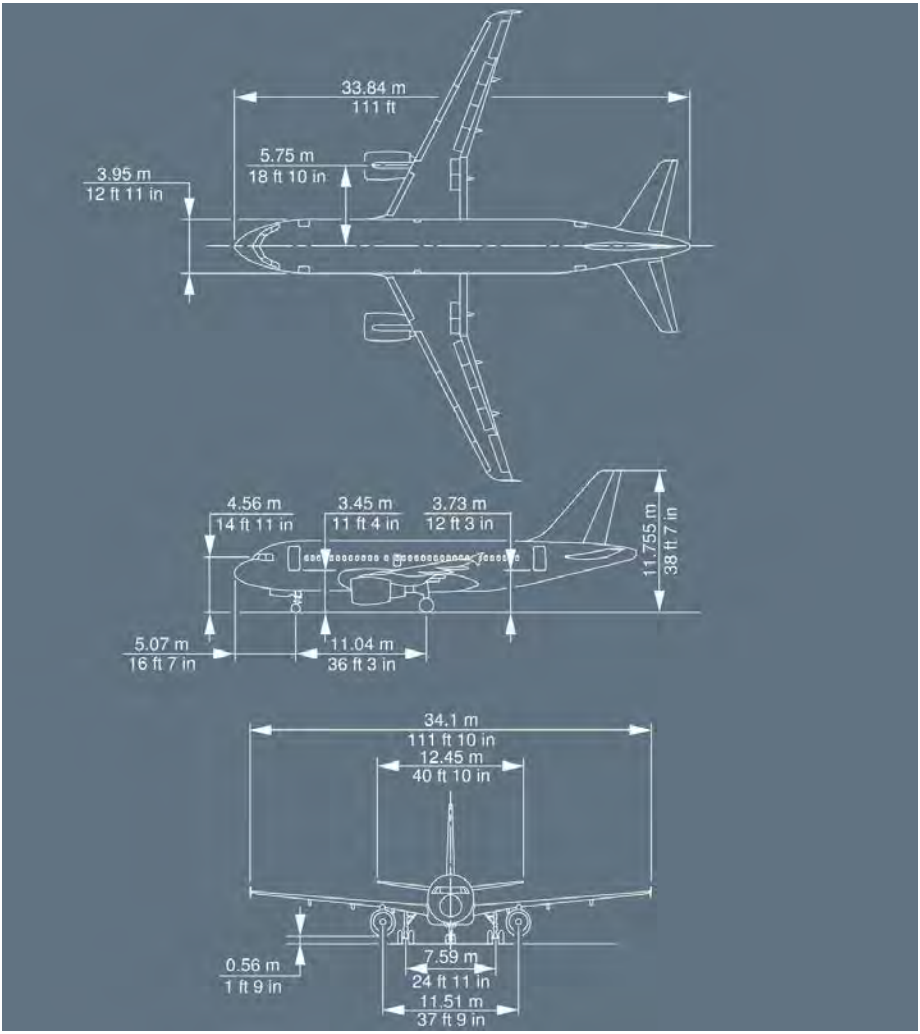
PRINCIPAL DIMENSIONS

Ident.: DSC-20-20-00000291.0001001 / 22 MAY 12
Applicable to: MSN 3408, 4100-4547



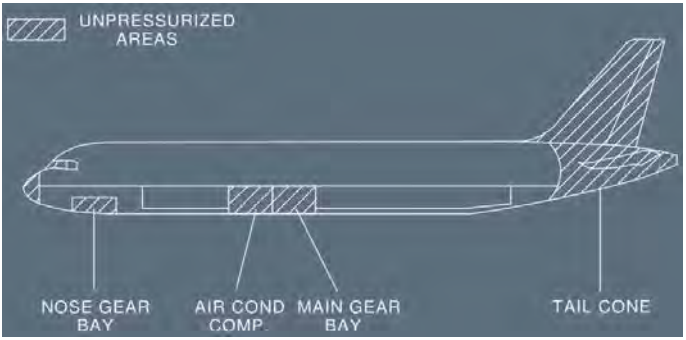
PRINCIPAL DIMENSIONS

Ident.: DSC-20-20-00000291.0002001 / 22 MAY 12
Applicable to: MSN 1882-2078, 3467-3518



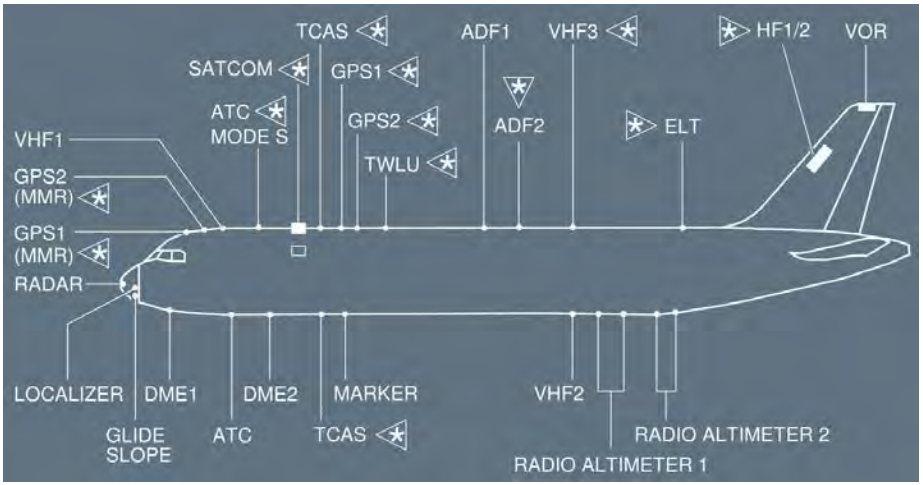
UNPRESSURIZED COMPARTMENTS

Ident.: DSC-20-20-00000292.0001001 / 21 MAR 16
Applicable to: ALL



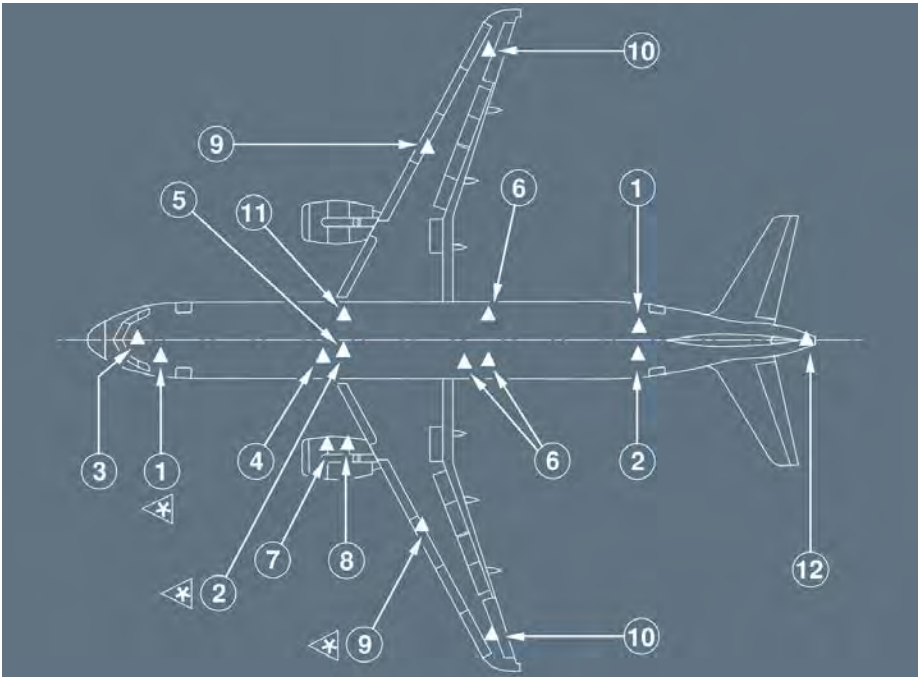
ANTENNA LOCATIONS

Ident.: DSC-20-20-00000293.0001001 / 28 JUL 14
Applicable to: ALL



GROUND SERVICE CONNECTIONS AND PANELS

Ident.: DSC-20-20-00000295.0001001 / 09 OCT 12
Applicable to: MSN 3408, 4100-4547



(1) Toilet servicing

(2) Water filling and/or draining

(3) Electrical ground power receptacle

(4) LP ground air supply connector

(5) HP ground air supply connector

(6) Hydraulic

(7) IDG oil filling

(8) Engine oil filling

(9) Refueling/defueling

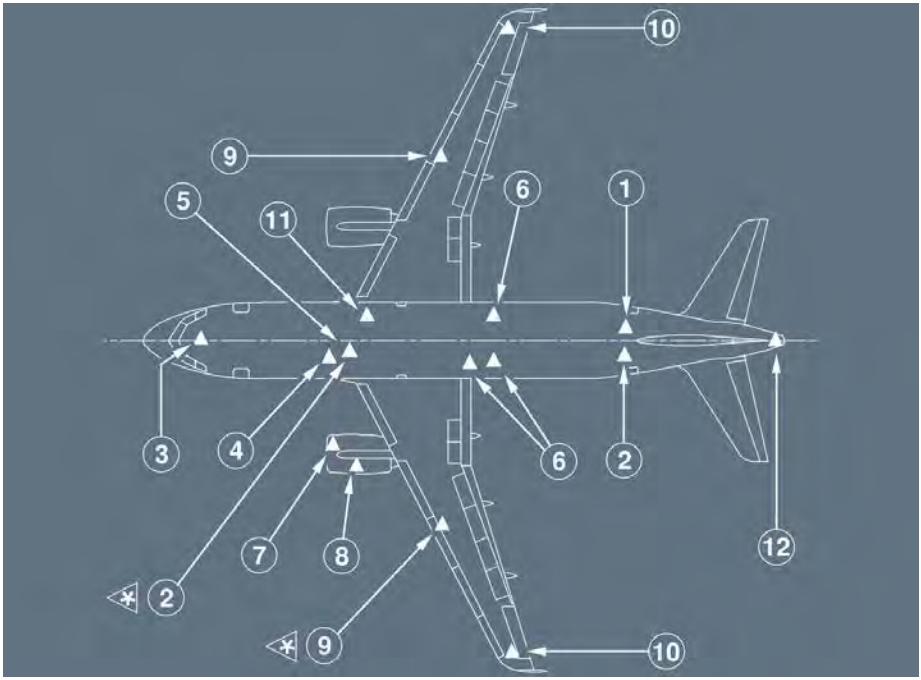
(10) Gravity filling panels

(11) Refueling/defueling panel

(12) APU oil filling

GROUND SERVICE CONNECTIONS AND PANELS

Ident.: DSC-20-20-00000295.0003001 / 09 OCT 12
Applicable to: MSN 1882-2078, 3467-3518



(1) Toilet servicing

(2) Water filling and/or draining

(3) Electrical ground power receptacle

(4) LP ground air supply connector

(5) HP ground air supply connector

(6) Hydraulic

(7) IDG oil filling

(8) Engine oil filling

(9) Refueling/defueling

(10) Gravity filling panels

(11) Refueling/defueling panel

(12) APU oil filling

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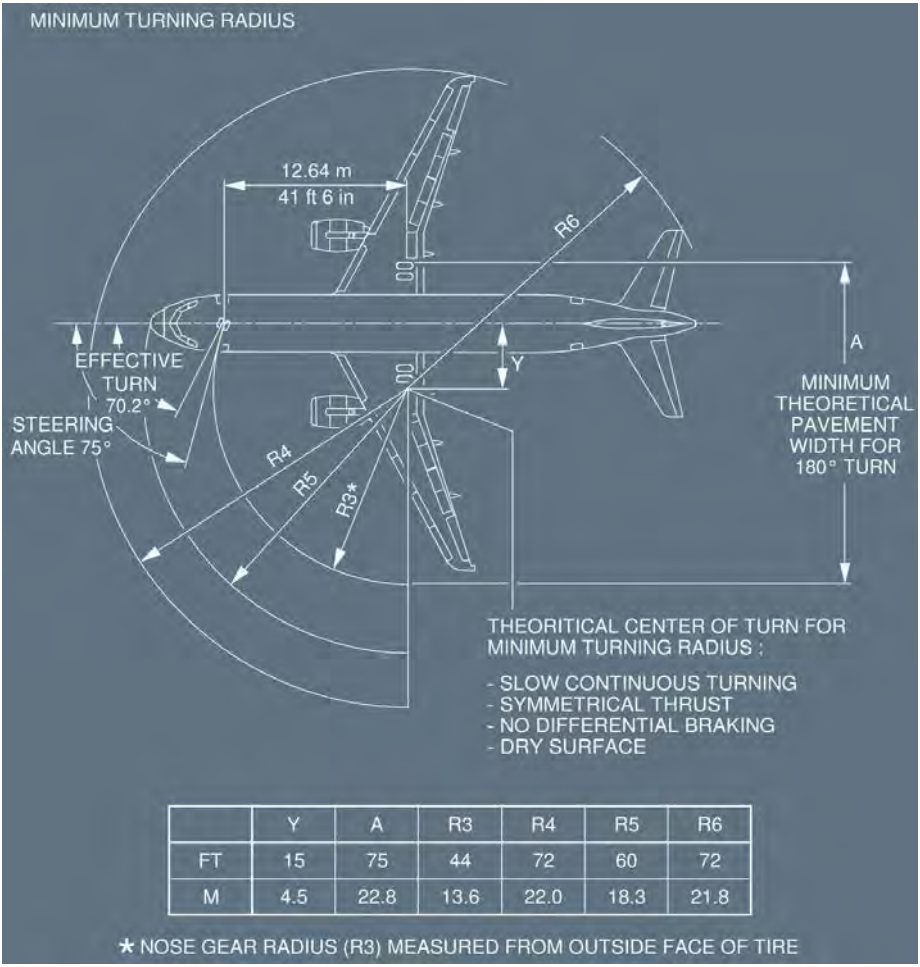
TAXIING

Ident.: DSC-20-30-00000294.0002001 / 01 JUN 17
Applicable to: MSN 3408, 4100-4547

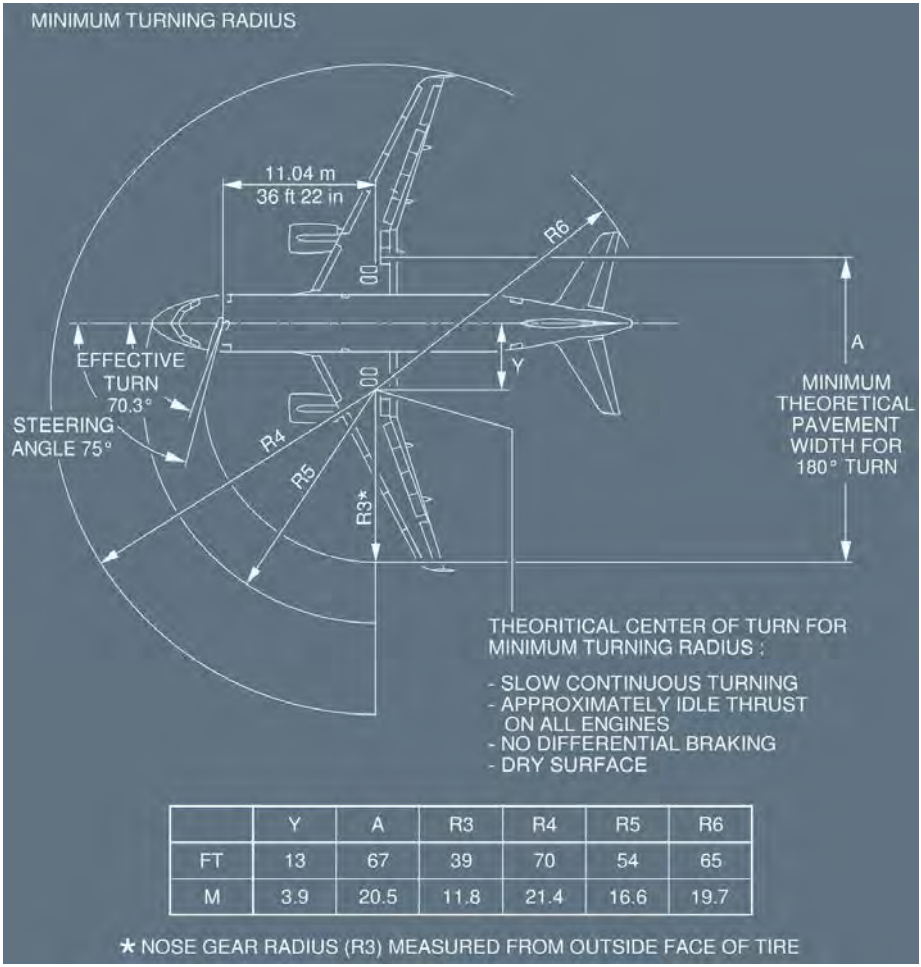


	Y	A	R3	R4	R5	R6
FT	15	75	44	72	60	72
M	4.5	22.8	13.6	22.0	18.3	21.8

* NOSE GEAR RADIUS (R3) MEASURED FROM OUTSIDE FACE OF TIRE

TAXIING

Ident.: DSC-20-30-00000294.0006001 / 01 JUN 17
Applicable to: MSN 1882-2078, 3467-3518



	Y	A	R3	R4	R5	R6
FT	13	67	39	70	54	65
M	3.9	20.5	11.8	21.4	16.6	19.7

* NOSE GEAR RADIUS (R3) MEASURED FROM OUTSIDE FACE OF TIRE

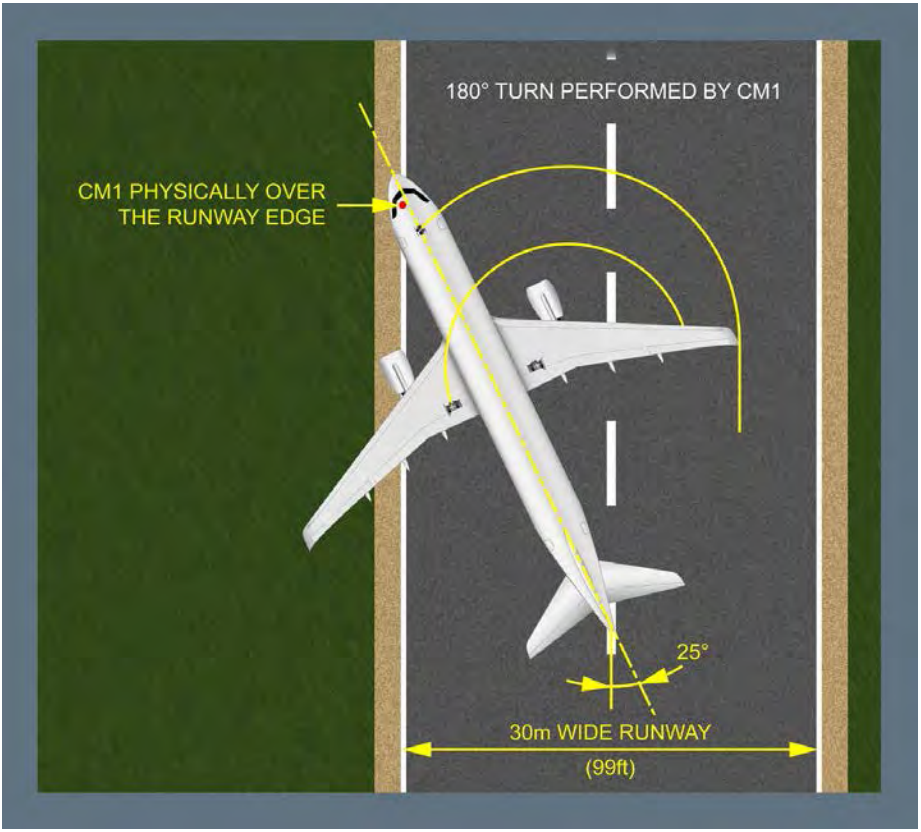
180 DEGREES TURN ON RUNWAY

Ident.: DSC-20-30-00021674.0001001 / 06 JUN 17
Applicable to: MSN 3408, 4100-4547

With the recommended 180 ° turn technique, on dry runway, the approximate turn width is 24 m (79 ft) without margin.

Note: *The flight crew should consider additional margin when the runway is wet or contaminated.*

For more information about the 180 ° Turn Technique, *Refer to FCTM/PR-NP-SOP-100 180 degrees Turn on Runway*.



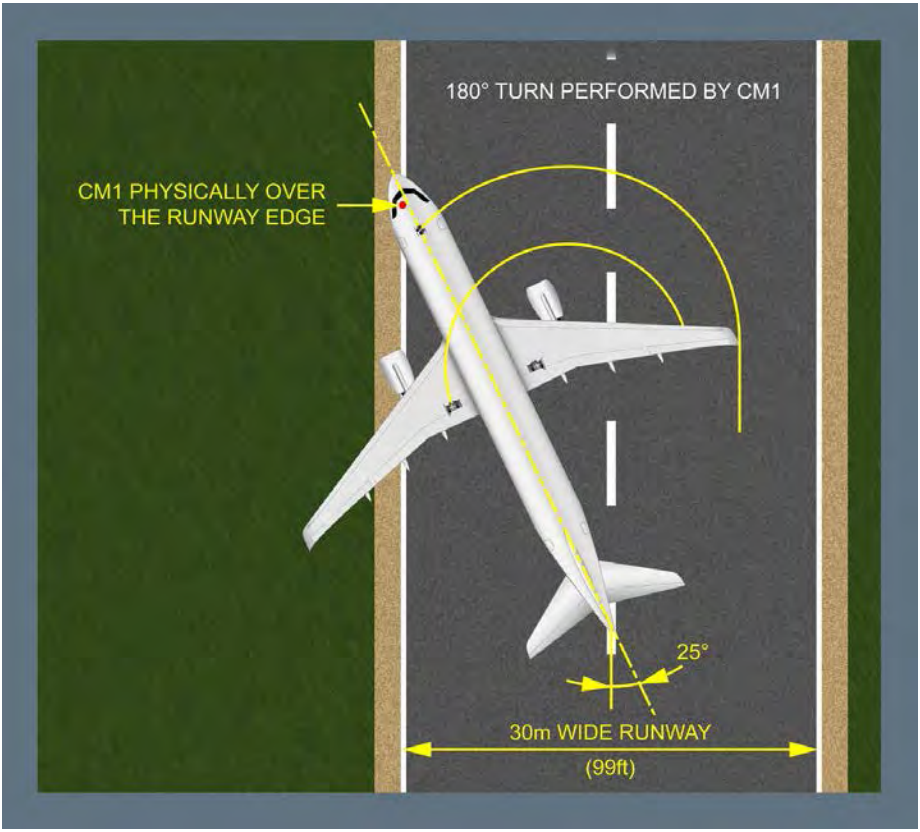
180 DEGREES TURN ON RUNWAY

Ident.: DSC-20-30-00021674.0004001 / 06 JUN 17
Applicable to: MSN 1882-2078, 3467-3518

With the recommended 180 ° turn technique, on dry runway, the approximate turn width is 21 m (69 ft) without margin.

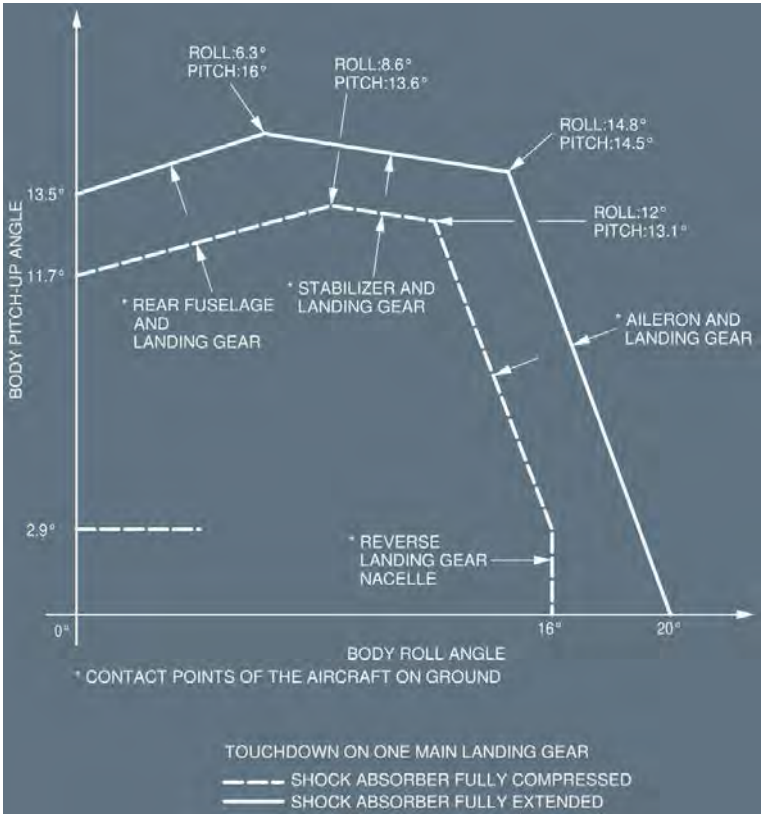
Note: *The flight crew should consider additional margin when the runway is wet or contaminated.*

For more information about the 180 ° Turn Technique, *Refer to FCTM/PR-NP-SOP-100 180 degrees Turn on Runway*.



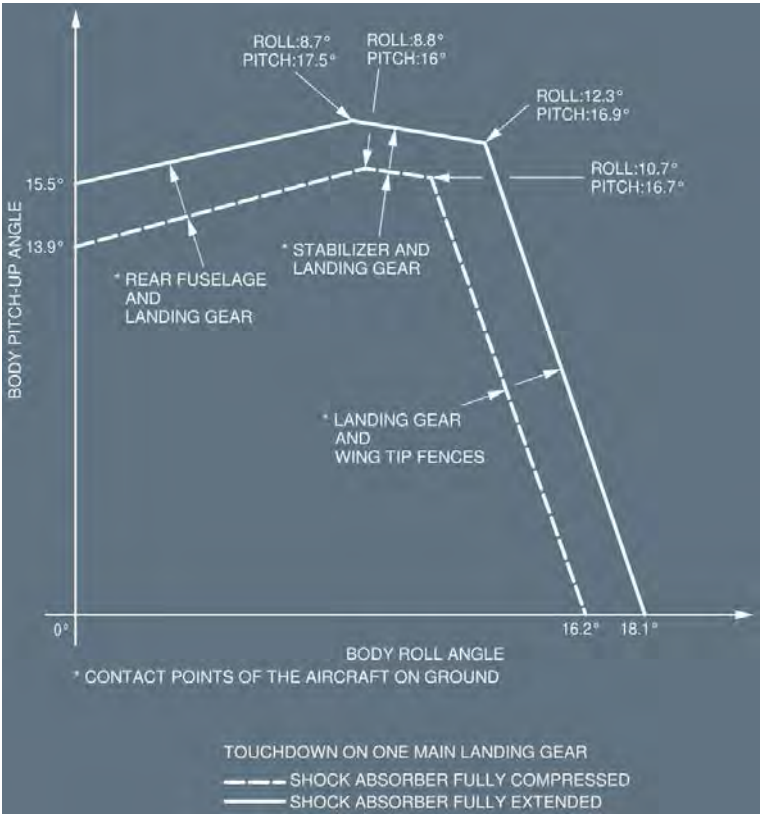
GROUND CLEARANCE DIAGRAM

Ident.: DSC-20-40-00018435.0001001 / 19 JAN 16
Applicable to: MSN 3408, 4100-4547



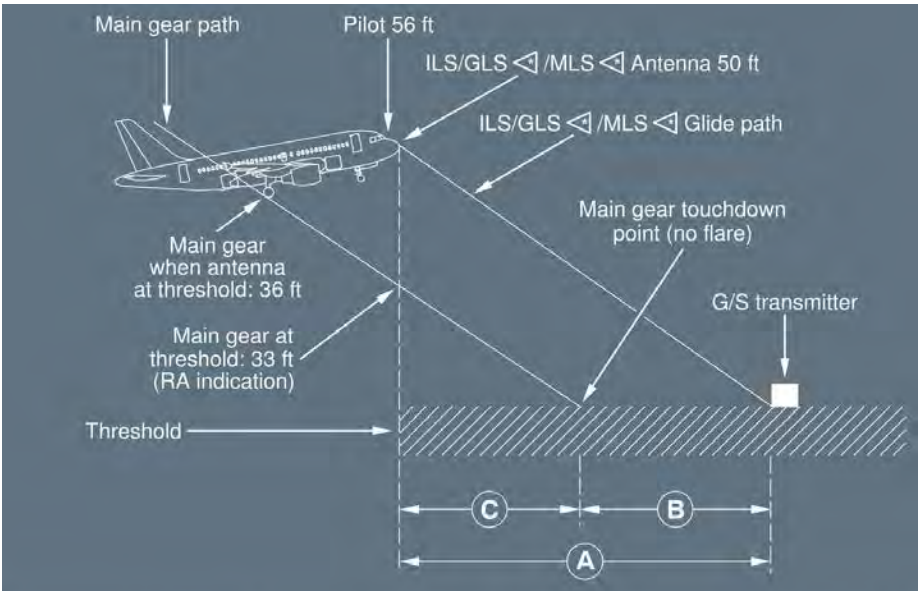
GROUND CLEARANCE DIAGRAM

Ident.: DSC-20-40-00018435.0003001 / 19 JAN 16
Applicable to: MSN 1882-2078, 3467-3518



ILS/GLS ◁ /MLS ◁ FINAL APPROACH AND LANDING GEOMETRY

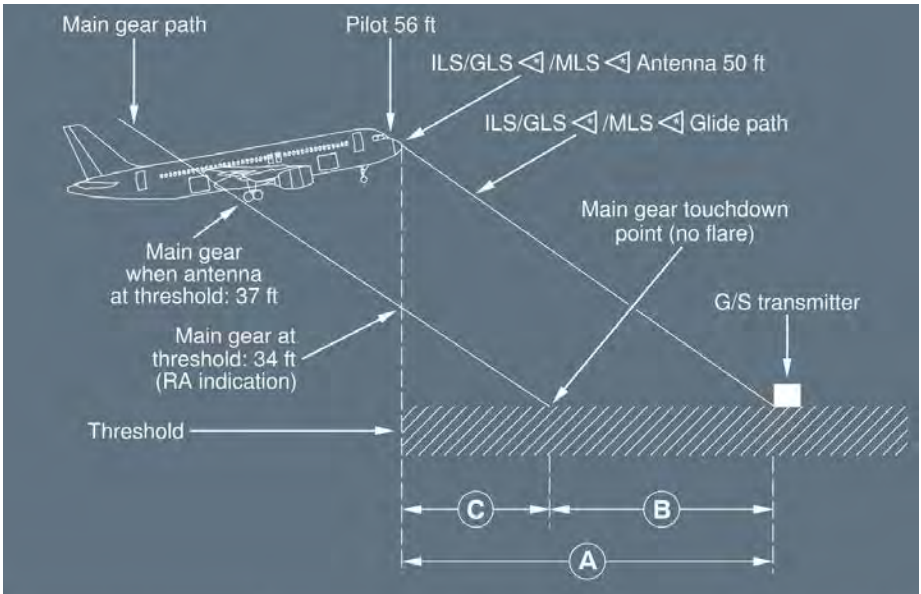
Ident.: DSC-20-50-00019878.0011001 / 22 FEB 17
Applicable to: MSN 1882-2078, 3467-3518



CONDITIONS :	PITCH ANGLE	GLIDE PATH (°)	A	B	TOUCHDOWN POINT C
– FLAPS FULL – ILS ANTENNA AT 50 ft AT THRESHOLD	4°8	2°5	349 m 1145 ft	114 m 375 ft	235 m 771 ft
– NO FLARE	5°3	3°	291 m 954 ft	100 m 329 ft	191 m 625 ft

ILS/GLS ◁ /MLS ◁ FINAL APPROACH AND LANDING GEOMETRY

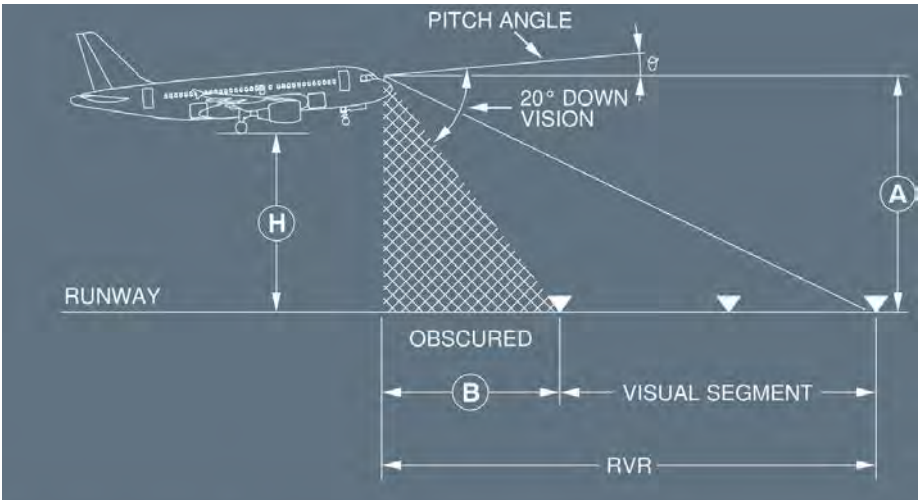
Ident.: DSC-20-50-00019878.0001001 / 22 FEB 17
Applicable to: MSN 3408, 4100-4547



CONDITIONS :	GLIDE PATH (°)	A	B	TOUCHDOWN POINT C
- ILS ANTENNA AT 50 ft AT THRESHOLD	2°5	348 m 1145 ft	112 m 366 ft	236 m 779 ft
- NO FLARE - PITCH ANGLE : 4°	3°	291 m 954 ft	93 m 306 ft	198 m 648 ft

MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)

Ident.: DSC-20-50-00019879.0011001 / 22 FEB 17
Applicable to: MSN 1882-2078, 3467-3518

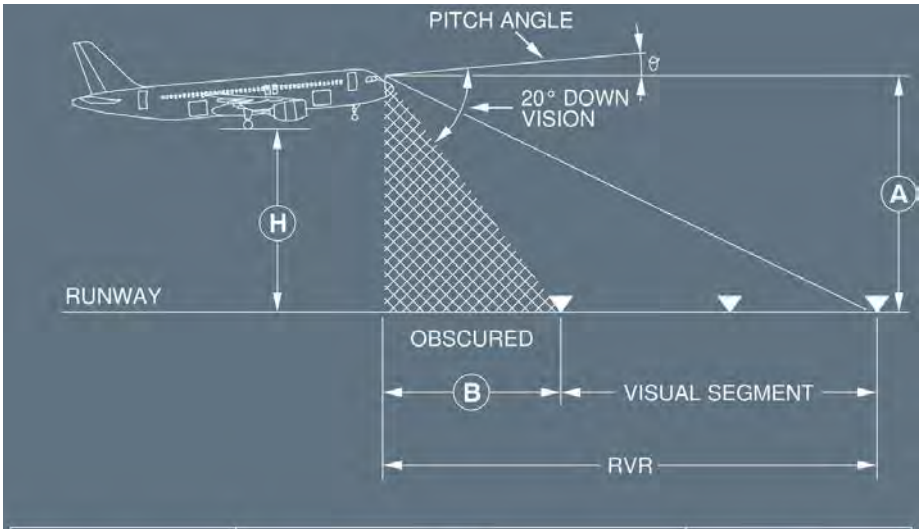


	CAT III		CAT II
H	15 ft (ϑ = 4.9°)	50 ft (ϑ = 5.3°)	100 ft (ϑ = 5.3°)
VISUAL SEGMENT	60 m (197 ft)		120 m (394 ft)
A	35 ft	71 ft	121 ft
OBSCURED B	40 m (131 ft)	82 m (269 ft)	140 m (460 ft)
MINIMUM RVR	100 m (328 ft)	142 m (466 ft)	260 m (854 ft)

Note: This drawing illustrates that, for a CAT III landing (60 m minimum visual segment), the minimum Runway Visual Range (RVR) is 100 m at 15 ft.

MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)

Ident.: DSC-20-50-00019879.0001001 / 22 FEB 17
Applicable to: MSN 3408, 4100-4547

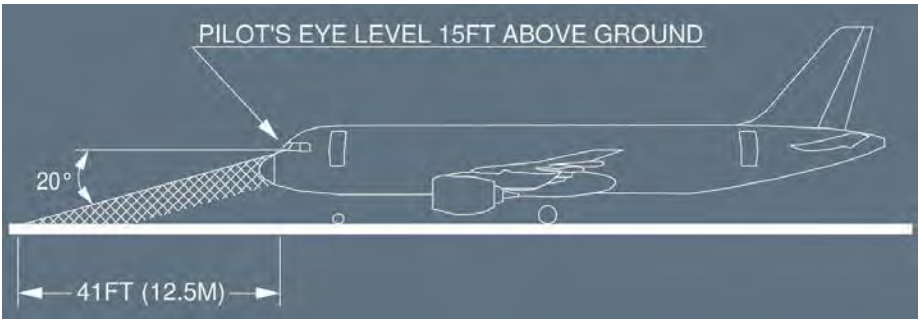


	CAT III		CAT II
H	15 ft (ϑ = 5.4°)	50 ft (ϑ = 4.7°)	100 ft (ϑ = 4.7°)
VISUAL SEGMENT	60 m (197 ft)		120 m (394 ft)
A	36 ft	71 ft	121 ft
OBSCURED B	43 m (140 ft)	79 m (259 ft)	134 m (442 ft)
MINIMUM RVR	103 m (337 ft)	139 m (456 ft)	254 m (836 ft)

Note: This drawing illustrates that, for a CAT III landing (60 m minimum visual segment), the minimum Runway Visual Range (RVR) is 103 m at 15 ft.

VISUAL GROUND GEOMETRY

Ident.: DSC-20-60-00010294.0001001 / 22 MAY 12
Applicable to: ALL



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AIRCRAFT SYSTEMS

AIR CONDITIONING / PRESSURIZATION / VENTILATION

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DSC-21-10 Air Conditioning

DSC-21-10-10 General

DSC-21-10-20 Main Components

DSC-21-10-30 Temperature and Flow Regulation

DSC-21-10-40 System Operation under Failure Condition

DSC-21-10-50 Controls and Indicators

Continued on the following page

Continued from the previous page

DSC-21-20 Pressurization

DSC-21-30 Ventilation

Continued on the following page

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GENERAL

Ident.: DSC-21-10-10-00017767.0001001 / 21 MAR 16
Applicable to: ALL

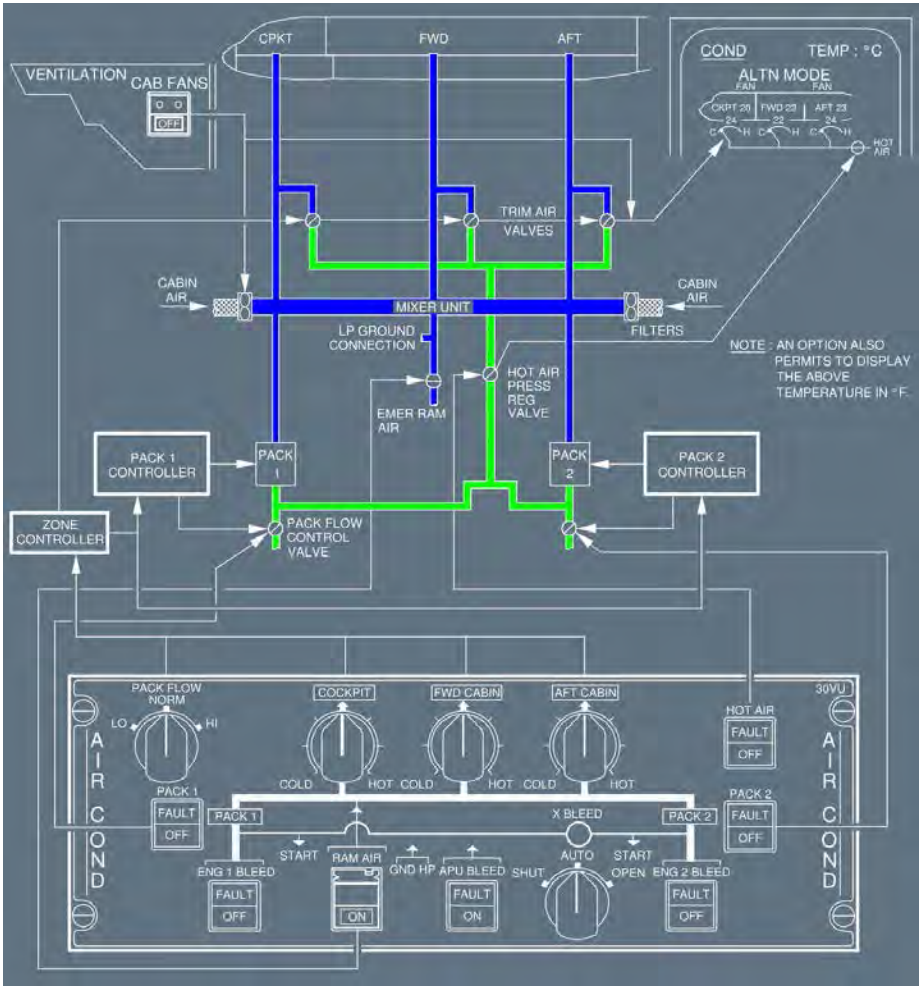
The air conditioning system is fully automatic.
It provides continuous air renewal and maintains a constant, selected temperature in the following three zones : COCKPIT, FWD CABIN, AFT CABIN. These three zones are independently controlled.

Air is supplied by the pneumatic system, via:
- Two pack flow control valves,
- Two packs,
- The mixing unit, which mixes the air that comes from the cabin and the packs.

Air is then distributed to the cockpit and the cabin.
In an emergency, a ram air inlet can provide ambient air to the mixing unit.
The temperature in the flight deck and in the cabin can be selected from the cockpit's AIR COND panel. Temperature regulation of the temperature is ensured by a zone controller and two pack controllers, or two Air Conditioning System Controller (ACSC) ◁ .
Temperature regulation is optimized via the hot air pressure regulating valve, and the trim air valves that add hot air, tapped upstream of the packs, to the air coming from the mixing unit.
A temperature control panel ◁ is also available on the Forward Attendant Panel (FAP). During cruise, the cabin crew can modify each cabin zone temperature that is selected from the cockpit, with a limited authority of ± 2.5 °C. (± 4.5 °F).
Low-pressure air is supplied to the mixing unit by a ground connection.

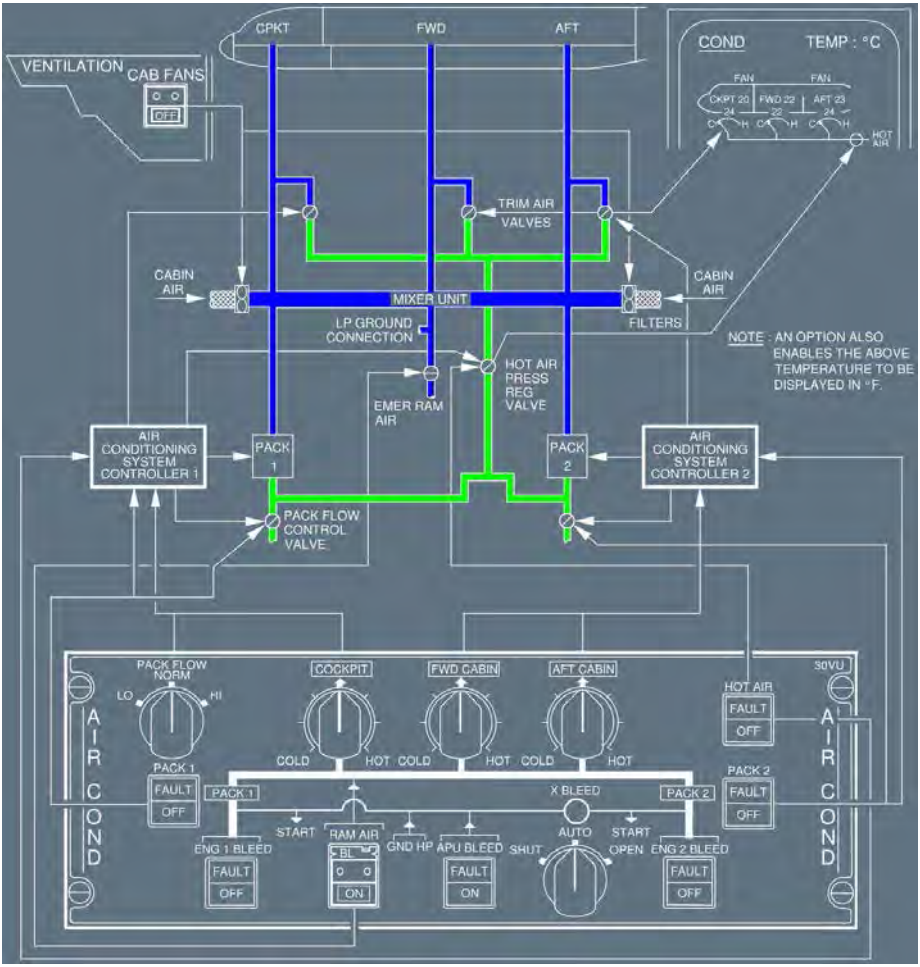
ARCHITECTURE

Ident.: DSC-21-10-10-00000297.0001001 / 22 MAY 12
Applicable to: MSN 1882-2078



ARCHITECTURE

Ident.: DSC-21-10-10-00000297.0003001 / 22 MAY 12
Applicable to: MSN 3408-4547



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AIR CONDITIONING PACK

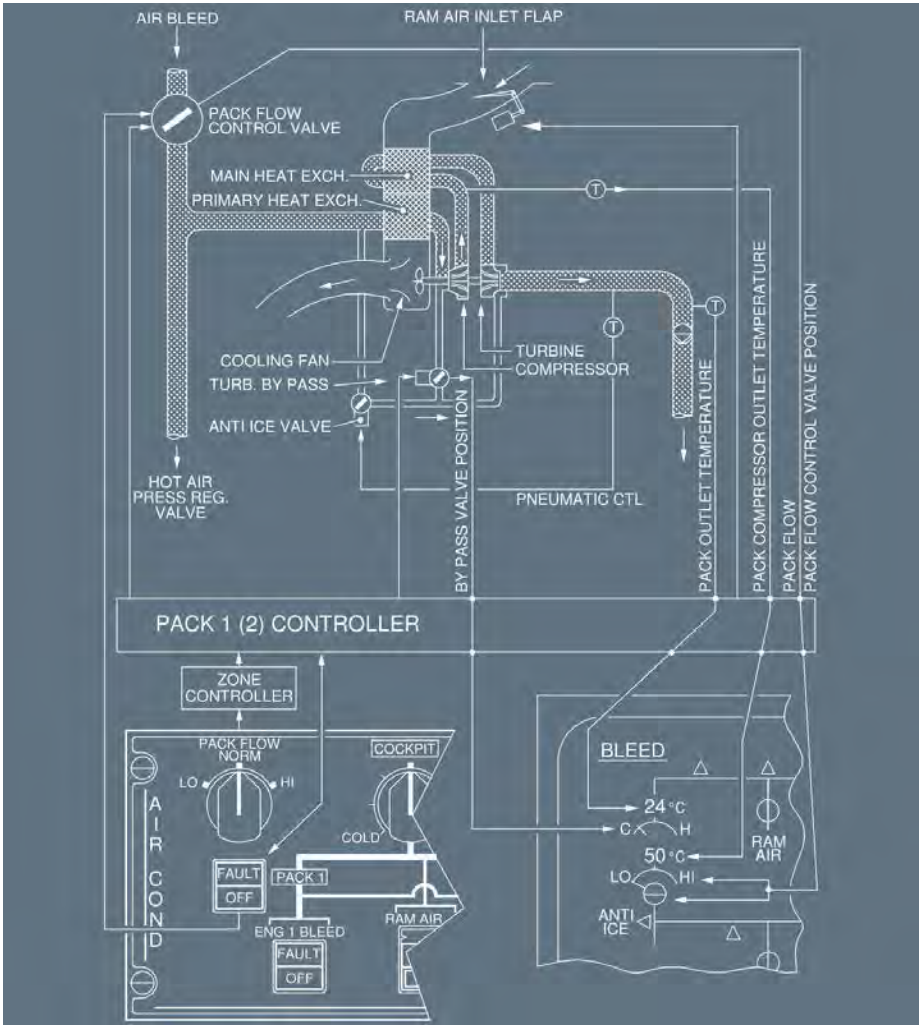
Ident.: DSC-21-10-20-00017768.0001001 / 21 MAR 16
Applicable to: ALL

The two packs operate automatically and independently of each other. Pack operation is controlled by signals coming from the pack controller or the Air Conditioning System Controller (ACSC) ◁❄ .
Warm pre-conditioned bleed air enters the cooling path via the pack flow control valve, and is ducted to the primary heat exchanger.
Then, the cooled bleed air enters the compressor section of the air-cycle machine and is compressed to a higher pressure and temperature.
It is cooled again in the main heat exchanger and enters the turbine section, where it expands and, in expanding, generates power to drive the compressor and cooling air fan.
The removal of energy during this process reduces air temperature, resulting in very low air temperature at turbine discharge.

L3 A water separator system dries the air before it enters the turbine section.

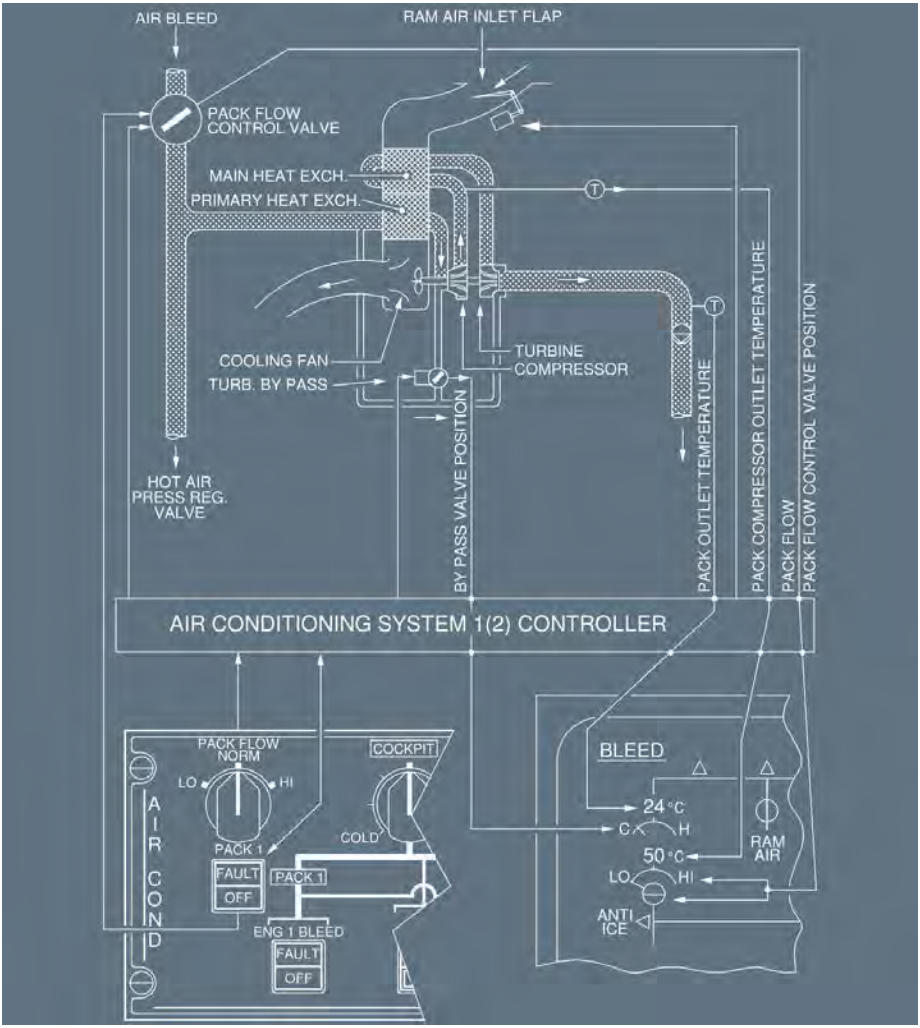
PACK SCHEMATIC (SIMPLIFIED)

Ident.: DSC-21-10-20-00000299.0003001 / 22 MAY 12
Applicable to: MSN 1882-2078



PACK SCHEMATIC (SIMPLIFIED)

Ident.: DSC-21-10-20-00000299.0008001 / 22 MAY 12
Applicable to: MSN 3408-4547



PACK FLOW CONTROL VALVE

Ident.: DSC-21-10-20-00017769.0001001 / 21 MAR 16
Applicable to: ALL

This valve is pneumatically-operated and electrically-controlled. It regulates the air flow in accordance with signals received from the pack controllers or the ACSC ◁❄ .
In the absence of air pressure, a spring keeps the valve closed.
The valve closes automatically in case of pack overheat, engine start, or operation of the fire or ditching pushbutton. The valve is controlled from the AIR COND panel.

EMERGENCY RAM AIR

Ident.: DSC-21-10-20-00000301.0001001 / 20 DEC 16
Applicable to: ALL

An emergency ram air inlet ventilates the cockpit and cabin to remove smoke, or if both packs fail.
The emergency ram air inlet valve is controlled by the RAM AIR pushbutton on the AIR COND panel. This pushbutton opens the ram air valve, provided that ditching is not selected.
When the RAM AIR pushbutton is ON : The outflow valve opens about 50 %, provided that it is under automatic control and ΔP is less than 1 PSI. The outflow valve does not automatically open if it is under manual control, even if ΔP is less than 1 PSI. If ΔP is greater than 1 PSI, the check valve located downstream the ram air door will not open, even if the ram air door has been selected open. No airflow will then be supplied.

MIXER UNIT

Ident.: DSC-21-10-20-00000302.0001001 / 21 MAR 16
Applicable to: ALL

This unit mixes cold fresh air from the packs with the cabin air being recirculated through recirculation fans. The mixer unit is also connected to the emergency ram air inlet and the low pressure ground inlets.

HOT-AIR PRESSURE-REGULATING VALVE

Ident.: DSC-21-10-20-00000303.0002001 / 15 FEB 11
Applicable to: MSN 1882-2078

This valve regulates the pressure of hot air, tapped upstream of the packs.
It is pneumatically-operated and electrically-controlled from the HOT AIR pushbutton on the AIR COND panel. In the absence of air, a spring keeps the valve closed.

The valve closes automatically, if:
- The duct overheats, or
- The cockpit trim air valve fails, or
- Both cabin trim air valves fail.

The hot-air pressure-regulating valve remains operative, even if either the forward or aft cabin trim air valve fails.

HOT-AIR PRESSURE-REGULATING VALVE

Ident.: DSC-21-10-20-00000303.0003001 / 15 FEB 11
Applicable to: MSN 3408-4547

In the absence of air, a spring keeps the valve closed. This pneumatically-operated and electrically-controlled valve regulates hot air pressure, which is tapped upstream of the packs. The air conditioning system controller 1 regulates this valve. This valve closes upon pressing the HOT AIR pushbutton on the AIR COND panel, or when both lanes of one air conditioning system controller fail.

The valve closes automatically, if:
- The duct overheats, or
- The cockpit trim air valve fails, or
- Both cabin trim air valves fail.

The hot-air pressure-regulating valve remains operative, even if either the forward or aft cabin trim air valve fails.

TRIM AIR VALVES

Ident.: DSC-21-10-20-00017771.0001001 / 21 MAR 16
Applicable to: ALL

These valves are electrically-controlled by the zone controller or the ACSC ◁. A trim air valve, associated with each zone, adjusts the temperature by adding hot air.
The cockpit trim air valve is controlled by the ACSC 1 ◁, and the cabin trim air valves are controlled by the ACSC 2 ◁.

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GENERAL

Ident.: DSC-21-10-30-00017772.0001001 / 21 MAR 16
Applicable to: ALL

Temperature regulation is automatic and controlled by one zone controller and two pack controllers, or the ACSC ◁ .

PACK CONTROLLER

Ident.: DSC-21-10-30-00000306.0002001 / 15 FEB 11
Applicable to: MSN 1882-2078

Each pack controller regulates the temperature of its associated pack, in accordance with a demand signal from the zone controller, by modulating the bypass valve and the ram air inlet flaps.
The ram air inlet flaps close during takeoff and landing to avoid ingestion of foreign matter.

Note: *During takeoff, the ram air inlet flaps close when TO power is set and the main landing gear struts are compressed.*
During landing they close as soon as the main landing gear struts are compressed, as long as speed is at or above 70 kt.
They open 20 s after the speed drops below 70 kt.

The pack controllers also regulate flow by modulating the associated pack flow control valve.

ZONE CONTROLLER

Ident.: DSC-21-10-30-00000307.0001001 / 18 MAR 11
Applicable to: MSN 1882-2078

PACK FLOW CONTROL

The crew can use the PACK FLOW pushbutton to adjust the pack flow for the number of passengers and for external conditions.

Whatever the crew selects, the system delivers higher flow for any of the following circumstances:
- In single-pack operation,
- When the APU is supplying bleed air.

The system delivers normal flow if the crew selects LO flow and the temperature demand cannot be satisfied.

ENGINE PRESSURE DEMAND

When the cooling demand in one zone cannot be satisfied, if the bleed pressure is too low, the zone controller sends a pressure demand signal to both Engine Interface Units (EIU) to increase the minimum idle and to raise the bleed pressure.

APU FLOW DEMAND

When the APU bleed valve is open, the zone controller signals the APU's Electronic Control Box (ECB) to increase the APU flow output when any zone temperature demand cannot be satisfied.

TEMPERATURE REGULATION

Ident.: DSC-21-10-30-00017773.0001001 / 21 MAR 16
Applicable to: ALL

Temperature regulation is achieved by the zone controller or the ACSC ◁ .
The zone controller regulates the temperature of the two cabin zones and the cockpit. The ACSC 2 ◁ regulates the temperature of the two cabin zones, and the ACSC 1 ◁ regulates the cockpit temperature.

BASIC TEMPERATURE REGULATION

The flight crew uses the temperature selectors on the air conditioning panel to select the reference temperatures. The zone controller or the ACSC ◁ computes a temperature demand from the selected temperature and the actual temperature. The reference temperatures are then fine tuned for each cabin zone through the temperature control panel ◁ installed on the FAP.

The actual temperature is measured by sensors:
- In the cockpit, for the cockpit zone;
- In the lavatory extraction circuit and galley ventilation system, for the cabin.

A signal corresponding to the lowest demanded zone temperature goes to the pack controller or the ACSC ◁ , which then make both packs supply the required outlet temperature.

OPTIMIZED TEMPERATURE REGULATION

The zone controller or the ACSC ◁ optimizes temperature by acting on the trim air valves.
The temperature selection range is from 18 °C (64 °F) to 30 °C (86 °F).

AIR CONDITIONING SYSTEM CONTROLLERS

Ident.: DSC-21-10-30-00017775.0001001 / 20 DEC 16
Applicable to: MSN 3408-4547

Each air conditioning system controller regulates the temperature of its associated pack, by modulating the bypass valve and the ram air inlet flap.
The ram air inlet flap closes during takeoff and landing to avoid the ingestion of foreign matter.

Note: During takeoff, the ram air inlet flap closes when takeoff power is set, and the main landing gear struts are compressed.
During landing, it closes as soon as the main landing gear struts are compressed, as long as speed is at or above 70 kt.
It opens 20 s after the speed drops below 70 kt.

The air conditioning system controllers also regulate flow by modulating the associated pack flow control valve.

PACK FLOW CONTROL

The flight crew can use the PACK FLOW selector to adjust the pack flow for the number of passengers and for external conditions.

Whatever the crew selects, the system delivers higher flow for any of the following circumstances:
- In single-pack operation,
- When the APU is supplying bleed air.

The system delivers normal flow if the flight crew selects LO flow and the temperature demand cannot be satisfied.

ENGINE PRESSURE DEMAND

When the cooling demand in one zone cannot be satisfied, if the bleed pressure is too low, the air conditioning system controller sends a pressure demand signal to both Engine Interface Units (EIU) to increase the minimum idle and to raise the bleed pressure.

APU FLOW DEMAND

When the APU bleed valve is open, the air conditioning system controller signals the APU's Electronic Control Box (ECB) to increase the APU flow output when any zone temperature demand cannot be satisfied.

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GENERAL

Ident.: DSC-21-10-40-00000309.0001001 / 15 FEB 11
Applicable to: MSN 1882-2078

Each controller consists of a primary channel that is normally in control and a secondary channel that acts as a backup if the primary channel fails.

GENERAL

Ident.: DSC-21-10-40-00000309.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

Each controller is comprised of two lanes. One lane controls the system, the other takes over full control, in case of an active lane failure.

ZONE CONTROLLER

Ident.: DSC-21-10-40-00000310.0001001 / 15 FEB 11
Applicable to: MSN 1882-2078

PRIMARY CHANNEL FAILURE

The secondary channel operates as backup.
The flow setting function and optimized temperature regulation are not available. HOT AIR and TRIM AIR valves close.
The zones are controlled to 24 °C (76 °F) (backup regulation). Pack 1 controls the cockpit temperature. Pack 2 controls the FWD and AFT cabin temperatures.
ALTN MODE appears on the ECAM (Electronic Centralized Aircraft Monitoring) COND page.

SECONDARY CHANNEL FAILURE

This has no effect on zone temperature regulation.
Backup mode is lost.

PRIMARY AND SECONDARY CHANNEL FAILURE

Optimized and backup temperature regulation is lost.
The packs deliver a fixed temperature: 20 °C (68 °F) for pack 1, 10 °C (50 °F) for pack 2. The failure removes all information from the ECAM COND page, which then displays PACK REG.

PACK CONTROLLERS

Ident.: DSC-21-10-40-00000311.0001001 / 15 FEB 11
Applicable to: MSN 1882-2078

PRIMARY CHANNEL FAILURE

The secondary computer operates as a backup.

Regulation is not optimized.
Pack flow is fixed at the previous setting.

SECONDARY CHANNEL FAILURE

This failure has no effect on pack regulation. Backup mode is lost.
ECAM signals related to the corresponding pack are lost.

PRIMARY AND SECONDARY CHANNEL FAILURE

As a backup, corresponding pack outlet temperature is controlled by the anti-ice valve and is stabilized to a temperature between 5 °C (41 °F) and 30 °C (86 °F) in a maximum of 6 min.
ECAM signals, related to the corresponding pack, are lost.

AIR CONDITIONING SYSTEM CONTROLLERS ⋖

Ident.: DSC-21-10-40-00018747.0001001 / 21 MAR 16
Applicable to: ALL

ONE LANE FAILURE

No effect, as the second lane takes over.

BOTH LANES FAILURE

The related pack is lost, and the hot air pressure-regulating valve and associated trim air valves close.

AIR CYCLE MACHINE FAILURE

Ident.: DSC-21-10-40-00000312.0002001 / 15 FEB 11
Applicable to: MSN 1882-2078

If the Air Cycle Machine (ACM) fails (compressor/turbine seizure), the affected pack may be operated in heat exchanger cooling mode.
Warm pre-conditioned bleed air enters the cooling path via the pack valve and goes to the primary heat exchanger. Then, the main part of the cooled air goes directly downstream of ACM turbine through the bypass valve, and the rest goes through the failed ACM.
The ACM seizure reduces the pack flow.

As for normal pack operation:
- The pack controller regulates temperature, in accordance with zone controller demand, by modulating the bypass valve and the ram air inlet flap.
- The zone controller regulates the hot air flow through the hot air valves to optimize cockpit/cabin temperature regulation. Hot air flow is lower than in normal pack operation, because pack flow is reduced.

AIR CYCLE MACHINE FAILURE

Ident.: DSC-21-10-40-00000312.0003001 / 21 MAR 16
Applicable to: MSN 3408-4547

If the Air Cycle Machine (ACM) fails (compressor/turbine seizure), the affected pack may be operated in heat exchanger cooling mode.
Warm pre-conditioned bleed air enters the cooling path via the pack valve and goes to the primary heat exchanger. Then, the main part of the cooled air goes directly downstream of ACM turbine through the bypass valve, and the rest goes through the failed ACM.
The ACM seizure reduces the pack flow.

As for normal pack operation :

- The air conditioning system controller regulates temperature by modulating the bypass valve and the ram air inlet flap.
- The air conditioning system controller regulates the hot air flow through the trim air valves to optimize cockpit/cabin temperature regulation. Hot air flow is lower than in normal pack operation, because pack flow is reduced.

HOT AIR PRESSURE REGULATING VALVE FAILURE

Ident.: DSC-21-10-40-00000313.0001001 / 21 MAR 16
Applicable to: ALL

Failed open : No effect.

Failed closed : Optimized regulation is lost. Trim air valves are driven to the fully closed position. Pack 1 controls the cockpit temperature to the selected value and pack 2 controls the cabin temperature (FWD and AFT) to the mean value of the selected temperatures.

TRIM AIR VALVE FAILURE

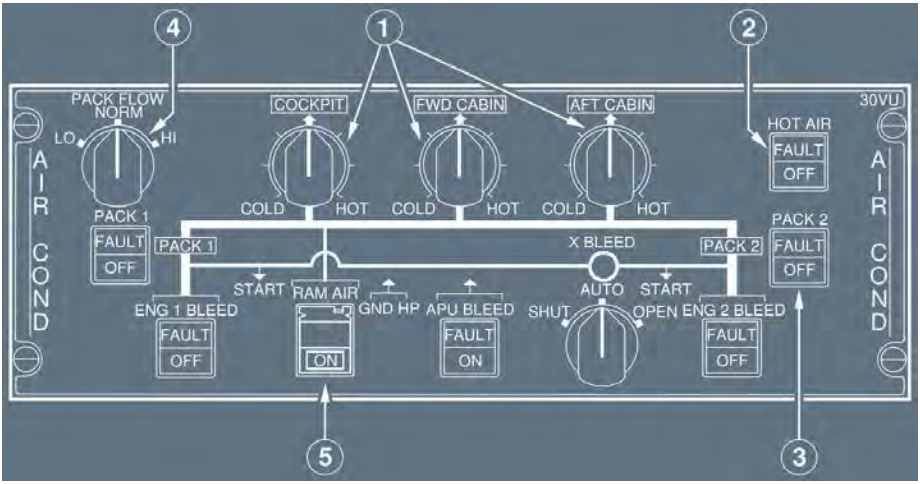
Ident.: DSC-21-10-40-00000314.0001001 / 21 MAR 16
Applicable to: ALL

Optimized temperature regulation of the corresponding zone is lost.

Intentionally left blank

CONTROLS ON OVERHEAD PANEL

Ident.: DSC-21-10-50-00000315.0002001 / 20 DEC 16
Applicable to: ALL



(1) Zone temperature selector

- 12 o'clock position: 24 °C (76 °F)
- COLD position: 18 °C (64 °F)
- HOT position: 30 °C (86 °F).

(2) HOT AIR pb

ON : The valve regulates hot air pressure.

OFF : The valve closes, and the trim air valves close.
The FAULT circuit is reset.

FAULT : The FAULT light comes on amber, along with an associated ECAM caution, when duct overheat is detected. The fault circuit detects an overheat when the duct temperature reaches 88 °C (190 °F) once.
The valve and trim air valves close automatically.
The FAULT light goes off when the temperature drops below 70 °C (158 °F), and the flight crew selects OFF.

(3) PACK pb-sw

ON : The pack flow control valve is automatically-controlled.

It opens, except in the following cases:
- Upstream pressure below minimum
- Compressor outlet overheat
- Engine start sequence:

1. If the crossbleed valve is closed, the valve located on the starting engine side immediately closes, when the MODE selector is set to IGN (or CRK)
2. It remains closed on the starting engine side (provided the crossbleed valve is closed) when:
   - The MASTER sw is set to ON (or MAN START pb is set to ON)
   - The start valve is open
   - N2 < 50 %.

   Note: If the crossbleed valve is open at engine start, both pack flow control valves close.

3. On ground, reopening of the valves is delayed for 30 s to avoid a supplementary pack closure cycle during second engine start.

- FIRE pb, of the engine on the related side, is pressed
- Ditching is selected.

OFF : The pack flow control valve closes.

FAULT lt : Comes on amber, and a caution appears on the ECAM, if the pack flow control valve position disagrees with the selected position, or in the case of compressor outlet overheat or pack outlet overheat.

(4) PACK FLOW selector

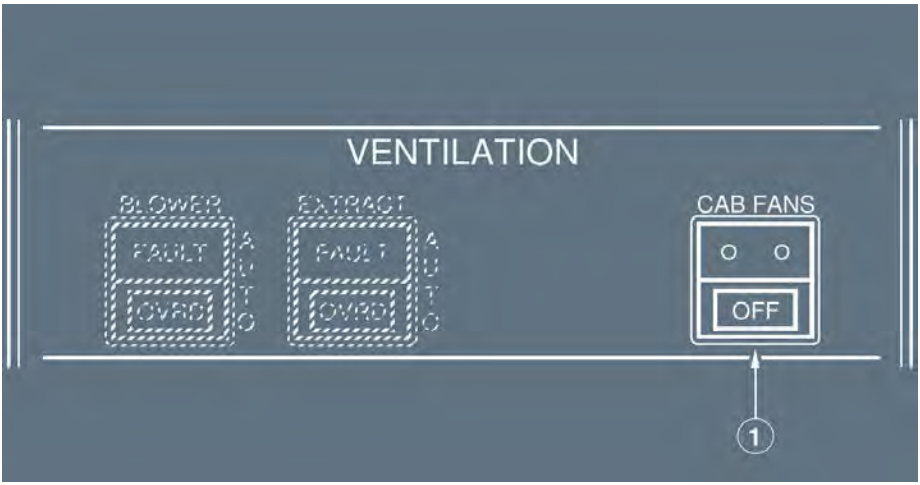
- Permits the selection of pack valve flow, according to the number of passengers and ambient conditions (smoke removal, hot or wet conditions)
  LO (80 %) – NORM (100 %) – HI (120 %)
- Manual selection is irrelevant in single pack operation, or with APU bleed supply. In these cases, HI is automatically selected
- If LO is selected, the pack flow can be automatically selected up to 100 % when the cooling demand cannot be satisfied.

(5) RAM AIR pb (guarded)

ON : The ON light comes on white.

If the DITCHING pb, on the CABIN PRESS panel, is in normal position:
- The emergency ram air inlet opens
- If $\Delta p \geq 1$ PSI: The outflow valve control remains normal. No emergency ram air flows in
- If $\Delta p < 1$ PSI: The outflow valve opens to about 50 % when under automatic control. It does not automatically open when it is under manual control. Emergency ram airflow is directly supplied to the mixer unit.

OFF: The emergency ram air inlet closes.



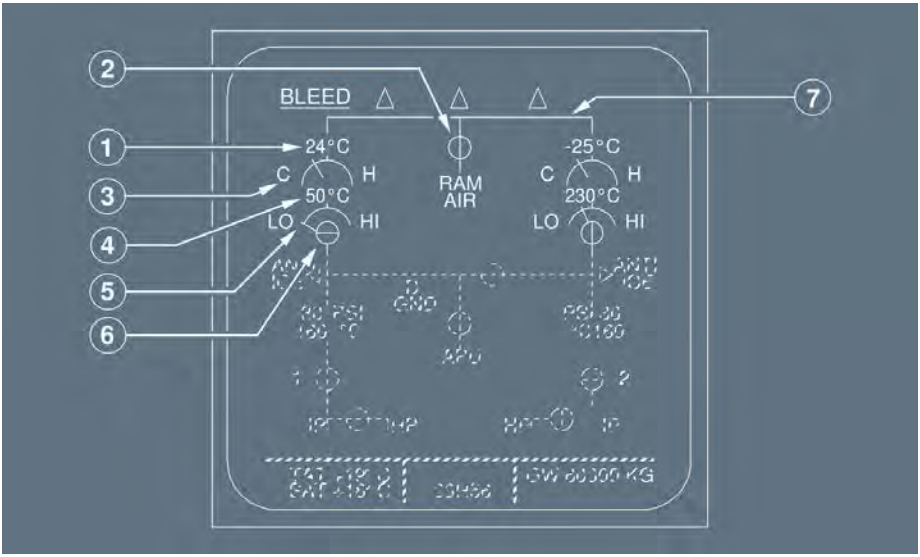
(1) CAB FAN pb

ON : The two cabin fans are on.

OFF: The two cabin fans are off.

ECAM BLEED PAGE

Ident.: DSC-21-10-50-00000316.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) Pack outlet temperature
It appears in green. It becomes amber, if the temperature is higher than 90 °C.

(2) PACK RAM AIR inlet

Crossline: – Green : The flap is normally closed.

In transit : – Amber : The flap is partially open

Inline – Amber : The flap is fully open on ground.

Inline – Green : The flap is fully open in flight.

(3) Pack turbine bypass valve position
Indication is green.

C = Cold – Valve closed

H = Hot – Valve open.

(4) Pack compressor outlet temperature
It appears in green. It becomes amber, if the temperature is higher than 230 °C.

(5) Pack flow
It appears in green. It becomes amber, if the pack flow control valve is closed.

Note: The pack flow indication can be up to 30 % below the actual flow rate.

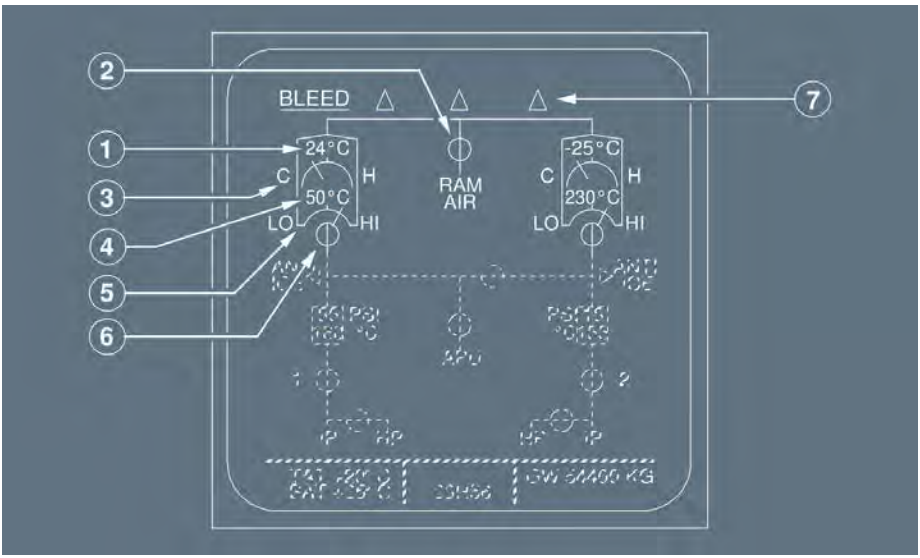
(6) Pack flow control valve

Inline - Green	:	Open.
Inline - Amber	:	Open, and disagrees with the control position.
Crossline - Green	:	Fully closed.
Crossline - Amber	:	Fully closed, and disagrees with the control position.

(7) User Indication
It appears in green. It becomes amber, in flight, when RAM AIR flap is not fully open, and both pack flow control valves are closed .

ECAM BLEED PAGE

Ident.: DSC-21-10-50-00000316.0003001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) Pack outlet temperature
It appears in green. It becomes amber, if the temperature is higher than 90 °C.

(2) PACK RAM AIR inlet

Crossline: – Green : The flap is normally closed.

In transit : – Amber : The flap is partially open

Inline – Amber : The flap is fully open on ground.

Inline – Green : The flap is fully open in flight.

(3) Pack turbine bypass valve position
Indication is green.

C = Cold – Valve closed

H = Hot – Valve open.

(4) Pack compressor outlet temperature
It appears in green. It becomes amber, if the temperature is higher than 260 °C.

(5) Pack flow
It appears in green. It becomes amber, if the pack flow control valve is closed.

Note: The pack flow indication can be up to 30 % below the actual flow rate.

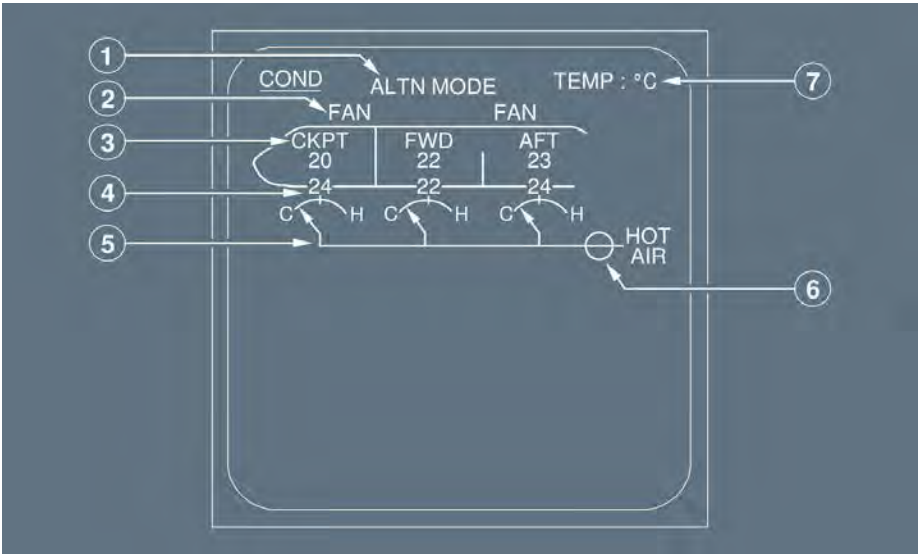
(6) Pack flow control valve

Inline - Green	:	Open.
Inline - Amber	:	Open, and disagrees with the control position.
Crossline - Green	:	Fully closed.
Crossline - Amber	:	Fully closed, and disagrees with the control position.

(7) User Indication
It appears in green. It becomes amber, in flight, when RAM AIR flap is not fully open, and both pack flow control valves are closed .

ECAM COND PAGE

Ident.: DSC-21-10-50-00000317.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078



(1) Zone controller fault indication

ALTN MODE : Primary zone controller fault (green).

PACK REG : Zone controller fault (basic regulation by packs only) (green).

No indication : Zone controller normal operation.

(2) Cabin FAN fault indication

It appears in amber, if the recirculation fan is detected as faulty.

(3) Zone temperature indication

It is in green.

(4) Zone duct temperature

It appears in green, and becomes amber at 80 °C (176 °F).

(5) Zone trim air valve position indication

The arrow is green. It is replaced by amber crosses (“XX”) if the valve fails.

C = Cold valve fully closed.

H = Hot valve fully open.

(6) Hot air pressure regulating valve

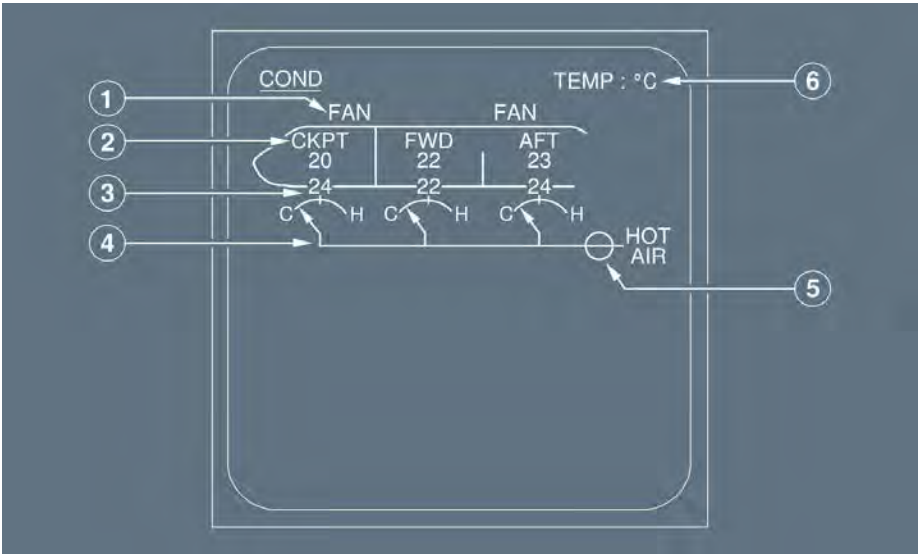
In line - Green	:	The valve is open.
In line - Amber	:	The valve is not closed; disagrees with the control position.
Crossline - Green	:	The valve is fully closed, and the pushbutton is at auto.
Crossline - Amber	:	The valve is closed, and pushbutton is OFF, or the valve disagree is closed.

(7) TEMP
Unit of measure (°C or °F) is indicated in cyan.

Note: When the hot air valve is closed, a spurious FWD CRG HEAT message may appear in the INOP SYS list, even if the system remains operative.

ECAM COND PAGE

Ident.: DSC-21-10-50-00000317.0004001 / 09 OCT 12
Applicable to: MSN 3408-4547



(1) Cabin FAN fault indication
It appears in amber, if the recirculation fan is detected as faulty.

(2) Zone temperature
It is in green.

(3) Zone duct temperature
It appears in green, and becomes amber at 80 °C (176 °F).

(4) Zone trim air valve position
The arrow is green. It is replaced by amber crosses (“XX”) if the valve fails.

C = Cold valve fully closed.

H = Hot valve fully open.

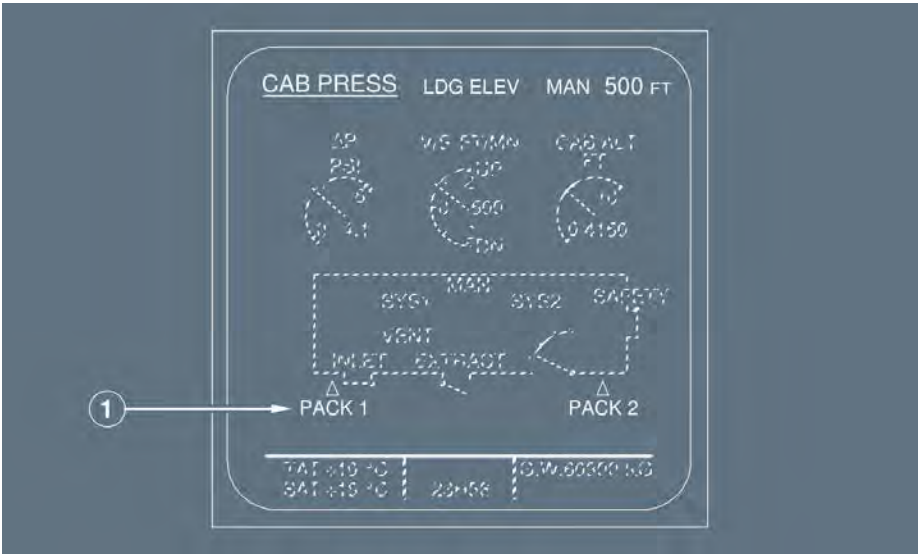
(5) Hot air pressure regulating valve

In line - Green	:	Valve is normally open.
In line - Amber	:	Valve is abnormally open (disagrees with control position).
Crossline - Green	:	Valve is normally fully closed.
Crossline - Amber	:	Valve is closed and pushbutton OFF, or valve position disagrees with control position.

(6) TEMP
Unit of measure (°C or °F) is indicated in cyan.

ECAM CAB PRESS PAGE

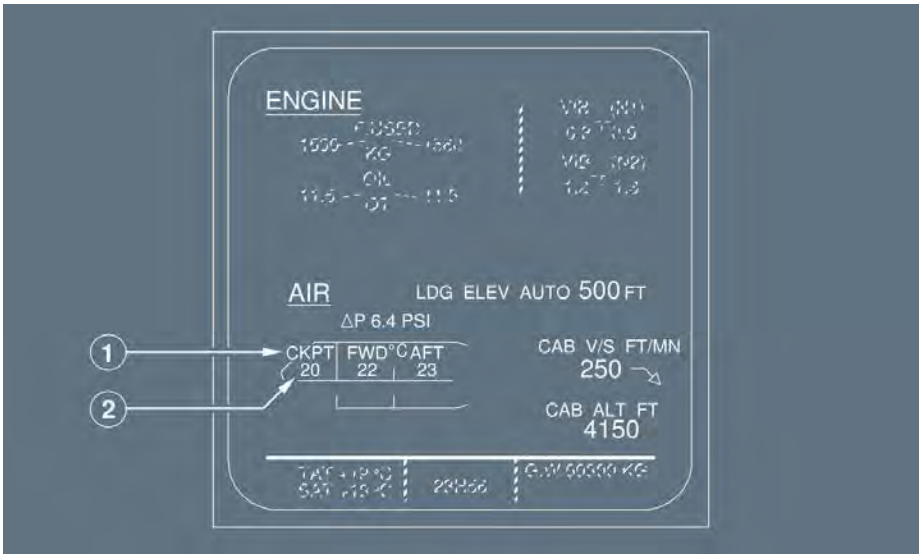
Ident.: DSC-21-10-50-00000318.0001001 / 09 OCT 12
Applicable to: ALL



(1) PACK indication
Triangle normally green, PACK 1(2) indication normally white. Both become amber when pack flow control valve is closed with associated engine running.

ECAM CRUISE PAGE

Ident.: DSC-21-10-50-00000319.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

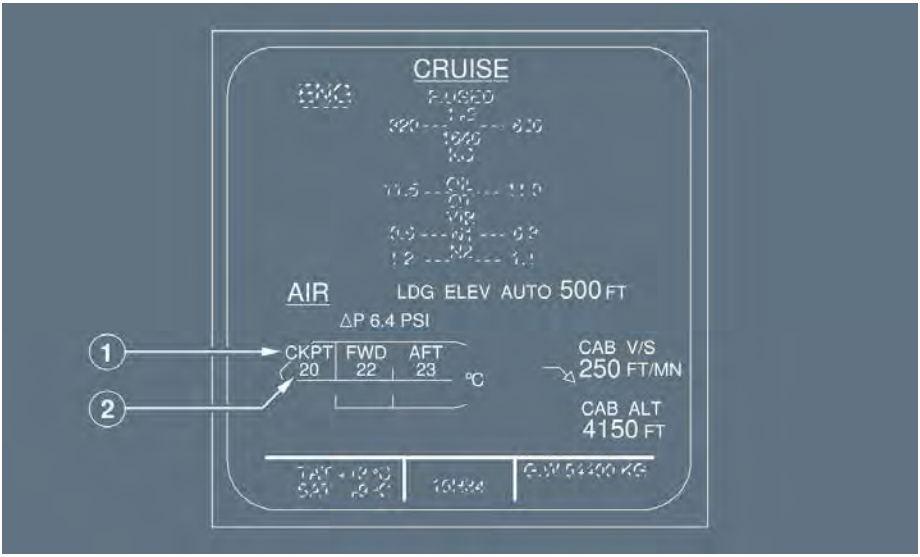


(1) Zone indication
This field also displays the temperature scale in use (°C or °F).

(2) Zone temperature

ECAM CRUISE PAGE

Ident.: DSC-21-10-50-00000319.0002001 / 09 OCT 12
Applicable to: MSN 3408-4547



(1) Zone indication
This field also displays the temperature scale in use (°C or °F).

(2) Zone temperature

MEMO DISPLAY

Ident.: DSC-21-10-50-00016760.0001001 / 21 MAR 16
Applicable to: ALL

RAM AIR ON : This memo appears in green, if the RAM AIR pb-sw is ON.

Intentionally left blank

GENERAL

Ident.: DSC-21-20-10-00017903.0001001 / 21 MAR 16
Applicable to: ALL

The cabin pressurization system has four general functions:

- Ground function : Fully opens the outflow valve on ground
- Prepressurization : During takeoff, increases cabin pressure to avoid a surge in cabin pressure during rotation
- Pressurization in flight : Adjusts cabin altitude, and rate of change to provide passengers with a comfortable flight
- Depressurization : After touchdown, gradually releases residual cabin overpressure before the ground function fully opens the outflow valve.

The system consists of:

- Two Cabin Pressure Controllers (CPC)
- One Residual Pressure Control Unit (RPCU ◁)
- One outflow valve, with an actuator that incorporates three motors (two for automatic operation, one for manual operation)
- One control panel
- Two safety valves.

Any one of the three independent electric motors may power the outflow valve.
Normally, one of the two cabin pressure controllers operates the outflow valve by means of its associated automatic motor.
In case of ditching, an override switch on the control panel allows the flight crew to close the outflow valve and all valves below the flotation line.
The flight crew can set the system to operate automatically, semi-automatically, or manually.
In normal operation, cabin pressurization is fully automatic.

AUTOMATIC OPERATION

Ident.: DSC-21-20-10-00000323.0001001 / 21 MAR 16
Applicable to: ALL

The flight crew monitors the operation of the system, but does nothing to control it. Air pressure in the cabin follows external schedules that the system receives as signals from the Flight Management and Guidance System (FMGS).
When FMGS data is not available for automatic pressurization, the crew only needs to select the landing field elevation.
The pressurization system then uses the manually-selected landing field elevation for internal schedules.

MANUAL OPERATION

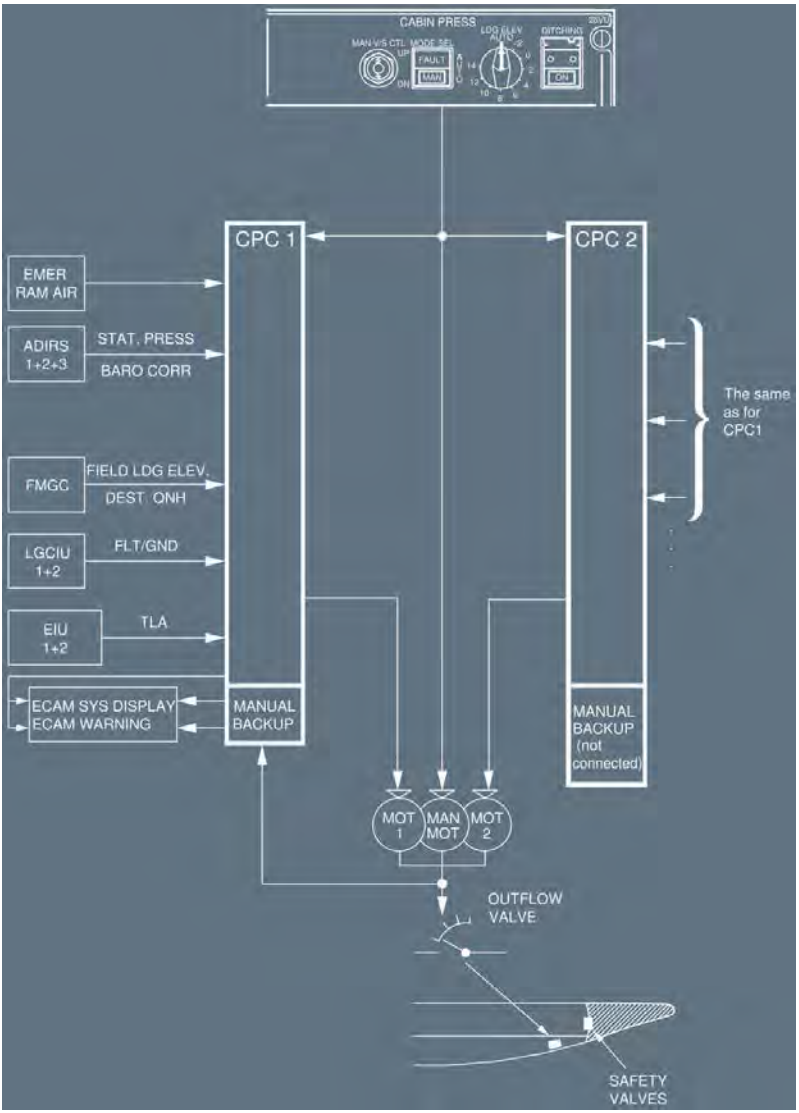
Ident.: DSC-21-20-10-00000324.0001001 / 21 MAR 16
Applicable to: ALL

In manual mode, the flight crew controls the cabin altitude via the manual motor of the outflow valves, by operating controls on the pressurization control panel.

SCHEMATICS

Ident.: DSC-21-20-10-00000325.0002001 / 21 MAR 16

Applicable to: ALL



CABIN PRESSURE CONTROLLERS

Ident.: DSC-21-20-20-00000326.0001001 / 21 MAR 16
Applicable to: ALL

Two identical, independent, digital controllers automatically control the system, by maintaining the proper cabin pressure. They receive signals from the Air Data Inertial Reference System (ADIRS), the Flight Management and Guidance Computer (FMGC), the Engine Interface Unit (EIU), and the Landing Gear Control Interface Unit (LGCIU).
When the system is in automatic or semi-automatic mode, one controller is active, the other is on standby.
The controllers also generate signals for the Electronic Centralized Aircraft Monitoring (ECAM).
For operation in manual mode, each controller has a backup section, which is powered by an independent power supply in the controller N°1 position. This section also has a pressure sensor that generates the cabin altitude and pressure signal for the ECAM, when MAN mode is selected.
The controllers communicate with each other via a cross-channel link.

OUTFLOW VALVE

Ident.: DSC-21-20-20-00000327.0001001 / 21 MAR 16
Applicable to: ALL

The outflow valve is on the right-hand side of fuselage, behind the aft cargo compartment and below the flotation line.
The outflow valve assembly consists of a flush, skin-mounted, rectangular frame, carrying inward and outward opening flaps linked to the actuator. The actuator contains the drives of the two automatic motors and the manual motor. Either of two automatic motors operates the valve in automatic mode, and the manual motor operates it in manual mode.
In automatic mode, the operating controller signals the position of the valve to the ECAM.
In manual mode, the backup section of the N° 1 controller signals the position of the valve to the ECAM.

Note: *When the RAM AIR pushbutton is ON, and Δp is below 1 PSI, the system drives the outflow valve about 50 % open if it is under automatic control. If the system is under manual control, the outflow valve does not automatically open, even if Δp is below 1 PSI.*

SAFETY VALVES

Ident.: DSC-21-20-20-00000328.0001001 / 21 MAR 16
Applicable to: ALL

Two independent pneumatic safety valves prevent cabin pressure from going too high (8.6 PSI above ambient) or too low (1 PSI below ambient).
They are located on the rear pressure bulkhead, above the flotation line.

RESIDUAL PRESSURE CONTROL UNIT (RPCU ◁)

Ident.: DSC-21-20-20-00017788.0001001 / 21 MAR 16
Applicable to: ALL

The RPCU automatically depressurizes the aircraft in case of abnormal residual pressure on ground.
It automatically opens the outflow valve, when:

- The outflow valve is not fully open, and
- Both CPCs are failed, or manual mode is selected, and
- The aircraft is on ground, and
- All engines are shutdown, or all ADIRS indicate an airspeed below 100 kt.

AUTOMATIC PRESSURE CONTROL MODE

Ident.: DSC-21-20-30-00000329.0001001 / 14 NOV 11
Applicable to: ALL

GENERAL

- Two identical, independent, automatic systems (each consisting of a controller and its associated motors) control cabin pressure.
  Either system controls the single outflow valve.
  Only one controller operates at a time.

  An automatic transfer occurs:
  - 70 s after each landing.
  - If the operating system fails.
- The controller automatically controls the cabin pressure. It limits the cabin pressure to 8 000 ft maximum and optimizes it during climb and descent phases.
- The controller normally uses the landing elevation and the QNH from the FMGC, and the pressure altitude from ADIRS.
  If FMGC data are not available, the controller uses the captain BARO Reference from the ADIRS and the LDG ELEV selection.
- Pressurization is assumed through the following modes:

GROUND (GN)

Before takeoff, and 55 s after landing, the outflow valve fully opens to ensure that there is no residual cabin pressure. At touchdown, any remaining cabin pressure is released at a cabin vertical speed of 500 ft/min.

TAKEOFF (TO)

To avoid a pressure surge at rotation, the controller pre-pressurizes the aircraft at a rate of 400 ft/min, until the ΔP reaches 0.1 PSI. At liftoff, the controller initiates the climb phase.

CLIMB (CL)

During climb, the cabin altitude varies according to a fixed pre-programmed law that takes into account the aircraft's actual rate of climb.

CRUISE (CR)

During cruise, the controller maintains cabin altitude at the level-off value, or at the landing field elevation, whichever is higher.

DESCENT (DE)

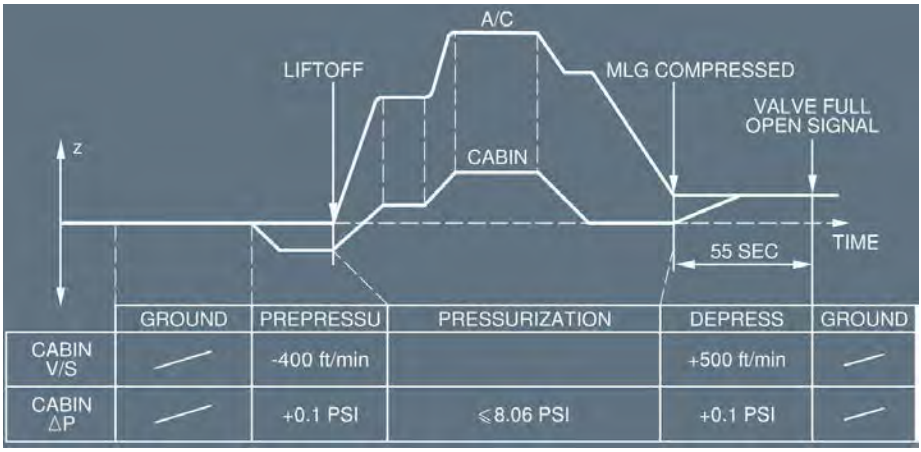
During descent, the controller maintains a cabin rate of descent, such that the cabin pressure is equal to the landing field pressure +0.1 PSI, shortly before landing.
The maximum descent rate is 750 ft/min.

ABORT (AB)

If the aircraft does not climb after takeoff, the abort mode prevents the cabin altitude from climbing.
Cabin pressure is set back to the takeoff altitude +0.1 PSI.

PRESSURIZATION FLIGHT PROFILE

Ident.: DSC-21-20-30-00000331.0001001 / 08 SEP 15
Applicable to: ALL



	GROUND	PREPRESSU	PRESSURIZATION	DEPRESS	GROUND
CABIN V/S		-400 ft/min		+500 ft/min	
CABIN ΔP		+0.1 PSI	⩽8.06 PSI	+0.1 PSI	

MANUAL PRESSURE CONTROL MODE

Ident.: DSC-21-20-30-00000332.0001001 / 21 MAR 16
Applicable to: ALL

If both automatic systems fail, the flight crew may use the CABIN PRESS control panel to take over manual control of cabin pressurization.

- Release the MODE SEL pushbutton to select MAN, and
- Push the MAN V/S CTL switch UP or DN to increase or decrease cabin altitude.

The first of these actions cuts off power to the AUTO motors, and enables the MAN motor to control the outflow valve.

Note: *1. Due to the slow operation of the outflow valves in manual mode, and the limited resolution of the outflow valves' position on the ECAM, the visual ECAM indication of a change in the outflow valves' position can take up to 5 s.*

2. As the pressurization system is manually-controlled, the outflow valve does not open automatically at touchdown.

DITCHING

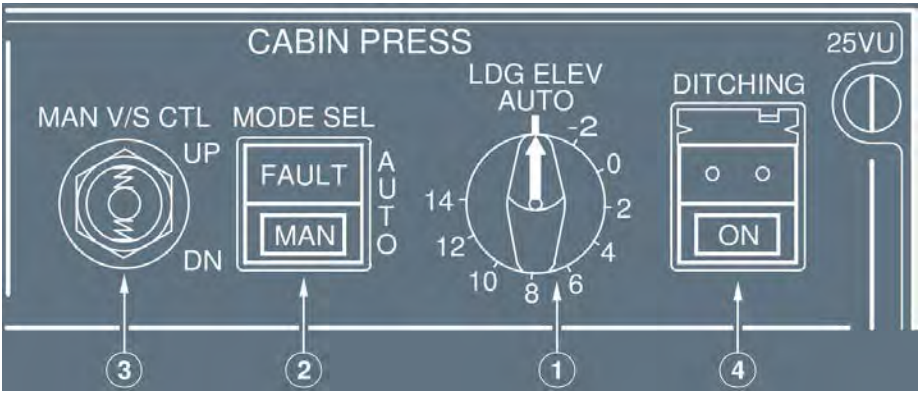
Ident.: DSC-21-20-30-00017789.0001001 / 21 MAR 16
Applicable to: ALL

To prepare for ditching, the flight crew must press the DITCHING pb on the CABIN PRESS control panel to close the outflow valve, the emergency ram air inlet, the avionics ventilation inlet and extract valves, the pack flow control valves, and the FWD cargo outlet isolation valve ⋖ .

Intentionally left blank

OVERHEAD PANEL

Ident.: DSC-21-20-40-00000334.0003001 / 07 MAY 13
Applicable to: MSN 1882-2078



(1) LDG ELEV knob

AUTO : The pressurization system uses the FMGS data to construct an optimized pressure schedule.
To exit the AUTO position, pull out and turn the selector.

Other positions : The pressurization schedule does not use the landing elevation from the FMGS, but instead uses the landing elevation selected with this knob (from -2 000 to +14 000 ft) as its reference.

Note: The LDG ELEV knob scale is only given as an indication; refer to the ECAM information for accurate adjustment.

(2) MODE SEL pb

AUTO : Automatic mode is operating. One of the two systems controls the outflow valve.

MAN : This legend appears in white, and FAULT does not come on. The flight crew then uses the MAN V/S CTL selector to control the outflow valve.

Note: Switching the MODE SEL pb to MAN, for at least 10 s, then returning it to AUTO will select the other system.

FAULT lt : This legend appears in amber and the ECAM caution light comes on only when both automatic systems are faulty.

Note: The pilot may notice a variation in the CAB ALT indication on the ECAM PRESS page, when the system switches from the cabin pressure control AUTO mode to MAN mode, due to the reduced resolution of the backup pressure sensor.

(3) MAN V/S CTL toggle switch

The switch, springloaded to neutral controls the outflow valve position through operation of the MAN motor, when the MODE SEL pb is in the MAN position.

UP : The valve moves towards the open position.

DN : The valve moves towards the closed position.

Note: To target precise cabin vertical speed rate, only short inputs should be applied on the toggle switch.

(4) DITCHING guarded pushbutton

Normal : The system functions normally.

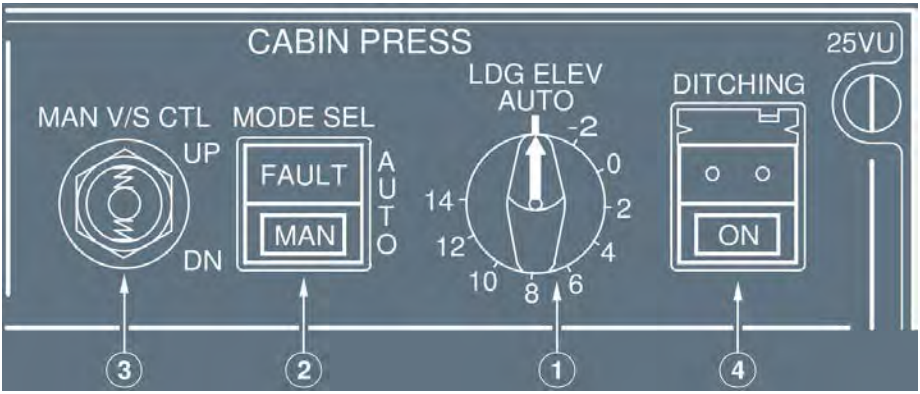
ON : The operating system sends a “close” signal to the outflow valve, emergency ram air inlet, avionics ventilation inlet and extract valves, pack flow control valves.

Note: The outflow valve will not close automatically, if it is under manual control.

CAUTION	If the ditching pb is set to ON, with the low pressure ground cart connected and all doors closed, a differential pressure will build up.

OVERHEAD PANEL

Ident.: DSC-21-20-40-00000334.0004001 / 07 MAY 13
Applicable to: MSN 3408-4547



(1) LDG ELEV knob

AUTO : The pressurization system uses the FMGS data to construct an optimized pressure schedule.
To exit the AUTO position, pull out and turn the selector.

Other positions : The pressurization schedule does not use the landing elevation from the FMGS, but instead uses the landing elevation selected with this knob (from -2 000 to +14 000 ft) as its reference.

Note: The LDG ELEV knob scale is only given as an indication; refer to the ECAM information for accurate adjustment.

(2) MODE SEL pb

AUTO : Automatic mode is operating. One of the two systems controls the outflow valve.

MAN : This legend appears in white, and FAULT does not come on. The flight crew then uses the MAN V/S CTL selector to control the outflow valve.

Note: Switching the MODE SEL pb to MAN, for at least 10 s, then returning it to AUTO will select the other system.

FAULT lt : This legend appears in amber and the ECAM caution light comes on only when both automatic systems are faulty.

Note: The pilot may notice a variation in the CAB ALT indication on the ECAM PRESS page, when the system switches from the cabin pressure control AUTO mode to MAN mode, due to the reduced resolution of the backup pressure sensor.

(3) MAN V/S CTL selector

The switch is springloaded to neutral and controls the outflow valve position through operation of the MAN motor, when the MODE SEL pb is in the MAN position.

UP : The valve moves towards the open position.

DN : The valve moves towards the closed position.

Note: To target precise cabin vertical speed rate, only short inputs should be applied on the selector.

(4) DITCHING pb (guarded)

Normal : The system functions normally.

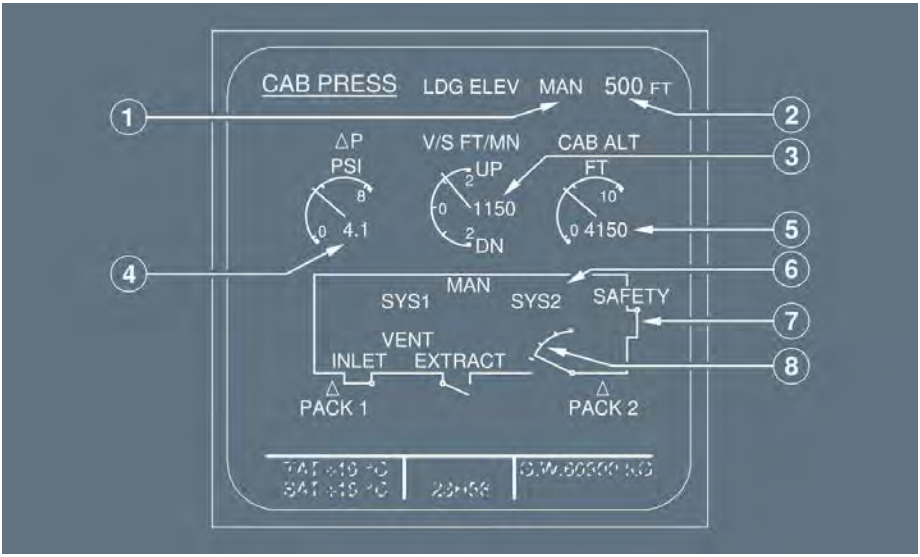
ON : The operating system sends a “close” signal to the outflow valve, emergency ram air inlet, avionics ventilation inlet and extract valves, pack flow control valves, and forward cargo isolation outlet valve.
The cargo extract fans stop automatically.

Note: The outflow valve will not close automatically, if it is under manual control.

CAUTION	On ground, If the ditching pushbutton is set to ON, with the low pressure ground cart connected and all doors closed, a differential pressure will build up.

ECAM CAB PRESS PAGE

Ident.: DSC-21-20-40-00000335.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) LDG ELEV AUTO/MAN

- LDG ELEV AUTO: appears in green when the LDG ELEV selector is in AUTO.
- LDG ELEV MAN: appears in green when the LDG ELEV selector is not in AUTO.

Neither appears when the MODE SEL pushbutton switch is in MAN.

(2) Landing elevation
The landing elevation selected either automatically by the FMGS or manually by the pilot appears in green (but not when the MODE SEL pushbutton switch is in MAN).

(3) V/S FT/MIN (cabin vertical speed)
The analog and digital presentations appear in green when V/S is in the normal range. They appear in amber when V/S ≥ 2 000 ft/min.
The digital presentation pulses when V/S > 1 800 ft/min (resets at 1 600 ft/min).

(4) ΔP PSI (cabin differential pressure)
The analog and digital presentations appear in green when ΔP is in the normal range. They appear in amber when ΔP ≤ –0.4 PSI or ≥ 8.5 PSI.

The digital presentation pulses if Δp > 1.5 PSI (resets at 1 PSI) during flight phase 7. (*Refer to DSC-31-15 Flight Phases*).

(5) CAB ALT FT (cabin altitude)
The analog and digital presentations appear in green, in normal range.
They appear in red if the cabin altitude goes above 9 550 ft.
The digital presentation pulses if the cabin altitude is at or above 8 800 ft (resets at 8 600 ft).

(6) Active system indication (SYS 1 or SYS 2 or MAN)
SYS 1 or SYS 2 appears in green when active and in amber when faulty. When either system is inactive, its title does not appear.
MAN appears in green when the MODE SEL switch is in MAN.

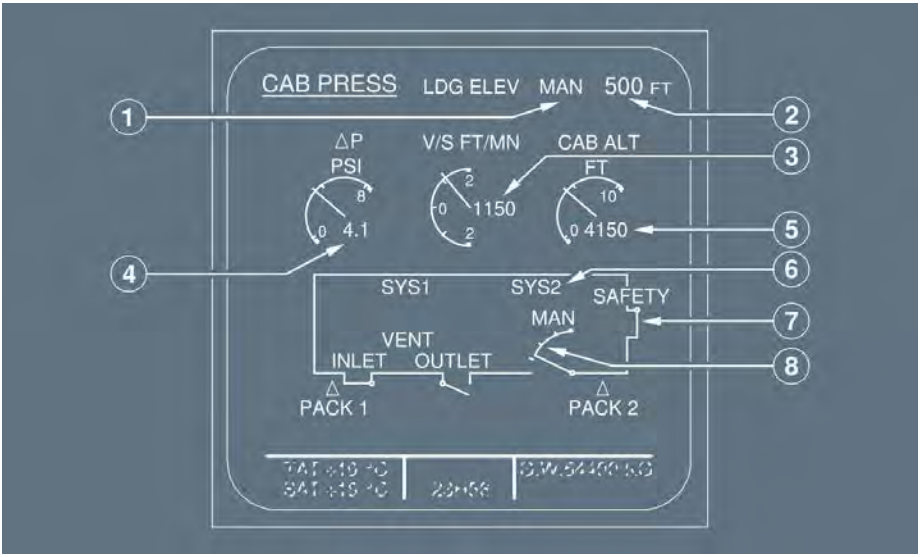
(7) Safety valve position
SAFETY appears in white and the diagram in green when both safety valves are fully closed.
SAFETY and the diagram appear in amber when either valve is not closed.

Note: The safety valve opens when the cabin differential pressure is between 8.2 and 8.9 PSI. The range is due to the reduced accuracy of ΔP measurements (in MAN mode), combined with the decrease in cabin differential pressure that occurs immediately after the safety valves open.

(8) Outflow valve position
The diagram is green when the valve is operating normally.
The diagram becomes amber when the valve opens more than 95 % during flight.

ECAM CAB PRESS PAGE

Ident.: DSC-21-20-40-00000335.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) LDG ELEV AUTO/MAN

- LDG ELEV AUTO: appears in green when the LDG ELEV selector is in AUTO.
- LDG ELEV MAN: appears in green when the LDG ELEV selector is not in AUTO.

Neither appears when the indications from SDAC are not valid.

(2) Landing elevation
The landing elevation selected either automatically by the FMGS or manually by the pilot appears in green (but not when the MODE SEL pushbutton switch is in MAN).

(3) V/S FT/MIN (cabin vertical speed)
The analog and digital presentations appear in green when V/S is in the normal range.
The digital presentation pulses when V/S > 1 750 ft/min (resets at 1 650 ft/min).

(4) ΔP PSI (cabin differential pressure)
The analog and digital presentations appear in green when ΔP is in the normal range.
They appear in amber when ΔP ≤ –0.4 PSI or ≥ 8.5 PSI.
The digital presentation pulses if Δp > 1.5 PSI (resets at 1 PSI) during flight phase 7. (*Refer to DSC-31-15 Flight Phases*).

(5) CAB ALT FT (cabin altitude)
The analog and digital presentations appear in green, in normal range.
They appear in red if the cabin altitude goes above 9 550 ft.
The digital presentation pulses if the cabin altitude is at or above 8 800 ft (resets at 8 600 ft).

(6) Active system indication (SYS 1 or SYS 2 or MAN)
SYS 1 or SYS 2 appears in green when active and in amber when faulty. When either system is inactive, its title does not appear.
MAN appears in green when the MODE SEL switch is in MAN.

(7) Safety valve position
SAFETY appears in white and the diagram in green when both safety valves are fully closed.
SAFETY and the diagram appear in amber when either valve is not closed.

Note: The safety valve opens when the cabin differential pressure is between 8.2 and 8.9 PSI. The range is due to the reduced accuracy of ΔP measurements (in MAN mode), combined with the decrease in cabin differential pressure that occurs immediately after the safety valves open.

(8) Outflow valve position
The diagram is green when the valve is operating normally.
The diagram becomes amber when the valve opens more than 95 % during flight.

ECAM CRUISE PAGE

Ident.: DSC-21-20-40-00000336.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

(1) LDG ELEV AUTO/MAN
Identifical to the CAB PRESS page.

(2) CAB V/S FT/MIN (cabin vertical speed)
Green, in normal range.
Amber, when out of normal range : V/S ≥ 2 000 ft/min
Pulses, when the V/S > 1 800 ft/min (resets at 1 600 ft/min).

(3) CAB ALT FT (cabin altitude)
Green, in normal range.
Red, for excessive cabin altitude : ≥ 9 550 ft.
Pulses for cabin altitude at, or above, 8 800 ft (resets at 8 600 ft).

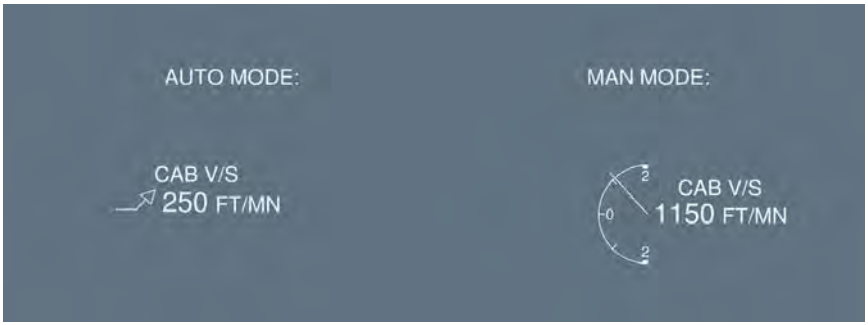
(4) ΔP indication
It is normally green.
It becomes amber, when out of normal range Δp ≤ -0.4 PSI or ≥ 8.5 PSI.

ECAM CRUISE PAGE

Ident.: DSC-21-20-40-00000336.0002001 / 09 OCT 12
Applicable to: MSN 3408-4547

(1) LDG ELEV AUTO/MAN
Identifical to the CAB PRESS page

(2) CAB V/S FT/MIN (cabin vertical speed)
Green, in normal range.
Pulses, when the V/S > 1 750 ft/min (resets at 1 650 ft/min).

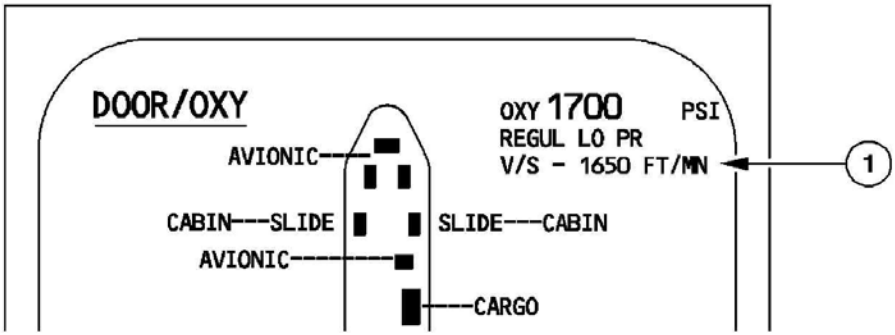


(3) CAB ALT FT (cabin altitude)
Green, in normal range.
Red, for excessive cabin altitude : ≥ 9 550 ft.
Pulses for cabin altitude at, or above, 8 800 ft (resets at 8 600 ft).

(4) ΔP indication
It is normally green. Pulses green when CAB ΔP ≥ 1.5 PSI before landing.
It becomes amber, when out of normal range Δp ≤ -0.4 PSI or ≥ 8.5 PSI.

ECAM DOOR/OXY PAGE

Ident.: DSC-21-20-40-00000337.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



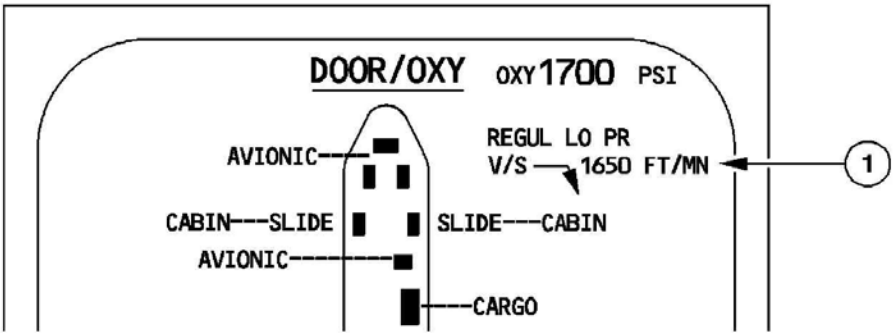
(1) V/S (cabin vertical speed)

This number only appears during flight phases 5, 6 and 7. (*Refer to DSC-31-15 Flight Phases* for flight phase definitions).

- It is normally green.
- It becomes amber, when the V/S is greater than 2 000 ft/min, or less than -2 000 ft/min.

ECAM DOOR/OXY PAGE

Ident.: DSC-21-20-40-00000337.0003001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) V/S (cabin vertical speed)

This number only appears during flight phases 5, 6 and 7. (*Refer to DSC-31-15 Flight Phases* for flight phase definitions).

- It is normally green.
- It pulses, when the V/S is greater than 1 750 ft/min and stops pulsing, when less than 1 650 ft/min.
- It becomes amber, when the V/S is greater than 2 000 ft/min, or less than -2 000 ft/min.

MEMO DISPLAY

Ident.: DSC-21-20-40-00016761.0001001 / 21 MAR 16
Applicable to: ALL

MAN LDG ELEV : This memo appears in green, if the LDG ELEV knob is not in the AUTO position.

GENERAL

Ident.: DSC-21-30-10-00017790.0001001 / 21 MAR 16
Applicable to: ALL

The ventilation system includes ventilation for:

- The avionics, controlled by the Avionics Equipment Ventilation Controller (AEVC),
- The batteries,
- The lavatories and galleys.

Note: *For more information about cargo ventilation , Refer to DSC-21-40-10 General.*

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GENERAL

Ident.: DSC-21-30-20-00000341.0001001 / 24 FEB 11
Applicable to: ALL

The avionics ventilation system is fully automatic.
It cools the electrical and electronic components in the avionics compartment and on the flight deck, including the instrument and circuit breaker panels. It uses two electric fans to force the circulation of cooling air.
Whatever the configuration of the avionics ventilation system is, a part of the avionics ventilation air is sucked from the cockpit through the different cockpit panels.

MAIN COMPONENTS

Ident.: DSC-21-30-20-00017791.0001001 / 21 MAR 16
Applicable to: ALL

FANS

Two electric fans continuously circulate air around the avionics equipment, when the aircraft is electrically supplied.
The Fan Speed Controller (FSC) ◁ controls the avionics ventilation fan speed as a function of temperature::

1. High speed when the ventilation air temperature is above +40 °C (104 °F)
2. Low speed when the ventilation air temperature is below +35 °C (95 °F)

SKIN AIR INLET AND OUTLET VALVES

These valves admit air from outside the aircraft and evacuate hot air from the avionics equipment.

SKIN EXCHANGE INLET AND OUTLET BYPASS VALVES

These valves enable air to circulate between the avionics bay and the space under the cargo compartment floor.

AIR CONDITIONING INLET VALVE

This valve opens to enable the air conditioning circuit to supply fresh air to the avionics bay.

SKIN EXCHANGE ISOLATION VALVE

This valve connects or isolates the skin heat exchanger.

AVIONICS EQUIPMENT VENTILATION CONTROLLER (AEVC)

The AEVC controls the operation of all fans and valves in the avionics ventilation system.

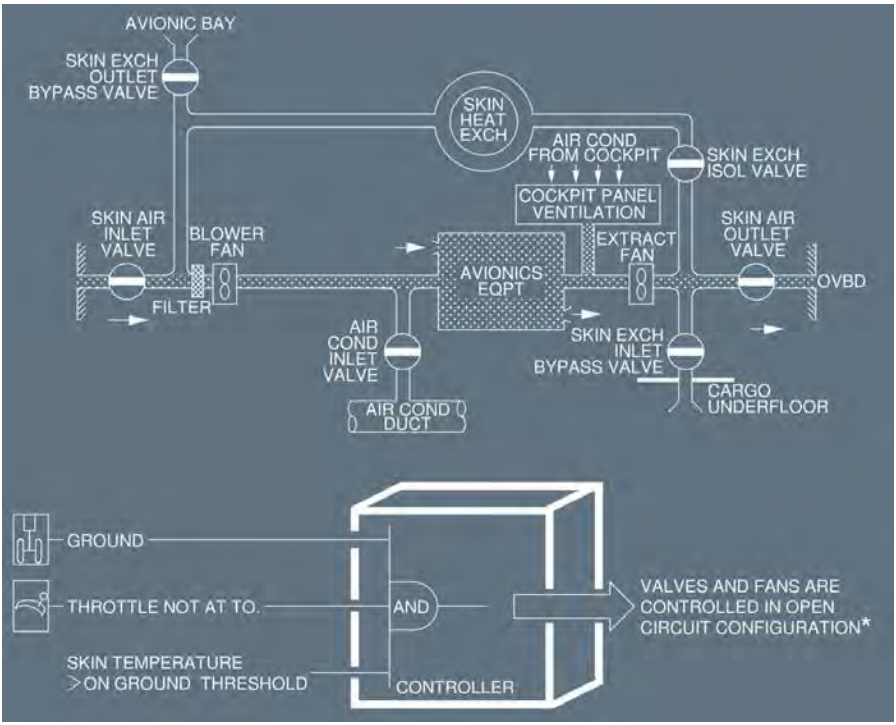
NORMAL OPERATION, OPEN-CIRCUIT CONFIGURATION

Ident.: DSC-21-30-20-00000343.0001001 / 16 APR 14
Applicable to: ALL

GROUND OPERATIONS

The open-circuit configuration operates when skin temperature is above the on-ground threshold.

On-ground threshold = +12 °C (53 °F), temperature increasing, or
+9 °C (48 °F), temperature decreasing.



(*)

Note: In some cases, the opening of the skin air valves can be delayed even if the skin temperature is above the on-ground thresholds: This is to avoid condensation phenomenon when the temperature inside the avionic compartment is too cold.

NORMAL OPERATION, CLOSE-CIRCUIT CONFIGURATION

Ident.: DSC-21-30-20-00000345.0001001 / 09 OCT 12
Applicable to: ALL

FLIGHT OPERATIONS

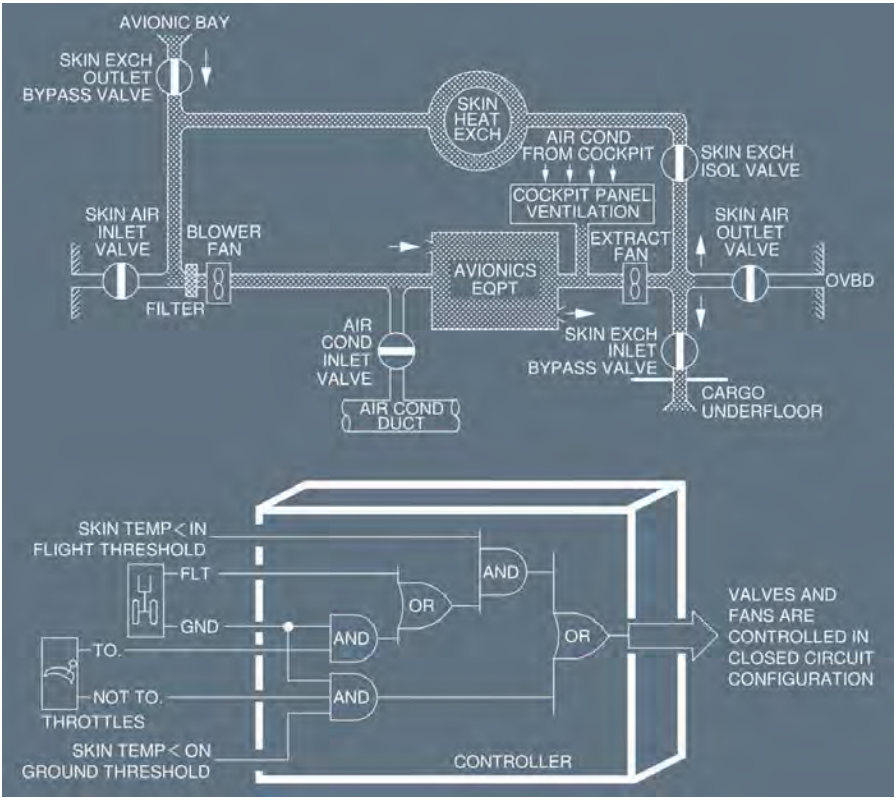
The close-circuit configuration operates when skin temperature is beneath the in-flight threshold.

In flight threshold = +35 °C (95 °F), temperature increasing, or
+32 °C (90 °F), temperature decreasing.

GROUND OPERATIONS

The close-circuit configuration operates when skin temperature is beneath the on-ground threshold.

On ground threshold = +12 °C (53 °F), temperature increasing, or
+9 °C (48 °F), temperature decreasing.



NORMAL OPERATION, INTERMEDIATE CONFIGURATION

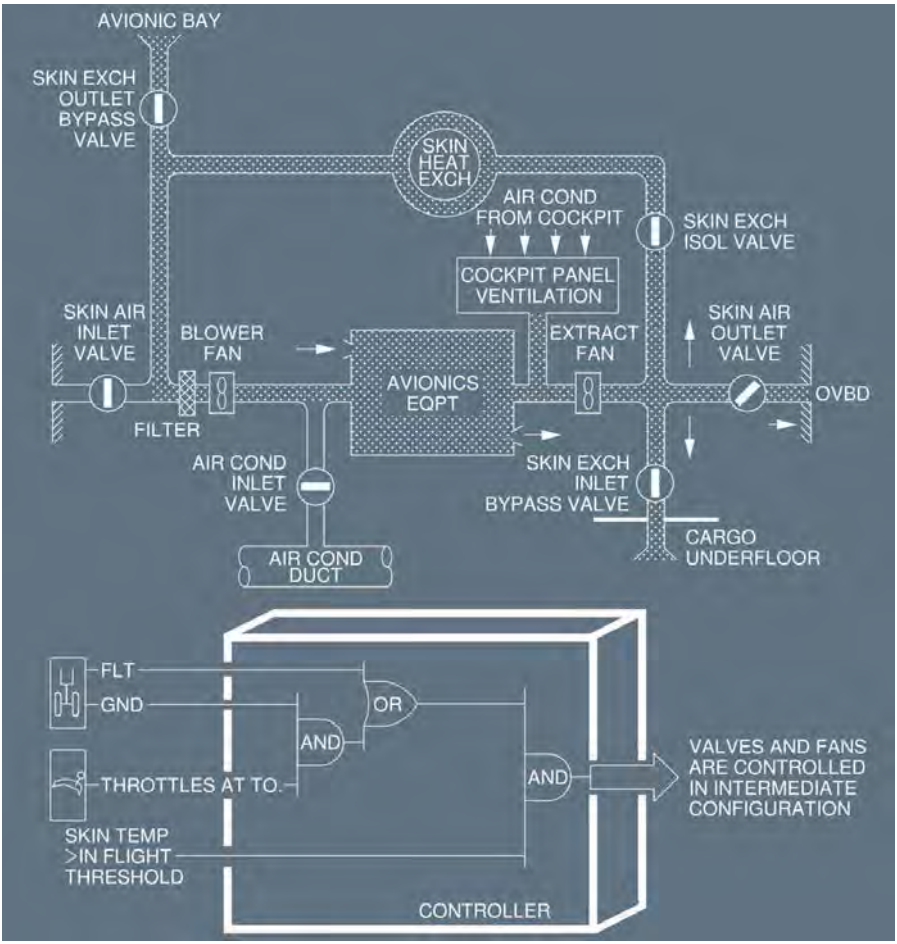
Ident.: DSC-21-30-20-00000344.0001001 / 09 OCT 12
Applicable to: ALL

FLIGHT OPERATIONS

The intermediate configuration operates when skin temperature is above the in-flight threshold.

In flight threshold = +35 °C (95 °F), temperature increasing, or
+32 °C (90 °F), temperature decreasing.

Note: *The measuring range of the skin temperature sensed is between -50 °C and 80 °C. Outside of this range, the AEVC sets the avionics ventilation configuration to the intermediate configuration (partially open) until the temperature is within the operation range again.*



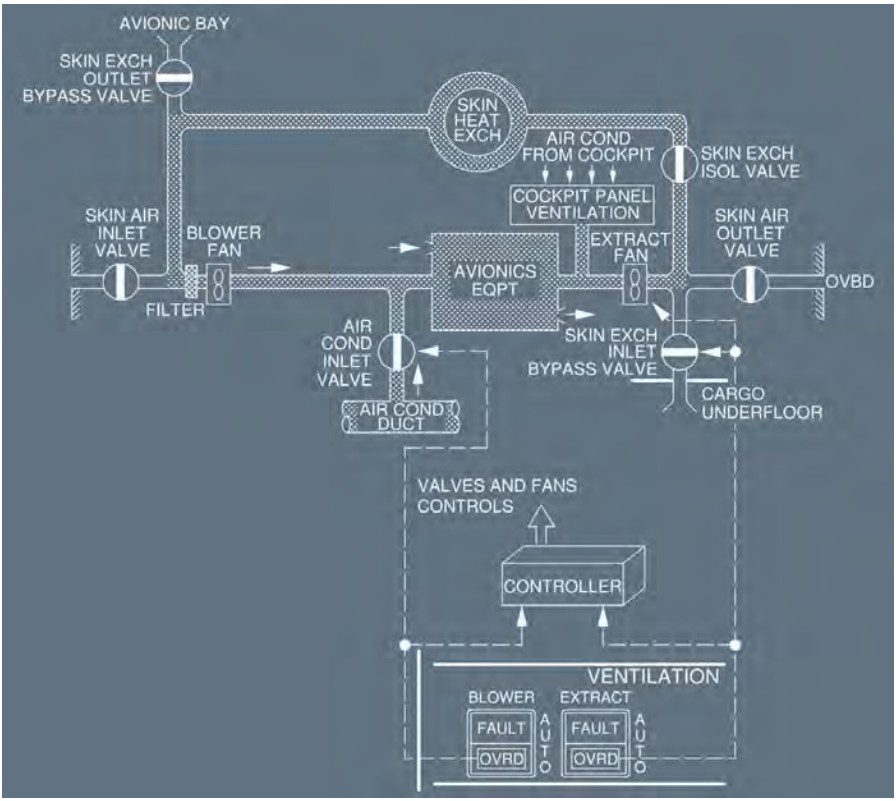
ABNORMAL OPERATION

Applicable to: ALL

Ident.: DSC-21-30-20-A-00000346.0001001 / 20 JAN 15

BLOWER FAULT OR EXTRACT FAULT ALERT

When the BLOWER or the EXTRACT pushbutton switch is set at the OVRD (override) position, the system is in closed-circuit configuration and adds air from the air conditioning system to the ventilation air.

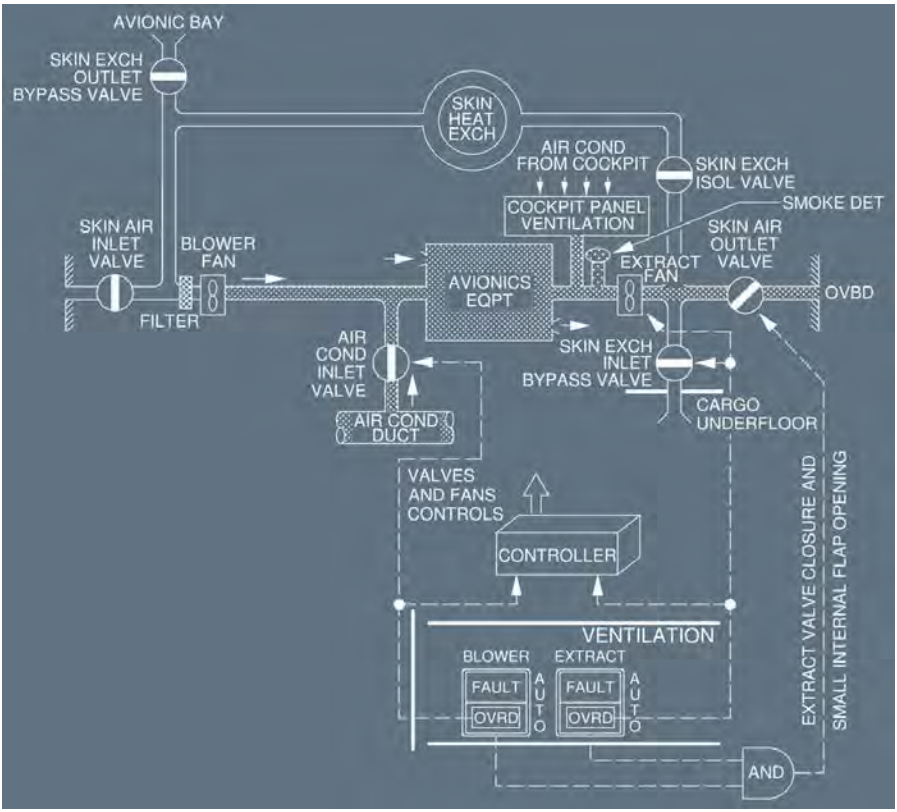


When the BLOWER pushbutton switch is set at OVRD, the blower fan is stopped and the extract fan continues to run.
When the EXTRACT pushbutton switch is set at OVRD, the extract fan is controlled directly from the pushbutton. Both fans continue to run.

Ident.: DSC-21-30-20-A-00000347.0001001 / 09 OCT 12

SMOKE CONFIGURATION

When the smoke detector detects smoke in the avionics ventilation air the BLOWER and the EXTRACT FAULT lights come on.
When both the BLOWER and the EXTRACT pushbuttons are set to the OVRD position, the air conditioning system supplies cooling air, which is then exhausted overboard. The blower fan stops.



Ident.: DSC-21-30-20-A-00000348.0001001 / 21 MAR 16

CONTROLLER FAILURE

The system goes to the same configuration as above, except that the skin exchange isolation valve stays open.

The inlet valve and the skin exchange inlet bypass valve remain in the position they were in before the failure occurred.
The extract fan keeps running.

BATTERY VENTILATION

Ident.: DSC-21-30-40-00000350.0001001 / 21 MAR 16
Applicable to: ALL

A venturi in the skin of the aircraft draws air from the space around the batteries and vents it overboard. The resulting airflow ventilates the batteries.

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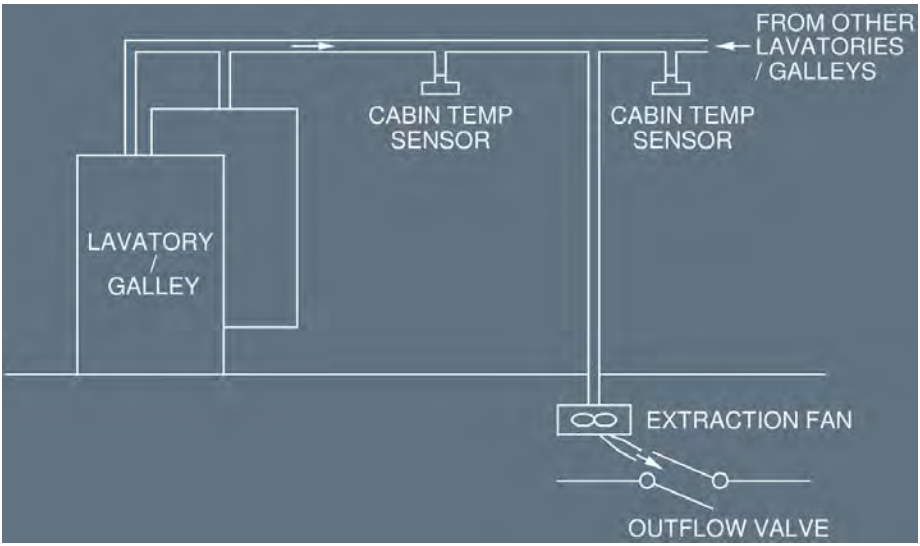
LAVATORY AND GALLEY

Ident.: DSC-21-30-50-00000351.0001001 / 09 OCT 12
Applicable to: ALL

An extraction fan draws ambient cabin air through the lavatories and galleys and exhausts it near the outflow valve.
The extraction fan runs continually when electric power is available.



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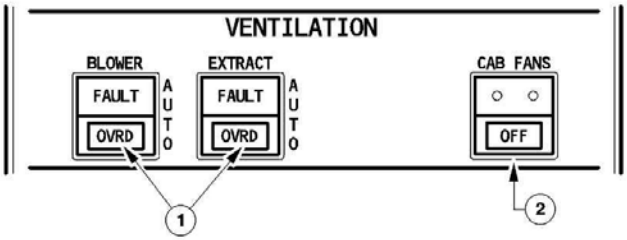
OVERHEAD PANEL

Ident.: DSC-21-30-60-00000352.0001001 / 24 FEB 11
Applicable to: ALL



(1) BLOWER pb-sw and EXTRACT pb-sw

AUTO: : When both pushbutton switches are on AUTO:
- On the ground before the application of TO power, the ventilation system is in open circuit configuration (closed configuration when the skin temperature is below the ground threshold).
- On the ground after the application of TO power, and in flight, the ventilation system is in closed circuit configuration.

OVRD: : When either pushbutton switch is on OVRD:
- The system goes to closed circuit configuration.
- Air from the air conditioning system is added to ventilation air. (The blower fan stops if the BLOWER pushbutton switch is in the OVRD position).

When both pushbutton switches are on OVRD:
- Air flows from the air conditioning system and then overboard.
- The extract fan continues to run.

FAULT : Lights up amber (and ECAM activates)

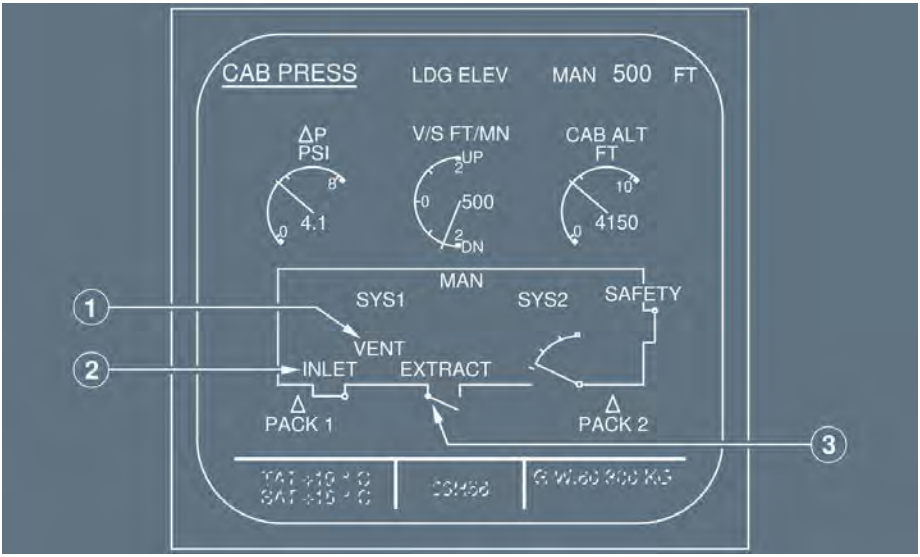
It:
- in the blower switch, if :
  - blowing pressure is low (See *)
  - duct overheats (See *)
  - computer power supply fails
  - smoke warning is activated
- in the extract switch, if :
  - extract pressure is low (See *)
  - computer power supply fails
  - smoke warning is activated.

* If the warning occurs on the ground when the engines are stopped, the external horn sounds.

(2) *Refer to DSC-21-10-50 Controls on Overhead Panel*

ECAM CAB PRESS PAGE

Ident.: DSC-21-30-60-00000353.0001001 / 03 APR 13
Applicable to: MSN 1882-2078



(1) VENT
This normally appears in white. It becomes amber, if there is a BLOWER FAULT, EXTRACT FAULT, or AVNCS SYS FAULT.

(2) INLET and EXTRACT Indications
Normally white. The corresponding indication becomes amber, in case of a BLOWER FAULT or EXTRACT FAULT.

(3) INLET and EXTRACT Valve Diagrams

This indicates that the valve is fully closed.
It is normally green, but is amber if there is a disagreement.

This indicates that the valve is fully open.
It is normally green, but is amber if there is a disagreement.

NOTE: Because of the accuracy of the temperature sensors, on the ground the closed or open indication may become amber when the temperature is close to the valve opening or closing threshold.

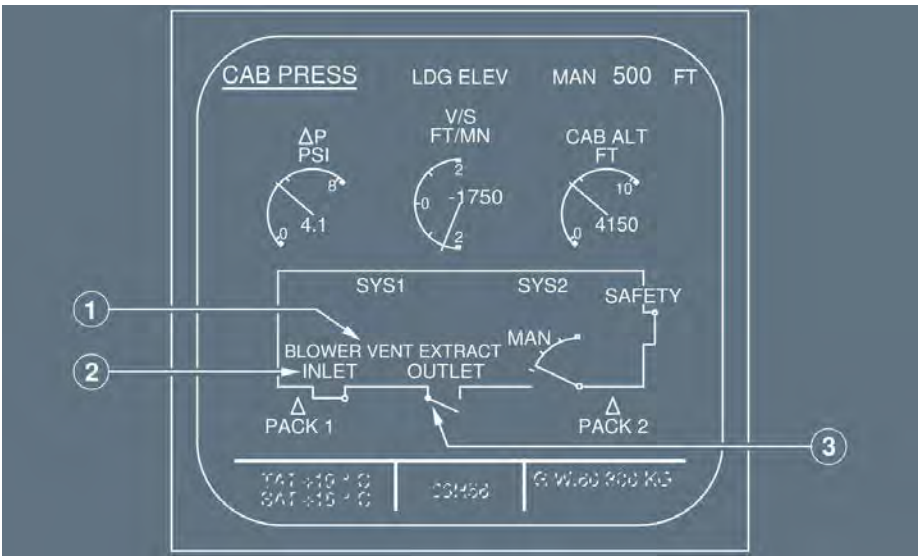
This indicates that the inlet valve is in transit (inlet valve only).
It is amber.

This indicates that the outlet valve is partially open (the outlet valve is closed but a small internal flap is open).

If the valve position is not available or the received status for the valve is inconsistent, XX appears in amber.

ECAM CAB PRESS PAGE

Ident.: DSC-21-30-60-00000353.0003001 / 03 APR 13
Applicable to: MSN 3408, 3518-4547



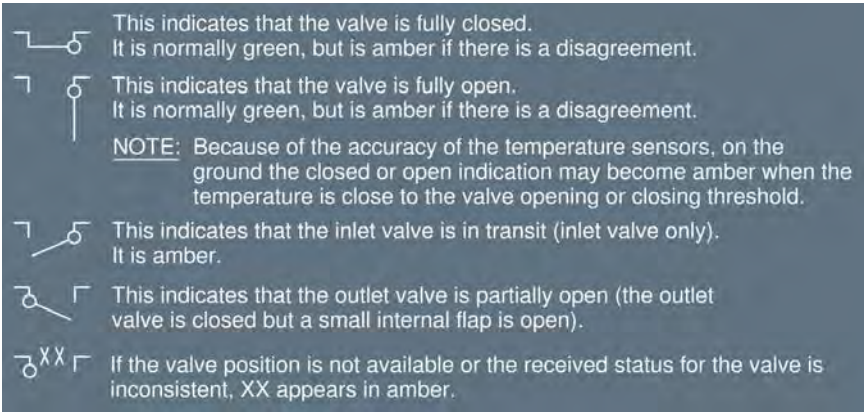
(1) BLOWER, VENT and EXTRACT Indications

VENT message normally appears in white. It becomes amber, if there is a BLOWER FAULT, EXTRACT FAULT, or AVNCS SYS FAULT.
BLOWER message appears in amber if there is a BLOWER FAULT.
EXTRACT message appears in amber if there is an EXTRACT FAULT.

(2) INLET and OUTLET Indications

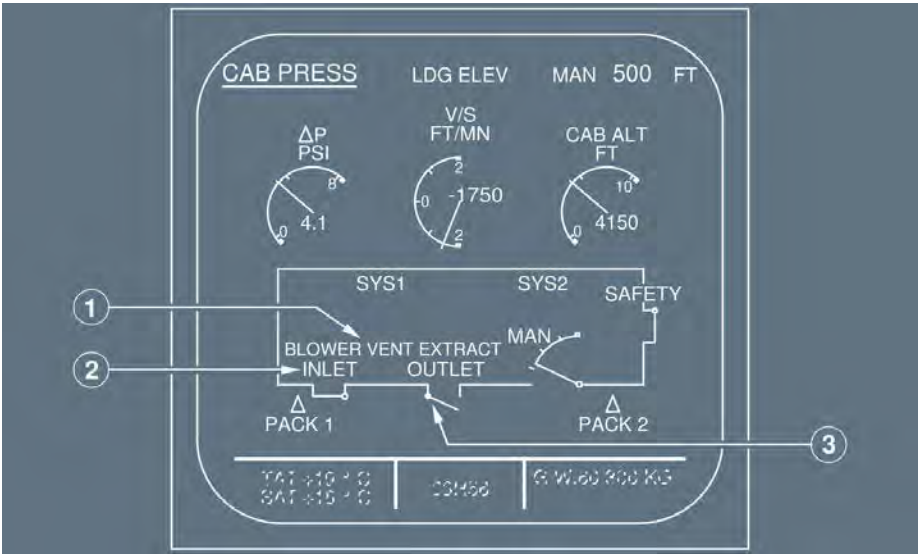
Normally white. The corresponding indication becomes amber, when the inlet valve or the outlet valve is failed.

(3) INLET and OUTLET Valve Diagrams



ECAM CAB PRESS PAGE

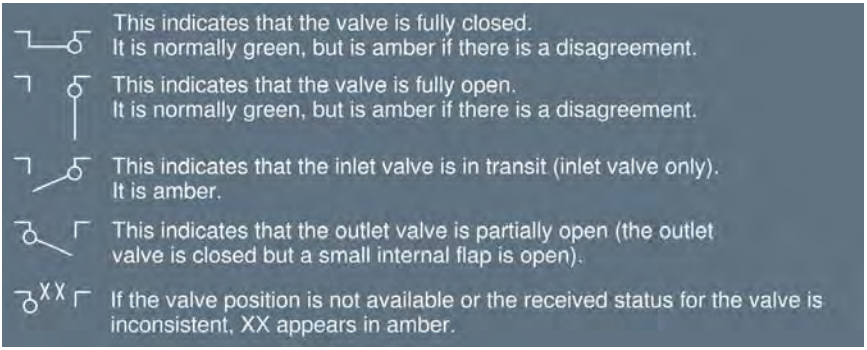
Ident.: DSC-21-30-60-00000353.0006001 / 03 APR 13
Applicable to: MSN 3467



(1) BLOWER, VENT and EXTRACT Indications
VENT message normally appears in white. It becomes amber, if there is a BLOWER FAULT, EXTRACT FAULT, or AVNCS SYS FAULT.
BLOWER message appears in amber if there is a BLOWER FAULT.
EXTRACT message appears in amber if there is an EXTRACT FAULT.

(2) INLET and OUTLET Indications
Normally white. The corresponding indication becomes amber, when the inlet valve or the outlet valve is failed.

(3) INLET and OUTLET Valve Diagrams



GENERAL

Ident.: DSC-21-40-10-00017795.0001001 / 21 MAR 16
Applicable to: ALL

CARGO VENTILATION

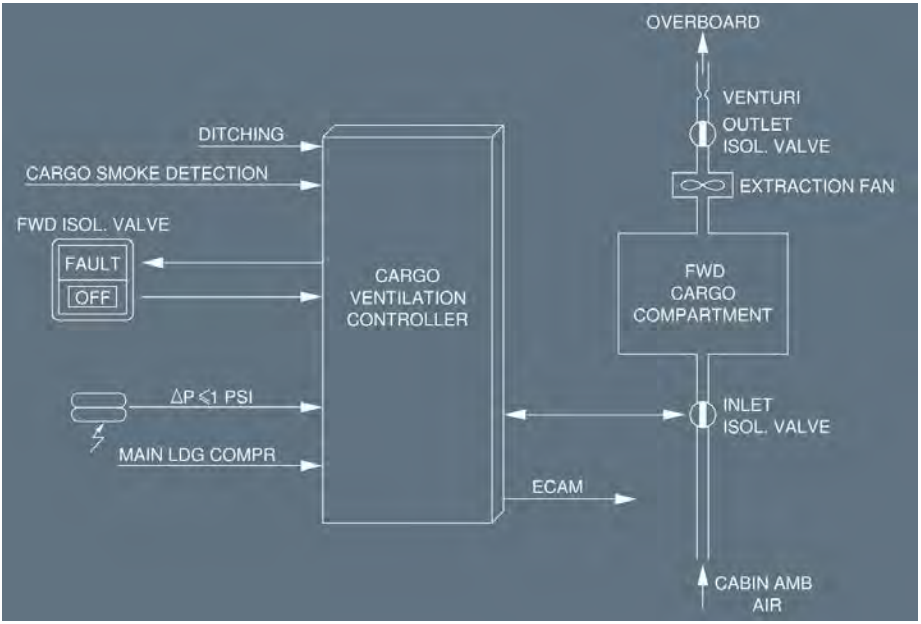
An extraction fan draws air from forward cargo compartment or aft cargo compartment, and exhausts it overboard. Air from the cabin replaces the exhausted air, thus ventilating the cargo compartments.

CARGO TEMPERATURE REGULATION

The system can mix hot bleed air with the air coming from the cabin, therefore giving the flight crew control of the temperature in the forward or aft cargo compartment.

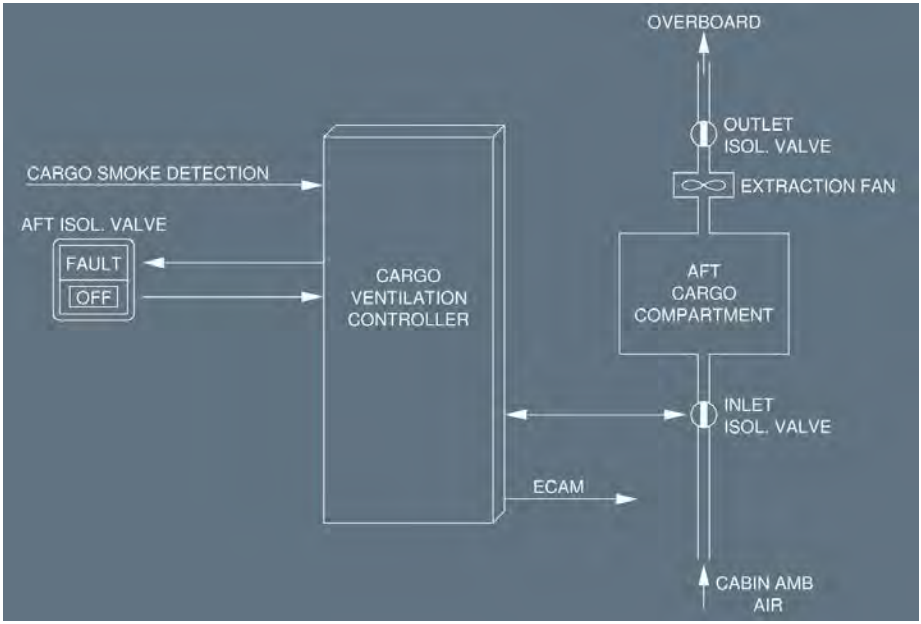
SCHEMATIC

Ident.: DSC-21-40-10-00000357.0001001 / 22 MAY 12
Applicable to: MSN 3408-4547



SCHEMATIC

Ident.: DSC-21-40-10-00000357.0002001 / 22 MAY 12
Applicable to: MSN 1882-2078



FWD CARGO VENTILATION

Ident.: DSC-21-40-20-00017796.0001001 / 21 MAR 16
Applicable to: ALL

Air from the cabin goes via the inlet isolation valve to the forward cargo compartment, driven either by an extraction fan or by differential pressure in flight. A skin-mounted venturi discharges the air overboard via the outlet isolation valve. The cargo ventilation controller controls the operation of the inlet and outlet isolation valves and the extraction fan.

The ventilation system operates in two modes:
- On the ground or when $\triangle P \leq 1$ PSI in flight, the controller opens the isolation valves, then starts the extraction fan
- In flight when $\triangle P > 1$ PSI, the controller stops the fan, and differential pressure maintains the ventilation.

The controller closes the isolation valves and stops the extraction fan when:
- The flight crew sets the FWD ISOL VALVE pb-sw to OFF, or
- The forward cargo smoke detection unit detects smoke.

The outlet valve closes and the extraction fan stops when the flight crew sets the DITCHING pb-sw to ON.

AFT CARGO VENTILATION

Ident.: DSC-21-40-20-00017797.0001001 / 21 MAR 16
Applicable to: ALL

Air from the cabin goes via the inlet isolation valve to the aft cargo compartment, driven by an extraction fan. Air is controlled by the outlet isolation valve and then goes outboard through the outflow valve.
The cargo ventilation controller controls the operation of the inlet and outlet isolation valves and the extraction fan.
When the isolation valves are fully open, the extraction fan operates continuously when the aircraft is on the ground and during flight.

The controller closes the isolation valves and stops the extraction fan when:
- The flight crew sets the AFT ISOL VALVE pb-sw to OFF, or
- The aft cargo smoke detection unit detects smoke.

AFT CARGO HEATING

Ident.: DSC-21-40-20-00017798.0001001 / 21 MAR 16
Applicable to: ALL

The ventilation system for the aft cargo compartment uses hot engine bleed air (upstream of the packs), mixing it with the ambient cabin air that flows through the cargo compartment.
The cargo regulating valve regulates the pressure of this hot air supply, and the trim air valve, which is modulated electrically by the controller, controls the flow.
The cargo pressure regulating valve is pneumatically operated and electrically controlled from the HOT AIR pb on the CARGO HEAT panel.
The hot air is controlled by the cargo trim air valve which is modulated electrically by the controller.
The hot air is then mixed with air from the cabin and supplied to the cargo compartment through the ventilation inlet isolation valve.
According to the temperature selector demand, the controller regulates the amount of hot air added by the trim air valve, until the desired temperature is reached.
If the inlet temperature exceeds 70 °C, the controller closes the trim air valve.
If the inlet temperature exceeds 88 °C, the controller interprets this as a duct overheat and closes the pressure regulating valve. This valve then remains closed until the flight crew resets the system by pressing the HOT AIR pb — which it cannot do until the temperature drops below 70 °C.

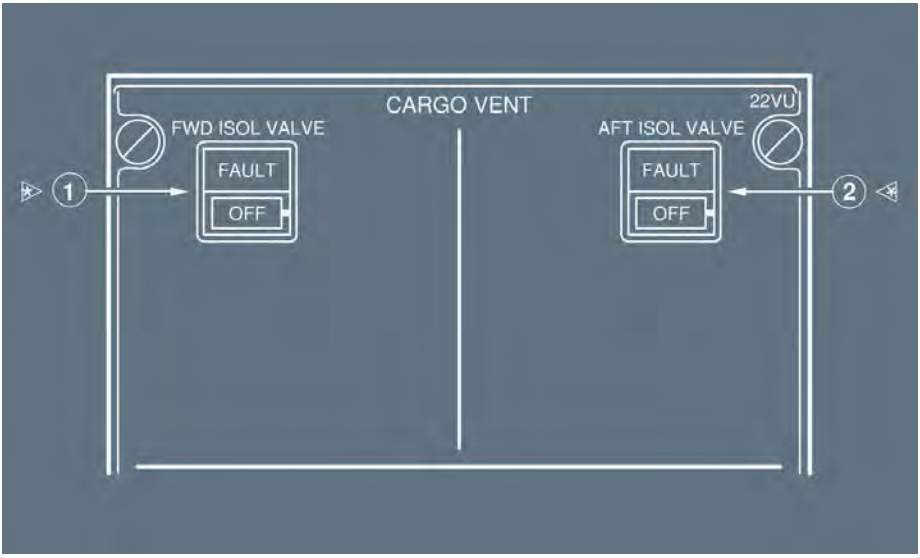
FWD CARGO HEATING

Ident.: DSC-21-40-20-00017799.0001001 / 21 MAR 16
Applicable to: ALL

The ventilation system for the forward cargo compartment uses hot engine bleed air, which is also used for cockpit and cabin temperature control, mixing it with the ambient cabin air that flows through the cargo compartment.
The cockpit and cabin hot air pressure regulating valve regulates the pressure of this hot air supply, and the cargo trim air valve, which is modulated electrically by the controller, controls the flow.
The hot air mixes with air from the cabin as it supplied to the cargo compartment through the ventilation inlet isolation valve.
The controller regulates the amount of hot air added by the trim air valve to get the desired temperature, per the temperature selector.
If the inlet temperature exceeds 70 °C, the controller closes the trim air valve. If the inlet temperature reaches 88 °C, the controller interprets this as a duct overhead and closes the pressure regulating valve. This valve then remains closed until the flight crew resets the system by pressing the HOT AIR pb - which it cannot do until the temperature drops below 70 °C.

OVERHEAD PANEL

Ident.: DSC-21-40-30-00017800.0001001 / 20 MAR 17
Applicable to: ALL



(1) FWD ISOL VALVE pb-sw

The switch controls the forward isolation valves and the extraction fan.

Auto : The inlet and outlet isolation valves open, extraction fan runs if there is no smoke detected in the fwd cargo bay.

OFF : The inlet and outlet isolation valves and the trim air valve close, the extraction fan stops.

FAULT lt : The light, associated with the ECAM caution, comes on amber when either inlet or outlet valve is not in the selected position.

(2) AFT ISOL VALVE pb-sw

The switch controls the isolation valves and the extraction fan.

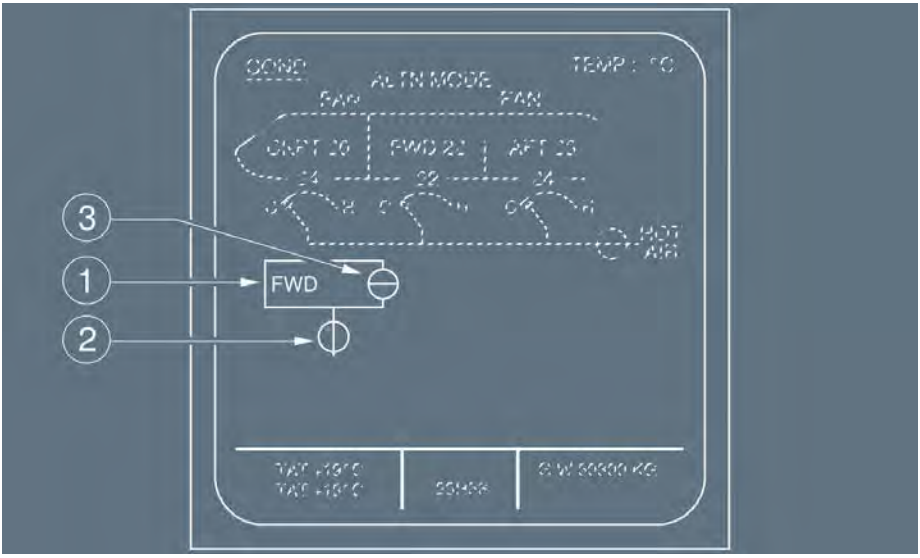
Auto : The inlet and outlet isolation valves open, extraction fan runs if there is no smoke detected in the aft cargo bay.

OFF : The inlet and outlet isolation valves and the trim air valve close, the extraction fan stops.

FAULT lt : The light, associated with the ECAM caution, comes on amber when either inlet or outlet valve is not in the selected position.

ECAM COND PAGE

Ident.: DSC-21-40-35-00006005.0009001 / 22 MAY 12
Applicable to: MSN 3408-4547



(1) Zone indication
It is white.

(2) Inlet isolation valve

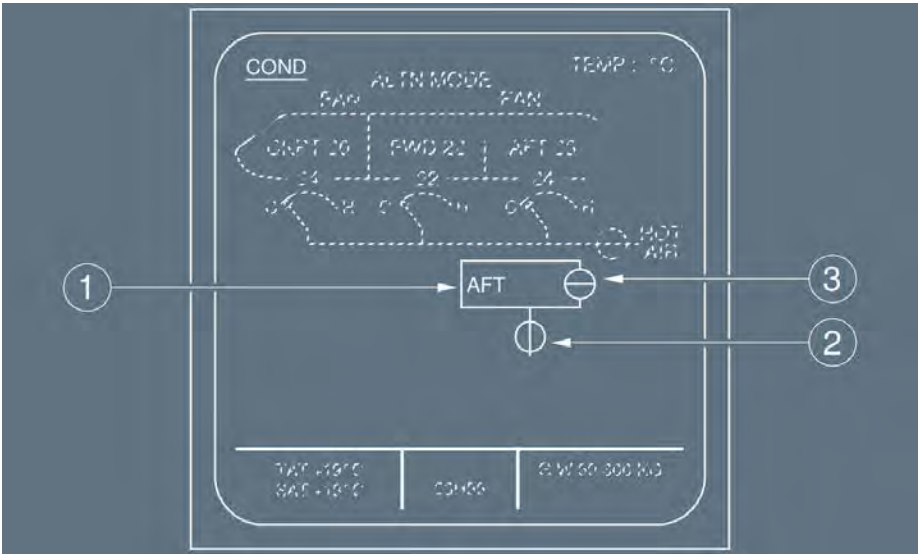
In line – Green	:	Valve is open.
Crossline – Amber	:	Valve is closed.

(3) Outlet isolation valve

Crossline – Green	:	Valve is open.
In line – Amber	:	Valve is closed.

ECAM COND PAGE

Ident.: DSC-21-40-35-00006005.0002001 / 22 MAY 12
Applicable to: MSN 1882-2078



(1) Zone indication
It is white.

(2) Inlet isolation valve

In line – Green	:	Valve is open.
Crossline – Amber	:	Valve is closed.

(3) Outlet isolation valve

Crossline – Green	:	Valve is open.
In line – Amber	:	Valve is closed.

AIRCRAFT SYSTEMS

AUTO FLIGHT - GENERAL

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FMGC STANDARD

Ident.: DSC-22_10-10-00014871.0005001 / 24 JUL 13
Applicable to: MSN 3408, 3518-4100

The aircraft is equipped with FMS2 HONEYWELL Release 1A H2 and FG C12.

FMGC STANDARD

Ident.: DSC-22_10-10-00014871.0012001 / 24 JUL 13
Applicable to: MSN 1882-2078, 3467, 4379-4547

The aircraft is equipped with FMS2 HONEYWELL Release 1A H2 and FG C13.

PREAMBLE

Ident.: DSC-22_10-10-00010067.0001001 / 17 AUG 10
Applicable to: ALL

This section gives a general description of the Auto Flight System and its functions:
- Architecture
- Function description
- Basic principle of systems:
  - Reversion
  - Protection
  - Managed and selected guidance modes.
- Mode information
- Display characteristics
- Operational principles
- Flight crew interface (MCDU pages)
- Degraded modes of operations.

DESCRIPTION

Ident.: DSC-22_10-10-00010068.0001001 / 17 AUG 10
Applicable to: ALL

The Flight Management Guidance System (FMGS) contains the following units:
- Two Flight Management Guidance Computers (FMGC)
- Two Multipurpose Control and Display Units (MCDU) (third MCDU optional)
- One Flight Control Unit (FCU)
- Two Flight Augmentation Computers (FAC).

GENERAL PHILOSOPHY

Ident.: DSC-22_10-10-00010069.0001001 / 17 AUG 10
Applicable to: ALL

The Flight Management and Guidance System (FMGS) provides predictions of flight time, mileage, speed, economy profiles and altitude.
It reduces cockpit workload, improves efficiency, and eliminates many routine operations generally performed by the flight crew.

The Flight Management Guidance System (FMGS) operates as follows:
- During cockpit preparation the flight crew uses the Multipurpose Control and Display Unit (MCDU) to insert a preplanned route from origin to destination. This route includes SID, EN ROUTE, WAYPOINTS, STAR, APPROACH, MISSED APPR, and ALTN route as available from the navigation database.
- Subsequently the system defines a vertical profile and a speed profile, taking into account ATC requirements and performance criteria.

Either FMGC performs all operations, if one FMGC fails.
The FMGS computes the aircraft position continually, using stored aircraft performance data and navigation data. Therefore it can steer the aircraft along a preplanned route and vertical and speed profiles. This type of guidance is said to be “managed”.
If the flight crew wants to modify any flight parameter (SPD, V/S, HDG, etc.) temporarily, they may do so by using the various Flight Control Unit (FCU) selectors. The FMGS then guides the aircraft to the target value of this parameter that they have selected. This type of guidance is said to be “selected”.

The two available types of guidance, then, are:
- Managed guidance guides the aircraft along the preplanned route and the vertical and speed/Mach profile. (The FMGS computes the target values of the various flight parameters).
- Selected guidance guides the aircraft to the target values of the various flight parameters the flight crew selects by using the FCU selectors.

Selected guidance always has priority over managed guidance.

FLIGHT MANAGEMENT GUIDANCE COMPUTER (FMGC)

Ident.: DSC-22_10-10-00010073.0002001 / 17 AUG 10
Applicable to: ALL

Each FMGC is divided into two main parts:

- The Flight Management (FM) part controls the following functions:
  - Navigation and management of navigation radios
  - Management of flight planning
  - Prediction and optimization of performance
  - Display management.
- The Flight Guidance (FG) part performs the following functions:
  - Autopilot (AP) command
  - Flight Director (FD) command
  - Autothrust (A/THR) command.

Each FMGC has its own set of databases. The individual databases can be independently loaded into their respective FMGC, or independently copied from one FMGC to the other.

Each FMGC contains these main databases:

1. The Navigation database (2.8 Mbytes) contains standard navigation data: Navaids, waypoints, airways, enroute information, holding patterns, airports, runways, procedures (SIDs, STARs, etc.), company routes, alternates.
   The airline updates this part every 28 days, and is responsible for defining, acquiring, updating, loading, and using this data. The updating operation takes 20 min to complete or 5 min if cross loaded from the opposite FMGC.
2. The Airline Modifiable Information (AMI), also described as the FM Airline Configuration file, contains:
   - Airline policy values: THR RED altitude, ACC altitude, EO ACC altitude, PERF factor, IDLE factor.
   - Fuel policy values: Fuel for taxi, % of route reserve, maximum and minimum values of route reserve, etc.
   - AOC functions customization.
3. The Aircraft Performance database includes the Engine model, Aerodynamical model, and Performance model. The airline cannot modify this database.
4. The Magnetic Variation database.
5. Each FMGC contains elements stored by the flight crew that enable them to create 20 waypoints, 10 runways, 20 navaids, and 5 routes.

MULTIPURPOSE CONTROL AND DISPLAY UNIT (MCDU)

Ident.: DSC-22_10-10-00010074.0001001 / 17 AUG 10
Applicable to: MSN 1882-2078

Two MCDUs are installed on the pedestal for flight crew loading and display of data. The use of the MCDU allows the flight crew to interface with the FMGC by selection of a flight plan for lateral and vertical trajectories and speed profiles. The flight crew may also modify selected navigation or performance data and specific functions of Flight Management (revised flight plan, engine-out, secondary flight plan, etc.). Additional data from peripherals (Centralized Fault Display System (CFDS), ARINC Communication Addressing and Reporting System (ACARS), Air Traffic Service Unit (ATSU)...) can also be displayed. Data that is entered into the MCDU that is illogical or beyond the aircraft capabilities will either be disregarded or will generate an advisory message.

MULTIPURPOSE CONTROL AND DISPLAY UNIT (MCDU)

Ident.: DSC-22_10-10-00010074.0002001 / 17 AUG 10
Applicable to: MSN 3408-4547

Two MCDUs are installed on the pedestal for flight crew loading and display of data. The use of the MCDU allows the flight crew to interface with the FMGC by selection of a flight plan for lateral and vertical trajectories and speed profiles. The flight crew may also modify selected navigation or performance data and specific functions of Flight Management (revised flight plan, engine-out, secondary flight plan, etc.). Additional data from peripherals (Centralized Fault Display System (CFDS), ARINC Communication Addressing and Reporting System (ACARS), Air Traffic Service Unit (ATSU)...) can also be displayed. Data that is entered into the MCDU that is illogical or beyond the aircraft capabilities will either be disregarded or will generate an advisory message.
The MCDUs allow the activation of the back–up navigation in the case of a dual FM Failure.

FLIGHT CONTROL UNIT (FCU)

Ident.: DSC-22_10-10-00010075.0001001 / 17 AUG 10
Applicable to: ALL

The FCU located on the glareshield, is the short-term interface between the flight crew and the FMGC. It is used to select any flight parameters or modify those selected in the MCDU. The autopilots and autothrust functions may be engaged or disengaged. Different guidance modes can be selected to change various targets (speed, heading, track, altitude, flight path angle, vertical speed).

FLIGHT AUGMENTATION COMPUTER (FAC)

Ident.: DSC-22_10-10-00010076.0001001 / 17 AUG 10
Applicable to: ALL

The FAC controls rudder, rudder trim and yaw damper inputs. It computes data for the flight envelope and speed functions. The FAC also provides warning for low-energy and windshear detection if these functions are installed.

OTHER FLIGHT CREW INTERFACES

Applicable to: ALL

Ident.: DSC-22_10-10-A-00010077.0001001 / 23 JUN 15

THRUST LEVERS

The thrust levers are the main interface between the Flight Management Guidance Computer (FMGC), the Full Authority Digital Engine Control System (FADEC), and the flight crew.

The thrust levers:
- Arm the autothrust at takeoff, when FLX or TOGA is selected
- Limit the maximum thrust by their position when autothrust is active
- Disconnect the autothrust system when the flight crew sets them to IDLE
- Command the thrust manually when autothrust is not active
- Engage the common modes (takeoff or go-around) when TOGA (or FLX for takeoff) is set
- Set the autothrust to the active mode when they are between IDLE and CL detent (MCT in engine out).

Ident.: DSC-22_10-10-A-00010078.0001001 / 17 AUG 10

ELECTRONIC FLIGHT INSTRUMENTS (EFIS)

Two Primary Flight Displays (PFD) and Navigation Displays (ND) provide the flight crew with full-time flight guidance, navigation and system advisory information for all flight phases. An EFIS control panel is located at each end of the glareshield and is used to control both Primary and Navigation Displays. This panel includes controls to select various modes within the PFD. A selector allows the barometric altimeter setting to be displayed on the PFD. Various distance ranges can be selected on the ND, and two switches allow either the left or right VOR/ADF bearing pointers to be displayed on the ND.

Ident.: DSC-22_10-10-A-00010079.0001001 / 17 AUG 10

PRIMARY FLIGHT DISPLAYS

The PFDs combine several conventional flight instrument indications on one color display panel, for centralized reference of flight data.

This centralized color display includes:
- Flight Director attitude guidance targets
- Armed and engaged modes
- Navigation and instrument approach information
- Altimeter setting
- Barometric altitude
- System messages.

Ident.: DSC-22_10-10-A-00010080.0002001 / 17 AUG 10

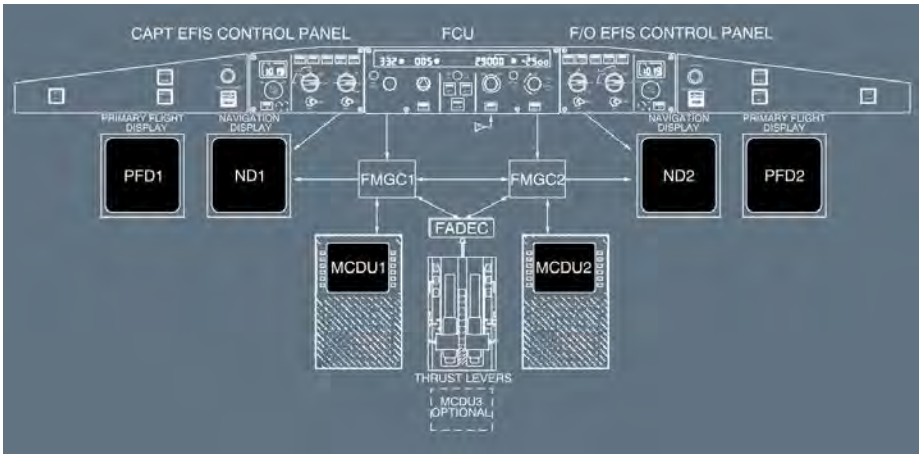
NAVIGATION DISPLAYS

Five different color navigation compass displays can be selected:
- ARC (map mode)
- ROSE NAV (map mode)
- ROSE VOR
- ROSE LS
- PLAN.

Information displayed on these modes uses the aircraft's position as a reference point for the flight plan navigation data (lateral and vertical information).

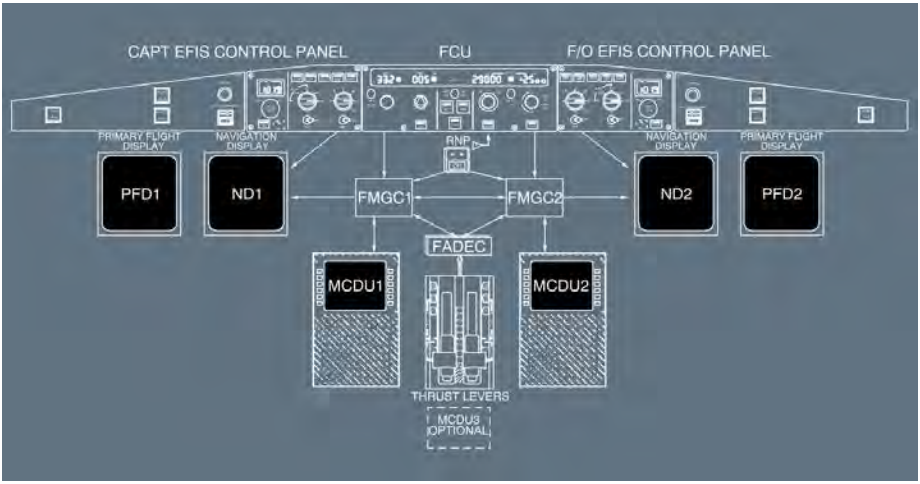
FLIGHT CREW INTERFACE WITH FMGC

Ident.: DSC-22_10-10-00010082.0002001 / 14 MAY 12
Applicable to: MSN 1882-3408, 3518-4547



FLIGHT CREW INTERFACE WITH FMGC

Ident.: DSC-22_10-10-00010082.0003001 / 14 MAY 12
Applicable to: MSN 3467



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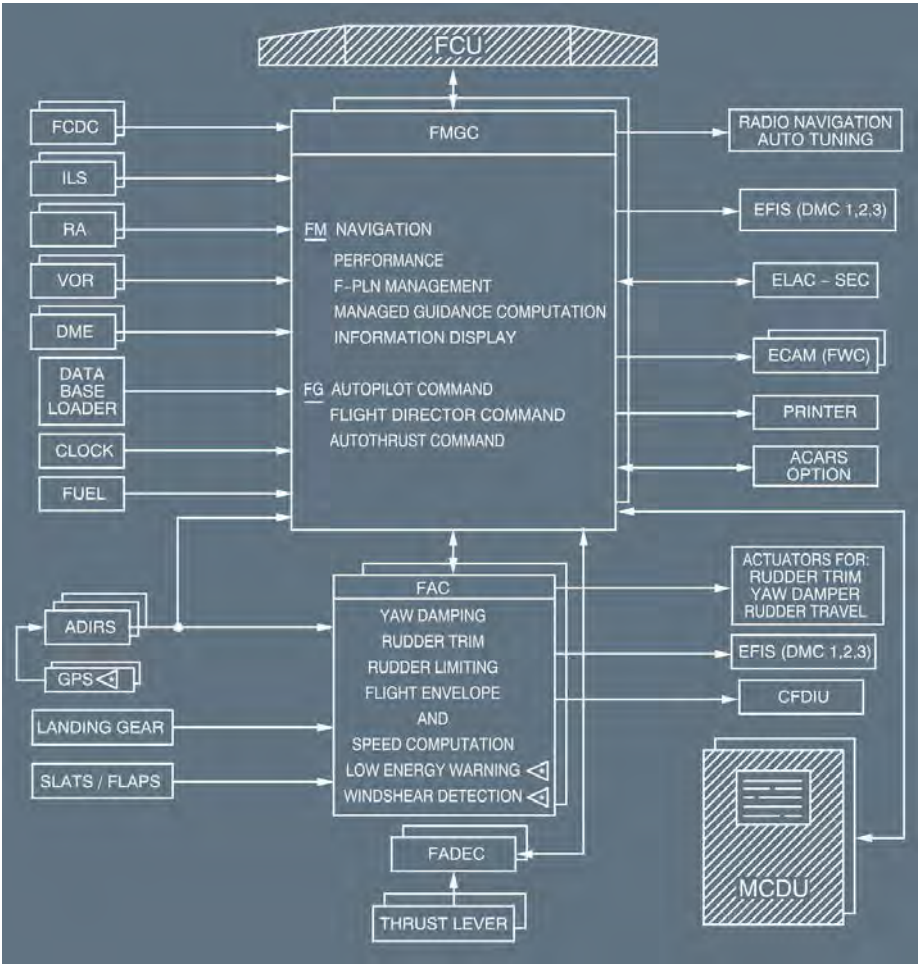
SYSTEM INTERFACE DIAGRAM

Ident.: DSC-22_10-20-00010084.0001001 / 01 OCT 12
Applicable to: ALL



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GENERAL

Ident.: DSC-22_10-30-00010085.0001001 / 17 AUG 10
Applicable to: MSN 1882-2078

The FMGS has three modes of operation:
- Dual mode (the normal mode)
- Independent mode. Each FMGC being controlled by its associated MCDU
- Single mode (using one FMGC only).

GENERAL

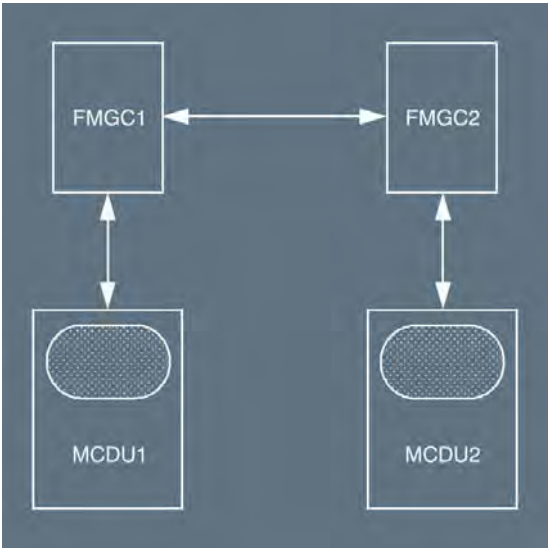
Ident.: DSC-22_10-30-00010085.0002001 / 17 AUG 10
Applicable to: MSN 3408-4547

The FMGS has four modes of operation:
- Dual mode (the normal mode)
- Independent mode. Each FMGC being controlled by its associated MCDU
- Single mode (using one FMGC only)
- Back–up navigation mode.

DUAL MODE

Ident.: DSC-22_10-30-00010086.0001001 / 01 OCT 12
Applicable to: ALL

This is the normal mode. The two FMGCs are synchronized: each performs its own computations and exchanges data with the other through a crosstalk bus.
One FMGC is the master, the other the slave, so that some data in the slave FMGC comes from the master.
All data inserted into any MCDU is transferred to both FMGCs and to all peripherals.

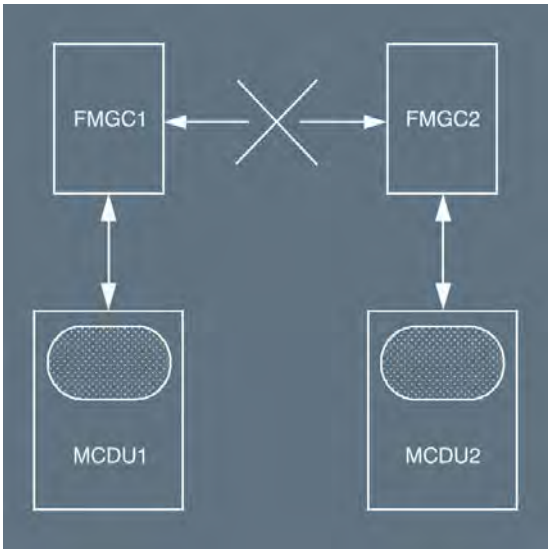


MASTER FMGC LOGIC

- If one autopilot (AP) is engaged, the related FMGC is master:
  - It uses the onside FD for guidance
  - It controls the A/THR
  - It controls the FMA 1 and 2.
- If two APs are engaged, FMGC1 is master.
- If no AP is engaged, and
  - The FD1 pb is on, then FMGC1 is master
  - The FD1 pb is off, and FD2 pb on then FMGC2 is master.
- If no AP/FD is engaged, A/THR is controlled by FMGC1.

INDEPENDENT MODE

Ident.: DSC-22_10-30-00010087.0001001 / 01 OCT 12
Applicable to: ALL



The system automatically selects this degraded mode under specific abnormal conditions (e.g. different database validity on both FMGCs).
Both FMGCs work independently and are linked only to peripherals on their own sides of the flight deck ("onside" peripherals).
When this occurs, the "INDEPENDENT OPERATION" message is displayed on both MCDU scratchpads.
Each MCDU transmits data it receives from its onside FMGC. It affects only the onside EFIS (Electronic Flight Instrument System) and RMP (Radio Management Panel).
On the POS MONITOR page (and GPS MONITOR page ◁✻), FMGS position (and GPS position ◁✻) from the opposite FMGC is not displayed.
On the RAD NAV page (and PROG page, if the FMGS GPS is not installed), navaids tuned on the opposite MCDU are not displayed. Corresponding fields are blank.

PROCEDURES ON GROUND

- **If each FMGC is loaded with a different database,** the FMGS will only operate in independent mode.

  CHECK the database number and validity.

CROSSLOAD ⩤ the database to restore the dual operation.

Crossload function is available on ground only (in preflight or done phase), when an independent operation is detected.

PROCEDURES IN FLIGHT

DO NOT SWITCH the navigation databases.
MAKE the same entries on both MCDUs to have both AP/FDs similar orders.

Both FGs being valid, 2 APs may be engaged for CAT II or CAT III operations.

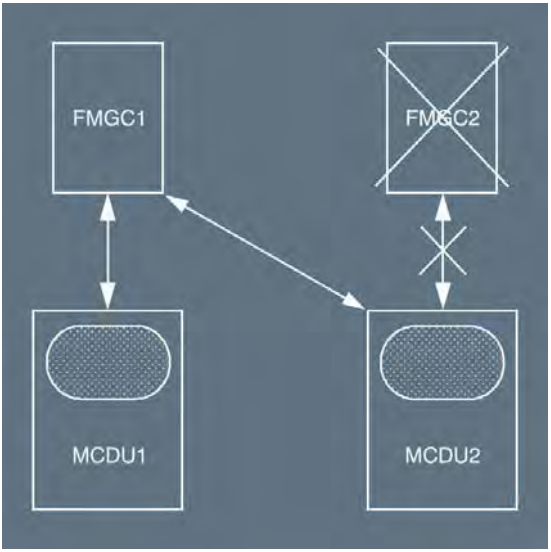
- **In the event of a go-around and when the second AP is disconnected:**

  ENSURE that the FMGC in command has correct flight plan orders and an updated nav database.

  Airbus does not recommend pulling one FMGC circuit breaker to force the system to operate in SINGLE mode.

SINGLE MODE

Ident.: DSC-22_10-30-00010088.0001001 / 01 OCT 12
Applicable to: MSN 1882-2078



The system automatically selects this degraded mode when one FMGC fails.
When this occurs, the failed FMGC displays “OPP FMGC IN PROCESS” in white on the MCDU scratchpad.

The corresponding ND displays the “SELECT OFFSIDE RNG/MODE” amber message.
Both POS MONITOR pages display the same position (operative FMGC position).
Both FDs are driven by the same FMGC. Any entry on either MCDU is sent to the operative FMGC.

PROCEDURES

- **If a transient failure triggers a single mode of operation:**

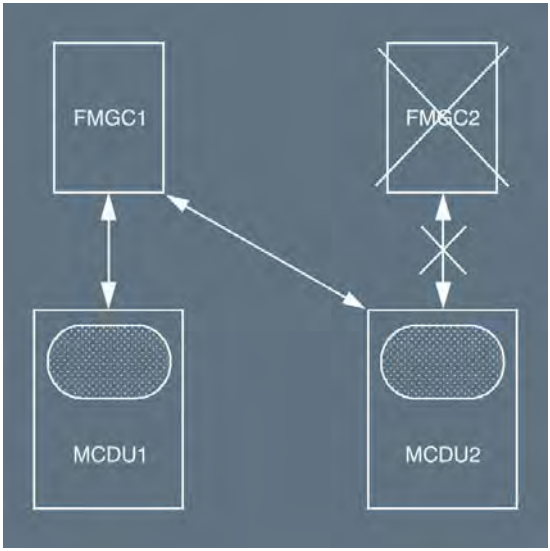
  DO NOT USE the MCDU(s) until the PLEASE WAIT message is suppressed.

  SET both NDs on the same range and mode to display the same information from the operative FMGC.

  When convenient, RESET the failed FMGC. (*Refer to DSC-22_20-90-10 Manual FMGC Reset - General*).

SINGLE MODE

Ident.: DSC-22_10-30-00010088.0004001 / 01 OCT 12
Applicable to: MSN 3408-4547



The system automatically selects this degraded mode when one FMGC fails.
When this occurs, the failed FMGC displays “OPP FMGC IN PROCESS” in white on the MCDU scratchpad.

On the ND usually associated with the failed FM:

- If the NDs are not both in the same mode or range, the associated ND displays "MAP NOT AVAIL" and "SET OFFSIDE RNG/MODE".
- If the NDs are in the same mode and range, the associated ND displays the "OFFSIDE FM CONTROL" amber message.

Both POS MONITOR pages display the same position (operative FMGC position).
Both FDs are driven by the same FMGC. Any entry on either MCDU is sent to the operative FMGC.

PROCEDURES

- **If a transient failure triggers a single mode of operation:**

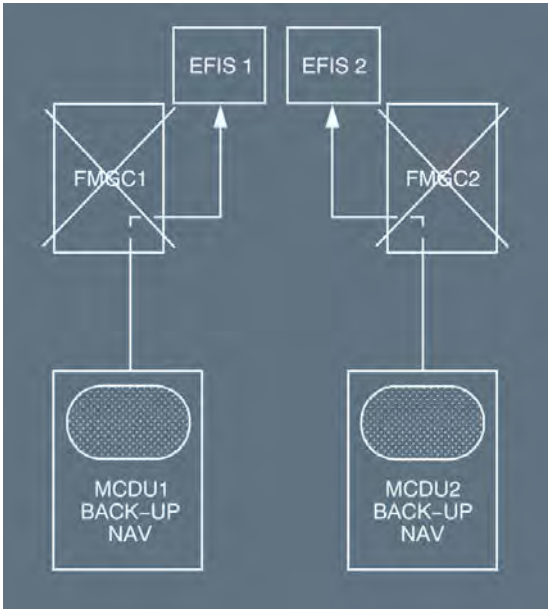
  DO NOT USE the MCDU(s) until the PLEASE WAIT message is suppressed.

  SET both NDs on the same range and mode to display the same information from the operative FMGC.

  When convenient, RESET the failed FMGC. (*Refer to DSC-22_20-90-10 Manual FMGC Reset - General*).

BACK UP NAVIGATION MODE

Ident.: DSC-22_10-30-00010089.0001001 / 01 OCT 12
Applicable to: MSN 3408-4547



The flight crew selects on the MCDU MENU page this degraded mode when both FMGCs fail. They recover the navigation function through the MCDU and IRS/GPS ◁ .
The MCDU continuously memorizes the active flight plan in its memory.

If both FMGCs fail, the back up navigation provides the following functions:
- Flight Planning
- Aircraft position using onside IRS, IRS3, or GPIRS position (if GPS ◁)
- F-PLN display on ND
- No AP/FD NAV mode
- Limited lateral revision
- F-PLN automatic sequencing.

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GENERAL

Ident.: DSC-22_10-40-05-00010083.0001001 / 17 AUG 10
Applicable to: ALL

The flight management system displays navigation, performance and guidance information on the:

- Multipurpose Control and Display Unit (MCDU)
- Navigation Display (ND) of the Electronic Flight Instrument System (EFIS)
- Primary Flight Display (PFD) of the EFIS.

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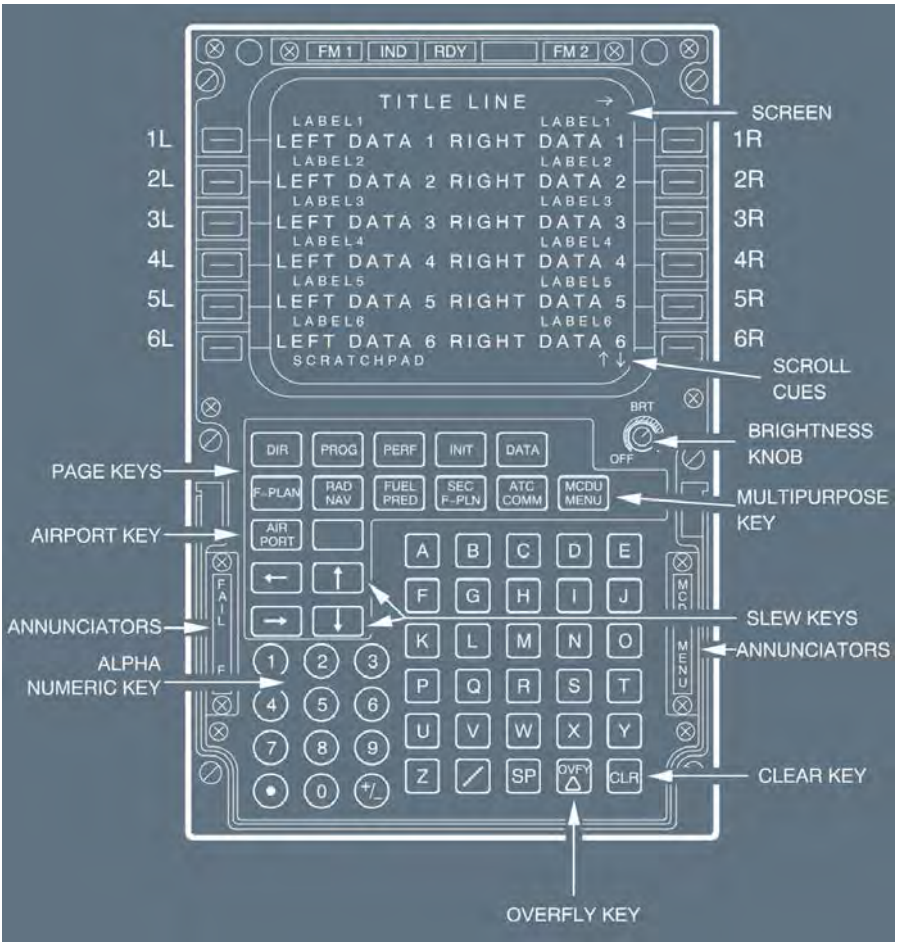
MCDU

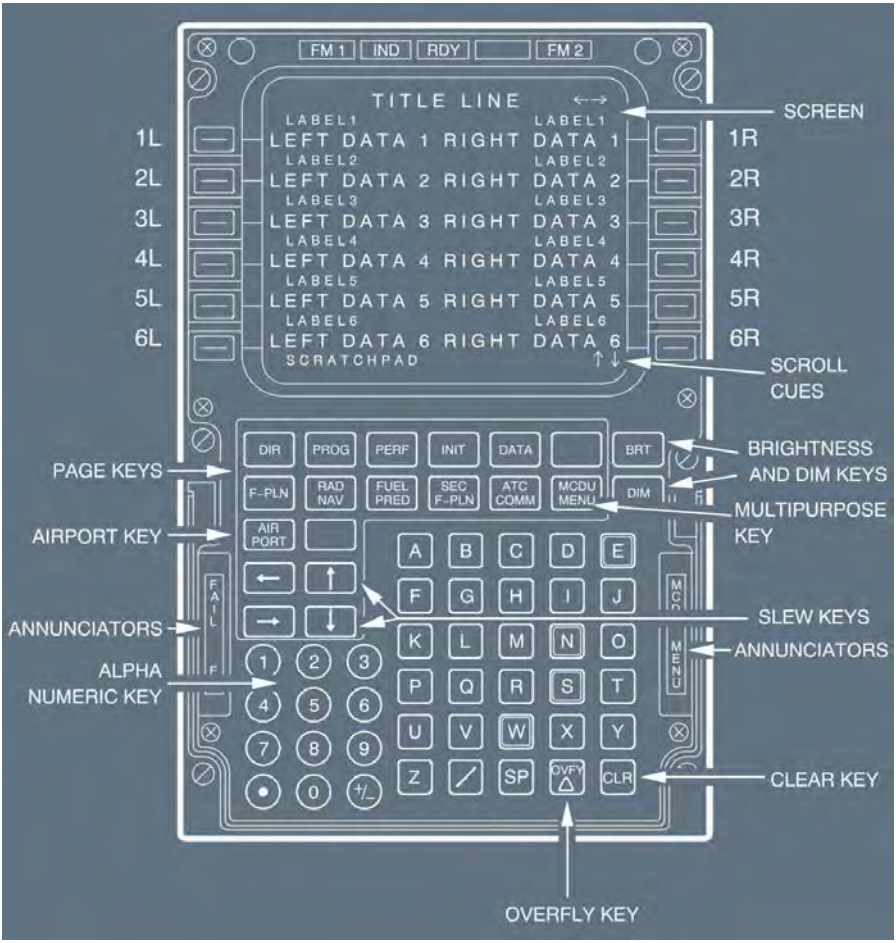
Ident.: DSC-22_10-40-10-A-00010090.0008001 / 14 MAY 12
Applicable to: MSN 1882-2078

MCDU INTERFACE



Ident.: DSC-22_10-40-10-A-00010090.0003001 / 14 MAY 12
Applicable to: MSN 3408-4547

MCDU INTERFACE



Ident.: DSC-22_10-40-10-A-00010091.0001001 / 17 AUG 10
Applicable to: MSN 1882-2078

GENERAL

The Multipurpose Control and Display Unit (MCDU) is a cathode ray tube that generates 14 lines of 24 characters each, including:
- A title line that gives the name of the current page in large letters
- Six label lines, each of which names the data displayed just below it (on the data field line)
- Six data field lines that display computed data or data inserted by the flight crew
- The scratchpad line that displays:
  - Specific messages
  - Information the flight crew has entered by means of the number and letter keys and which can then be moved to one of the data fields.

Ident.: DSC-22_10-40-10-A-00010091.0002001 / 13 DEC 12
Applicable to: MSN 3408-4547

GENERAL

The Multipurpose Control and Display Unit (MCDU) has a Liquid Crystal Display (LCD) with 14 lines of 24 characters each, including:
- A title line that gives the name of the current page in large letters
- Six label lines, each of which names the data displayed just below it (on the data field line)
- Six data field lines that display computed data or data inserted by the flight crew
- The scratchpad line that displays:
  - Specific messages
  - Information the flight crew has entered by means of the number and letter keys and which can then be moved to one of the data fields.

Ident.: DSC-22_10-40-10-A-00010092.0001001 / 17 AUG 10
Applicable to: ALL

LINE SELECT KEYS

There is a column of Line Select Keys (LSKs) on each side of the screen.

The flight crew uses these keys to:
- Move a parameter they have entered in the scratchpad to the appropriate line on the main screen
- Call up a specific function page indicated by a prompt displayed on the adjacent line
- Call up lateral or vertical revision pages from the flight plan page.

Ident.: DSC-22_10-40-10-A-00010093.0002001 / 17 AUG 10
Applicable to: ALL

KEYBOARD

The keyboard includes:

- Function and Page keys — Call up functions and pages the flight crew uses for flight management functions and computations.
  - ↑ ↓ (or SLEW) keys — Move a page up or down to display portions that are off the screen.
  - ← → keys — Moves to the next page of a multi-page element. An arrow in the top right corner indicates that another page is available.
  - AIRPORT key — Calls up the flight plan page that contains the next airport along the current flight plan. Successive pushes on the key show the alternate airport, the origin airport (before takeoff), and the next airport again.
- Number and letter keys allow the flight crew to insert data in the scratchpad so that they can use a line select key to enter it in the main display.
- Three keys have special functions:
  - CLR (clear) key — Erases material (messages or inserted data) from the scratchpad or from certain areas of displayed pages.
  - OVFY (overfly) key — Allows the aircraft to overfly a selected waypoint.
  - SP (space) key — Allows to insert a space in specific message.

Ident.: DSC-22_10-40-10-A-00010094.0002001 / 17 AUG 10
Applicable to: ALL

ANNUNCIATORS (ON THE SIDE OF THE KEYBOARD)

FAIL (amber)	Indicates that the Multipurpose Control and Display Unit (MCDU) has failed.
MCDU MENU (white)	Indicates that the flight crew should call up a peripheral linked to the MCDU (such as ACARS, ATSU or CFDS).
FM (white)	Comes on while the flight crew is using the MCDU to display peripherals. This light tells the flight crew that the FMGC has an important message to deliver. The flight crew accesses the message by pressing the MCDU MENU key and the line select key adjacent to the FMGC prompt.

Ident.: DSC-22_10-40-10-A-00010757.0001001 / 17 AUG 10
Applicable to: MSN 1882-2078

ANNUNCIATORS (ON THE TOP OF THE KEYBOARD)

FM 1 and FM 2 (amber)	The onside FM is failed
IND (amber)	The onside FM detects an independent mode of operation while both FM are healthly.

RDY (green)	MCDU has passed its power up test after its BRT knob was turned to OFF.

Ident.: DSC-22_10-40-10-A-00010757.0002001 / 17 AUG 10
Applicable to: MSN 3408-4547

ANNUNCIATORS (ON THE TOP OF THE KEYBOARD)

FM 1 and FM 2 (amber)	The onside FM is failed
IND (amber)	The onside FM detects an independent mode of operation while both FM are healthly.
RDY (green)	MCDU has passed its power up test after it was turned off using its DIM key.

Ident.: DSC-22_10-40-10-A-00010750.0001001 / 17 AUG 10
Applicable to: MSN 3408-4547

BRT AND DIM KEYS

Control the light intensity of the entire MCDU. MCDU power up is performed with the BRT key and MCDU shut down is performed with the DIM key.

Ident.: DSC-22_10-40-10-A-00010095.0001001 / 17 AUG 10
Applicable to: MSN 1882-2078

BRT knob

Controls the light intensity of the entire MCDU.

Ident.: DSC-22_10-40-10-A-00010097.0001001 / 17 AUG 10
Applicable to: ALL

DATA ENTRY

The flight crew enters data by typing it into the scratchpad on the MCDU. Next, pressing the line select key (LSK) will load the data from the scratchpad into the desired field. An error message displays if the data is out of range or not formatted correctly. To correct data, the flight crew may clear the message with the clear (CLR) key and then retype the message into the scratchpad. Pressing the CLR key when the scratchpad is empty displays “CLR”. To clear data from a field, select CLR from the scratchpad to the data field to be cleared.

Ident.: DSC-22_10-40-10-A-00010098.0001001 / 17 AUG 10
Applicable to: ALL

MCDU ENTRY FORMAT

The flight crew enters information into the MCDU at the bottom line of the scratchpad. When data has lead zeros, they may be omitted if desired. For example a three-digit wind direction of 060 may be typed as 60. The display will still show 060. To enter an altitude below 1 000 ft, the lead zero must be added as 0400 for 400 ft. This differentiates the altitude from a flight level.

To enter a double data entry such a speed/altitude, the separating slash must be used. If entering only the first part of a double entry, omit the slash. To enter only the second part of a double entry, a leading slash must be used i.e. /0400.

Ident.: DSC-22_10-40-10-A-00010099.0001001 / 17 AUG 10
Applicable to: ALL

MESSAGES

The scratchpad displays various messages for flight crew information. Theses messages are prioritized by importance to the flight crew as either amber or white.

Amber messages are:
- Navigation messages
- Data entry messages
- EFIS repeat messages.

Amber messages are categorized into two types:
- Type 1 message that is a direct result of a flight crew action. Type 1 messages are displayed immediately in the scratchpad ahead of other messages.
- Type 2 messages inform the flight crew of a given situation or request a specific action. Stored in “last in”, “first out” message queue that holds maximum of 5 messages.
  Type 2 messages are displayed in the scratchpad only if there are no Type 1 messages or other data and will remain until all the messages have been viewed and cleared with the CLR key.

White messages are advisory only.

Ident.: DSC-22_10-40-10-A-00010101.0001001 / 17 AUG 10
Applicable to: ALL

CHARACTERS

Small and large fonts are displayed according to the following rules:
- The title line and the scratchpad are displayed in large font
- Datafields are usually displayed in large font
- Label lines are displayed in small font
- Flight crew entries and modifiable data are displayed in large font
- Defaulted/computed and non modifiable data are displayed in small font.

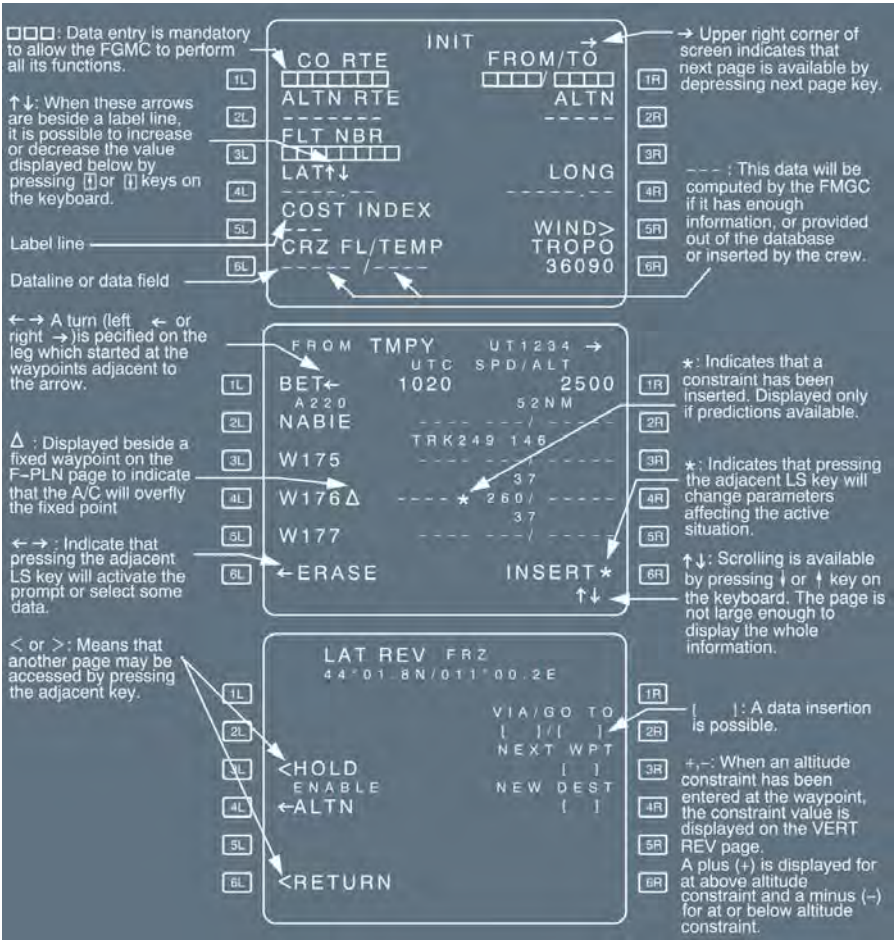
Ident.: DSC-22_10-40-10-A-00010102.0001001 / 17 AUG 10
Applicable to: ALL

COLORS

DATA	MCDU COLOR
TITLES, COMMENTS, <, >, ↑ ↓, ← →, DASHES, MINOR MESSAGES	WHITE
- MODIFIABLE DATA - SELECTABLE DATA - BRACKETS	BLUE
- NON MODIFIABLE DATA - ACTIVE DATA	GREEN
- MANDATORY DATA (BOXES) - FLIGHT CREW ACTION REQUIRED - IMPORTANT MESSAGES - MISSED CONSTRAINT	AMBER
- CONSTRAINTS - MAX ALTITUDE	MAGENTA
PRIMARY F-PLN	GREEN WAYPOINTS, WHITE LEGS
TEMPORARY F-PLN	YELLOW WAYPOINTS, WHITE LEGS
SECONDARY F-PLN	WHITE WAYPOINTS AND LEGS
MISSED APPROACH (not active)	BLUE WAYPOINTS, WHITE LEGS
ALTERNATE F-PLN (not active)	BLUE WAYPOINTS, WHITE LEGS
OFFSET	GREEN WAYPOINTS, WHITE LEGS, OFST DISPLAYED IN THE TITLE OF THE F-PLN PAGE
TUNED NAVAID	BLUE
"TO" WAYPOINT AND DESTINATION	WHITE

Ident.: DSC-22_10-40-10-A-00010103.0001001 / 14 MAY 12
Applicable to: ALL

SCREEN PROMPTS



MCDU FUNCTION KEYS

The function keys on the Multipurpose Control and Display Units allow the flight crew to call up MCDU pages quickly.
The following is a summary of the purpose of each key:

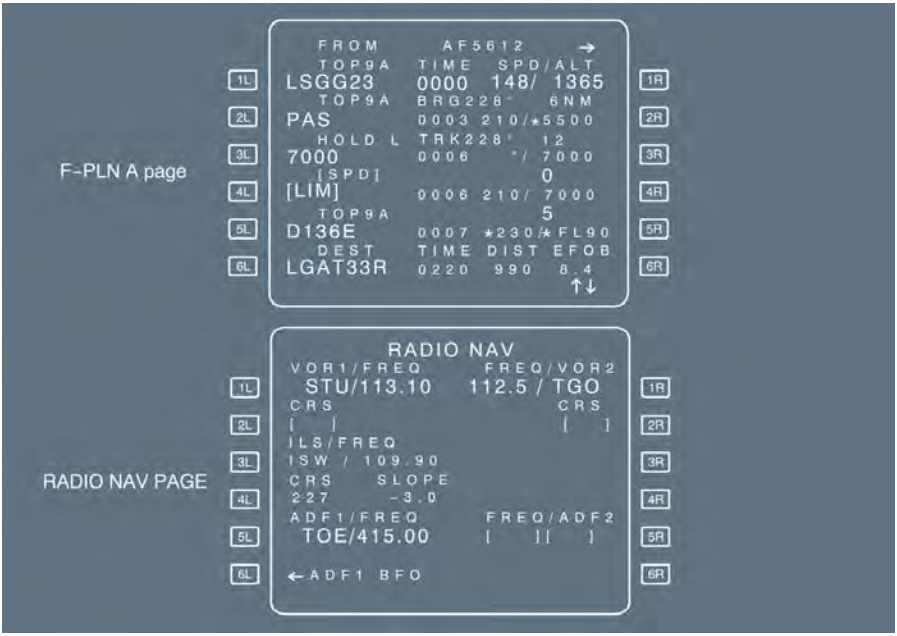
DIR	Calls up the DIR TO page, and enables the flight crew to proceed directly from the present position to any waypoint, entered manually or selected in the active flight plan.
PROG	Calls up the progress page corresponding to the phase of the active flight plan that is in progress. This page displays navigation information and active data such as the optimum and maximum recommended cruise flight levels. It enables the flight crew to update the FMGS position and to obtain a bearing and distance to any location.
PERF	Calls up the performance pages, that display the optimum speed or Mach number for each phase. The flight crew can amend these pages. The first page to be displayed is the one corresponding to the current flight phase (except for preflight and done phases). The flight crew can then use the appropriate 6L or 6R LSK to call up pages corresponding to future flight phases.
INIT	Calls up the flight plan initialization A page, which also gives the flight crew access to the B page. The flight crew uses the INIT pages to initialize Flight Management for the flight. The flight crew uses the INIT A page primarily to insert his flight plan and to align the inertial reference system. The flight crew uses the INIT B page to insert aircraft weight, fuel on board, CG and various fuel requirements. The FMGS uses this data to compute predictions and fuel planning parameters. The flight crew has access to the INIT A page only in the preflight phase. INIT B page (not accessible after engine start) is called up by pressing the "NEXT PAGE" key.
DATA	Calls up the data index page. This gives the flight crew access to various reference pages that show aircraft position, aircraft status, runways, waypoints, navaids, routes, and data stored by the flight crew.

F-PLN	Calls up the flight plan A and B pages, which contain a leg-by-leg description of the active primary flight plan. The flight crew can use the slewing keys to review the entire active flight plan. They can make all lateral and vertical revisions to the flight plan through these pages, using the left LSKs for lateral revision and the right keys for vertical revision.
RAD NAV	Calls up the radio navigation page. This page displays the Radio Navaids tuned automatically or manually through the FMGC.
FUEL PRED	Calls up the fuel prediction page. Once the engines are started, this page displays the fuel predicted to be remaining at the destination and the alternate, as well as fuel management data.
SEC F-PLN	Calls up the index page for the secondary flight plan. The flight crew can use this page to call up the secondary flight plan and all the functions related to it (copying, deleting, reviewing, activating, and the INIT and PERF pages).
ATC COMM	Calls up the ATC applications (not activated).
MCDU MENU	Calls up the MCDU MENU page, which displays the subsystems currently addressed via the MCDU. The key next to the name of a subsystem enables the flight crew to select that subsystem. When the MCDU MENU annunciator lights up, the flight crew should press the MCDU MENU key. The menu will have [REQ] displayed next to the name of the subsystem that requires attention.

Ident.: DSC-22_10-40-10-A-00010107.0005001 / 01 OCT 12
Applicable to: ALL

MCDU DISPLAY

The MCDUs display:
- Position and accuracy information
- Tuned navaids
- Lateral and vertical flight plans (waypoints, pseudo waypoints, constraints)
- Predictions (SPD, TIME, ALT, WIND)
- Fuel predictions and fuel management information (estimated fuel on board, extra fuel)
- Performance data.


F-PLN A page
FROM AF5612
TOP9A TIME SPD/ALT
LSGG23 0000 148/ 1365
TOP9A BRG228° 6NM
PAS 0003 210/*5500
HOLD L TRK228° 12
7000 0006 °/ 7000
[SPD] 0
[LIM] 0006 210/ 7000
TOP9A 5
D136E 0007 *230/*FL90
DEST TIME DIST EFOB
LGAT33R 0220 990 8.4
RADIO NAV PAGE
RADIO NAV
VOR1/FREQ FREQ/VOR2
STU/113.10 112.5 / TGO
CRS CRS
[ ] [ ]
ILS/FREQ
ISW / 109.90
CRS SLOPE
227 -3.0
ADF1/FREQ FREQ/ADF2
TOE/415.00 [ ][ ]
←ADF1 BFO

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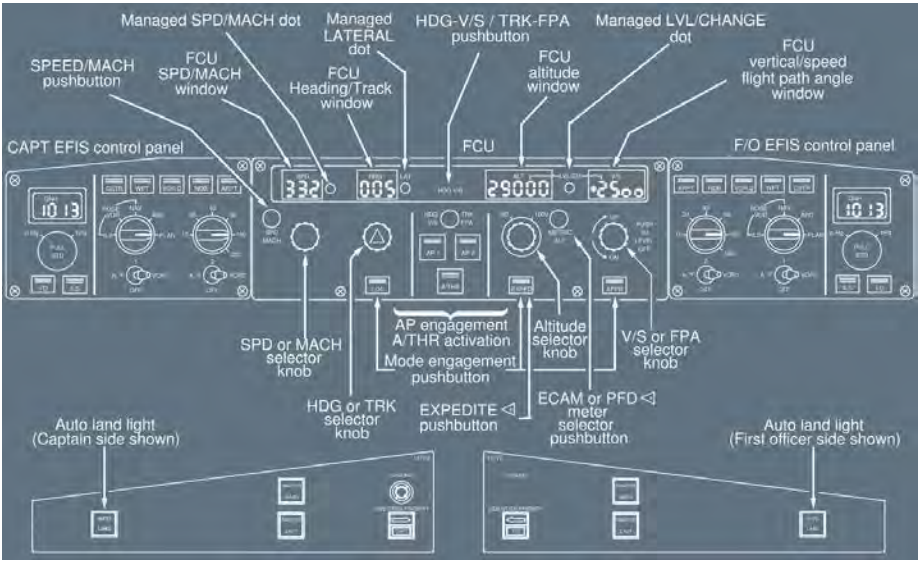
FCU

Ident.: DSC-22_10-40-20-00010112.0003001 / 03 AUG 17
Applicable to: ALL

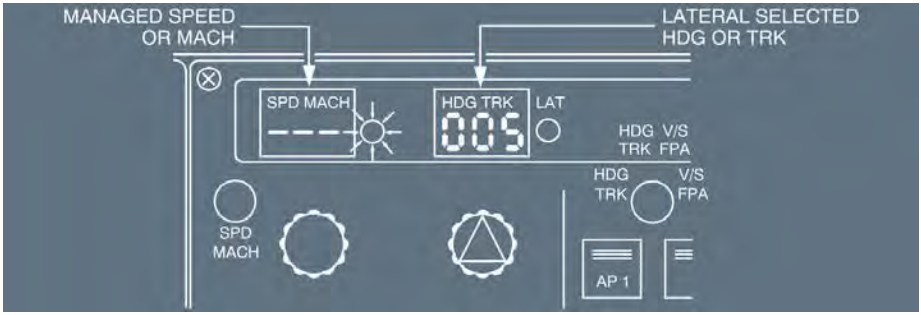
The Flight Control Unit (FCU) is located on the glareshield and is constituted of three control panels: One for the automatic flight controls and two for the Electronic Flight Instrument System (EFIS). The FCU has two channels, each of which can independently command the central control panel. If one channel fails, the other channel can control all the functions.



FCU PHILOSOPHY

Ident.: DSC-22_10-40-20-00010113.0002001 / 14 MAY 12
Applicable to: ALL

The flight crew can use two types of guidance to control the aircraft in auto flight. One type is managed by the Flight Management Guidance System (FMGS). The other uses target quantities which are manually entered by the flight crew.
When the aircraft uses target quantities from the FMGS (managed guidance), the FCU windows display dashes and the white dots next to those windows light up. When the aircraft uses target quantities, entered by the flight crew (selected guidance), the windows display the selected numbers and the white dots do not light up.



Note: The altitude window always displays an altitude selected by the flight crew (never dashes).

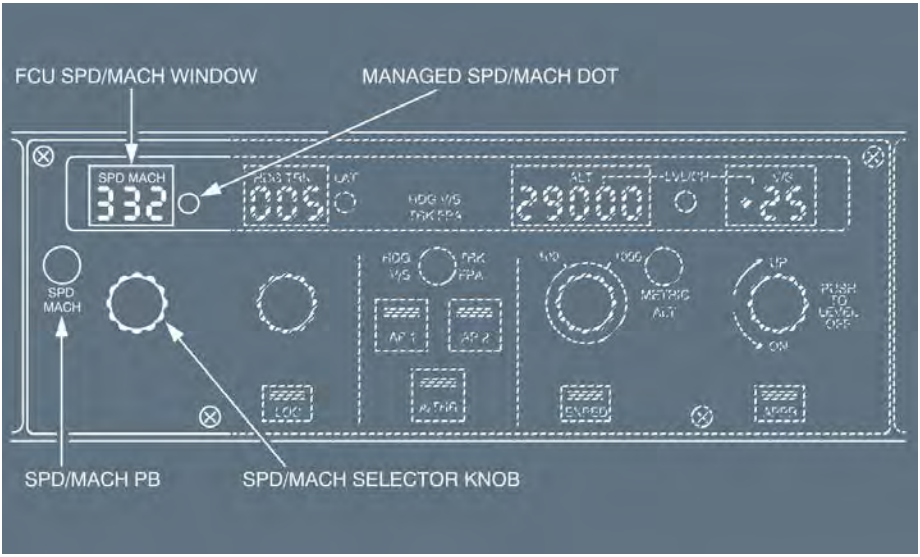
The FCU has four knobs:
- SPD-MACH
- HDG-TRK
- ALT
- V/S-FPA.

The knobs can be rotated, pushed in, and pulled out:
- In order to arm or engage managed guidance for a given mode, the flight crew pushes in the associated knob. If, for example, they push in the HDG knob, they engage or arms the NAV mode.
- In order to engage a selected guidance mode, the flight crew turns the knob to set the desired value, then pulls the knob out to engage the mode with a target value equal to the selected value.

Note: In managed guidance (lateral, vertical guidance or managed speed), the corresponding window is dashed. Turning a knob without pulling it, displays a value that is the sum of the current target and the turn action value. The display remains 45 s on the HDG/TRK and V/S windows and 10 s on the SPD/MACH window before the dashes reappear. This rule does not apply to the ALT knob/window.

SPEED/MACH CONTROL AREA

Ident.: DSC-22_10-40-20-00010114.0002001 / 14 MAY 12
Applicable to: ALL



SPD/MACH knob

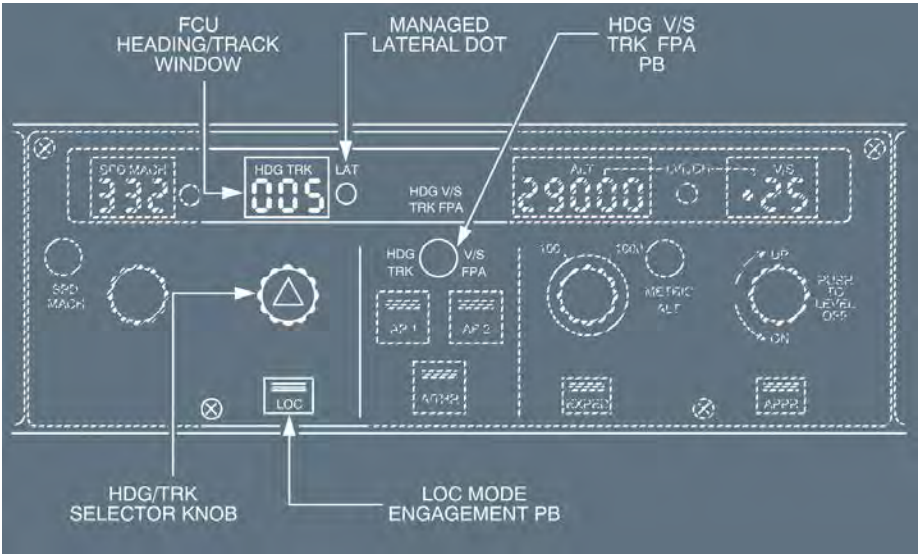
Display range: between 100 and 399 kt for speed, between 0.10 and 0.99 for Mach number. One rotation of the knob corresponds to approximately 32 kt or M 0.32.

SPD/MACH pb

Pushing this pushbutton changes the SPD target to the corresponding MACH target and vice versa.

LATERAL CONTROL AREA

Ident.: DSC-22_10-40-20-00010115.0007001 / 14 MAY 12
Applicable to: ALL



HDG/TRK knob

Display range: between 0 ° and 359 °.
One rotation of the knob corresponds to 32 ° (1 ° per click).

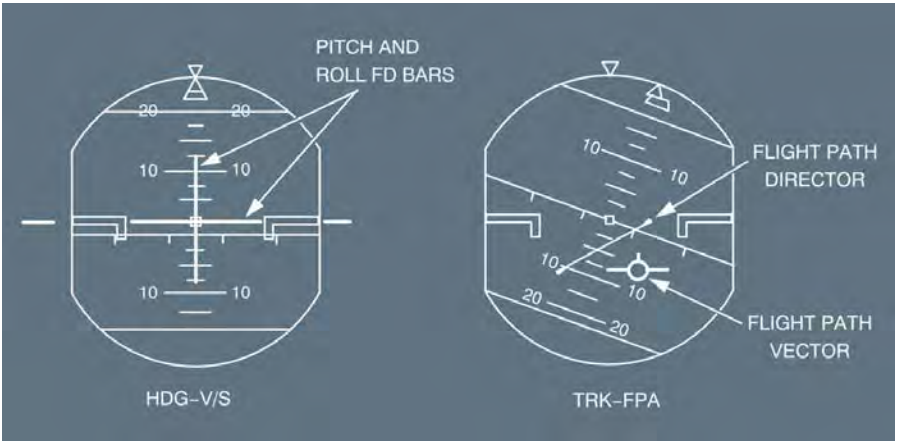
LOC pb

Pushing this pushbutton arms, engages, or disengages the LOC mode.

HDG V/S – TRK FPA pb

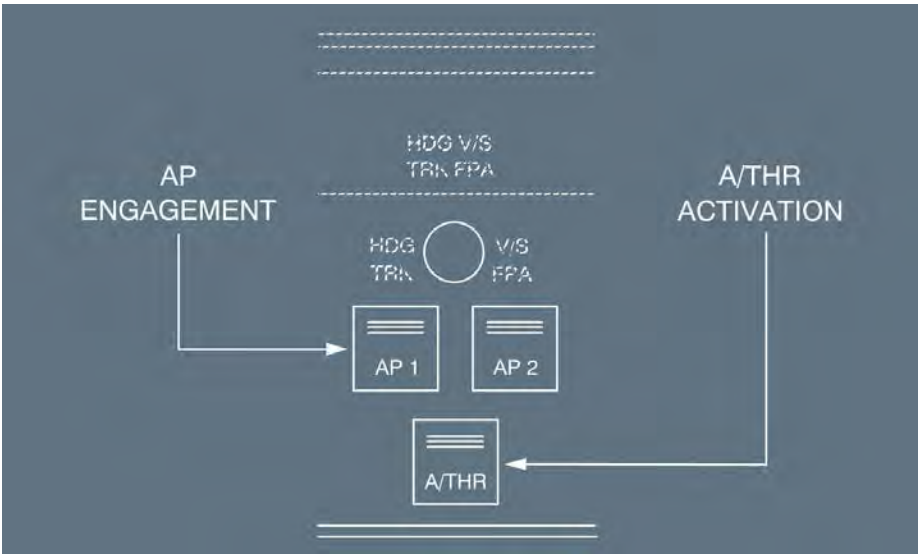
The flight crew uses this pushbutton to select HDG (associated with V/S) or TRK (associated with FPA). Pushing it:

- Displays the Flight Path Vector (FPV) on the Primary Flight Display (PFD) or deletes it.
- On the PFD, changes the FD crossbar display (with the aircraft attitude as its reference) to the aircraft Flight Path Director (with the flight path vector as its reference) and vice versa.
- Changes heading reference into track reference in the HDG/TRK window and vice versa.
- Changes vertical speed reference target into flight path angle reference target in the V/S-FPA window and vice versa.



AP-A/THR CONTROL AREA

Ident.: DSC-22_10-40-20-00010116.0001001 / 14 MAY 12
Applicable to: ALL



AP1 pb AND AP2 pb

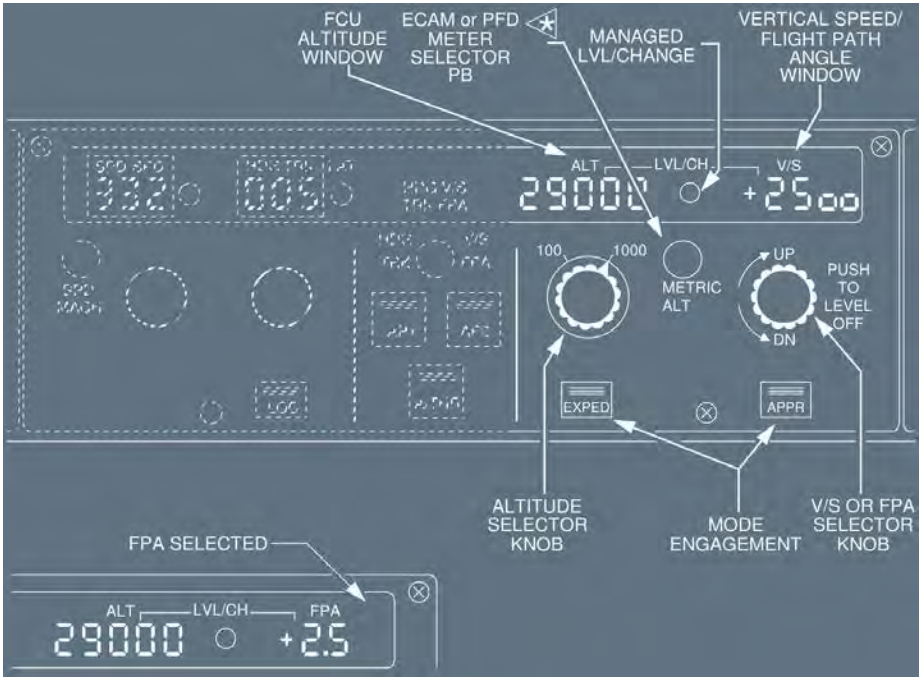
The flight crew uses these pushbuttons to engage or disengage the autopilots. The buttons illuminate green when the autopilot is engaged.

A/THR pb

The flight crew uses this pushbutton to arm, activate, or disconnect the autothrust (A/THR). This button illuminates green if the A/THR is armed or active.

VERTICAL CONTROL AREA

Ident.: DSC-22_10-40-20-00010117.0006001 / 22 MAY 12
Applicable to: MSN 3408-4547



The FCU altitude window always displays a target value selected by the flight crew. It never displays dashes.

Altitude knob (INNER AND OUTER)

Display range: 100 to 49 000 ft
- The outer knob has two positions: 100 and 1000
- The inner knob sets the altitude in the FCU window in increments of 100 or 1 000 ft, depending upon the position of the outer knob.

EXPED pb

This pushbutton is used to engage the expedite mode. *Refer to DSC-22_30-70-90 General*.

METRIC ALT pb

This pushbutton is used to display the FCU altitude target in meters on the ECAM, or the current altitude and FCU/FM altitude target in meters on the PFD ◁ .

V/S or FPA knob

Range (V/S) : –6 000 to +6 000 ft/min
2 clicks = 100 ft/min
If the flight crew turns the knob slowly, each click equals 100 ft/min.

Range (FPA) : –9.9 ° to +9.9 °
1 click = 0.1 °

The flight crew turns this knob to set the value of the vertical speed (V/S) or flight path angle (FPA) to be displayed in the V/S or FPA window (They choose which, V/S or FPA, is to be displayed by pushing the HDG V/S - TRK FPA pb).

One rotation of the knob corresponds to 32 clicks. One complete rotation sets:
FPA = 3.2 °
V/S = 1 600 ft/min

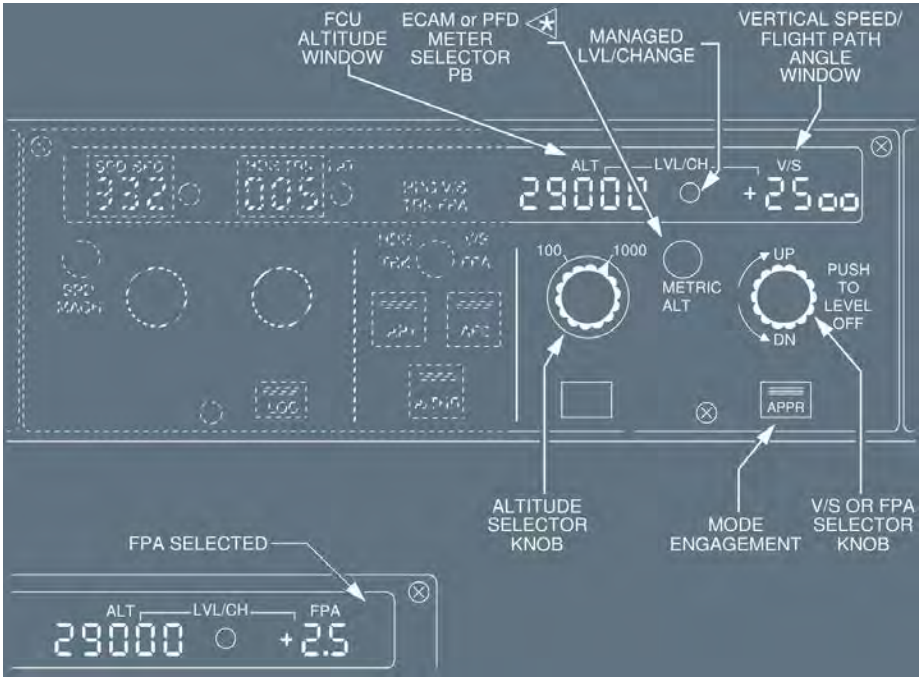
When the flight crew pushes in the V/S or FPA knob, the system commands an immediate level-off by engaging the V/S or FPA mode with a target of zero. The flight mode annunciator (FMA) then displays "V/S = 0" in green when V/S or FPA is nulled. If the flight crew now turns the knob to put in a new setting for V/S or FPA, the aircraft changes flight path accordingly.

APPR pb

This pushbutton arms, disarms, engages, or disengages the approach modes:
- LOC and G/S modes, if an ILS approach is selected in the active F-PLN.
- APP NAV-FINAL modes, if a non precision approach is selected in the active F-PLN.

VERTICAL CONTROL AREA

Ident.: DSC-22_10-40-20-00010117.0012001 / 22 MAY 12
Applicable to: MSN 1882-2078



The FCU altitude window always displays a target value selected by the flight crew. It never displays dashes.

Altitude knob (INNER AND OUTER)

Display range: 100 to 49 000 ft

- The outer knob has two positions: 100 and 1000
- The inner knob sets the altitude in the FCU window in increments of 100 or 1 000 ft, depending upon the position of the outer knob.

METRIC ALT pb

This pushbutton is used to display the FCU altitude target in meters on the ECAM, or the current altitude and FCU/FM altitude target in meters on the PFD ◁ .

V/S or FPA knob

Range (V/S) : –6 000 to +6 000 ft/min
2 clicks = 100 ft/min
If the flight crew turns the knob slowly, each click equals 100 ft/min.

Range (FPA) : –9.9 ° to +9.9 °
1 click = 0.1 °

The flight crew turns this knob to set the value of the vertical speed (V/S) or flight path angle (FPA) to be displayed in the V/S or FPA window (They choose which, V/S or FPA, is to be displayed by pushing the HDG V/S - TRK FPA pb).

One rotation of the knob corresponds to 32 clicks. One complete rotation sets:
FPA = 3.2 °
V/S = 1 600 ft/min

When the flight crew pushes in the V/S or FPA knob, the system commands an immediate level-off by engaging the V/S or FPA mode with a target of zero. The flight mode annunciator (FMA) then displays "V/S = 0" in green when V/S or FPA is nulled. If the flight crew now turns the knob to put in a new setting for V/S or FPA, the aircraft changes flight path accordingly.

APPR pb

This pushbutton arms, disarms, engages, or disengages the approach modes:
- LOC and G/S modes, if an ILS approach is selected in the active F-PLN.
- APP NAV-FINAL modes, if a non precision approach is selected in the active F-PLN.

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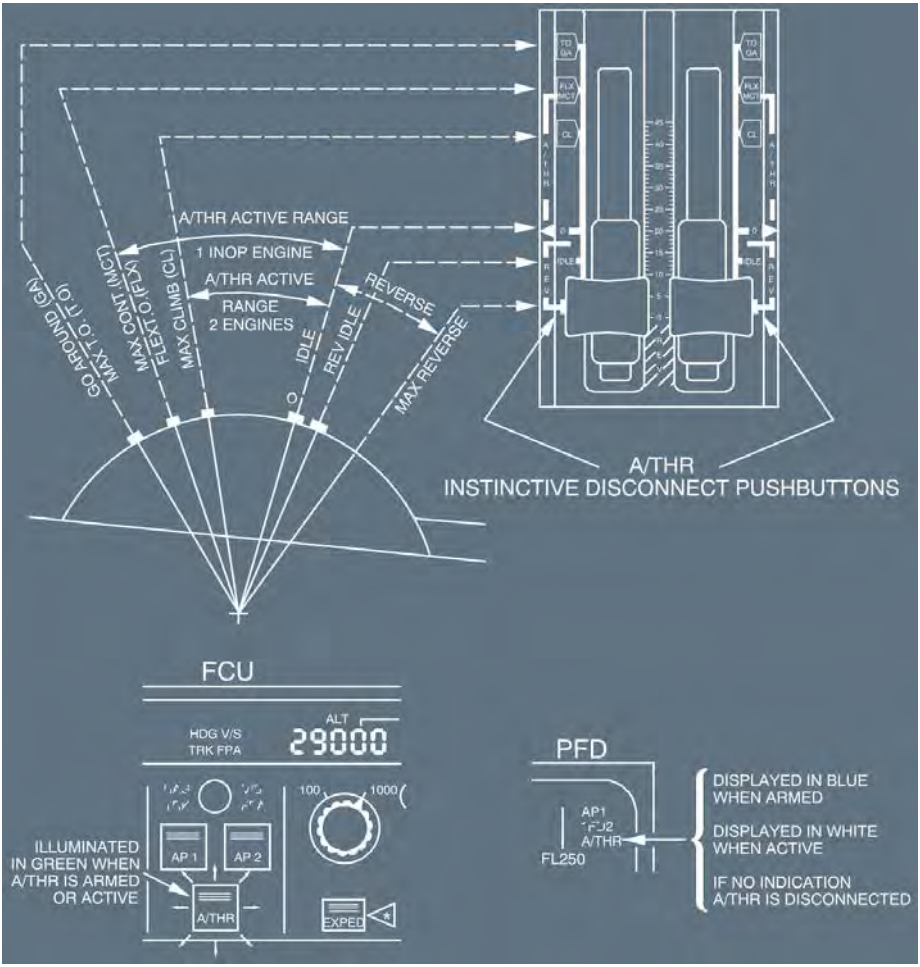
THRUST LEVERS

Ident.: DSC-22_10-40-30-00010119.0001001 / 14 MAY 12
Applicable to: ALL



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PFD

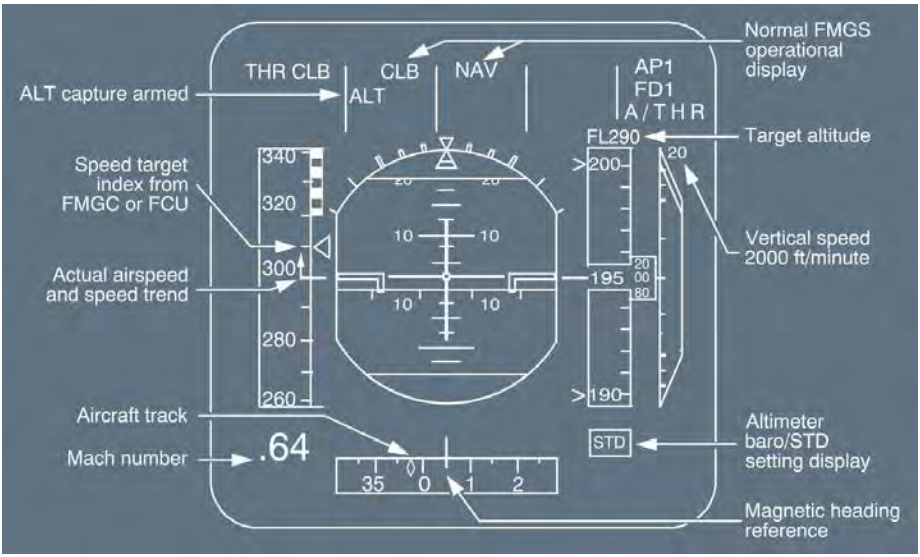
Ident.: DSC-22_10-40-40-00010677.0001001 / 17 AUG 10
Applicable to: ALL

The Flight Management and Guidance System generates the following information to the EFIS Primary Flight Display:

- Armed and engaged modes on the Flight Mode Annunciator (FMA)
- FMGS guidance targets (SPD, ALT, HDG)
- Vertical deviation from descent profile
- Messages
- Navigation information.

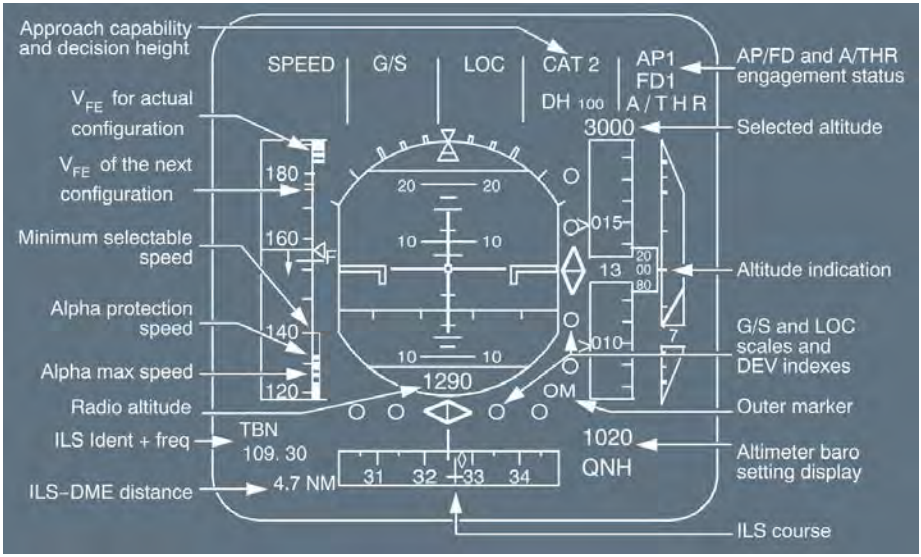
CLIMB PHASE

Ident.: DSC-22_10-40-40-00010121.0002001 / 14 MAY 12
Applicable to: ALL



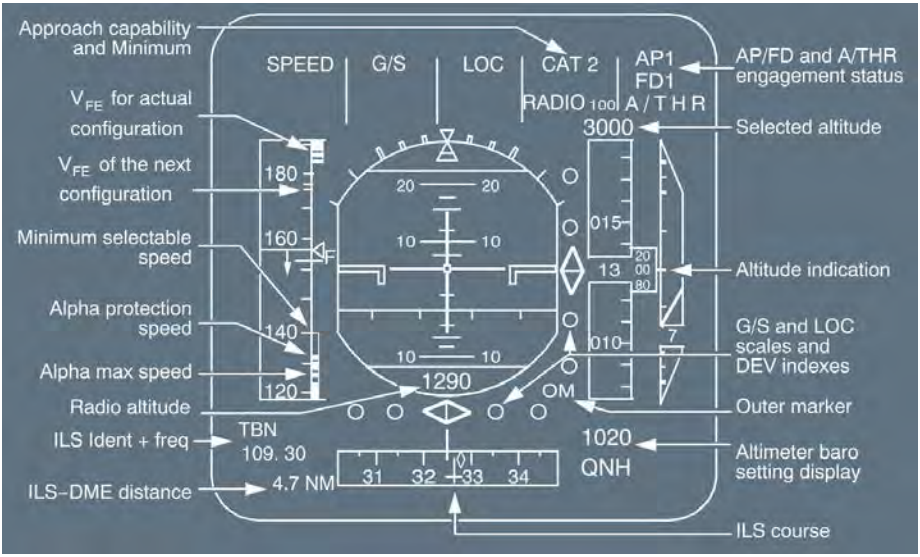
APPROACH PHASE

Ident.: DSC-22_10-40-40-00010122.0002001 / 14 MAY 12
Applicable to: MSN 1882-2078



APPROACH PHASE

Ident.: DSC-22_10-40-40-00010122.0013001 / 14 MAY 12
Applicable to: MSN 3408-4547



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ND

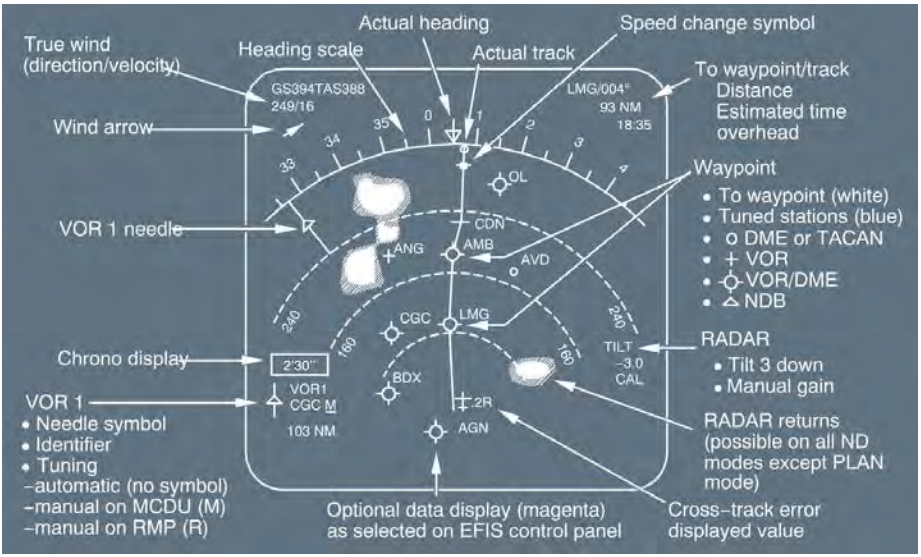
Ident.: DSC-22_10-40-50-00010123.0001001 / 17 AUG 10
Applicable to: ALL

The FMGS generates the following information, displayed on the EFIS Navigation Displays:

- Flight plan (active secondary, temporary, dashed)
- Aircraft position and lateral deviation from the flight plan
- Pseudo-waypoints along the flight plan
- Raw data from tuned Navaids and type of selected approach
- Various display options (waypoints, Navaids, NDBs, airports, constraints)
- Wind information and various messages.

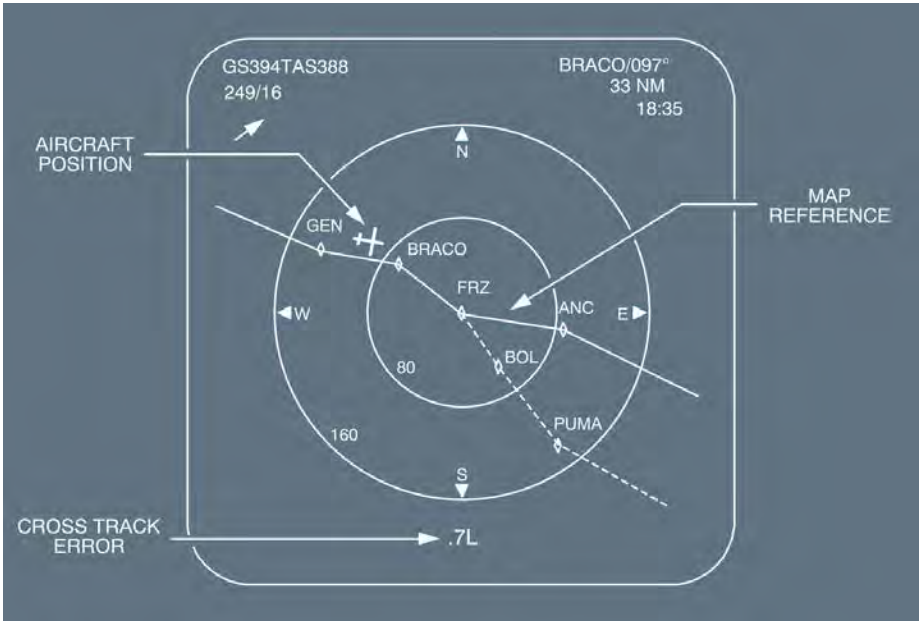
ARC MODE

Ident.: DSC-22_10-40-50-00010124.0001001 / 14 MAY 12
Applicable to: ALL



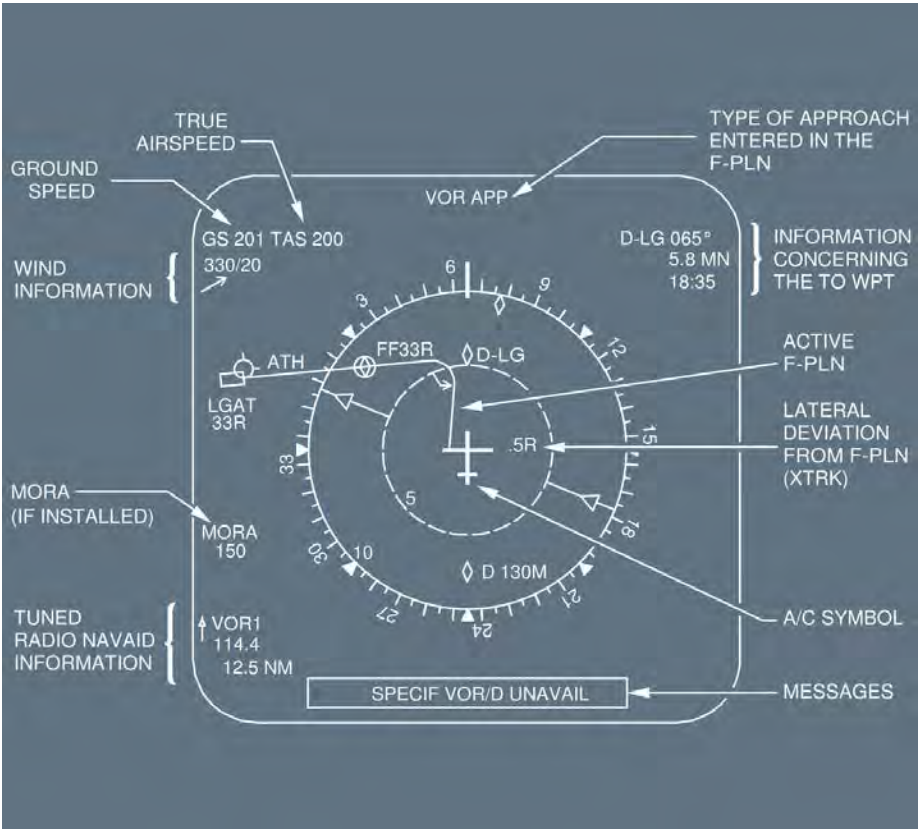
PLAN MODE

Ident.: DSC-22_10-40-50-00010125.0001001 / 01 OCT 12
Applicable to: ALL



ROSE MODES

Ident.: DSC-22_10-40-50-00010126.0022001 / 09 MAR 15
Applicable to: ALL



FLIGHT PLAN DISPLAY COLORS

Ident.: DSC-22_10-40-50-00010127.0002001 / 17 AUG 10
Applicable to: ALL

F-PLN	Color
Primary Flight Plan	- Managed mode: Steady green - Selected mode: Dashed green
Track line	Steady green
Alternate flight plan	Dashed blue
Missed approach	Steady blue
Offset flight plan	Steady green (Original flight plan: Dashed green)
Temporary flight plan	Dashed yellow
Engine-out SID (not inserted)	Steady yellow
Secondary flight plan	Steady dimmed white
Abeam/Radial	Dashed blue

GENERAL

Ident.: DSC-22_10-50-10-00020369.0001001 / 17 MAR 17
Applicable to: ALL

This chapter shows the speed symbols and definitions.
The source of the computation is also given, when applicable.

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CHARACTERISTIC SPEEDS

Ident.: DSC-22_10-50-20-00020370.0008001 / 17 MAR 17
Applicable to: MSN 1882-2078, 3467-3518

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to aerodynamic data.
VLS (of normal landing configuration: CONF 3 or FULL), F, S and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.
The speeds displayed by the MCDU are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted gross weight (for approach or go-around).

VS : Stalling speed.
Not displayed.
For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1 g. This gives a stall speed that is lower than the stall speed at 1 g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).
Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.
All the operating speeds must be referenced to a speed that can be demonstrated by flight tests. This speed is designated VS1g.

Airworthiness Authorities have agreed that a factor of 0.94 represents the relationship between VS1g for aircraft of the A320 family and VSmin for conventional aircraft types. As a result, Authorities allow aircraft of the A320 family to use the following factors :

$V2 = 1.2 \times 0.94\ VS1g = 1.13\ VS1g$

$VREF = 1.3 \times 0.94\ VS1g = 1.23\ VS1g$

These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320 and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.
The FCOM uses VS for VS1g.

VLS : Lowest Selectable Speed.
Represented by the top of an amber strip along the airspeed scale on the PFD.
Computed by the FAC, based on aerodynamic data, and corresponds to 1.13 VS during takeoff, or following a touch and go.
Becomes 1.23 VS, after retraction of one step of flaps.
Becomes 1.28 VS, when in clean configuration.

Note: If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20 000 ft, VLS is corrected for Mach effect to maintain a buffet margin of 0.2 g.
In addition, VLS increases when the speedbrakes are extended.

F : Minimum speed at which the flaps may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.
Represented by “F” on the PFD speed scale. Equal to about 1.26 VS of CONF 1 + F.

S : Minimum speed at which the slats may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 1.
Represented by “S” on the PFD airspeed scale.
Equal to about 1.23 VS of clean configuration.

O : Green dot speed.
Engine-out operating speed in clean configuration.
(Best lift-to-drag ratio speed).
Also corresponds to the final takeoff speed.
Represented by a green dot on the PFD scale.
Below 20 000 ft equal to 2 × weight (tons) +85
Above 20 000 ft, add 1 kt per 1 000 ft

CHARACTERISTIC SPEEDS

Ident.: DSC-22_10-50-20-00020370.0002001 / 17 MAR 17
Applicable to: MSN 3408, 4100-4547

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to aerodynamic data.
VLS (of normal landing configuration: CONF 3 or FULL), F, S and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.
The speeds displayed by the MCDU are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted gross weight (for approach or go-around).

VS : Stalling speed.
Not displayed.
For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1 g. This gives a stall speed that is lower than the stall speed at 1 g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).
Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.
All the operating speeds must be referenced to a speed that can be demonstrated by flight tests. This speed is designated VS1g.

Airworthiness Authorities have agreed that a factor of 0.94 represents the relationship between VS1g for aircraft of the A320 family and VSmin for conventional aircraft types. As a result, Authorities allow aircraft of the A320 family to use the following factors :

V2 = 1.2 × 0.94 VS1g = 1.13 VS1g
VREF = 1.3 × 0.94 VS1g = 1.23 VS1g

These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320 and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.
The FCOM uses VS for VS1g.

VLS : Lowest Selectable Speed.
Represented by the top of an amber strip along the airspeed scale on the PFD.
Computed by the FAC, based on aerodynamic data, and corresponds to 1.13 VS during takeoff, or following a touch and go.
Becomes 1.23 VS, after retraction of one step of flaps.
Becomes 1.28 VS, when in clean configuration.

Note: *If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.*

Above 20 000 ft, VLS is corrected for Mach effect to maintain a buffet margin of 0.2 g.
In addition, VLS increases when the speedbrakes are extended.

F : Minimum speed at which the flaps may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.
Represented by “F” on the PFD speed scale. Equal to about 1.18 VS to 1.22 VS of CONF 1 + F.

S : Minimum speed at which the slats may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 1.
Represented by “S” on the PFD airspeed scale.
Equal to about 1.22 VS to 1.25 VS of clean configuration.

O : Green dot speed.
Engine-out operating speed in clean configuration.
(Best lift-to-drag ratio speed).
Also corresponds to the final takeoff speed.
Represented by a green dot on the PFD scale.
Below 20 000 ft equal to 2 × weight (tons) +85
Above 20 000 ft, add 1 kt per 1 000 ft

LIMIT SPEEDS

Ident.: DSC-22_10-50-30-00020383.0001001 / 17 MAR 17
Applicable to: ALL

VA	:	Maximum design maneuvering speed. This corresponds to the maximum structural speed permitted for full control deflection, if alternate or direct law is active.
VMCG	:	Minimum speed, on the ground during takeoff, at which the aircraft can be controlled by only using the primary flight controls, after a sudden failure of the critical engine, the other engine remaining at takeoff thrust.
VMCA	:	Minimum control speed in flight at which the aircraft can be controlled with a maximum bank of 5 °, if one engine fails, the other engine remaining at takeoff thrust (takeoff flap setting, gear retracted).
VMCL	:	Minimum control speed in flight, at which the aircraft can be controlled with a maximum bank of 5 °, if one engine fails, the other engine remaining at takeoff thrust (approach flap setting).
VFE	:	Maximum speed for each flap configuration.
VLE	:	Maximum speed with landing gear extended.
VLO	:	Maximum speed for landing gear operation.
VMO	:	Maximum speed.
VFE NEXT	:	Maximum speed for the next (further extended) flap lever position.

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PROTECTION SPEEDS

Ident.: DSC-22_10-50-40-00020382.0001001 / 17 MAR 17
Applicable to: ALL

Vα PROT, Vα MAX and VSW are computed by the FAC, based on aerodynamic data. They are only used for display on the PFD, and not for flight control protection (the activation of the protections is computed by the ELAC).

Vα PROT : Angle of attack protection speed.
Corresponds to the angle of attack at which the angle of attack protection becomes active.
Represented by the top of a black and amber strip along the PFD speed scale, in normal law.

Vα MAX : Maximum angle of attack speed.
Corresponds to the maximum angle of attack that may be reached in pitch normal law.
Represented by the top of a red strip along the PFD speed scale, in normal law.

VSW : Stall warning speed.
Represented by a red and black strip along the speed scale when the flight control normal law is inoperative.

VMAX : Represented by the bottom of a red and black strip along the speed scale.
Determined by the FAC according to the aircraft configuration.
Is equal to VMO (or speed corresponding to MMO), VLE or VFE.

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OTHER SPEEDS

Ident.: DSC-22_10-50-50-00020384.0004001 / 17 MAR 17
Applicable to: MSN 3408, 4100-4547

V1 : The highest speed, during takeoff, at which the flight crew has a choice between continuing the takeoff or stopping the aircraft.
Represented by "1" on the airspeed scale (or the V1 value when it is off the airspeed scale).
Inserted manually through the MCDU by the flight crew.
Displayed on the MCDU TAKEOFF page.

VR : The speed at which the pilot rotates in order to reach V2 at an altitude of 35 ft at the latest after an engine failure.
Inserted manually through the MCDU by the flight crew.
Displayed on the MCDU TAKEOFF page.

V2 : Takeoff safety speed that the aircraft attains at the latest at an altitude of 35 ft with one engine failed, and maintains during the second segment of the takeoff.
Represented by the SPEED SELECT symbol on the speed scale.
Minimum value equal to 1.13 VS for the corresponding configuration.
Inserted manually through the MCDU by the flight crew.
Displayed on the MCDU TAKEOFF page.

VREF : Reference speed used for normal final approach.
Equal to 1.23 × VS of CONF FULL.
Displayed on the MCDU APPR page, if landing is planned in CONF FULL (VLS CONF FULL).

VAPP : Final approach speed.
Displayed on MCDU APPR page.
Calculated by the FMGCs.
Represents : VAPP = VLS + wind correction
The wind correction is limited to a minimum of 5 kt and a maximum of 15 kt.

The flight crew may modify VAPP through the MCDU.
- During autoland or when A/THR is on or in case of ice accretion or gusty crosswind greater than 20 kt, VAPP must not be lower than VLS +5 kt.

SPEED TARGET : Represented by a magenta triangle.
Calculated by the FMGCs
Gives efficient speed guidance in approach during various windy conditions.
Represents :
SPEED TARGET = GS mini + actual headwind (measured by ADIRS)
GS mini = VAPP – TOWER WIND (headwind component along runway axis calculated by FMGC from tower wind entered on MCDU).

OTHER SPEEDS

Ident.: DSC-22_10-50-50-00020384.0002001 / 17 MAR 17
Applicable to: MSN 1882-2078, 3467-3518

V1 : The highest speed, during takeoff, at which the flight crew has a choice between continuing the takeoff or stopping the aircraft.
Represented by “1” on the airspeed scale (or the V1 value when it is off the airspeed scale).
Inserted manually through the MCDU by the flight crew.
Displayed on the MCDU TAKEOFF page.

VR : The speed at which the pilot rotates in order to reach V2 at an altitude of 35 ft at the latest after an engine failure.
Inserted manually through the MCDU by the flight crew.
Displayed on the MCDU TAKEOFF page.

V2 : Takeoff safety speed that the aircraft attains at the latest at an altitude of 35 ft with one engine failed, and maintains during the second segment of the takeoff.
Represented by the SPEED SELECT symbol on the speed scale.
Minimum value equal to 1.13 VS for the corresponding configuration.
Inserted manually through the MCDU by the flight crew.
Displayed on the MCDU TAKEOFF page.

VREF : Reference speed used for normal final approach.
Equal to 1.23 × VS of CONF FULL.
Displayed on the MCDU APPR page, if landing is planned in CONF FULL (VLS CONF FULL).

VAPP : Final approach speed.
Displayed on MCDU APPR page.
Calculated by the FMGCs.
Represents : VAPP = VLS + wind correction.
The wind correction is limited to a minimum of 5 kt and a maximum of 15 kt.
The flight crew may modify VAPP through the MCDU.

- During autoland or when A/THR is on or in case of ice accretion or gusty crosswing greater than 20 kt, VAPP must not be lower than VLS +5 kt.
- For landing in configuration 3 with ice accretion VAPP must not be lower than VLS +10 kt.

SPEED TARGET : Represented by a magenta triangle.
Calculated by the FMGCs
Gives efficient speed guidance in approach during various windy conditions.
Represents :
SPEED TARGET = GS mini + actual headwind (measured by ADIRS)
GS mini = VAPP – TOWER WIND (headwind component along runway axis calculated by FMGC from tower wind entered on MCDU).

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AIRCRAFT SYSTEMS

AUTO FLIGHT - FLIGHT MANAGEMENT

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DSC-22_20-30 Flight Planning

DSC-22_20-30-05 General

DSC-22_20-30-10 Lateral Functions

DSC-22_20-30-10-05 General

DSC-22_20-30-10-15 FMS2 HONEYWELL

DSC-22_20-30-20 Vertical Functions

DSC-22_20-30-20-05 General

DSC-22_20-30-20-25 FMS2 Honeywell

Continued on the following page

Continued from the previous page

Continued on the following page

Continued from the previous page

Continued on the following page

Continued from the previous page

Continued on the following page

Continued from the previous page

Continued on the following page

Continued from the previous page

DSC-22_20-70 AOC Functions

DSC-22_20-80 Print Functions

DSC-22_20-90 Abnormal Operations

DSC-22_20-90-10 FMGC Reset

DSC-22_20-90-20 "CHECK GW" or "CHECK WEIGHT" Message

DSC-22_20-100 Temporary Abnormal Behaviors

DSC-22_20-100-20 FMS2 HONEYWELL Temporary Abnormal Behaviors

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GENERAL

Ident.: DSC-22_20-10-00010128.0001001 / 17 AUG 10
Applicable to: ALL

The flight management and guidance system (FMGS) performs navigation functions and lateral and vertical flight planning functions. It also computes performance parameters and guides the aircraft along a preplanned route.

The Flight Management (FM) part controls the following functions:

- Navigation
- Management of flight planning
- Prediction and optimization of performance
- Management of navigation radios
- Management of displays

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NAVIGATION

Ident.: DSC-22_20-20-05-00010129.0001001 / 17 AUG 10
Applicable to: ALL

Essential navigation functions are:

- Computation of position
- Evaluation of position accuracy
- Radio navigation tuning
- Alignment of Inertial Reference System.

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GENERAL

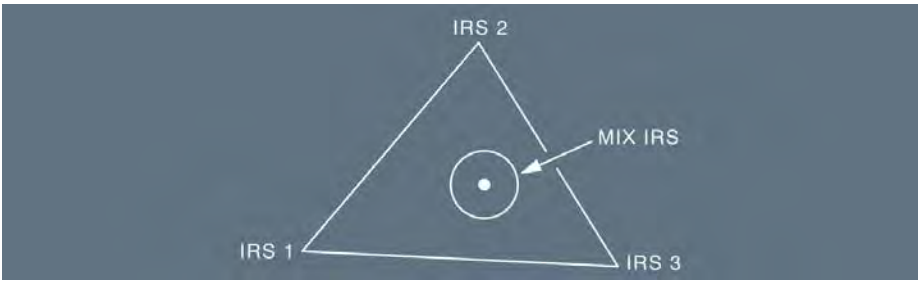
Ident.: DSC-22_20-20-10-00010130.0002001 / 16 MAR 11
Applicable to: ALL

Each FMGC computes its own aircraft position (called the "FM position") from a MIX IRS position and a computed radio position, or a GPS position.
The FMGS selects the most accurate position, considering the estimated accuracy and integrity of each positioning equipment.
GPS/INERTIAL is the basic navigation mode, provided GPS data is valid and successfully tested. Otherwise, navaids plus inertial or inertial only are used. (*Refer to DSC-22_20-20-10 Navigation Modes*).

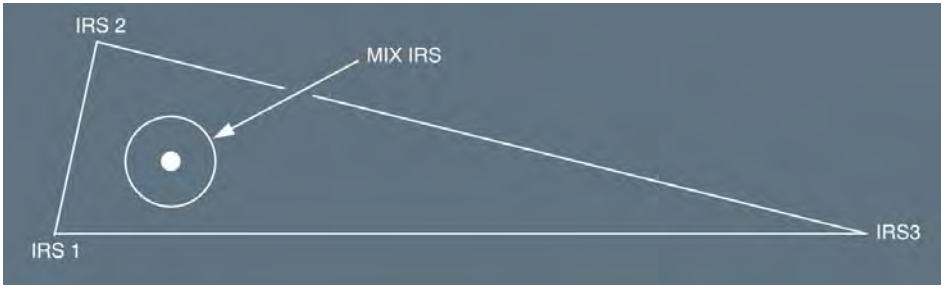
MIX IRS POSITION

Ident.: DSC-22_20-20-10-00010131.0002001 / 01 OCT 12
Applicable to: ALL

Each FMGC receives a position from each of the three IRSs, and computes a mean-weighted average called the “MIX IRS” position:



- If one of the IRSs drifts abnormally, the MIX IRS position uses an algorithm that decreases the influence of the drifting IRS within the MIX IRS position.



- If one of the IRSs fails, each FMGC uses only one IRS (onside IRS or IRS3). Each IRS position and inertial speed are continuously tested. If the test fails, the corresponding IRS is rejected.
- When the "CHECK IRS (1, 2 or 3)/FM POSITION" message appears on the MCDU.

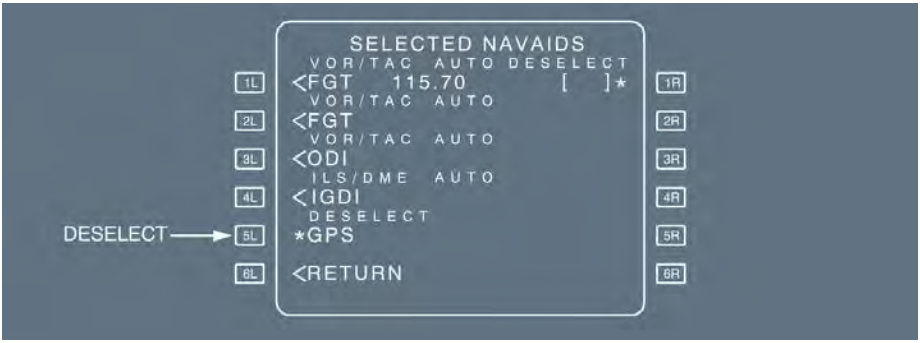
GPS POSITION

Ident.: DSC-22_20-20-10-00010132.0002001 / 23 JUN 15
Applicable to: ALL

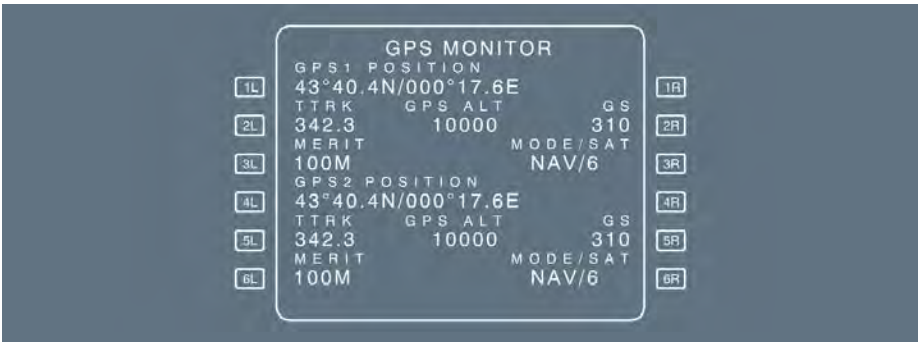
Each IRS computes a mixed IRS/GPS position called the GPIRS position. For this, each IRS can independently select their GPS source in order to maximize the availability of GPS data.
Of the three GPIRS positions that each FMGC receives, the FMS selects one GPIRS position based on a figure of merit and priority.

The FMS uses the following hierarchy to perform the selection:
- Onside GPIRS position
- GPIRS 3
- Opposite GPIRS position.

If the GPIRS data does not comply with an integrity criterion that is based on a Horizontal Integrity Limit (HIL) and on the automatic detection of failed satellites, the FMS rejects the GPS mode and uses the radio position update.
The flight crew can deselect/select the GPS position on the SELECTED NAVAIDS page, if necessary.



Information about the GPS position is displayed on the GPS MONITOR page.



Note: *In nominal case, ADIRU1 selects GPS1 and ADIRU2 selects GPS2. The GPS selection by ADIRU3 depends on the position of the ATT HDG selector switch. If one of the GPS source is rejected by the ADIRUs, all ADIRUs will select the same GPS source. As a result, the data of the GPS that is not selected is dashed on the GPS MONITOR page. The "GPS PRIMARY LOST" message may not be displayed.*

RADIO POSITION

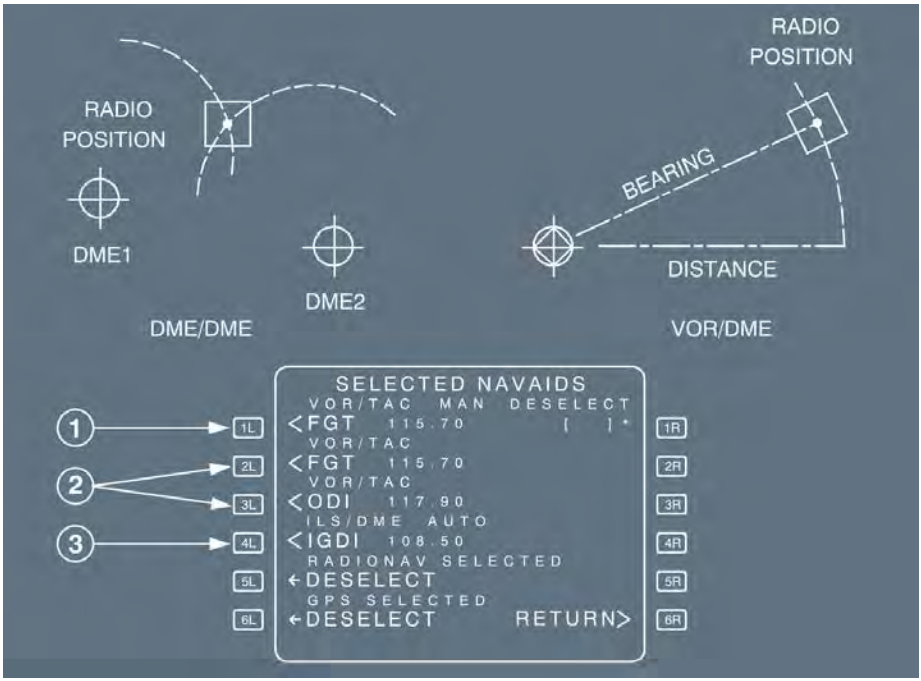
Ident.: DSC-22_20-20-10-00010669.0020001 / 01 OCT 12
Applicable to: ALL

Each FMGC uses onside navaids to compute its own radio position. These navaids are displayed on the SELECTED NAVAIDS page.

The available navaids are:
- DME/DME
- VOR/DME

- LOC
- DME/DME-LOC
- VOR/DME-LOC.

It uses LOC to update the lateral position, using LOC beam during ILS approach.
LOC is also used for quick update, when in GPS/IRS mode.
If one or more navaids fail, each FMGC can use offside navaids to compute the VOR/DME, or the DME/DME radio position.
The radio navaid selection is displayed on the DATA “SELECTED NAVAIDS” page.



(1) VOR/DME selection (auto or manual) for display (onside VOR).

(2) DMEs automatic selection for DME/DME onside radio position.

(3) ILS selection (auto or manual) for LOC update computation.

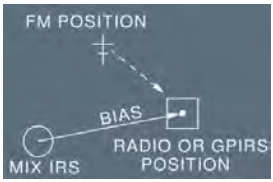
FM POSITION

Ident.: DSC-22_20-20-10-00010135.0017001 / 17 AUG 10
Applicable to: ALL

At flight initialization, each FMGC displays an FM position that is a MIX IRS/GPS position (GPIRS):

- At takeoff, when the FM position is updated to the runway threshold position as stored in the database, possibly corrected by the takeoff shift entered on PERF TO page.
- In flight, the FM position approaches the radio position or the GPS position at a rate depending upon the aircraft altitude.

Note: The FM position update at takeoff is inhibited when GPS PRIMARY is active.



BIAS

Each FMGC computes a vector from its MIX IRS position to the radio position or GPIRS position. This vector is called the “bias”.

Each FMGC updates its bias continuously as long as a radio position or a GPIRS position is available.

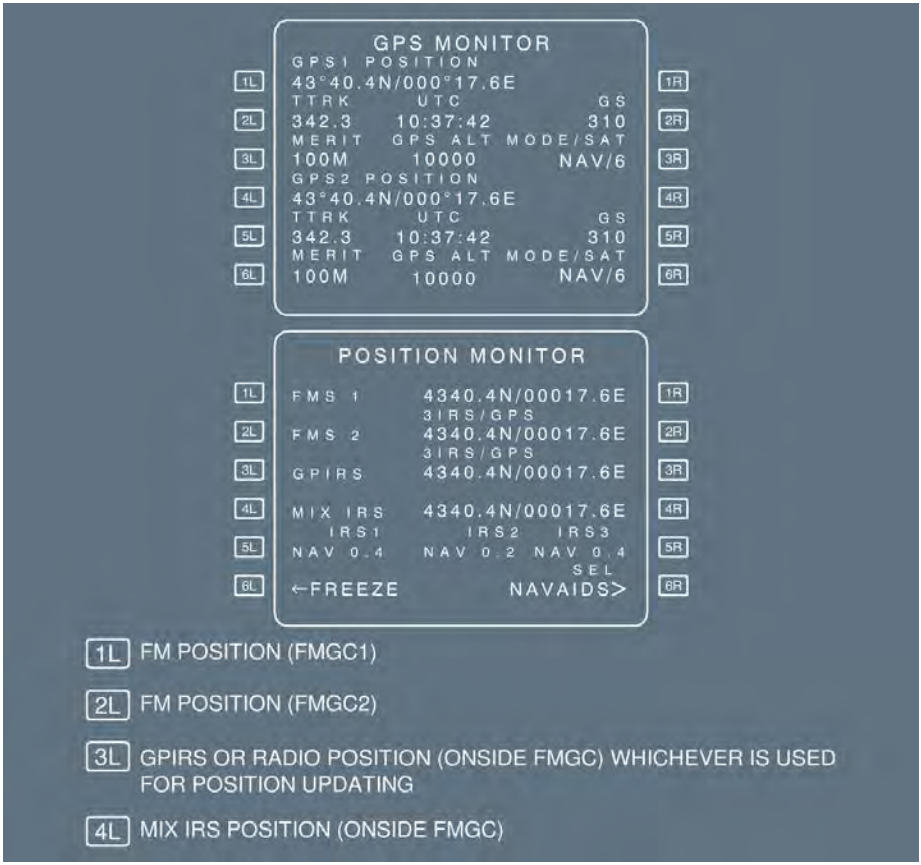
If an FMGC loses its radio/GPIRS position, it memorizes the bias and uses it to compute the FM position, which equals the MIX IRS position plus the bias. Until the radio or the GPIRS position is restored, the bias does not change.

The flight crew can update the FM position manually. This also updates the bias.

POSITION MONITOR

Ident.: DSC-22_20-20-10-00010136.0016001 / 07 MAY 13
Applicable to: ALL

The flight crew may check the position computation using the GPS MONITOR or POSITION MONITOR page.



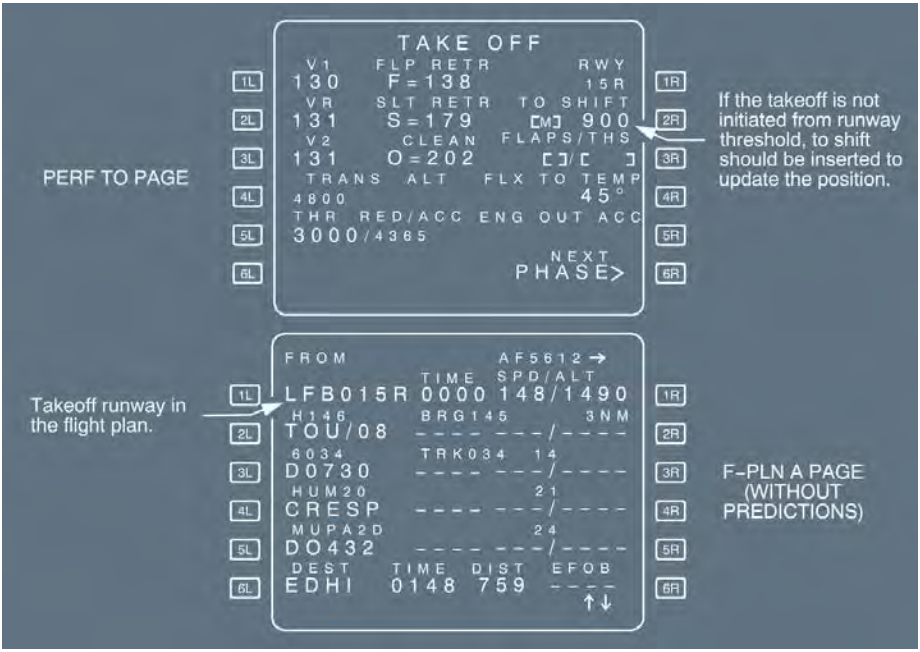
TAKEOFF UPDATE

Ident.: DSC-22_20-20-10-00010137.0017001 / 04 AUG 16
Applicable to: ALL

A takeoff update requires that the takeoff runway be part of the flight plan. This provides the most accurate position update.

If the takeoff run starts at an intersection, enter a takeoff shift on the PERF TO page to refine the takeoff update.

An accurate takeoff update ensures a precise aircraft position during departure.



NAVIGATION MODES

Ident.: DSC-22_20-20-10-00010138.0001001 / 19 JUL 11
Applicable to: ALL

The FMGS updates the FM position via the use of radio navaids or GPS, if available. It can use four different FM navigation modes to make this update.

The decreasing order of priority is:
- IRS-GPS
- IRS-DME/DME
- IRS-VOR/DME
- IRS only.

During ILS approaches, the system performs a temporary lateral update, via one of the following modes:
- IRS-GPS/LOC
- IRS-DME/DME-LOC

- IRS-VOR/DME-LOC
- IRS-LOC.

GENERAL

Ident.: DSC-22_20-20-20-00010448.0023001 / 27 MAY 13
Applicable to: ALL

The FMGS continuously computes an Estimated Position Uncertainty (EPU).
It is an estimate of how much the FM position diverged, and it is a function of the navigation mode that the system uses.

CURRENT NAV MODE	EPU (RATE or THRESHOLD)	REMARK
IRS/GPS	$\sqrt{(FOM^2 + 100^2)}$ (in meters).	FOM = Figure of Merit of GPS. If above 0.28 NM, the FMS rejects the GPS position.
IRS/DME/DME	Moves toward 0.28 NM.	EPU decreases from initial value to 0.28 NM.
IRS/VOR/DME	0.1 NM + 0.05 X DME DIST. Minimum : 0.28 NM.	Dependent on the distance between the aircraft and the VOR/DME.
IRS ONLY	+8 nm/h for the first 30 min. 0 nm/h for the following 60 min. +4 nm/h for the following 30 min. 0 nm/h for the following 60 min. +2 nm/h after.	EPU increases continuously.

Note: *After an IRS alignment or at takeoff, the EPU is set to 0.2 NM.*

ESTIMATED POSITION UNCERTAINTY

Ident.: DSC-22_20-20-20-00010499.0076001 / 01 OCT 12
Applicable to: ALL

The FMS displays the EPU to the flight crew and compares it with the Required Navigation Performance (RNP):
- If the EPU does not exceed the RNP, accuracy is HIGH
- If the EPU exceeds the RNP, accuracy is LOW.

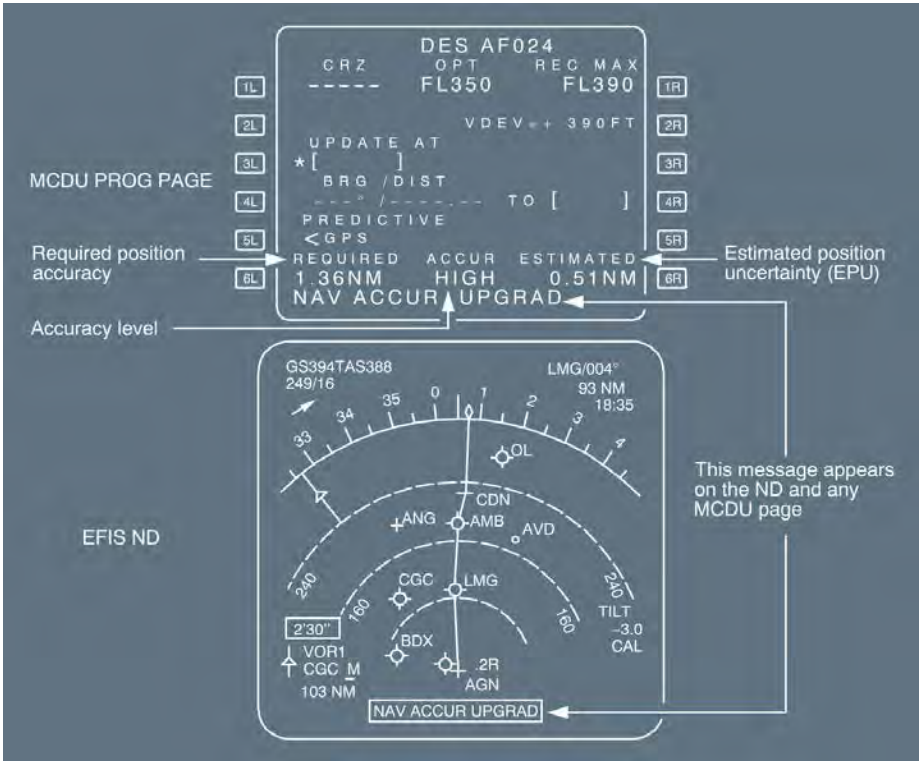
The RNP is displayed in the REQUIRED field of the PROG page. The displayed RNP is (in a decreasing order of priority):
- The value that the flight crew entered
- The navigation database procedure value
- The system's default value.

When a flight crew enters an RNP that is higher than the published value, one of the following messages is displayed : "PROCEDURE RNP IS XX.XX", or "AREA RNP IS XX.XX". When this occurs, the flight crew should verify the RNP value that was manually entered in the REQUIRED field of the PROG page, and clear or modify it if necessary.

The "AREA RNP IS XX.XX" message is also displayed at the change of flight area if the new RNP (default value) is smaller than the displayed RNP (manually entered).

DEFAULT AREA RNP VALUES	
EN ROUTE	2.0 NM
TERMINAL	1.0 NM
APPROACH	GPS 0.3 NM OTHER CASES 0.5 NM

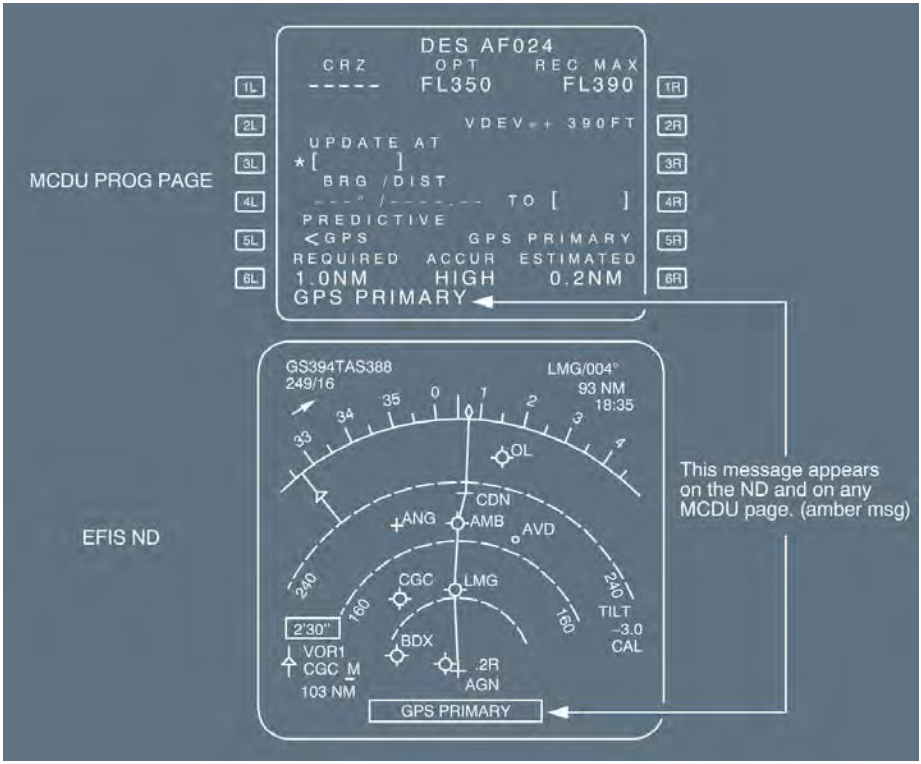
When one FMGC changes the NAV accuracy from LOW to HIGH (or HIGH to LOW), the MCDU and the ND display the "NAV ACCUR UPGRAD" (or DOWNGRAD) message.
These messages are inhibited when the navigation mode is IRS/GPS.



When in IRS/GPS mode, the GPS PRIMARY status combines two different criteria:
- The accuracy criterion previously described (HIGH/LOW accuracy)
- An integrity criterion: This is the capability to detect a failure and provide appropriate warning of it. This criterion indicates the confidence that the flight crew can have in the FMS position.

If the GPS PRIMARY status complies with both criteria, "GPS PRIMARY" is displayed on the MCDU (PROG page, [5R] field and scratchpad) and temporarily on the ND.
If the GPS PRIMARY status no longer complies with one of these criteria (Navigation downgraded or integrity lost), the GPS PRIMARY status is lost and the MCDU and the ND display the "GPS PRIMARY LOST" message. It is possible to clear the scratchpad message on the MCDU, but not on the ND.

CAUTION	"HIGH" or "LOW" on the PROG page indicates the FM position accuracy, based on estimated uncertainty. When GPS PRIMARY mode is lost, the flight crew must periodically check this position accuracy. In GPS PRIMARY mode, the position accuracy is always at HIGH.



When the GPS is manually deselected, the "GPS IS DESELECTED" message is displayed on the MCDU, 80 NM before the T/D or at approach phase transition.

FM/GPS POSITION DISAGREEMENT

Ident.: DSC-22_20-20-20-00010500.0011001 / 17 AUG 10
Applicable to: ALL

When the GPS PRIMARY function is active, and either of the FM positions deviate from the GPS positions 1 or 2 by more than:

- A longitude threshold that depends on the latitude:
  - 0.5' for latitudes below 55°
  - 0.9' for latitudes at or above 55°, and below 70°.
- A latitude threshold of 0.5', regardless of the latitude,

then, the lower ECAM displays the NAV FM/GPS POS DISAGREE amber caution. The master caution light comes on and the single chime sounds.
This amber caution is inhibited during the takeoff phase.
Above 70° of latitude, a longitude difference does not trigger the alarm.

PREDICTIVE GPS PAGE

Ident.: DSC-22_20-20-20-00010501.0001001 / 16 MAR 11
Applicable to: ALL

The predictive GPS page is only operative with the Honeywell ADIRS equipment. All fields are blank with Litton ADIRS equipment.
The predictive GPS function predicts the availability of the GPS within ± 15 min of ETA at destination, or at any waypoint entered by the flight crew.

Predictions are displayed on the predictive GPS page at time intervals of 5 min (+15 and –15 min of ETA).
To access this page, press the 5L key of the PROG page. This page also enables the deselection of up to 4 satellites at a time.

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GENERAL

Ident.: DSC-22_20-20-30-00010478.0001001 / 17 AUG 10
Applicable to: ALL

Radio navaids are tuned for two different purposes: Display and computation.

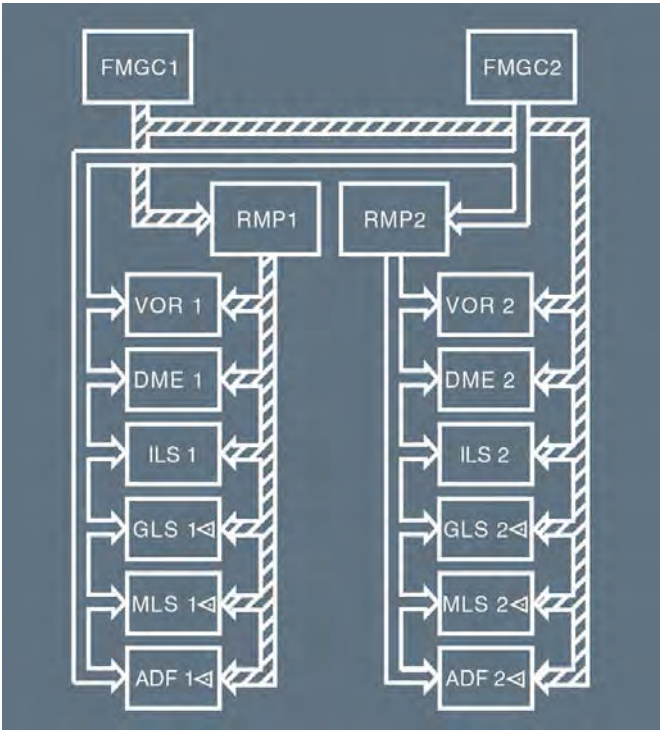
It is possible to perform tuning for display in three different ways:
- Automatic tuning via FMGC software
- Manual tuning via the MCDU RAD NAV page
- Manual tuning via the Radio Management Panel (RMP) if both FMGCs or both MCDUs fail.

The FMGS automatically tunes the radio navaids for computation of the radio position.

Note: *The manual selection of a VOR or VOR/DME may prevent the FMGS from automatically tuning a VOR/DME to compute position. In this case, the related MCDU displays "TUNE BBB FFF.FF" (BBB = ident, FFF.FF = frequency).*

ARCHITECTURE

Ident.: DSC-22_20-20-30-00010479.0001001 / 31 AUG 17
Applicable to: ALL



- In dual mode and independent mode, each FMGC simultaneously tunes the navaids on its own side (one VOR, one DME, one ILS, one GLS ◁, one MLS ◁ and one ADF). In these modes, the flight crew can also manually tune the VOR (and associated DME), ILS, GLS ◁, MLS ◁ and ADF ◁.
- In single mode, the valid FMGC tunes navaids on both sides. The flight crew can also use the RAD NAV page to manually tune both VORs, both ADFs ◁, and the ILS / GLS ◁ / MLS ◁.

Manual tuning has priority over automatic tuning.

Note: *If one receiver fails, both FMGCs use the operative radio receiver to compute the position of the aircraft.*

VOR

Ident.: DSC-22_20-20-30-00010480.0001001 / 17 AUG 10
Applicable to: ALL

Each FMGC may tune only one VOR (manually or automatically).

Automatic tuning complies with the following priorities for tuning the VOR:
1. The specified navaid for the approach
2. The navaid that the flight crew should use to compute the current radio position
3. For display purposes:
   - A navaid specified for the active flight leg
   - The “TO” waypoint (TO WPT), if it is a navaid
   - The “FROM” waypoint (FROM WPT), if it is a navaid
   - A waypoint farther along the flight path, if it is a navaid
   - The navaid closest to the current position of the aircraft.

The scratchpad displays “SPECIFIC VOR-D UNAVAIL”, if the VOR or the VOR/DME that the flight crew requires for tuning is deselected.

DME

Ident.: DSC-22_20-20-30-00010481.0002001 / 17 AUG 10
Applicable to: ALL

Each FMGC automatically uses its four DME frequencies as follows:
- One DME frequency for display. It is possible to tune it manually or automatically. This DME frequency is also used for VOR/DME position computation.
- Two DME frequencies in DME/DME mode for calculating the radio position of the aircraft. The FMGC automatically tunes these as a function of their best accuracy. The flight crew does not receive any indication that this process is happening.
- One DME frequency is connected to the ILS/DME.

ADF

Ident.: DSC-22_20-20-30-00010482.0001001 / 17 AUG 10
Applicable to: ALL

The FMGC automatically tunes one ADF, when the flight plan specifies a Non Directional Beacon (NDB) approach and a fix in the approach is the “TO” waypoint.
The scratchpad displays “SPECIFIC NDB UNAVAIL”, if the NDB that the flight crew requires for autotuning is deselected.

ILS

Ident.: DSC-22_20-20-30-00010483.0001001 / 17 AUG 10
Applicable to: ALL

Each FMGC automatically tunes one ILS frequency:
- In the PREFLIGHT or TAKEOFF phase, when the takeoff runway has an associated ILS.
- In the CLIMB, CRUISE, DESCENT, APPROACH, or GO-AROUND phase, when the type of approach in the flight plan is ILS.

The scratchpad displays “RWY/ILS MISMATCH” when the flight crew manually tunes the ILS and the entered frequency does not agree with the ILS or the LOC IDENT/FREQ that the flight crew requests for automatic tuning. The FMGS logic does not enable the flight crew to modify the course of an ILS when its frequency is identical to the ILS selected in the F-PLN.

SELECTION OF NAVAIDS ON MCDU PAGES

Ident.: DSC-22_20-20-30-00010485.0032001 / 31 AUG 17
Applicable to: ALL

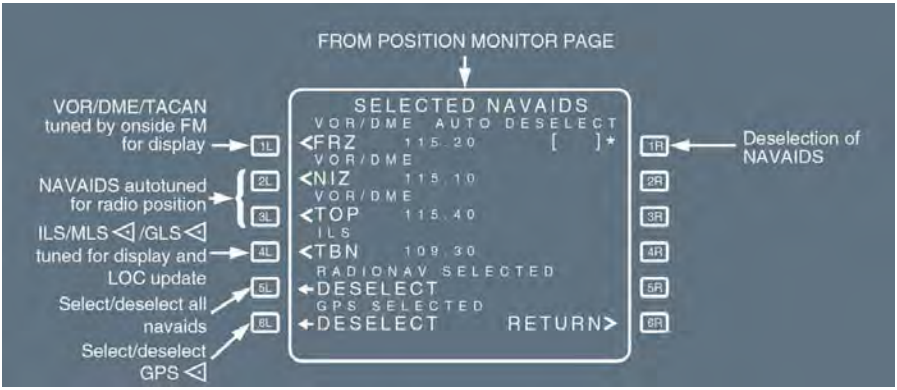
The MCDU displays the navaids tuned by the FMGC on two pages:
- RADIO NAV Page
- SELECTED NAVAIDS Page.

RADIO NAV PAGE

This page shows which navaids have been tuned automatically or manually for display purposes.

SELECTED NAVAIDS PAGE

This page lists the navaids tuned by the onside FMGC. No navaids can be modified on this page. The flight crew may deselect navaids and or GPS for the whole flight.

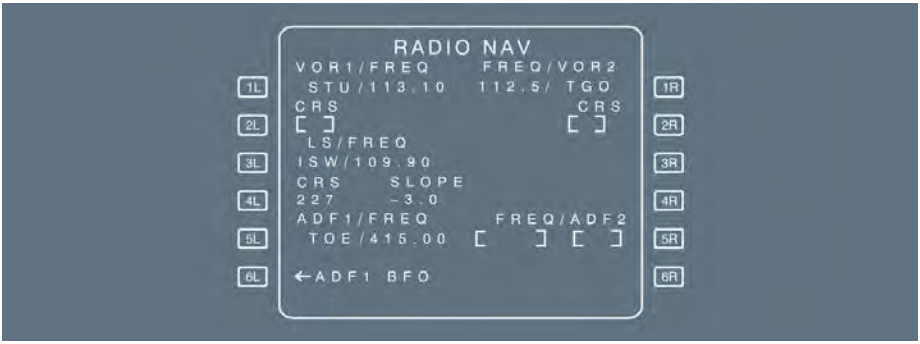


MANUAL TUNING

Ident.: DSC-22_20-20-30-00010486.0002001 / 01 MAR 17
Applicable to: ALL

INSERT the identifier on the RADIO NAV page.

Preferably use the identifier.



Note: The RAD NAV page may differ according to option installed (ADF1, ADF2, xLS).

- **If the MCDU displays "NOT IN DATA BASE":**

  INSERT the frequency.

  DISREGARD the ident that appears in small font on the MCDU.

  When a frequency is entered in the VOR field, the FMGC automatically associates to the tuned frequency the closest navaid identifier with the same frequency, and displays it on the RAD NAV page. This identifier may not correspond to the tuned navaid.

If the closest navaid, found in the database, is of a different type (e.g. VOR instead of VOR/DME), the flight crew will obtain a partial tuning (e.g. VOR indication instead of VOR/DME indication).

ENTER the course.

If the flight crew intends to manually tune an ILS that is not in the Navigation Database or to manually tune an ILS by its frequency (ident not entered), and if they do not enter the course, the flight crew will not be able to arm approach modes.

NAVAID IDENTIFICATION

Ident.: DSC-22_20-20-30-00010487.0001001 / 31 AUG 17
Applicable to: ALL

CHECK the xLS (ILS or GLS ◁ or MLS ◁) identifier decoded on the PFD, and the VOR or ADF ◁ on the ND.

When the navaid identifier is decoded in agreement with that published, no audio check is necessary. When the decoding is different from the published one, check the audio. Due to morse coding inaccuracy, wrong decoding may sometimes occur.
For GLS ◁ , the audio signal may be inaudible. However, the GLS ◁ identifier displayed on ND and PFD is raw data. Consequently, for GLS ◁ , no audio check is necessary.

Note: *When a DME or a TACAN only is selected using either its identifier or its frequency, the NDs do not display the decoded indication.*

ALIGNMENT OF INERTIAL REFERENCE SYSTEM

Ident.: DSC-22_20-20-40-00010143.0002001 / 01 OCT 12
Applicable to: MSN 1882-2078

The FMGS uses the reference point coordinates of the departure airport to align the IRS.
It calls these up from the database automatically after the flight crew has entered a company route or an origin-destination city pair and pressed the ALIGN IRS key on the MCDU. The flight crew can adjust these coordinates manually to the gate position. A normal alignment takes 10 min, a fast alignment 30 s.
Fast alignment is used to refine a position when time is limited.

Note: *If "ALIGN" flashes on the ADIRS overhead CDU during the alignment process, it indicates one of the following:*

- *It has detected excessive motion. (It automatically restarts the alignment)*
- *It has detected a disagreement between the position the MCDU has sent to the IRS, and the last memorized IRS position. The flight crew must enter new coordinates in the MCDU, and realign the IRS*
- *It has detected a disagreement between the latitude the MCDU has sent to the IRS, and the latitude the IRS has computed during the alignment*
- *The IRS has not received a position from the MCDU or the ADIRS overhead CDU.*

ALIGNMENT OF INERTIAL REFERENCE SYSTEM

Ident.: DSC-22_20-20-40-00010143.0013001 / 01 OCT 12
Applicable to: MSN 3408-4547

The FMGS uses the reference point coordinates of the departure airport to align the IRS.
It calls these up from the database automatically after the flight crew has entered a company route or an origin-destination city pair and pressed the ALIGN IRS key on the MCDU. The flight crew can adjust these coordinates manually to the gate position. A normal alignment takes 10 min, a fast alignment 30 s.

Fast alignment is used to refine a position when time is limited.

Note: *If the "IRS IN ALIGN" memo flashes on the E/WD during the alignment process, it indicates one of the following:*

- *It has detected excessive motion. (It automatically restarts the alignment)*
- *It has detected a disagreement between the position the MCDU has sent to the IRS, and the last memorized IRS position. The flight crew must enter new coordinates in the MCDU, and realign the IRS*
- *It has detected a disagreement between the latitude the MCDU has sent to the IRS, and the latitude the IRS has computed during the alignment*
- *The IRS has not received a position from the MCDU .*

GENERAL

Ident.: DSC-22_20-20-50-00010410.0001001 / 09 MAR 15
Applicable to: ALL

Overall navigation performance is mainly based on two elements:
- The accuracy of the aircraft position calculation
- The validity of the flight path definition, as extracted from the navigation database.

The level of validation depends on the type of operations. For example, JAA TGL 10 requires that, for Precision RNAV in terminal area, providers and operators implement a quality assurance program for the navigation database, which may include a navigation database validation process. The highest level of validation is required for RNAV approach, with lateral and vertical navigation.
The navigation databases are revised every 28 days (AIRAC cycle). Flights should be conducted with a navigation database that is within its cycle. This should be checked on the AIRCRAFT STATUS MCDU page.

OPERATIONS WITH AN OUTDATED NAVIGATION DATABASE

Ident.: DSC-22_20-20-50-00010411.0001001 / 13 DEC 12
Applicable to: ALL

Airbus recommends flying with an updated navigation database. However, in exceptional circumstances, and for a limited period of time, an aircraft can continue to operate beyond the end date of the database cycle, provided it is approved by the national authorities.

The following precautions need to be considered:
- Prior to flight, identify recent changes on the intended route, with the navigation charts and manuals. Some “strategic” new waypoints, not in the navigation database, may be worth entering as DEFINED WAYPOINT on MCDU.

  Note: *Flying with an outdated database, in an airspace that was recently restructured with numerous new waypoints, should be avoided.*

- Check SID, STAR, and approach procedures of departure, destination and required alternates for recent changes.
  Do not attempt to modify or manually construct terminal instrument procedures or approaches.
- Fly terminal instrument procedures and approaches with managed guidance, that are in the navigation database and that have been checked for accuracy. Otherwise, fly the procedure, or the approach, in selected guidance with conventional radio navaid raw data.

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FLIGHT PLANNING

Ident.: DSC-22_20-30-05-00010492.0002001 / 17 AUG 10
Applicable to: ALL

The flight crew uses the MCDU to insert flight plans into the FMGS:
- A lateral flight plan that defines the intended horizontal flight path
- A vertical flight plan that defines the intended speed and altitude profile for the aircraft to follow while flying the lateral flight plan.

Note: *The flight planning function is available for both the primary and secondary flight plans.*

The FMGS can contain two different flight plans:
- The ACTIVE flight plan, which is the basis for:
  - Lateral and vertical guidance
  - MCDU and ND display
  - Radio navigation autotuning
  - Performance predictions
  - Fuel planning.
- The SECONDARY flight plan which the flight crew may use:
  - When an alternate takeoff runway is probable
  - To plan a diversion
  - To prepare the next flight
  - To compare predictions or evaluations.

Each flight plan is composed of the same elements:
- The primary flight plan, from origin to destination and missed approach
- The alternate flight plan, from destination to alternate destination.

The flight crew enters the flight plan in either of two ways:
- Automatically by selecting a company route. Such a selection will call all the elements of the route out of the database.
- Manually by selecting an ORIGIN/DEST pair, and then selecting all successive waypoints, procedures, and vertical constraints on the MCDU.

The flight crew may then modify the flight plan on the ground or in flight, by making lateral and vertical revisions.

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General

GENERAL

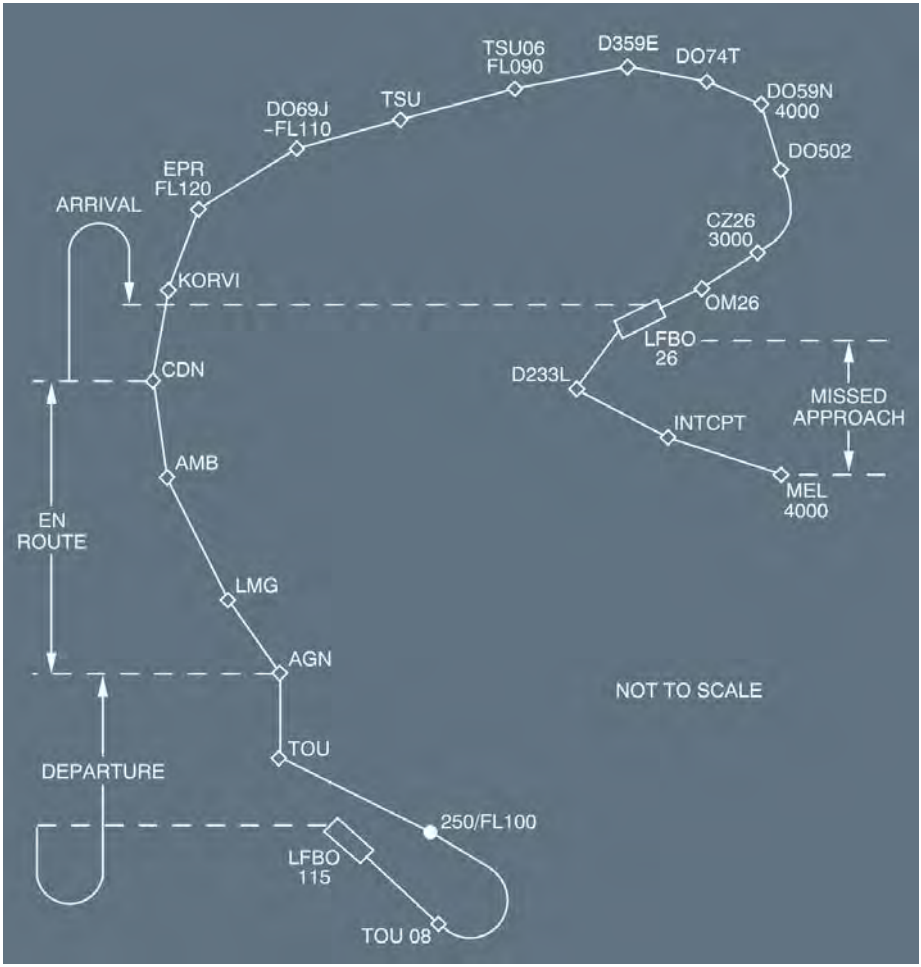
Ident.: DSC-22_20-30-10-05-00011075.0002001 / 23 JUN 15
Applicable to: ALL

To insert the lateral flight plan, the flight crew can use either a company route number or an ICAO four-letter city pair.

The lateral flight plan includes the following elements:

- Departure
  - Takeoff runway
  - SID
  - En route transition.
- En route
  - En route waypoints and airways.
- Arrival
  - En route transition
  - STARs/VIAs
  - Landing runway with selected approach
  - Missed approach.
- Alternate flight plan.

These elements are defined by waypoints and legs between the waypoints.



The FMGC automatically strings the legs in sequence.
The flight plan has a discontinuity if any two waypoints do not have a leg defined between them.
The computer assumes that the aircraft will fly a direct leg between the two waypoints that define the discontinuity.

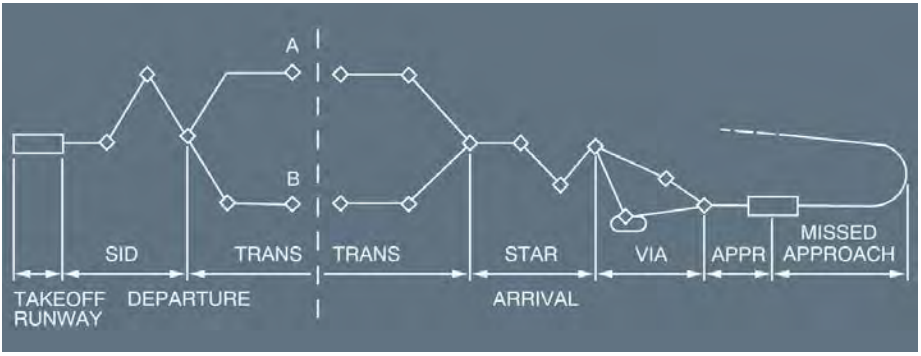
Note: *1. When the aircraft overflies a flight plan discontinuity, the NAV mode automatically reverts to the HDG (TRK) mode.*

2. In HDG/TRK mode, a waypoint is sequenced when it passes behind the aircraft, and the aircraft is less than 7 NM from it, and also when the difference between the track of the aircraft and the track of the leg is less than 90 °.
If the aircraft is flying a discontinuity towards a waypoint, this waypoint is sequenced when the aircraft is less than 5 NM from it.
The same conditions apply in NAV mode, except that no distance to the waypoint is taken into account.

The FMGS automatically strings additional types of legs, when departure or arrival procedures (SID - STAR - TRANS) are defined.

Those strings correspond to specific patterns that are heading or track referenced and are defined in the database, such as:
- DME arc leg
- Holding pattern to a fix, or reverse turn
- Course-to-fix leg
- Radius-to-fix leg
- Heading leg
- MANUAL leg.

The flight crew cannot create these types of legs: They are part of the stored departure/arrival procedures they have selected.
The flight crew can only create direct legs between manually defined geographic points (navaids, airports, waypoints).



Note: The departure and arrival procedures are defined in the database to minimize the amount of memory required.

They are divided, as follows:
- *DEPARTURE = SID + EN ROUTE TRANSITION*
- *ARRIVAL = APPR VIA + STAR + EN ROUTE TRANSITION*

The SID is the central common part of the departure procedure, as the STAR is of the arrival procedure. Enroute transitions (TRANS) are the various possible trajectories defined between the last SID point and the first enroute waypoints, and between the last enroute waypoint and the first fix of the STAR. "APPR VIAs" are the possible trajectories, defined between the last STAR point and the first point of the approach.

MANUAL LEGS

Ident.: DSC-22_20-30-10-05-00010629.0001001 / 17 AUG 10
Applicable to: ALL

A MANUAL leg stays on a constant TRK or HDG and has no termination point. The flight crew cannot insert it into a flight plan manually: it is part of a given procedure such as a SID or a STAR. When the aircraft is flying a MANUAL leg, the NAV mode remains engaged and predictions assume that the aircraft will fly a direct leg from its present position to the next waypoint (DIR TO). When the aircraft is cleared to fly to the next waypoint of the flight plan, the flight crew performs a DIR TO.

Note: 1. In NAV mode, a MANUAL leg is sequenced only by performing a DIR TO.
2. The use of the descent mode (DES) on a MANUAL leg is not recommended.

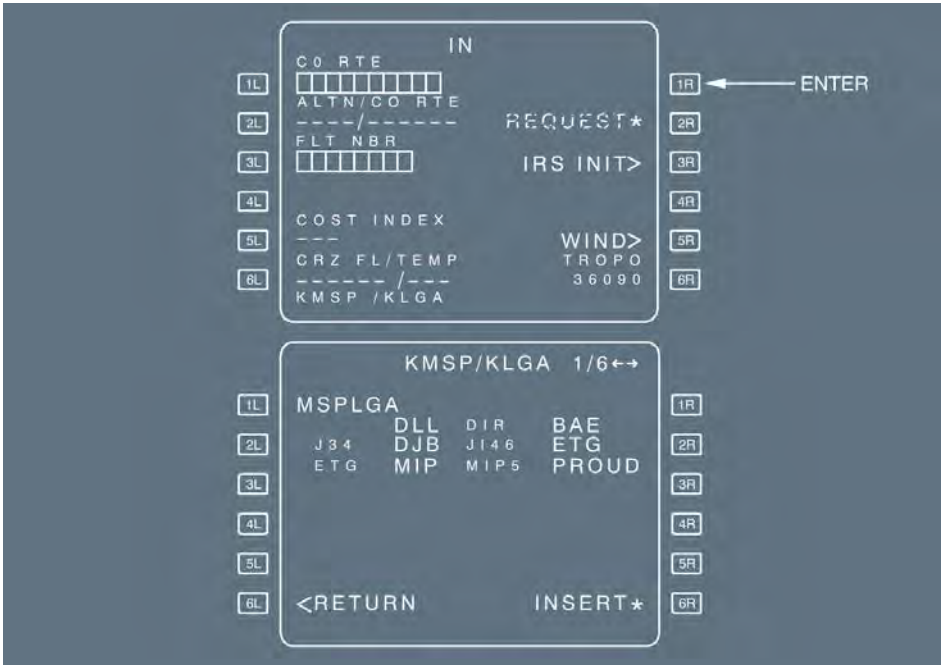
FLIGHT PLAN CONSTRUCTION

Ident.: DSC-22_20-30-10-05-00011076.0032001 / 01 OCT 12
Applicable to: ALL

There are three ways of defining the route:

1. A company route, that is in the database, and is known by the flight crew.
   The flight crew enters the name of the CO RTE into the [1L] field of the INIT A page. This action enters all the elements of the flight plan. The database usually includes an alternate route associated with the destination.

2. A company route, that is in the database, but the flight crew does not know it is there.
   The flight crew enters a city pair in the [1R] field. The ROUTE SELECTION page automatically appears and enables the flight crew to review all stored routes between the two cities before selecting one of them.



3. There is no company route between the two cities.
   The flight crew enters the city pair in the [1R] field. The ROUTE SELECTION page appears and displays “NONE”.
   The flight crew has to manually construct the entire flight plan.
   For procedure, *Refer to PRO-NOR-SRP-01-10 Flight Plan Initialization - General*.

FLIGHT PLAN CAPACITY

Ident.: DSC-22_20-30-10-05-00010631.0002001 / 17 AUG 10
Applicable to: ALL

In terms of flight plan capacity, the FMS takes into account 3 flight plans:
- The active flight plan
- The secondary flight plan
- The temporary flight plan.

Each flight plan can contain up to 200 legs. If a flight plan contains 200 legs, and if the flight crew attempts to perform a lateral revision that increases the number of legs of this flight plan, the FMS rejects the revision and the MCDU displays the “F-PLN FULL” message. For the active and

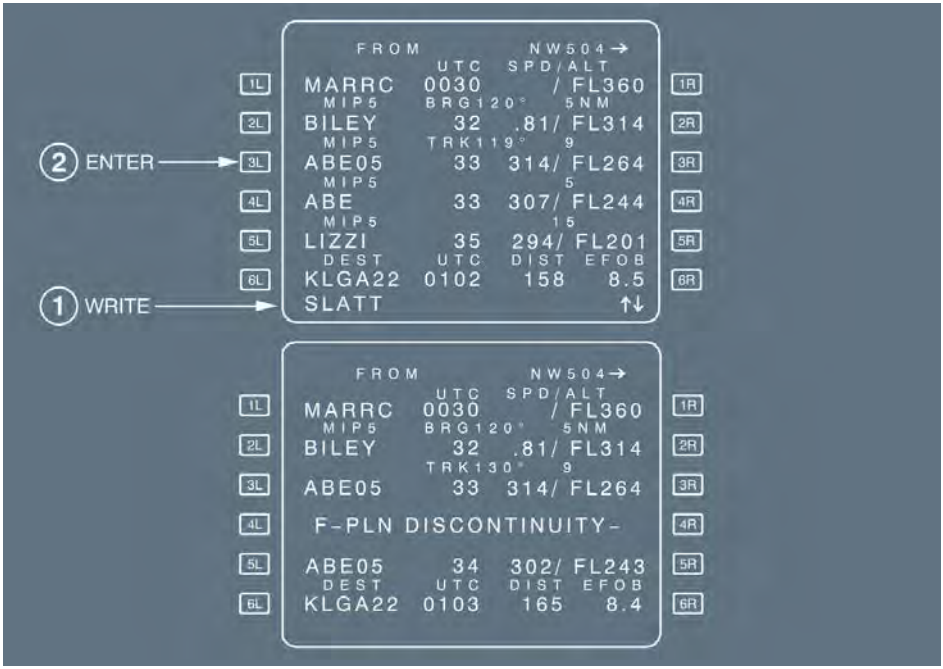
secondary flight plans, the primary parts must contain less than 135 legs, and the alternate parts must contain lesgs than 65 legs.

LATERAL REVISIONS

Ident.: DSC-22_20-30-10-05-00010632.0002001 / 07 APR 17
Applicable to: ALL

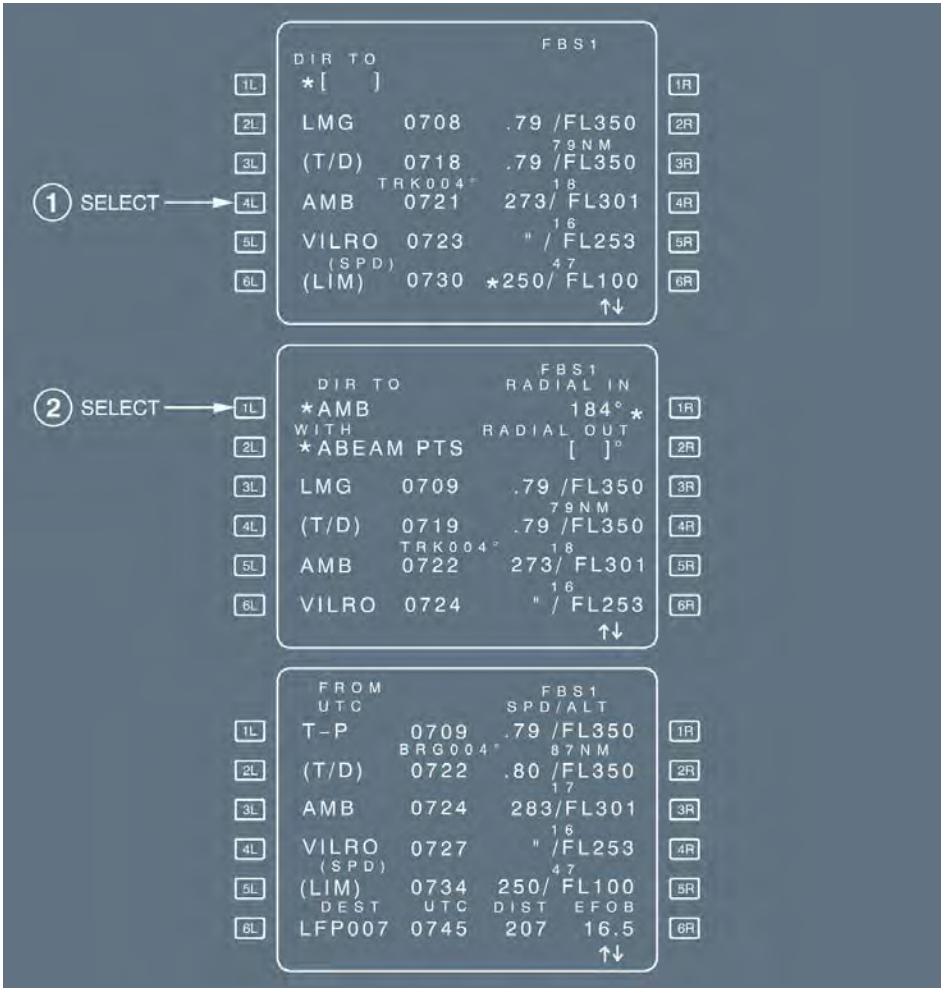
The flight crew can revise the lateral flight plan following two types of revisions:

1. Lateral revisions that have an immediate effect on the active flight plan:
   - The flight crew inserts a new waypoint directly on the F-PLN page, deletes, or changes a waypoint from it:



When the flight crew enters a new waypoint, which does not exist in the flight plan, the following waypoint moves down the flight plan, with a discontinuity shown after the new waypoint.

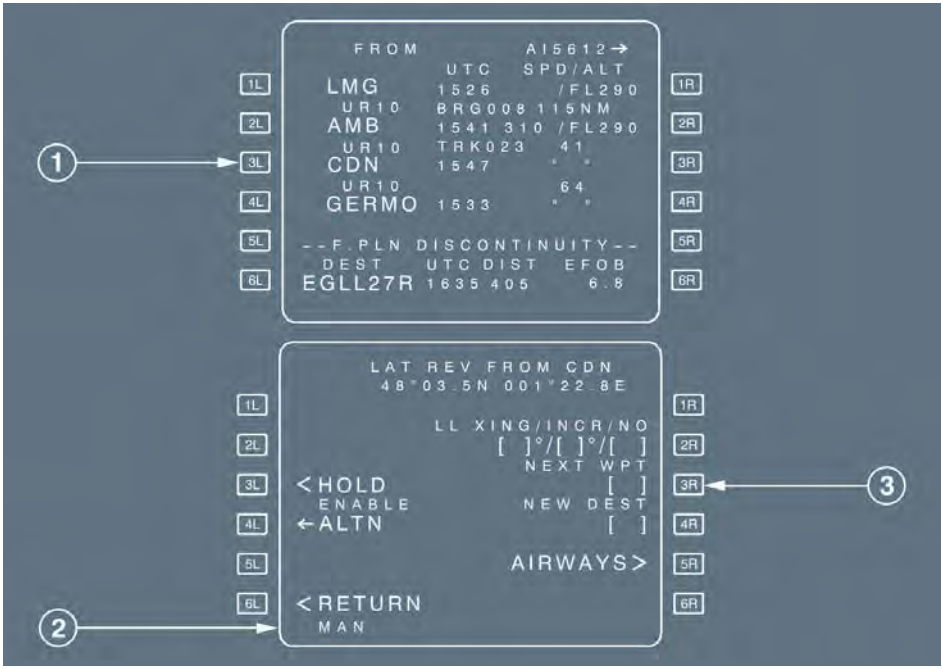
- The flight crew adds a direct leg (DIR TO) from his present position to a selected waypoint: The flight crew can change the “TO” waypoint of the active leg. The DIR TO function gives access to DIR TO, DIR TO ABEAM, or DIR TO/INTERCEPT. The active leg then goes from the present position (T/P) to the waypoint selected or inserted as the new “TO” waypoint.



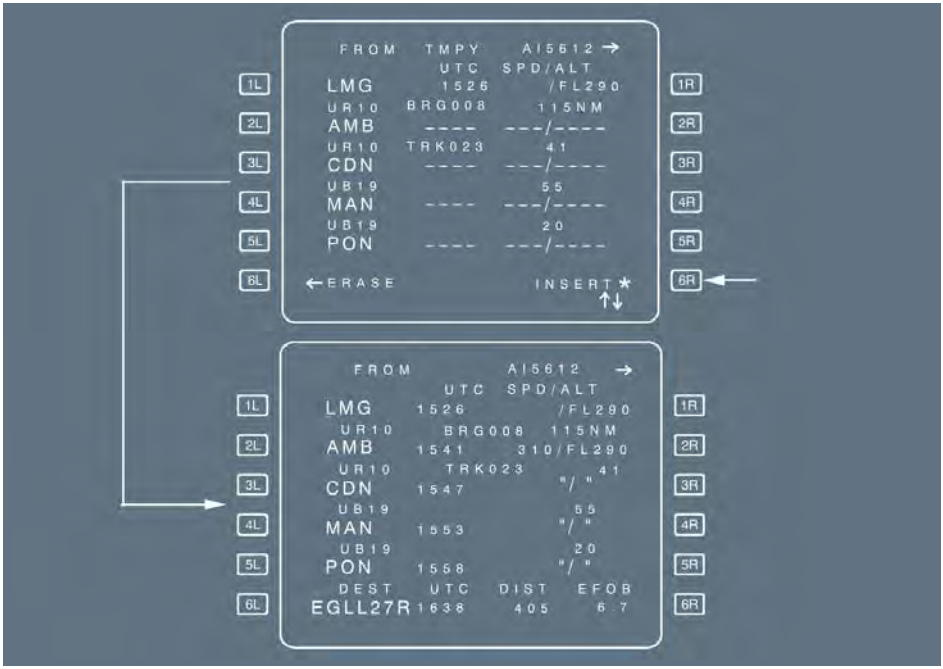
2. Lateral revisions that lead to a temporary flight plan (TMPY) before they take effect:
   The flight crew creates a temporary flight plan, then inserts it as a revision to the active flight plan. The flight crew does this when selecting, deleting, or modifying several waypoints of an airway or procedure at once (SID, STAR, HOLD, TAKEOFF or LANDING RWY). This modification is made on specific “LAT REV” pages from the flight plan page.

Possible revisions are:
- Insert or modify the departure procedure
- Insert or modify the arrival procedure
- Insert a waypoint
- Change the destination
- Insert an airway
- Insert an offset
- Insert a holding pattern
- Select or enable an alternate flight plan
- Fix information.

The purpose of the temporary flight plan is to allow the flight crew to check a revision on the MCDU and on the ND before inserting the changes into the active flight plan. It is a copy of the active flight plan that has been changed according to the flight crew revision. While it is displayed, the aircraft will continue to follow the original active flight plan.
No predictions are computed or displayed on the pages of the temporary flight plan.



A temporary flight plan is displayed for a check and/or new modification. Inserting the temporary revision will modify the active flight plan.



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FMS2 HONEYWELL

GENERAL

Ident.: DSC-22_20-30-10-15-00005067.0001001 / 09 FEB 11
Applicable to: ALL

The lateral revision function allows the pilot to create or modify the following parts of the flight plan:

- Airway
- Waypoint
- New destination
- Holding pattern
- Offset
- Alternate
- Fix information
  Each time the pilot activates one of the above-listed revisions, he accesses a temporary flight plan that enables the modification to be checked before inserting it in the active flight plan. The crew selects these functions by pressing the left keys on F-PLN A or B.
- Direct to and overfly functions are accessed via the MCDU keys. No temporary flight plan is created with these functions.
- “Update at” capability is a specific function that manually updates the FM position. It does not .use a temporary flight plan, but the pilot must confirm its insertion before it is activated.

TEMPORARY F-PLN (TMPY)

Ident.: DSC-22_20-30-10-15-00000460.0001001 / 01 OCT 12
Applicable to: ALL

When a pilot makes a lateral revision to the F-PLN, the FMGS creates a temporary flight plan. This is a copy of the active F-PLN, but is corrected by the lateral revision in progress.
The aircraft continues to follow the active F-PLN, until the temporary revision is inserted.
The revision appears in yellow font on both MCDUs and NDs.

- Lateral and vertical revisions cannot be made to a temporary F-PLN.
- Only one temporary F-PLN may be accessed at a time.
- The “DIRECT TO” function, when used, erases a temporary F-PLN.
- When a DIR TO is in process, a temporary revision cannot be displayed on the other MCDU.
- A TMPY F-PLN changes the title of the flight plan pages. (TMPY appears in all titles).
- No predictions are computed for a temporary flight plan (dashes are displayed).

Temporary data is displayed in yellow (ND and MCDU). Once inserted, it becomes active and is displayed in green.

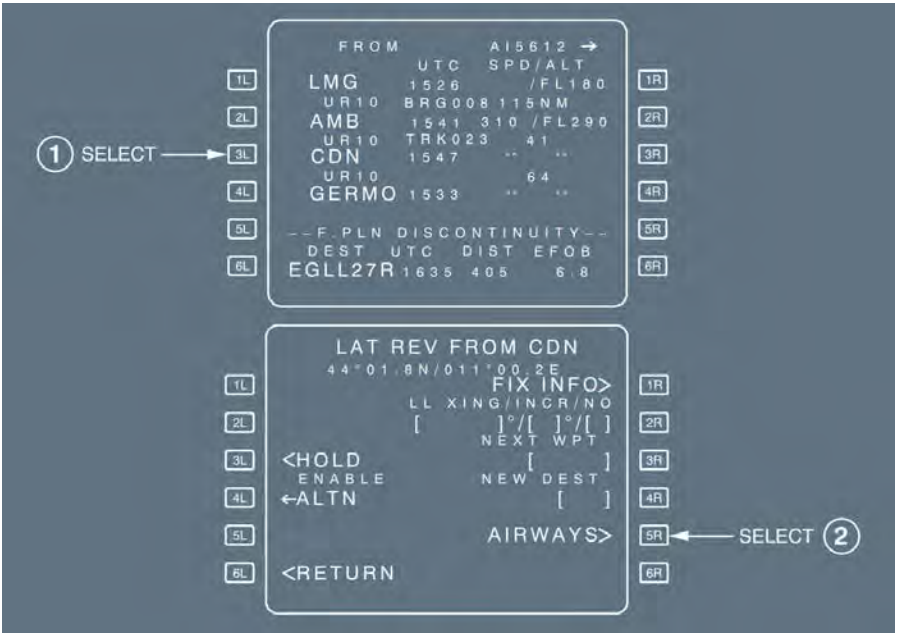
INSERTING AN AIRWAY WITH "VIA"

Applicable to: ALL

Ident.: DSC-22_20-30-10-15-E-00012828.0001001 / 14 MAY 12

GENERAL

In the active flight plan, the pilot can insert up to 5 successive airway segments, going from a revised waypoint or ending at a given waypoint of the flight plan.

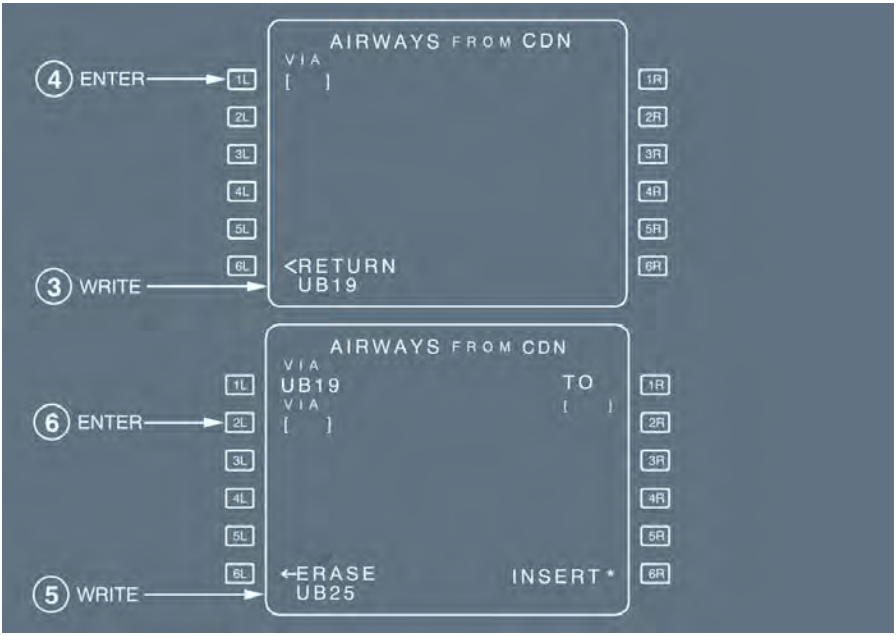


SELECT the revised waypoint (here CDN).
PRESS [5R] to select the airways function.

Ident.: DSC-22_20-30-10-15-E-00012829.0001001 / 14 MAY 12

THE PILOT WISHES TO INSERT SUCCESSIVE AIRWAY SEGMENTS FROM A WAYPOINT

e.g. from CDN - Airways UB19 – Airways UB25 – Ending point AAA.

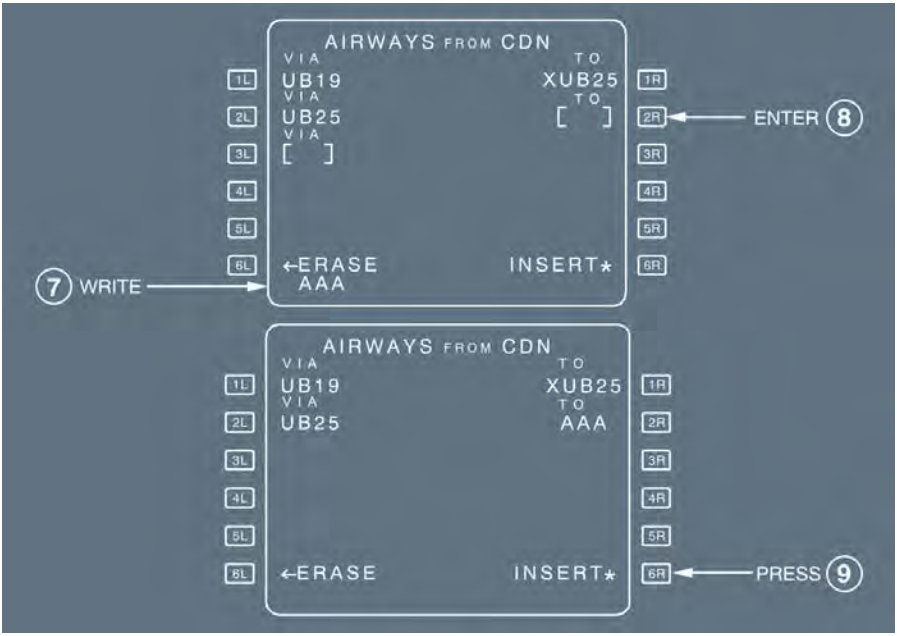


WRITE the first airway in the scratchpad (here UB19).
PRESS [1L] to insert it into the VIA field.
WRITE the second airway in the scratchpad (here UB25).
PRESS [2L] to insert it into the VIA field.

The system automatically determines the first downpath intersection point between the 2 airways.

- If the airways have a common waypoint, the system selects it as the ending point of the first VIA.
- If they have no common waypoint, but have a single intersection, the system creates this intersection as an FM-computed point and displays X followed by the airway IDENT (here XUB25).
- If they have no common waypoint or intersection, the system displays NO INTERSECTION FOUND in the scratchpad.

Once the pilot has entered the required airways (up to 5), he must enter the ending point of the last selected airways:

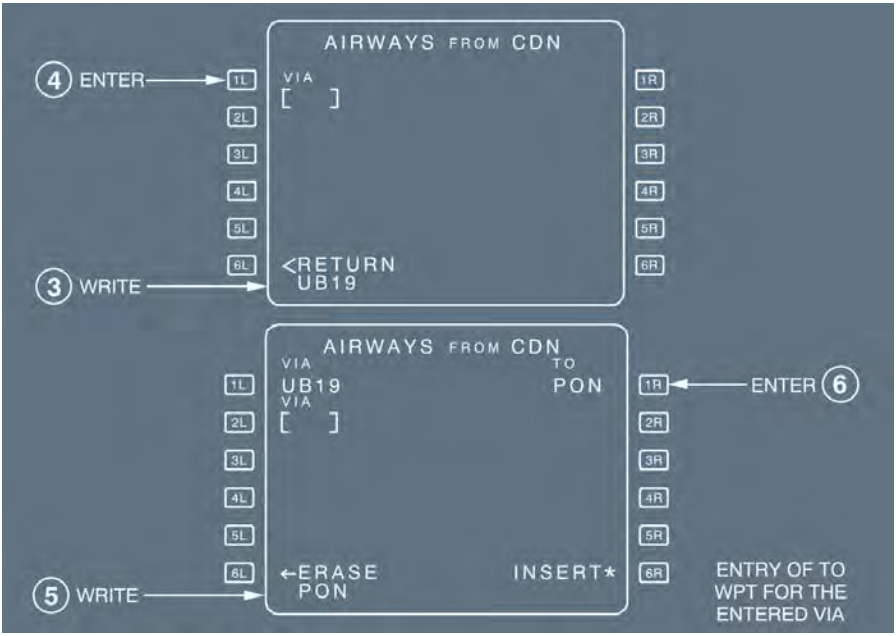


WRITE the ending waypoint in the scratchpad (here AAA).
PRESS [2R] to insert the ending waypoint into the TO field.

Note: *If two waypoints with the same IDENT belong to the same airway, the DUPLICATE NAMES page will not be called up, and the system selects the first one in the database.*

Ident.: DSC-22_20-30-10-15-E-00012830.0001001 / 01 OCT 12

THE PILOT WISHES TO INSERT ONE AIRWAY SEGMENT TO AN ENDING WAYPOINT



WRITE the airway IDENT in the scratchpad (here UB19).
PRESS [1L] to insert it into the VIA field.
WRITE the ending waypoint in the scratchpad (here PON).
PRESS [1R] to insert it into the TO field.

Note: - *If the revise waypoint, or the ending waypoint, does not belong to the entered airway, the system displays AWY/WPT MISMATCH in the scratchpad.*
- *If two waypoints with the same IDENT belong to the same airway, the DUPLICATE NAMES page will not be called up and the system selects the first one in the database.*

Ident.: DSC-22_20-30-10-15-E-00012831.0001001 / 09 FEB 11

FLIGHT PLAN INSERTION

The flight crew either inserts the flight plan directly from the AIRWAYS page, or from the TMPY F-PLN page. In both cases:

PRESS [6R] to insert the temporary flight plan. Clear flight plan discontinuity, as needed.

INSERTING A WAYPOINT

Applicable to: ALL

Ident.: DSC-22_20-30-10-15-F-00012832.0001001 / 09 FEB 11

GENERAL

Waypoints can be inserted in two ways:

- Directly into the flight plan. All modifications go directly into the active flight plan. No temporary flight plan is created.
- By means of a lateral revision at the “NEXT WAYPOINT”, a process that creates a temporary flight plan.

The second method enables the temporary flight plan to be checked before it is inserted.

Ident.: DSC-22_20-30-10-15-F-00012833.0001001 / 09 FEB 11

WAYPOINT IDENTIFICATION

The pilot can identify a waypoint by:

- Its identifier (if it is in the navigation database).
- A Latitude/Longitude (LL).
- A Place/Bearing/Distance (PBD). The waypoint is defined by its bearing and distance from a place.
- A Place-Bearing/Place-Bearing (PBX). The waypoint is defined by the interception of 2 radials from 2 places.
- A Place/Distance (PD). The waypoint is defined by a distance from a place, along the F-PLN.

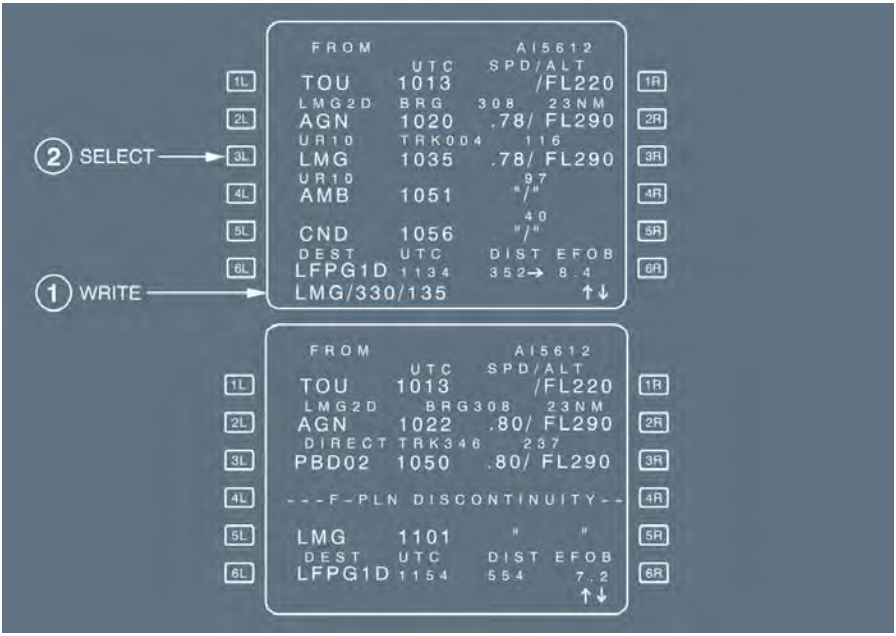
Note: *If a slash or a dash is not entered properly, the MCDU displays a “FORMAT ERROR” message.*

When the Flight Management Guidance System receives a waypoint that is not in the database, it identifies it as LLxx or PBD xx or PBX xx or PD xx (xx is a two-digit number between 01 and 20) and stores it in the stored waypoints file of the database.

Note: *When NAV mode is engaged, the crew cannot modify the “TO” waypoint (active leg) using the waypoint insertion function. If the crew wants to modify it, the DIR TO function will be used.*

Ident.: DSC-22_20-30-10-15-F-00012834.0001001 / 14 MAY 12

WAYPOINT INSERTED DIRECTLY IN THE FLIGHT PLAN



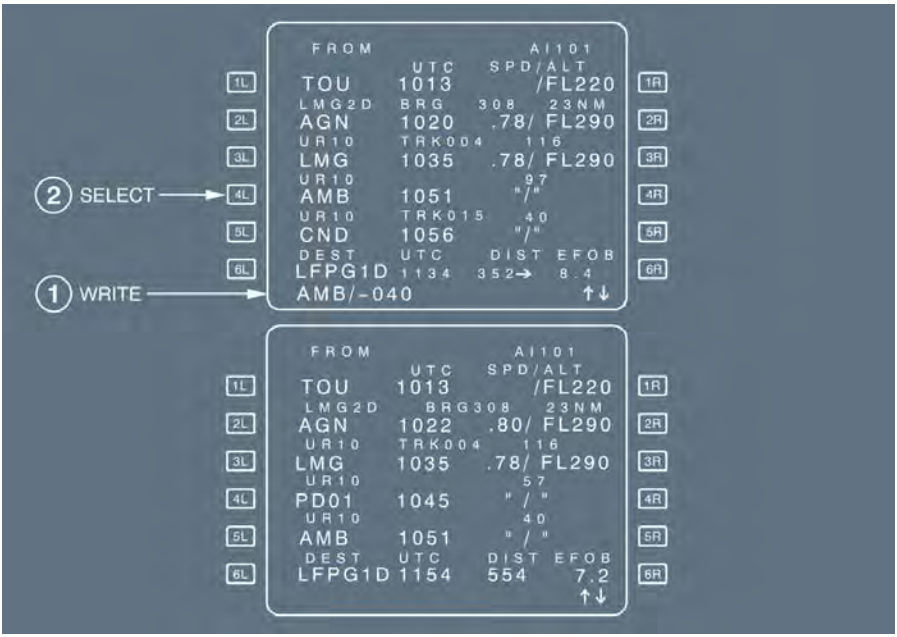
WRITE the waypoint identifier or LAT/LONG, Place/Bearing/Distance or Place-Bearing/Place-Bearing into the scratchpad. (Example: Place: LMG, Bearing: 330 °, Distance: 135 NM).
PRESS the appropriate key to enter the waypoint into the flight plan. The rule is that the new waypoint appears next to the pressed key, and the previous waypoint moves down the flight plan path.

This operation creates a discontinuity between the new waypoint and the previous one.
The new flight plan will have to be cleared of the discontinuity and some waypoints erased.

Ident.: DSC-22_20-30-10-15-F-00012835.0001001 / 01 OCT 12

ALONG TRACK WAYPOINT INSERTION

On the F-PLN or STEP ALTS page, the pilot can enter an along track waypoint, defined as a place/distance waypoint.



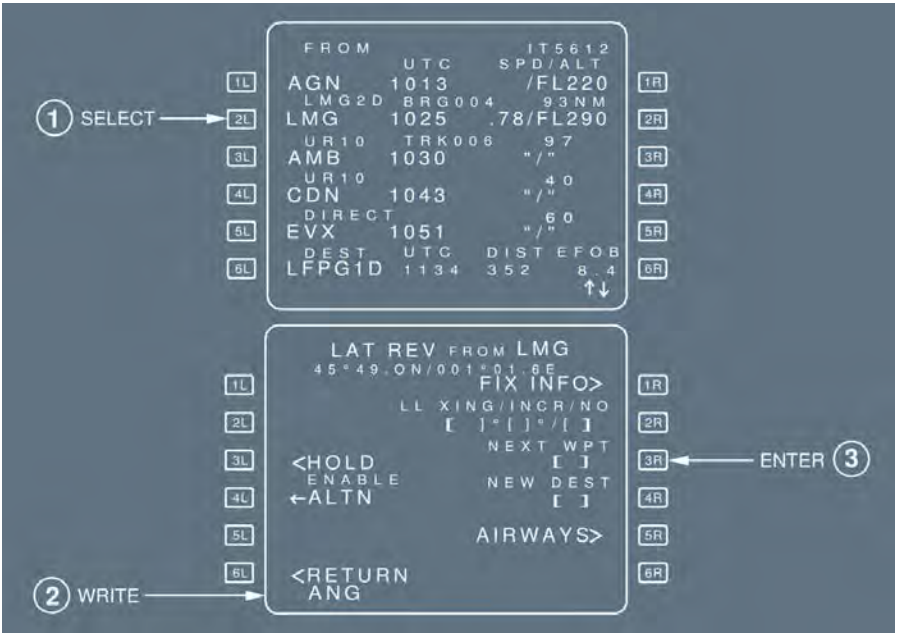
WRITE the waypoint identifier and distance from this place.

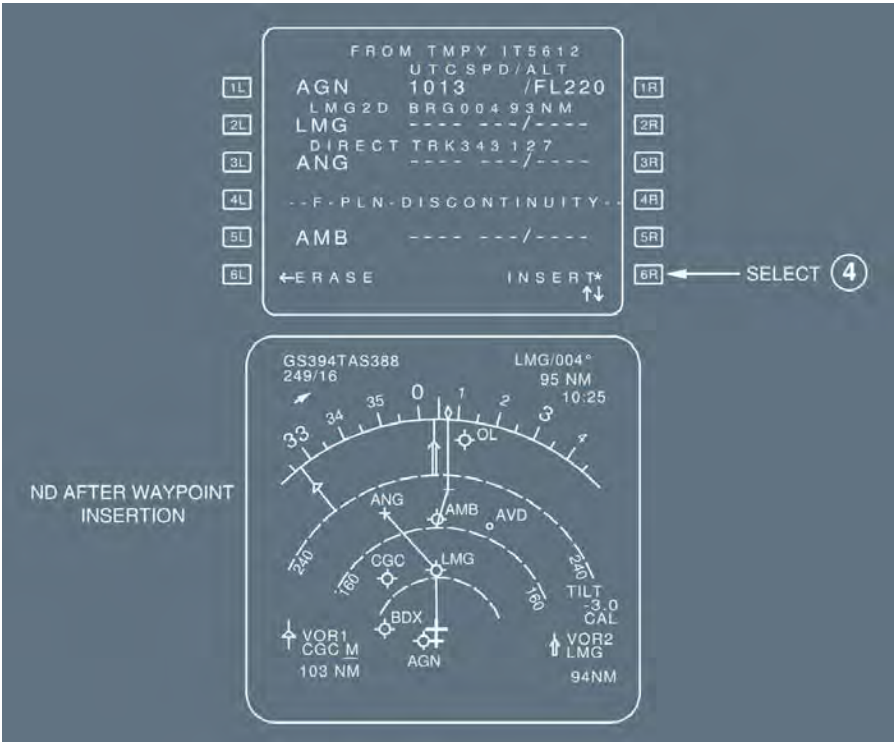
According to the sign of the distance, the crew may define an along track waypoint before or after the revised place. (Example: AMB/-040).

PRESS the appropriate key adjacent to the place identifier. The system automatically positions the waypoint in the flight plan.

This operation does not create any discontinuity.
The system does not accept an along track waypoint entered at the FROM waypoint.

WAYPOINT INSERTED THROUGH THE USE OF "NEXT WAYPOINT"



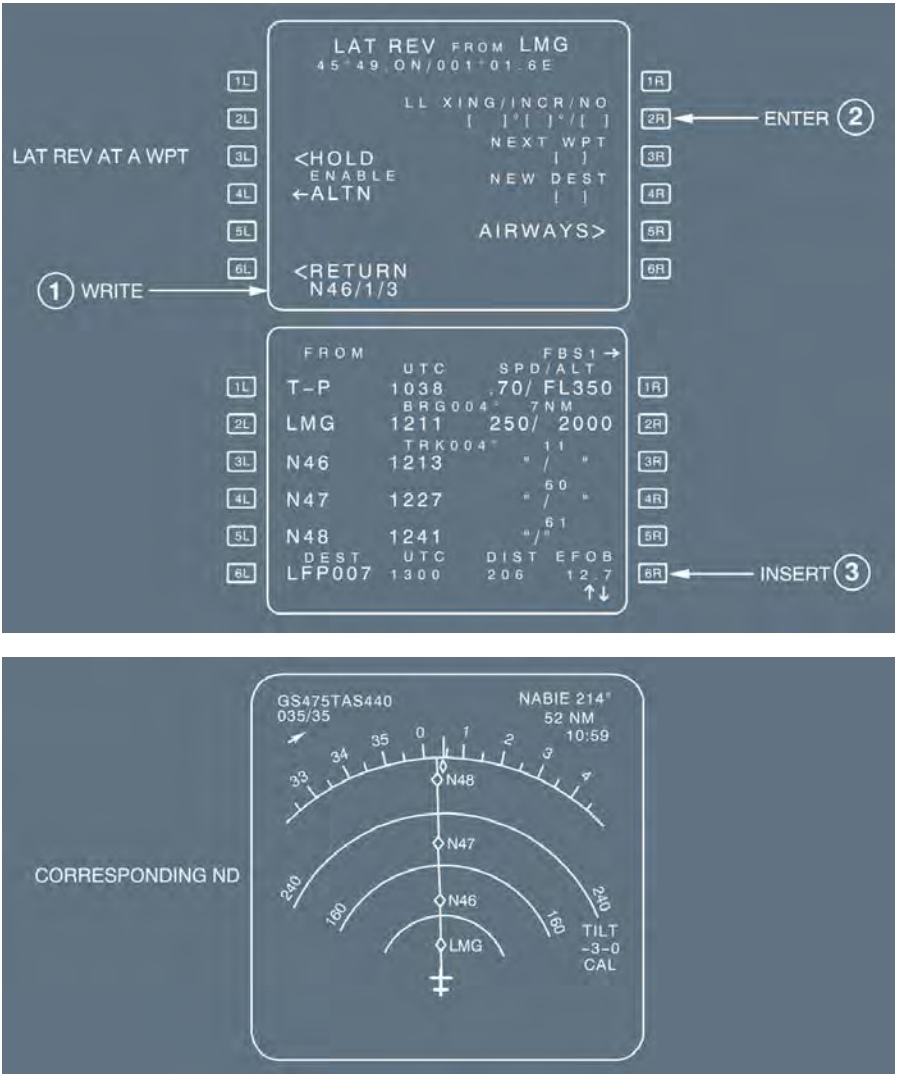


SELECT the lateral revision (LAT REV) function at an appropriate waypoint.
WRITE the waypoint identifier, or LAT/LONG, or Place/Bearing/Distance, or Place-Bearing / Place-Bearing into the scratchpad.
ENTER it in the brackets under NEXT WPT (next waypoint).
INSERT the temporary flight plan by pressing the [6R] key.
CLEAR the F-PLN discontinuity, as appropriate.

Ident.: DSC-22_20-30-10-15-F-00012837.0001001 / 14 MAY 12

LATITUDE/LONGITUDE CROSSING WAYPOINT INSERTION

This function allows the insertion of one or several points along the flight-plan beyond the revised waypoint, at fixed latitude or longitude intervals (INCR) from a specified latitude or longitude. These waypoints are not considered as part of the pilot-defined elements. The system deletes them when sequenced.



WRITE the latitude (NXX, XXN, SXX or XXS), the required increment in degrees between the successive waypoints, and the number of required waypoints.

(Example: The pilot wants to obtain 3 points, every degree from latitude N46: He enters N46/1/3).

PRESS [2R] to insert it into the LL XING/INCR/NO field.
PRESS [6R] to insert the new waypoints in the flight plan without discontinuity.
The system does not store these waypoints in the database.

FIX INFO

Applicable to: ALL

Ident.: DSC-22_20-30-10-15-G-00012838.0008001 / 09 FEB 11

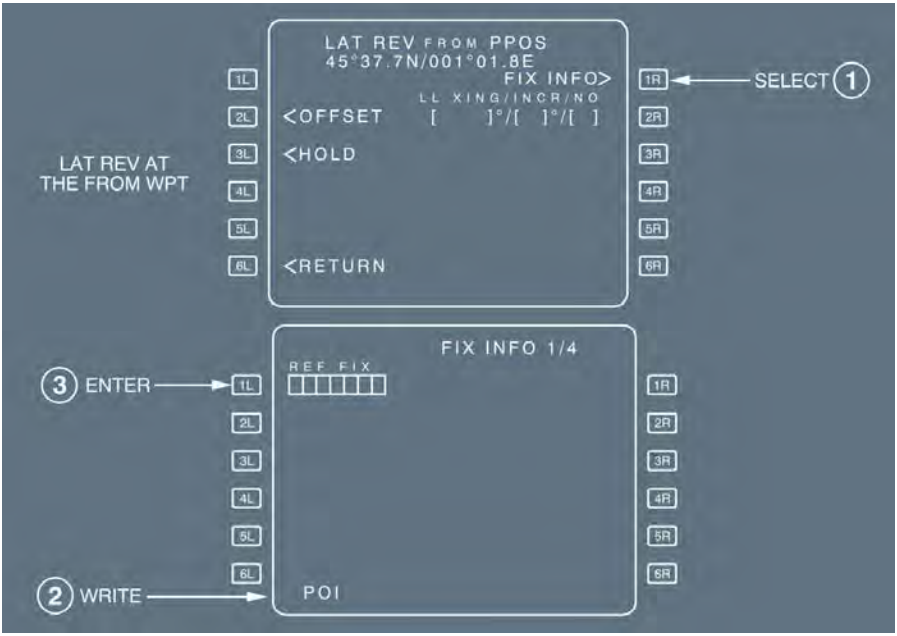
GENERAL

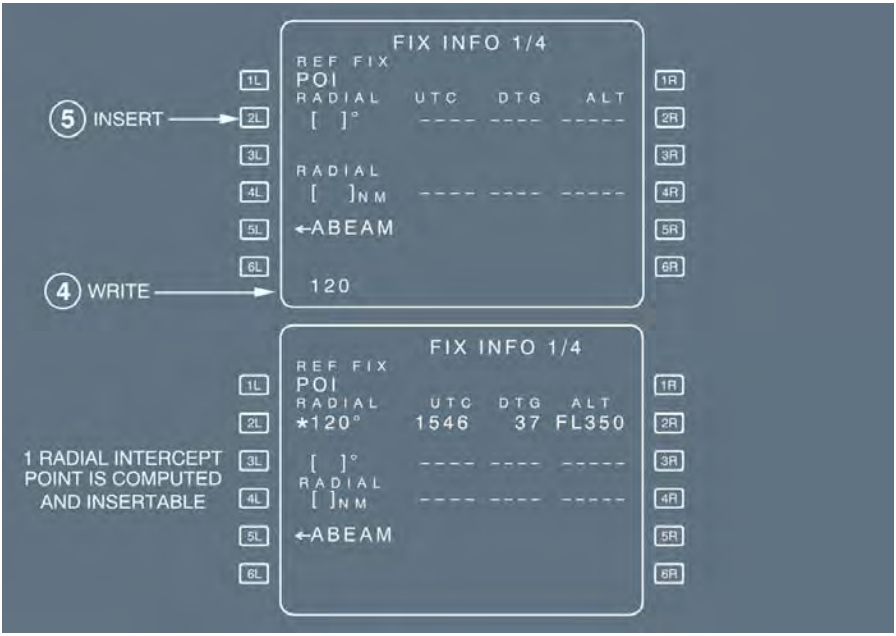
When using the FIX INFO function, the flight crew defines waypoint intersections of the flight plan with radials, circle or abeam associated to a fix.
When the flight crew inserts the intersection points, the system automatically identifies these points, but does not store them in the navigation database.

Ident.: DSC-22_20-30-10-15-G-00012839.0008001 / 01 OCT 12

INSERTING A RADIAL INTERCEPT WAYPOINT

The flight crew accesses the radial intercept function from the lateral revision page at the origin or “from” waypoint.


LAT REV FROM PPOS
45°37.7N/001°01.8E
FIX INFO>
LL XING/INCR/NO
<OFFSET [ ]°/[ ]°/[ ]
<HOLD
<RETURN
1L
2L
3L
4L
5L
6L
1R
2R
3R
4R
5R
6R
SELECT 1
LAT REV AT THE FROM WPT
FIX INFO 1/4
REF FIX
3 ENTER
2 WRITE
POI



WRITE the reference fix identifier into the scratchpad (here POI), and ENTER it [1L].

It may be any database or pilot-defined fix.

WRITE the radial into the scratchpad (here 120 °) and ENTER it [2L].

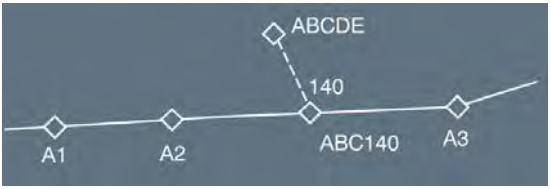
The defined radial appears as a blue dashed line on the ND.

If the radial line intersects the active flight plan, the system computes the time, distance to go, and the altitude at the intersection point.

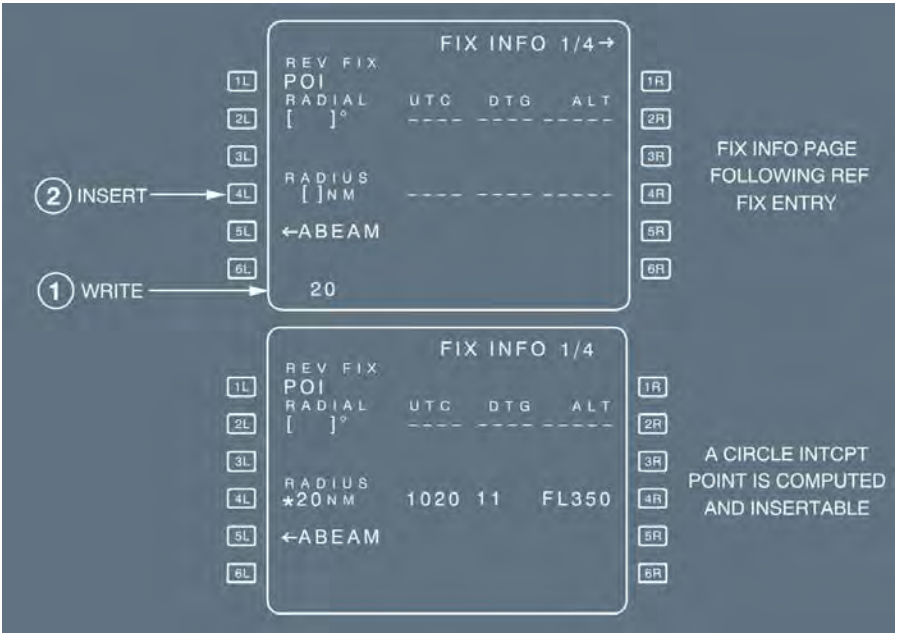
Up to two radials can be entered.

SELECT the required radial to insert the associated waypoint into the flight plan (if needed):

The system automatically assigns its IDENT as the three first characters of the reference fix IDENT, followed by the radial. (Example: ABC 140). The blue dashed line disappears from the ND.



INSERTING A CIRCLE INTERCEPT WAYPOINT

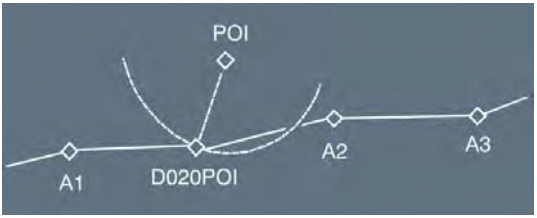


WRITE the reference fix identifier into the scratchpad (here POI), and ENTER it [1L].
WRITE the circle radius in the scratchpad (here 20 NM), and ENTER it [4L]:

The defined circle appears as a blue dashed circle on the ND. If the circle intersects the active flight plan, the system computes the time, along path distance to go and altitude at the first intersection point from the current aircraft position.

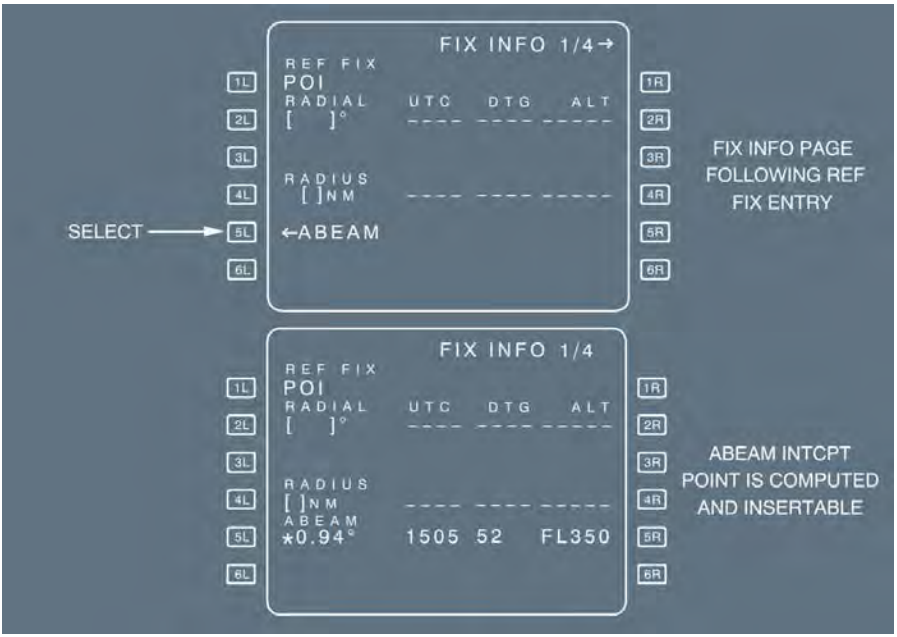
SELECT the required radius to insert the associated waypoint into the flight plan (if needed).

The system automatically assigns its IDENT as a D, followed by the radius, and followed by the three first characters of the reference fix IDENT (example D020 POI). The blue dashed circle disappears from the ND.



Ident.: DSC-22_20-30-10-15-G-00012841.0008001 / 01 OCT 12

INSERTING AN ABEAM INTERCEPT WAYPOINT

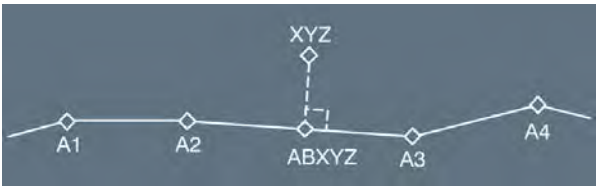


WRITE the reference fix identifier into the scratchpad (here POI), and ENTER it [1L]
SELECT the ABEAM prompt [5L]:

A blue dashed line from the reference fix and perpendicular to the flight plan appears on the ND. The system computes the radial, time, distance to go, altitude and predictions related to the waypoint abeam the reference fix.

SELECT [5L] to insert the abeam intercept waypoint into the flight plan (if needed):

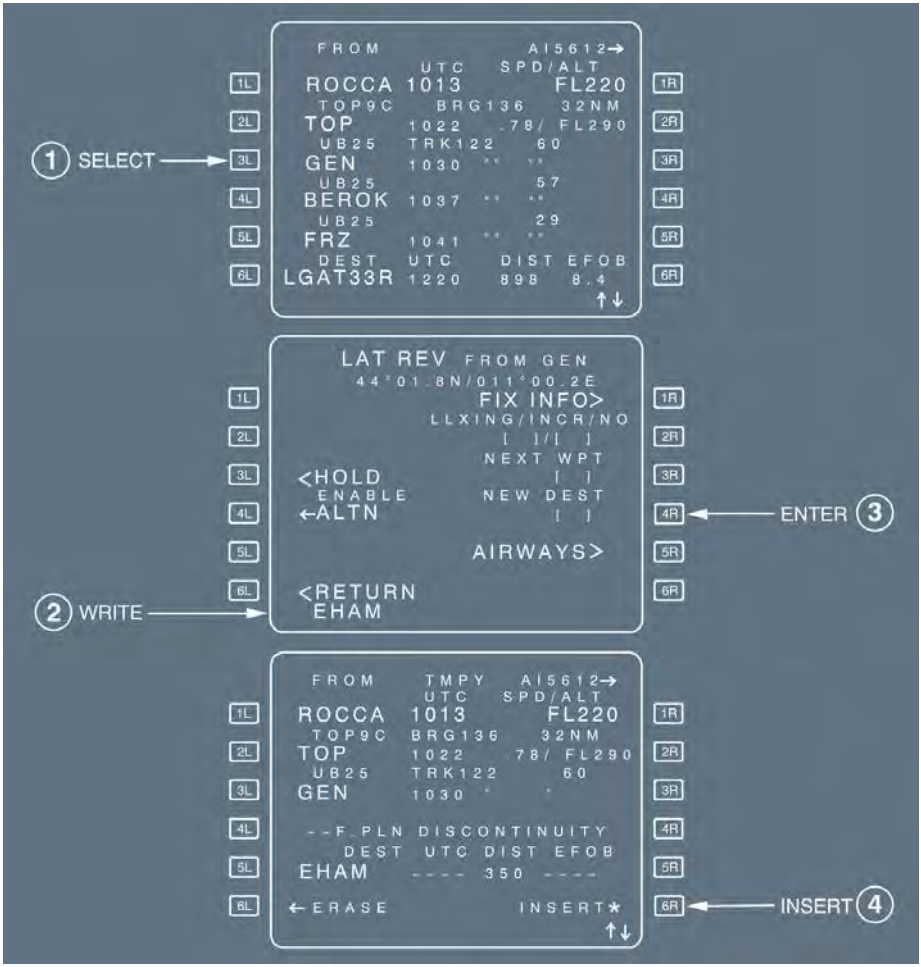
The system automatically assigns its identifier as AB, followed by the first five characters of the reference fix identifier (Example ABXYZ). The blue dashed line disappears from the ND.



INSERTING A NEW DESTINATION

Ident.: DSC-22_20-30-10-15-00000471.0001001 / 14 MAY 12
Applicable to: ALL

The pilot may define a new destination and insert it via the lateral revision page. The pilot may then call up the new destination from any waypoint along the flight plan, except the FROM waypoint, the destination, and the missed-approach waypoint. When the new destination has been inserted, a flight plan discontinuity appears between the revision waypoint and the new destination. All waypoints beyond the revision waypoint (including the previous destination and associated missed approach) are deleted.



SELECT the lateral revision function at an appropriate waypoint.
WRITE the new destination in the scratchpad.
Enter it in the brackets under “NEW DEST”.
INSERT the temporary flight plan ([6R] key), and complete the flight plan to the new destination.

HOLDING PATTERN

Applicable to: ALL

Ident.: DSC-22_20-30-10-15-A-00007222.0001001 / 09 FEB 11

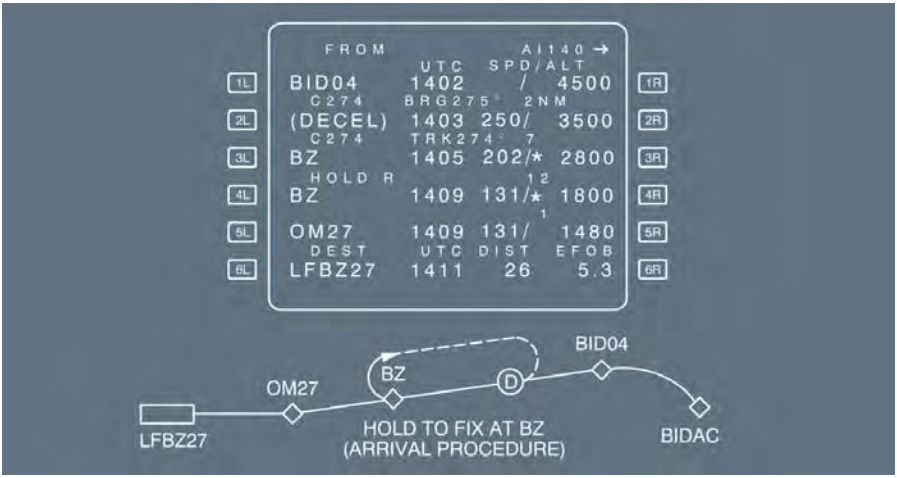
GENERAL

This section describes holding patterns, associated guidance and flight crew procedures.
The Flight Management and Guidance Computer (FMGC) has three types of holding patterns that the pilot can use in a flight plan.

Ident.: DSC-22_20-30-10-15-A-00007163.0001001 / 01 OCT 12

HOLD TO FIX (HF)

The holding pattern is always part of an arrival or departure procedure. The aircraft flies it once and then automatically exits the holding pattern at the fix. The predicted speed in the holding pattern is the lowest of the ICAO speed limit, max endurance speed, or any speed constraint. Guidance to the fix in the holding pattern is similar to that on any leg of a flight plan. The HF patterns are part of the navigation database and cannot be created by the crew.

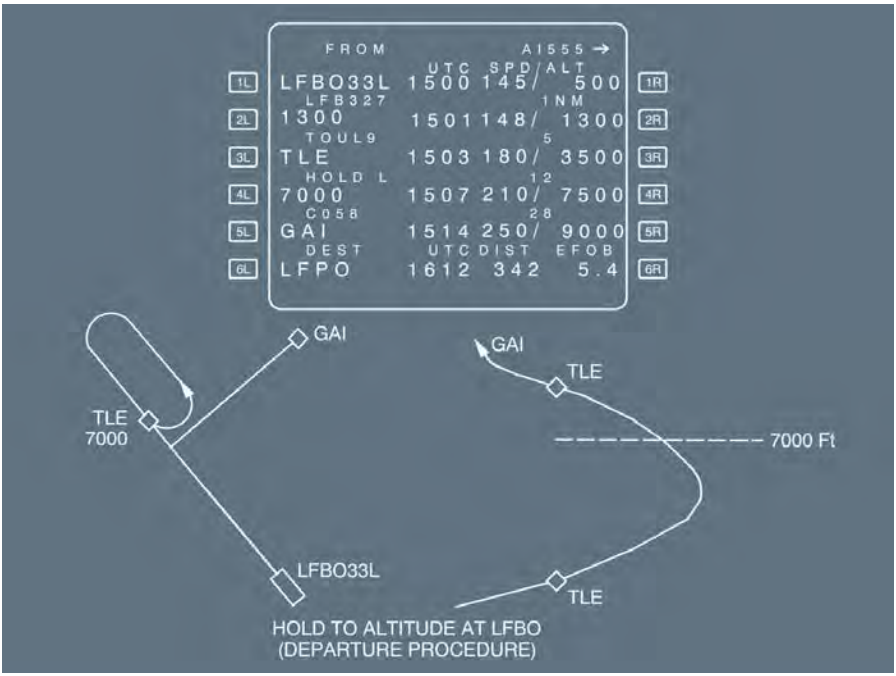


Ident.: DSC-22_20-30-10-15-A-00007182.0001001 / 01 OCT 12

HOLD TO ALTITUDE (HA)

The aircraft flies the hold until it reaches the specified altitude. Then, it automatically exits the hold at the fix.
The predicted speed for the holding pattern is the lowest of the ICAO speed limits, the max endurance speed, or any speed constraint.

The size of the holding pattern is a function of the predicted speed.
Guidance in a hold to altitude (HA) is similar to that for any leg of a flight plan.
The HAs are in the navigation database, as part of the arrival or departure procedures, and cannot be created by the crew.

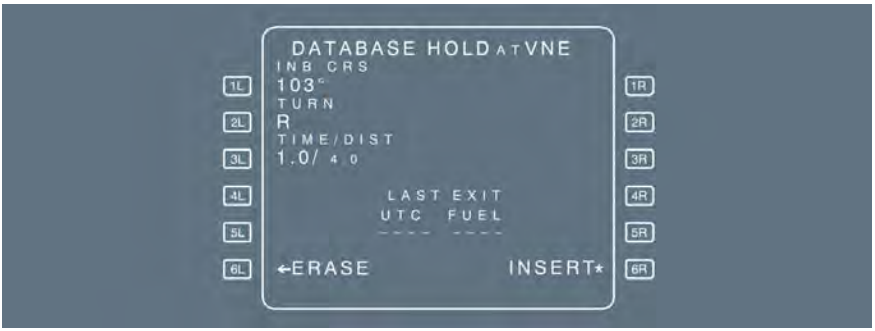


Ident.: DSC-22_20-30-10-15-A-00007206.0013001 / 01 OCT 12

HOLD WITH MANUAL TERMINATION (HM)

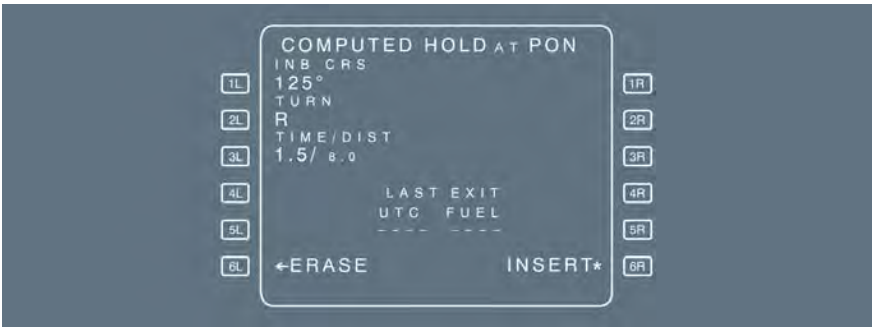
This type of holding pattern may be part of an arrival procedure, or the pilot may enter it at the present position or at any flight plan waypoint.
The pilot will use this type of holding pattern to comply with a defined procedure or a clearance limit, or to meet an operational need (such as losing altitude, holding for weather improvement, or absorbing an ATC delay).
This type of holding pattern is exited according to the pilot's decision, not automatically.
There are 3 types of HM.
All are modifiable.

DATABASE HOLD



If the holding pattern is part of the database, it is named DATABASE HOLD and all its associated data (inbound course, turn direction, time/distance) are defined in the database. The flight crew can modify this data.

COMPUTED HOLD AT...



If the holding pattern is not in the database, the FMGC designs a holding pattern and proposes it to the pilot. The associated data consists of default values that the pilot can modify.

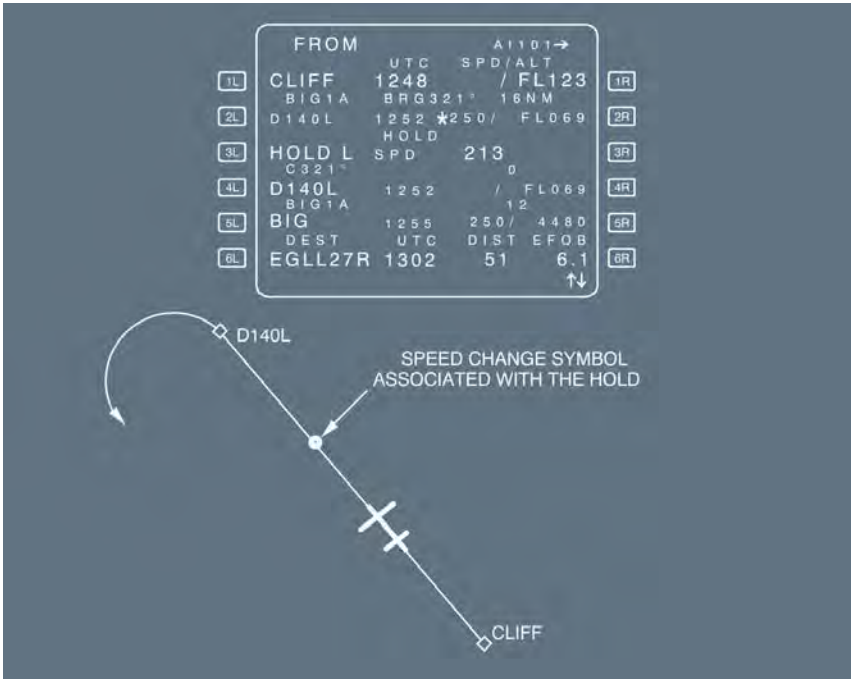
HOLD AT...

If the pilot inserts into the active flight plan a holding pattern that is manually-corrected from a hold defined by the FMGS, the screen displays a “HOLD AT...” page. The 2R field displays REVERT TO DATABASE or REVERT TO COMPUTED to restore the database data, if necessary.

PREDICTIONS AND GUIDANCE ASSOCIATED WITH A HM HOLDING PATTERN (HOLD WITH MANUAL TERMINATION)

Before deceleration

If an altitude constraint is defined at the hold entry fix, then the FMS duplicates this constraint on the hold exit.
However, different constraints may be inserted at entry and exit fixes.
Although the hold is inserted into the flight plan, the FMGS does not take it into account for predictions until the aircraft enters the hold.
However, if the hold is not deleted by the crew, the FMGS schedules a deceleration point and displays it on the ND.



The FMGS predicts the estimated time and amount of fuel remaining at which the aircraft must exit holding, so as to comply with the fuel policy specified on the fuel prediction page. When the aircraft enters the holding pattern, the FMGS revises all predictions and assumes the aircraft will fly one turn of the holding pattern.
All predictions are revised for one more holding circuit at holding fix overfly.

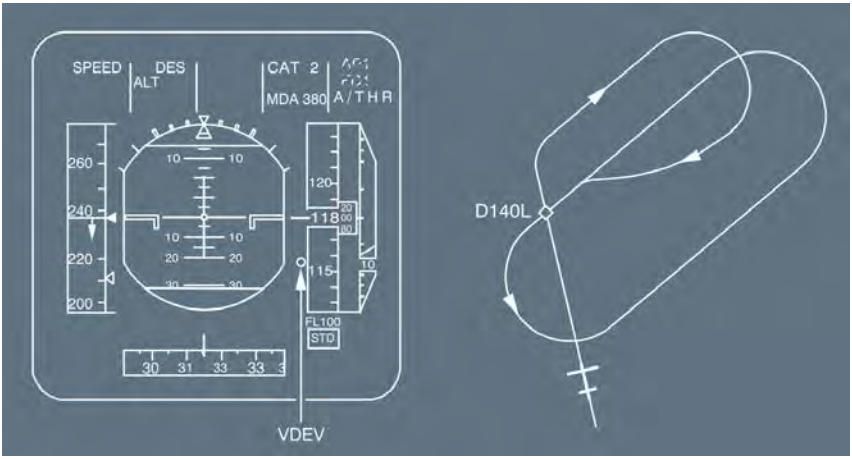
Upon reaching the speed change pseudo waypoint

The FMGS either causes the aircraft to decelerate to the hold speed (if managed speed is active and NAV mode engaged), or displays “SET HOLD SPD” (set hold speed) on the MCDU and primary flight display, if the flight crew had selected a speed target.

The default hold speed is the lowest of the:
- Maximum endurance speed
- ICAO limit holding speed
- Speed constraint (if any).

When no specific speed limit applies, the default hold speed is approximately equal to:
- Green Dot speed on the A318, A319, A320 (CFM) and A321
- Green Dot + 20 kt for altitude lower than 20 000 ft, on the A320 (IAE).
- Green Dot + 5 kt for altitude bigger than 20 000 ft, on the A320 (IAE).

The flight plan predictions for time and fuel do not yet consider that the hold will be flown, however, the navigation display shows the hold entry and holding pattern trajectory.



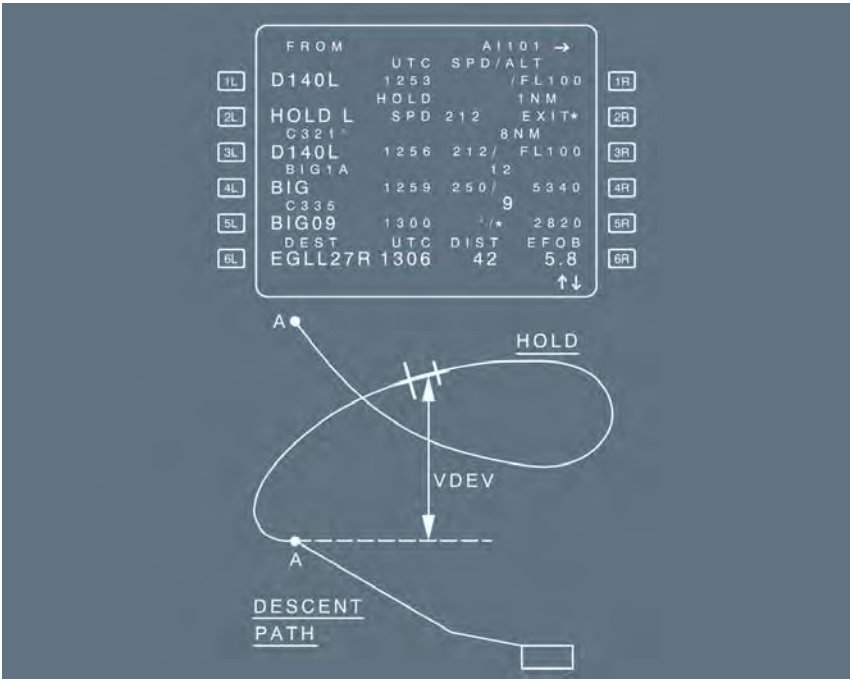
Deceleration receives priority, so that when the aircraft is in descent with the descent mode engaged, it will deviate above the descent path to decelerate. (VDEV becomes positive on the progress page).
The flight plan page displays an immediate exit prompt.
If the flight crew presses the key next to “IMM EXIT” before arriving at the holding fix, the aircraft will not enter the holding pattern, but will resume its phase-related managed-speed profile.

After reaching the hold entry fix

The aircraft enters the hold. The MCDU HOLD page displays the associated holding data:
- The inbound course (INB CRS)
- The TURN direction (L or R)
- The TIME/DIST
- The LAST EXIT time and the associated fuel to reach the alternate airport with no extra fuel.

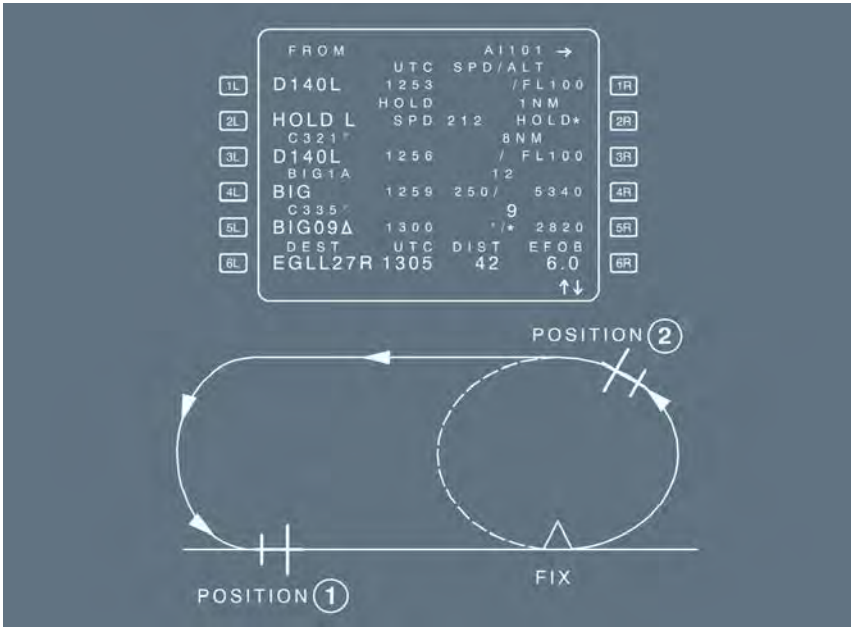
The FMS assumes that the aircraft will fly one turn of the holding pattern, and revises the predictions accordingly.
When the holding pattern is defined by a leg time (and not a leg distance), the system revises the size of the hold as a function of the target speed.

- If managed speed is active, the system uses the predicted holding speed to calculate the size of the holding pattern.
- If the selected speed is active, the system uses the target speed selected by the flight crew at the entry fix sequencing to calculate the size of the holding pattern.
- The VDEV displayed on the primary flight display and the PROG page when the aircraft is flying in the HM (hold pattern with manual termination) is the difference between the aircraft's current altitude and the altitude at which it should be when it reaches the hold exit fix in order to be correctly positioned on the descent path.



With IMM EXIT pressed (aircraft in the holding pattern)

The predictions and guidance assume that the aircraft is immediately returning to the hold fix. Sequencing the hold fix, the aircraft exits the holding pattern and resumes its navigation. The flight plan page displays “RESUME HOLD*” instead of “IMM EXIT*”.



HOLD EXIT PROCEDURE

Position (1) If “IMM EXIT” pressed, the aircraft will exit at the next fix overfly.
Position (2) If “IMM EXIT” pressed, the aircraft will make an immediate turn to the fix where the hold will be exited.

- **If managed speed is active:**

  The computer sets the target speed to the applicable speed of the current phase (for example, speed constraint, ECON speed, or speed limit).
  The computer then bases its predictions on the assumption that the flight will continue on the descent path, if the aircraft is in descent.

- **If DES mode is engaged:**

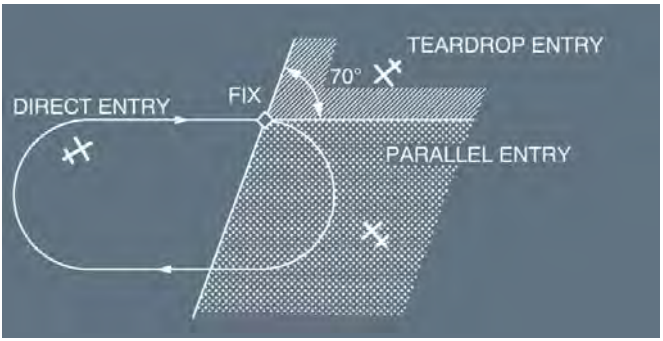
  The following applies:
  - The holding pattern is never included in the descent path computation.
  - The flight crew cannot enter altitude and speed constraints at the hold exit fix. (This is only allowed at the hold entry fix).
  - The vertical guidance in the HM, during the descent phase, calls for a constant -1 000 ft/min. But the computer considers altitude constraints that will take effect farther down the flight path as it calculates vertical guidance and predictions. The system will not allow the aircraft to descend below the next altitude constraint, neither the FCU selected altitude. If the aircraft reaches the next altitude constraint, it will level off and the altitude constraint mode will engage.

With RESUME HOLD pressed

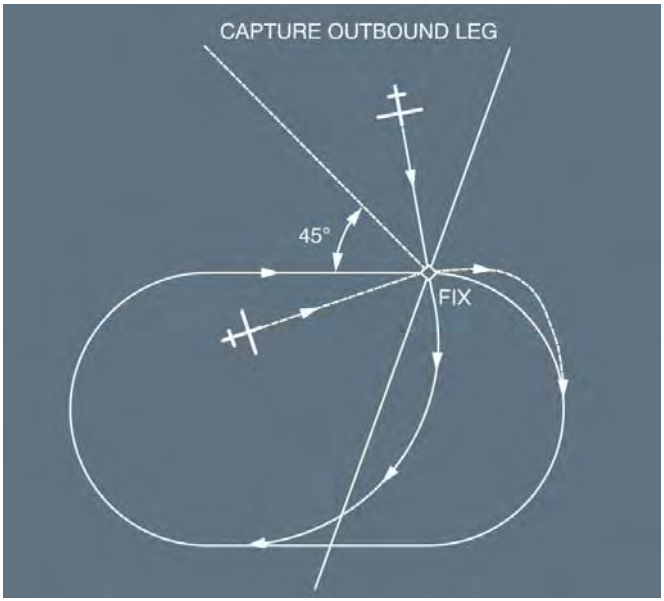
If the flight crew presses the key next to “RESUME HOLD”, the aircraft remains in the holding pattern, and “IMM EXIT” is displayed again.
After that, each time the aircraft flies over the holding fix, the system updates the predictions for one more holding circuit.

HOLDING PATTERN ENTRIES

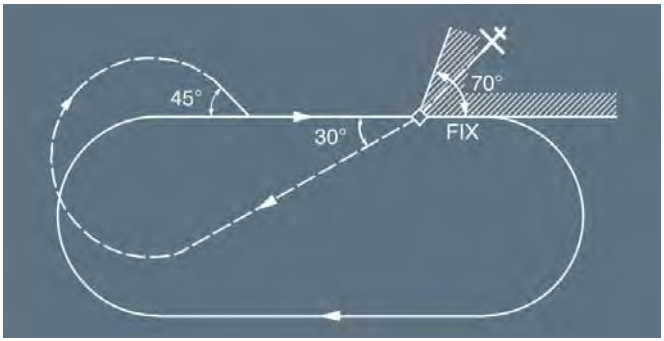
The FMGS offers three types of entry into holding patterns:
1. Direct entry
2. Teardrop entry
3. Parallel entry



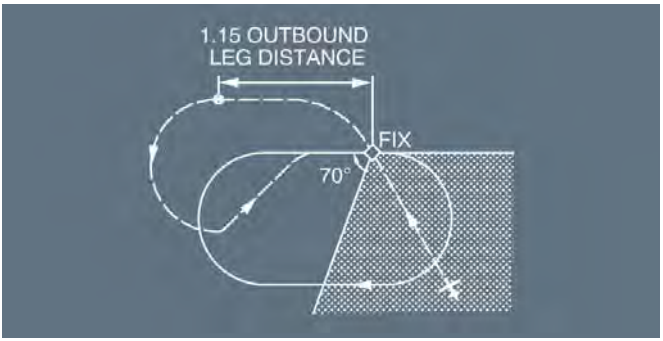
1. The direct entry



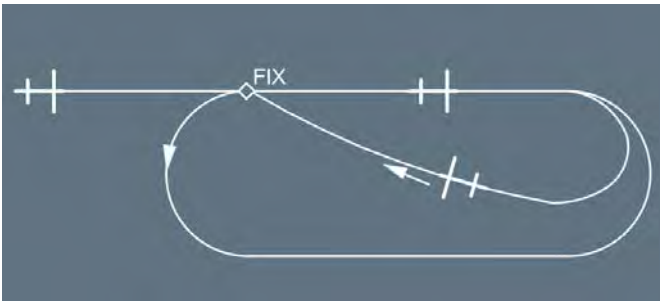
2. The teardrop entry



3. The parallel entry



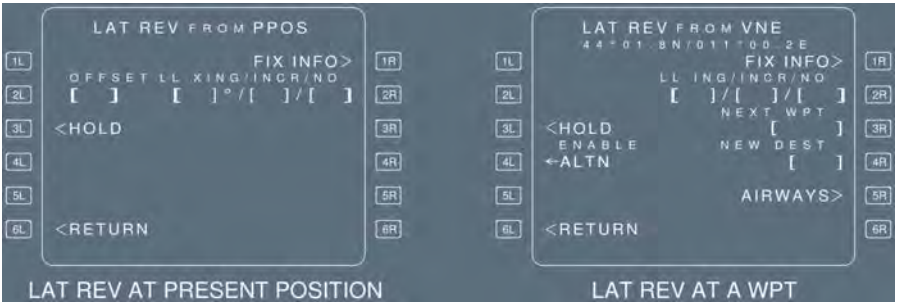
Note: *If the leg the aircraft is flying toward the holding fix is on a "limit" between a teardrop entry and a parallel entry, the FMGC may compute and display either of the two entries. The pilot should keep this in mind and should not assume that the FMGC is malfunctioning.*
If the flight plan leg toward the hold entry fix is on a course that is the reciprocal of the inbound course of the holding pattern, the aircraft will fly a parallel entry.



Ident.: DSC-22_20-30-10-15-A-00007220.0001001 / 09 FEB 11

PROCEDURE TO INSERT A HOLD (HOLD WITH MANUAL TERMINATION)

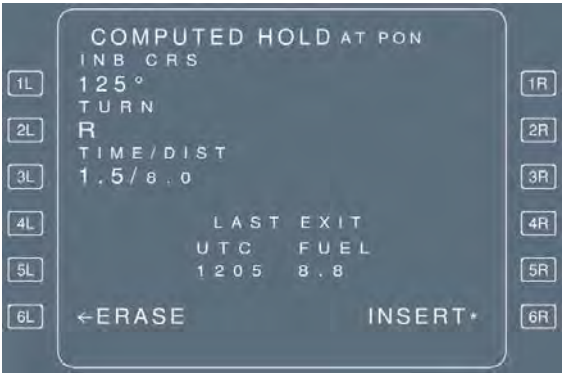
The HOLD prompt allows the flight crew to enter a hold with manual termination (HM), at the revised waypoint or at the present position.
The flight crew accesses the HOLD page from a lateral revision at the present position (PPOS) or at a waypoint.



SELECT lateral revision at present position (PPOS), or an applicable waypoint.
PRESS the HOLD prompt [3L].

A TMPY F-PLN is created and if applicable, the database hold is proposed.
If no database hold is available, the computed hold is proposed.

CHECK and (if necessary) MODIFY the HOLD data.
CHECK the temporary flight plan and INSERT it, if appropriate.



Ident.: DSC-22_20-30-10-15-A-00007219.0001001 / 09 FEB 11

PROCEDURE TO DELETE A HOLD (HOLD WITH MANUAL TERMINATION)

CLEAR the HOLD directly in the flight plan, as can be done for a normal waypoint.

OFFSET

Applicable to: ALL

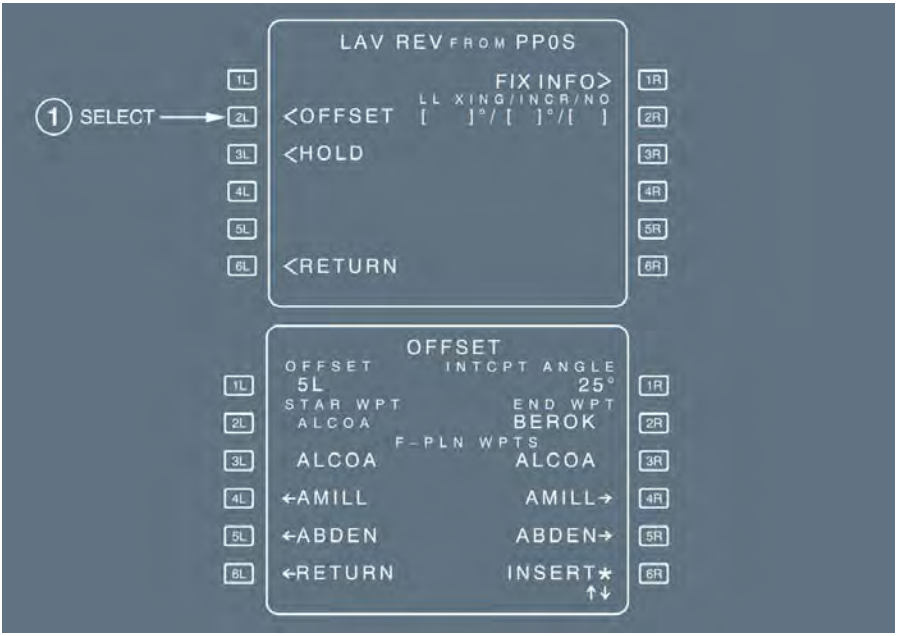
Ident.: DSC-22_20-30-10-15-B-00007230.0009001 / 14 MAY 12

GENERAL

Offset allows the flight crew to define on offset of the active flight plan. The offset can be immediate or deferred to start on a downstream leg. The offset will end by default or at a pre-planned end waypoint. Additionally, the flight crew can specify the intercept angle used for the transitions to and from the offset path.
In most cases, the pilot will use it enroute because of an ATC clearance, or to avoid bad weather expected along the flight plan route.
This page is accessed from LAT REV page at the FROM waypoint or at any waypoint downpath the flight plan, except the destination airport.
After inserting the offset in the flight plan, the flight plan page shows OFST in its title, left or right arrows are displayed on every label line between the start and end waypoints of the offset, and the navigation display shows the offset flight plan with a solid green line and the original flight plan with a dashed green line.

The offset is cleared:
- Automatically (holding pattern, approach), or
- Manually with the clear (CLR) key, or by entering “o” in the offset value field [1L] or by using the delete prompt in the OFFSET page.

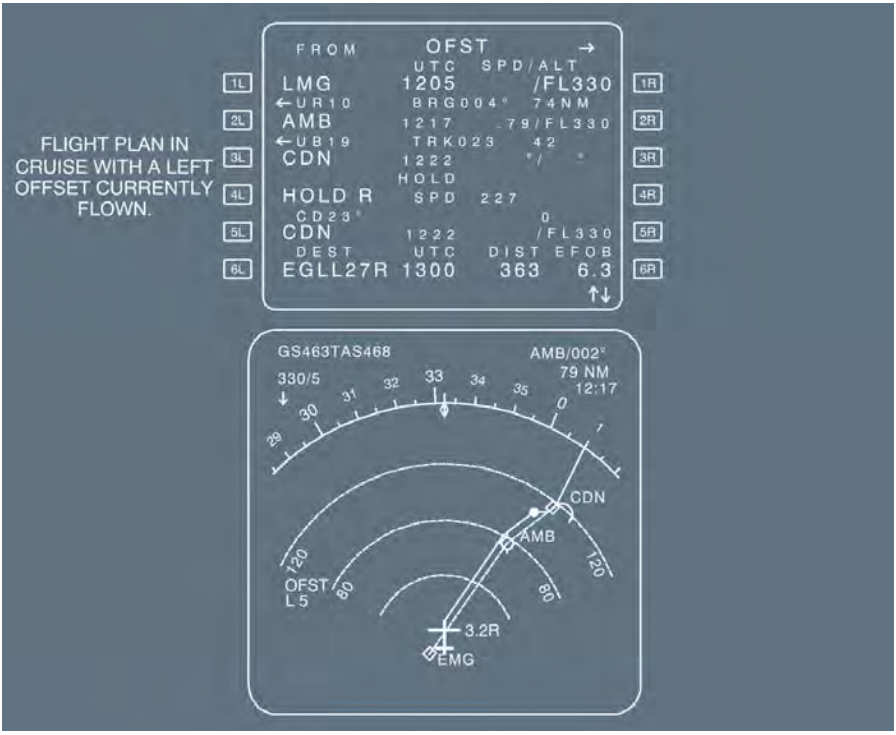
Note: If the pilot enters an OFFSET when the aircraft is too close to the TO waypoint, the FMGS may refuse to accept it, in which case the MCDU displays the “ENTRY OUT OF RANGE” message.



Ident.: DSC-22_20-30-10-15-B-00007207.0010001 / 01 OCT 12

INSERTING AN OFFSET

SELECT LAT REV page at a waypoint.
SELECT OFFSET function by pressing [2L].
WRITE the required offset value and direction (for example, L5 or 5L), and enter it into [1L] field.
CHECK or INSERT the START WPT from the list in [3L] - [5L] fields or manually enter it.
CHECK or ENTER the INTCP ANGLE in [1R] field.
CHECK OR INSERT the END WPT from the list in [3R] - [5R] fields or manually enter it.
PRESS INSERT in [6R] field to activate the OFFSET.

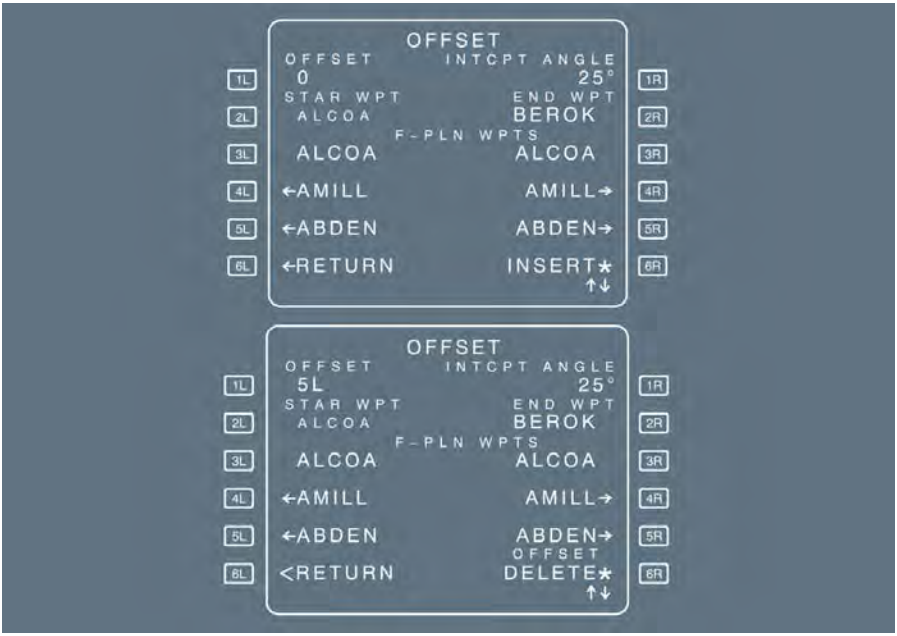


Ident.: DSC-22_20-30-10-15-B-00007218.0009001 / 14 MAY 12

MANUAL CANCELLATION OF AN OFFSET

There are two standard methods for cancelling an offset:
1. SELECT DIR TO a waypoint (the next waypoint, for example).
2. SELECT a Lateral Revision (LAT REV) at FROM WPT.

CLEAR the OFFSET field or enter “0” in the OFFSET value field [1L], and press INSERT* in [6R] to activate the temporary flight plan (cancelling OFFSET), or
PRESS the OFFSET DELETE prompt [6R] to activate the temporary flight plan (cancelling OFFSET).



ALTERNATE FUNCTION

Applicable to: ALL

Ident.: DSC-22_20-30-10-15-C-00007240.0001001 / 09 FEB 11

GENERAL

The ALTERNATE FUNCTION performs two actions:

- It reviews and defines alternate airports and inserts them into the flight plan.
- It allows a diversion to be activated through the ENABLE ALTN command.

Ident.: DSC-22_20-30-10-15-C-00007217.0009001 / 23 JUN 15

REVIEW AND SELECTION OF ALTERNATE AIRPORT

Several alternate airfields may be stored in the database and assigned to a destination. When the pilot selects a company route (CO RTE) (or a city pair), the computer strings the preferred alternate into the active flight plan.

The pilot may review the alternate airports on the ALTN page and, if the one selected is not suitable because of weather or fuel considerations, another alternate may be strung into the active flight plan.

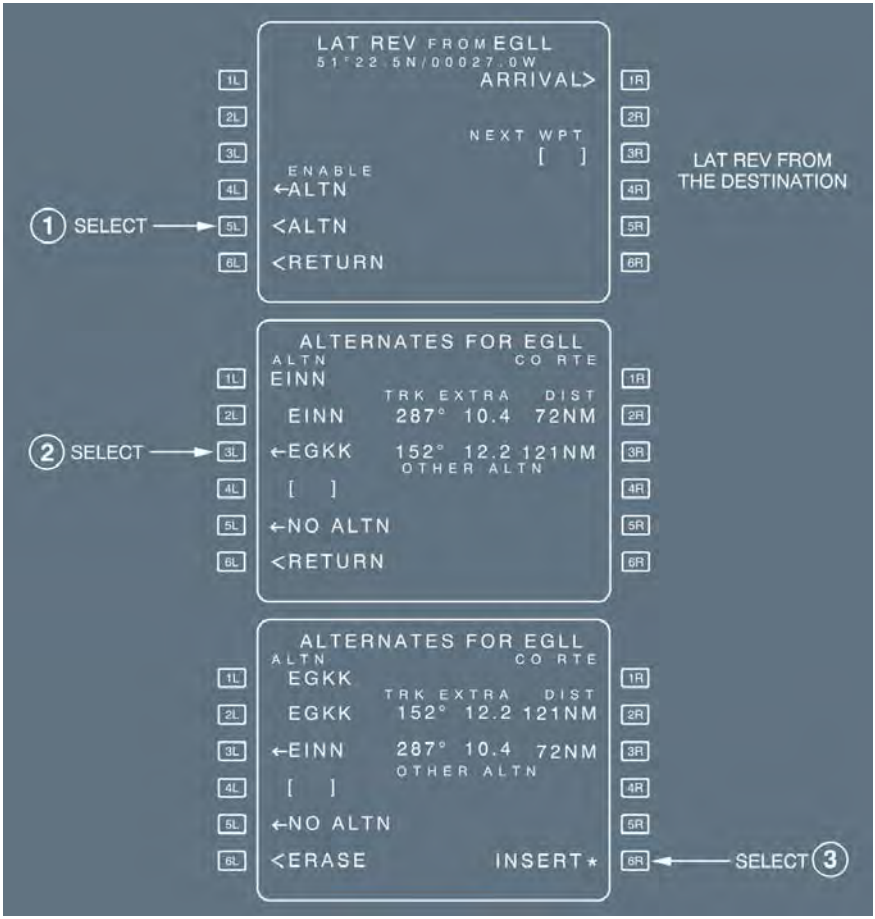
The pilot may define an additional alternate airport into the list, if necessary.
The ALTERNATE page shows the track and distance (airway or direct) between destination and alternate, as well as fuel management data (EXTRA fuel, assuming the associated airfield is the alternate airport). This data will help the pilot change the preferred alternate, if necessary.
Access the ALTERNATE page through the ALTN prompt on the LAT REV page at destination.
Alternate airfields are attached to the destination.

ENTERING NEW ALTERNATE INTO THE F-PLN

If the preferred alternate is unsuitable, proceed as follows:

SELECT F-PLN key on MCDU.
SELECT LAT REV at destination.
SELECT ALTN [5L].
SELECT an AIRFIELD IDENTIFIER.
INSERT the temporary flight plan.

Note: If weather and destination airfield conditions permit, you may select "NO ALTN". Fuel predictions will be computed without alternate fuel.



SELECTION OF ANOTHER ALTERNATE

Fuel management information for flight to another alternate airfield may be obtained by selecting the OTHER ALTN field.

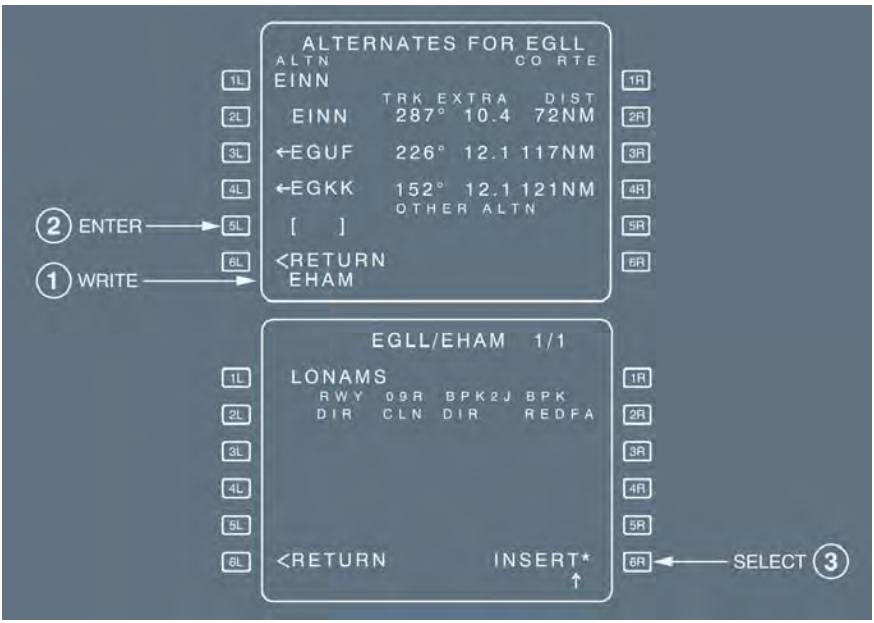
SELECT LAT REV at DESTINATION.
SELECT ALTN [5L].

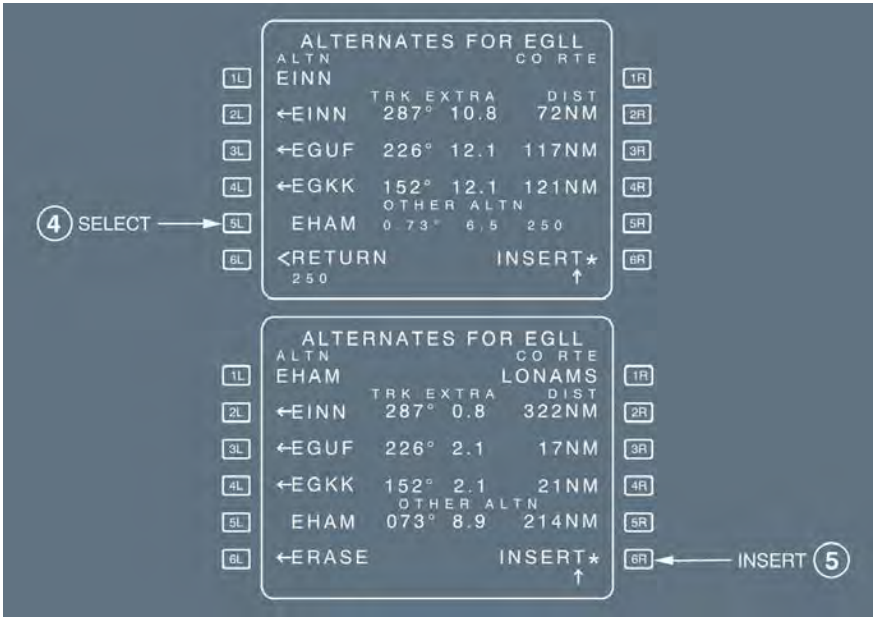
ENTER the airfield identifier in the brackets.

- *If the airfield is not in the database, the NEW RUNWAY page automatically appears.*
- *If the airfield is in the database and there is a company route (CO RTE) to it, the ROUTE SELECTION page automatically appears.*

SELECT the route, as appropriate, or RETURN to the ALTN page.
ENTER the distance in the brackets (if required). XTRA fuel and track (TRK) will appear.
SELECT the other alternate (OTHER ALTN) as a primary alternate if convenient. (EXTRA fuel and DIST revert to AIRWAY distance).
INSERT it, if you want to have it as a primary alternate.

<u>Note:</u>
- *The pilot can always overwrite the "OTHER ALTN". The new "OTHER ALTN" then replaces the previous one, which is lost.*
- *The pilot can select OTHER ALTN as a primary alternate (active flight plan), to replace any alternate on the initial list.*
- *If the pilot selects the other alternate as a primary alternate, and overwrites the OTHER ALTN field by entering a new airport, the first one will remain a primary alternate and the system will memorize a second OTHER ALTN.*





The pilot may enter a distance in the OTHER ALTN field. The system will compute the extra fuel and the track for this distance.

PREDICTED DATA FOR ALTERNATE

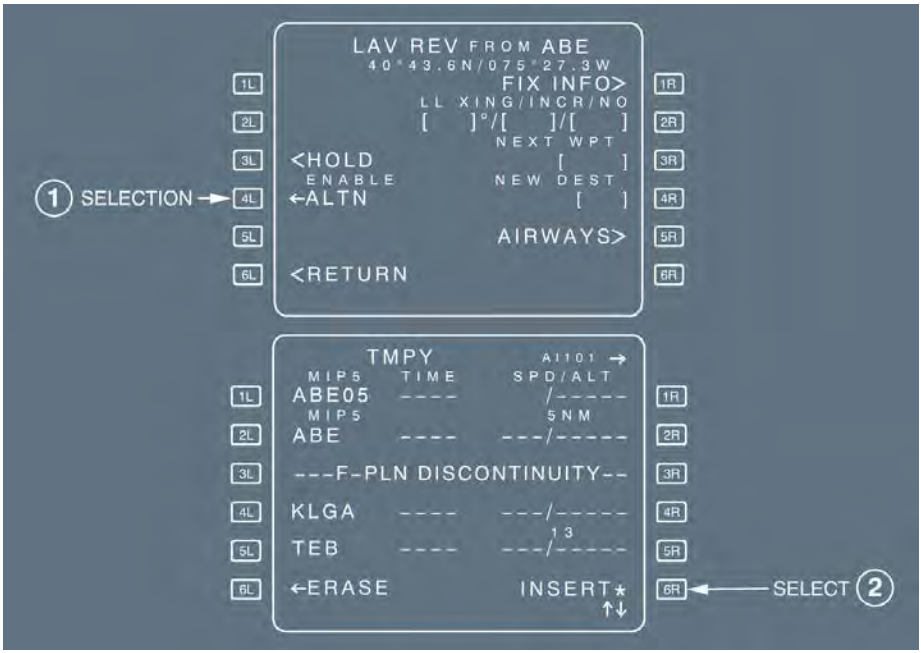
Data predictions are based on:

- Aircraft weight being equal to landing weight at primary destination.
- Flight at FL 100 if the alternate F-PLN length is less than 100 NM , at FL 220 if the alternate F-PLN length is comprised between 100 and 200 NM , or else at FL 310.
- Cost index 0.
- Constant wind (as entered in the alternate field of the DES WIND page).
- Constant delta ISA (equal to delta ISA at primary destination).
- The along flight path distance from the destination to the alternate airport. If the flight crew enters an ALTN fuel value, this value is the one taken into account.

ENABLE ALTN

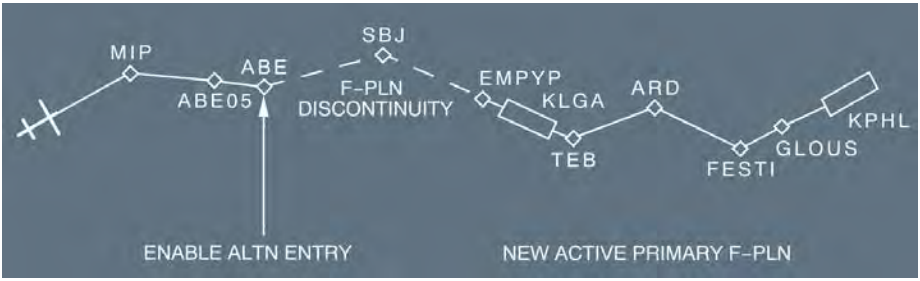
Ident.: DSC-22_20-30-10-15-00000467.0009001 / 01 OCT 12
Applicable to: ALL

This enables the pilot to initiate a diversion by entering the alternate flight plan just after the revision waypoint (with a discontinuity).
The pilot may have to adjust the resulting flight plan (use “direct to”, or add or suppress waypoints), depending on the circumstances.



TO ACTIVATE THE PRIMARY ALTN:

SELECT a LAT REV at the “TO” waypoint (or at another suitable waypoint).
PRESS the ENABLE ALTN key.
INSERT the temporary flight plan.
ENTER an appropriate waypoint in DIRECT TO and adjust the flight plan.
ADJUST the cost index on the PERF page and the defaulted cruise flight level (CRZ FL) on the PROG page, as required.



When ENABLE ALT is pressed at ABE, a flight plan discontinuity is created from ABE down to destination and the alternate route is linked to the active flight plan.

DIR KEY (DIRECT-TO-FUNCTION)

Applicable to: ALL

Ident.: DSC-22_20-30-10-15-D-00007243.0001001 / 09 FEB 11

GENERAL

The pilot uses the “Direct To” function to define a direct leg from the present position to any waypoint on the active flight plan or to any waypoint.
The designated waypoint may be entered by its identifier (if it is stored in the database) or by a latitude/longitude, place/bearing/distance, or a place-bearing/place-bearing.

Note: *If the autopilot or flight director is in the heading/track or localizer mode, the “DIR TO” function engages the NAV mode.*

Three functions are available through the DIR TO key:

- The DIR TO defines a direct leg from the present position to a specified waypoint.
  NAV mode engages simultaneously to the DIR TO selection.
  When the pilot uses DIR TO, the present position (PPOS) becomes the “FROM” waypoint and the active flight plan shows it as the T-P (turn point).
- The DIR TO/ABEAM function, defines the abeam waypoints along the direct leg. These waypoints are the projection on the direct leg of the initial F-PLN waypoints located between the aircraft position and the specified waypoint.
  NAV mode engages simultaneously to the DIR TO/ABEAM selection.
- The DIR TO/INTCPT function allows the definition of a specified RADIAL INBOUND or OUTBOUND at an inserted waypoint. The current aircraft track is used to compute the INTCPT point with the specified radial.
  NAV mode is armed simultaneously to the DIR TO/INTCPT selection.

The ND displays the DIR TO leg as a temporary flight plan leg between current aircraft position and specified waypoint. In case of a DIR TO/INTCPT, the leg is not displayed when the angle between the current aircraft track and the intercept radial exceeds 160 °.

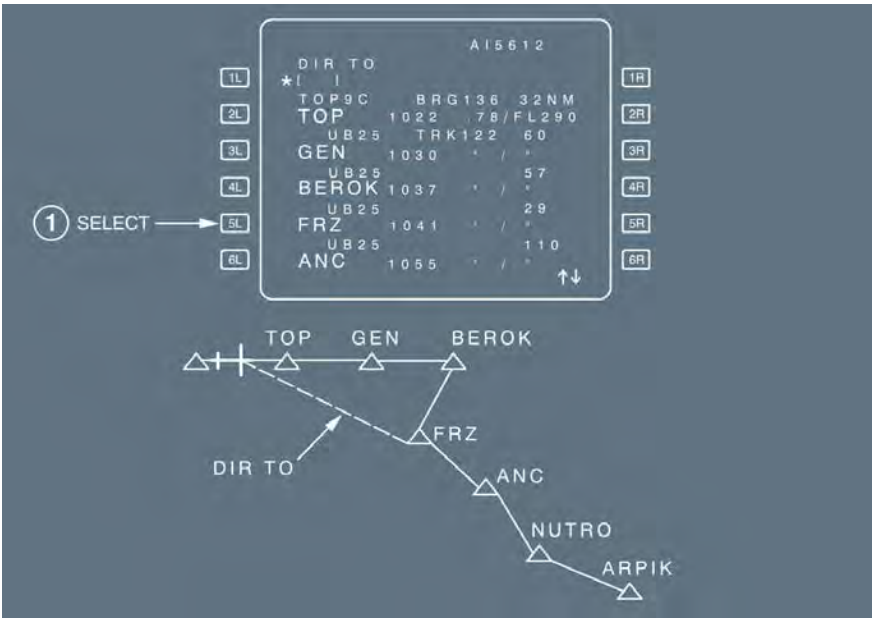
Ident.: DSC-22_20-30-10-15-D-00007216.0001001 / 14 MAY 12

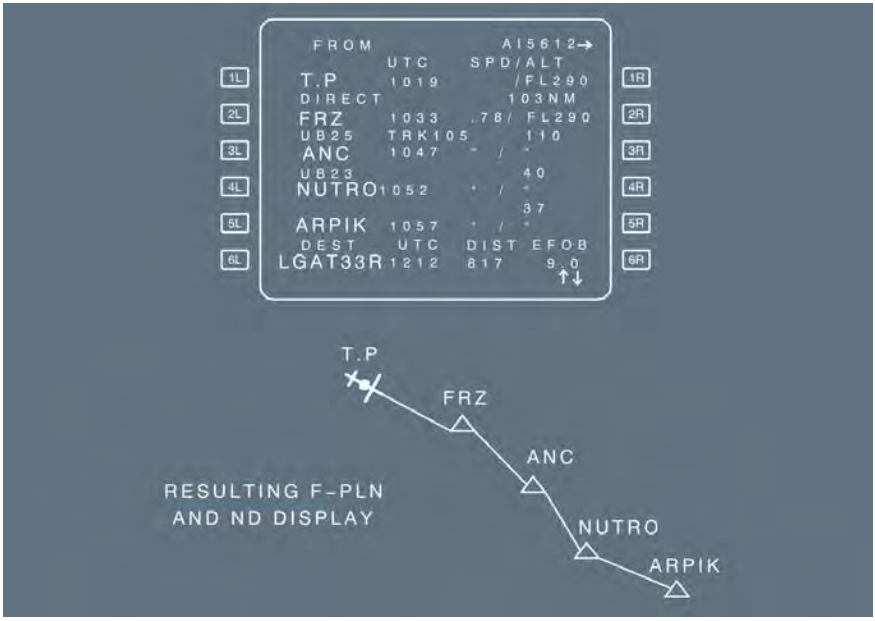
PROCEDURE FOR DIR TO WAYPOINT

CASE 1. THE "TO" WAYPOINT IS IN THE FLIGHT PLAN

Example : DIR TO FRZ

PRESS the DIR key on the MCDU.
PRESS the line select key next to "FRZ".

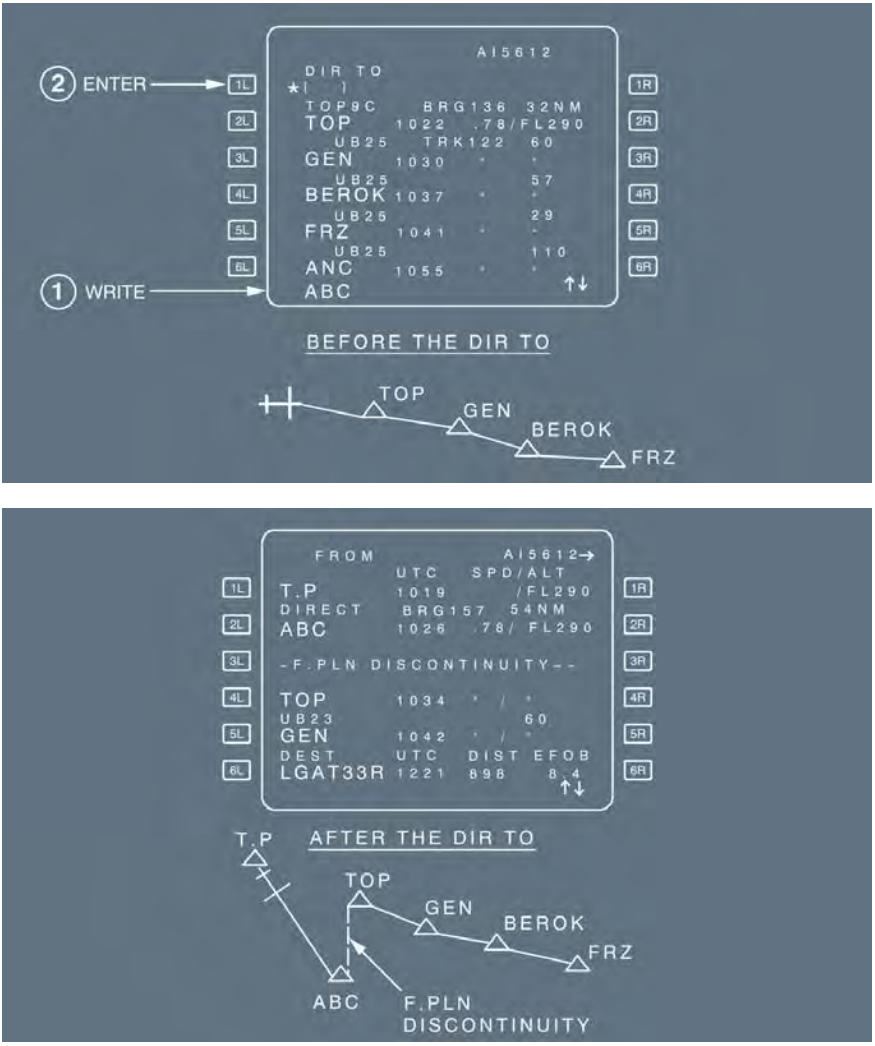




CASE 2. THE "TO" WAYPOINT DOES NOT BELONG TO THE FLIGHT PLAN

Example : Direct to ABC (ABC being an ident, LL or PBD or PBX (Place/Bearing-Place/Bearing)

PRESS the DIR key.
WRITE the waypoint identifier (e.g. ABC) into the scratchpad.
PRESS [1 L] to enter "ABC" in the "DIR TO" field.



Clear the discontinuity and the waypoints that are not included in the new flight plan.

PARTICULAR CASES FOR USE OF DIR TO

- If the pilot is flying a manual leg (part of a SID or STAR), the flight plan page displays “F-PLN DISCONTINUITY”, preceded by “MANUAL” (see below).
  These legs are specific heading or track legs flown with no defined end waypoint.

- When the pilot encounters a flight plan discontinuity, or if a major reset occurs, the flight plan page displays “PPOS - F-PLAN DISCONTINUITY”, and the pilot looses managed guidance in both the lateral and vertical plans.
  The autopilot or flight director reverts to the basic HDG V/S (or TRK FPA) modes. Predictions remain available and are based on the assumption that the aircraft will fly a direct leg from its present position to the next waypoint.

- **In both of these cases, the only way to get back to a standard flight plan is to perform a “DIR TO” to a designated waypoint.**
- Following a DIR TO, the message “MAP PARTLY DISPLAYED” may appear on the NDs, if the new flight plan includes a very long leg (*Refer to DSC-31-45 Flags and Messages Displayed on ND*). When this message comes up, enter an intermediate waypoint to shorten the leg.

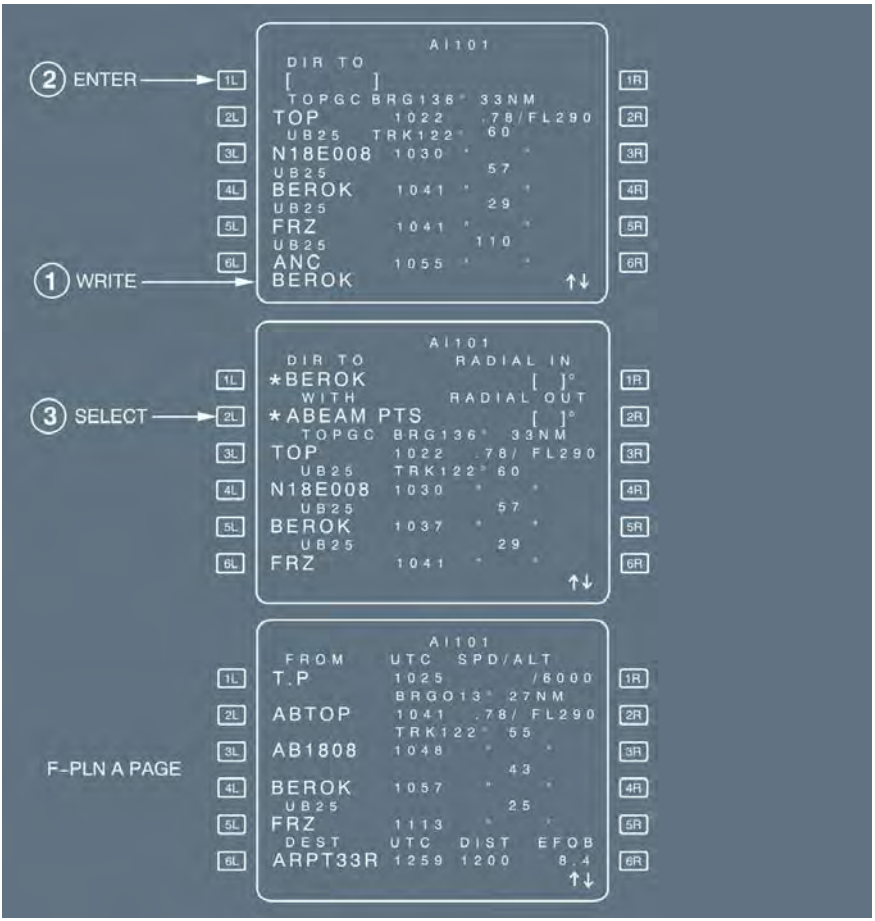
Note: *During cruise, the DIR TO function is not available as long as uplink wind data, received through ACARS , is not inserted or cancelled on the CRUISE WIND page.*

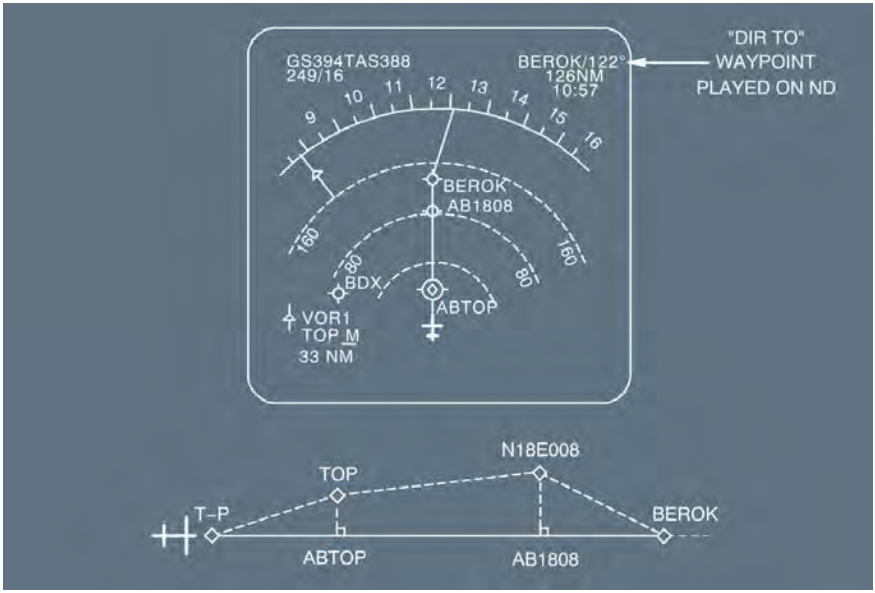
PROCEDURE FOR DIR TO/ABEAM

Example : DIR TO/ABEAM BEROK

PRESS the DIR on the MCDU.
WRITE the waypoint identifier into the scratchpad (Example : BEROK).
PRESS [1 L] to enter the waypoint in the DIR TO field.
SELECT the ABEAM PTS function.

The display reverts to F-PLN A page.





Note: *1. If, between two waypoints projected on the direct leg, there was a discontinuity in the original flight plan, this discontinuity disappears between the corresponding abeam points on the direct leg.*

2. . Abeam waypoints computed from latitude/longitude-type waypoints are renamed by the system as "AB XXXXX", where "xxxxx" is an abbreviation in 5 characters, of the latitude and longitude of the initial waypoints.

Ident.: DSC-22_20-30-10-15-D-00007221.0001001 / 14 MAY 12

PROCEDURE FOR DIR TO/INTERCEPT

PRESS the DIR key.
WRITE the waypoint identifier into the scratchpad.
PRESS [1L] to enter the waypoint in the DIR TO field.

In the [1R] and [2R] fields, the MCDU displays the functions radial inbound and radial outbound from the waypoint.
If the waypoint belongs to the flight plan, the system displays the flight plan track as the default inbound radial. The crew can modify it.

WRITE the required in or out radial into the scratchpad.
PRESS [1R] or [2R] to enter the radial in the required field.

The ND displays the entered radial as an amber dotted line : The pilot can still modify it.

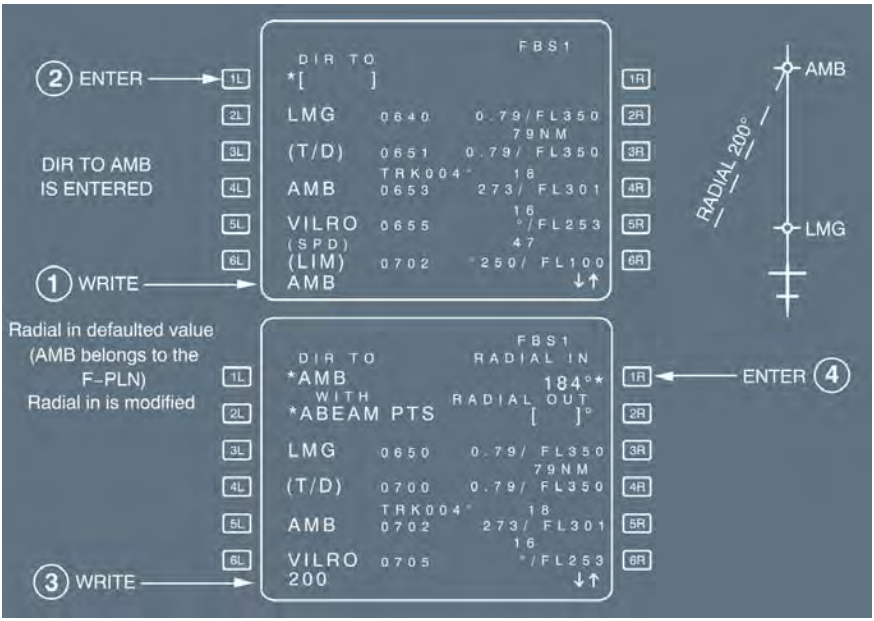
PRESS [1R] or [2R] to confirm the DIR TO/INTERCEPT selection.

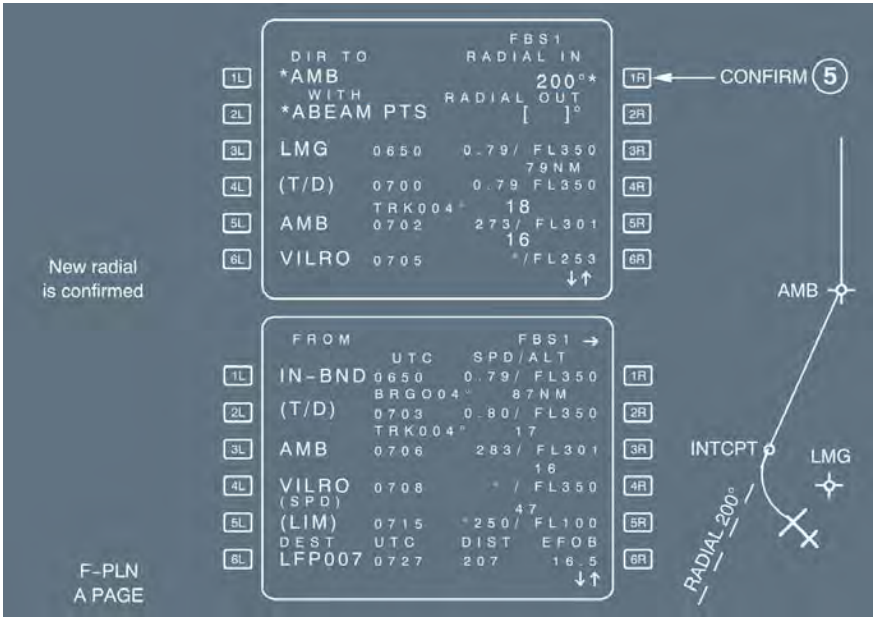
The display reverts to the F-PLN A page, the system arms the NAV mode, and engages the HDG mode. The FROM waypoint is the aircraft position at the time of the DIR TO/INTERCEPT selection. The MCDU indicates it as INBND or OUTBND.

Note:
1. *If the waypoint does not belong to the flight plan, the system strings the DIR TO/INTERCEPT leg to this waypoint, and inserts a discontinuity following the waypoint.*
2. *A DIR TO/INTERCEPT cancels any active offset.*
3. *If the current AP/FD lateral mode is HDG or TRK, NAV becomes armed.*
   If the NAV mode was engaged, NAV becomes armed. FCU HDG or TRK must be used to guide the aircraft.
   The ND displays an intercept point, if the intercept angle is less than 120 °. The system constantly updates it to reflect the current aircraft track and position with respect to the intercept radial. The NAV mode engages when reaching the intercept point.

EXAMPLE: RADIAL INBND

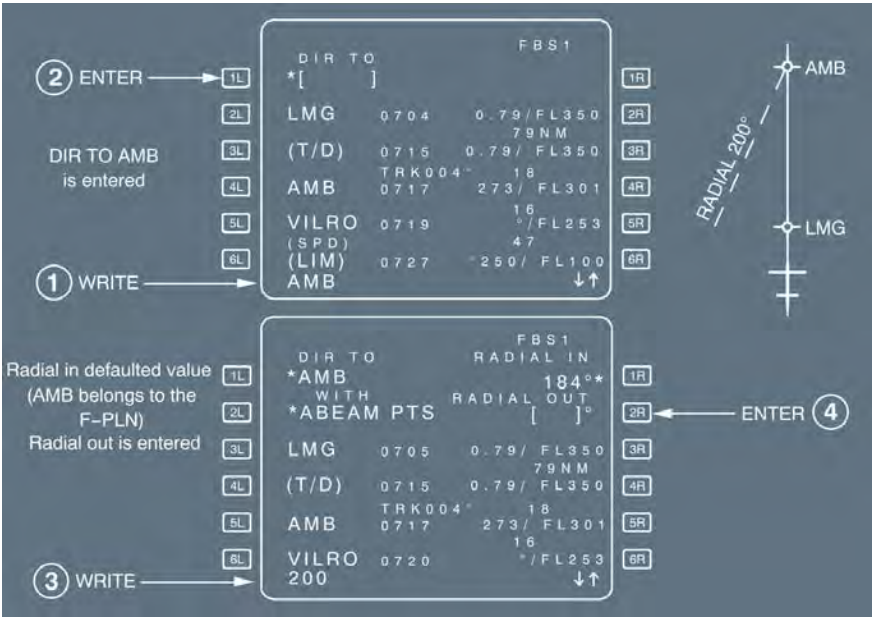
DIR TO AMB - RADIAL 200 ° INBOUND

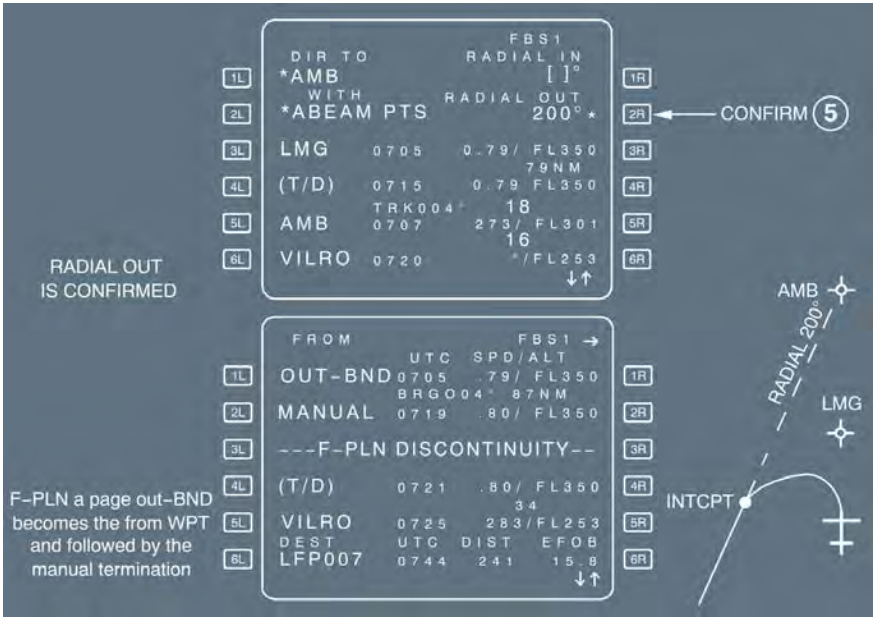




EXAMPLE: RADIAL OUTBND

DIR TO AMB - RADIAL 200 ° OUTBOUND


2 ENTER
DIR TO AMB
is entered
1 WRITE
FBS1
DIR TO
*[ ]
LMG 0704 0.79/FL350
79NM
(T/D) 0715 0.79/ FL350
TRK004° 18
AMB 0717 273/ FL301
16
VILRO 0719 °/FL253
(SPD) 47
(LIM) 0727 °250/ FL100
AMB
AMB
RADIAL 200°
LMG
Radial in defaulted value
(AMB belongs to the
F-PLN)
Radial out is entered
3 WRITE
FBS1
DIR TO
*AMB
WITH
*ABEAM PTS
RADIAL IN
184°*
RADIAL OUT
[ ]°
ENTER 4
LMG 0705 0.79/ FL350
79NM
(T/D) 0715 0.79/ FL350
TRK004° 18
AMB 0717 273/ FL301
16
VILRO 0720 °/FL253
200



OVFY (OVERFLY) KEY

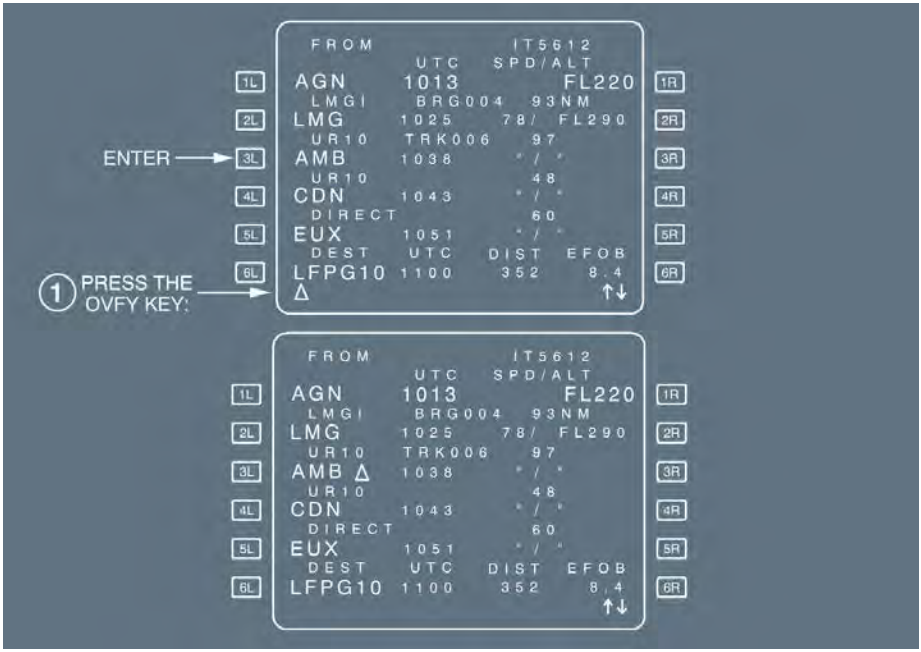
Ident.: DSC-22_20-30-10-15-00000469.0001001 / 01 OCT 12
Applicable to: ALL

The overfly key programs the Flight Management Guidance Computer to fly over a specific waypoint or NAVAID. To use it:

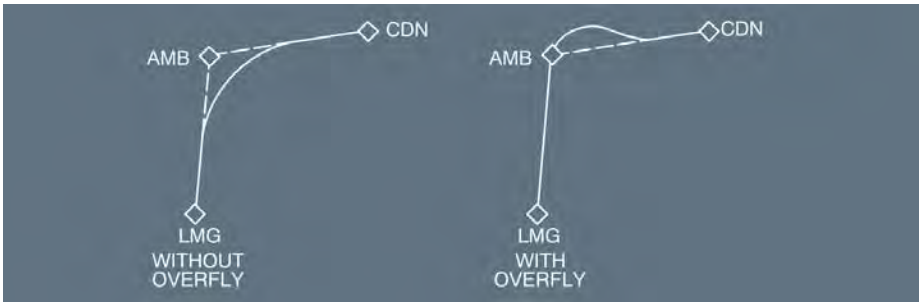
PRESS the “OVFY” key.

A “Δ” appears in the scratchpad.

INSERT it by pressing the key adjacent to the waypoint to be overflown. [3L] in this example.



The pilot cannot cancel the overfly program. If you do not want to fly over the point you have entered, use DIR TO (direct to) the next waypoint or engage the heading mode, whichever is more suitable.

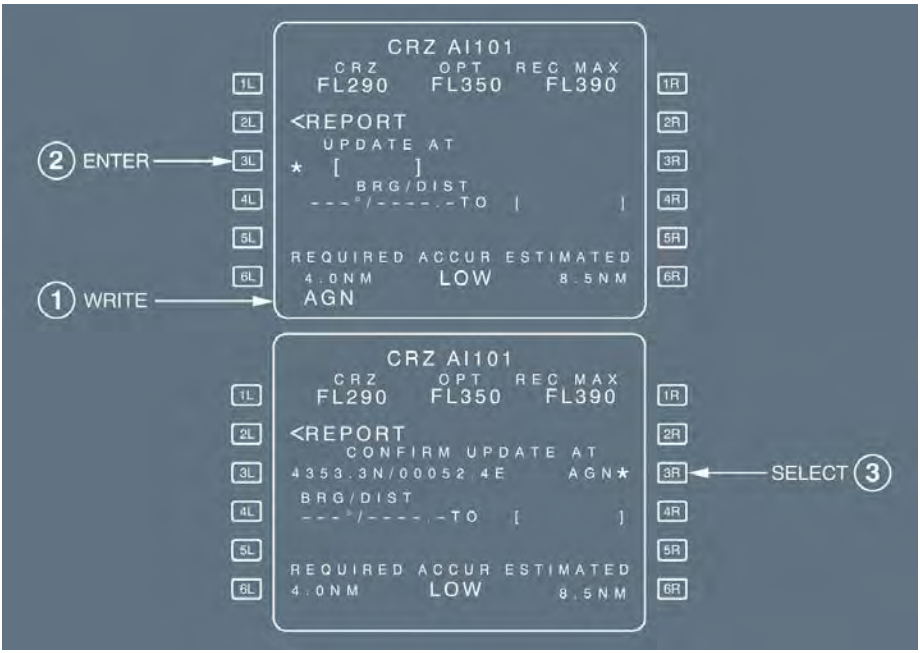


The overfly function allows you to fly over a specific waypoint, and return the aircraft to the great circle track.

"UPDATE AT"

Ident.: DSC-22_20-30-10-15-00000470.0001001 / 01 OCT 12
Applicable to: ALL

To manually change the position computed by the FMGC (FM position and bias), the pilot uses "UPDATE AT" on the progress page.
Use this facility with extreme caution: It is apt to be inaccurate, because it relies on the pilot's estimation of when a designated position has been reached.



WRITE the ident for the NAVAID (or waypoint or airport), or the coordinates, or the PBD or PBX (Place/Bearing-Place/Bearing) at which the update is intended.
PRESS [3L] to enter the ident in the "UPDATE AT" field. The coordinates of the point, along with its identifier (or "ENTRY", if the identifier is not in the database), appear in that field.
PRESS [3R] to activate the update, when you estimate that you are at the position.

Note: The system reinitializes the Estimated Position Error computation when a position update is performed. This may lead to the appearance of a "NAV ACCUR DOWNGRAD" or "NAV ACCUR UPGRAD" message.

If the “UPDATE AT” does not properly take effect, it corrupts the FM position.

- In an area with good radio NAVAID coverage:
  - If the update error is small, subsequent radio position updating will correct the FM position.
  - If the update error is large, the system will reject any radio updating because its internal “reasonableness test” will reject the various NAVAIDs. Thus, the FM position will only be the MIX IRS position corrected by the position bias, determined at the time of the update, and the error will be maintained.
- In an area without proper NAVAID coverage, radio position updating will not be available and the FM position, if incorrect, will remain incorrect until a new manual update is performed.
- Therefore, the pilot should only use “UPDATE AT” in case of a major position problem, such as:
  - On the ground, no flight plan appears on the navigation display and ARC/ROSE NAV mode is selected.
  - A “CHECK IRS/FM POSITION” message appears on the MCDU.
  - A “FM/IR POSITION DISAGREE” message appears on the ECAM.

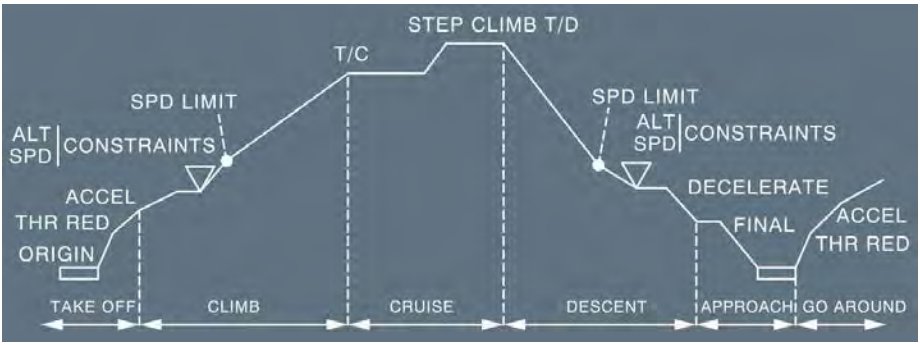
When GPS PRIMARY is operative, the FM position will always converge towards the GPS position at a rate depending on the aircraft altitude. Therefore, when GPS PRIMARY is operative, an inaccurate “update at” will have a temporary effect on the FM position.

General

GENERAL

Ident.: DSC-22_20-30-20-05-00010939.0001001 / 01 OCT 12
Applicable to: ALL

The vertical flight plan is divided into the following flight phases:
Preflight - Takeoff - Climb - Cruise - Descent - Approach - Go-Around - Done.
All but “Preflight” and “Done” phases are associated with speed and altitude profiles.



Each phase has an assigned profile of target speeds. For each phase the FMGS computes an optimum (ECON) speed as a function of the strategic parameters (CI, CRZ FL, ZFW, ZFWCG, block FUEL) and performance criteria.
ECON speed is the basis of the managed speed profile.

The ECON speed can be modified by:
- Presetting a speed or Mach number on the MCDU (PERF page) for the next phase
- Selecting on the FCU a speed or a Mach number for the active phase
- Inserting speed constraints or speed limits on the MCDU vertical revision (VERT REV) page.

The vertical flight plan includes vertical constraints (altitude, speed, time) that may be stored in the data base or entered manually by the flight crew through vertical revision pages.
The flight crew may also define step climbs or step descents for cruise purposes. If the flight crew plans to climb to a higher flight level or descend to a lower level, they can use a vertical revision at any waypoint to insert the new level.
When all the vertical data has been defined, the FMGC computes the vertical profile and the managed speed/Mach profile from takeoff to landing.

VERTICAL FLIGHT PLANNING

Ident.: DSC-22_20-30-20-05-00011065.0002001 / 17 AUG 10
Applicable to: ALL

DATA ENTRY

The vertical flight plan provides the FMGS with all the data required to calculate performance and predictions. This data is either entered by the flight crew or calculated by the FMS.

There are three categories of data:

- Strategic data, that applies to the overall flight profile:
  - Cost Index (CI)
  - Cruise Flight Level (CRZ FL) and STEP ALTS if any
  - Zero-Fuel Weight (ZFW)
  - Zero-Fuel Weight Center of Gravity (ZFWCG)
  - Block Fuel.
- Weather data:
  - Winds (for climb, cruise, descent, approach)
  - Sea level atmospheric pressure (QNH) at destination
  - Surface temperature (TEMP) at destination
  - Temperature in cruise phase
  - The Tropopause altitude (TROPO).
- Tactical data for the flight phases:
  - Phase switching conditions:
    - Setting of the thrust levers to TOGA or FLEX positions
    - Reaching acceleration altitude (ACCEL ALT)
    - Entering cruise (T/C)
    - Initiation of descent (T/D)
    - Passing a deceleration pseudo waypoint (DECEL PSEUDO WPT)
    - Touchdown.
  - Speed profile:
    - V2
    - Economy climb speed or Mach (ECON CLB SPD/MACH)
    - Preselected speed or Mach (SPD/MACH PRESELECTION)
    - Economy cruise Mach (ECON CRZ MACH)
    - Constant Mach
    - Economy descent Mach or speed (ECON DES MACH/SPD)
    - Approach speed (VAPP).
  - Vertical limitations:
    - Speed limits (SPD LIMIT)
    - Speed and altitude constraints (SPD AND ALT CSTR)
    - Time constraints or Required Time of Arrival (RTA).

In addition to the data entered by the flight crew, the FMS uses some real flight data parameters (CRZ SAT, actual wind) to improve the accuracy of the computed predictions.

FLIGHT PHASES

Ident.: DSC-22_20-30-20-05-00011024.0007001 / 22 MAR 16
Applicable to: ALL

The vertical flight plan is divided into flight phases. For each phase, the FMGS computes the optimum speed or Mach Profile. These flight phases are:
Preflight - Takeoff - Climb - Cruise - Descent - Approach - Go-Around - Done.

FLIGHT PHASES	OPTIMUM SPEED PROFILE	SWITCHING CONDITIONS TO NEXT PHASE
PREFLIGHT	/	SRS takeoff mode engaged and N1 > 85 %(EPR ≥ 1.25) or Ground Speed >90 kt
TAKEOFF	V2 (V2 + 10)	At acceleration altitude or by engagement of another vertical mode.
CLIMB	ECON CLB SPD / MACH	Reaching cruise FL
CRUISE	ECON CRZ MACH	No step descent, and distance to destination < 200 NM, or all engines operative and selected altitude below Max [FL 200, highest DES ALT CSTR]
DESCENT	ECON DES MACH / SPD	- Overflying (DECEL) pseudo waypoint with NAV (or LOC*/LOC) mode engaged and altitude <9 500 ft AGL - Manual activation of the approach phase.
APPROACH	VAPP (GS Min)	1. To Go-Around: When thrust levers at TOGA detent, or 2. To Done: 30 s after landing, or 3. To Climb: When inserting a new CRZ FL.
GO-AROUND	VAPP or current SPD, whichever is greater. Green Dot at ACC ALT	1. To Approach: Manual activation of the approach phase, or 2. To Climb: Above acceleration altitude, modification of the destination airport by: - Selection of the ALTN, or - Insertion of a NEW DEST, or - Insertion of a SEC F-PLN with a destination airport different from the destination airport of the active F-PLN.
DONE	/	To preflight: When INIT or PERF key depressed.

Note: *During the preflight phase, the flight crew inserts the flight plan, which includes all data needed for the flight.*
During the Done phase, the FMGC erases the data entered for the flight. If the descent or the approach phase is inadvertently activated (manual approach phase activation, for example), the flight crew may reselect a CRZ FL on the PROG page to reactivate the CRZ phase.

VERTICAL REVISION

Ident.: DSC-22_20-30-20-05-00011025.0002001 / 17 AUG 10
Applicable to: ALL

The flight crew uses vertical revisions to enter or modify:
- The speed limit in the climb and descent phases
- An altitude or speed constraint at the revised waypoint
- A step climb or a step descent
- New wind data
- A time constraint.

The vertical revision page is accessed by pressing a right hand select key of the flight plan page.

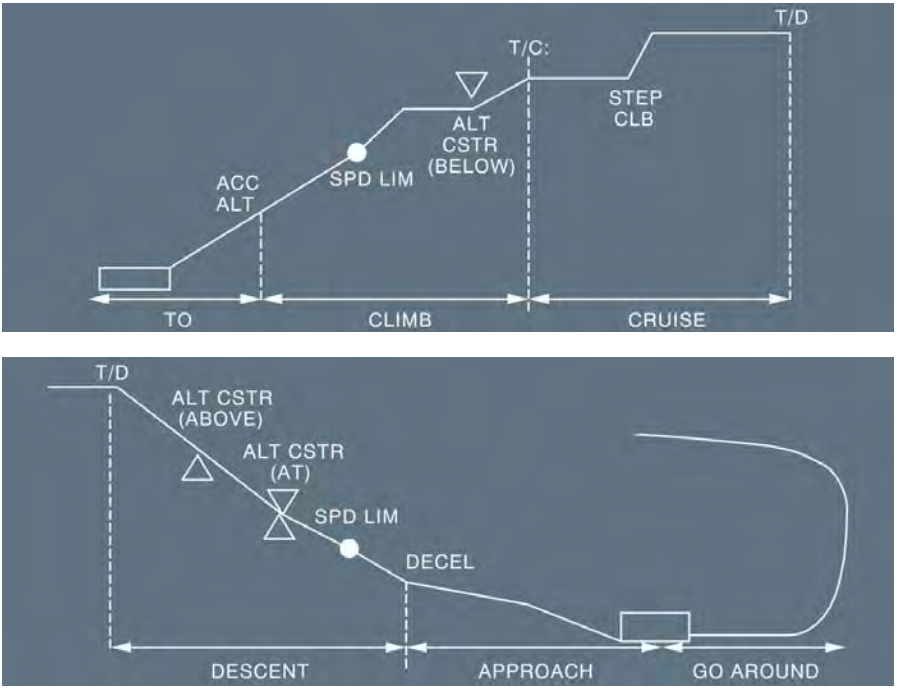
VERTICAL CONSTRAINTS (SPEED, ALTITUDE, TIME)

Ident.: DSC-22_20-30-20-05-00012689.0005001 / 18 FEB 15
Applicable to: ALL

The flight crew enters speed, altitude and time constraint, either to comply with ATC requests and specified procedures, or at the discretion of the flight crew, in response to operational variables.

SPEED LIMIT

A speed limit is associated with altitude as a maximum speed below a specified altitude (only one in climb and one in descent).



ALTITUDE CONSTRAINT

Altitude constraints may be attached to specific waypoints in the climb, descent, or approach phases.
To meet the altitude constraint, the aircraft must fly over the waypoint at an altitude equal, above or below the altitude constraint as specified by the flight crew or the database.

Note: *The database may contain an altitude constraint window (two altitudes between which the aircraft must fly passing over a given waypoint), but the flight crew cannot enter such a constraint manually.*

An altitude constraint is considered as missed if the system predicts more than 250 ft of difference between the constraint value and the predicted aircraft altitude.
Altitude constraints are observed in CLB or DES or APP NAV-FINAL modes.

The FMS automatically deletes from the F-PLN:

- The altitude constraints ("AT", "AT OR ABOVE", or "AT OR BELOW") with values greater than the CRZ FL
- The altitude constraint windows with the upper constraint greater than the CRZ FL.

The MCDU and the ND no longer display the deleted altitude constraints. These altitude constraints are no longer used for the computation of the FMS climb and descent profile.
In that case, the scratchpad of the MCDU displays the "CSTR DEL ABOVE CRZ FL" message.
The FMS does not delete the altitude constraints at the CRZ FL. The FMS computes the T/D, in order to respect these altitude constraints. However these altitude constraints are not used for guidance. If the flight crew initiates the descent before reaching the T/D, the aircraft descents below the altitude constraints, and the altitude constraints are missed (amber on the MCDU and on the ND).

SPEED CONSTRAINT

Speed constraints may be attached to specific waypoints in the climb, descent or approach phases. To meet the speed constraint, the aircraft must fly over the waypoint with a speed equal or less than the speed constraint.
A speed constraint is considered as missed if the system predicts an aircraft speed 10 kt greater than the speed constraint.
Speed constraints are observed when NAV mode is engaged and speed target is managed. Otherwise speed constraints are disregarded.

TIME CONSTRAINT

Time constraint may be attached to any waypoint except the "from" waypoint.

Note: *No constraint can be associated with go-around waypoints.*

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FMS2 Honeywell

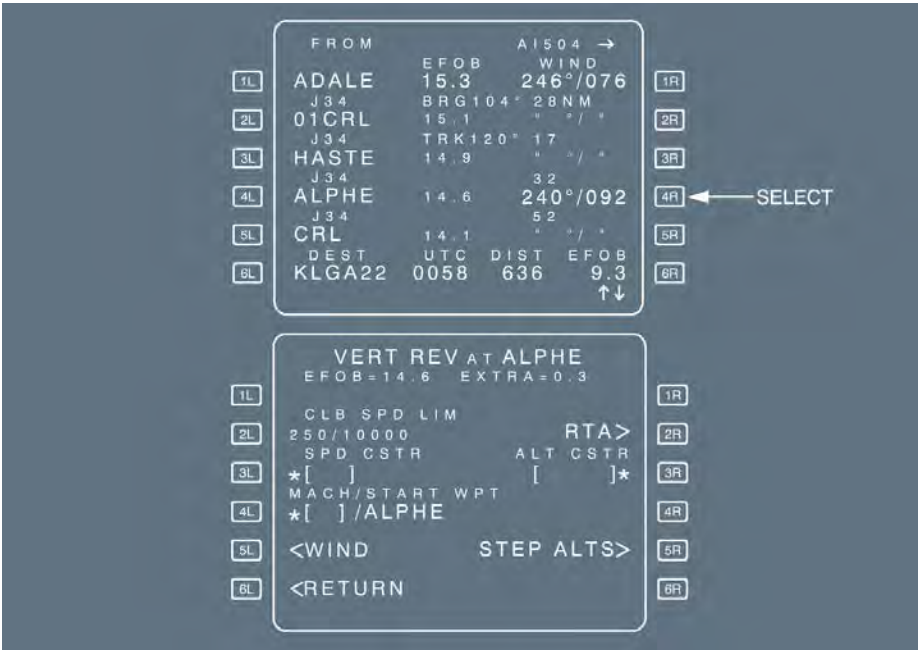
GENERAL

Ident.: DSC-22_20-30-20-25-00009323.0008001 / 14 MAY 12
Applicable to: ALL

The vertical revision function allows the pilot to modify the following parts of the flight plan:

- Speed limit
- Speed and altitude constraints
- Time constraints
- Wind
- Step climb or step descent
- Constant Mach Segment

The pilot selects these functions by pressing the right key on flight plan A or B.



Note: This vertical functions section only describes the following three functions: Wind and time constraints, and Constant Mach Segment.
For other vertical revision functions: Refer to the Systems Related Procedures section.

REQUIRED TIME OF ARRIVAL (RTA)

Applicable to: ALL

Ident.: DSC-22_20-30-20-25-A-00009324.0001001 / 24 JAN 11

GENERAL

A Required Time of Arrival (RTA) is a time requirement to be met over a specified waypoint of the lateral flight plan, including destination but excluding the origin and FROM waypoints. When the predictions are available, the time constraint value is replaced by the predicted time at the related waypoint, highlighted by a star (*):

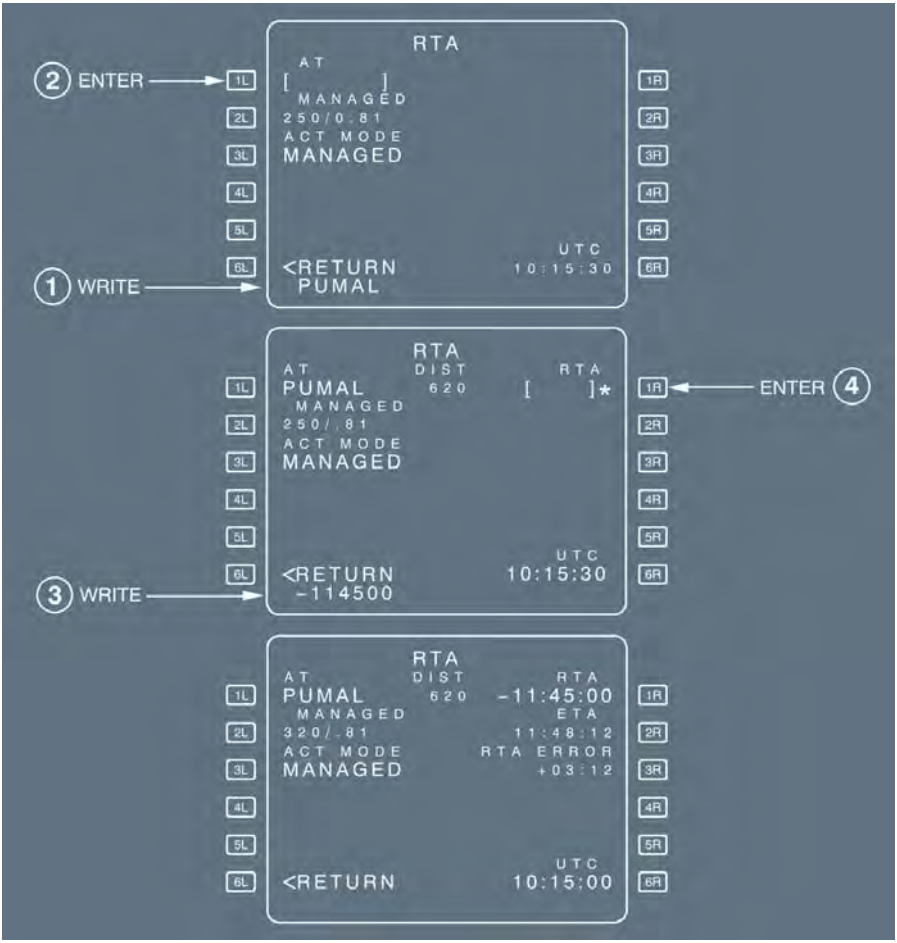
- If the RTA is predicted as matched, the star (*) is in magenta.
- If the RTA is predicted as missed, the star (*) is in amber.

No specific symbol is provided on the ND.
A time constraint is cleared in the same way as any other constraints. If a time constraint is automatically deleted. The MCDU displays an “RTA DELETED” message.

Ident.: DSC-22_20-30-20-25-A-00000489.0008001 / 14 MAY 12

ENTERING A REQUIRED TIME OF ARRIVAL

SELECT the F-PLN key on the MCDU.
SELECT a VERT REV at the revised waypoint.
SELECT the RTA prompt (2R).
CHECK, ENTER or MODIFY the identifier of the waypoint at which the time constraint is to be defined in the [1L] field.



WRITE the required time of arrival.

The format is +/- HHMMSS (entry of seconds is not mandatory).

ENTER it in the 1R field.

CHECK the 2R and 3R fields to determine whether the entered constraint can be met.

WIND - TEMPERATURE - QNH

Ident.: DSC-22_20-30-20-25-B-00000490.0001001 / 24 JAN 11
Applicable to: ALL

GENERAL

In order to receive the best predictions, the pilot must enter wind and temperature values for the different phases and for the various waypoints of the cruise phase.
The system uses the temperature value at a given altitude, associated with the tropopause entered on the INIT A page, to optimize the temperature profile.

Ident.: DSC-22_20-30-20-25-B-00009327.0001001 / 24 JAN 11
Applicable to: ALL

ENTERING THE TRIP WIND AND TEMPERATURE DURING F-PLN INITIALIZATION

The trip wind is a mean wind component for the entire flight from origin to destination. The pilot can enter it on the INIT B page prior to engine start. It is usually defined by the airline's flight operations on the computerized flight plan.
The FMGS does not consider the trip wind for alternate predictions.
The trip wind is used as long as no winds are entered in the CLB, CRZ, and DES WIND pages. When the pilot enters a CLB, CRZ or DES WIND, the FMGS disregards the trip wind.

PRESS the INIT key.
INSERT the temperature at cruise FL.
On the INIT B page, INSERT the TRIP WIND.
The trip wind is defined as a headwind component (HDXX, XXHD or –XX), or as a tailwind (TLXX, XXTL or +XX).
The FMGS uses the trip wind to compute preliminary performance, time and fuel predictions.
CHECK the predictions on the F-PLN B page.

Ident.: DSC-22_20-30-20-25-B-00009328.0008001 / 01 OCT 12
Applicable to: ALL

ENTERING THE WIND AND TEMPERATURE DURING F-PLN INITIALIZATION

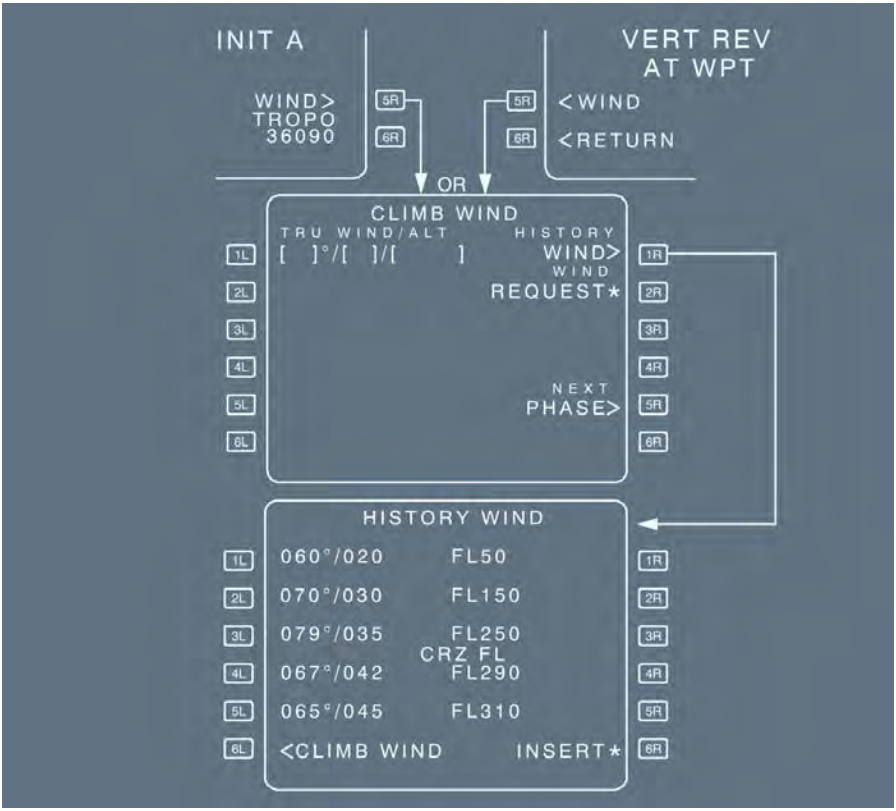
When completing the INIT A page, and once the wind and cruise FL temperature forecasts are available, the pilot may enter them, if significantly different, by pressing the wind prompt.
The pilot will access the different wind pages by using the NEXT PHASE and PREV PHASE prompts. He will slew the CRZ WIND page to access the various cruise wind waypoints.

The pilot will enter wind data as follows:

- For climb phase: By inserting either the HISTORY WIND data (as recorded during the last descent), or by inserting winds (at up to 5 altitudes) on the CLIMB WIND page.
- For cruise phase: By inserting winds (at up to 4 FL) at various CRZ waypoints on the CRZ WIND pages. The 4 levels are the same for all the cruise waypoints. The pilot may enter the temperature of each waypoint and at destination on this page.
- For descent phase: By inserting winds (at up to 5 FL/altitudes) on the DES WIND page.
- For the ALTN F-PLN, an average wind may be entered on the DES WIND page for alternate cruise flight level.

Note: *Wind can be automatically received (and inserted) through the ACARS system (Refer to DSC-22_20-70 Wind Data - Request for Wind Data).*

Once a CLIMB, CRZ, or DESCENT WIND is entered, the system ignores the TRIP WIND.
Once temperature and winds are inserted, the FMGS computes the ISA profile, and the F-PLN B page displays the forecast wind profile (by linear interpolation and propagation).



WIND ENTRY RULES

When a wind entry is performed from an empty field, direction/velocity/altitude (or flight level) must be entered simultaneously. One entry in each bracket.
Overwriting a wind cancels the previous one.
Entered wind data can be cleared: The field reverts to brackets.
Propagated wind cannot be cleared.
Entering a new altitude, over an existing altitude, replaces that existing altitude at all cruise waypoints. Any winds entered at the overwritten altitude are lost at all cruise waypoints.

ENTERING THE HISTORY WIND (F-PLN INITIALIZATION)

The pilot may insert the history wind, but cannot modify this page.

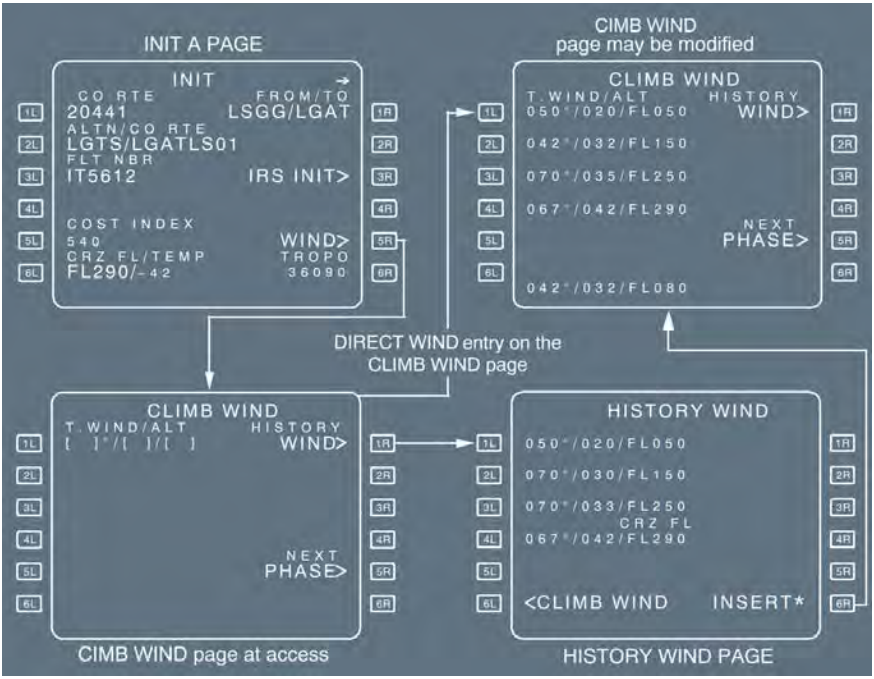
If convenient, PRESS the (6R) prompt to insert. After insertion, the [6R] prompt is suppressed, but the page still displays the wind values for information.

ENTERING THE CLIMB WIND (F-PLN INITIALIZATION)

If history winds are not convenient:

SELECT CLIMB WIND page from INIT A page or VERT REV page.
WRITE new winds into the scratchpad and ENTER.

Winds entered on the CLIMB, CRZ, and DESCENT WIND pages are always true north referenced.
Tower wind, entered on PERF APPR page is magnetic-referenced.
The pilot can enter “GRND” in the altitude field for wind at destination.
CLIMB WIND cannot be modified when the climb phase is active.
At climb phase transition, wind data switches from blue to green, and any attempted modification will trigger the “NOT ALLOWED” message.
The system extrapolates the highest wind entry to all higher levels.
The system interpolates winds between 2 entered levels.



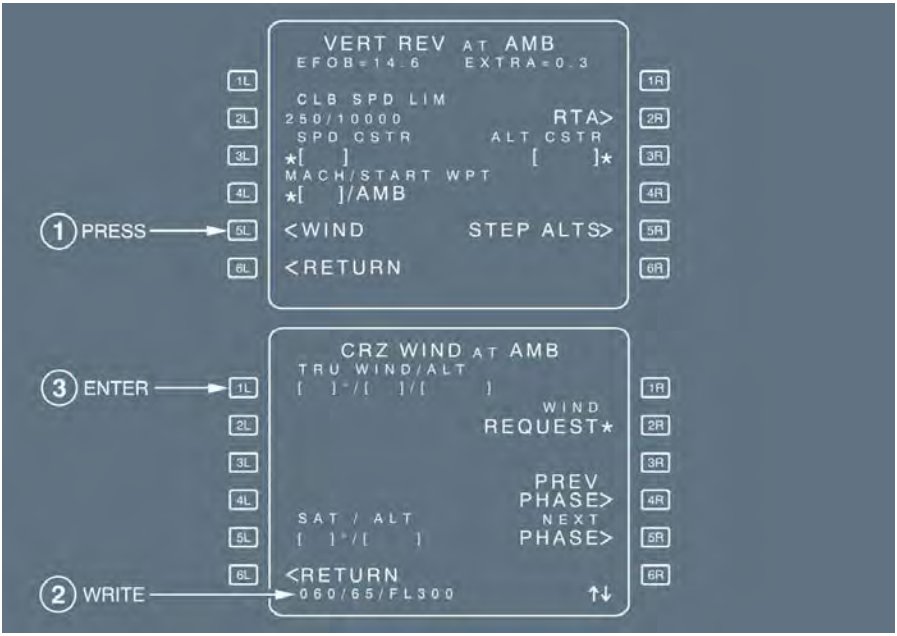
Ident.: DSC-22_20-30-20-25-B-00009329.0001001 / 14 MAY 12
Applicable to: ALL

ENTERING THE CRUISE WINDS AND TEMPERATURES

At flight plan initialization, the CRZ WIND page displays all cruise waypoints with empty brackets. In flight, only downpath waypoints are displayed.

SELECT VERT REV at WPT.
PRESS the WIND prompt.
SELECT NEXT PHASE.
SLEW until relevant waypoint is displayed.
WRITE and ENTER the new temperature into the scratchpad.
WRITE and ENTER the new wind data into the scratchpad.

WIND and temperature may be entered through the ACARS pages. (Refer to DSC-22_20-70 Wind Data - Procedure to Insert Wind Data).



The crew will modify the entered winds and temperatures in flight, if a significant difference is expected (greater than 30 kt or 30 ° for the wind data and greater than 5 °C for the temperature). The system propagates the pilot's (or ACARS) wind and temperature entries downpath, until a waypoint for which a different temperature or wind has been entered (for the same flight level), or until the last cruise waypoint.

The forecast winds at a waypoint are determined as follows:

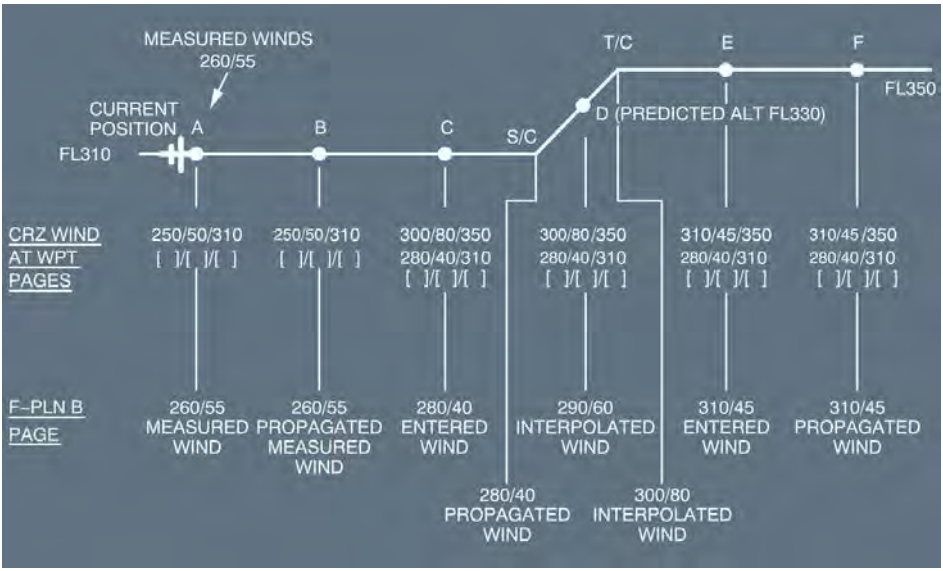
- If the predicted altitude at the waypoint matches an altitude defined in the CRZ WIND page, the forecast wind, is the corresponding entered or propagated wind, displayed at that waypoint on the CRZ WIND page.
- If the predicted altitude lies between two altitudes entered on the CRZ WIND page, the wind direction and velocity are linearly interpolated.
- If the predicted altitude is above or below the set of cruise altitudes, the forecast wind is a constant value extrapolated from the entered or propagated wind at the highest (or lowest) altitude displayed on the CRZ WIND page for that point.

Once in flight, the FMGS considers the actual measured wind up to 200 NM ahead of the aircraft to permanently update the wind profile. This updated wind profile is used to compute the predictions and the performance data, but is not displayed to the crew.

The CRZ WIND pages display the propagated values in small blue font, and the pilot (or ACARS) entries in large blue font.

Note: *The CRZ WIND page displays ACARS or crew-entered or propagated data. It never displays computed data (F-PLN B page only).*

Example:



Ident.: DSC-22_20-30-20-25-B-00009330.0001001 / 24 JAN 11
Applicable to: ALL

EFFECT OF WIND ENTRIES ON OPTIMUM FLIGHT LEVEL

The OPT FL computation considers the wind entries made at different altitudes (normally at the different CRZ FL).

When flying the subsequent CRZ FL, the OPT FL proposed by the PROG page may be affected by the wind entries made at the previous CRZ FL; these winds are automatically propagated and may be significantly different from the actual winds.

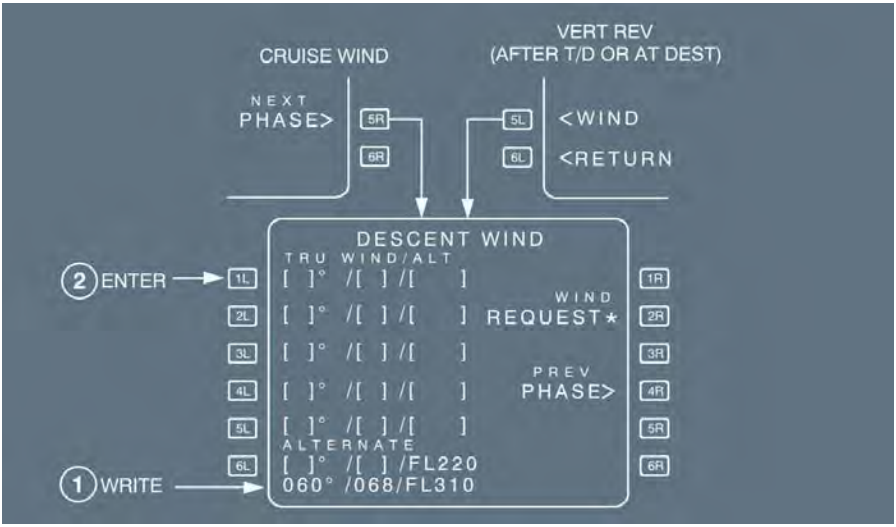
We recommend the following procedure: If the propagated winds at the lower altitudes are significantly different from the actual winds, enter the wind at these altitudes, or if not available, the wind measured at the current CRZ FL.

ENTERING THE DESCENT WINDS

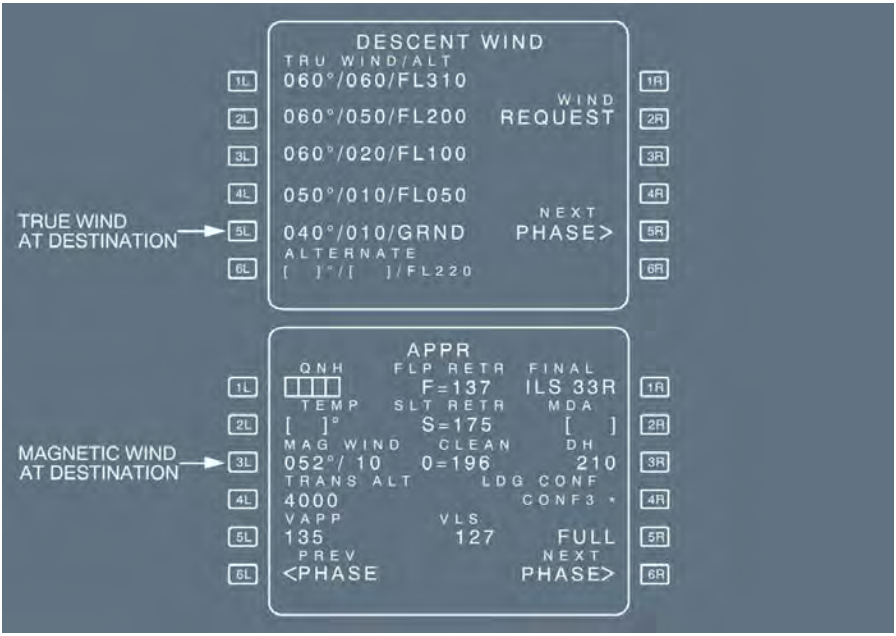
The pilot will enter as many as one wind at 5 different FL or altitudes. This wind data will be used for descent profile and prediction computation.

From the vertical revision page, or from the CRZ WIND page:

PRESS the WIND prompt.
SELECT the DESCENT WIND page.
ENTER up to 5 different “wind/altitude”.



A wind is written as true direction/velocity/flight level or altitude in feet.
If the crew enters “GRND” in the altitude field, the system uses the associated wind as wind at destination.
The descent profile is corrected, as well as the tower wind entered in the PERF APPR page.



When the winds have been entered, the F-PLN B page displays the forecasted wind profile at all descent waypoints, using values it has interpolated from manual entries. Descent winds are not modifiable when the descent, approach, or go-around phase is active. At descent phase transition, wind data switches from blue to green, and any attempted modification will trigger the “NOT ALLOWED” message.

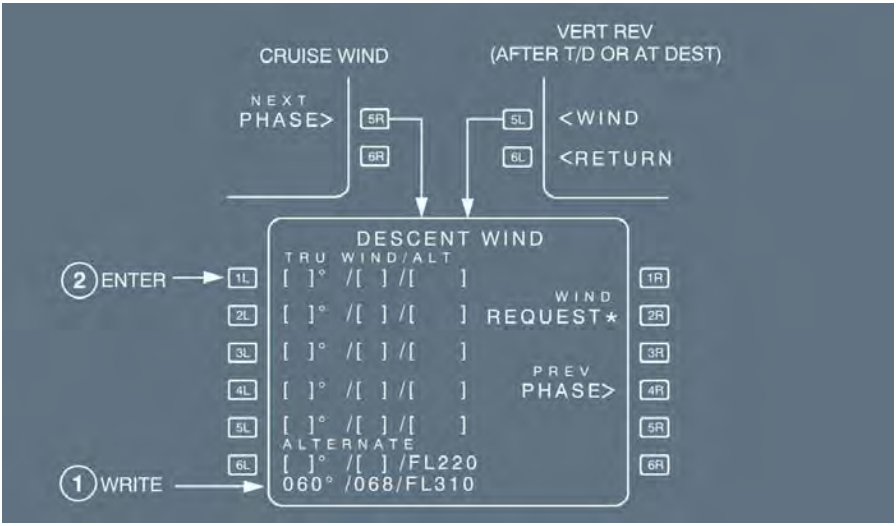
Ident.: DSC-22_20-30-20-25-B-00009331.0016001 / 14 MAY 12
Applicable to: MSN 3408-4547

ENTERING THE DESCENT WINDS

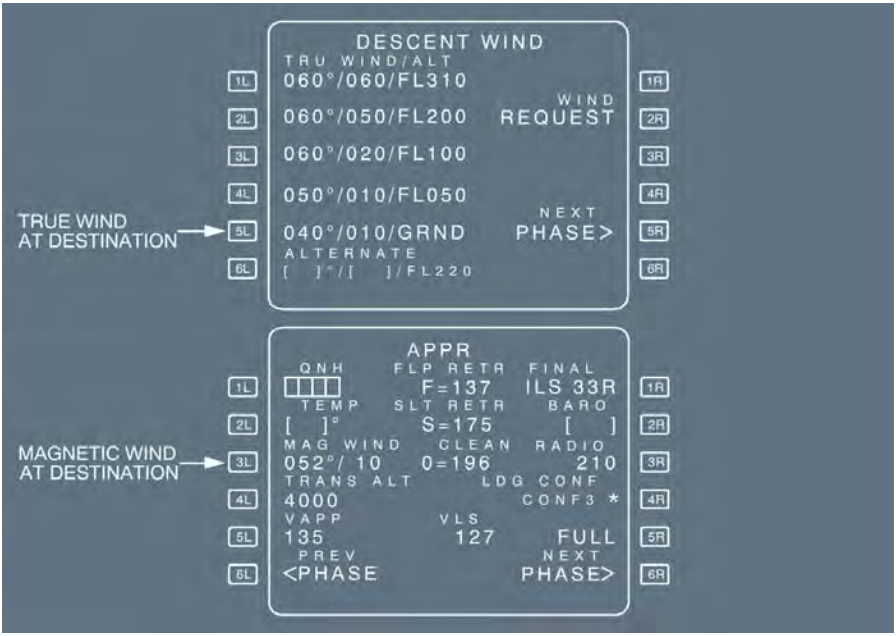
The pilot will enter as many as one wind at 5 different FL or altitudes. This wind data will be used for descent profile and prediction computation.

From the vertical revision page, or from the CRZ WIND page:

PRESS the WIND prompt.
SELECT the DESCENT WIND page.
ENTER up to 5 different “wind/altitude”.



A wind is written as true direction/velocity/flight level or altitude in feet.
If the crew enters “GRND” in the altitude field, the system uses the associated wind as wind at destination.
The descent profile is corrected, as well as the tower wind entered in the PERF APPR page.



When the winds have been entered, the F-PLN B page displays the forecasted wind profile at all descent waypoints, using values it has interpolated from manual entries. Descent winds are not modifiable when the descent, approach, or go-around phase is active. At descent phase transition, wind data switches from blue to green, and any attempted modification will trigger the “NOT ALLOWED” message.

Ident.: DSC-22_20-30-20-25-B-00009332.0001001 / 24 JAN 11
Applicable to: ALL

ENTERING THE ALTERNATE WIND

Alternate wind is entered on the DESCENT WIND page.

The alternate cruise (ALTN CRZ) level defaults to:
- FL 220 if the length of the ALTN F-PLN is less than 200 NM.
- FL 310 if the length of the ALTN F-PLN is greater than 200 NM.

If an alternate wind is not defined, the predictions are computed with a wind defaulted to zero. Alternate wind can be modified at any time.

The alternate wind profile is as follows:

- ALTN CLB wind : Mean wind between ALTN CRZ wind (as entered on the DESCENT WIND page), and the wind at primary DEST (as entered on the PERF APPR page).
- ALTN CRZ wind : If no ALTN WIND has been entered on the DESCENT WIND page, the WIND at primary DEST (as entered on the PERF APPR page) is considered.
  In case no entry is made, zero wind is assumed.
- ALTN DES wind : Mean wind between ALTN CRZ WIND and wind at FL 100.
  Wind at FL 100 = Interpolation between wind at ALTN CRZ FL and zero at ALTN DEST.

Ident.: DSC-22_20-30-20-25-B-00009333.0001001 / 14 MAY 12
Applicable to: MSN 1882-2078

ENTERING THE APPROACH WIND TEMPERATURE AND QNH

The wind at destination is entered in the 3L field of the PERF APPR page.
It is copied in true reference into the DESCENT WIND page at ground level (GRND), and F-PLN B page at destination. A ground entry on the DESCENT WIND page is, in the same way, automatically copied to F-PLN B page and the PERF APPR page.
This wind is modifiable in descent, approach, and go-around phases.

SELECT the PERF key on the MCDU.
PRESS NEXT PHASE (6R).
WRITE QNH and temperature, and enter them.
WRITE the surface wind in the scratchpad, and enter it.

Note: At each wind entry, the descent profile is recomputed. Therefore, it is recommended to enter all winds, temperature, and QNH at the same time in order to minimize recomputation time.

Ident.: DSC-22_20-30-20-25-B-00009333.0016001 / 14 MAY 12
Applicable to: MSN 3408-4547

ENTERING THE APPROACH WIND TEMPERATURE AND QNH

The wind at destination is entered in the 3L field of the PERF APPR page.
It is copied in true reference into the DESCENT WIND page at ground level (GRND), and F-PLN B page at destination. A ground entry on the DESCENT WIND page is, in the same way, automatically copied to F-PLN B page and the PERF APPR page.
This wind is modifiable in descent, approach, and go-around phases.

SELECT the PERF key on the MCDU.
PRESS NEXT PHASE (6R).
WRITE QNH and temperature, and enter them.
WRITE the surface wind in the scratchpad, and enter it.

Note: At each wind entry, the descent profile is recomputed. Therefore, it is recommended to enter all winds, temperature, and QNH at the same time in order to minimize recomputation time.

CONSTANT MACH SEGMENT

Applicable to: ALL

Ident.: DSC-22_20-30-20-25-C-00009334.0001001 / 14 MAY 12

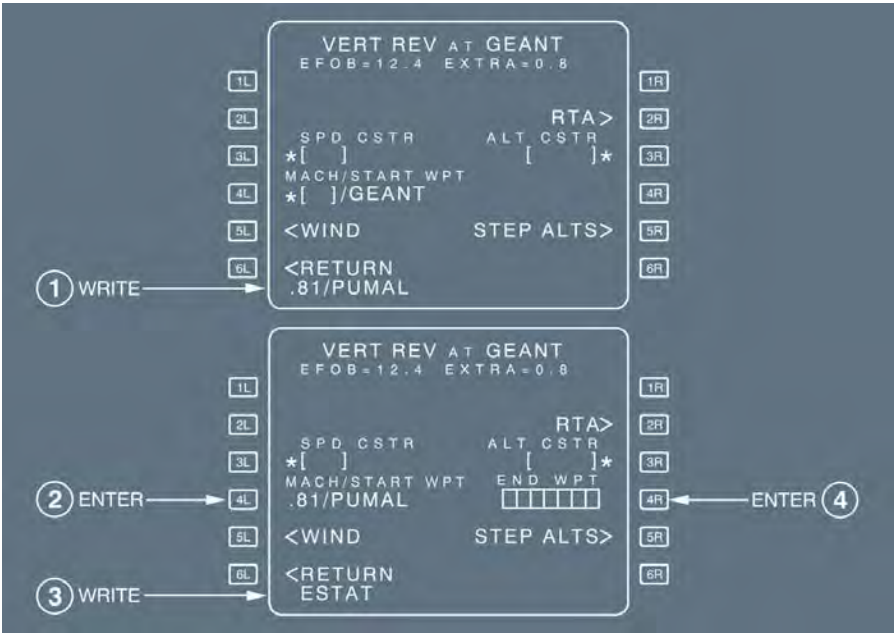
GENERAL

The pilot can enter the start and end points of a constant Mach segment, and its associated Mach number, from the VERT REV page.
Only one constant Mach segment may be defined in the active flight plan, and only one in the secondary flight plan. No constant Mach segment can be defined in the alternate flight plan.

Ident.: DSC-22_20-30-20-25-C-00000491.0008001 / 01 OCT 12

ENTERING A CONSTANT MACH SEGMENT

SELECT the F-PLN key on the MCDU.
SELECT VERT REV at a waypoint.
(Except the destination and alternate flight plan waypoint).
WRITE the Mach/start waypoint pair.
It is possible to enter only the Mach or the waypoint. But, for the first entry, a Mach entry is mandatory.
The waypoint must be located in front of the aircraft and must be part of the cruise.
ENTER it in the 4L field
The END WPT prompt appears in the 4R field.



WRITE the end waypoint.

The end waypoint must be part of the cruise.

ENTER it in the 4R field.

GENERAL

Ident.: DSC-22_20-40-10-00011077.0001001 / 17 AUG 10
Applicable to: ALL

The performance function:
- Optimizes a flight plan
- Computes predictions.

OPTIMIZATION

Ident.: DSC-22_20-40-10-00011084.0029001 / 23 JUN 15
Applicable to: ALL

The FMGC minimizes cost by optimizing the following items:
- Takeoff, approach, and go-around speeds (F, S, Green Dot, VAPP)
- Target speed for CLB, CRZ and DES phases (ECON SPD/MACH)
- Flight Level (for flight crew's information)
- Descent profile from CRZ FL down to the destination airport.

These items depend on the data the flight crew inserts during lateral and vertical flight planning and revision procedures.
Most are displayed on the PERF pages associated with the appropriate flight phases.

WIND PROFILE

To obtain the best predictions, the flight crew must enter the wind for the various flight phases and specifically for waypoints in cruise.

■ **ON GROUND:**
During flight planning initialization, enter the winds for the climb and cruise phases using the HISTORY WIND and WIND pages. Enter, manually or with ACARS, different wind values in the climb and cruise phases. The system will compute a wind for all waypoints of the F-PLN using linear interpolation between manual/ACARS entries.
The wind profile will be displayed on the F-PLN B page, and is called forecast wind profile. Flight crew or ACARS entries are displayed in large font, and system-computed winds in small font.

■ **IN FLIGHT:**
The system updates the predictions and the current ECON speed, using the measured wind at the present position. It combines actual wind and forecast winds to compute the wind ahead of the aircraft, but this is totally transparent to the flight crew.
During cruise, the flight crew will enter the descent winds and the approach wind. The system will update the final predictions, compute the optimum descent profile and compute the optimum speed in descent and approach.

The forecast wind profile will be used to compute fuel and time predictions, as well as ECON speed/Mach targets.

OPTIMUM TAKEOFF, APPROACH AND GO-AROUND SPEEDS

The FMGC computes takeoff speeds (F, S, Green Dot) during the preflight and takeoff phases, using the performance model in the database and the takeoff weight.
The flight crew has to insert V1, VR, and V2 in the PERF TO page manually.
The FMGC uses the performance model and either the predicted landing weight or the current gross weight at transition to the approach phase to compute approach speeds (VLS, VAPP, F, S, Green Dot).
On the PERF APPR page, the selected LDG CONF determines the applicable VLS and VAPP, the latter being updated by the WIND correction that the flight crew enters on the same page. The FMGC uses the performance model and gross weight to compute go-around speeds (F, S, Green Dot).

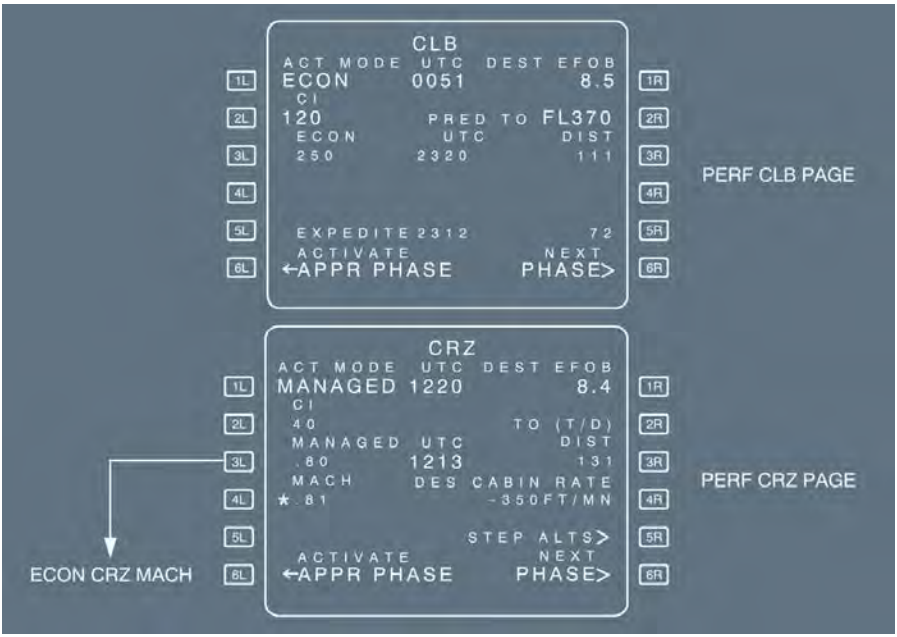
OPTIMUM TARGET SPEED FOR CLIMB, CRUISE AND DESCENT (ECON SPD/MACH)

The FMGS computes the optimum target speed (ECON SPD/MACH) as a function of:
- Cost index (CI)
- Cruise flight level (CRZ FL)
- Gross weight (GW)
- Wind and temperature models
- Performance factor.

The computer processes the ECON SPDs for the climb and descent phases before the initiation of the flight phase, and freezes the values once the flight phase becomes active.
When there is no time or speed constraint/limit, ECON SPEED is the optimum speed for the selected cost index. It refers to fuel and time cost and not directly to fuel saving.
The FM calculates ECON CLB, ECON DES and the associated top of climb and top of descent as a function of cost index, cruise FL, and meteo data.

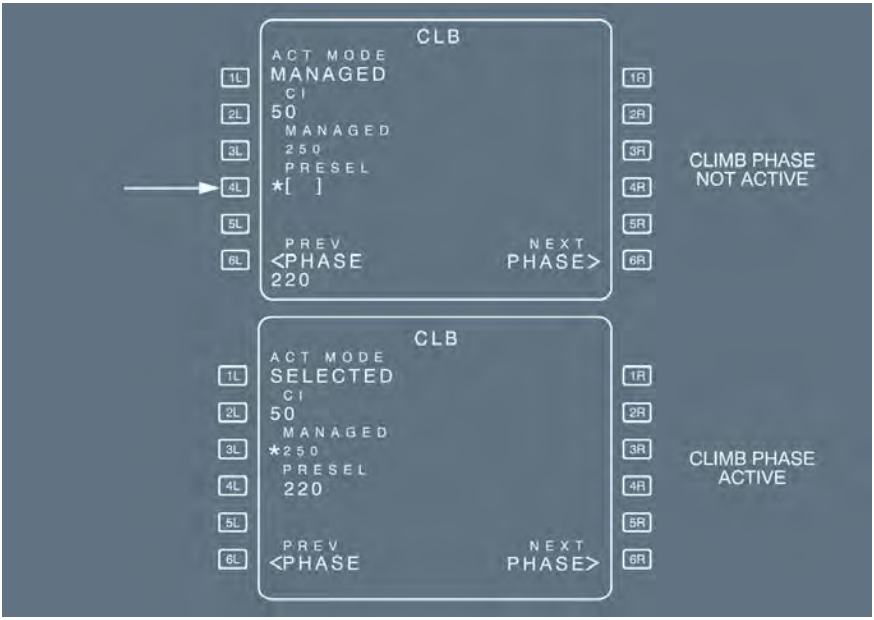
The computer continually updates ECON CRUISE MACH (SPD), taking into account current weather conditions and modifications to the flight plan.

Note: If the cruise FL is below FL 250, ECON CRUISE SPEED is computed.
If the cruise FL is above FL 250, ECON CRUISE MACH is computed.



PRESET TARGET SPEED FOR CLB PHASE

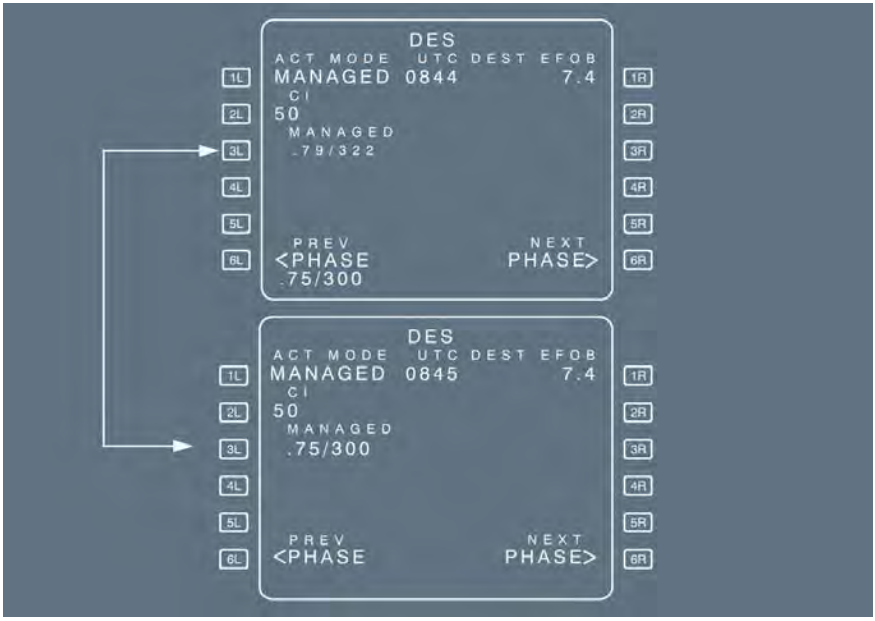
The flight crew can preselect the climb speed before the CLB phase begins, by inserting a speed in the PRESEL field:



The active mode field changes from MANAGED to SELECTED, and the FM will use the entered speed for climb predictions computation.
The flight crew can revert to managed mode by pressing the 3L key.

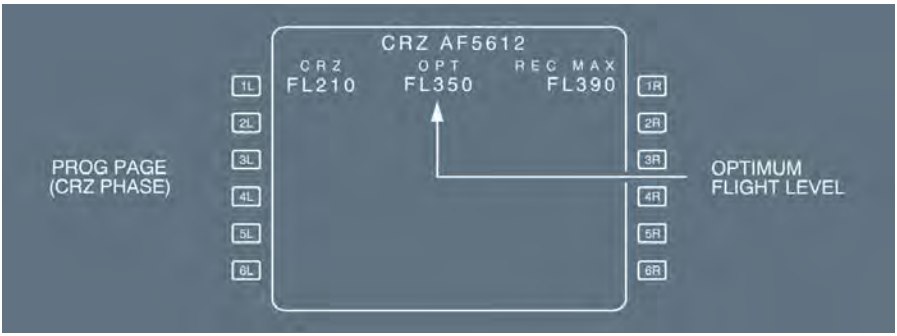
PRESET TARGET SPEED/MACH FOR DES PHASE

The flight crew can change the speed and/or Mach displayed in the MANAGED field by inserting a speed and/or Mach in the MANAGED field.
Although the entered speed is chosen by the flight crew, the FMGS uses it to compute the descent flight path and top of descent. It is therefore part of the managed descent profile.



The flight crew can revert to the optimum speed/Mach by clearing the 3L field.

OPTIMUM FLIGHT LEVEL

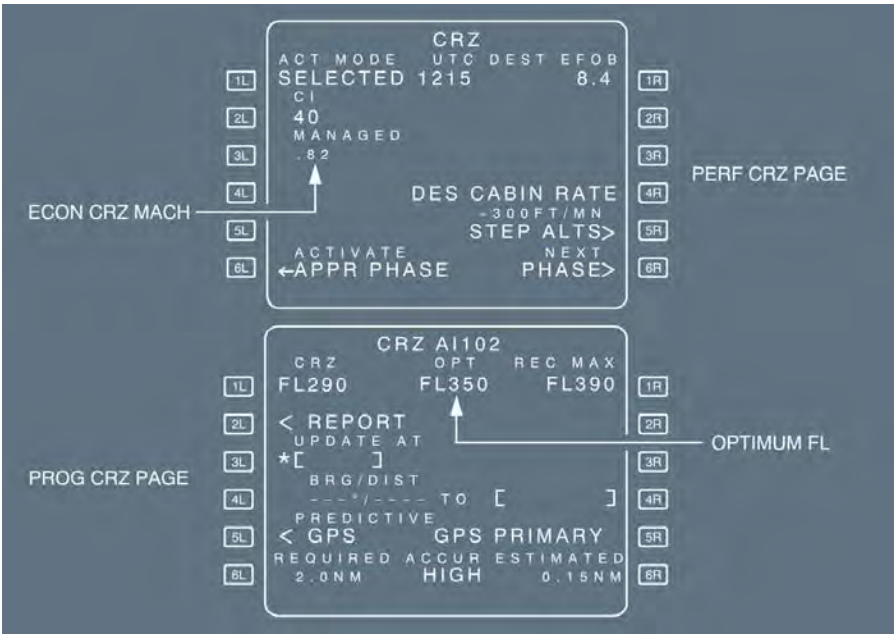


The optimum flight level (OPT FL) indicates the most economic flight level for a given cost index, weight, weather data. It is continuously updated in flight. It requires a 5 min minimum cruise time, at a minimum cruise flight level of FL 100.

The OPT FL is a compromise between fuel and time saving. As a result, the flight crew may observe jumps in OPT FL due to GW, ISA, or wind changes. The computation of the OPT FL considers the wind entries made at the different altitudes (normally at the different CRZ FL). When flying the subsequent CRZ FL, the OPT FL proposed by the PROG page may be affected by the wind entries made at the previous CRZ FL; these winds are automatically propagated and may be significantly different from the actual winds.

Note: *For simplification purposes, the FCOM/QRH gives the OPT FL at a given Mach number. It does not consider the cost index, therefore the FMGS and the FCOM/QRH values are different.*

FM displays OPT FL on the PROG page. The PROG page displays dashes for this quantity when the system detects an engine-out condition.



OPTIMUM DESCENT PATH

The vertical flight path is computed to minimize fuel consumption, while satisfying the various altitude constraints of the F-PLN and the descent speed profile, in order to reach VAPP at 1 000 ft.

The computer calculates the descent profile before the descent phase is initiated, taking into account:

- All lateral and vertical flight plan data
- The descent and approach winds, as inserted into the DESCENT WIND page and PERF APPR page, and the required maximum cabin rate of descent.

During descent, the descent profile is updated only if the flight plan is modified, or if data for the APPR phase (WIND, VAPP, or LDG CONF) are changed.

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COST INDEX (CI)

Ident.: DSC-22_20-40-20-00011041.0001001 / 17 AUG 10
Applicable to: ALL

The cost index is a fundamental input for the ECON SPEED or ECON MACH computation. ECON SPEED and ECON MACH reduce the total flight cost in terms of flight time and fuel consumption (and not only in terms of fuel saving).
CI is the ratio of flight time cost (CT) to fuel cost (CF).
CI = CT/CF (kg/min or 100 lb/h).
CI = 0 corresponds to minimum fuel consumption (Max Range).
CI = 999 corresponds to minimum time.
CI = Long Range Cruise (*Refer to PRO-NOR-SRP-01-50 Preparation for Descent and Approach - Cost Index for Long-Range Cruise*).

Note: *The airline's operations department usually defines the cost index, to optimize each company route. The flight crew does not ordinarily modify the cost index during a flight.*

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GENERAL

Ident.: DSC-22_20-40-30-00011080.0002001 / 17 AUG 10
Applicable to: ALL

The FMGC computes predictions for the primary and secondary flight plans and displays them on the Multipurpose Control and Display Units (MCDUs), and on the navigation display (ND) of the Electronic Flight Instrument System (EFIS).
The computations use the current state of the aircraft (GW, CG, position, altitude, speed, engaged mode of the autopilot or flight director, time, wind, temperature) for the active flight plan.
The computations use data entered by the flight crew for the secondary flight plan when it is not a copy of the active flight plan. When the secondary flight plan is a copy of the active flight plan, it uses the same data.

PREDICTIONS FOR THE PRIMARY FLIGHT PLAN

Ident.: DSC-22_20-40-30-00011085.0001001 / 17 AUG 10
Applicable to: ALL

The predictions displayed on the MCDU assume that the FMGS will guide the aircraft along the preplanned lateral and vertical flight plans.
The predictions displayed on the ND assume that the aircraft will continue to operate in the modes (selected or managed) that are currently active.
As long as the aircraft is flying the flight plan under managed guidance, the predictions on the MCDU will match those on the ND.

If the flight crew does not fly the flight plan, the MCDU predictions assume that:
- The flight crew will fly back towards the flight-planned route
- The flight crew will immediately resume flying the FMGC managed modes.

If the flight crew does not fly the managed speed profile, the MCDU predictions assume that they will maintain the selected speed until they reach:
- In the climb or descent phase, the next speed limit or speed constraint if any, or next phase
- In cruise, the top of descent.

Then, the predictions assume that the flight crew will revert to managed speed.

COMPUTATION OF PREDICTIONS

Ident.: DSC-22_20-40-30-00011086.0001001 / 17 AUG 10
Applicable to: ALL

The system calculates various predictions for the active flight plan and updates them continually during flight as functions of:
- Revisions to the lateral and vertical flight plans
- Cost index

- Current winds and temperature
- Present position versus lateral and vertical flight plans
- Current guidance modes
- Speed control (managed/selected).

The MCDU and the ND show these predictions, each of which is based on specific assumptions.

Note: During computation, prediction fields on the MCDU pages display dashes.

PREDICTIONS DISPLAYED ON THE NAVIGATION DISPLAY

Ident.: DSC-22_20-40-30-00011090.0002001 / 17 AUG 10
Applicable to: ALL

These predictions consist of symbols positioned along the lateral flight plan (NAV mode engaged) or the track line (NAV mode not engaged). These symbols (named as pseudo waypoints) and their meanings are:

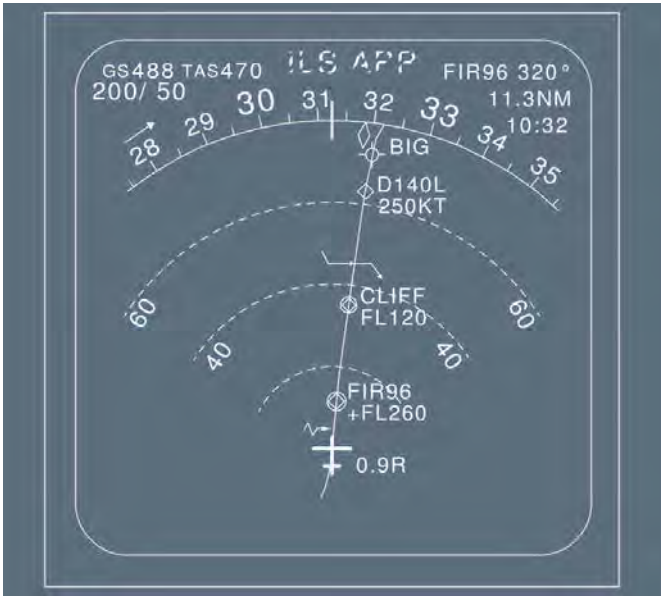
Pseudo waypoint	Definition
	Level symbol at the position (top of climb or level-off) where the aircraft will reach: - The FCU selected altitude (blue) or - The constrained altitude, if it is more restrictive than the FCU altitude and if appropriate modes are engaged (magenta).
	Top of descent or continue descent symbol: - Top of descent (always white) - Continue descent symbol (white if DES is not armed, blue if it is).
	Start of CLIMB symbol: - White if CLB is not armed - Blue if CLB is armed.
	Intercept point symbol: The point where the aircraft is predicted to intercept the descent path, if there is any vertical deviation when the aircraft is in DES mode (white if DES is not engaged, blue if it is).
•	Speed change symbol: The point at which the aircraft will initiate an automatic ACCEL or DECEL from current speed to a new computed speed if it encounters a SPD LIM, SPD CSTR, or HOLDING SPD (magenta).
	Decelerate point symbol: - Indicates the point at which the aircraft is predicted to decelerate for approach (and thus switch to the approach phase) - Magenta, if in managed speed and NAV or approach mode is engaged - White, if in selected speed or HDG/TRK mode - Automatic deceleration only occurs when displayed in magenta.

Continued on the following page

Continued from the previous page

Pseudo waypoint	Definition
	ALT CSTR symbol set around the constrained waypoint: - Magenta, when the ALT CSTR is predicted to be met - Amber, when the ALT CSTR is predicted to be missed - White, when the ALT CSTR is not taken into account by the FMGS, and the NAV mode is engaged.
 (10 45)  (ETP)	Time marker and equitime point symbols appear in green to indicate where the aircraft reaches the time marker or equitime point.
	Energy circle symbol (green arc) centered on the aircraft position and oriented to the current track line. Represents the Required Distance to Land. Only displayed if the lateral guidance mode is heading or track, and the current FMS flight phase is in cruise, descent or approach, and the aircraft is within 180 NM of the destination.
Crosstrack error XX.XR or XX.XL (X is a number)	The crosstrack error displays the lateral deviation between the aircraft position and the track of the F-PLN active leg. The value is limited to 99.9 NM left or right.
INTCPT	Intercept waypoint is displayed on the ND at the point at which the present track intercepts the F-PLN.

The predicted time of arrival at the TO WPT is located in the upper right-hand corner of the ND. It assumes direct distance from the aircraft position to the TO WPT and assumes current ground speed will be constant.



As a general rule, the ND indicates what the aircraft will fly, with the current active FG modes.

For example:

- The continuous green line on the ND represents the track the aircraft is currently flying:
  - If HDG/TRK is engaged, the track line is green and the flight plan is dashed
  - If NAV mode is engaged, the green line is the flight plan.
- If the speed target is manually selected, the speed-change symbol is no longer displayed because it will not be taken into account.
- When the aircraft is not following the vertical flight plan (OP CLB, OP DES, V/S) but the NAV mode is engaged, the system disregards any altitude constraints and puts white circles around the waypoints that have these constraints and positions level symbols accordingly.
- Pseudo waypoints are adjusted each time predictions are updated.

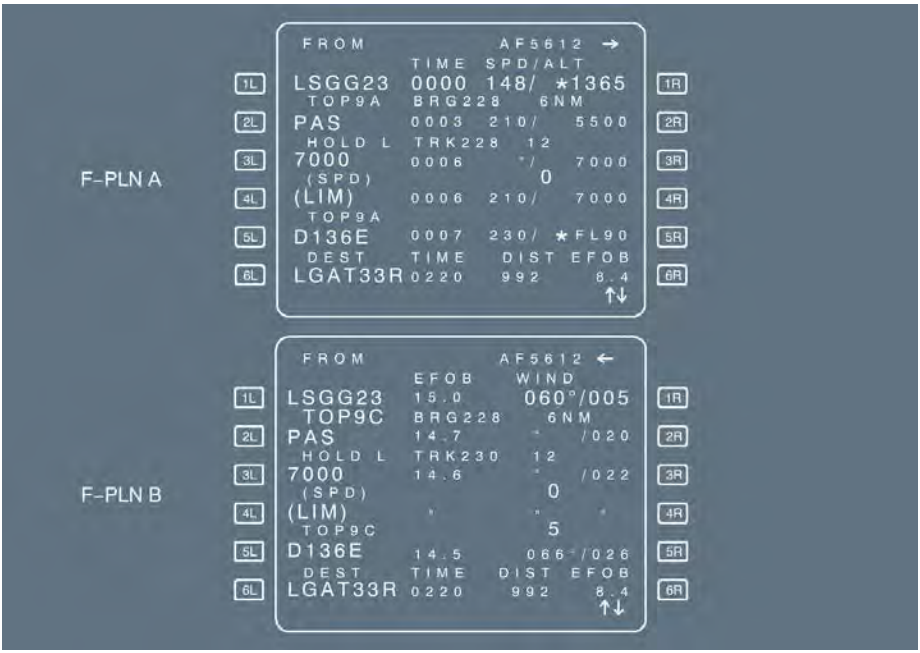
PREDICTIONS DISPLAYED ON THE MCDU

Ident.: DSC-22_20-40-30-00011093.0001001 / 14 MAY 12
Applicable to: ALL

The predictions displayed on the MCDU assume that AP (or FD order) is controlling the aircraft and flying it along the preplanned lateral and vertical flight plan.

Therefore:

- If the aircraft is guided along the flight plan (managed guidance), the MCDU predictions correspond exactly to what the aircraft is doing
- If the aircraft is not guided along the flight plan (selected guidance), the MCDU predictions assume that it will return immediately to the flight plan, intercepting at a predetermined angle, and will then proceed under managed guidance
- If the aircraft does not fly the managed speed profile (ECON, SPD CSTR...), the MCDU predictions assume that it will remain at the present selected speed/Mach until it reaches the next SPD CSTR or SPD LIM or enters the next flight phase.



Note: *For secondary flight plan predictions,* *Refer to DSC-22_20-60-50 Secondary Flight Plan.*

TYPE OF PREDICTIONS

Ident.: DSC-22_20-40-30-00011113.0002001 / 18 MAR 11
Applicable to: ALL

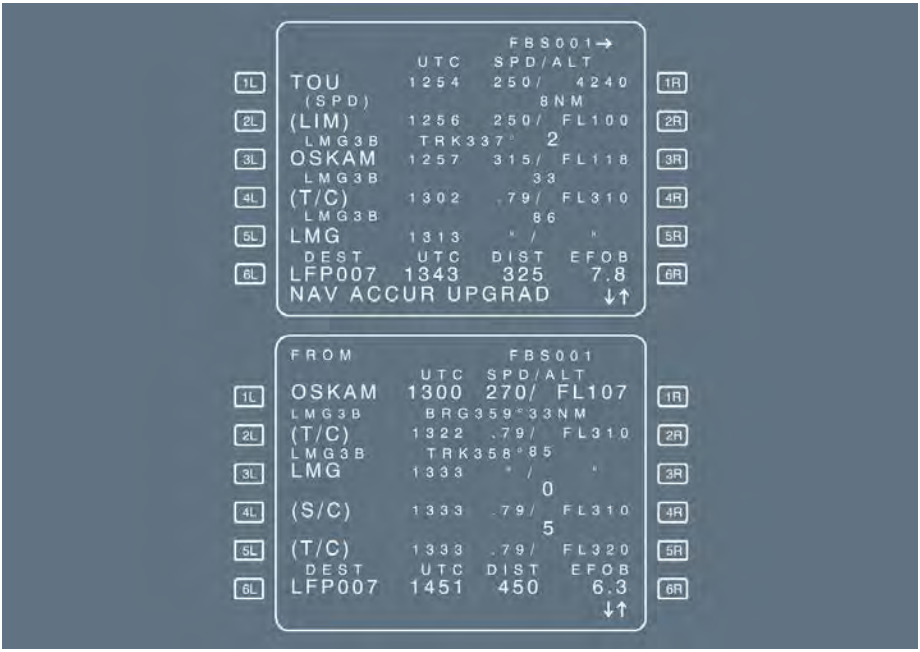
	MCDU PAGE
Pseudo waypoints: T/C, T/D, S/C, S/D, I/P, SPD LIM, DECEL	F-PLN A and B
TIME/SPD/ALT at each WPT and pseudo-WPT	F-PLN A
ETA/DIST TO DEST along F-PLN/EFOB at destination	F-PLN A and B
EFOB/T-WIND at each WPT and pseudo-WPT	F-PLN B
Constraint symbol * at each constrained WPT (TIME/SPD/ALT)	F-PLN A and B
Altitude error in case of missed ALT constraint	VERT REV
EFOB/EXTRA FUEL at each WPT	VERT REV
TIME/EFOB at destination	FUEL PRED/PERF CLB/CRZ/DES
TIME/DIST to a selected altitude	PERF CLB or DES
Fuel prediction prior engine start	INIT B
REC MAX FL	PROG
TIME/EFOB at Alternate	FUEL PRED
XTRA FUEL for various Alternates	ALTN
VDEV vertical deviation from vertical flight path	PROG

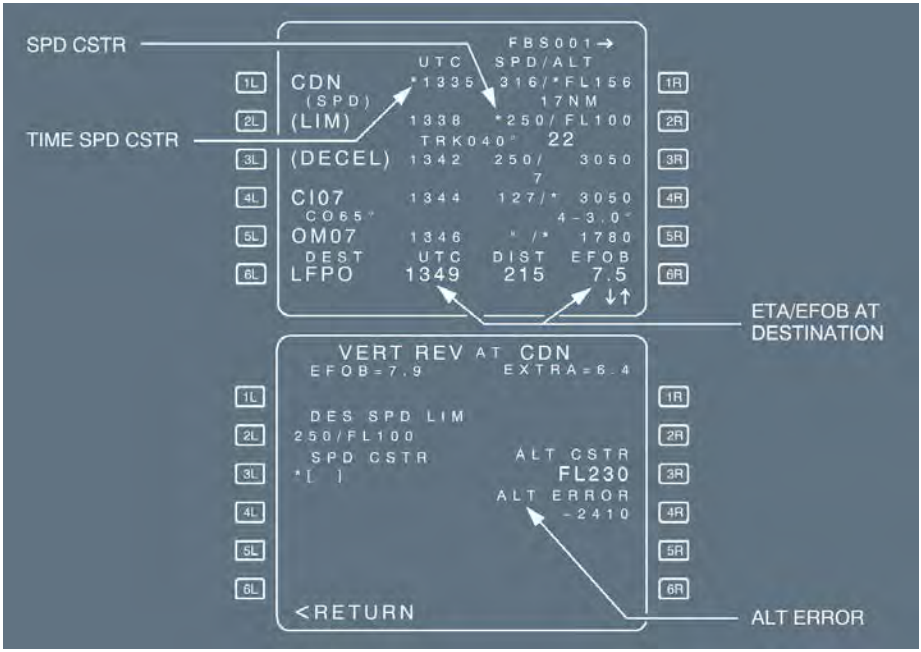
EXAMPLES OF MCDU PREDICTIONS

Ident.: DSC-22_20-40-30-00011120.0001001 / 14 MAY 12
Applicable to: ALL

The following MCDU pages display some of the prediction types.

- Pseudo-waypoints:
  Top of Climb (T/C), Top-of-Descent (T/D), Start of Climb (S/C) or Start of Descent (S/D) for Step Climb/Descent, Speed Limit (SPD LIM), deceleration to approach phase (DECEL)
- Time, speed, and altitude predictions:
  TIME/SPD/ALT for all waypoints and pseudo-waypoints.

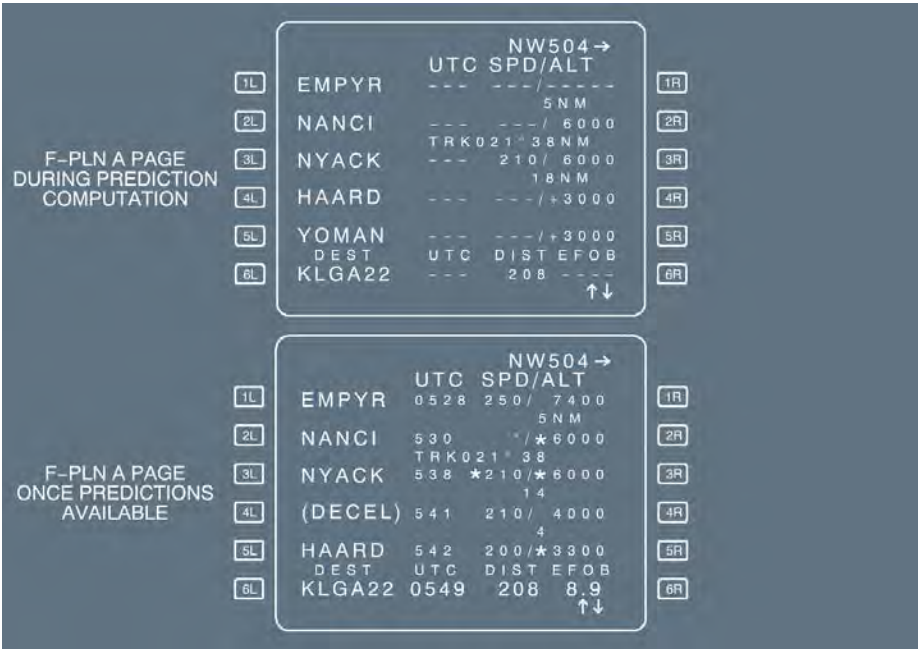

FBS001→
UTC SPD/ALT
1L TOU 1254 250/ 4240
(SPD) 8NM
2L (LIM) 1256 250/ FL100
LMG3B TRK337° 2
3L OSKAM 1257 315/ FL118
LMG3B 33
4L (T/C) 1302 .79/ FL310
LMG3B 86
5L LMG 1313 °/ °
DEST UTC DIST EFOB
6L LFP007 1343 325 7.8
NAV ACCUR UPGRAD ↓↑
FROM FBS001
UTC SPD/ALT
1L OSKAM 1300 270/ FL107
LMG3B BRG359°33NM
2L (T/C) 1322 .79/ FL310
LMG3B TRK358°85
3L LMG 1333 °/ °
0
4L (S/C) 1333 .79/ FL310
5
5L (T/C) 1333 .79/ FL320
DEST UTC DIST EFOB
6L LFP007 1451 450 6.3
↓↑



CONSTRAINT SYMBOLS (STAR)

Ident.: DSC-22_20-40-30-00011150.0001001 / 14 MAY 12
Applicable to: ALL

When a time speed or an altitude constraint is part of the vertical flight plan, it appears on the F-PLN A page only at the time of insertion, or when predictions are not yet available.
Once available, the time speed and altitude predictions are displayed for all F-PLN waypoints: when a speed or an altitude constraint is at a waypoint, a star symbol appears adjacent to the speed or altitude prediction. If the star is magenta, the constraint is predicted to be matched. If the star is amber, the constraint is predicted to be missed.



Note: *If an altitude constraint is predicted as missed, the system tells you what will be the error at the specific waypoint.*

VERTICAL DEVIATION

Ident.: DSC-22_20-40-30-00011139.0001001 / 29 SEP 15
Applicable to: ALL

During descent, the system indicates to the flight crew the vertical deviation from the computed descent profile (PFD and MCDU) and predicts where the flight crew can rejoin it.
VDEV on the PFD and PROG page, predictions on the MCDU F-PLN page, symbols on the ND, enable assessment to the vertical position versus the computed flight profile.

OPERATION RULES CONCERNING PREDICTIONS

Ident.: DSC-22_20-40-30-00011140.0001001 / 17 AUG 10
Applicable to: ALL

The flight crew must properly update the flight plan data during the flight, in order to obtain accurate and meaningful predictions.

The flight crew should rely on the ND for short-term predictions. It indicates what the aircraft will do under the currently engaged modes (selected or managed).
The flight crew should rely on the MCDU for long-term predictions, when managed guidance is active or about to be reengaged.

OTHER COMPUTATIONS

Applicable to: ALL

Ident.: DSC-22_20-40-30-A-00011141.0002001 / 17 AUG 10

ENGINE-OUT CASE

The FMGS computes an engine-out target speed for each flight phase. It computes an engine-out maximum altitude at long-range cruise speed, and displays it on the PROG page.
The new speed target becomes Green Dot in climb, and EO CRZ SPD in cruise.
The system computes the flight plan predictions down to the primary destination. If the aircraft is above EO MAX ALT, the predictions are computed, assuming that a drift down descent will immediately be performed to reach EO MAX ALT.

Ident.: DSC-22_20-40-30-A-00011142.0001001 / 17 AUG 10

RECOMMENDED MAXIMUM ALTITUDE (REC MAX)

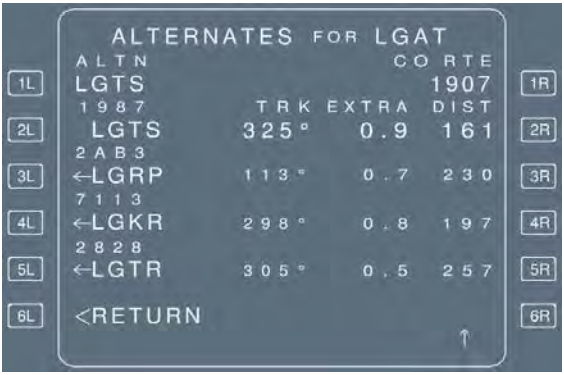
The recommended maximum altitude is the lowest of the maximum altitude that:
- The aircraft can reach with a 0.3 g buffet margin
- The aircraft can fly in level flight at MAX CRZ rating
- The aircraft can maintain a V/S of 300 ft/min at MAX CLB thrust
- The aircraft can fly at a speed higher than Green Dot and lower than VMO/MMO
- The aircraft is certified at.

The REC MAX altitude is displayed on the PROG page.
Anti-ice is not taken into account for this computation. Refer to QRH graphs if icing conditions are expected.
A maximum altitude using a 0.2 g buffet margin is also computed. It is not displayed, but the system uses it to limit CRZ ALT entry.

Ident.: DSC-22_20-40-30-A-00011250.0001001 / 17 AUG 10

PREDICTIONS FOR ALTERNATES

Predictions for alternates are displayed on the ALTERNATES page.



They are based on:

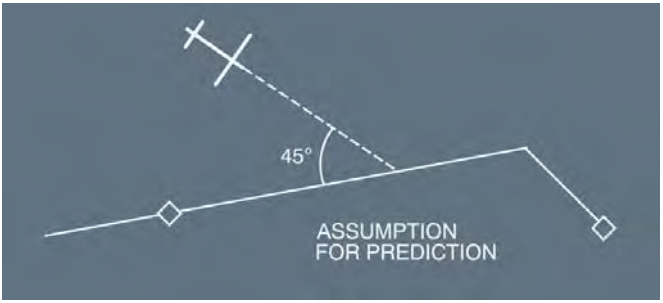
- A default cruise FL equal to 220, if the airway distance is less than 200 NM. Otherwise, it is FL 310
- Simplified wind/temperature models, based on flight crew entries:
  - ALT CRZ wind, as entered on the FUEL PRED page
  - CRZ temperature interpolated from the temperature model for the primary flight plan.
- Airway distance, or direct distance, as provided by the database (manual entry, if not in the database)
- Cost index = 0 (minimum fuel)
- Initial aircraft weight equal to landing weight at primary destination.

Note: *1. No step can be inserted in an alternate flight plan*
2. No predictions are displayed for the selected alternate on flight plan pages. However, the flight crew can read ALTN trip fuel and time on the INIT B page before engine start, and estimated time and estimated fuel on board at alternate on the FUEL PRED page after engine start.

RETURN-TO-TRAJECTORY ASSUMPTIONS

Ident.: DSC-22_20-40-30-00011148.0001001 / 19 DEC 12
Applicable to: ALL

If the aircraft is not on the lateral flight plan, predictions assume an immediate return to the active lateral leg with a 45 ° convergence angle, or that it will fly directly to the “TO” waypoint, when the required convergence angle is greater than 45 °.



ENERGY CIRCLE

Ident.: DSC-22_20-40-30-00011144.0001001 / 17 AUG 10
Applicable to: ALL

The energy circle is a green arc, centered on the aircraft's position and oriented towards the current track line. It is displayed on the NDs during descent, when HDG or TRK mode is selected. It represents the required distance to land from the aircraft's position down to airport elevation at VAPP speed, considering all speed constraints on the vertical profile.

INTRODUCTION TO PERF AND IDLE FACTORS

Ident.: DSC-22_20-40-30-00014856.0001001 / 31 JAN 13
Applicable to: ALL

The FMGS contains a performance database to compute the predictions and the performance data. This performance database has a model of several aircraft configurations (aircraft type/engine model) to tune the performance and the FMGS predictions. For some aircraft configurations, the model can differ from the real aircraft performance. In these cases, the FMGS has to correct the computation of the performance and the predictions. This is the aim of PERF and IDLE factors. With time, the real aircraft drag and engine performance can deviate from the nominal model. The airline Flight Operations should periodically revise the value of these factors to adapt FMGS predictions to actual aircraft performance.

Note: *The IDLE factor is not available on aircraft with FMS1 Honeywell Legacy.*

PERF FACTOR

Applicable to: ALL

Ident.: DSC-22_20-40-30-B-00011145.0001001 / 30 JAN 13

GENERAL

The FMGS uses the PERF factor to correct the predicted fuel flow that is used for the computation of the fuel predictions.

The PERF factor modifies the predicted fuel flow, according to the following formula:

$$FFpred = FFmodel \times (1 + \frac{PERF\,FACTOR}{100})$$

FFpred is the FF used for prediction.
FFmodel is the FF from the aero-engine model.

This correction is applied throughout the entire flight, and modifies the performance predictions and the ECON speed or Mach.
For example: Entering a PERF factor of +1.5 means that Flight Operations have evaluated the aircraft fuel deviation as 1.5 %, compared to the basic performance model (0.0).

PERF FACTOR VALUES

The PERF factors to be used on FMS2, depending on engine type, are:

- For CFM 56-5B engines only:
  Depending on the engine type: CFM 56–5B SAC (Single Annular Chamber) or DAC (Double Annular Chambers), or non/P (without the new LP and HP blade compressor), a positive performance factor has to be entered on the MCDU STATUS page to increase the FMGS' predicted fuel consumption and match the actual fuel burnt.

		NON/P		/P or /3	
		SAC	DAC	SAC	DAC
A321-111	CFM56-5B1	2	2	0	1
A321-112	CFM56-5B2	2	2	0	1
A321-211	CFM56-5B3	2	2	0	1
A321-212	CFM56-5B1	2	2	0	1
A321-213	CFM56-5B2	2	2	0	1
A321-214	CFM56-5B4	-	-	1	-
A320-214	CFM56-5B4	3	3	0	1
A320-215	CFM56-5B5	-	-	0	-
A320-216	CFM56-5B6	-	-	0	-
A319-111	CFM56-5B5	4.5	4.5	0	1
A319-112	CFM56-5B6	4.5	4.5	0	1
A319-115	CFM56-5B7	4.5	4.5	0	1
A318-111	CFM56-5B8	-	-	0	-
A318-112	CFM56-5B9	-	-	0	-

- For other engines:
  - A318 "PW": 0.0 %
  - A319/A320 "CFM" Family fitted with CFM 56-5A engines: 0.0 %
  - A319/A320/A321 "IAE" Family: 0.0 %
  - A320 "PW" Family: 0.0 %
  - A320 "CFM LEAP" Family: 0.0 %

All these numbers assume that:

- The aircraft is brand-new
- Anti-ice is OFF
- The air conditioning is on NORMAL for "IAE" engines and on LOW for "CFM" engines
- The conservative Fuel Lower Heating Value (FLHV) is 18400 btu/lb.

When an aircraft ages, fuel consumption degradation will be measured to determine the so-called "monitored fuel factor". This factor corresponds to the deviation of the aircraft's actual fuel consumption from the nominal model. Generally, the FLHV that is used during fuel factor monitoring is higher than the FMS value.
In order not to penalize FMS predictions, it is necessary to correct the "monitored fuel factor". For example, add -1 % to the "monitored fuel factor", when an FLHV of 18590 btu/lb is used.
Once this factor is established by the airline, it should be arithmetically added to the above-noted performance factor.

Note: *1. At delivery, ENTER the PERF factor (given in the table above) directly in the MCDU (no correction factor is needed).*
2. When replacing an FMS1 Legacy by an FMS2, on any given aircraft model, the performance model that is stored in the FMS2 may be different from the one that was previously stored in the FMS1 Legacy.
As a result, DISREGARD the PERF factor previously entered in the MCDU.
ADD the "monitored fuel factor" (when available) to the PERF factor (given above), and ENTER the resulting factor in the MCDU.

IDLE FACTOR

Applicable to: ALL

Ident.: DSC-22_20-40-30-D-00014861.0001001 / 29 SEP 15

GENERAL

The FMGS uses the IDLE factor to adjust the computation of the vertical profile during the descent phase (IDLE segment).

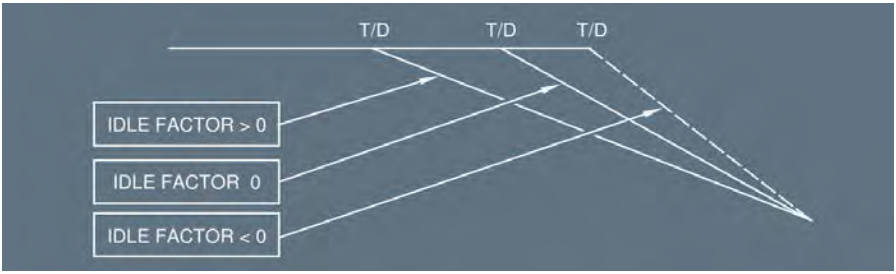
The FMGS computes the vertical profile and the predictions from the Top of Descent (T/D) to the first altitude constraint with the following assumptions:
- The aircraft has a given thrust
- The aircraft has a given speed (within the speed target range).

The IDLE Factor adjusts the value of the given thrust by an addition of a delta (DELTA) thrust to IDLE thrust. With this additional thrust, the IDLE Factor gives flexibility to maintain the aircraft on the computed vertical profile in case of external perturbations such as windy conditions (previously entered by the flight crew in WIND pages).
Depending on the IDLE factor value, the FMGS modifies the position of the T/D and computes a vertical profile in function of the given thrust (IDLE + DELTA).

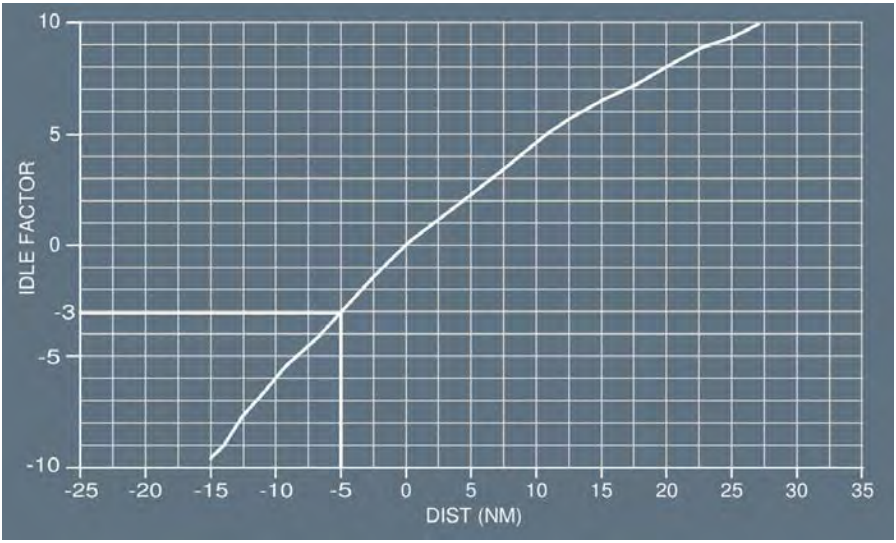
Therefore, the IDLE factor has a direct impact on:
- The computation of vertical profile
- The capability of the aircraft to maintain the vertical profile.

IMPACT ON VERTICAL PROFILE

- If the IDLE factor is positive, the vertical profile is less steep than with IDLE factor 0. The descent phase starts earlier.
- If the IDLE factor is negative, the descent path is steeper than with IDLE factor 0. The descent phase start later.



The following graph provides an example (average values) of the IDLE factor's effect on descent length:

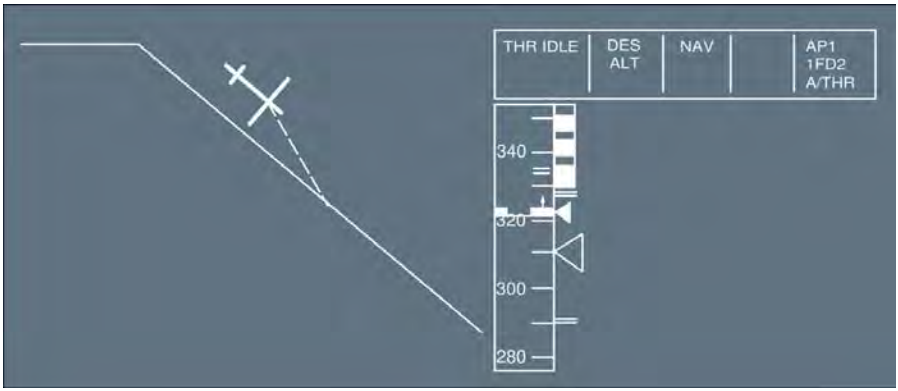


Example: An IDLE factor of -3 decreases the computed descent length by 5 NM.

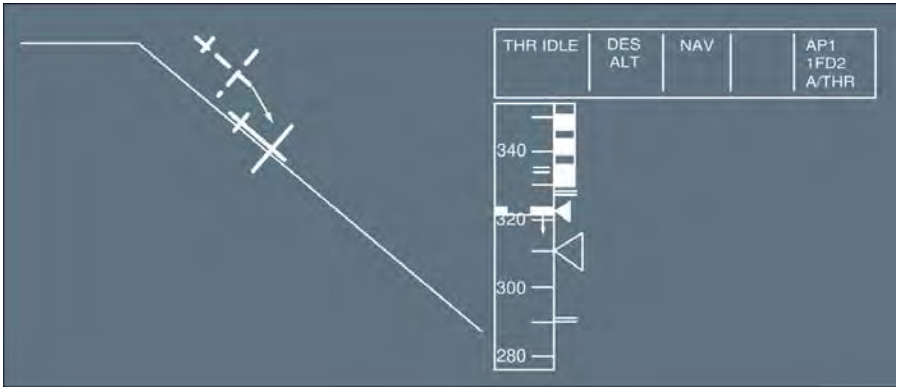
Ident.: DSC-22_20-40-30-D-00014863.0001001 / 30 JAN 13

IMPACT ON GUIDANCE

In DES mode, the FMGS maintains the aircraft on the vertical profile and keeps the IAS within the speed target range.
If the aircraft deviates above the profile, the IAS will increase to return to the vertical profile.



When the aircraft returns to the descent profile, the IAS will decrease to the target speed.



Ident.: DSC-22_20-40-30-D-00014864.0001001 / 30 JAN 13

IDLE FACTOR AT DELIVERY

The IDLE factor to be used at delivery is 0 %.

PROCEDURE TO MODIFY THE PERF AND IDLE FACTORS

Ident.: DSC-22_20-40-30-00014857.0001001 / 30 JAN 13
Applicable to: ALL

PROCEDURE TO MODIFY THE PERF AND IDLE FACTORS (ON GROUND ONLY)

- PRESS the MCDU DATA key and then the A/C STATUS prompt in order to access the A/C STATUS page
- For aircraft with FMS2 Honeywell or Thales:
  - ENTER the change code in the CHG CODE field.
    The default value for this code is “ARM” but it is possible to modify it on airline request.
    The applicable code is then coded in the Airline Modifiable Information (AMI).
    When a valid change code is entered, the IDLE and PERF factors are displayed in blue.
  - ENTER the new IDLE and PERF factors in the MCDU scratchpad separated by a "/".
    For example: "-2/+1"
  - PRESS the corresponding key to insert the new IDLE and PERF factors.

  The new IDLE and PERF factors are displayed in large blue font.

  Note: *Only authorized personnel should take the responsibility to update the IDLE and PERF factor values.*

- For aircraft with FMS1 Honeywell Legacy:
  - ENTER the new PERF factor in the MCDU scratchpad.
  - PRESS the corresponding key to insert the new PERF factor.

  The new PERF factor is displayed in large blue font.

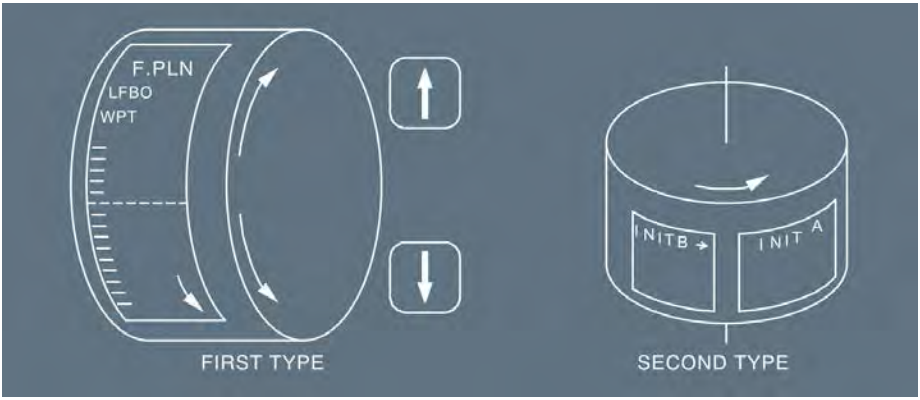
  Note: *1. Only authorized personnel should take the responsibility to update the PERF factor value.*
  2. The IDLE Factor is not available on aircraft with FMS1 Honeywell Legacy.

FMS2 Honeywell

GENERAL

Ident.: DSC-22_20-50-10-25-00000556.0001001 / 01 OCT 12
Applicable to: ALL

The Flight Management and Guidance System (FMGS) displays information on various “pages”. When a page cannot display all of the assigned information, it cues the pilot to call up additional information. There are three types of pages, and each type has its particular way of cuing the pilot to call up additional information.



FIRST TYPE

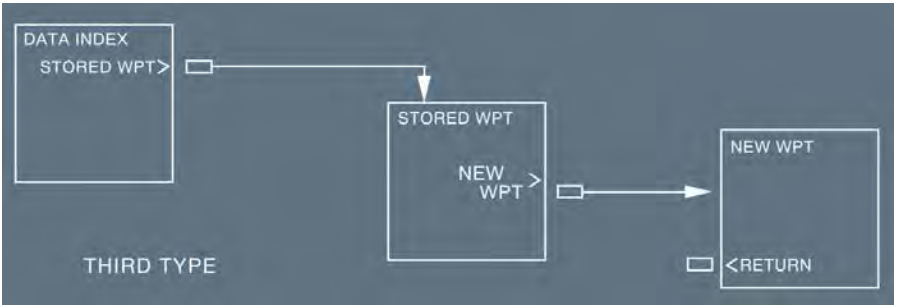
When this page cannot simultaneously display all the information on the screen (more information than the six pairs of lines can hold), the pilot can scroll the page up or down.
In this case, the screen displays a ↑ ↓ symbol in the bottom righthand corner (F-PLN pages, secondary F-PLN page, departure/arrival pages,...).

SECOND TYPE

When the information is on successive pages, the pilot presses the “NEXT PAGE” key to sequentially call up these pages.
In this case, an arrow is displayed in the top righthand corner of the screen (INIT pages).

THIRD TYPE

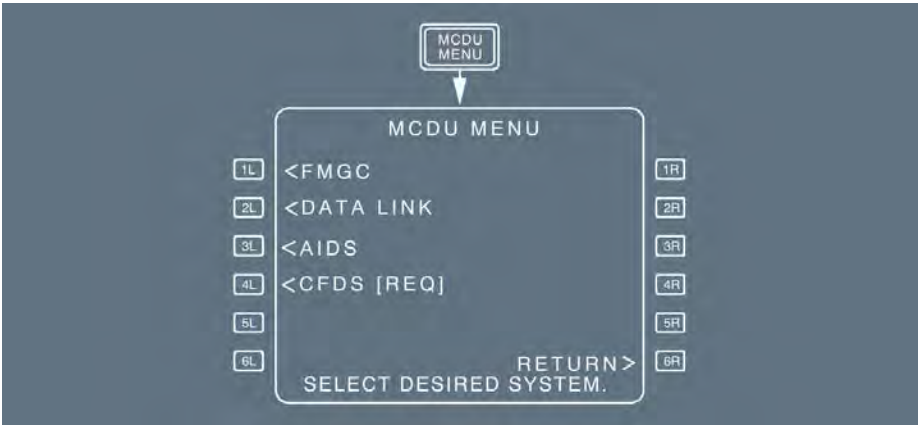
When different types of information are on successive pages, the pilot calls up these pages by pressing the key adjacent to the prompts >, < or *.



MCDU MENU PAGE

Ident.: DSC-22_20-50-10-25-00000557.0001001 / 14 MAY 12
Applicable to: MSN 1882-2078

This page lists the various systems which the pilot can access via the MCDU.

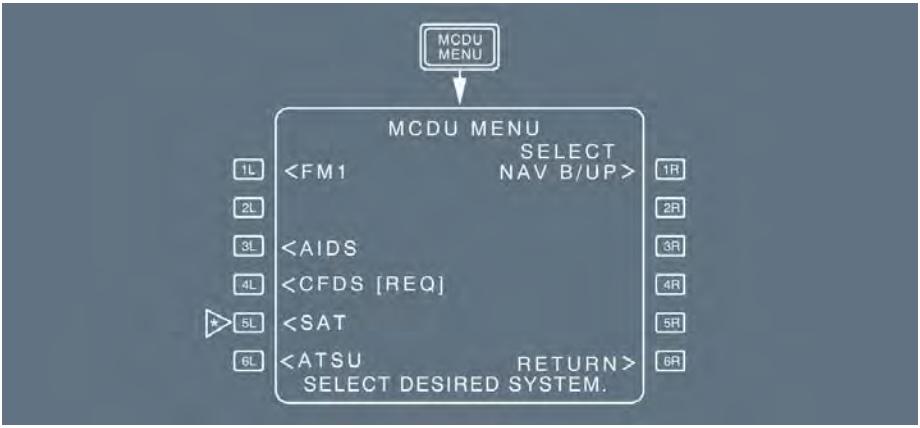


The pilot selects a system by pressing the key adjacent to the name of that system. The name of the selected system is displayed in green, all others in white.
If the MCDU cannot establish communication with the selected system, it displays “OUT”.
When a system calls for the pilot's attention, the MCDU displays “REQ” next to the system's name, and the “MCDU MENU” annunciator lights up.
When the pilot presses the key next to the name of the system requiring attention, the “MCDU MENU” annunciator light goes out.

MCDU MENU PAGE

Ident.: DSC-22_20-50-10-25-00000557.0010001 / 14 MAY 12
Applicable to: MSN 3408-4547

This page lists the various systems which the pilot can access via the MCDU.



The flight crew selects a system by pressing the key adjacent to the name of that system.
The name of the selected system is displayed in green, all others in white.
If the MCDU cannot establish communication with the selected system, it displays “OUT”.
When a system calls for the flight crew attention, the MCDU displays “REQ” next to the system’s name, and the “MCDU MENU” annunciator lights up.
When the flight crew presses the key next to the name of the system requiring attention, the “MCDU MENU” annunciator light goes out.

SELECT NAV B/UP — Pressing the [1R] key selects the NAV B/UP function and DESELECT NAV B/UP appears in the [1R] field. If the NAV B/UP is inoperative, the field is blank.

RETURN — This field is displayed when a function is active

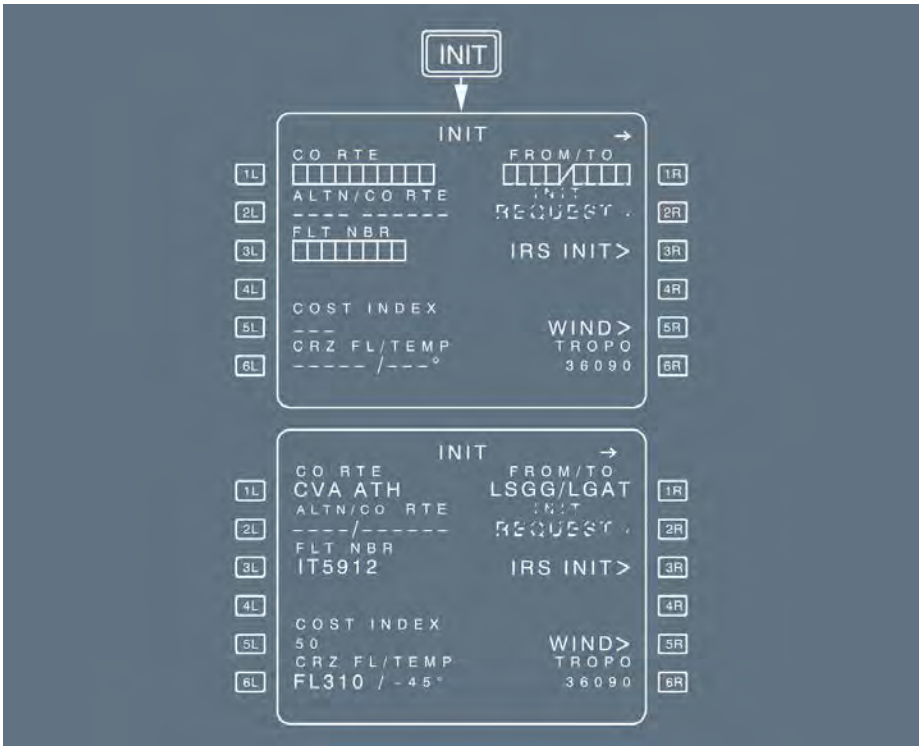
When the MCDU communicated with a system other than the FMGC, the flight crew should use the MCDU MENU page to revert to the FMGC system.

INIT A PAGE

Ident.: DSC-22_20-50-10-25-00000558.0009001 / 14 MAY 12
Applicable to: ALL

The flight crew uses the INIT A page to initialize the flight plan and align the inertial reference system.

- The flight crew accesses to this page by pressing the INIT key on the MCDU. The INIT A page can be accessed on ground or in flight.
- The flight crew may also call up this page by:
  - Pressing the “NEXT PAGE” key on the MCDU console, while on the INIT B page, or
  - Pressing the key next to “RETURN” or “INSERT” on the route selection page, or
  - Pressing the key next to “INSERT” on the wind page.
- When in the done phase, the pilot may press the INIT key to switch to the next preflight phase.



[1L] CO RTE	If the flight crew enters a company route number, the screen displays all data associated with that route (8 or 10 characters, depending on the pin program). Inserting the CO RTE into the RTE selection page also enters the CO RTE number in this field.
[2L] ALTN/CO RTE (blue)	This field is dashed, until a primary destination is entered in the 1R field. If a preferred alternate is associated with the primary destination, it is displayed in this field with the company route identification. The crew may manually enter an alternate and company route. If preferred alternate is not associated with the primary destination, NONE is displayed in this field. When the alternate route and the primary destination do not match, the MCDU scratchpad displays “DEST/ALTN MISMATCH”. If the primary destination is changed, this field is modified accordingly.
[3L] FLIGHT NUMBER	The flight number automatically appears in this field, if it is stored with the company route. The flight crew may modify it, or enter a new number here.
[5L] COST INDEX	This is usually stored in the database along with the company route. The flight crew may modify it, or enter a new value here. It defaults to the last entered value, if a value is not stored in the database.
[6L] CRZ FL/TEMP (cruise flight level and temperature)	The cruise flight level is usually stored in the database along with the company route. If not, it has to be entered manually. If no cruise flight level is entered, the system will not furnish predictions, while the aircraft is on the ground. The flight crew has to enter the temperature at cruise flight level in order to refine the predictions. Otherwise, these are computed for ISA conditions. (If no sign is entered, the system uses a plus).
[1R] FROM/TO	This field allows the pilot to enter a city pair (ICAO codes for city of origin and destination). This entry automatically deletes any previously entered company route and calls up the route selection page. If one airfield of the pair is not in the database, the display changes to the NEW RWY page.

[2R] INIT REQUEST	This prompt is displayed if the pilot did not enter an active flight plan or entered a flight number or a company route that is not in the aircraft database. Selecting this prompt sends the ground a request for active flight plan initialization (downlink message). When the star is not displayed, a downlink message cannot be sent. The uplink flight plan is automatically inserted in the active flight plan, prior to engine start, provided an active flight plan does not exist. After engine start, the uplink flight plan is sent to the secondary flight plan and manually inserted or rejected. (*Refer to DSC-22_20-70 Flight Plan Initialization Through ACARS*).
[3R] IRS INIT	The flight crew presses this key to access the IRS INIT page.
[5R] WIND	The pilot presses this key in order to gain access to the climb wind page, unless a temporary flight plan exists. In this case, the scratchpad displays TEMPORARY F-PLN EXISTS.
[6R] TROPO	The default tropopause altitude is 36 090 ft. The pilot can use this field to modify it (60 000 ft maximum).

ROUTE SELECTION PAGE

Ident.: DSC-22_20-50-10-25-00000559.0001001 / 17 MAR 11
Applicable to: ALL

This page displays all the company routes, stored in the database, that are associated with the inserted city pair. They can be called up manually, or displayed automatically.

- Manually : The pilot presses the FROM/TO or ALTN key on the INIT A page when a city pair is displayed.
- Automatically : The system displays it, when the pilot enters a city pair, or defines an alternate on the INIT A page of the active or secondary flight plan.

TITLE	Idents for the city pair inserted on the INIT A page. (The numbers in the upper righthand corner are the total number of company routes from this city pair stored in the database).
[1L]	This field shows the name of the company route. NONE appears, if there is no company route for this city pair.
Line 2 to Line 5	These fields display the various elements of the company route: Waypoints in large green font, and airways in small white font.
[6L] RETURN	The pilot presses this key to return to the INIT A page.
[6R] INSERT	The pilot presses this key to insert the displayed company route in the flight plan, and return to the INIT A page.

Note: The pilot can slew the display to show the rest of the route, if one page does not show it all, or to display other company routes for this city pair.

IRS INIT PAGE

Ident.: DSC-22_20-50-10-25-00013511.0051001 / 14 MAY 12
Applicable to: ALL

The flight crew uses the IRS INIT page to align the inertial reference system. The crew accesses this page, by pressing the IRS INIT key on the INIT A page.

Line 1 LAT-REFERENCE-LONG	This line provides the latitude and longitude of the FM reference position. This reference is extracted from the navigation database. The flight crew can modify this reference. Only when the FM reference position matches the origin airport position, the airport identifier is displayed in green. Otherwise, there are dashes at the place of the airport identifier. Latitude and longitude of the FM reference position are displayed in blue. The flight crew can modify the latitude and longitude values using the scroll keys.
Line 2 LAT-GPS POSITION-LONG	This line displays the GPS position latitude and longitude.
Line 3 to 5	These lines display the IRS 1-2-3 alignment state, source and latitude/longitude. The alignment status can be ALIGNING ON XXX, or ALIGNED ON XXX or IN ATT. XXX is the alignment source and can be GPS or CDU or REF. It is displayed in white font. The latitude and longitude values are displayed in green.
[6L] RETURN	This prompt enables the flight crew to return to the INIT A page.
[6R]	If a reference is available, field displays ALIGN ON REF → in blue which is replaced by CONFIRM ALIGN* in amber when 6R prompt is pressed. Pressing again the 6R prompt enables the transmission of the FM reference position displayed in line 1.

WIND PAGES

Ident.: DSC-22_20-50-10-25-00000560.0009001 / 17 MAR 11
Applicable to: ALL

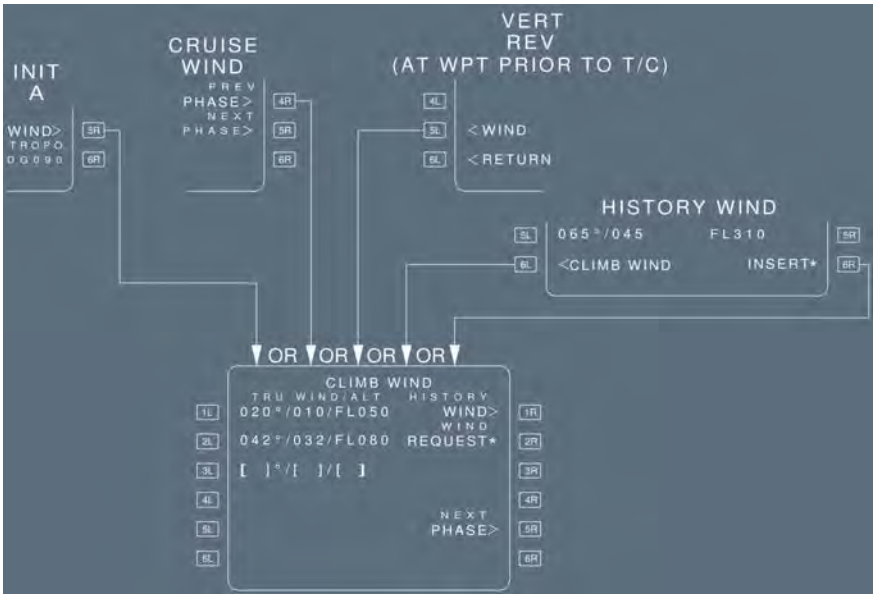
Winds in climb, cruise, descent and approach are necessary to provide the pilot with reliable predictions and performance. Wind pages enable the pilot to enter and/or review the winds propagated by the FMGS or sent by ACARS for the various flight phases.

Note: *On WIND pages, wind direction is always true-referenced.*

CLIMB WIND PAGE

This page enables the pilot to enter and/or review predicted wind vectors (direction and velocity) at up to 5 different levels.

THE CLIMB WIND PAGE IS ACCESSED FROM:



TITLE CLIMB WIND in large white font.

[1L] to [5L] TRU WIND/ALT — This field displays the winds, entered at various climb altitudes : In blue before climb phase activation, and in green after climb phase activation.
This field may also display history winds or uplink winds. Large blue brackets are displayed before any wind entry. Pilot-entered and uplinked winds are displayed in large font. History wind data is displayed in small font.
Upon sequencing the top of climb, the climb winds are deleted.

Note: *Climb winds are not deleted, when the origin airport is changed.*

[1R] HISTORY WIND — Displayed in preflight phase only. This key calls up the history wind page. This page is not modifiable (small green font), but can be inserted into the CLIMB WIND page by using the 6R key and modified accordingly.

[2R] WIND REQUEST — Pressing this key sends a request for ACARS winds. (*Refer to DSC-22_20-70 Wind Data - Request for Wind Data*).

[5R] NEXT PHASE — Pressing this key calls up the CRUISE WIND page, or the DESCENT WIND page, if no cruise waypoint exists.

HISTORY WIND PAGE

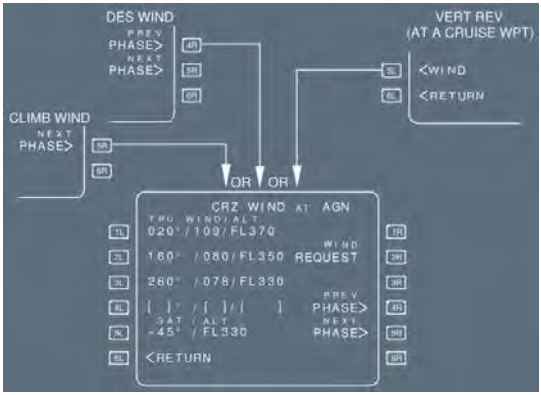
[6L] CLIMB WIND — This key reverts the display to the CLIMB WIND page.

[6R] INSERT — This key inserts the history wind values into the CLIMB WIND page.

CRZ WIND PAGE

This page displays the wind direction and velocity for each cruise waypoint.

The cruise wind page enables the definition of a temperature at a given altitude, and is accessed as follows:



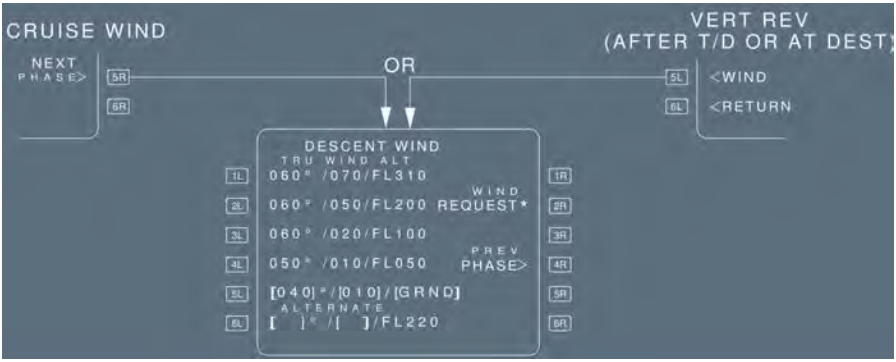
TITLE	CRZ WIND AT in large white font.
[1L] to [4L] TRU WIND/ALT	These fields display the entered wind at various altitudes in blue. The entered winds are propagated at the same altitude to the downpath cruise waypoints, if no other winds are entered. The propagated wind direction and velocity are displayed in small fonts. Both uplinked winds and pilot-entered winds are displayed in large blue font. Wind data is modifiable during cruise.
[5L] SAT/ALT	This field allows the pilot to enter a temperature at a given flight level, or to display a propagated value. The crew must enter both temperature and altitude at the first entry. They can then independently modify the temperature, or the altitude.
[2R] WIND REQUEST	Pressing this key sends a request for ACARS winds. (*Refer to DSC-22_20-70 Wind Data - Request for Wind Data*)
[4R] PREV PHASE	This prompt is displayed in Preflight, Takeoff, Climb and Done phases. Pressing this prompt calls up the CLIMB WIND page.
[5R] NEXT PHASE	Pressing this prompt calls up the DES WIND page.

Any new entry performed on the CRZ WIND page is immediately inserted into the corresponding flight plan. Predictions are dashed on the F-PLN pages during the recomputation time. CRZ WIND page automatically reverts to F-PLN page, if a temporary flight plan is created or the secondary flight plan is activated.

DESCENT WIND PAGE

This page enables the pilot to define and display the winds used for computing the descent profile.

The pilot calls it up by selecting NEXT PHASE on the CRUISE WIND page, or the WIND prompt on the VERT REV page.



[1L] to [5L]	This displays inserted winds or uplinked winds, in large blue fonts, prior to activating the descent phase (modifiable values), and in green after descent phase activation (not modifiable values). An entry of “GRND” in the “ALT” field is seen as the wind at ground level. This wind is copied on the PERF APPR page (and corrected for the magnetic variation). A clear action on one key reverts the line to blue brackets.
[6L] ALTERNATE	This field is only displayed when an alternate is defined. The pilot-entered value or uplinked value is displayed in large blue font. It is always modifiable by the pilot.
[2R] WIND REQUEST*	Pressing this key sends a request for ACARS winds. (*Refer to DSC-22_20-70 Wind Data - Request for Wind Data*).
[4R] PREV PHASE	Pressing this key calls up the CRUISE WIND page. The field is erased after the top of descent has sequenced.

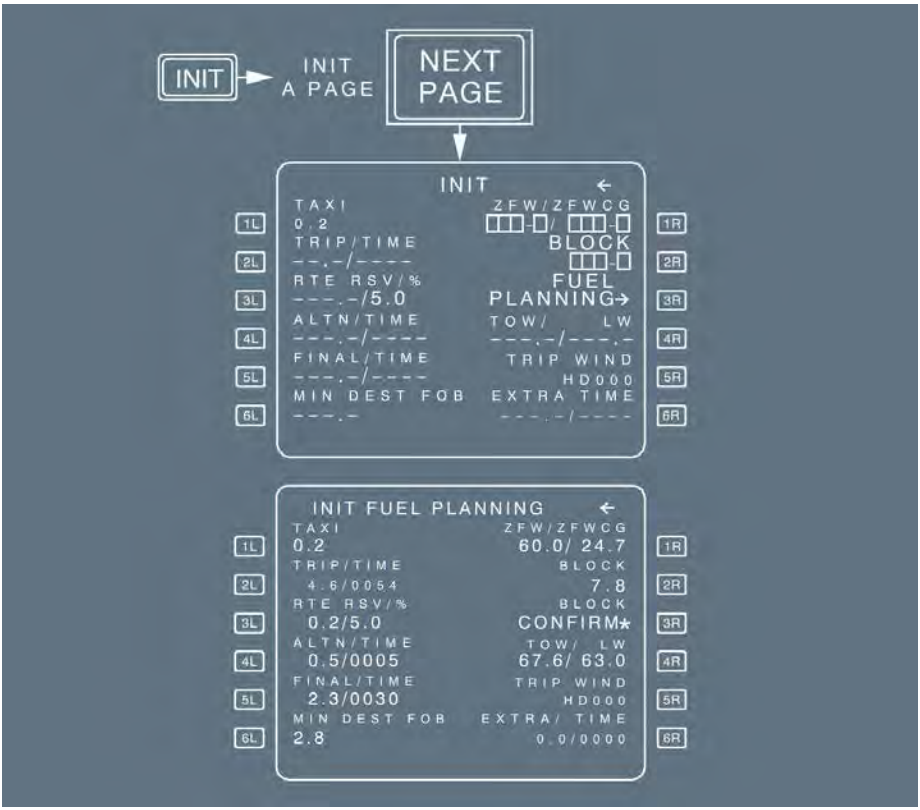
Note: *Descent winds and alternate wind are deleted, if the destination airport is changed.*

INIT B PAGE

Ident.: DSC-22_20-50-10-25-00000561.0009001 / 14 MAY 12
Applicable to: ALL

The pilot uses this page to initialize the gross weight and center of gravity, before starting the engines.
The pilot can call it up from the INIT A page during preflight phase prior to engine start, by pressing the NEXT PAGE key on the MCDU console, as long as engines have not been started.

This page automatically reverts to the FUEL PRED page after the first engine is started.
The FMGC will stop using the pilot-entered block fuel and will compute its predictions based on the FOB indicated by the FQI computer (or the FAC as a back up) from that moment on.



[1L] TAXI	This is the taxi fuel, which defaults to a preset value, (usually 200 kg or 400 lb in the AMI file). The crew can change the value through this field.
[2L] TRIP/TIME (green)	This field displays trip fuel and time when predictions become available. The pilot cannot modify this data.
[3L] RTE RSV/% (blue)	This field displays the contingency fuel for the route and the corresponding percentage of trip fuel. It may be equal to 0.0, if such is the policy of the operator. The flight crew can either enter a fuel quantity, or a percentage.

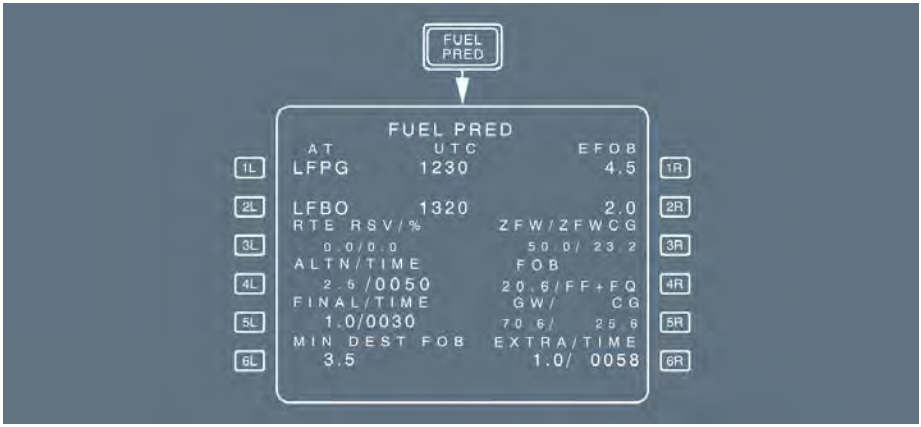
[4L] ALTN/TIME (blue/green)	Displays alternate trip fuel and time, assuming that the Cost Index = 0 and that the aircraft flies at the default cruise flight level. (*Refer to DSC-22_20-30-10-15 Alternate Function - Review and Selection of Alternate Airport*). The flight crew can modify the alternate fuel as required. In this case, alternate time will be dashed.
[5L] FINAL/TIME (blue)	Displays the final reserve fuel and time calculated at the alternate airport (or destination airport, if selected in the "airline fuel policy" section of the AMI). Before any crew entry, the FINAL field is dashed and FINAL TIME field is defaulted to the value specified in the AMI file (typically 30 min). The flight crew may enter a final fuel or time, and the system will compute associated holding time/fuel available. The system assumes a holding pattern at 1 500 ft AGL, with the aircraft in CONF 1 at maximum endurance speed (racetrack pattern, altitude and selected airport can be modified through the "airline fuel policy" section of the AMI).
[6L] MIN DEST FOB (blue)	Displays the expected minimum fuel at destination. It is equal by default to the ALTN + FINAL fuel. This field can be modified directly by the flight crew, and is also impacted by the modification of ALTN and/or FINAL fuel. *Note: If pilot entry of MIN DEST FOB is lower than ALTN + FINAL fuel, the message "CHECK MIN DEST FOB" is triggered on the MCDU.*
[1R] ZFW/ZFWCG (blue)	Displays the Zero Fuel Weight (ZFW) and Zero Fuel Weight CG (ZFWCG). The flight crew must enter the ZFW/ZFWCG values (as appropriate) to obtain a speed profile and predictions. *Note: If the flight crew enters a ZFW value that exceeds the acceptable range (as defined in the OPC or in the performance database), the "ENTRY OUT OF RANGE" message appears and the value is rejected.*
[2R] BLOCK	The block fuel in this field is a mandatory entry. When the flight crew enters a block fuel, the page title changes to INIT FUEL PREDICTION.

[3R] FUEL PLANNING (amber)	Initiates an FMGC block fuel computation using current hypothesis and extra = 0. When the pilot selects this function, FUEL PLANNING becomes green, and the BLOCK field is dashed during FMGC computation. The title of the page changes to INIT FUEL PLANNING, and BLOCK CONFIRM* replaces the FUEL PLANNING prompt, when the block fuel is computed by the FMGC. If the pilot modifies the parameters used to compute prediction before confirmation, the computation automatically restarts and FUEL PLANNING is displayed in green.
[4R] TOW/LW (green)	Displays the computed Takeoff Weight (TOW) and Landing Weight (LW) at the primary destination. This cannot be modified.
[5R] TRIP WIND (blue)	This field allows the entry of a mean wind component for the trip from the origin to the destination. Upon entry of a CO RTE or FROM/TO pair, this field defaults to HD 000 in small font. An entry preceeded by –, H, HD is considered to be headwind, +, T, TL to be tailwind. The entered speed is displayed in large blue font. When the flight crew inserts a wind on the CLIMB, CRUISE or DESCENT WIND page, or on the PERF APP page, the system no longer considers the trip wind, and the corresponding field is dashed.
[6R] EXTRA/TIME (green)	Displays the amount of extra fuel, and the resulting time available for holding over the primary destination. EXTRA FUEL = BLOCK – (TAXI + TRIP + RSV + MIN DEST FOB). The field displays its information in small font, and it cannot be modified by the flight crew.

FUEL PREDICTION PAGE

Ident.: DSC-22_20-50-10-25-00000562.0009001 / 14 MAY 12
Applicable to: ALL

The pilot presses the FUEL PRED key on the MCDU console to display fuel prediction information at destination and alternate, as well as fuel management data after the engines are started.



[1L] - [1R] AT-UTC/TIME-EFOB (green)
Display time and fuel predictions to the primary destination.
TIME is displayed before takeoff. UTC predictions are displayed after takeoff. If the flight crew has entered an Estimated Takeoff Time (ETT), the UTC is displayed.
The EFOB at destination will turn to amber, if it becomes less than the MIN DEST FOB value.

[2L] - [2R] AT-UTC/TIME-EFOB (green)
These lines display time and fuel predictions to the alternate airport. (*Refer to DSC-22_20-30-10-15 Alternate Function - General*).

[3L] RTE RSV% (blue)
Before departure, this field displays the route reserve fuel and the corresponding percentage of trip fuel. It may be equal to 0.0, if such is the policy of the operator. The crew can either enter a fuel quantity or a percentage. After takeoff, it becomes green 0.0/0.0, and the corresponding fuel is added to the EXTRA fuel.

[4L] ALTN/TIME (blue/green)
Displays alternate trip fuel and time, assuming that the Cost Index = 0 and that the aircraft flies at the default cruise flight level.
(*Refer to DSC-22_20-30-10-15 Alternate Function - Review and Selection of Alternate Airport*).
The flight crew can modify the alternate fuel as required.
In this case, alternate time will be dashed.

[5L] FINAL/TIME (blue)	Displays the final reserve fuel and time calculated at the alternate airport (or destination airport, if selected in the "airline fuel policy" section of the AMI). The flight crew may enter a final fuel or time, and the system will compute associated holding time/fuel available. The system assumes a holding pattern at 1 500 ft AGL, with the aircraft in CONF 1 at maximum endurance speed (racetrack pattern, altitude and selected airport can be modified through the "airline fuel policy" section of the AMI).
[6L] MIN DEST FOB (blue)	Displays the expected Minimum Fuel at Destination. It is equal to the FINAL + ALTN fuel. The field can be modified directly by the flight crew, and is also impacted by the modification of the ALTN and/or the FINAL fuel.
[3R] ZFW/ZFWCG (blue)	Displays the Zero Fuel Weight (ZFW) and Zero Fuel Weight Center of Gravity (ZFWCG) values, as entered before engine start on the INIT B page. The flight crew can re-enter or modify these values after engine start on the FUEL PRED page. If at engine start, no ZFW or ZFWCG values have been entered, amber boxes are displayed in the corresponding field. The flight crew must enter the ZFW/ZFWCG values to obtain a speed profile and predictions.
[4R] FOB (blue)	Displays the Fuel On Board (FOB) calculated by the FMGS and the following fuel sensors: - Fuel flow and fuel quantity sensors (/FF+FQ) - Fuel flow sensors only (/FF). - Fuel quantity sensors only (/FQ). The flight crew can modify the FOB value in flight, or modify the sensors used by entering "/FF", "/FQ" or "/FF+FQ", as required.
[5R] GW/CG (green)	The FMS continuously updates the GrossWeight (GW) and Center of Gravity (CG) during the flight. The field displays dashes, as long as the system is not calculating the Fuel On Board, or the ZFW has not been entered by the flight crew. The field cannot be modified.
[6R] EXTRA/TIME (green)	Displays the amount of extra fuel, and the resulting time available for holding over the primary destination. EXTRA FUEL = FOB – (TAXI + TRIP + RSV + MIN DEST FOB). This field displays its information in small green font, and it cannot be modified by the flight crew.

Note: All fields are dashed before engines are started.

FLIGHT PLAN PAGES

Ident.: DSC-22_20-50-10-25-00000563.0009001 / 23 JUN 15
Applicable to: ALL

These pages display all waypoints of the active and alternate flight plans, along with associated predictions.

The pilot can make all revisions to the lateral and vertical flight plans from these pages:
He presses the left key to revise the lateral flight plan, and the right key to revise the vertical flight plan.
He presses the F-PLN key on the MCDU console to access the page A of the active flight plan.

FLIGHT PLAN A PAGE

Page A displays time, speed, and altitude predictions for each waypoint of the active flight plan.

TITLE	FLIGHT NUMBER (blank, if no flight number has been entered). This line may display: TMPY in yellow if a temporary flight plan exists; OFST in white, if a lateral offset is flown; or, OFST in yellow, if a lateral offset revision is pending.
Line 1 to Line 5 WPT, UTC, SPD, ALT	These lines display consecutive waypoints along with associated predictions of time, speed or Mach and altitude for each. TIME is displayed before takeoff, and UTC after takeoff. After the pilot enters an estimated takeoff time (ETT), UTC is displayed. The time and flight level display at the FROM waypoint (first line of the flight plan) are values that the system memorized at waypoint sequencing.

[1R] SPD/ALT

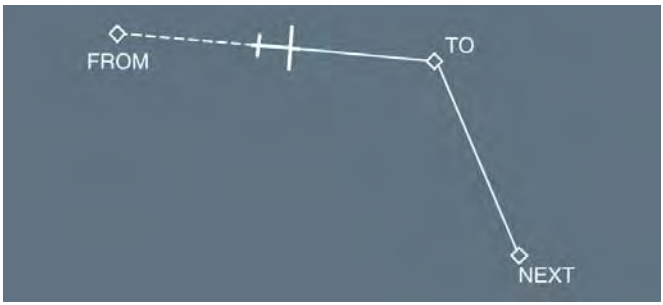
The field dedicated to SPEED or MACH is blank at the FROM waypoint, except at the departure airport. (V1 associated with runway elevation, is displayed).

Note: *When the HOLD marker is slewed, the HOLD SPD Label will overwrite the TIME/UTC title.*

Line 6, DEST UTC/TIME DIST, EFOB

DIST is the distance to destination along the displayed flight plan.
EFOB is the estimated fuel on board at destination. The EFOB at destination will turn to amber, if it becomes less than the MIN DEST FOB value.
The sixth line is permanent and is displayed in white font once predictions are available, except when a TMPY F-PLN is displayed or in some cases when an ALT CSTR is entered ("*CLB or DES*" prompt appears).

Note: *The predicted altitude at a waypoint is related to the QNH below the transition altitude, and is given as a flight level above the transition altitude.*



The generic flight plan page displays the FROM waypoint (last waypoint to be overflown) on the first line, and the TO waypoint (in white) on the second line. The FROM/TO flight plan leg is called the active leg.
The flight crew can use the scroll keys to review all flight plan legs down to the last point of the alternate flight plan. The AIRPORT key serves as a fast slew key. The pilot can press it to call up the next airport (DEST, ALTN, ORIGIN) to be displayed on the flight plan page.
In order to return to the beginning of the flight plan page, the pilot presses the F-PLN key on the MCDU console.
The display shows the name of the leg between two waypoints, and the distance between them on a line between the lines that identify them. During an approach, this in-between line also defines the angle of the final descent path. For example, "2-3 °" indicates that the leg is two nautical miles long, and the flight path angle is -3 °.

The display shows the bearing between FROM and TO waypoints as the bearing from the aircraft position to the TO waypoint. It shows track (TRK) between the waypoints shown in lines 2 and 3. This is the outbound track of the next leg.
If the database contains a published missed approach procedure, or if someone has inserted one manually, the display shows it in blue after the destination runway identification. It turns green when the go-around phase becomes active.
After the last waypoint of the missed approach, the display shows the alternate flight plan in NAV mode.
When NAV mode is engaged, the flight crew can only clear or modify the TO waypoint by using the DIR key on the MCDU console.

PREDICTIONS

The system calculates and displays predictions for all waypoints.
It uses the current wind to compute TO waypoint predictions, and uses predicted winds to compute all others.

CONSTRAINTS

The database may define an altitude and speed constraint for each waypoint of the climb, descent, and approach phases, or the pilot may manually insert such constraints (except at origin, destination, FROM, and pseudo-waypoints).
The constraints are displayed in magenta, as long as predictions are not completed.
Once predictions are available, constraints are replaced by speed and altitude predictions, preceded by stars. If the star is in magenta, the system predicts that the aircraft will match the constraint (altitude within 250 ft, speed not more than 10 kt above the constraints). If the star is in amber, the system predicts that the aircraft will miss the constraint and the MCDU displays: “SPD ERROR AT WPT”.

Note: SPD and ALT CSTR may either be entered on the VERT REV page or directly on the F-PLN A page, whereas TIME CSTR may only be entered from the RTA page.

PSEUDO-WAYPOINTS

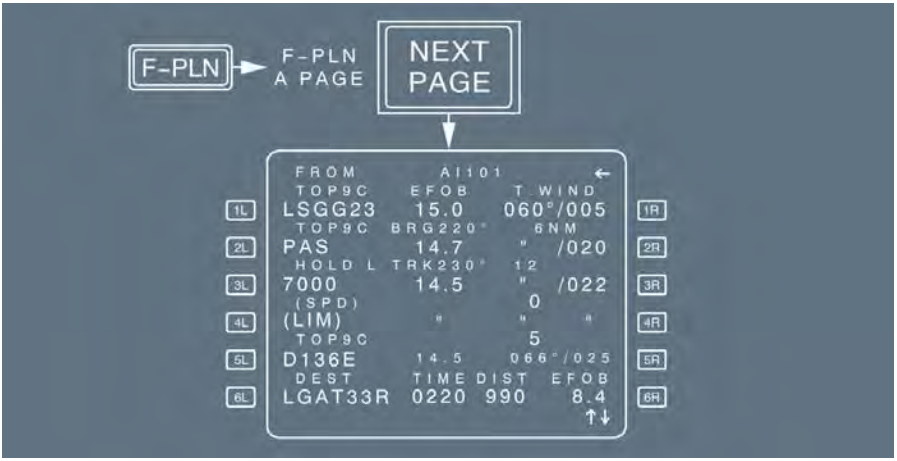
Pseudo-waypoints are geographical positions corresponding to an event in the vertical flight plan: T/C (top of climb), T/D (top of descent), SPD/LIM (speed limit), DECEL (deceleration for approach), etc. The display shows them as waypoints in parentheses.

APPROACH DISPLAY

The flight crew cannot enter an altitude constraint at destination or Missed Approach Point (MAP).

FLIGHT PLAN B PAGE

This page displays fuel predictions and forecast winds at each waypoint.
The pilot calls it up by pressing the NEXT PAGE key when the FLIGHT PLAN A page is displayed.



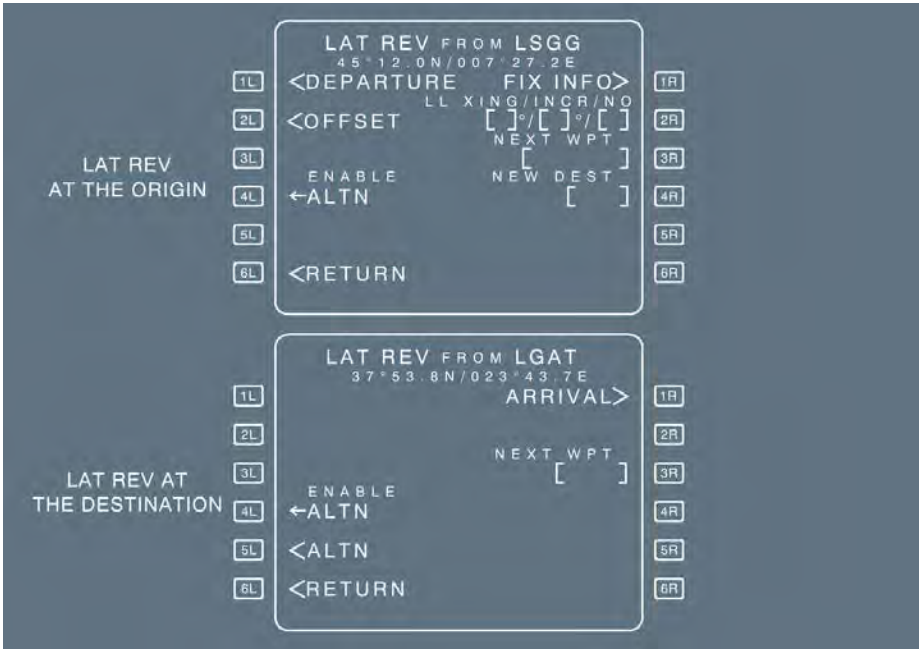
TITLE FLIGHT NUMBER (blank if no flight number has been entered).

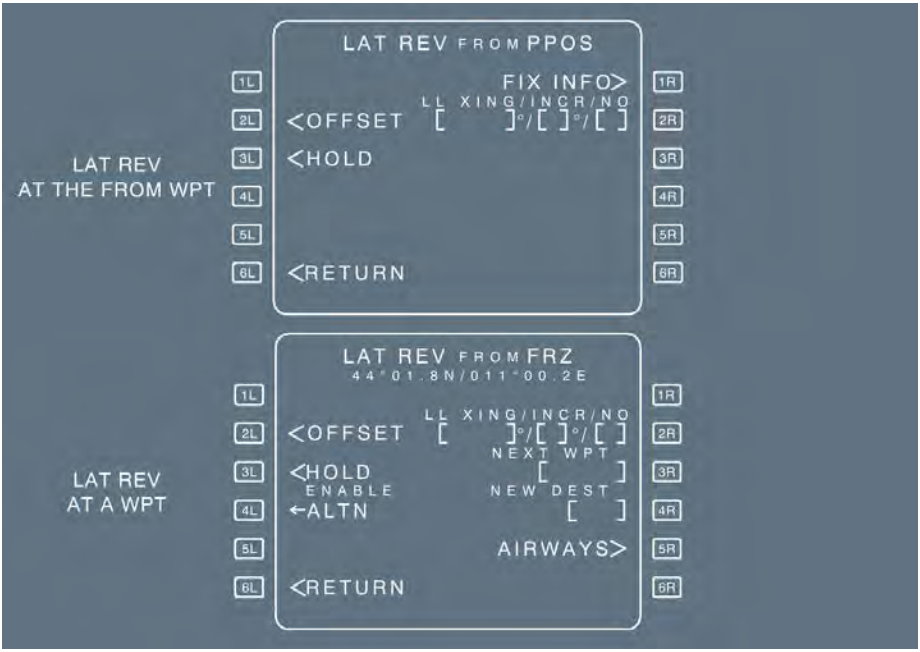
Line 1 to Line 5 WPT-EFOB-WIND	These lines display consecutive waypoints and associated fuel predictions, and the forecast wind profile. The direction of forecast winds is relative to true north. Forecast winds include winds entered by the pilot (large font) and the propagated winds at intermediate waypoints (small font). If the flight crew uses a trip wind, it will be displayed for each waypoint. If no other wind entry is made after takeoff, the FROM waypoint will display the actually recorded wind, and the waypoints downpath will still display the trip wind.
Line 6 DEST-UTC/DIST-EFOB	Identical to F-PLN A page.

LATERAL REVISION PAGES

Ident.: DSC-22_20-50-10-25-00000564.0009001 / 01 OCT 12
Applicable to: ALL

These pages give the pilot a list of the lateral flight plan revisions, which can be used to change the flight plan beyond a selected waypoint.
The pilot calls up these pages from the flight plan pages (A or B) by pressing the left key adjacent to the selected waypoint.
Different lateral flight plan revisions are available for different waypoints.


LAT REV AT THE ORIGIN
LAT REV FROM LSGG
45°12.0N/007°27.2E
<DEPARTURE
FIX INFO>
LL XING/INCR/NO
<OFFSET
[ ]°/[ ]°/[ ]
NEXT WPT
[ ]
ENABLE
NEW DEST
←ALTN
[ ]
<RETURN
LAT REV AT THE DESTINATION
LAT REV FROM LGAT
37°53.8N/023°43.7E
ARRIVAL>
NEXT WPT
[ ]
ENABLE
←ALTN
<ALTN
<RETURN

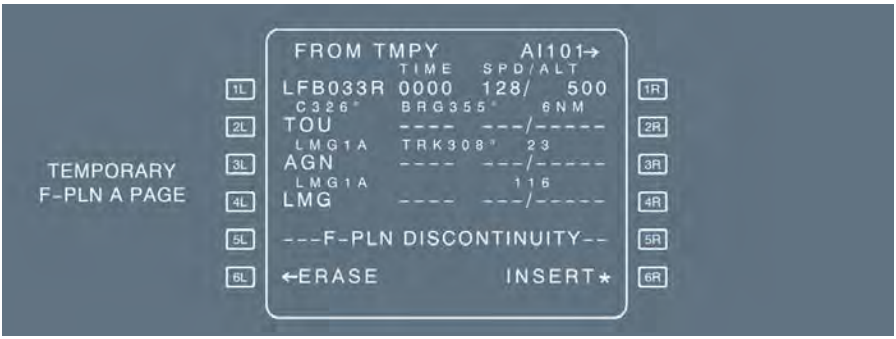


TITLE	The ident of the waypoint or airport selected for revision, along with its latitude and longitude. If the selected waypoint is the FROM waypoint, the title omits the aircraft latitude and longitude, and displays the “PPOS” (present position) instead.
[1L] DEPARTURE	This prompt gives the pilot access to the departure pages, where he can select and insert runways, SIDs, and TRANSs.
[2L] OFFSET	This prompt gives the flight crew access to the OFFSET page.
[3L] HOLD	This prompt gives access to the hold pages.
[4L] ENABLE ALTN	This prompt allows the pilot to switch to the alternate flight plan at the selected revision waypoint, and use it as a new active flight plan. The system never displays this prompt at the FROM waypoint.
[5L] ALTN	This prompt gives access to the alternate airport page. The system displays it only at the destination.
[6L] RETURN	This prompt returns the display to the flight plan page.
[1R] ARRIVAL	This prompt calls up the arrival pages, where RWY, APPR, STAR TRANS and VIA can be selected and inserted.

[1R] FIX INFO	FIX INFO is only displayed on the lateral revision page at the origin or FROM waypoint. It gives access to the FIX INFO page.
[2R] LLXING/INCR/NO	This prompt allows the pilot to create the latitude/longitude crossing point. The increment (INCR) ranges from 1 to 20 °, and the number of crossing points from 1 to 99. This prompt is not displayed for waypoints belonging to the descent procedure.
[3R] NEXT WPT	The pilot uses this prompt to enter the next waypoint. If this waypoint is a latitude/longitude, or is neither in the database nor in the pilot-defined elements, the display reverts to the NEW WAYPOINT PAGE.
[4R] NEW DEST	The pilot uses this prompt to enter a new destination.
[5R] AIRWAYS	The pilot uses this prompt to access the AIRWAYS page.
[6R] INSERT	This prompt is displayed when the pilot has created a temporary flight plan. It can be used to activate the temporary flight plan.

TEMPORARY REVISION

When the pilot selects a lateral revision, the system creates a “Temporary F-PLN” and displays it in yellow on the MCDU, and as a dashed yellow line on the ND, enabling the pilot to review the data before inserting it. As long as the temporary flight plan is not inserted, the previous flight plan remains active and the system guides the aircraft along it.

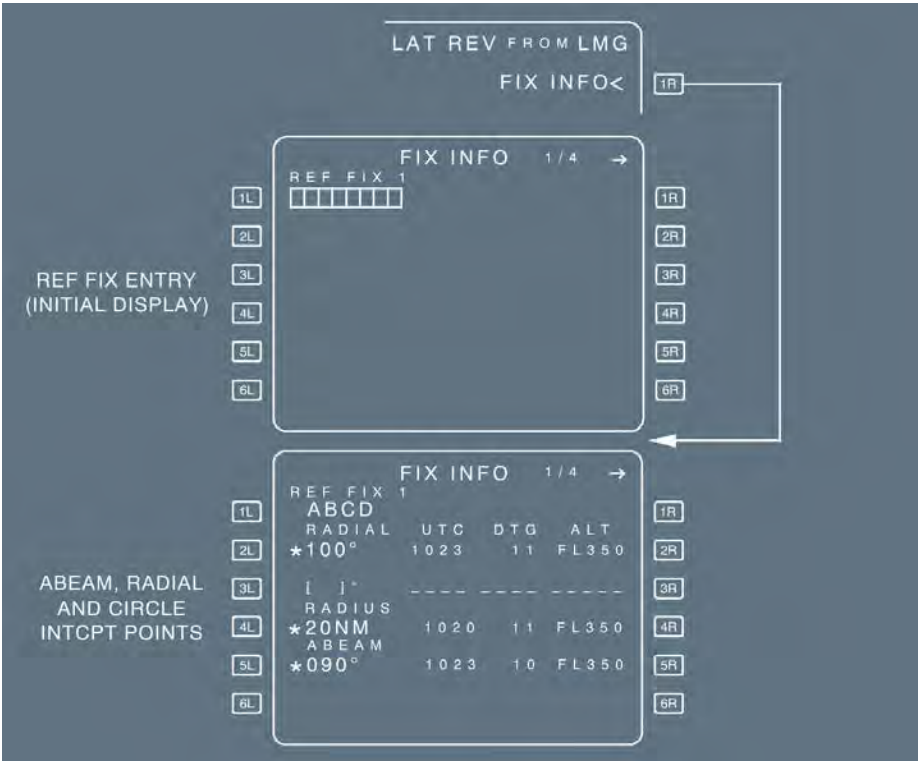


FIX INFO PAGE

Ident.: DSC-22_20-50-10-25-00000565.0009001 / 14 MAY 12
Applicable to: ALL

This page provides access to the RADIAL, CIRCLE, and ABEAM intercept functions.
The reference may be a given database fix or a pilot-defined element.
If the radial, circle or abeam intercepts the active flight plan, the intersection point can be converted to a waypoint and inserted into the flight plan.

The FIX INFO page may be accessed from the LAT REV page at the origin airport, or at FROM.



[1L] REF FIX (blue) — Allows entries of the REF FIX. This reference may be any database element (navaid, waypoint, NDB, airport, runway) or a pilot-defined element. Prior to entry, amber boxes are displayed.

[2L] - [2R] RADIAL (blue) and [3L] - [3R] (blue) — Enables entry of a radial from the REF FIX.

If the radial line intersects the active flight plan, the FMGS will compute the time, the along path DTG (Distance To Go), and the altitude at the intersection point (small green font). A large blue star is then displayed to insert the intersection waypoint into the flight plan. This waypoint is not part of the pilot-stored elements. Format of the created waypoint is:

XXXNNN XXX = First 3 letters of REF FIX ident.
NNN = Value of the radial

[4L] - [4R] RADIUS (blue)

This function enables the flight crew to enter a radius that defines a circle around the REF FIX.
When the circle intercepts the current flight path, the FMGS will compute the time, the along path distance and the altitude at the first intersection point, from the current aircraft position (small green front).
A large blue star is then displayed to insert the intersection waypoint into the flight plan. This waypoint is not part of the pilot stored element.

The waypoint is automatically labelled:

"DNNNXXX" NNN = Value of the radius
XXX = First 3 letters of the REF FIX ident.

[5L] - [5R] ABEAM

This function enables the pilot to create waypoints on a flight plan (primary or secondary) that are abeam a reference fix.
Once computed, the page displays the radial number in large green font.
Time, distance and altitude predictions are displayed in small green font.
Selecting the key adjacent to the star creates the waypoint and inserts it into the flight plan.
The waypoint is identified by AB + the REF FIX ident e.g. AB TLS.
Abeam waypoints are not stored in the pilot-stored waypoint database.

Note: *Four FIX INFO pages, providing the capability to define four different REF FIX elements, are available.*

OFFSET PAGE

Ident.: DSC-22_20-50-10-25-00013512.0019001 / 14 MAY 12
Applicable to: ALL

This page allows the flight crew to insert a preplanned offset into the flight plan by entering:
- A start waypoint
- An end waypoint
- An offset distance to the left or to the right
- The intercept angle value.

The flight crew calls up this page from the LATERAL REVISION page, by pressing [2L] key.

TITLE	OFFSET in white large font. If a temporary flight plan exists, it is displayed in yellow large font.
[1L] OFFSET	This field displays the lateral offset distance, left or right, in the flight plan. The offset may be between 1 and 50 NM. Blue brackets are displayed until an offset is inserted. When the flight crew enters an offset, or modifies another element in the OFFSET page, the OFFSET field becomes yellow. One time the temporary flight plan is inserted, the field becomes blue. The flight crew can delete an inserted offset either by pressing the CLR key, by entering a zero for the amount of the offset, or by pressing OFFSET DELETE in 6L field.
[2L] START WPT	The START WPT ident for the offset is displayed in yellow if a temporary flight plan exists, in blue if already inserted, or in green when the field is not modifiable. The default START WPT shall be the waypoint where the lateral revision is performed, the first waypoint offsettable, or PPOS if the offset is currently flown. This waypoint can also be selected from the list of waypoints in the fields 3L to 5L, or can be manually entered by the flight crew.
[3L] to [5L]	Display the start waypoints available for selection. Two scrolling list are available. The active start waypoint is displayed in green in the list. Other waypoints are displayed in blue. The currently selected start waypoint does not have selection arrow associated.
[6L] RETURN ERASE	RETURN: The flight crew presses this key to return to the last displayed LAT REV page. ERASE: It is displayed when a temporary flight plan has been created, and it enables the flight crew to erase the temporary flight plan.

[1R] INTCPT ANGLE	This field displays the intercept angle. The angle may be between 10 ° and 50 °. The intercept angle in the AMI is the default value, and is shown in blue. When the flight crew enters an intercept angle, or modifies another element in the OFFSET page, the field becomes yellow. One time the temporary flight plan is inserted, the field becomes blue.
[2R] END WPT	The END WPT ident for the offset is displayed in yellow if a temporary flight plan exists, or in blue if already inserted. The default END WPT shall be the waypoint terminating the last consecutive offsettable leg from default or currently selected START WPT. This waypoint can also be selected from the list of waypoints in the fields 3R to 5R, or can be manually entered by the flight crew.
[3R] to [5R]	Display the end waypoints available for selection. Two scrolling lists are available. The active end waypoint is displayed in green in the lists. Other waypoints are displayed in blue. The currently selected end waypoint does not have selection arrow associated.
[6R] INSERT OFFSET DELETE	INSERT: This field allows the flight crew to activate the temporary flight plan and reverts the display to the active flight plan. This field is displayed when the offset segment is completely defined on OFFSET page. OFFSET DELETE: This prompt enables the flight crew to create a temporary flight plan where the predefined offset is canceled. This field is displayed when an offset exists in the active flight plan.

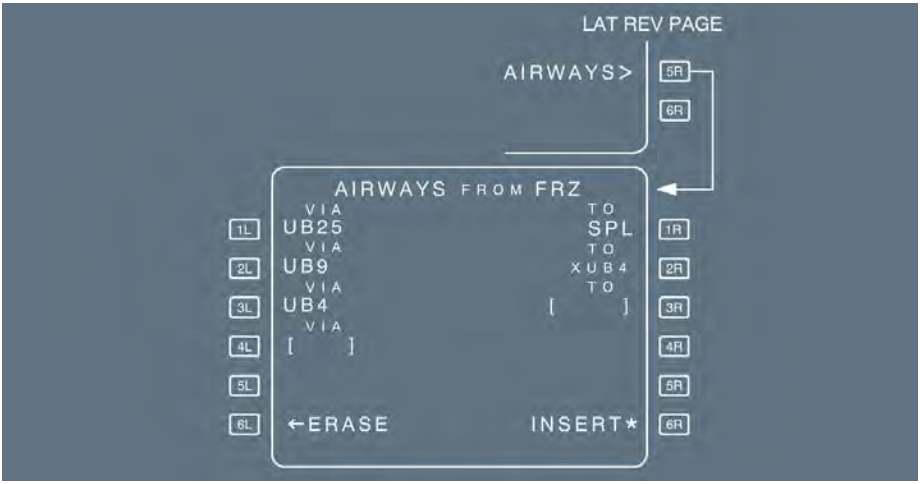
Note: *If the waypoint lists in lines 3 to 5 do not fit in one page, the flight crew can scroll in an open loop, two lines by two lines. To keep the initial order of the list, two markers appear:*

- *- START OF LIST - : This marker is displayed at the beginning of the list*
- *- END OF LIST - : This marker is displayed at the end of the list.*

AIRWAYS PAGE

Ident.: DSC-22_20-50-10-25-00000566.0009001 / 14 MAY 12
Applicable to: ALL

This page allows the pilot to select up to five airways for stringing into the flight plan, after the revise waypoint.
The pilot calls up this page by pressing the lateral revision page [5R] key.



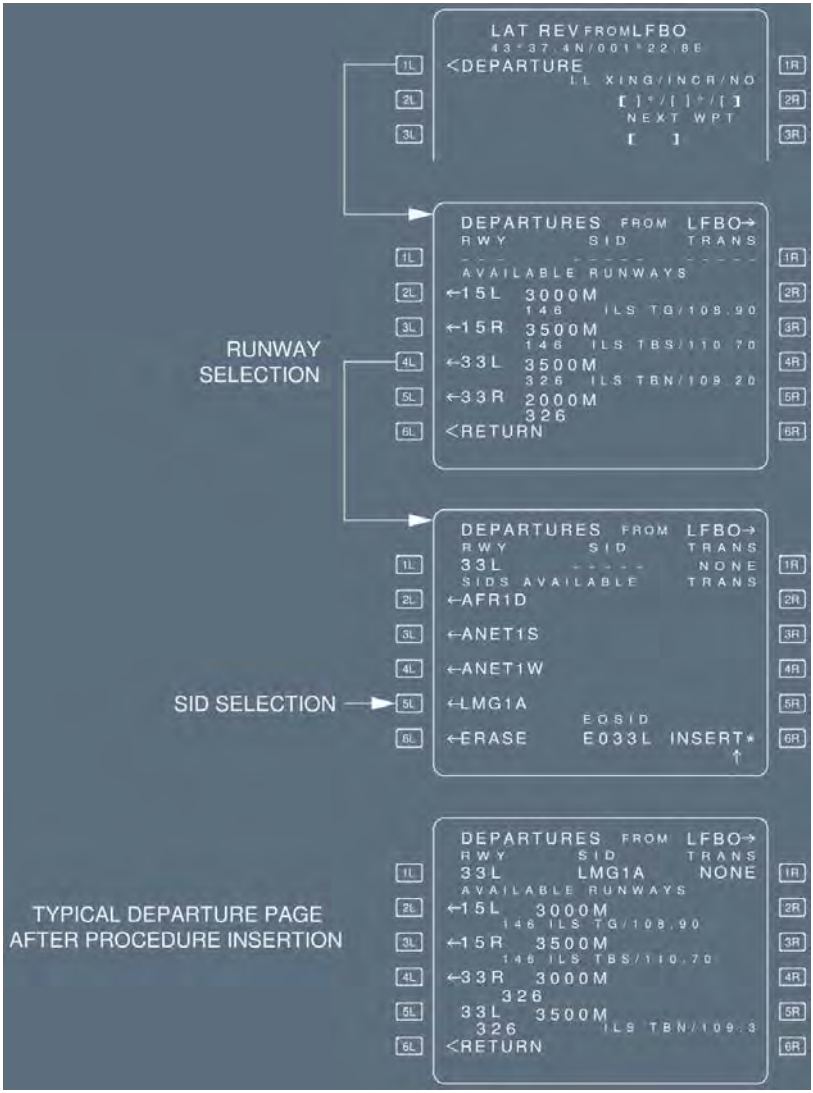
TITLE	Revise point ident (large green font)
[1L] to [5L] VIA	This field displays the airways entered by the pilot.
[6L] ERASE or RETURN	The flight crew presses this key to return to the lateral revision page. This field displays ERASE when a temporary flight plan is created. It enables the temporary flight plan to be erased.
[1R] to [5R] TO	Displays the end points of the corresponding airways entered on the [1L] to [5L] entries. The ending point is displayed in large blue font, if manually-entered, in blue small font if FMGC-computed.
[6R] INSERT (amber)	Allows the entered VIA/TO segments to be inserted into the flight plan. The display reverts to the F-PLN page.

Note:
1. *If the entered airway contains at least one fixed radius transition waypoint as defined in the navigation database, and the TO waypoint is defined and, the fixed radius transition waypoint is in the flight plan, then, "FIXED TURN RADIUS AWY" is displayed between the VIA and TO fields.*
2. *If the condition for display "FIXED TURN RADIUS AWY" is satisfied for two consecutives airways lines, the second line displays (") instead of the whole message.*

DEPARTURE PAGES

Ident.: DSC-22_20-50-10-25-00000567.0001001 / 17 MAR 11
Applicable to: ALL

These pages allow the pilot to review departure procedures (RWY, SID, TRANS) and enter them into the active flight plan.
When the display shows the lateral revision page for the origin, the pilot calls them up by pressing the 1L key.
Three pages are available: RWY, and SIDS and TRANS (if any).
The pilot sequentially calls up each page by selecting a data item (such as RWY), or by pressing the NEXT PAGE key on the MCDU console.



Line 1 RWY, SID TRANS

This line displays the RWY, SID, and TRANS in green after they have been inserted into the active flight plan, or in yellow if selected but not yet inserted. If nothing has been selected or inserted, the line displays dashes.

[2L] to [5L] RWY/SIDs	These fields display selectable and selected RWYs or SIDs (including EOSID and NO SID option). The pilot can slew each list. Selectable RWYs and SIDs are displayed in blue with an arrow. Once a RWY or SID is selected, the arrow disappears. A RWY or SID, already inserted in the flight plan, is displayed in green. The display shows the length, heading, and, if available, the ILS ident and frequency for each runway.
[6L] ERASE or RETURN	The pilot presses this key to erase a selected data item and revert to the previous selection. If the pilot erases the page, the display reverts to the active flight plan page. The display shows RETURN instead of ERASE, when the pilot has not created a temporary flight plan.
[2R] to [5R] TRANS	This field displays the selectable and selected enroute transitions in blue and green respectively. They are blank, if there are no transitions.
[6R] INSERT or BLANK	The pilot uses this key to insert a temporary procedure into the flight plan. The page reverts to the active flight plan page, when the insertion is completed. It is associated with RETURN (6L).
[6M] EOSID	Once a runway is inserted into the flight plan, this field displays any ENG OUT SID for that runway. If there is none, it displays NONE.

HOLD PAGES

Ident.: DSC-22_20-50-10-25-00000568.0001001 / 01 OCT 12
Applicable to: ALL

These pages allow the pilot to review and modify the holding pattern parameters at the selected revise waypoint.
The flight crew calls up these pages by pressing the HOLD key on the LAT REV page for the waypoint. The flight crew can insert database hold, holds computed by the FMS or holds that they manually define.

At first access, the HOLD page appears as follow:

DATABASE HOLD

If a hold is defined in the navigation database for the revised waypoint, and can be inserted, the parameters in [1L], [2L] and [3L] appear in yellow.

COMPUTED HOLD

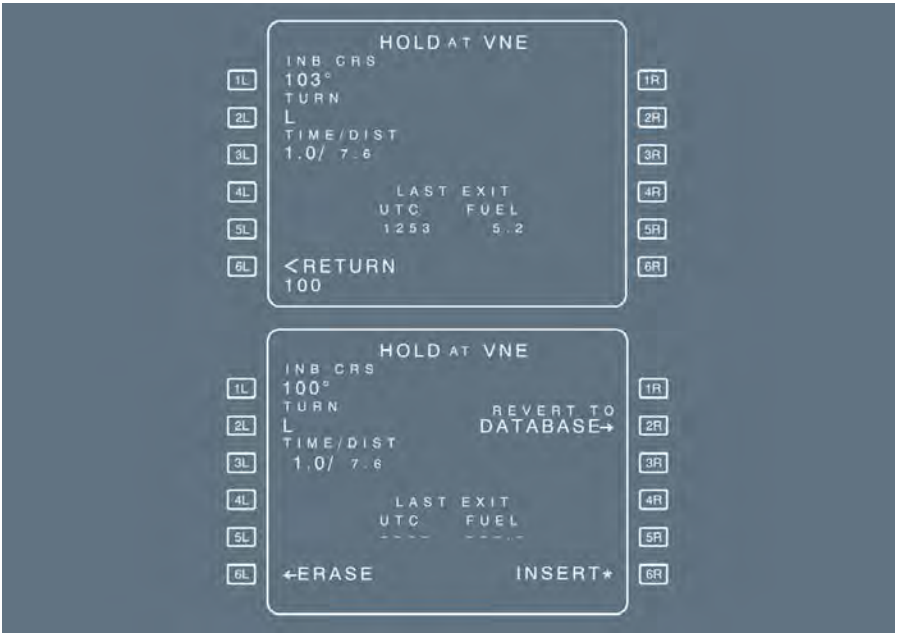
If a default hold is computed by the FMS and can be inserted, the parameters in [1L], [2L] and [3L] appear in yellow.

A computed hold has the following default parameters:

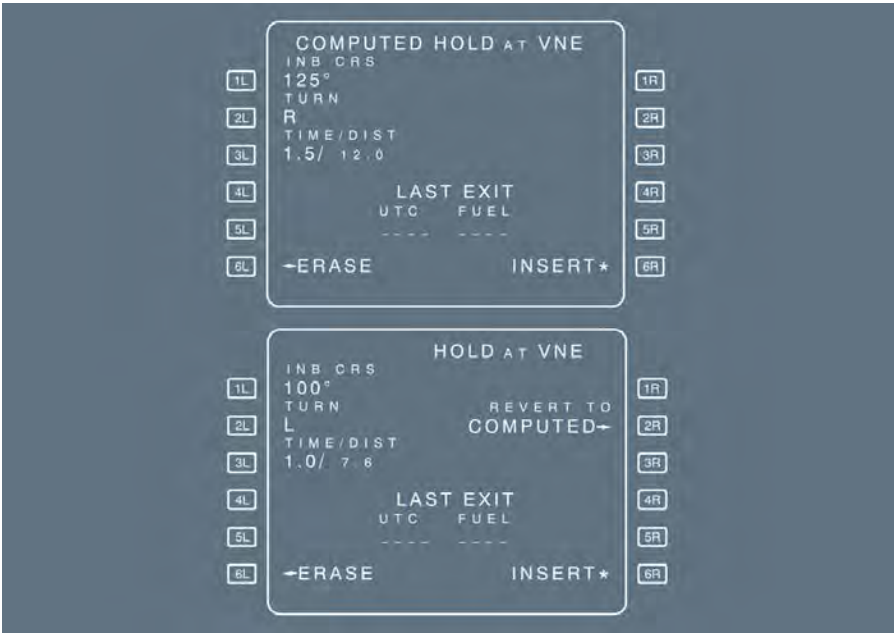
[1L] INB CRS	Inbound track of the F-PLN leg leading to the revised waypoint
[2L] TURN	Direction right (R) to turn in the hold
[3L] TIME/DIST	TIME on outbound leg is 1.5 min above 14 000 ft, 1 min below 14 000 ft.
[2R]	This field shows “REVERT TO COMPUTED” when the flight crew has modified the holding pattern.

HOLD MODIFIED BY FLIGHT CREW

If the flight plan contains a holding pattern that was defined by the pilot from an existing database or computed hold, the parameters in [1L], [2L] and [3L] appear in blue.
If the pilot has modified holding pattern data from the database, the field next to [2R] displays “REVERT TO DATABASE” or “REVERT TO COMPUTED” to enable the pilot to revert to default parameters.



EXAMPLE	The pilot modifies the inbound course.



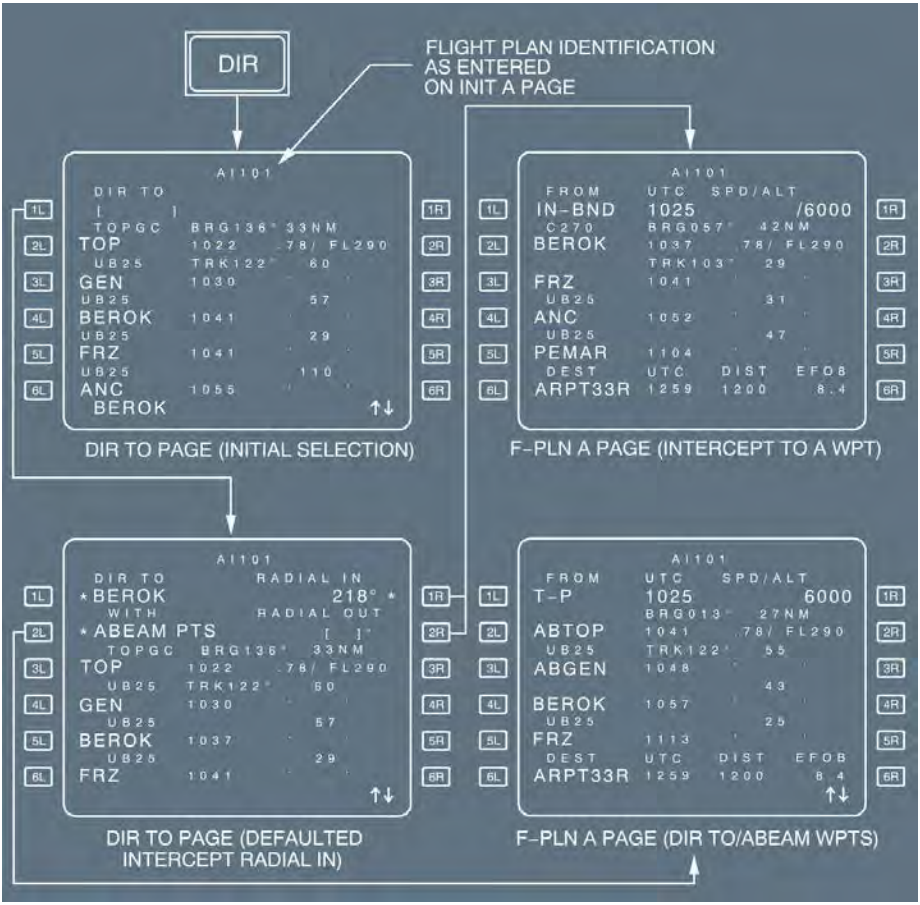
[1L] INB CRS	This field displays the inbound course of the holding pattern. The data may be manually or automatically modified.
[2L] TURN	This field shows the direction to turn in the hold (L or R). The data may be modified.
[3L] TIME/DIST	This field shows the time and distance for the outbound leg. The data may be modified, but time and distance cannot be entered simultaneously. Time and distance are dependent values that the system calculates from the predicted true airspeed, which in turn depends upon the holding speed (speed for maximum endurance, ICAO speed limit, or constraint speed, whichever is lower).
[6L] ERASE or RETURN	The pilot presses this key when the field shows “ERASE”, to erase the holding pattern. The pilot presses this key when the field shows “RETURN”, to return to the LAT REV page, if the hold is already inserted in the flight plan.
[2R] REVERT TO...	The pilot presses this key to delete manual modifications to the database hold (or computed hold), and to revert to the database (or computed) holding data.

[6R] INSERT — The pilot presses this key to insert the hold into the active flight plan.

LAST EXIT UTC FUEL — This field displays the time at which the aircraft must leave the holding pattern in order to meet fuel policy criteria (extra fuel = 0). The system also displays the estimated fuel on board at that time. Always displayed in thousand of kilograms or pounds.

DIRECT TO PAGE

Ident.: DSC-22_20-50-10-25-00000569.0001001 / 23 JUN 15
Applicable to: ALL



Pressing the “DIR” key under the MCDU screen brings up the DIR TO page. On this page, the [1L] key is the DIR TO key. The pilot presses it to modify the flight plan by creating a direct leg from the aircraft's present position to any selected waypoint. When in NAV mode, the pilot must use this key to modify the active leg or the TO waypoint. The pilot cannot call up this page when the aircraft's present position is not valid.

[1L] DIR TO

Pressing this key selects the DIRECT TO or INTERCEPT waypoint. The pilot can identify the waypoint to be inserted by using its identifier, its latitude and longitude, place/bearing/distance, or place-bearing/place-bearing.

Note: If the entered DIR TO is a latitude/longitude, the NEW WAYPOINT page is automatically called up.

If the pilot does not select the RADIAL IN (1R) or RADIAL OUT (2R) or ABEAM PTS (2L), the DIR TO function routes the aircraft from the present position to the waypoint inserted in the DIR TO field.

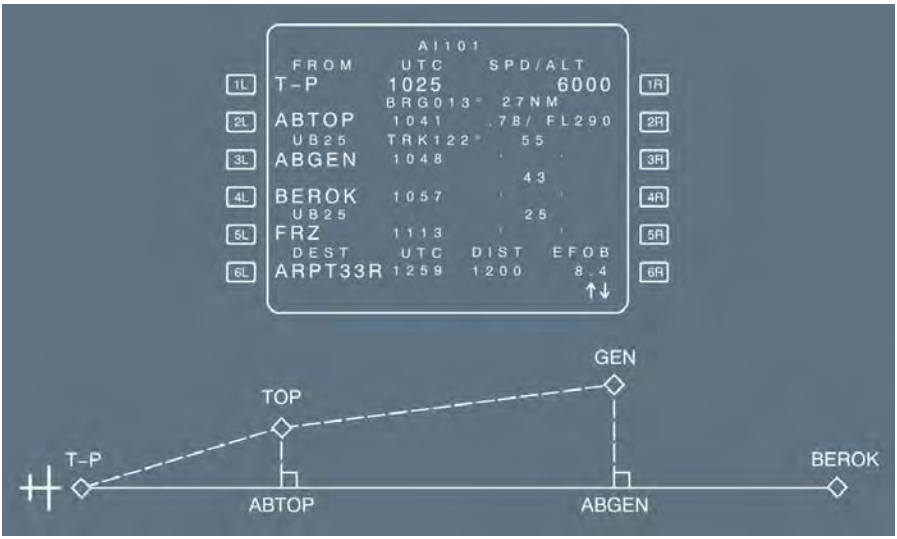
Line 3 to Line 6

These lines display the active flight plan with time/speed/distance predictions. The display may be slewed ↑ ↓.
Pressing any key activates the DIRECT TO function from the present position to the waypoint adjacent to that key.

[2L] ABEAM PTS

The flight crew presses this key to activate the DIR TO/ABEAM function which projects the flight plan waypoints perpendiculary on the DIR TO leg:

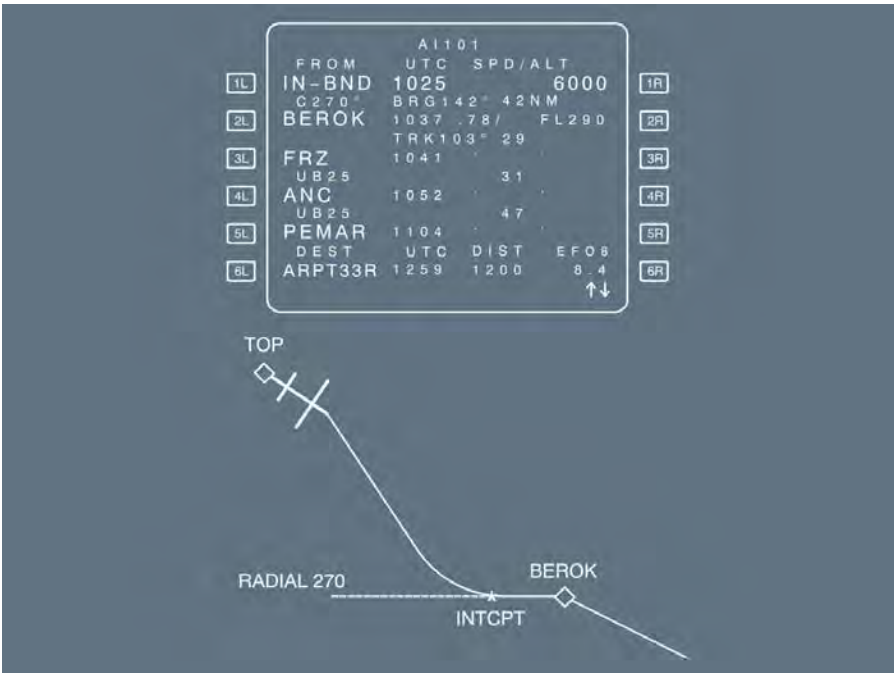
EXAMPLE: DIR TO BEROK - ABEAM.



[1R] RADIAL IN and
[2R] RADIAL OUT

The pilot fills in these fields to define a radial, associated to the waypoint defined in 1L. These keys respectively activate the DIR TO/INTERCEPT TO and DIR TO/INTERCEPT FROM functions. The pilot enters the radial in, or radial out, as : XXX, XXX being the radial.
The aircraft intercepts from its current position and tracks the selected waypoint and radial to (or from) this waypoint.

EXAMPLE: RADIAL INBND - DIR TO BEROK - RADIAL 270 ° INBOUND



If the DIR TO/INTCPT WPT entry is to a waypoint already in the flight plan, a default RADIAL IN is displayed in small font. However, no radial is displayed on the ND for this default radial. No default radial is provided for the RADIAL OUT field.

Selecting the INTCPT TO (RADIAL IN [1R]) function:
- Activates the intercept radial INTO the WPT.
- Sets the course = radial IN + 180 °.
- Reverts the display to the F-PLN A page.

Selecting the INTCPT FROM (RADIAL OUT [2R]) function:
- Activates the intercept radial FROM the WPT.
- Sets the course = radial OUT.
- Reverts the display to F-PLN A page.

For details, DSC_22_20_30 Flight Planning.

Note: *It is not recommended to use the DIR TO function when the aircraft is on the ground. The use of the DIR TO function when the aircraft is on the ground may result in the loss of all departure data, that includes both of the following:*

- *The takeoff speeds*
- *The derated level, or the flexible temperature.*

ARRIVAL PAGES

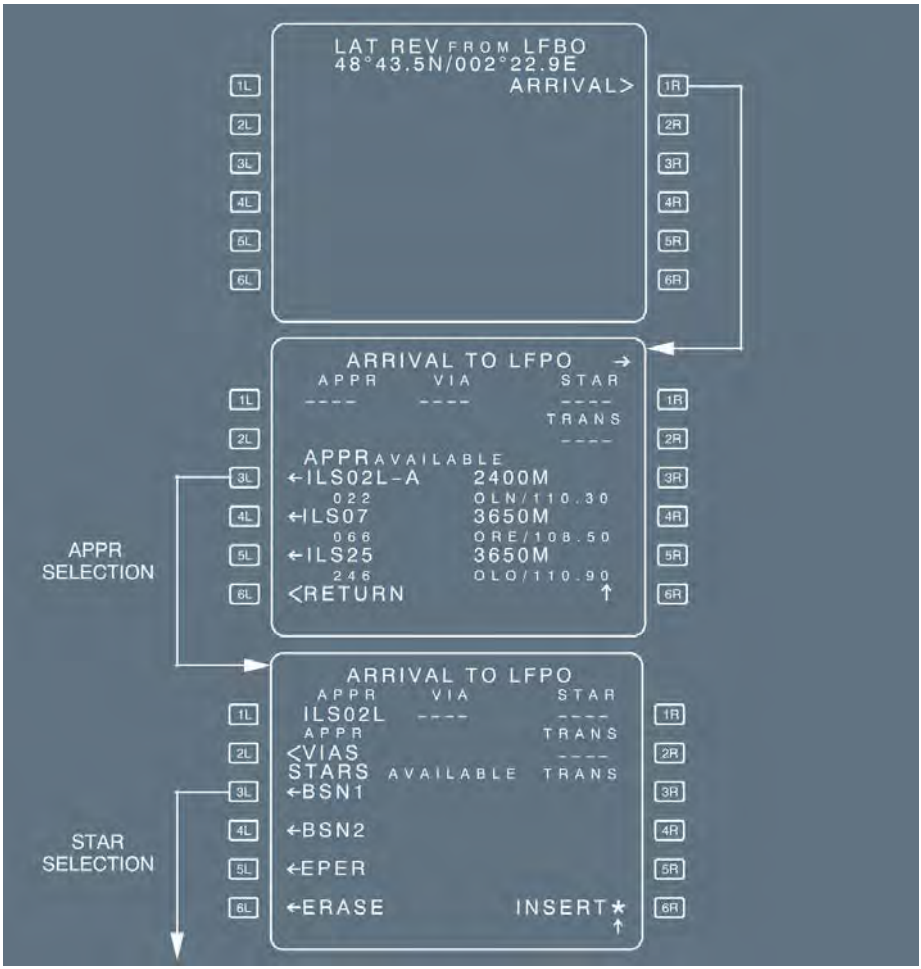
Ident.: DSC-22_20-50-10-25-00000570.0009001 / 14 MAY 12
Applicable to: ALL

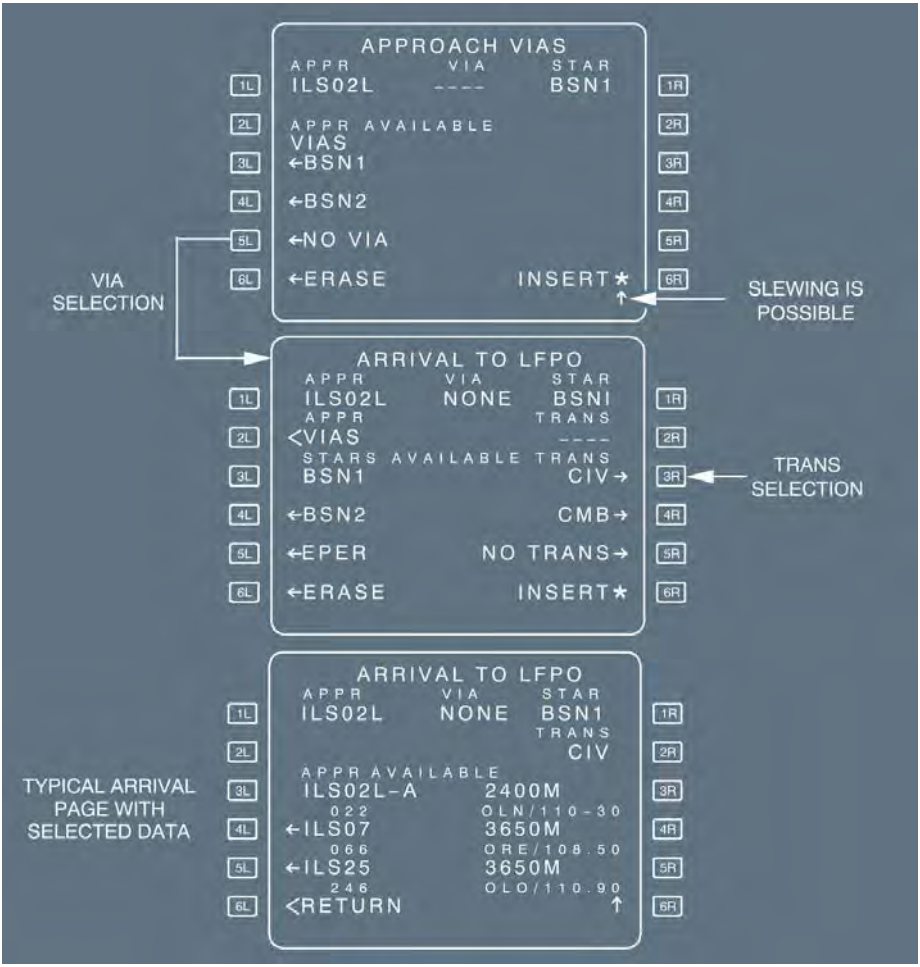
These pages enable the pilot to review arrival procedures (approaches, VIAs, STARs, TRANS) and enter them into the active flight plan.
The pilot calls them up from the LAT REV page for the destination by the pressing the 1R key.
Three pages, APPR, STAR, and VIA, are available, along with a fourth,TRANS, if there are any transitions.
The pilot calls up each page sequentially, either by selecting a data item (such as APPR), or by pressing the NEXT PAGE key on the MCDU console.

Line [1L] - [1R] [2R]	This line displays the APPR, VIA, STAR, and TRANS in green, if they have been inserted in the flight plan, and in yellow, as a temporary flight plan, if they have been selected but not yet inserted. It displays dashes or NONE, if nothing has been selected or inserted.
[2L] APPR VIAS	The pilot presses this key to call up transitions from the last point of the STAR to the first point of the approach.
[3L] to [5L]	These fields list selectable and selected APPRs, STARs, and VIAs. The flight crew can slew the pages, when necessary. Selectable APPRs, STARs, and VIAs are displayed in blue with an arrow. Once the pilot has selected an APPR, STAR, or VIA, the arrow disappears. After the APPR, STAR, or VIA is inserted into the flight plan, it is displayed in green. For each approach, the display shows runway length, heading, and the frequency and identifier of the ILS when ILS is available. In case there are multiple approaches for the same runway, the approach is identified with the runway plus the multiple indicator (i.e. ILS 33L-S).
[6L] ERASE or RETURN	The pilot presses this key to erase selected data and to revert to the previous selection. The page reverts to the LAT REV page. The field displays “RETURN”, instead of ERASE, when the flight crew has not created a temporary flight plan.

[3R] TRANS to [5R] These fields display selectable and selected enroute transitions (if any). They are blue when selected, and become green when inserted into the active flight plan.

[6R] INSERT The pilot presses this key to insert the temporary procedure into the active flight plan. The page reverts to the active flight plan page when this occurs.



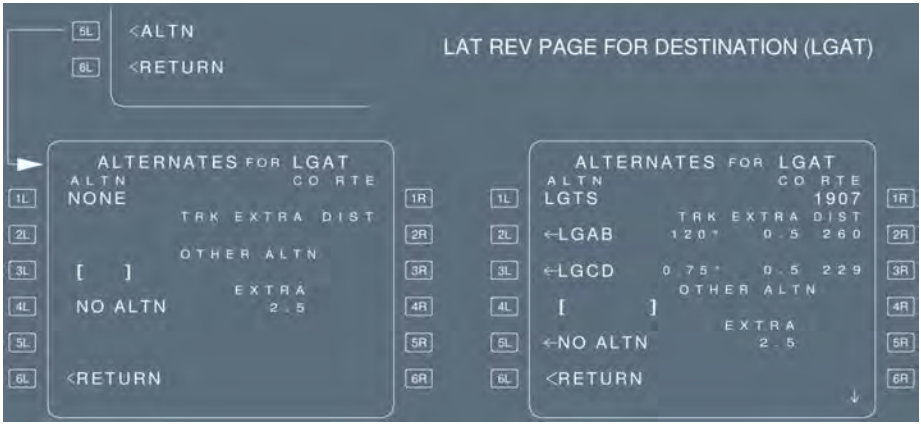


ALTERNATE PAGE

Ident.: DSC-22_20-50-10-25-00000571.0001001 / 17 MAR 11
Applicable to: ALL

This page enables the pilot to review, in the NAV database, the alternate airports that are paired with the destination, and define additional alternates, if needed. (Alternate airports are linked to the

destination). The pilot calls up this page with the ALTN prompt, from the lateral revision page for the destination.



TITLE	The destination airport is displayed large green font.
[1L] ALTN	This field displays the selected alternate: In green, if it is active; in yellow, if it is temporary. “NONE” is displayed, if NO ALTN option is selected, or if the destination has no alternate.
Line 2 to line 5	These lines display the identifications of alternates (up to 6), the extra fuel weight remaining after landing at the alternates, and the great-circle track and distances to them from the destination. If the database contains a company route between the destination and the alternate, the distance shown is an airway distance, not a great-circle distance. When the database defines a preferred alternate, it is displayed on Line 2 (if no scrolling has been performed).

[4L] OTHER ALTN	The pilot can enter an airport identifier in the brackets (Line 3). If that airport is not stored in the database , the NEW RUNWAY page appears for the pilot to use in defining it. If it is stored in the database, the ROUTE SELECTION page appears, and the pilot can use it to select the best route. The pilot may enter a distance in the DIST field of the OTHER ALTN prompt, in order to get preliminary fuel predictions. However, once he has selected the alternate airfield as a temporary alternate and then inserted it, the ALTN distance reverts either to the airway distance, if he has selected a company route, or otherwise to the direct distance to the alternate. The pilot can use OTHER ALTN to overwrite and replace the previous OTHER ALTN.
NO ALTN	The pilot uses this key to select the NO ALTN option.
[6L] RETURN or ERASE	The pilot presses this key to make the display revert to the LAT REV page. Pressing this key erases the temporary selection.
[1R] CO RTE	Pressing this key displays the active company route between the destination and the selected alternate.
[6R] INSERT	Pressing this key activates the temporary selection.

ROUTE SELECTION PAGE FOR ALTERNATE

Ident.: DSC-22_20-50-10-25-00000572.0001001 / 17 MAR 11
Applicable to: ALL

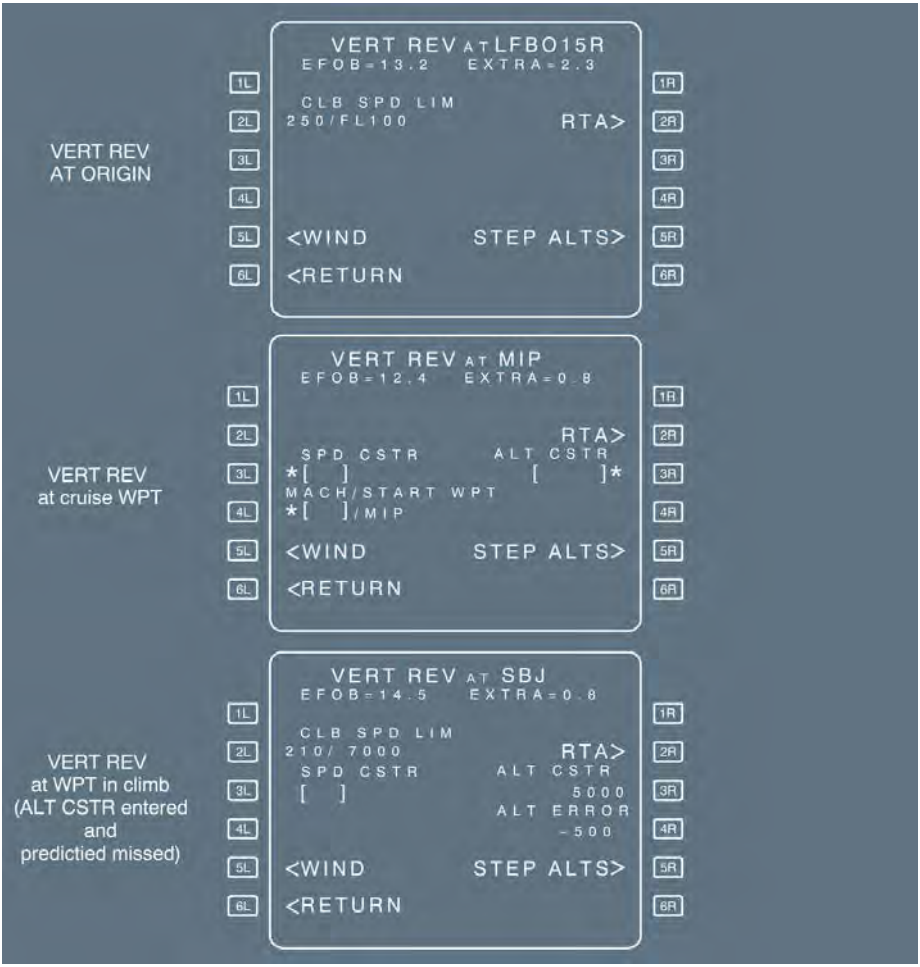
This page enables the pilot to review the company route between the destination and the alternate, and to select a different route, if that seems appropriate.
This page comes up automatically, when the flight crew enters an ident in the OTHER ALTN field.
See the “Route Selection” page *Refer to DSC-22_20-50-10-25 Route Selection Page* for a description of this page.

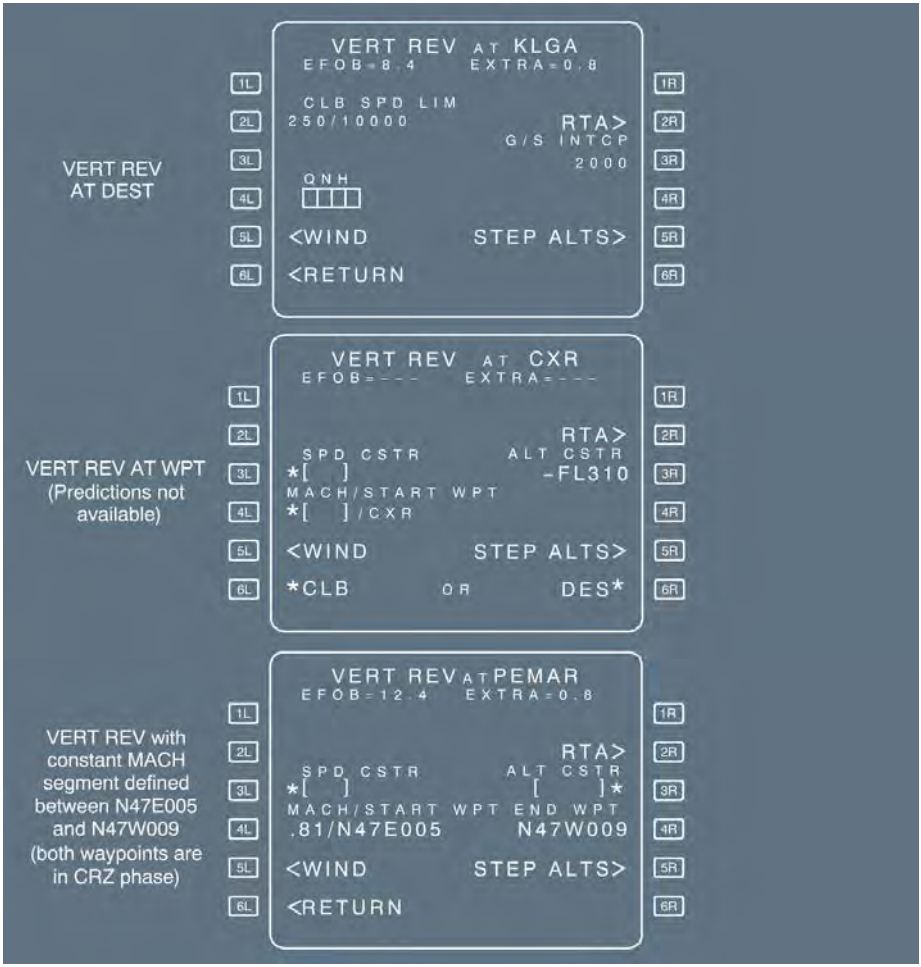
[6R] SELECT	Pressing this key reverts the display to the alternate page. (The distance between the destination and the alternate is then the airway distance).

VERTICAL REVISION PAGES

Ident.: DSC-22_20-50-10-25-00000573.0009001 / 14 MAY 12
Applicable to: ALL

These pages contain the menu of available vertical flight plan revisions that can be applied at a selected waypoint.
The pilot calls up these pages from the flight plan A or B pages by pressing the right hand key next to the selected revised waypoint.
The pilot may make several different vertical revisions (although some may not be available at all waypoints): Speed limit, speed constraint, altitude constraint, time constraint, wind page and STEP ALTS page.


VERT REV AT ORIGIN
VERT REV AT LFBO15R
EFOB=13.2 EXTRA=2.3
CLB SPD LIM
250/FL100
RTA>
<WIND
STEP ALTS>
<RETURN
VERT REV at cruise WPT
VERT REV AT MIP
EFOB=12.4 EXTRA=0.8
RTA>
SPD CSTR
ALT CSTR
*[ ]
[ ]*
MACH/START WPT
*[ ]/MIP
<WIND
STEP ALTS>
<RETURN
VERT REV at WPT in climb (ALT CSTR entered and predictied missed)
VERT REV AT SBJ
EFOB=14.5 EXTRA=0.8
CLB SPD LIM
210/ 7000
RTA>
SPD CSTR
ALT CSTR
[ ]
5000
ALT ERROR
-500
<WIND
STEP ALTS>
<RETURN



TITLE (white)	"VERT REV AT [location]" The second line shows remaining fuel and extra fuel at the waypoint being revised.
[1L] "TOO STEEP PATH BEYOND" (amber)	This message is displayed, if the waypoint is part of a leg with too steep a descent path.

[2L] CLB/DES SPD LIM (magenta)	This field displays the speed limit applicable to the climb or descent phase. It displays it in large font when data has been inserted manually, and in small font when data comes from the database.
[3L] SPD CSTR (magenta)	This field displays any speed constraint assigned to the revised waypoint. It is in large font when inserted manually, and in small font when it comes from the database. It is not displayed at the origin airport, at a FROM waypoint, a speed limit pseudo waypoint, or the destination airport.
[4L] QNH	This field only functions when the revised waypoint is the primary destination. It allows the pilot to enter the atmospheric pressure at sea level. This field is identical to the QNH field of the PERF APPR page.
[4L] MACH/START WPT (blue)	This prompt allows the pilot to enter or modify the start point of a constant Mach segment, and its associated Mach. It is not displayed at primary destination and alternate flight plan waypoints. (*Refer to DSC-22_20-30-20-25 Constant Mach Segment - Entering a Constant Mach Segment*).
[5L] WIND (blue)	The pilot presses this key to access the wind pages. The first wind displayed page, corresponds to the selected waypoint (e.g. climb page), if the selected waypoint is a climb phase waypoint. A CLR action reverts it to brackets.
[6L] RETURN or CLB	The pilot presses this key to return to the last displayed flight plan page. When displayed, pressing this key assigns the constraint to CLB phase and inserts it into the vertical flight plan. The page reverts to the flight plan page.
[2R] RTA prompt	This prompt gives access to the RTA page. It is not displayed when the VERT REV page is accessed from the alternate F-PLN.
[3R] ALT CSTR (magenta)	This field displays the altitude constraint assigned to this revised waypoint. It uses large font when the constraint is manually-entered, and small font when it is from the database. A CLR action reverts it to brackets. The constraint may be: - "At", entered as XXXXX (Example: FL 180). - "At or above", entered as + XXXXX or XXXXX + (Example: FL +310). - "At or below", entered as – XXXXX or XXXXX – (Example: -5 000). - A "window" constraint. The altitude window consists of two altitudes between which the aircraft should fly. The crew cannot manually enter a "window" constraint.

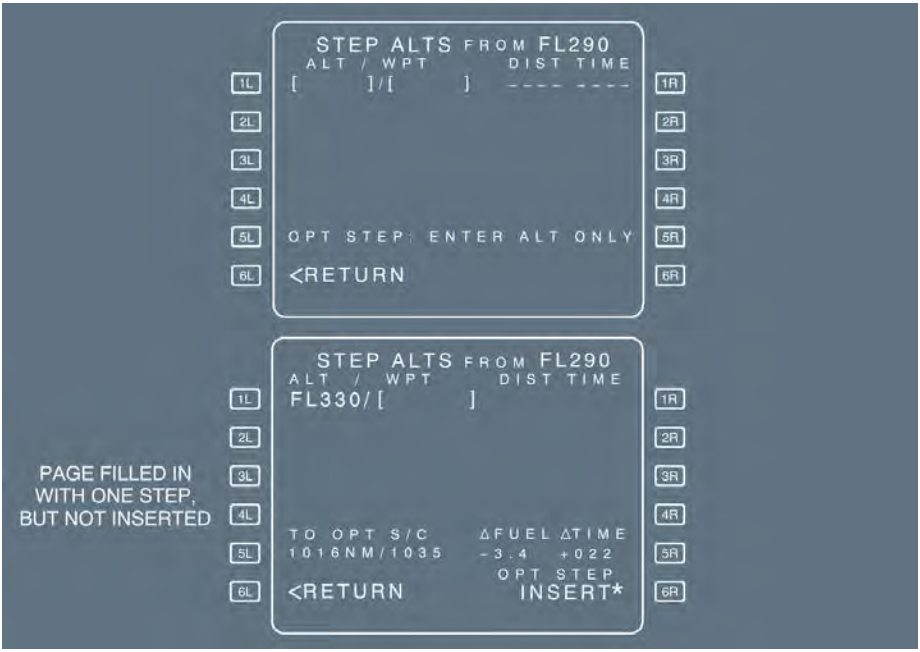
G/S INTCP (green)	This field displays the glide intercept altitude for an ILS approach on the vertical revision page at destination.
[4R] ALT ERROR (green)	When the aircraft misses a predicted altitude constraint, this field displays the difference between the altitude constraint and the predicted altitude. If, for example, "-500" appears in this field in green, the aircraft will reach the waypoint at an altitude 500 ft below the constraint altitude. This only applies to waypoints in the climb and descent phases.
[4R] END WPT (blue)	This prompt allows the pilot to enter or modify the endpoint of a constant Mach segment. It is displayed when a pair Mach/start exists in 4L field. This prompt is not displayed on the destination VERT REV page. (*Refer to DSC-22_20-30-20-25 Constant Mach Segment - Entering a Constant Mach Segment*).
[5R] STEP ALTS (white)	This legend appears for any waypoint, once a cruise altitude has been entered. It is not available in engine-out, descent, approach, and go-around phases. This gives the pilot access to the STEP ALTS page.
[6R] DES	When this field displays "DES", pressing this key assigns the constraints to the descent phase and inserts them into the vertical flight plan. The page reverts to the F-PLN page. (See note below).

Note: Altitude and speed constraints may apply to the climb, descent, or approach phase, but never to the cruise phase. Fields 6L/6R display "CLB/DES" when the revised waypoint is a cruise phase waypoint and the FMGS needs to know if the new constraint is to be applied in climb or descent phase. The FMGS will modify the cruise phase accordingly. These 2 prompts also display "CLB/DES" when the predictions are not computed. (Top of climb and top of descent not yet defined).

STEP ALTS PAGE

Ident.: DSC-22_20-50-10-25-00000574.0009001 / 14 MAY 12
Applicable to: ALL

This page allows the pilot to insert up to four geographic step points and one optimal step point into the flight plan. This page also displays the fuel/time savings associated with the optional step.
The flight crew calls it up either from the vertical revision page.



TITLE [1L] - [1R] [4L] - [4R] STEP ALTS in white followed by the current cruise altitude in green.

ALT/WPT {blue} : The waypoint identifier, as well as the altitude to step, can be entered in this field. Both are displayed in large font. The waypoint may either be an active (or secondary) flight plan waypoint, or an inserted optimal point (OPT). When an entry is made, a temporary F-PLN is created.

DIST / TIME (UTC) (small green font)

Displays the distance to go, and time from the present aircraft position along the flight plan to the step point.

Note: *The following messages may be displayed in the DIST/TIME field:*
- *ABOVE MAX, if the step altitude exceeds the MAX altitude.*
- *"IGNORED", if the step start or end point is less than 50 NM from the top of descent or if the step climb is located prior to the top of climb or after the top of descent.*
- *"STEP AHEAD", when the aircraft is within 20 NM of the start step point.*
- *"NO OPTIMAL" if a non inserted optimal step falls in a discontinuity due to a flight plan change, or when no new optimal exists after an UPDATE or when no optimal step point exists for the entered altitude.*

Note: *If no optimal step point exists for the altitude displayed in [1L], the "NO OPTIMAL" message is displayed in the FUEL/TIME field. This message is also displayed, if the optimal step falls into a discontinuity.*

[5L] OPT STEP: ENTER ONLY ALT (white) TO OPT S/C (green small front)

This field displays the distance and time to an uninserted optimal step point, if one exists. It is displayed to guide the flight crew for the entry format of an optional step.

Note: *On any flight plan change, an inserted optimal step remains in the flight plan at a fixed distance to destination.*

[6L] RETURN

The flight crew presses this key to return to the previous page.

[5R] SAVINGS

This field displays the fuel and time savings prior to the insertion of the optimal step point.

Fuel savings are displayed in thousand of kilograms (or pounds) (maxi 99.9). The value is preceded by:
"–" in case of fuel saving,
"+" in case of additional fuel cost.

Time savings are displayed in hours and minutes. The value is preceded by
"–" in case of time saving,
"+" in case of additional time cost.

[6R] INSERT* (amber) This field displays INSERT*, when an optimal step point exists but is not yet inserted. When INSERT is selected:
- The optimal step point is inserted into the flight plan.
- OPT is displayed in line 1L.
- Optimal step distance and time are deleted in line 5L.
- The UPDATE* blue prompt replaces the INSERT* prompt.

UPDATE* This prompt enables the computation of another optimal step point. The UPDATE* prompt is then replaced by the INSERT* prompt.

RTA PAGE

Ident.: DSC-22_20-50-10-25-00000575.0009001 / 14 MAY 12
Applicable to: ALL

The Required Time of Arrival (RTA) page allows the entry and display of a waypoint identifier, with associated time constraints. The page also displays the entered or computed Estimated Takeoff Time (ETT), as well as the following data:
- Predicted ETA at the time-constrained waypoint;
- Performance adjusted SPD target;
- Time error;
- Distance to time constrained waypoint;
- Active speed mode;

The flight crew calls up this page with the RTA prompt from the vertical revision page.

TITLE RTA (large white font)

line 1	This line displays: - AT WPT, DIST and RTA when a time constraint can be defined. The identifier of the revised waypoint or the first following waypoint at which the time constraint can be defined, is displayed by default in large blue font - AT WPT, DIST and RTA when a time constraint has already been defined. The associated constrained waypoint identifier is displayed by default in large blue font - AT WPT and white dashes when no time constraint can be defined - AT WPT and blue brackets if a time constraint can only be introduced before the waypoint at which the VERT REV has been initiated. Only when the waypoint identifier has been defined (by the flight crew or by default), blue brackets and a blue start are displayed in [1R] field. The flight crew enters the time constraint as “HHMMSS”, preceded by: - for at or before; + for at or after; no sign for at.
[2L] MANAGED	This field displays the FMGS-computed ECON speed/Mach (*Refer to DSC-22_20-40-10 Optimization*)
[3L] ACT MODE	This field displays the active speed mode : MANAGED or SELECTED/NNN (NNN is the selected target speed). The pilot cannot modify it through this field.
[6L] RETURN	The pilot presses this key to revert the display to the VERT REV page.
[2R] ETA	When a required time at arrival has been defined, the 2R field displays the estimated time of arrival as “HHMMSS”.
[3R] RTA ERROR	This field is blank when the RTA is predicted as made. If the RTA is predicted as missed, “RTA ERROR” is displayed in small white font, and the time error between ETA and RTA is displayed in small amber font.
[6R] ETT	The Estimated Takeoff Time (ETT) field is available in the preflight phase. If no ETT is available, the 6R field displays blue brackets and a blue star. Once available, the ETT is displayed in magenta.
UTC	Universal time is displayed in green for takeoff, climb, cruise, descent and approach phases.

DATA INDEX PAGES

Ident.: DSC-22_20-50-10-25-00000576.0001001 / 17 MAR 11
Applicable to: ALL

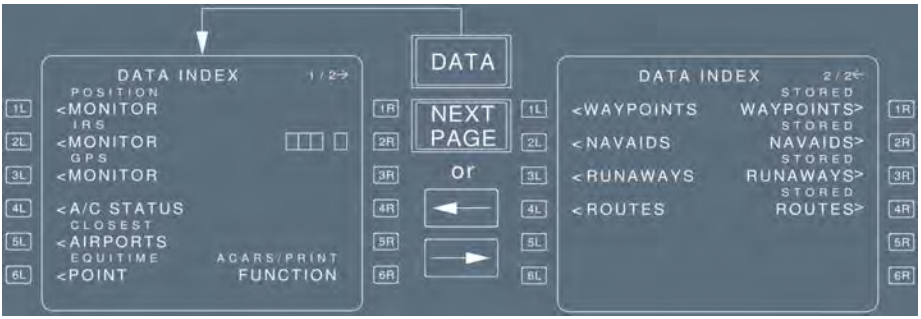
There are two INDEX pages:

The DATA INDEX 1/2 page gives access to various pages devoted to navigation.

The DATA INDEX 2/2 page lists the navigation data, entered in the FMGS.

The pilot enters those items labeled “stored” and can modify them. The pilot can call up the others, but cannot modify them.

The pilot calls up these pages by pressing the DATA key on the MCDU console:



DATA INDEX 1/2 PAGE

[1L] POSITION MONITOR - [2L] IRS MONITOR	When the flight crew presses these keys, the display shows all essential navigation data.
[3L] GPS MONITOR	This key calls up the GPS MONITOR page.
[4L] A/C STATUS	This key calls up the aircraft status page.
[5L] CLOSEST AIRPORTS.	This key calls up the closest airports page.
[6L] EQUITIME POINT	This key calls up the equitime point page.
[6R] ACARS/PRINT	This key calls up the PRINT function pages and the ACARS function pages.

DATA INDEX 2/2 PAGE

[1L] WAYPOINTS
[2L] NAVAIDS
[3L] RUNWAYS
[4L] ROUTES

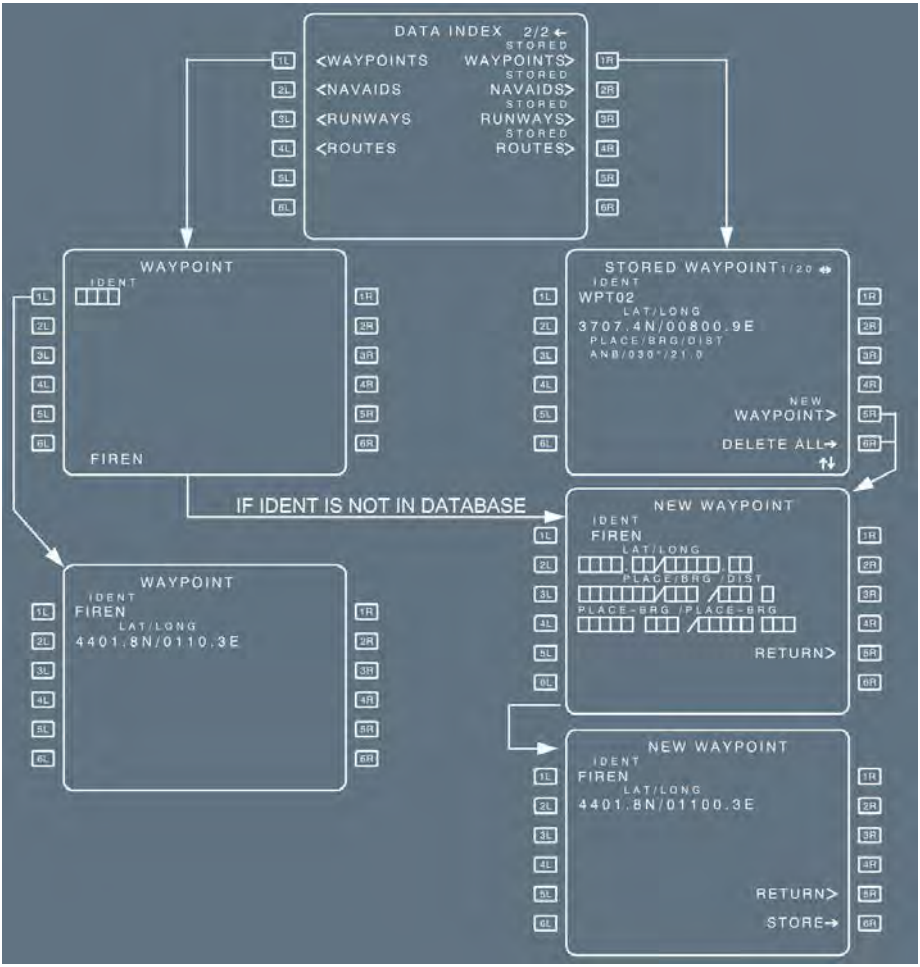
These keys call up descriptions of waypoints, NAVAIDs, runways, and routes stored in the database, so that they can be reviewed.

[1R] STORED WAYPOINTS
[2R] STORED NAVAIDS
[3R] STORED RUNWAYS
[4R] STORED ROUTES

These keys call up waypoints, NAVAIDs, runways, and routes that the pilot has stored, enabling the pilot to review and store them in, or delete them from, the database.
The airline can choose to automatically have all pilot-stored data erased in the done phase.

WAYPOINT/STORED WAYPOINT/NEW WAYPOINT PAGES

Ident.: DSC-22_20-50-10-25-00000577.0001001 / 01 OCT 12
Applicable to: ALL



WAYPOINT PAGE

- The pilot can call up this page by pressing the 1L key on the DATA INDEX page. The display then shows waypoint information associated with the identifier the flight crew inserts it in the [1L] field.
- With this page it is possible to call any waypoint not stored in the stored waypoint list, if they belong to the active, temporary, or secondary flight plan.

STORED WAYPOINT PAGE

The pilot calls up this page by pressing the 1R key on the DATA INDEX page.
This page displays waypoints, defined and stored by the pilot. It lists each stored waypoint, along with a number that shows the relative order in which it was inserted in the database. This number is displayed in the upper righthand corner of the page. For example, “1/20” indicates that the waypoint was the first of 20 stored.

Note: Latitude/Longitude crossing points and Abeam/Radial Intercept points are never included in the stored waypoint list.

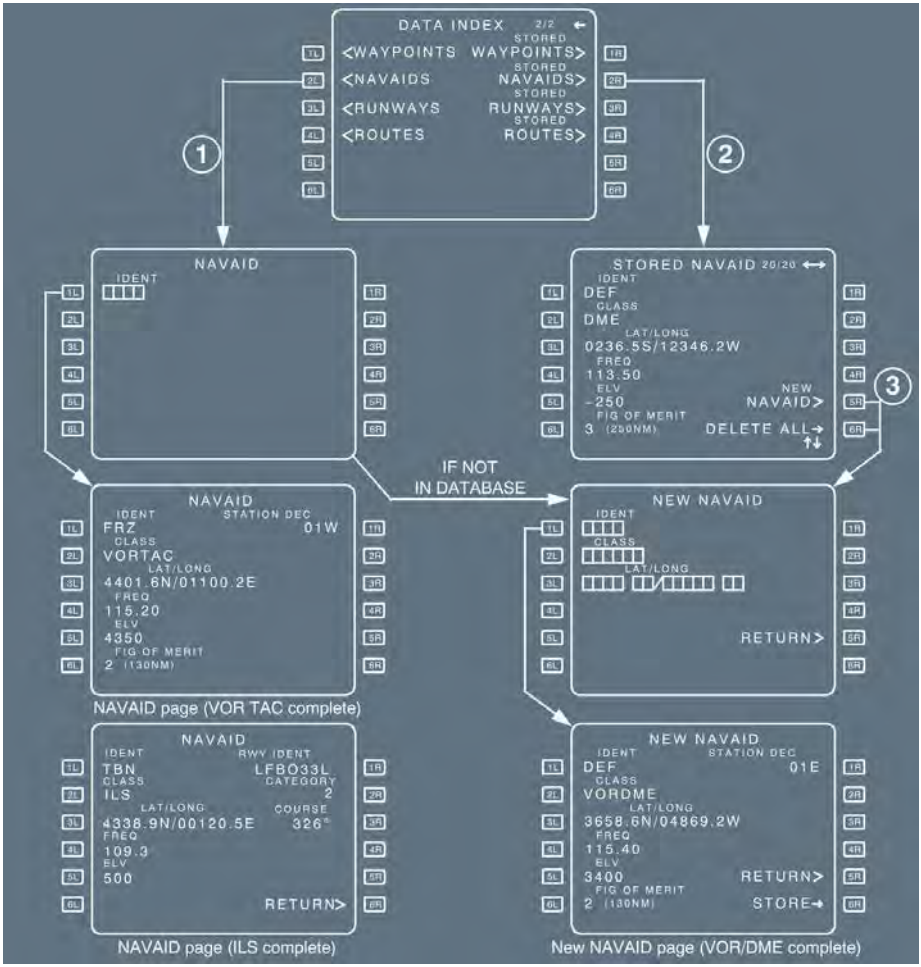
[1L] IDENT	To delete a waypoint, the pilot clears the 1L ident display.
[2L] LAT/LONG	Latitude and longitude of the waypoint are displayed in this field.
[3L]	This field either displays PLACE/BRG/DIST or PLACE-BRG/ PLACE-BRG or PLACE/DIST, depending on how the waypoint was defined.
[5R] NEW WAYPOINT	The pilot presses this key to call up the NEW WAYPOINT page.
[6R] DELETE ALL	The pilot presses this key and the label changes to amber CONFIRM DELETE ALL. Pressing this key a second time deletes all the waypoints, stored by the flight crew, except those currently used in the active or secondary flight plan. (“F-PLN ELEMENT RETAINED” appears on the MCDU).

NEW WAYPOINT PAGE

- The pilot calls up this page by pressing the 5R key on the STORED WAYPOINT page.
- The pilot can use this page to define and store up to 20 waypoints. Entering an additional waypoint deletes the first one.
  The pilot defines a waypoint by entering its ident in the data field next to 1L, then by entering its position in the amber boxes.
  The STORE prompt appears next to 6R when the boxes are filled in, and the pilot presses the key to store the waypoint in the database.
  If the pilot enters the waypoint's position as place/bearing/distance, or place-bearing/place-bearing, the FMGC computes its latitude and longitude.

NAVAID/STORED NAVAID/NEW NAVAID PAGES

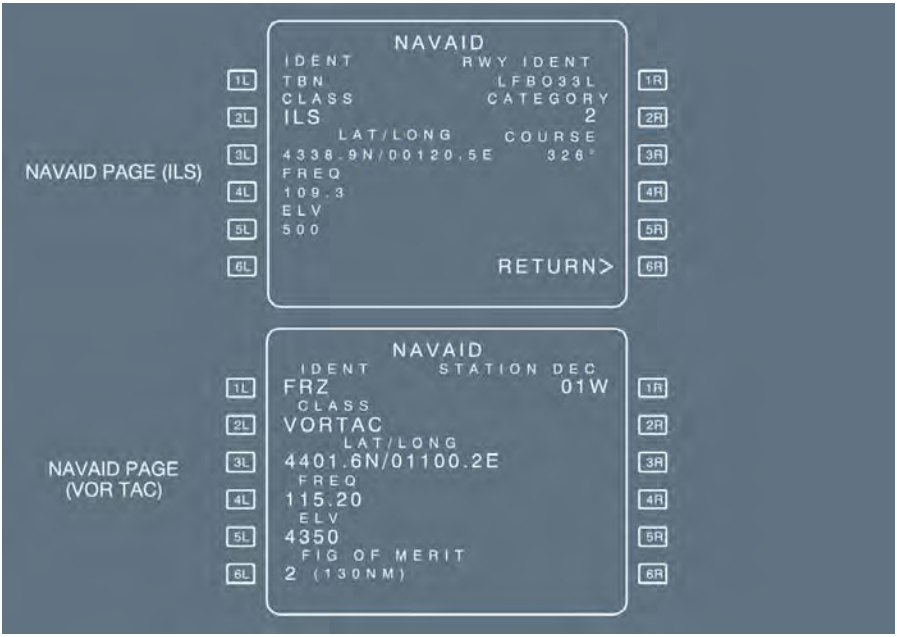
Ident.: DSC-22_20-50-10-25-00000578.0001001 / 01 OCT 12
Applicable to: ALL



NAVAID PAGE

The pilot calls up this page by pressing the 2L key on the DATA INDEX page 2.

This page displays NAVAID information associated with the identifier the pilot inserts in the [1L] field.



[2L] CLASS	This field identifies the NAVAID as VOR, DME, VOR DME, VORTAC, NDB, LOC, ILS, MLS, ILS/DME, MLS/DME, ILS/TAC or TACAN. It displays NON COLLOCATED, if the NAVAID is uncollocated.
[4L] FREQ or CHAN	CHAN is displayed, if the class of NAVAID is an MLS or an MLS DME.
[5L] ELV	This field gives the NAVAID elevation in feet above sea level. It is not displayed for VOR or NDB.
[6L] FIG OF MERIT	This field shows how far out the FMGS can autotune a VOR, VOR/DME, VORTAC, or DME for display or for computing position. 0 : up to 40 NM 1 : up to 70 NM 2 : up to 130 NM 3 : up to 250 NM

[1R] STATION DEC or RWY IDENT	This is the magnetic declination in the NAVAID area (used only for VOR, VOR/DME, and VORTAC). The field displays RWY IDENT, if the NAVAID is a LOC, ILS, MLS, ILS/DME, MLS/DME or ILS/TAC.
[2R] CATEGORY	This field shows the NAVAID's category, if it is an ILS, ILS/DME, MLS, MLS/DME or ILS/TAC. A LOC DME has a category = 0.
[3R] COURSE	This is the localizer course, if the NAVAID is an ILS or a LOC.
[6R] RETURN	This prompt is displayed, if the page has been accessed from the SELECTED NAVAID page. The pilot presses this key to return to the SELECTED NAVAID page.

STORED NAVAID PAGE

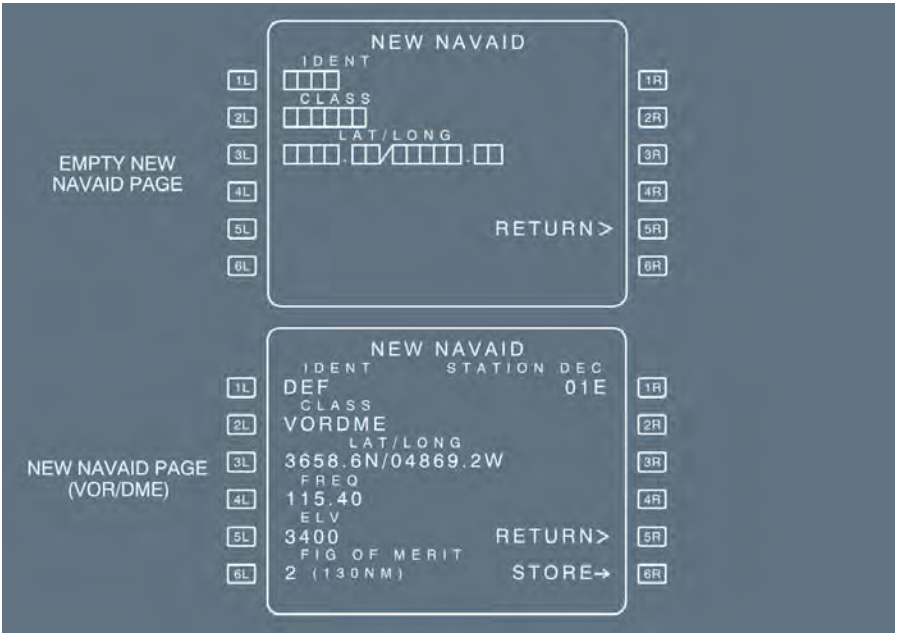
The pilot calls up this page by pressing the 2R key on the DATA INDEX page. This page is used to display or delete defined and stored NAVAIDs.

A number in the upper righthand corner of the screen shows the relative order in which the NAVAIDs were stored. (For example, 3/7 means the third out of the seven stored).
Slew keys give the pilot access to the different stored NAVAIDs.

[1L] IDENT	The pilot deletes a stored NAVAID by entering its ident in this field, then by pressing the CLR key at the bottom of the MCDU control panel.
[6R] DELETE ALL and CONFIRM DELETE ALL	The pilot presses this key to erase all the stored NAVAIDs, except those currently used in the active or secondary flight plan. (The MCDU displays “F-PLN ELEMENT RETAINED.”).

NEW NAVAID PAGE

The pilot calls up this page by pressing the 5R key on the STORED NAVAID page.



It can be used to define and store up to 20 NAVAIDs. Entering an additional waypoint deletes the first one. The NAVAID elements must be entered in two steps:

1. Enter the data in the lines of amber boxes.
2. Enter frequency, elevation, figure of merit, and station declination or ILS category and course, if applicable.

Note: *The pilot cannot create an ILS/DME or an uncollocated NAVAID.*
If the runway associated with the ILS has been entered through the new runway page, the course, IDENT, and runway IDENT are already displayed on the new NAVAID page when it comes up (copied from the new runway page). For details, see the new runway page info below.

[1R] STATION DEC — The pilot must enter the magnetic declination, if the prompt is displayed. This prompt is displayed only for VOR, VORTAC or VOR/DME.

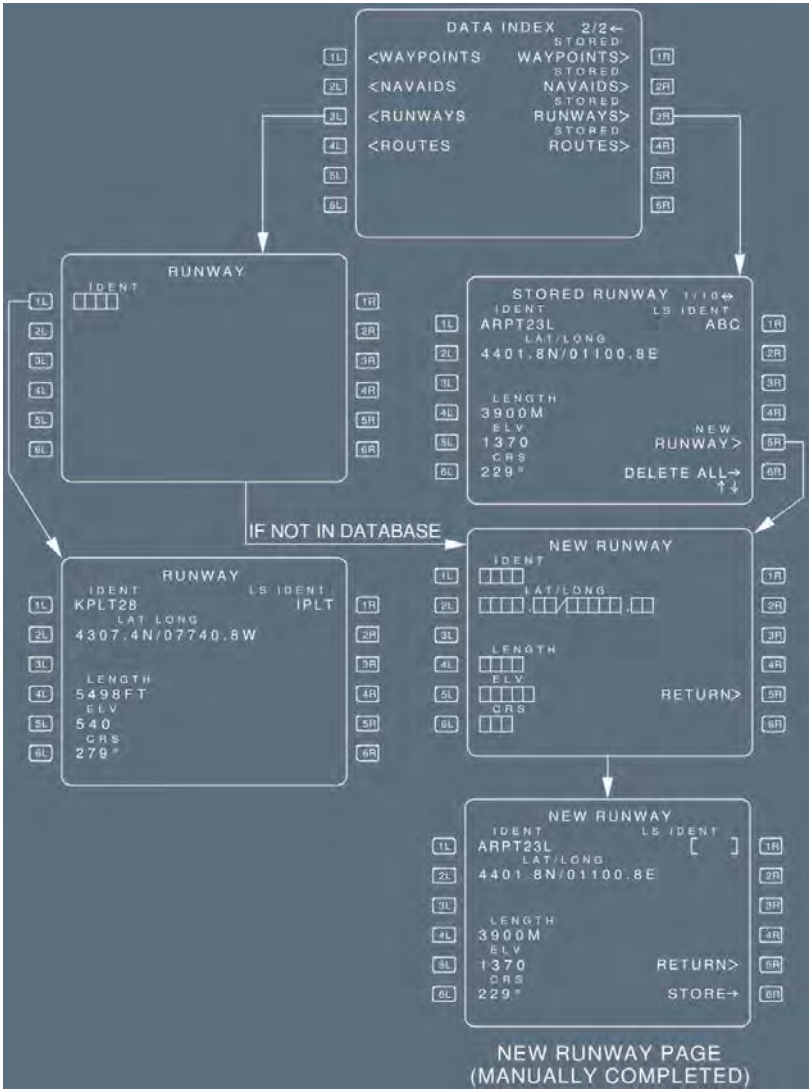
[3R] COURSE — If the NAVAID is an ILS, LOC, enter the course.

[6R] STORE — This prompt appears when all the amber boxes are filled in. The pilot presses the key to store the NAVAID.

A stored NAVAID is never used for position computation.

RUNWAYS/STORED RUNWAYS/NEW RUNWAY PAGES

Ident.: DSC-22_20-50-10-25-00000579.0001001 / 17 MAR 11
Applicable to: ALL



RUNWAY PAGE

This page displays the following information:

[1L] IDENT	The runway IDENT, which comprises the airport identification and the runway direction, uses six or seven digits (Example: CYYZ 24L and LFRJ 08).
[2L] LAT/LONG	The latitude and longitude of the runway threshold.
[4L] LENGTH	The runway length in meters (M) or feet (ft), in five digits (9 999 ft).
[5L] ELV	The elevation of the threshold in feet above sea level.
[6L] CRS	The runway course (degrees magnetic).
[1R] LS IDENT	The LOC or ILS identifier.

STORED RUNWAY PAGE

The pilot uses this page to display or delete the defined and stored runways. The stored runways are listed and numbered in the order in which they were inserted. The number is displayed in the upper righthand corner of the page. (For example, 2/4 means the runway is the second of the four stored runways).

The pilot can delete any stored runway from the database by displaying its IDENT in the 1L field, then by pressing the CLR key on the MCDU control panel.

[6R] DELETE ALL and CONFIRM DELETE ALL	The pilot presses this key to erase all the stored runways, except those used in the active or secondary flight plan. (The MCDU displays “F-PLN ELEMENT RETAINED”).
[1L] to [6L]	These fields are similar to the RUNWAY page fields.

NEW RUNWAY PAGE

The pilot can use this page to define and store up to 10 runways.

- **When the pilot enters an ILS/LOC IDENT in the [1R] field the new NAVAID page comes up. When the pilot has entered and stored the necessary data in the new NAVAID page, the new runway page reappears.**

The new runway page and the new NAVAID page (ILS/LOC) are not independent:

- **When the flight crew first defines the ILS/LOC (on the new NAVAID page) the new runway page, when called up, already displays the RWY course, RWY IDENT, and ILS IDENT (copied from the new NAVAID page).**
- **When the flight crew first defines the runway (on the new runway page) the new NAVAID page, when called up, already displays the ILS course, ILS IDENT, and runway IDENT.**

The pilot must enter the two runway directions on two different new runway pages (Example: LFRJ 08 and LFRJ 26) to allow the flight plan to select either one.

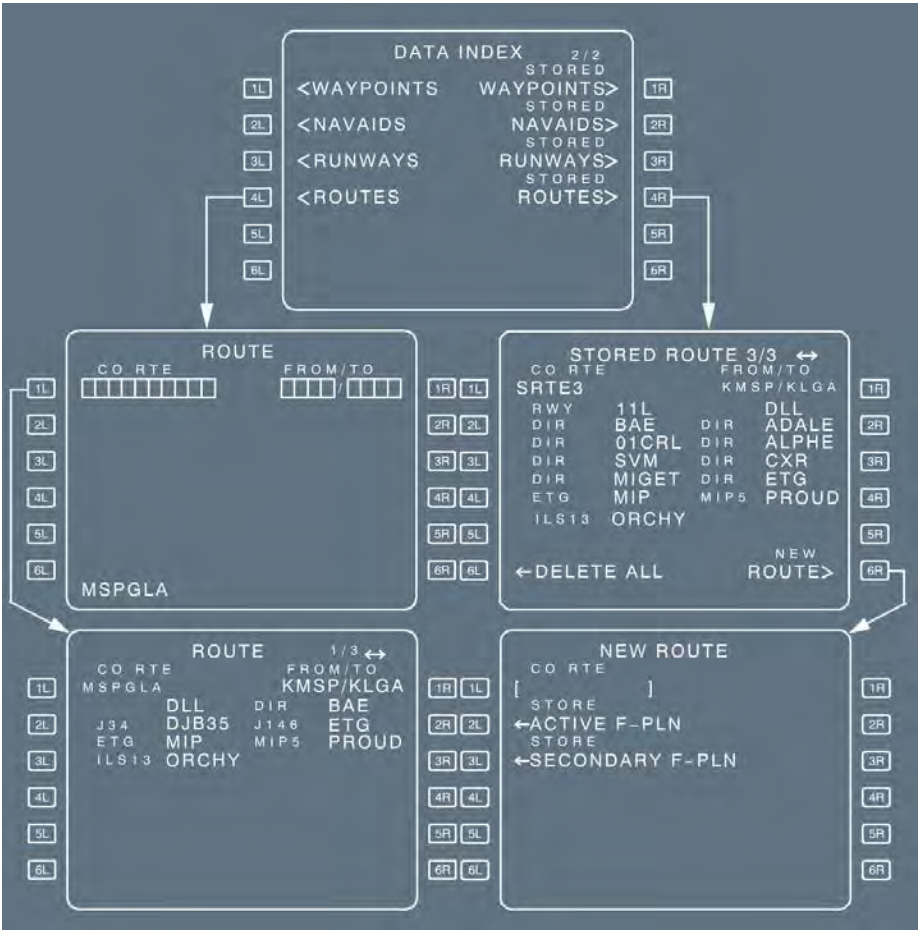
Note: *When 10 runways are stored, entering a new stored runway deletes the first one of the list (1/10).*

[1L] to [6L]	Enter information about the new runway.
[1R] LS IDENT	Enter the ILS/LOC IDENT. The NEW NAVAID page comes up.
[5R] RETURN	The pilot presses this key to return to the NEW NAVAID page.
[6R] STORE	This prompt only appears when all the amber boxes have been filled in.

Note: *The NEW RUNWAY may be used for departure or destination, but no SID or STAR can be associated or stored with this runway. Therefore, the pilot will use it as an "independent" airport.*
A new runway is identified by the 4–letter ICAO airport identifier, although all six or seven digits must be entered.

ROUTE/STORED ROUTE/NEW ROUTE PAGES

Ident.: DSC-22_20-50-10-25-00000580.0001001 / 01 OCT 12
Applicable to: ALL



ROUTE PAGES

(Not-modifiable)

[1L] CO RTE — Any company route IDENT, entered in this field, causes all the elements of the route to be displayed.

Line 2 to Line 6	These lines display the various route elements, including waypoints and airways.
[1R] FROM/TO	This field is automatically filled in, when the pilot enters the IDENT for a company route. When the pilot manually enters a city pair, the MCDU displays “NOT IN DATA BASE” if the city pair is not in the navigation database. If the city pair is in the database, the CO RTE field displays the first route stored (small blue font). If more than one route is stored, the pilot can slew to see the different routes.

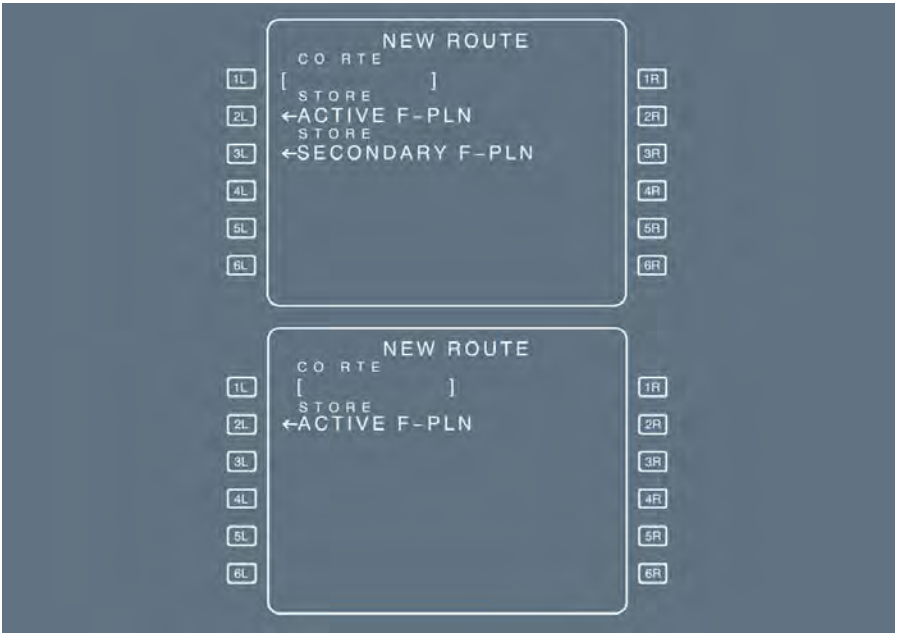
STORED ROUTE PAGE

This page displays up to 5 routes, stored by the pilot. The stored routes are listed and numbered in the order of insertion. The number is displayed in the upper right-hand corner of the page.

[1L] CO RTE	This field identifies the stored route. Clearing this field deletes the stored route.
Line 2 to Line 5	The fields in these lines are identical to the corresponding fields in the route page.
[6L] DELETE ALL	Pressing this key changes the label to amber CONFIRM DELETE ALL. Pressing this key a second time deletes all previously-stored routes.
[1R] FROM/TO	This identifies the city pair of the stored route.
[6R] NEW ROUTE	Pressing this key calls up the new route page.

NEW ROUTE PAGE

The pilot calls up this page by pressing the NEW ROUTE key on the stored route page. It can be used to store up to five new routes that have already been defined in the active or secondary flight plan.



[1L] CO RTE	This field enables the pilot to enter a new company route IDENT. If that IDENT has already been assigned, the entry is rejected.
[2L] STORE ACTIVE F-PLN (blue)	Pressing this key stores parameters of the active flight plan as new route. The display shows this prompt when the system contains a FROM/TO, but only during preflight.
[3L] STORE SECONDARY F-PLN (blue)	Pressing this key stores parameters of the secondary flight plan as new route. The display shows this prompt when the system contains a FROM/TO and the secondary flight plan has not yet been sequenced.

Note:
- *If it has not already been named, a stored route is automatically named when stored: SRTE 1 to SRTE 5.*
- *When 5 routes are already stored, the pilot cannot insert a new stored route. The "STORED ROUTE FULL" message is displayed, and the pilot must manually delete a route in order to store a new one.*
- *Several flight plan elements are not retained when the route is stored:*
  - *Pilot-entered holds*
  - *Offset*
  - *Pilot-entered constraints*
  - *Modifications to terminal procedures*
  - *Pseudo-waypoints*
  - *Step at optimum.*
  - *Pilot-entered constant Mach segment.*

  The MCDU then displays "REVISIONS NOT STORED".

AIRCRAFT STATUS PAGE

Ident.: DSC-22_20-50-10-25-00000581.0001001 / 28 APR 14
Applicable to: ALL

The system automatically displays this page at power up, but the pilot may also call it up by pressing the DATA key on the MCDU console.

TITLE	AIRCRAFT TYPE
[1L] ENGINE TYPE	The system uses this to calculate predictions.

Note: *When the same performance database is used for various aircraft configurations, the aircraft type displayed may differ from the actual aircraft.*

[2L] ACTIVE DATABASE
The validity period and part number are displayed in large font.

[3L] SECOND DATABASE
The validity period is displayed in small font. The pilot can press the 3L key to switch to the second database as the active database.

CAUTION	Cycling the database erases the primary and secondary flight plans, as well as the stored data. The flight crew must never do this in flight.

[5L] CHG CODE
This field allows the entry of a code to change the IDLE and/or PERF factor, displayed in 6L. It is displayed in the PREFLIGHT and DONE phases. The label is displayed in small white font. The brackets, or the entered value, is displayed in large blue font.

[6L] IDLE/PERF
It is only possible to modify these factors when the aircraft is on ground. If no value was entered, the FMS displays default values coded in the Airline Modifiable Information (AMI) file.
Default values are displayed in small font, although manually entered values are displayed in large font.

When it is necessary to modify the IDLE or the PERF factor:
- ENTER the change code in the CHG CODE field [5L].
  The default value for this code is “ARM” but it is possible to modify it on airline request (the applicable code is then coded in the Airline Modifiable Information (AMI) file).
  When a valid change code is entered, the IDLE and PERF factors are displayed in blue.
- ENTER the new IDLE and/or PERF factor(s) in the scratchpad.
- PRESS the [6L] key to insert the new IDLE and/or PERF factor(s).
  The new IDLE and/or PERF factor(s) is (are) displayed in large blue font.

[4R] STORED
This field displays pilot-stored data in a large green font. The field is blank, if no data is stored. (The airline can choose to have this data automatically erased at the done phase).

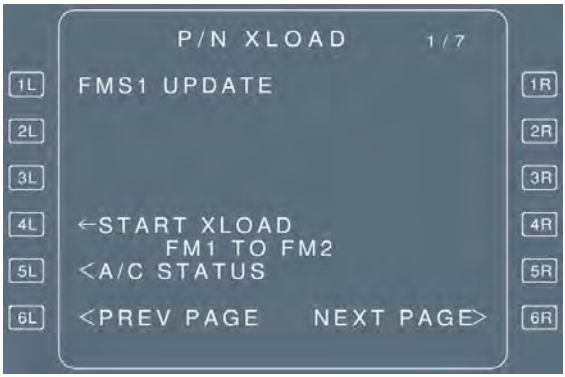
[5R] DELETE ALL
Pressing this key changes the label to amber CONFIRM DELETE ALL. Pressing this key a second time deletes all pilot-stored data, except data that is part of the active and secondary flight plans.

[6R] STATUS/XLOAD
This prompt gives access to the P/N STATUS and P/N XLOAD pages.

P/N XLOAD PAGE

Ident.: DSC-22_20-50-10-25-00000582.0001001 / 17 MAR 11
Applicable to: ALL

This page allows the crossloading of all databases or configuration files part numbers which are different between both sides. Crossloading from this page avoids reviewing each individual P/N STATUS page.



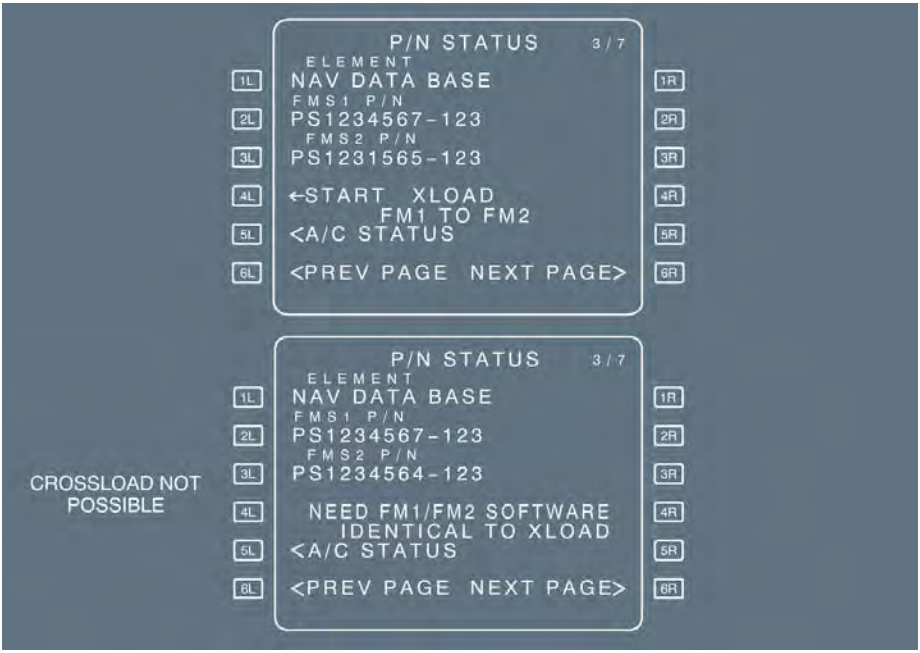
TITLE	P/N XLOAD
[1L]	FMS 1 UPDATE: FMS 1 can be loaded on the right side MCDU. FMS 2 UPDATE: FMS 2 can be loaded on the left side MCDU
[4L]	START XLOAD: This blue prompt is displayed, only if the system detects a difference between both sides' part numbers. FMS 1/FMS 2 IDENTICAL: Displayed in green, when there is no difference between both sides' part numbers.
Line 5	FM 1 TO FM 2 or FM 2 TO FM 1: Indicates the crossloading direction. This line is not displayed when there is no difference between both side part numbers.
[5L]	A/C STATUS: This white prompt is displayed, when there is no crossloading in process. It gives access to the A/C STATUS page. MM: SS MIN REMAINING: Indicates the time remaining for crossload completion, when a crossload is in process.
[6L] PREV PAGE	The pilot presses this key to return to the A/C STATUS page.
[6R] NEXT PAGE	Pressing this key calls up the next P/N XLOAD page.

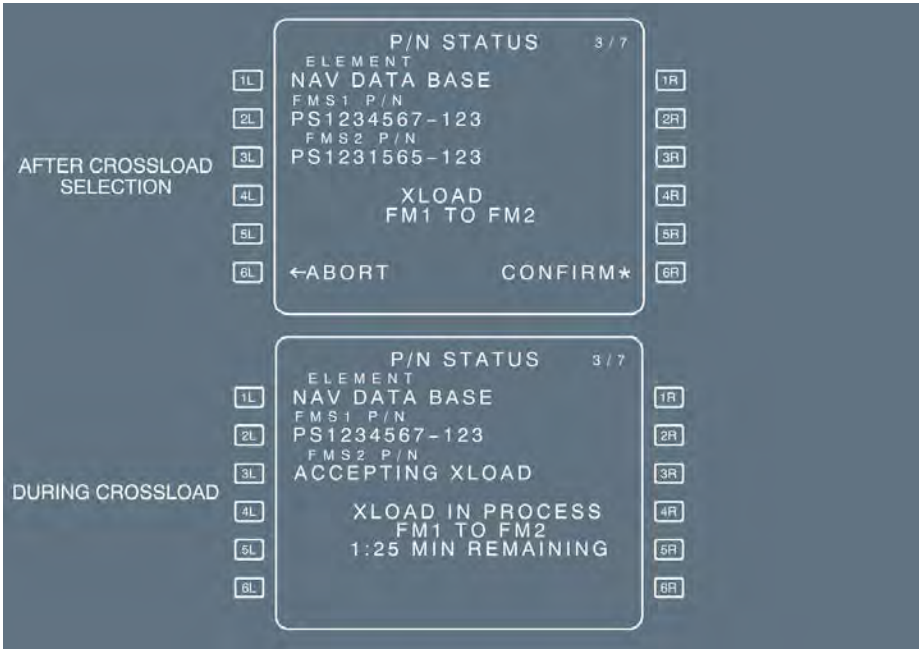
P/N STATUS PAGES

Ident.: DSC-22_20-50-10-25-00000583.0001001 / 01 OCT 12
Applicable to: ALL

These pages allow reviewing and crossloading the following databases and configuration files between both FMS:

- Page 2 FMS SOFTWARE part numbers
- Page 3 NAV DATA BASE part numbers
- Page 4 FM AIRLINE CONFIG part numbers
- Page 5 FM OPTIONS CONFIG part numbers
- Page 6 PERF DATA BASE part numbers
- Page 7 FLIGHT TEST DATA BASE





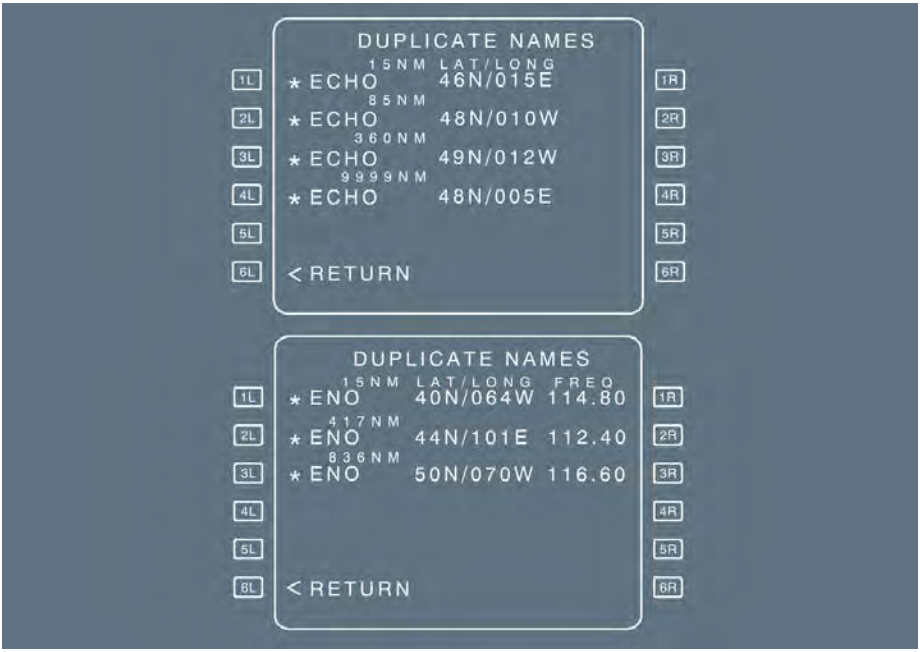
TITLE	P/N STATUS
Line 1 ELEMENT	Indicates the name of the database or configuration file that can be crossloaded: - FMS SOFTWARE on Page 2 - NAV DATA BASE on Page 3 - FM AIRLINE CONFIG on Page 4 - FM OPTIONS CONFIG on Page 5 - PERF DATA BASE on Page 6 - FLIGHT TEST DATABASE on Page 7.
Line 2 FMS1 P/N Line 3 FMS2 P/N	These fields display the part numbers of the database or configuration file (stated on line 1), that are installed on the FMS 1 and 2. Identical part numbers are displayed in green, different ones in amber. During crossload, the updated part number is replaced by the amber “ACCEPTING XLOAD” message.

Line 4	This line is empty when the active flight phase is not Preflight or Done. XLOAD FMx TO FMy or START XLOAD FMx TO FMy: This blue prompt is displayed when the database or configuration file (stated on line 1) can be crossloaded. XLOAD ARMED: Displayed in blue on the receiving FM when the crossload has been requested, but not yet confirmed. XLOAD IN PROCESS: Displayed in white when the crossload is ongoing. XLOAD NOT SUPPORTED: Crossloading is unavailable for this element. NO P/N TO XLOAD: The element is missing. NEED FG 1/FG 2 IDENTICAL TO XLOAD: The receiving side's FG software is incompatible with the FG software to be crossloaded. NEED FM 1/FM 2 SOFTWARE IDENTICAL TO XLOAD: The crossloaded element is incompatible with the receiving side's FM software.
[5L] A/C STATUS	This prompt is available, when no crossload is in process. This gives the pilot access to the aircraft status page. MM: SS MIN REMAINING: Displays the time remaining to complete the crossload, when a crossload is in process.
[6L] PREV PAGE ABORT	This key calls up the previous P/N STATUS page. This amber prompt is displayed when a crossload is in process. The pilot uses it to stop the crossload.
[6R] NEXT PAGE CONFIRM*	This key calls up the next P/N STATUS page. This amber prompt is displayed when a crossload has been armed. The pilot presses it to start the crossload.

DUPLICATE NAMES PAGE

Ident.: DSC-22_20-50-10-25-00000584.0001001 / 01 OCT 12
Applicable to: ALL

This page, which automatically appears, allows the pilot to select a specific waypoint, airport, or NAVAID when the database holds more than one under the same identifier.



The pilot presses the key adjacent to a waypoint, NAVAID, or airport to select it as the one to be entered. When the pilot has finished, the page automatically reverts to the previously displayed page.

DISTANCE

The direct distance to the aircraft is displayed in green above each name. If this distance is greater than 9 999 NM, 9 999 NM is displayed.

LAT/LONG COLUMN

This column lists the rounded off latitudes and longitudes of the different points, using the same identifier.

FREQ/CHAN COLUMN

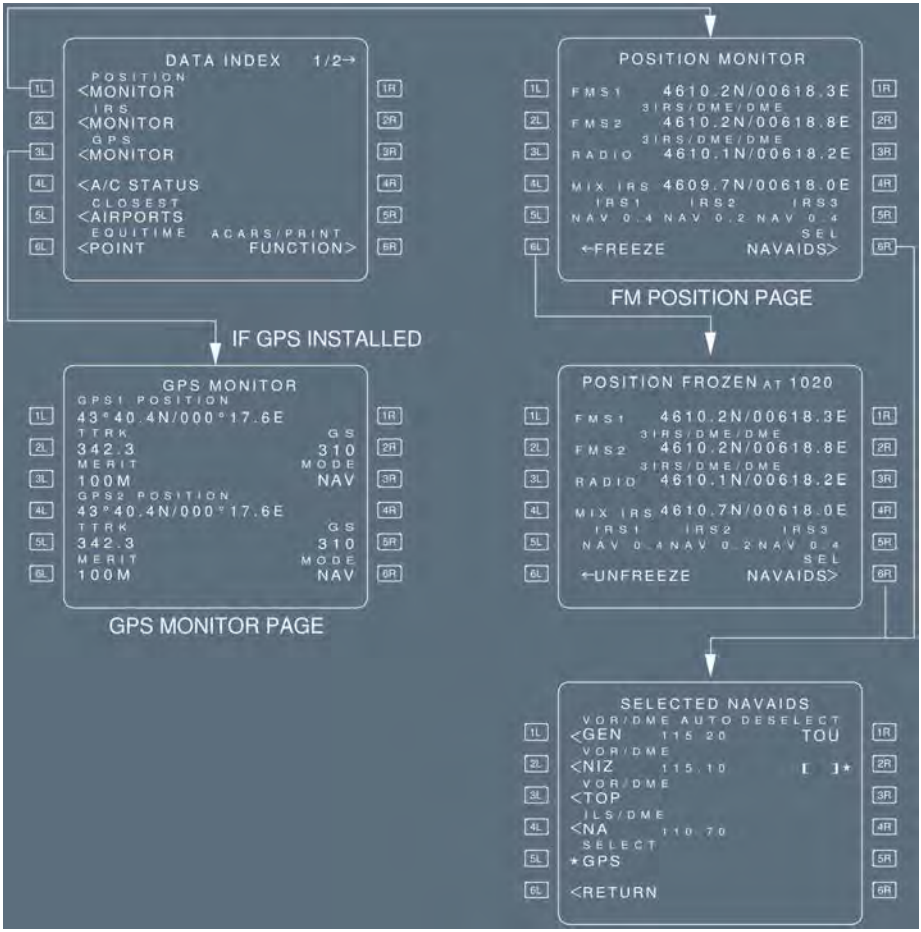
This column lists the NAVAIDs frequencies, if any. It displays CHAN for a MLS.

Note:
- *The DUPLICATE NAMES page is not displayed when 2 waypoints with the same IDENT belong to the same airway. The system selects the first waypoint found in the database.*
- *The waypoints or NAVAIDs are ranked by their distance from the aircraft position.*
- *When a waypoint is named using ICAO phonetic alpha characters, a minus sign and the ICAO code of the country where the waypoint is located, are displayed. e.g. Alpha in France becomes A-LF; Bravo in England becomes B-EG.*

POSITION MONITOR PAGE

Ident.: DSC-22_20-50-10-25-00000585.0001001 / 17 MAR 11
Applicable to: ALL

This page displays all the different positions that the FMGC has computed with the various available methods of navigation. It also shows which method obtained each position. (The positions should be almost identical).
The pilot calls up this page by pressing the 1L key on the data index page.



POSITION MONITOR AND POSITION FROZEN PAGE

Ident.: DSC-22_20-50-10-25-00009133.0001001 / 29 MAR 12
Applicable to: ALL

Line 1 FMGC 1 — This line shows the latitude and longitude, as calculated by the FMGC 1, and the navigation method used by the FMGC for that calculation (Example: “3 IRS/DME/DME”).

Line 2 FMGC 2	This line shows the latitude and longitude, as calculated by the FMGC 2, and the navigation method used.
Line 3 RADIO or GPS or GPIRS	This line shows the latitude and longitude, calculated by the onside FMGC from selected radio NAVAIDs (Example: DME/DME, VOR/DME, or LOC) or from GPS or GPIRS.
Line 4 MIX IRS	This line shows the latitude and longitude of the weighted mean inertial reference system (IRS) calculated by the onside FMGC from the available IRSs.
Line 5 IRS 1,2,3	This line shows the deviation in nautical miles of each IRS position from the onside FMGC position. It also displays the IRS mode, which can be INVAL, ALIGN, NAV or ATT. *Note: INVAL is displayed when an ADIRS has failed, or the IRS position is not refreshed.*
[6L] FREEZE/UNFREEZE	The pilot presses this key to freeze (or unfreeze) all the data displayed on the page. When the data is frozen, the title of the page specifies the time at which it was frozen.
[6R] SEL NAVAIDS	The pilot presses this key to access the selected NAVAIDs page.

SELECTED NAVAIDS PAGE

Ident.: DSC-22_20-50-10-25-00000586.0014001 / 03 APR 13
Applicable to: ALL

MODIFIABLE ONLY FOR DESELECTION

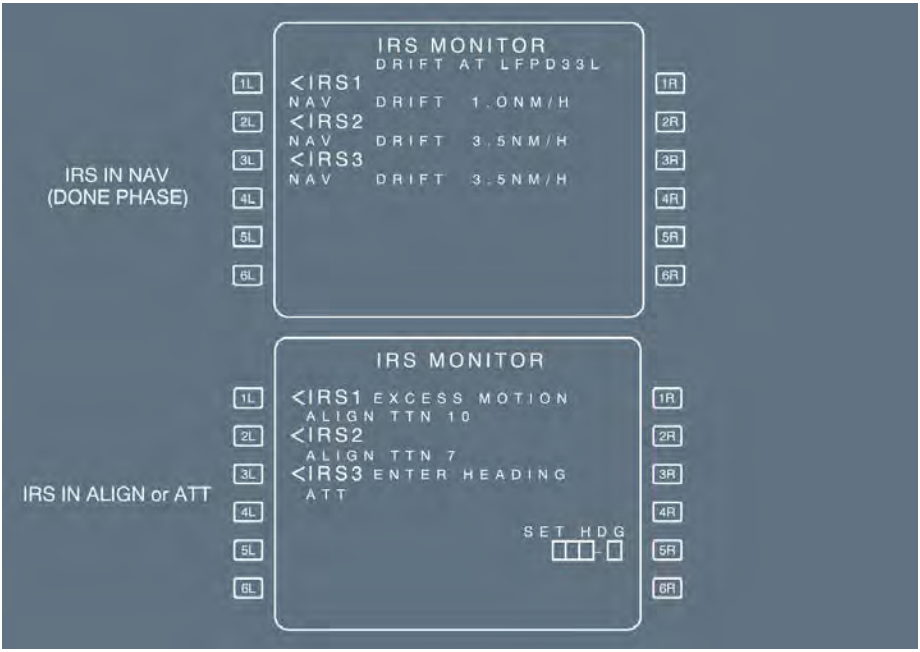
Line 1	This field displays the NAVAID tuned for display purposes, and the tuning mode (AUTO, MAN, or RMP).
Line 2 and 3	These fields display the NAVAIDs, if any, tuned for the calculation of radio position by the FMGC.
[4L]	This field displays the tuned ILS, GLS ◁, MLS ◁, if any.
[5L] DESELECT/SELECT RADIONAV	The flight crew presses this key to manually select or deselect the NAVAIDs. If the flight crew selects (deselects) the NAVAIDs for position calculation, “RADIONAV SELECTED” (“RADIONAV DESELECTED”) is displayed in the label line in blue small font and “DESELECT” (“SELECT”) is displayed in white large font. By default NAVAIDs are selected. The deselection of the RADIONAV inhibits use of radio position (either DME/DME or VOR/DME) for position calculation.

[6L] DESELECT/SELECT GPS	The crew presses this key to manually select or deselect the GPS for position computation. Upon transition to the DONE phase, the prompt returns to DESELECT status. If the pilot deselects the GPS, “GPS IS DESELECTED” is displayed when the aircraft is less than 80 NM from the top of descent, or in approach phase.
[1R] DESELECT to [4R]	The pilot deselects a NAVAID by entering its identifier in one of these six fields. Once deselected in this way, the NAVAID can no longer be tuned manually through the entry of its IDENT, nor can it be autotuned for display or determination of the position for the rest of the flight. The deselection is cleared: - Manually, by a CLR action into this field, or - Automatically upon transition to the done or preflight phase, or upon activation of the second database. The pilot may deselect as many as four stations.
[6R] RETURN	The pilot presses this key to return to the POSITION MONITOR page.

IRS MONITOR PAGE

Ident.: DSC-22_20-50-10-25-00000587.0010001 / 01 OCT 12
Applicable to: ALL

This page displays the IRS data. The crew calls up this page by pressing the IRS monitor prompt of the DATA INDEX page.



TITLE DRIFT AT XXXX (amber)	Displays “DRIFT AT” runway identifier, if at least one IRS average drift is displayed.
[1L] to [3L] IRS 1(2) (3) (white)	These prompts allow access to the associated IRS pages. Each label line displays the mode (NAV, ALIGN, ATT or INVAL), the average drift (upon transition to DONE phase), and the Time To NAV (if IRS in align) for each IRS.

[1R] to [3R] Displays the status message of the associated IRS in small green font.

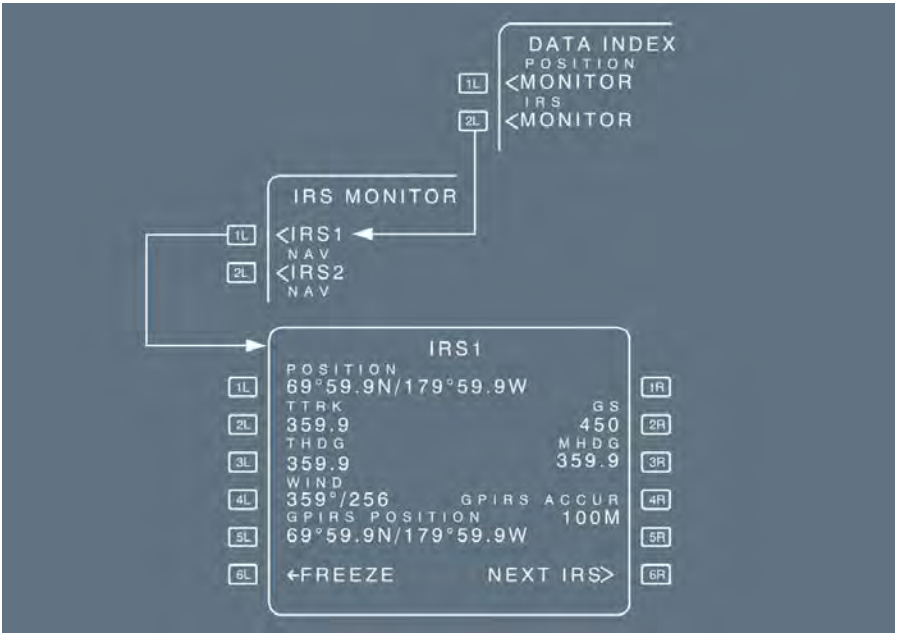
List of available messages:
- IR FAULT
- CHECK C/B
- DELAYED MAINT
- CDU FAULT
- ENTER PPOS
- ENTER HEADING
- SELECT ATT
- REENTER PPOS
- EXCESS MOTION
- SYS BELOW -15 °
- SWITCH ADR

[5R] SET HDG (white) This field is displayed, if at least one IRS is in ATT mode.

This function allows initialization of a heading for IRS in ATT mode:
- If a heading has been entered in this field, or on the ADIRS panel, the value is displayed in blue.
- If not, amber boxes are displayed.

IRS 1 (2)(3) PAGE

This page displays the IRS parameters and GPS/IRS hybrid parameters. The pilot calls up this page by pressing either the 1L key from the IRS MONITOR page, or the NEXT IRS prompt on another IRS page (closed loop).



TITLE	Displays the selected IRS in large white font. When data is frozen, IRS is replaced by “IRS FROZEN AT”, followed by the time at which the pilot has frozen the display.
[1L] POSITION	Displays the latitude/longitude given by the selected IRS.
[2L] TTRK	True track
[3L] THDG	True heading
[4L] WIND	True wind direction/velocity
[5L] GPIRS	GPS/IRS hybrid position of the IRS
[6L] FREEZE/UNFREEZE	Allows the crew to freeze or unfreeze all data displayed on all three IRS pages. When the data is frozen, the title of the page specifies the time at which it was frozen. It is automatically unfrozen when exiting the page.
[2R] GS	Ground speed
[3R] MHDG	Magnetic heading
[4R] GPIRS ACCUR	GPS/IRS Figure of Merit (meters or feet)

[6R] NEXT IRS — This prompt enables another IRS page (closed loop IRS 1 → 2 → 3 → 1) to be displayed.

GPS MONITOR PAGE

Ident.: DSC-22_20-50-10-25-00000588.0001001 / 17 MAR 11
Applicable to: ALL

This page displays the GPS data. The pilot calls up this page by pressing the GPS MONITOR prompt of the DATA INDEX page.

Line 1 and 4 GPS 1,2 — POSITION

[2L] and [5L] TTRK — GPS 1, 2 true track

[3L] and [6L] MERIT — GPS 1, 2 figure of merit (meters or feet)

[2R] and [5R] GS — GPS 1, 2 ground speed

[3R] and [6R] MODE/SAT — GPS 1, 2 mode (INIT, ACQ, NAV, TEST, FAULT, AIDED or ALTAID) and Number of satellites tracked.

- INIT : System initialization
- ACQ : Satellite acquisition
- NAV : Normal mode
- TEST : System test
- FAULT : Invalid system
- ALTAID/AIDED : Degraded modes. GPS uses aircraft inputs for computation purposes.

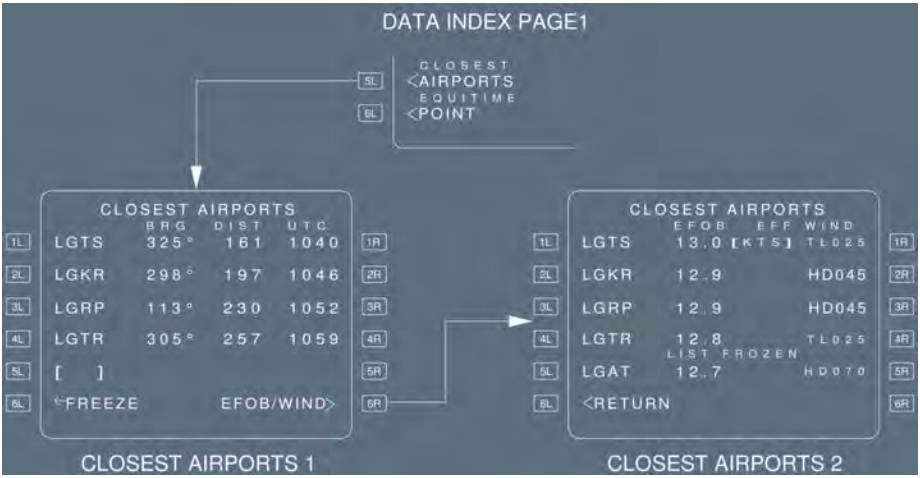
[2] and [5] UTC : GPS 1, 2 UTC

[3] and [6] GPS ALT : GPS altitude is displayed for information purposes. It is not used by the FMGS.

CLOSEST AIRPORTS PAGES

Ident.: DSC-22_20-50-10-25-00000589.0001001 / 17 MAR 11
Applicable to: ALL

The system automatically selects the closest 4 airports from the current aircraft position, and displays them on these pages. A fifth one can be selected by the pilot.
Page 1 displays the bearing, distance, and time to go to each airport; page 2 displays the EFOB and allows the crew to enter an effective wind to be flown to each airport.
The flight crew accesses the CLOSEST AIRPORTS page 1 by pressing the 5L key from the DATA INDEX A page. They access the CLOSEST AIRPORTS page 2 by pressing the EFOB/WIND prompt (6R key) on page 1.



[1L] - [1R] to [4L] - [4R] The closest four airports are extracted from the database, and ranked by distance from the aircraft position.

- BRG — Displays the current bearing from the aircraft's position to the airport.
- DIST — Displays the current great-circle distance from the aircraft's position to the airport.
- TIME or UTC — Displays the predicted time to the airport, computed using the current wind or a wind vector entered on page 2, and the speed according to the current mode (managed or selected).
  The time is only computed in cruise phase.

[5L]	The crew may enter a fifth airport here, using the 4-letter code. The entry may be modified at any time, even when "LIST FROZEN" is displayed.

If the pilot enters an airport that is not in the database, then "NOT IN DATABASE" appears in the scratchpad.

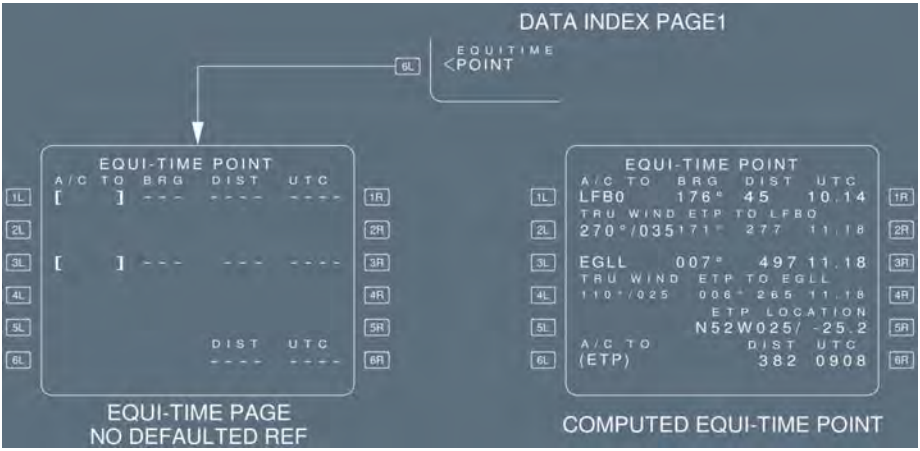
[1L] - [1R] EFOB to [5L] - [5R] EFF WIND	Displays the EFOB at each airport. EFOB is only computed in cruise phase. Used to enter an anticipated headwind or tailwind along the bearing to the airport. If the entry is preceded by +, T, or TL, a tailwind is assumed. If the entry is preceded by -, H, or HD, a headwind is assumed. Before pilot entry, a default value may be displayed, based on the current wind. The effective wind is used to compute the EFOB and time to the airport.
[6L] FREEZE/UNFREEZE	This prompt enables the pilot to freeze and unfreeze the list of four airports. The list is automatically frozen when accessing page 2. It will remain frozen upon returning to page 1. The "LIST FROZEN" message is always displayed on page 2.
RETURN	Returns to page 1.
[6R] EFOB/WIND	Gives access to page 2. Pressing this prompt automatically freezes the list of the four closest airports.

Note:
- *If the aircraft position becomes invalid, all fields are dashed, FREEZE/UNFREEZE and EFOB/WIND prompts are removed, LIST FROZEN is displayed, and the A/C POSITION INVALID message is displayed in the scratchpad. Page 2 cannot be accessed.*
- *Predictions (EFOB, TIME) displayed on the page assume:*
  - *ECON CRZ speed (managed) or current selected speed (selected)*
  - *CI (for managed speed only) and CRZ FL from primary F-PLN are kept*
  - *constant wind value*
  - *In case of engine out, the aircraft altitude is the minimum of (CRZ FL, EO MAX ALT)*
  - *Downpath steps are not considered*
  - *Descent fuel burn is a conservative value which only depends on the difference between current CRZ ALT and destination altitude.*

EQUI-TIME POINT PAGE

Ident.: DSC-22_20-50-10-25-00000590.0001001 / 18 DEC 12
Applicable to: ALL

The pilot uses this page to require an equitime point computation between two different points (airport, NAVAID, runway, NDB or waypoint). This pseudo-waypoint (ETP) is displayed on the navigation display along the F-PLN. The EQUI-TIME POINT page is accessed by pressing the 6L key from the DATA INDEX page:



[1L] A/C TO and (blue) [3L] Displays reference waypoint 1.
Displays reference waypoint 2.

Note: *Origin and destination airports are used by default for respective reference points 1 and 2, until a pilot entry is made.*

[1R] BRG/DIST/UTC and [3R] (green) Displays the bearing, distance, time, from the aircraft's current position to the reference waypoint 1.
Displays the bearing, distance, time, from the current position of the aircraft to the reference waypoint 2.

- BRG : Displays the current great-circle bearing from the position of the aircraft to the reference waypoint.
- DIST : Displays the current great-circle distance from the position of the aircraft to the reference waypoint.
- UTC : Displays the predicted time of arrival at the reference waypoint (computed using the current wind or a wind vector, entered by the crew).
  The time is only computed in cruise phase. In other phases, it is dashed.

[2L] and [4L] TRU WIND (blue) The pilot may enter the wind (direction/velocity) at the reference waypoint and the CRZ FL:
This wind is used to compute the time from the aircraft's position to the reference waypoint, and to locate the equitime point.
If no entry is made, the wind/velocity field will read zero.

[2R] and [4R] EPT TO XXX (green)	This field displays the bearing distance and the time from the equitime point position (ETP) to the reference waypoint.
[5R] ETP LOCATION	This field displays the ident of the next waypoint following the equitime point. It provides the distance along the flight plan from the equitime point to the indicated waypoint.
[6L] - [6R] A/C TO (ETP) DIST/UTC (green)	This field displays the distance and time from the aircraft's current position to the equitime point along the flight plan. If at least one reference waypoint exists, but no equitime point exists, the field is blank and NO ETP is displayed in 6L.

Note: The assumptions for the equitime point computation include the cost index, speed managed (with SPD LIM), and winds.
In case of engine-out, the EO LRC speed is considered.

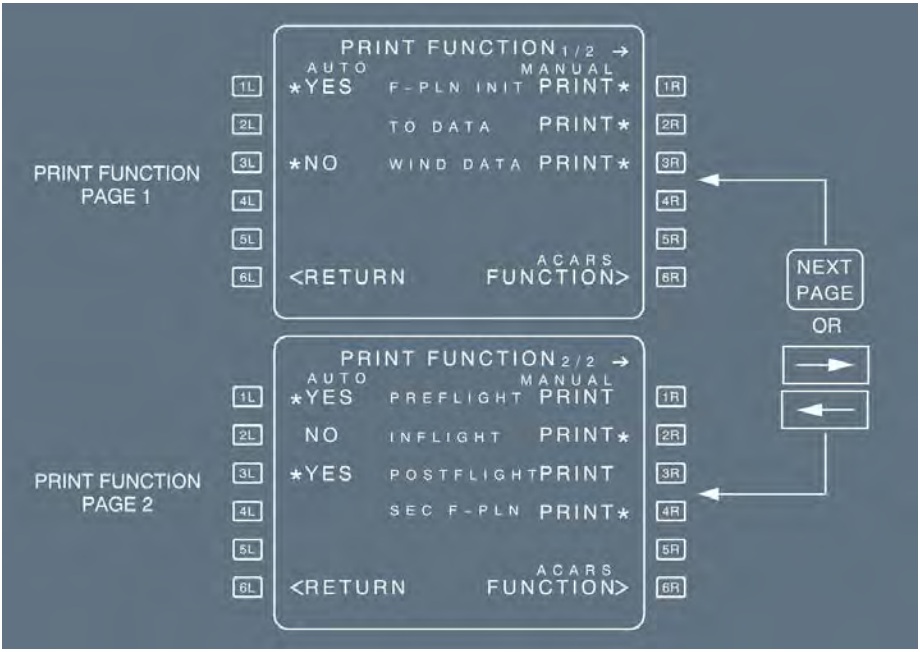
PRINT FUNCTION PAGES

Ident.: DSC-22_20-50-10-25-00000591.0001001 / 01 OCT 12
Applicable to: ALL

The PRINT FUNCTION pages enable the crew to print the data relative to the current flight.

This data comes from 2 different sources:
- ACARS uplink messages, and
- Active data from the current flight.

The pilot may access these pages from the “DATA INDEX” page1/2 by pressing the [6R] ACARS/PRINT FUNCTION key.



PRINT FUNCTION PAGE 1/2

This page displays the status of the automatic printing capabilities, for the uplink messages (left column), and the status of the manual printing capabilities of the current active data (right column).

LEFT COLUMN

AUTO

* YES (blue)	Line 1:	Uplink messages related to flight plan INIT data are automatically printed when received.
	Line 2:	Uplink messages related to takeoff data are automatically printed when received.
	Line 3:	Uplink messages related to wind data are automatically printed when received.
* NO (blue)	When “NO”, preceded by a star, is displayed in front of a line, automatic printing is deselected. The pilot can reactivate it by pressing the left key of the line.	
NO (without a star)	Automatic printing is internally deactivated for the data of the line. The pilot cannot reactivate it manually.	
Blank	The ACARS function is not available for this line. Uplink messages can neither be received nor automatically printed.	

RIGHT COLUMN

MANUAL — Displays the status of the manual printing capability of the active data (and not of the ACARS uplink data).

PRINT * (amber) — Pressing the right keys prints the following active data:
- Line 1: Active flight plan INIT data
- Line 2: Active takeoff data
- Line 3: Active wind data

If the star is not displayed, printing is not possible.
When the key is pressed, the star is removed until the data is printed.

[6L] RETURN — Pressing this key reverts the display to the DATA INDEX page.

[6R] ACARS FUNCTION — Pressing this key reverts the display to the ACARS FUNCTION page.

PRINT FUNCTION PAGE 2/2

This page describes the printing capabilities of the reports displayed on lines 1 to 4.

LEFT COLUMN

AUTO (white)

* YES (blue)
- Line 1: The PREFLIGHT report is automatically printed at engine start.
- Line 2: The INFLIGHT report is automatically printed at takeoff.
- Line 3: The POSTFLIGHT report is automatically printed at engine shutdown.

* NO (blue) — The report, displayed on the line, is not printed automatically. The pilot can reactivate the function by pressing the left key of the line.

NO (without a star) — Automatic printing is internally deactivated for the report. The pilot cannot reactivate it.

RIGHT COLUMN

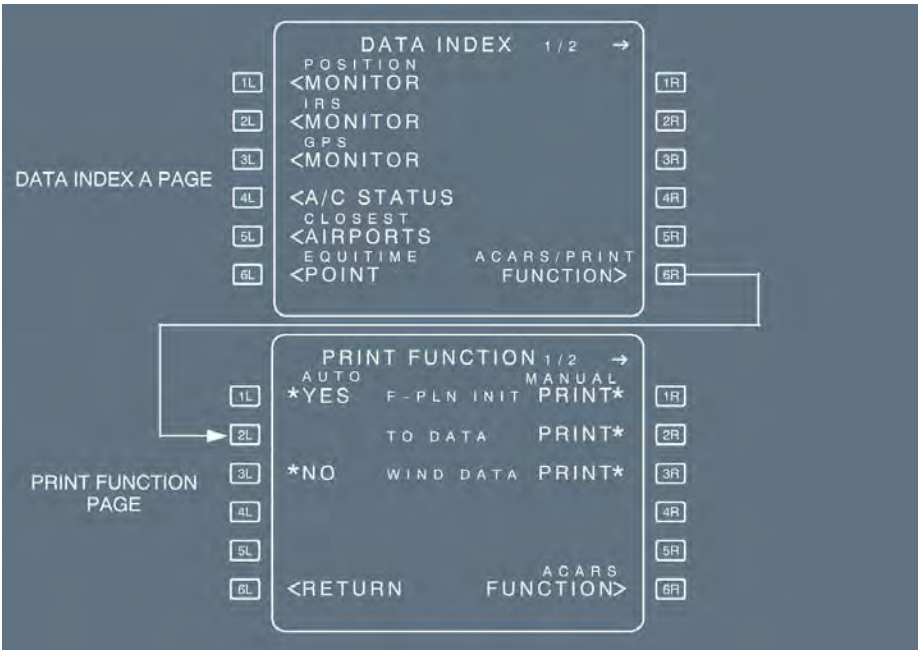
MANUAL
PRINT * — Pressing a right key prints the report displayed on the line.
If the star is not displayed, printing is not possible.
When the key is pressed, the star is removed until the report is printed.
For the PREFLIGHT, INFLIGHT and POSTFLIGHT reports, only one type of report is available for printing at any given time, depending on the current flight phase.
For the SEC F-PLN report, the print selection start is only displayed if a secondary flight plan exists.

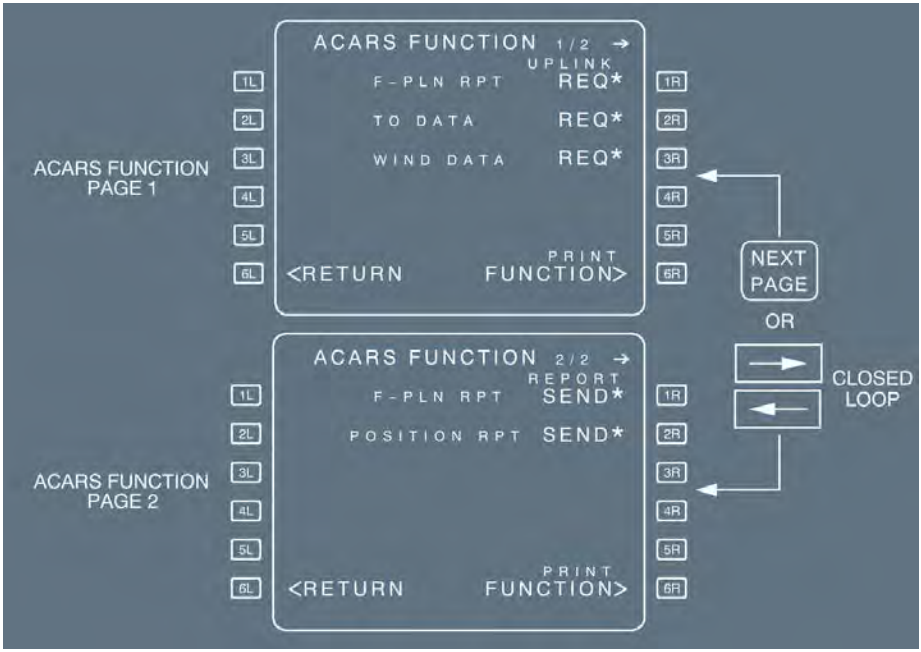
ACARS FUNCTION PAGE

Ident.: DSC-22_20-50-10-25-00000592.0001001 / 01 OCT 12
Applicable to: ALL

The ACARS FUNCTION pages display the functions enabling the crew to send manual requests or reports to the ground.

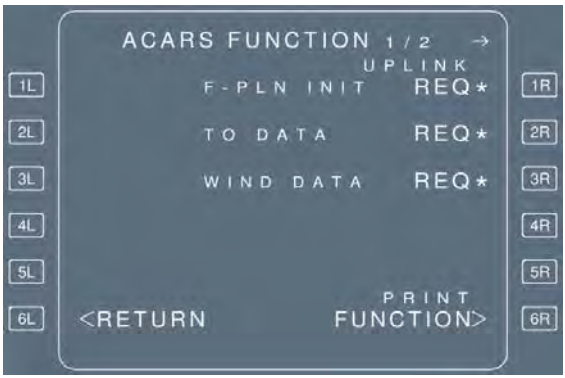
All functions, displayed on pages 1 and 2, may be inhibited through a pin program.
The ACARS/PRINT FUNCTION prompt is displayed on the DATA INDEX page 1/2. Pressing this key displays the PRINT FUNCTION page from which the ACARS FUNCTION page can be accessed.





ACARS FUNCTION PAGE 1

Ident.: DSC-22_20-50-10-25-00000593.0001001 / 17 MAR 11
Applicable to: ALL



TITLE ACARS FUNCTION 1/2 in white

Line 1 F-PLN INIT REQ* Pressing this key sends a request for flight plan to the ground (downlink message)
The INIT REQUEST prompt of the INIT A page provides the same function.

Line 2 TO DATA REQ* Pressing this key sends a request for takeoff data.
Displayed in the DONE and PREFLIGHT phases.
The TO DATA REQUEST prompt of the UPLINK TO DATA REQ page provides the same function.

Line 3 WIND DATA REQ* Pressing this key sends a request for wind data.
The WIND REQUEST prompt of the CLIMB, CRUISE, and DESCENT WIND pages provides the same function.

Note: *If "REQ" is not followed by a star, the request cannot be sent (downlink message).*
When a function (line 1 or 2 or 3) is deactivated internally, the corresponding line is blank.

[6L] RETURN The pilot presses this key to make the display revert to the DATA INDEX page.

[6R] PRINT FUNCTION The pilot presses this key to access the PRINT FUNCTION page. (*Refer to DSC-22_20-50-10-25 Print Function Pages*).

UPLINK TO DATA REQ PAGES

Ident.: DSC-22_20-50-10-25-00000594.0009001 / 14 MAY 12
Applicable to: ALL

This page allows the flight crew to send a request for takeoff data for up to 2 runways. There is one page for each runway. The page is accessed from the PERF TAKEOFF page, or from the UPLINK XXX (MAX or DRT or FLX) TO DATA page, by pressing the UPLINK TO DATA prompt.

TITLE	White.
[1L] TOW/TOCG (green)	This field is dashed, until a runway is defined in the [1R] field. The TOW/TOCG is defaulted to the values of the INIT B and FUEL PRED pages. If not available, dashes are displayed. It cannot be modified by the pilot.
[2L] TEMP/QNH or QFE (green/blue)	This field is dashed, until a runway is defined in the [1R] field. It displays the temperature at origin and baro setting. TEMP = If the temperature is not defined, blue brackets are displayed, and the flight crew can modify this field according to the weather information. BARO = Defaulted to FCU selection and can be modified by the pilot.
[3L] MAG WIND (blue)	This field is dashed, until a runway is defined in the [1R] field. It displays the wind at the origin. If the wind is not defined, blue brackets are displayed. The pilot can modify this field.

[4L] CONTAM (blue) — This field is dashed, until a runway is defined in the [1R] field. The display is defaulted to DRY.
The scroll keys allow the crew to modify the runway contamination.
DRY, WET, 1/4 WATER, 1/2 WATER, 1/4 SLUSH, 1/2 SLUSH, COMP SNOW.

[6L] RECEIVED TO DATA — This field calls up the UPLINK MAX (or FLX or DRT) TO DATA page that displays the data received by AOC.

[1R] SHIFT/RWY (blue) — This field is dashed, until a runway is defined in the F-PLN. If a runway is defined in the F-PLN, it is automatically filled in as:

- SHIFT = Value from the PERF TO page, or blue brackets [ ], if no value is defined.
- RWY = F-PLN departure runway. The pilot can modify this field.

[2R] TO LIMIT (blue) — It is dashed, until a runway is defined in the [1R] field.
It displays blue brackets [ ], when a runway is defined.
The pilot may enter a length, considering runway obstacles.

[3R] FLAPS/THS (blue) — This field is dashed, until a runway is defined in the [1R] field; it is then defaulted to values from the PERF TO page. Blue brackets are displayed, if the PERF TO page does not have any defined values.

[4R] FLEX TO TEMP (blue) — This field is dashed, until a runway is defined in the [1R] field; it is then defaulted to values from the PERF TO page. Blue brackets are displayed, if the PERF TO page does not have any defined values.
The pilot can modify this field and enter a FLEX TO temperature (FXX).

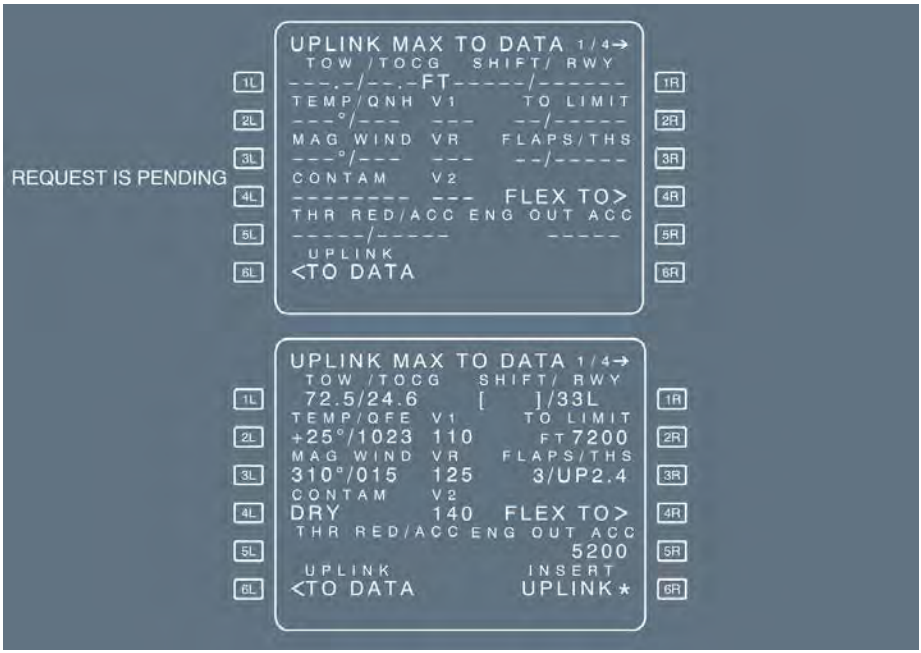
[6R] TO DATA REQUEST* (amber) — Pressing the key sends the takeoff data request message to the ground.
The asterisk disappears when the request is sent. It reappears when the data is available.

Page 2/2 is a page used for requesting a second runway data.

Note: If the UPLINK TO DATA REQ Page 2 is accessed (Page 1 being filled), the fields of this page are filled with default values after entry of a runway in [1R]. QNH or QFE and wind are common with Page 1.

UPLINK MAX TO DATA PAGES

Ident.: DSC-22_20-50-10-25-00000595.0010001 / 01 OCT 12
Applicable to: ALL



This page is accessed from the UPLINK TO DATA REQ page by pressing the RECEIVED TO DATA key.
There is a set of 2 pages (MAX TO DATA and FLEX TO DATA) for each of the 4 uplinked runway data. Uplinked data is displayed in green. (It cannot be modified by the flight crew).

[1L] TOW/TOCG	Uplinked reference Takeoff Gross Weight and Takeoff Center of Gravity.
[2L] TEMP/QNH (or QFE)	Uplinked assumed temperature and BARO setting.
[3L] MAG WIND	Uplinked takeoff runway wind.
[4L] CONTAM	Uplinked takeoff runway contamination.

[5L] THR RED/ACC	Uplinked Thrust Reduction and Acceleration altitudes.
[6L] UPLINK TO DATA	Pressing the key calls up the UPLINK TO DATA REQ page.
V1, VR, V2	Uplinked takeoff speeds.
[1R] SHIFT/RWY	Uplinked TO runway IDENT, runway intersection and position shift.
[2R] TO LIMIT	Uplinked runway length remaining.
[3R] FLAPS/THS	Uplinked FLAPS/SLATS CONF and TRIM position.
[4R] FLEX TO	Pressing this key calls up the UPLINK FLEX TO DATA pages.
[5R] ENG OUT ACC	Uplinked engine-out acceleration altitude.
[6R] INSERT UPLINK*	Uplinked takeoff data is available for insertion.

Selecting this prompt inserts the following data on the PERF TO page:
- V1, VR, V2
- THR RED/ACC, ENG OUT ACC altitudes
- FLAPS/THS
- SHIFT
- FLEX

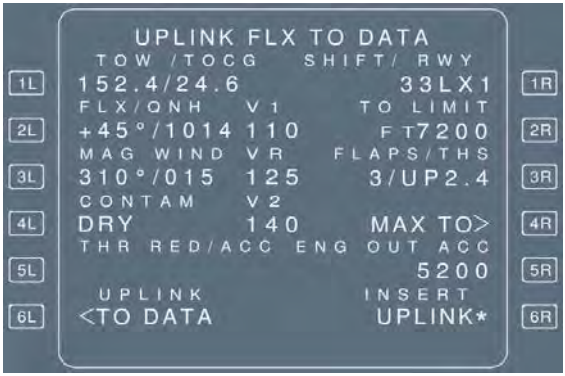
The display reverts to the PERF TO page, the asterisk disappears.

This field is not displayed, if the runway does not match the active runway. If the runway matches the active runway but the uplinked TOW differs from the current TOW (the uplinked TOW is 3 t greater or 1 t lower than the TOW estimated by the FMS):
- The asterisk disappears and the insertion is not possible
- The TOW value is displayed in amber in [1L] field.

Note: *All previously-received data is replaced by the new uplinked data.*

UPLINK FLX TO DATA PAGES

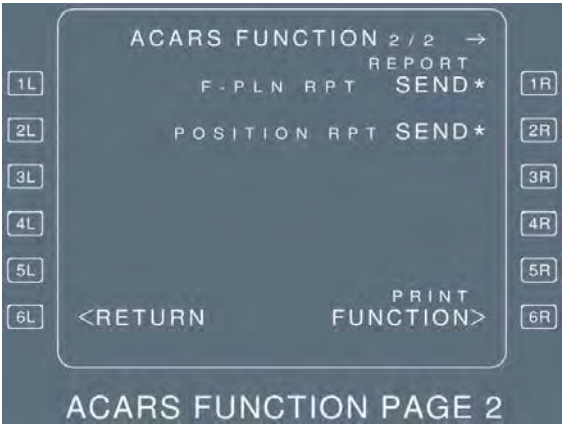
Ident.: DSC-22_20-50-10-25-00000596.0001001 / 23 JUN 15
Applicable to: ALL



TITLE	UPLINK FLX TO DATA.
[2L]	FLX/QNH (or QFE) When the UPLINK FLEX TO DATA page is selected, it displays uplink assumed Flex Temperature and BARO setting (QNH or QFE).
[4R] MAX TO	Pressing this key calls up the MAX TO DATA page. For all other fields, *Refer to DSC-22_20-50-10-25 Uplink MAX TO Data Pages*

ACARS FUNCTION PAGE 2

Ident.: DSC-22_20-50-10-25-00000597.0001001 / 17 MAR 11
Applicable to: ALL



Line 1 F-PLN RPT SEND — Pressing this key sends the flight plan report to the ground.

Line 2 POSITION RPT SEND — Pressing this key sends a Position Report to the ground.

Note: - *No report can be sent, if "SEND" is not followed by a star*
- *When a function (line 1 or 2) is deactivated through the navigation database policy file, the corresponding line is blank.*

[6L] RETURN — The pilot presses this key to revert to the DATA INDEX page.

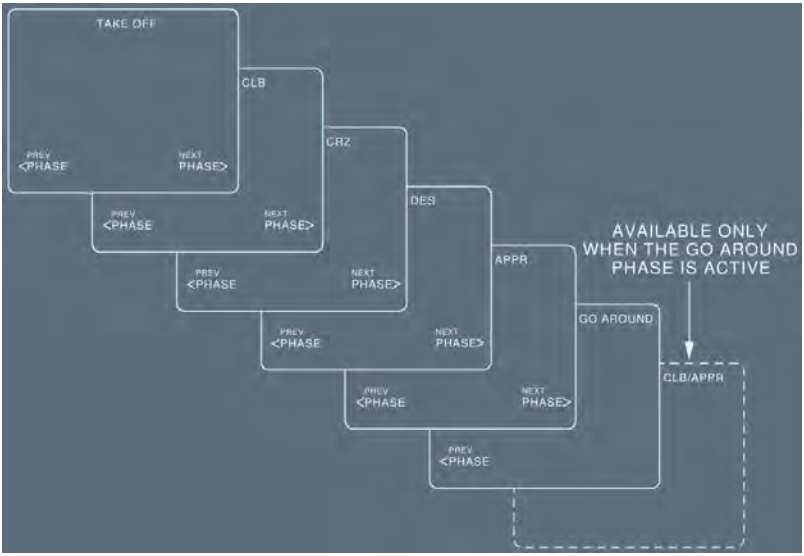
[6R] PRINT FUNCTION — The pilot presses this key to access the PRINT FUNCTION page.

PERF PAGE

Ident.: DSC-22_20-50-10-25-00000598.0001001 / 17 MAR 11
Applicable to: ALL

The flight plan is divided into the following phases:
PREFLIGHT, TAKEOFF, CLIMB, CRUISE, DESCENT, APPROACH, GO-AROUND, DONE.
Each phase, except for the preflight and done phases, has a performance (PERF) page. The PERF pages display performance data, speeds related to the various phases, and predictions.
Pressing the PERF key on the MCDU console calls up the performance page for the current active phase. Performance pages, relating to phases already flown, are not available.
In the preflight and done phases, pressing the PERF key brings up the takeoff performance page.

Pressing the PERF key in the done phase makes the phase transition to the preflight phase.

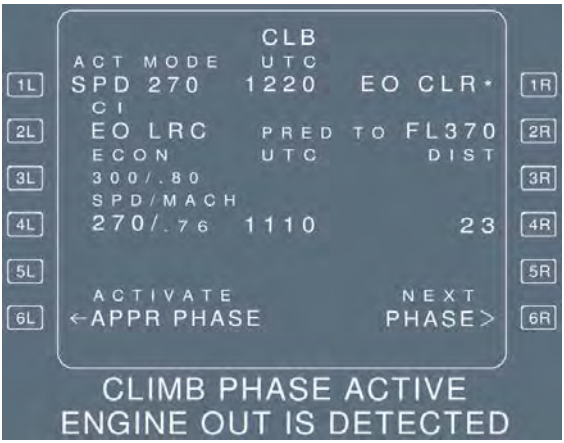


The FMGS flight phases are not related to the FWC flight phases.

Line 6	Fields may display two different prompts, depending upon whether the phase is active or not.
[6L] PREV PHASE	To review the performance page for the previous phase. The prompt is unavailable on the takeoff performance page. It is also unavailable for phases already flown.
[6L] ACTIVATE APPR PHASE	To activate, then confirm, the APPR phase. Available only on the page corresponding to the active phase.
[6R] NEXT PHASE	To review the performance page for the next phase.

Note: ***Engine-out condition***

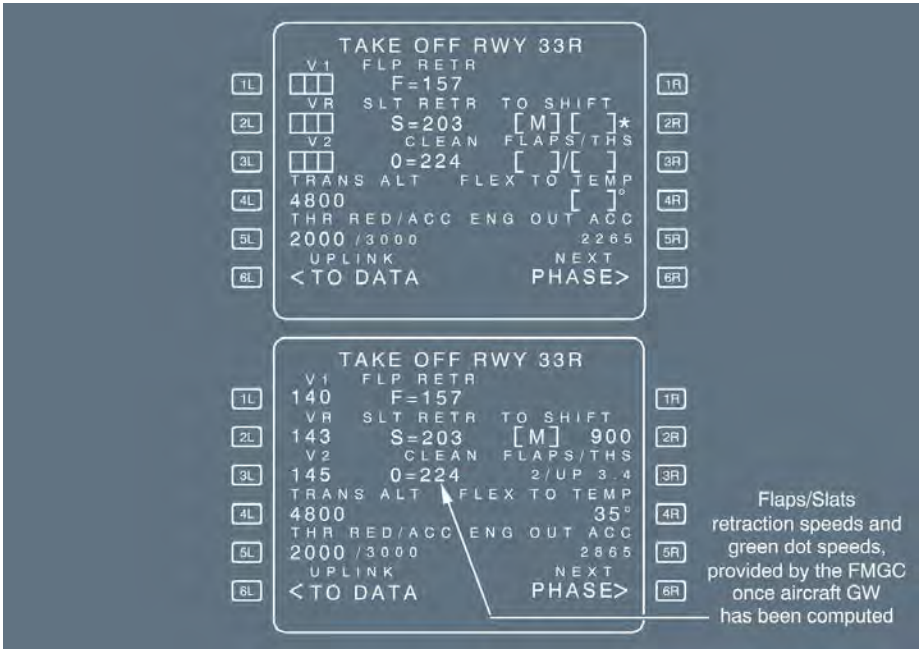
- *When the FMGS detects an engine-out condition, the system automatically calls up the performance page for the current flight phase (except when this occurs before the diversion point during takeoff or no EOSID exists in the flight plan) and displays "EO CLR*" in the [1R] field and EO LRC (engine-out long range cruise) in the [2L] field. On the CLB, CRZ and DES (when the descent phase is not active) PERF pages, the pilot can enter a cost index value and overwrite to "EO LRC". Clearing the cost index reverts to EO LRC.*
  If the pilot presses the [1R] key, the system reverts to the normal processing (with no engine failed) and suppresses the EO information. (Refer to DSC-22_20-30-10-15 General).
- *If the engine-out condition is detected before the diversion point at takeoff, a temporary flight plan is created.*



PERF TAKEOFF PAGE

Ident.: DSC-22_20-50-10-25-00000599.0010001 / 08 JUL 15
Applicable to: ALL

During the preflight phase, the pilot presses the PERF key to call up the takeoff performance page.



TITLE

TAKE OFF RWY is in large green font when the takeoff phase is active, and in large white font when it is inactive. The active flight plan selected runway is displayed in large green font.

Note: *If the takeoff shift, or the flaps/THS, or the runway is changed after V1, VR or V2 insertion, but the origin airport remains the same, the MCDU "CHECK TAKE OFF DATA" message appears. All takeoff parameters are retained except in case of runway change. In case of runway change, the parameters are invalidated, but still displayed adjacent to each field. The "CONFIRM TO DATA" prompt in [6R] allows reverting to the previous values.*

[1L] V1 [2L] VR [3L] V2 — The boxes remain amber, as long as the pilot does not make entries in them. The pilot can modify any entry, as long as the takeoff phase is not active.

Note: *1. If the flight crew does not enter V2, the SRS mode will be unavailable at takeoff.*
2. The MCDU "V1/VR/V2 DISAGREE" amber message appears if the inserted V1, VR, V2 speeds do not satisfy the condition: V1 ≤ VR ≤ V2.
3. The MCDU "TO SPEED TOO LOW" amber message appears if the inserted V1, VR, V2 speeds do not satisfy the existing regulatory conditions regarding VMCG/VMCA and VS1G speeds.

[4L] TRANS ALT (transion altitude) — This field displays the navigation database default altitude (if defined) once the origin airport is entered. The pilot can modify it.

[5L] THR RED (thrust reduction altitude) — This is the altitude at which the pilot should reduce the thrust from TOGA/FLX to MAX CLIMB (CL detent) with all engines operative ("CLB" or "LVR CLB" flashing on the FMA).
- The thrust reduction altitude defaults to 1 500 ft above the runway elevation, or to the altitude set by the airline
- The pilot can modify this altitude: The minimum is 400 ft above the runway elevation.

ACC (Acceleration altitude) — This is the altitude at which the climb phase is triggered.
- The target speed jumps to the initial climb speed
- The default value is 1 500 ft above runway elevation
- The flight crew can modify the value. The minimum value is 400 ft above runway elevation, and it can be higher than, or equal to, or lower than THR RED.

Note:
- *A clearing action reverts both values to the defaulted ones*
- *When the flight crew selects an altitude on the FCU that is below THR RED, it brings THR RED and ACC down to this altitude. (The 400 ft minimum still applies).*

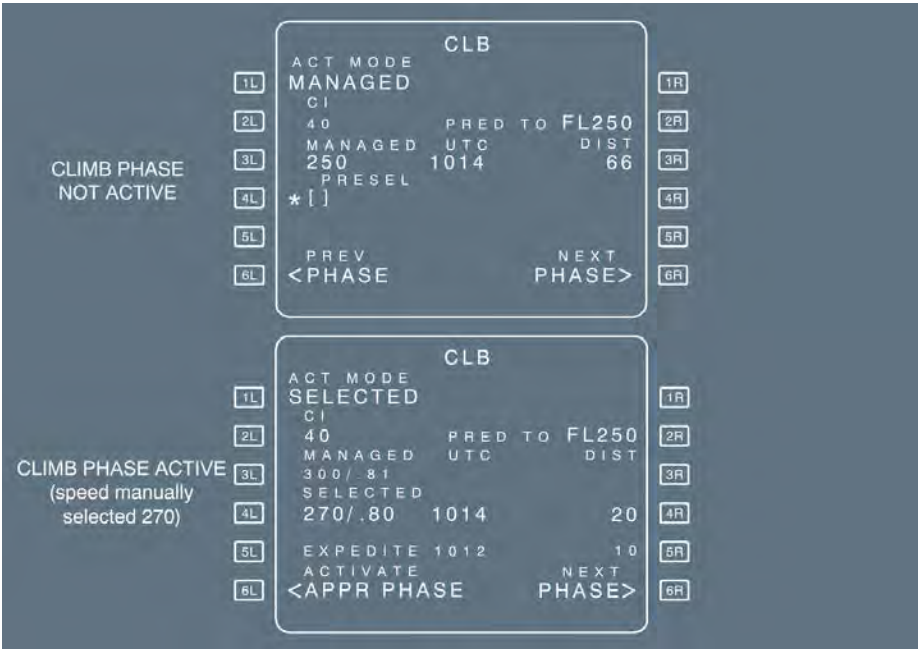
[6L] UPLINK TO DATA — This key calls up the UPLINK TO DATA REQ page.
It is only displayed in the preflight and done phases.

[1R] EO CLR — EO CLR is displayed when an engine-out is detected and when active flight phase is takeoff.

[2R] TO SHIFT	The takeoff shift is the distance in meters or feet between the beginning of the runway and the aircraft's takeoff position. When taking off from an intersection, the flight crew should insert this value to ensure a correct update of the FM position. The takeoff shift value must be positive, and cannot be greater than the runway length.
[3R] FLAPS/THS	This is a flight crew entry for the positions of the flaps and the trimmable horizontal stabilizer (THS) at takeoff. The flight crew can modify it until takeoff, by entering “UP X.X” or “X.X UP”, or “DN X.X” or “X.X DN” for the THS.
[4R] FLX TO TEMP	The flight crew inserts the FLX TO temperature for FLX takeoff setting purposes. The flight crew can only enter it during preflight. The system sends it to the FADEC and displays the entered data on the upper ECAM display. The TEMP value is always entered in degrees Celsius.
[5R] ENG OUT ACC	This field displays the engine-out acceleration altitude, as defined in the database, or is manually entered by the flight crew. This is for display only, as a reminder. It cannot be cleared. The above ACC altitude rules of [5L] apply to this field.
[6R] NEXT PAGE or CONFIRM TO DATA*	This key calls up the climb performance page, or allows the flight crew to revert to the previously-entered T.O. parameters, in case of runway change with the same origin airport.

PERF CLIMB PAGE

Ident.: DSC-22_20-50-10-25-00000600.0001001 / 14 MAY 12
Applicable to: ALL

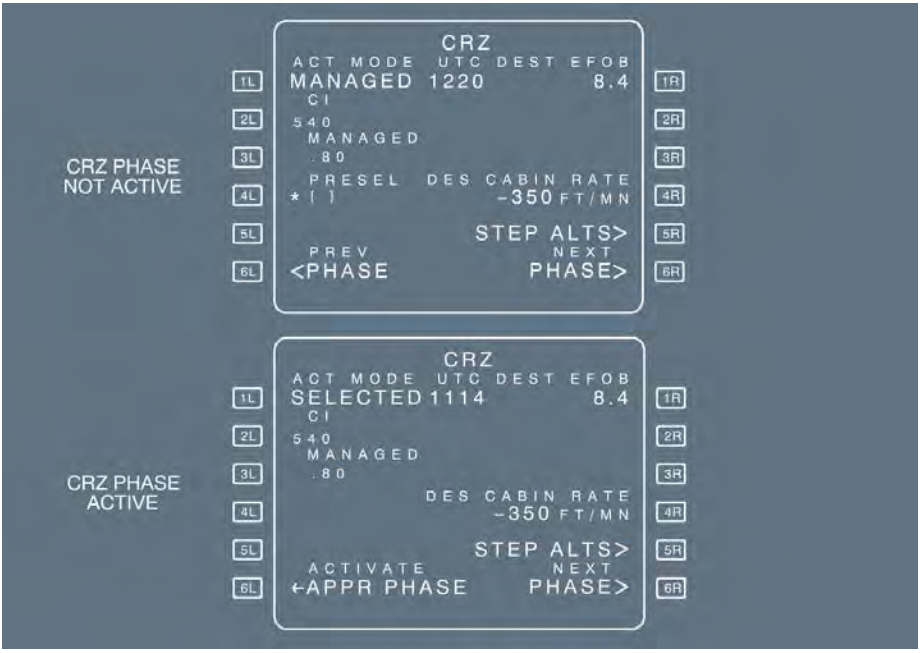


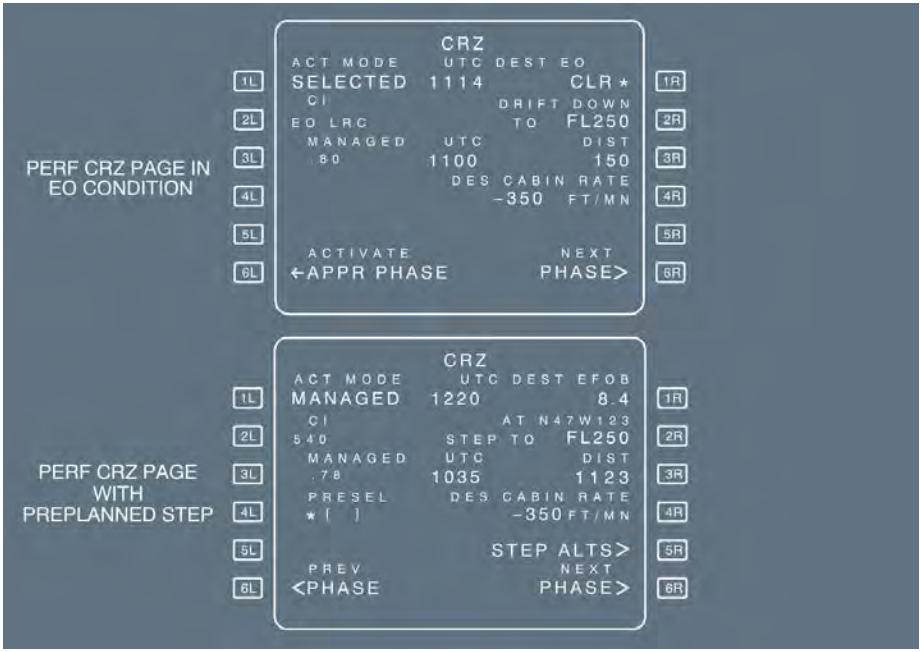
TITLE	CLB is displayed in large white fonts when the climb phase is inactive, and in large green fonts if it is active.
[1L] ACT MODE	This field displays the preselected or active speed mode: SELECTED or MANAGED. The pilot cannot modify it from this field.
[2L] CI (Cost Index)	This field displays the cost index, as initialized on the INIT A or defaulted from the database, or inserted in this field by the pilot. EO LRC automatically replaces the cost index value in case of engine-out.
[3L] MANAGED	This field displays the FMGS computed ECON speed/Mach (*Refer to DSC-22_20-40-10 Optimization*). Before CLIMB phase is active, if the preselected speed mode is SELECTED, a star is displayed next to the MANAGED speed. Pressing the 3L key in this case preselects MANAGED speed, and 4L reverts to brackets.

[4L] PRESEL or SELECTED	If the climb phase is not active: This field displays PRESEL as long as the climb phase is not active. The pilot can enter a preselected speed only. If the climb phase is active: The title of this field becomes SELECTED. This field displays the selected (or preselected) SPD or MACH target. The pilot cannot modify it directly in this field, but can adjust it with the SPD/MACH selection knob on the FCU. If the pilot pushes in the FCU SPD/MACH selection knob to revert to managed speed, the system selects (or reselects) ECON SPD/MACH and [4L] is blank.
[5L] Blank or EXPEDITE	This field is blank as long as the aircraft is in preflight. This field displays this legend when the takeoff or climb phase is active. The flight crew cannot engage EXPEDITE from this field. It indicates the time and distance required to reach the altitude displayed in the 2R field, in case of climb at green dot.
[6L] PREV PHASE	This field displays this legend if climb phase is not active. The pilot presses this key to call up the takeoff page.
[6L] ACTIVATE APPR PHASE	The field displays this legend if the climb phase is active. Pressing this key once displays “CONFIRM APPR PHASE*”. Pressing it again activates the approach phase.
[1R] EO CLR	The system displays the EO CLR prompt in case of engine out in climb.
[2R] PRED TO...	This field displays the target altitude for the predictions shown in 3R, 4R, or 5L. It defaults to FCU altitude, but the pilot can modify it to any altitude below CRZ FL.
[3R] [4R] [5R]	These fields show time and distance predictions for the target altitude selected in [2R], computed for the current vertical mode and speed mode (MANAGED, SELECTED). These fields are displayed only while the takeoff, or climb phase is active.
[6R] NEXT PHASE	The flight crew presses this key to call up the PERF CRZ page.

PERF CRUISE PAGE

Ident.: DSC-22_20-50-10-25-00000601.0009001 / 30 MAR 15
Applicable to: ALL





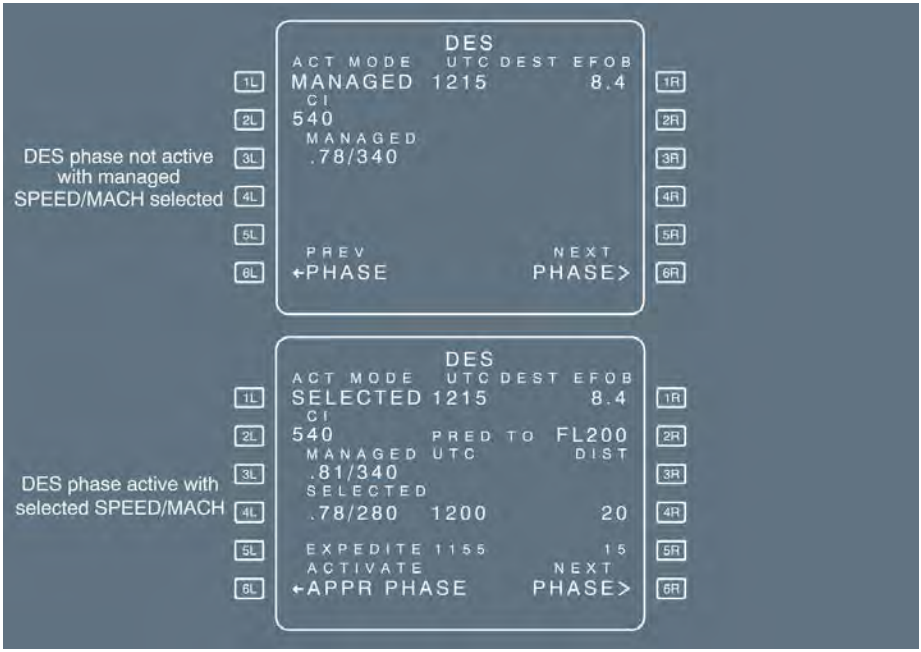
TITLE	CRZ in white large font, when cruise phase is not active, in green large font, when it is.
[1L] ACT MODE	This field shows the preselected or active speed mode: SELECTED or MANAGED. The pilot cannot modify it through this field.
[2L] CI	This field shows the cost index as initialized on the INIT A page or defaulted from the database, or as inserted in this field by the crew. EO LRC replaces automatically the cost index value in case of engine out.
[3L] MANAGED	This field displays the FMGS computed ECON speed/Mach (*Refer to DSC-22_20-40-10 Optimization*). Before CRUISE phase is active, if the preselected speed mode is SELECTED, a star is displayed next to the MANAGED speed. Pressing the 3L key in this case preselects MANAGED speed, and 4L reverts to brackets.

[4L] PRESEL	If cruise phase is not active: The pilot can enter a preselected speed or Mach number. If cruise phase is active: This field is blank. Note: *If the flight crew enters a value in the PRESEL field during the cruise altitude capture (ALT CRZ*), the FCU selected speed may revert to M 0.01.*
[6L] PREV PHASE or	The pilot can press this key to call up the climb page, if the cruise phase is not yet active.
[6L] ACTIVATE APPR PHASE	This field displays this legend if the cruise phase is active. The flight crew presses the key once to change the legend to “CONFIRM APPR PHASE*”. A second press activates the approach phase. Note: *If the pilot activates the approach phase inadvertently, it can reselect the cruise flight level into the progress page to reactivate the cruise phase.*
[1R] TIME/UTC DES EFOB	Before takeoff this field displays the flight time to destination and the predicted remaining fuel on board. If the crew enters an estimated takeoff time, the field displays automatically the predicted arrival time (UTC) at destination. After takeoff it displays the predicted arrival time at destination (UTC) and the remaining fuel on board (DEST EFOB) at destination, in green font. The DEST EFOB field will turn to amber, if the EFOB at destination becomes less than the MIN DEST FOB value displayed on the FUEL PRED page. EO CLR is displayed when an engine-out is detected.
[2R] STEP TO FL XX, DRIFT DOWN TO FL XX, or TO T/D	The field, in combination with 3R, displays the predictions for the step point and the step altitude, the drift down altitude, or the Top of Descent.
[3R] TIME/UTC and DIST	This field displays the time and distance to go to the various points identified in 2R.
[4R] DES CABIN RATE	This field displays MAX [computed DES cabin rate, maximum descent cabin rate]. The pilot may modify the value: the FM recomputes then the top of descent in order to match this value. If the FM cannot match the pilot entry, the FM computed value overwrites the pilot entry. A clear action reverts to the default value (-350 ft/min). DES CAB RATE being a negative value, 'minus” is not a necessary entry.
[5R] STEP ALTS	This key calls up the STEP ALTS page (vertical revision *Refer to DSC-22_20-50-10-25 VERTICAL REVISION Pages*).

[6R] NEXT PHASE — This key calls up the DES page.

PERF DESCENT PAGE

Ident.: DSC-22_20-50-10-25-00000602.0011001 / 23 JUN 15
Applicable to: ALL



TITLE	DES is in large white font if the descent phase is not active; it is in large green font, if it is.
[1L] ACT MODE	This field displays the preselected or active speed mode (MANAGED or SELECTED). The flight crew cannot modify it through this field.
[2L] CI	This field displays the cost index, as initialized on the INIT A page or defaulted from the database, or inserted in this field by the flight crew. The flight crew cannot modify it when the descent phase is active.

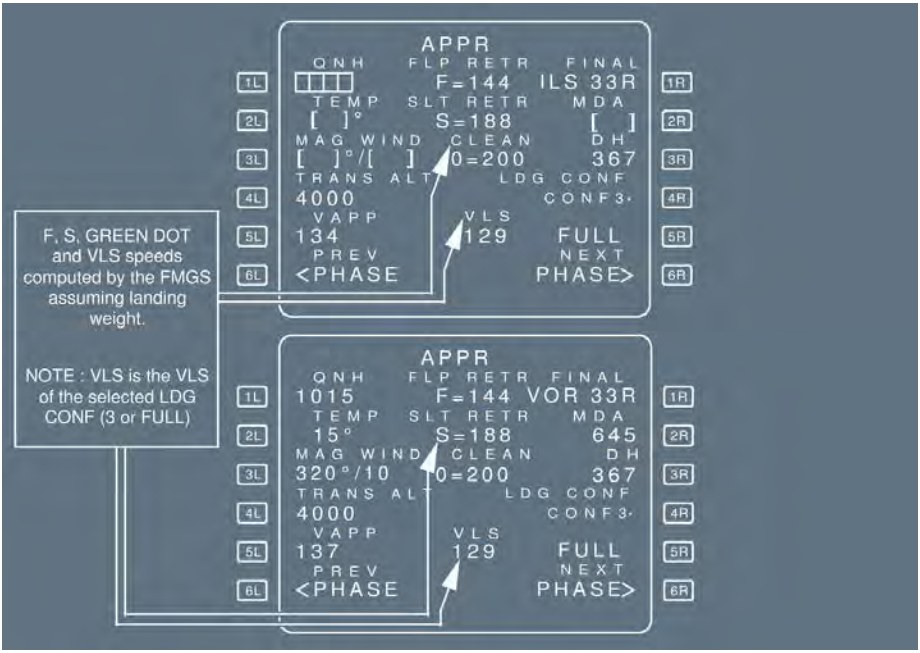
[3L] MANAGED	If the descent phase is not active: Before the flight crew makes any entry. This field displays MANAGED in white, with the associated ECON descent Mach or speed in blue. The crew may overwrite the ECON descent Mach or speed by entering a Mach number or a speed in this field. The system uses the pilot entry to compute the descent profile. The descent may be flown in managed using this new pilot entry. The entry is modifiable. It can be cleared to revert to ECON speed/Mach. If the descent phase is active: The flight crew cannot make an entry in this field. The field displays the ECON speed/Mach or the speed/Mach value previously entered by the pilot.
[4L] blank or SELECTED	If the descent phase is not active, or the descent phase is active but the active speed mode is MANAGED: This field is blank. If the descent phase is active and the active speed mode is SELECTED: The field displays the speed or Mach target manually selected by the pilot. "SELECTED" is displayed in the [1L] field. To modify the field value, the pilot will use the SPD/MACH selector knob of the FCU. [4L] field and FCU window will display the same value. Pushing in the FCU speed selector knob activates the managed SPD/MACH target displayed in the [3L] field.
[5L] Blank or EXPEDITE	If the descent phase is not active this field is blank. Displays this legend if the descent phase is active. It indicates the time and distance required to reach the altitude displayed in the 2R field at MMO/VMO speed. The pilot cannot select the EXPEDITE mode through this field.
[6L] PREV PHASE or ACTIVATE APPR PHASE	This key calls up the cruise phase page if the descent phase is not yet active. Displayed if the descent phase is active. First press causes "CONFIRM APPR PHASE" to be displayed. Second press activates the approach phase.

[1R] TIME/UTC DEST EFOB	Before takeoff, this field displays the flight time to destination and the predicted remaining fuel on board. If the crew enters an estimated takeoff time, the field displays automatically the predicted arrival time (UTC). After takeoff, it displays the predicted arrival time at destination (UTC) and the remaining fuel on board (DEST EFOB) at destination in green font. The DEST EFOB field will turn to amber, if the EFOB at destination becomes less than the MIN DEST FOB value displayed on the FUEL PRED page. EO CLR is displayed when an engine-out is detected.
[2R] PRED TO...	This field displays the target altitude for the predictions in [3R] [4R], or [5R]. The display defaults to the altitude selected on the FCU. The flight crew can modify it to any altitude lower than present altitude.
[3R] [4R] [5R]	These fields display time and distance predictions down to the target altitude selected in [2R], computed for the current vertical mode (DES or OP DES) and the indicated speed mode (MANAGED, SELECTED).
[6R] NEXT PHASE	The pilot presses this key to call up the PERF APPR page.

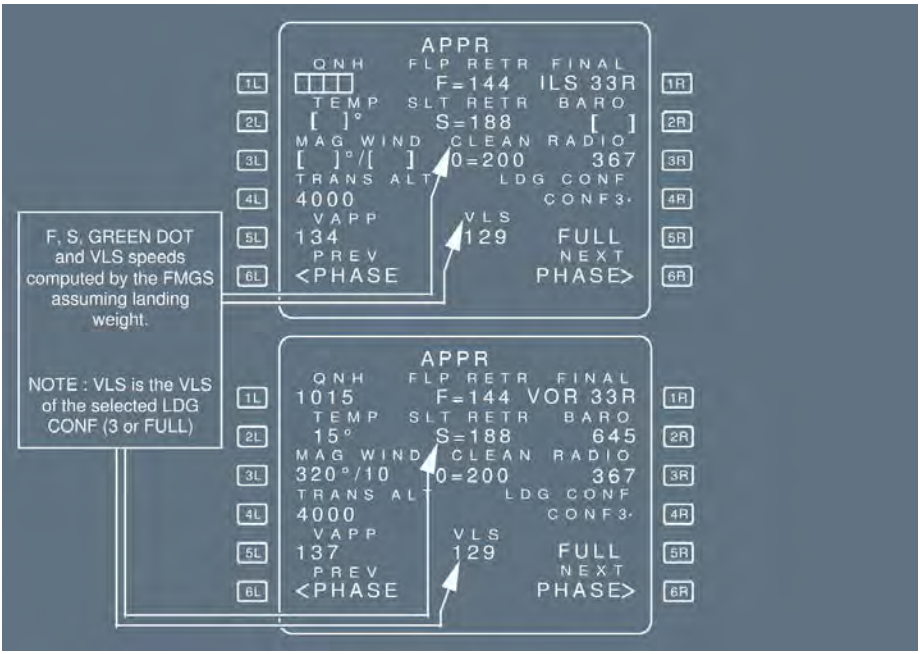
PERF APPR PAGE

Ident.: DSC-22_20-50-10-25-00016132.0010001 / 24 FEB 15
Applicable to: MSN 3408, 4100-4547

PERF APPR Page



PERF APPR Page (with BARO/RADIO ◁✻ option)



APPR is in large white font, if the approach phase is not active; it is in large green font, if it is.

[1L] QNH

This field displays brackets, when the aircraft is more than 180 NM from the destination. Inside 180 NM, a mandatory amber box appears. The flight crew must enter the QNH in hPa or in inches of mercury.

- For hPa, enter three or four digits
- For inches of mercury:
  - Enter two digits, or
  - Enter two digits followed by a decimal point and two additional digits.

The system interprets:
- 1 003 as 1 003 hPa;
- 29 as 29.00 in.
- 29.92 as 29.92 in.

Note: *An erroneous entry of an OAT in QNH field, for example 22 °C, or a higher value, is accepted by the system.*

The flight crew can modify this entry at any time.
The Cabin Pressure Controller (CPC) uses the QNH to compute the cabin repressurization segment. Therefore, an erroneous QNH entry may result in a cabin pressurization that is not appropriate.

[2L] TEMP

This field displays the temperature at destination. The field displays brackets until the pilot enters the temperature. The pilot can modify this figure.
The system uses this temperature to refine its computation of the descent profile (ISA model).

[3L] MAG WIND

The flight crew enters the magnetic wind in knots at the destination in this field. The system transmits any entry made in this field to the vertical revision and flight plan B pages (which display wind direction as true, not magnetic).

[4L] TRANS ALT

This field displays the transition altitude taken from the data base (small font) or entered by the flight crew (large font).
The flight crew can modify it at any time.

[5L] VAPP

The FMGC computes this approach speed, using the formula:
VAPP = VLS + 1/3 of the headwind components (limited to VLS + 5 as a minimum and VLS + 15 as a maximum).
The flight crew can modify VAPP. A clear action reverts VAPP to the computed value.

Note: *VLS = 1.23 VS1G of the selected landing configuration (full or 3).*

[6L] PREV PAGE

This field displays this legend if the approach phase is not active.
Pressing this key calls up the descent performance page.

[1R] FINAL	This field displays the approach specified in the flight plan. The flight crew cannot modify it through this field.

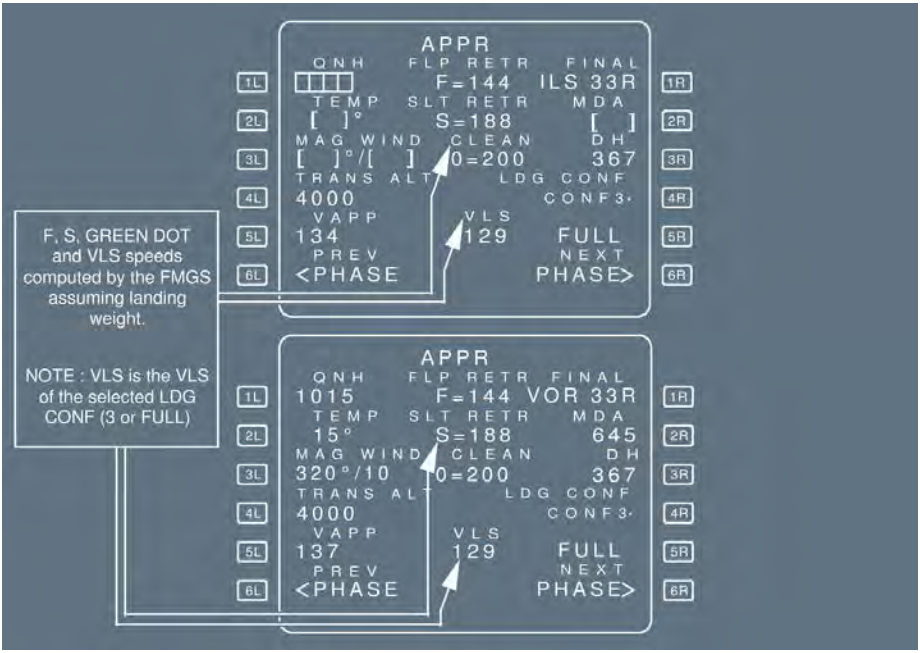
[2R] MDA/MDH or BARO ◁	This field displays:
	- The Minimum Descent Altitude with associated brackets, or
	- The Minimum Descent Height with associated brackets, if:
	  - The QFE pin program is activated, or
	  - The FCU setting is QFE, on aircraft equipped with the BARO ◁ option.
	
	The flight crew inserts the value, which it can modify at any time. If the flight crew makes an entry in [3R] or changes the approach, it clears this figure.

[3R] DH or RADIO ◁	If the flight plan includes an ILS approach, this field displays “DH" or "RADIO" ◁ and empty brackets. The flight crew inserts the decision height. The system will accept an entry of “NO", "NODH" or "NO DH". If the flight crew inserts an MDA or an MDH (or a BARO ◁ value) in FIELD [2R], this erases the decision height, and this field reverts to brackets. The DH or RADIO range is 0 to 700 ft.
[4R] LDG CONF CONF 3	The flight crew can select configuration 3 by pressing the 4R key. This moves the * down to the [5R] field, which is displaying “FULL"?.
[5R] FULL	The flight crew can use this key to select configuration FULL when necessary configuration FULL is the default landing configuration.
[6R] NEXT PHASE	Pressing this key calls up the go-around performance page.

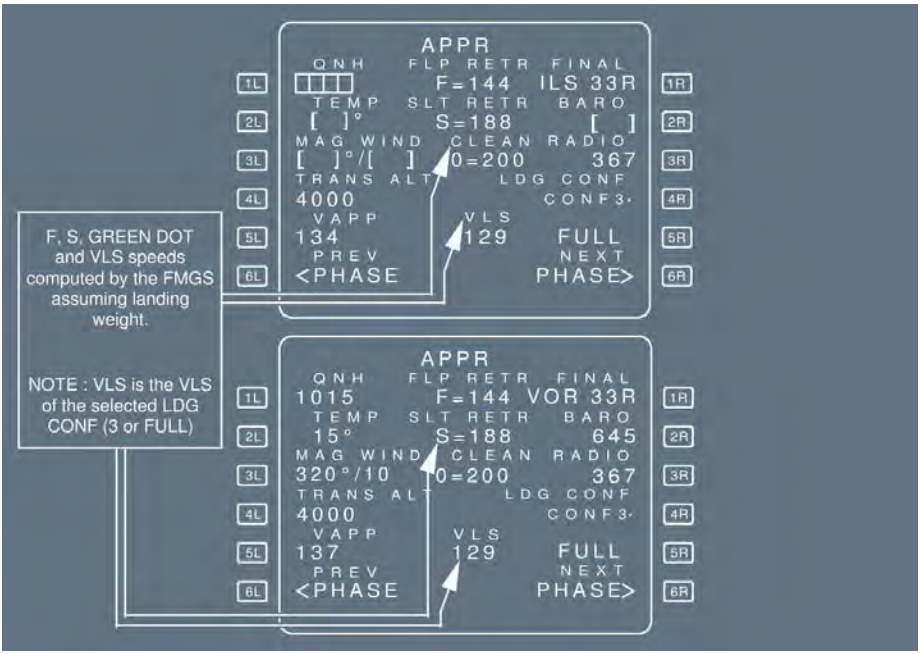
PERF APPR PAGE

Ident.: DSC-22_20-50-10-25-00016132.0002001 / 24 FEB 15
Applicable to: MSN 1882-2078, 3467-3518

PERF APPR Page



PERF APPR Page (with BARO/RADIO ◁✻ option)



APPR is in large white font, if the approach phase is not active; it is in large green font, if it is.

[1L] QNH

This field displays brackets, when the aircraft is more than 180 NM from the destination. Inside 180 NM, a mandatory amber box appears. The flight crew must enter the QNH in hPa or in inches of mercury.

- For hPa, enter three or four digits
- For inches of mercury:
  - Enter two digits, or
  - Enter two digits followed by a decimal point and two additional digits.

The system interprets:
- 1 003 as 1 003 hPa;
- 29 as 29.00 in.
- 29.92 as 29.92 in.

Note: *An erroneous entry of an OAT in QNH field, for example 22 °C, or a higher value, is accepted by the system.*

The flight crew can modify this entry at any time.
The Cabin Pressure Controller (CPC) uses the QNH to compute the cabin repressurization segment. Therefore, an erroneous QNH entry may result in a cabin pressurization that is not appropriate.

[2L] TEMP

This field displays the temperature at destination. The field displays brackets until the pilot enters the temperature. The pilot can modify this figure.
The system uses this temperature to refine its computation of the descent profile (ISA model).

[3L] MAG WIND

The flight crew enters the magnetic wind in knots at the destination in this field. The system transmits any entry made in this field to the vertical revision and flight plan B pages (which display wind direction as true, not magnetic).

[4L] TRANS ALT

This field displays the transition altitude taken from the data base (small font) or entered by the flight crew (large font).
The flight crew can modify it at any time.

[5L] VAPP

The FMGC computes this approach speed, using the formula:
VAPP = VLS + 5 + 1/3 of the headwind components (1/3 of the headwind component is limited to 15 kt).
The flight crew can modify VAPP. A clear action reverts VAPP to the computed value.

Note: *VLS = 1.23 VS1G of the selected landing configuration (full or 3).*

[6L] PREV PAGE

This field displays this legend if the approach phase is not active.
Pressing this key calls up the descent performance page.

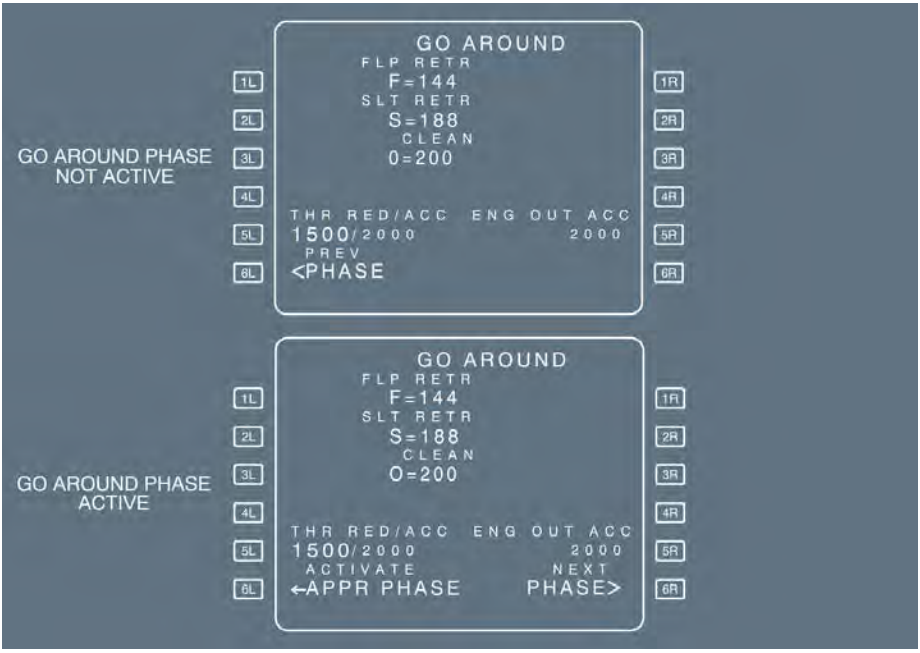
[1R] FINAL	This field displays the approach specified in the flight plan. The flight crew cannot modify it through this field.

[2R] MDA/MDH or BARO ◁	This field displays:
	- The Minimum Descent Altitude with associated brackets, or
	- The Minimum Descent Height with associated brackets, if:
	  - The QFE pin program is activated, or
	  - The FCU setting is QFE, on aircraft equipped with the BARO ◁ option.
	
	The flight crew inserts the value, which it can modify at any time. If the flight crew makes an entry in [3R] or changes the approach, it clears this figure.

[3R] DH or RADIO ◁	If the flight plan includes an ILS approach, this field displays “DH" or "RADIO" ◁ and empty brackets. The flight crew inserts the decision height. The system will accept an entry of “NO", "NODH" or "NO DH". If the flight crew inserts an MDA or an MDH (or a BARO ◁ value) in FIELD [2R], this erases the decision height, and this field reverts to brackets. The DH or RADIO range is 0 to 700 ft.
[4R] LDG CONF CONF 3	The flight crew can select configuration 3 by pressing the 4R key. This moves the * down to the [5R] field, which is displaying “FULL"?.
[5R] FULL	The flight crew can use this key to select configuration FULL when necessary configuration FULL is the default landing configuration.
[6R] NEXT PHASE	Pressing this key calls up the go-around performance page.

PERF GO AROUND PAGE

Ident.: DSC-22_20-50-10-25-00000604.0002001 / 01 OCT 12
Applicable to: ALL



TITLE	GO AROUND is in large white font, if the go-around phase is not active; it is in large green font, if it is.

[5L] THR RED ACC — This field displays the thrust reduction altitude and the acceleration altitude.

Thrust reduction altitude:

- Altitude at which thrust must be reduced from takeoff/go-around thrust to maximum climb thrust
- "CLB" or "LVR CLB" flashing on flight mode annunciator
- Defaults to 1 500 ft above destination runway elevation, or to the altitude set by the airline
- Can be modified by the crew (minimum 400 ft above destination runway elevation).

Acceleration altitude:

- Altitude at which target speed jumps to green-dot speed (see the note below)
- Defaults to 1 500 ft above destination runway elevation, or to the altitude set by the airline.
- Can be modified by the crew, but is always equal to (or higher than) the thrust reduction altitude.

[6L] PREV PHASE or ACTIVATE APPR PHASE — This field displays this legend if the go-around phase is not active.
Pressing the key calls up the PERF APPR page.
This field displays this legend if the go-around phase is active.
Pressing it once makes "CONFIRM APPR" appear.
A second press activates the approach phase.

[5R] ENG OUT ACC — This display has the same characteristics as the display beside the 5R key on the takeoff page. It is for display only, and the pilot can modify it.

[6R] NEXT PHASE — Pressing this key calls up the PERF APPR page.

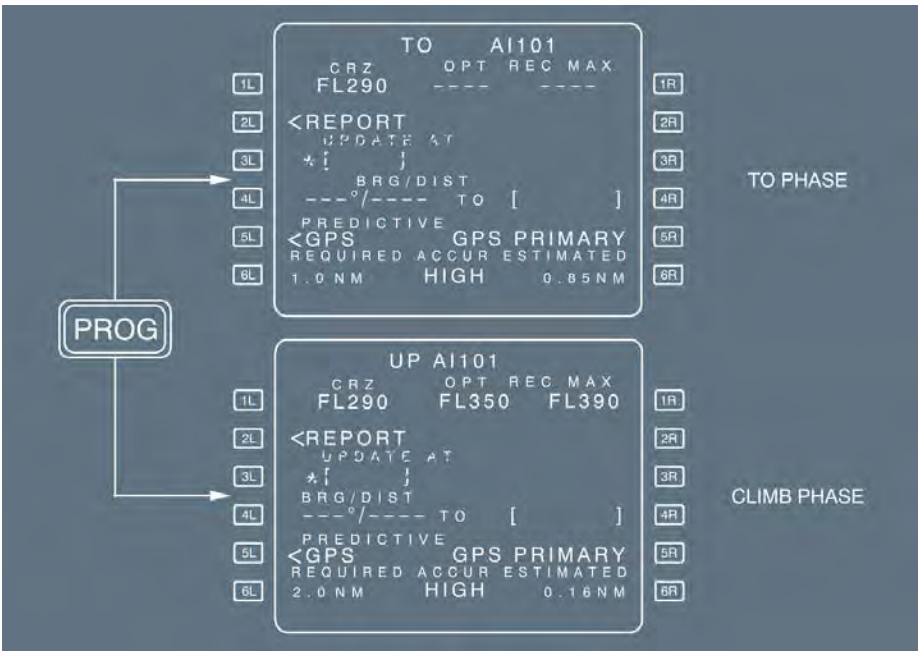
[IR] Blank or EO CLR* — This field is normally blank.
EO CLR* is displayed when GO AROUND is the active phase and an engine-out condition is detected.

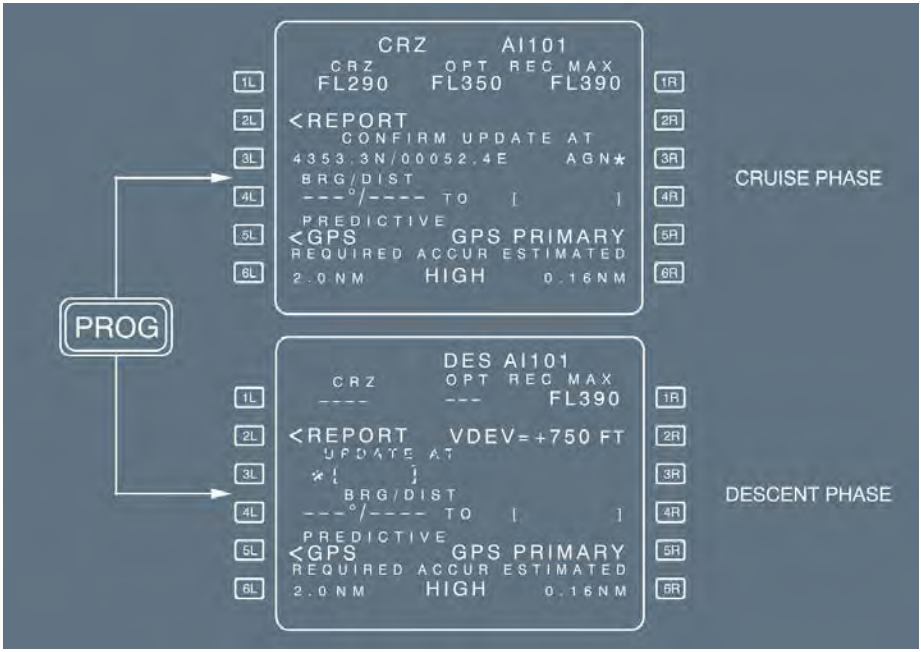
Note: *When the go-around phase is active, if the pilot enables ALTN or if the pilot inserts a new destination in the active flight plan and a new cruise flight level on the progress page, the go-around phase shifts automatically into the climb phase. (The target speed jumps from green dot speed to initial climb speed).*

PROG PAGES

Ident.: DSC-22_20-50-10-25-00000605.0051001 / 22 MAR 17
Applicable to: ALL

The progress page is a multifunction page that enables the pilot to:
- Select a new cruise flight level
- Crosscheck the navigation accuracy of the Flight Management (FM) system and validate it
- Update the FM position
- Monitor the descent.





TITLE	Different for each flight phase (see above). The vertical phase is in large green font. The flight number is in large white font. EO is large amber font, if the engine-out condition is detected.
Line 1 CRZ (blue)	This line displays the cruise flight level, inserted on the INIT A page or directly in this field in blue. If the flight crew uses the FCU to select an altitude that is higher than the one displayed in this field, the system changes the number displayed to agree. In this line, the flight crew cannot insert a flight level that is lower than the FCU-selected altitude. This field shows dashes when the descent or approach phase is active.
OPT	This field displays the optimum flight level (in green), that is computed based on the current gross weight, cost index, temperature and wind. This flight level requires a 5 min minimum cruise at a minimum cruise flight level of FL 100. It displays dashes if an engine-out is detected.

REC MAX

This field displays the recommended maximum altitude (in magenta), that is computed based on the current gross weight and temperature, and assuming that the anti-ice is off (if icing conditions are expected, *Refer to QRH/PER-M Optimum & Maximum Altitudes (Paper Only)* or the performance application of FlySmart with Airbus). It provides the aircraft with a 0.3 g buffet margin, a minimum rate of climb at MAX CL thrust, and level flight at MAX CRZ thrust. This field is limited to FL 398.
If one engine is out, this field displays the recommended maximum engine-out altitude, that is computed based on the long-range cruise speed and assuming that anti-ice is off.

[2L] REPORT

This key calls up the REPORT PAGE.

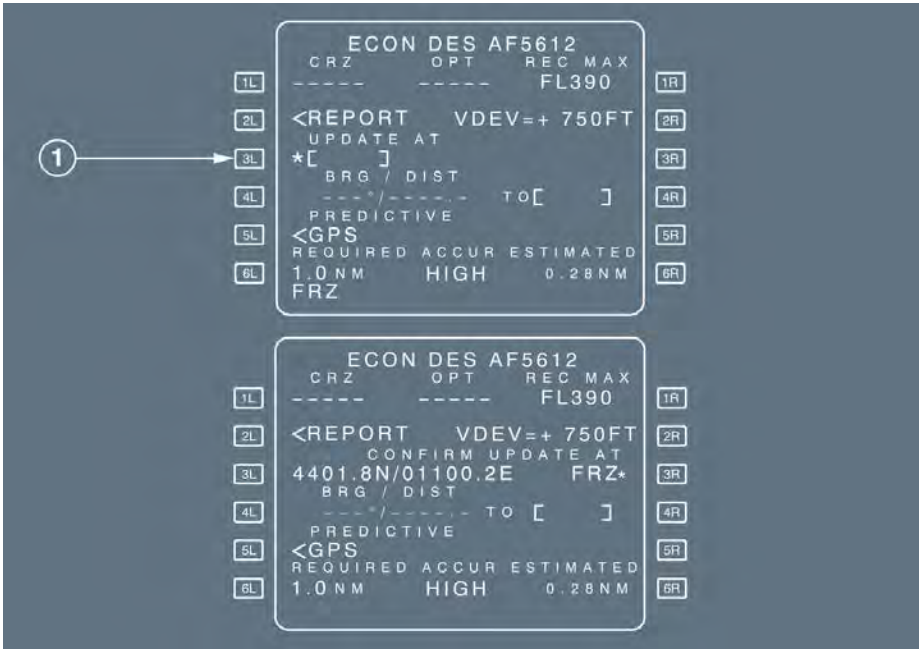
[2R] VDEV

This field is displayed during the descent and approach phases, when NAV mode is engaged, or in HDG mode, provided that the crosstrack error (XTK) is less than 5 NM. It displays the vertical deviation between the aircraft's current altitude and the FMS-computed vertical profile.

Line 3 POSITION UPDATE AT ◁

The flight crew can update the FMS position via this field by entering either the IDENT of a waypoint, a NAVAID, an airport, a latitude and longitude (LL), a place/bearing/distance, or a place-bearing/place-bearing (PBX).
When the flight crew has entered this data, this field changes its format to: “CONFIRM UPDATE AT”, followed by the latitude/longitude and IDENT of the inserted position with an asterisk.
The flight crew presses the right-hand key adjacent to the asterisk to confirm the update, when the aircraft overflies the inserted position.

Note: *If no IDENT has been inserted, the field displays “ENTRY” instead of an IDENT.*

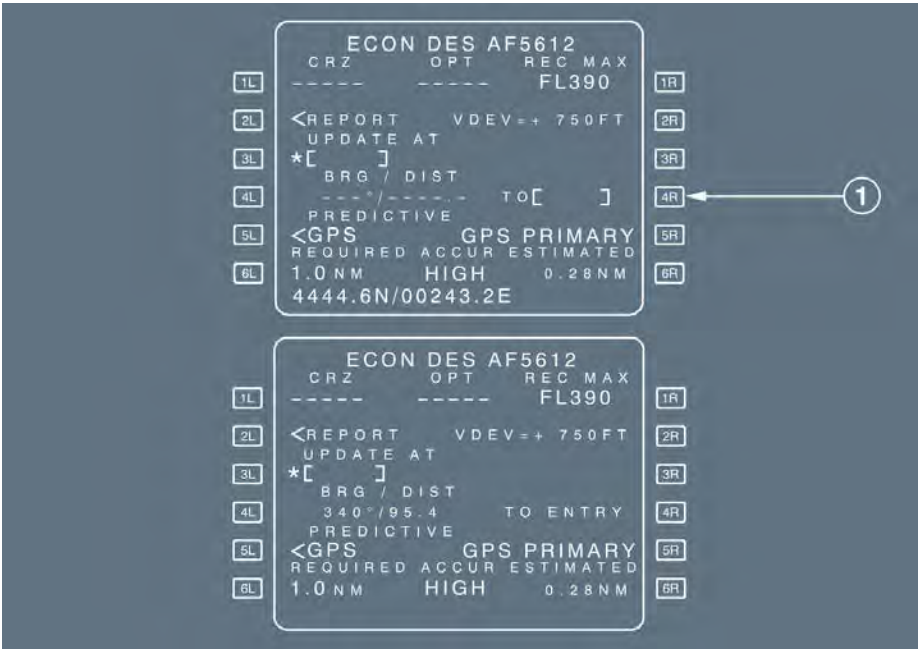


Line 4 BRG/DIST

On this line, the pilot can enter an airport, a waypoint, a NAVAID, or a runway. The pilot may enter each as an IDENT, a latitude/longitude (LL), a place/bearing/distance (PBD), or a place-bearing/place-bearing (PBX). The field then shows the FMGC-computed bearing and distance from this site to the aircraft's present position. The last distance digit is in 1/10 of a NM. If it does not have an IDENT, the point is called “ENTRY”.

Example:

BRG/DIST
340 °/95.4 to ENTRY



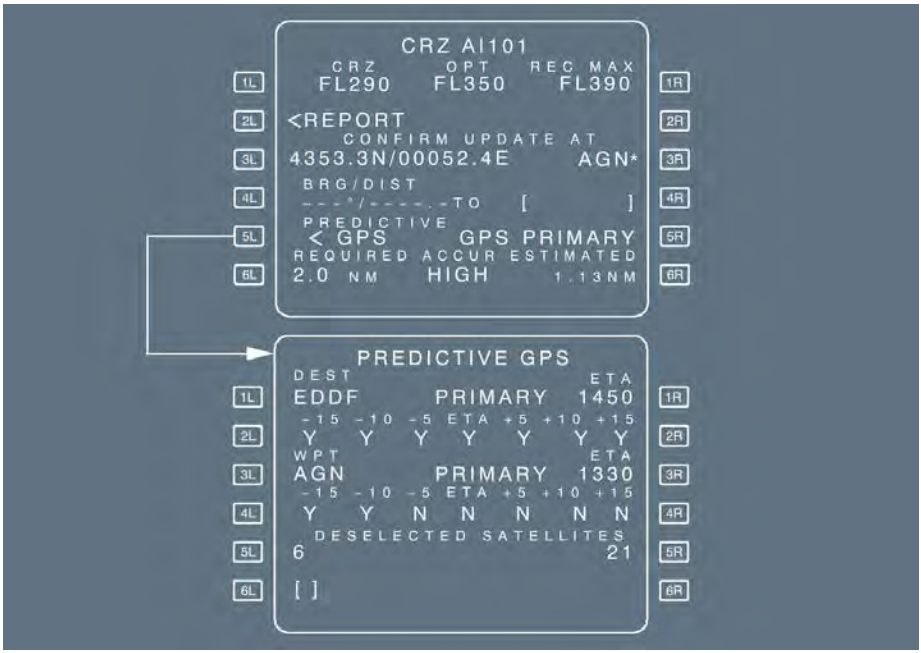
[5L] PREDICTIVE GPS	This prompt gives access to the PREDICTIVE GPS page.
[5R] GPS PRIMARY	This prompt is displayed, when the FMS navigation mode is GPS PRIMARY. When GPS PRIMARY is not available, or navigation mode is not GPS/IRS, this field is blank. The scratchpad displays the relevant “GPS PRIMARY” message when this prompt appears; and “GPS PRIMARY LOST”, when the field turns to blank.
[6L] REQUIRED	This field displays the default value for the required navigation accuracy level. The pilot can modify it. Provided no pilot entry has been made, the default value changes according to the actual flight area (En route, terminal, approach).
ACCUR HIGH/LOW	This field shows the flight management system's estimate of the navigational accuracy. “HIGH” indicates that the FMS estimates that the navigational accuracy matches the accuracy criteria of the area currently flown. “LOW” indicates that the criteria are not matched.
[6R] ESTIMATED	This field displays the current estimated navigation accuracy value (EPE) as computed by the FMS.

PREDICTIVE GPS PAGES

Ident.: DSC-22_20-50-10-25-00009139.0001001 / 31 AUG 17
Applicable to: ALL

Note: *1. This page is only operative with Honeywell ADIRS.*
2. This page cannot be used as a substitute to determine pre-flight planning RAIM availability when required by operational regulations. Refer to PRO-NOR-SOP-02 GPS PRIMARY Availability (If Installed).

The pilot accesses this page by pressing the PREDICTIVE GPS prompt of the PROG page.
This page displays information relative to theoretical predictive availability of GPS PRIMARY at destination, and at any waypoint selected by the crew.



[1L] DEST — Destination, airport as currently selected in active flight plan. It is not modifiable. This field displays dashes, when no destination airport exists.

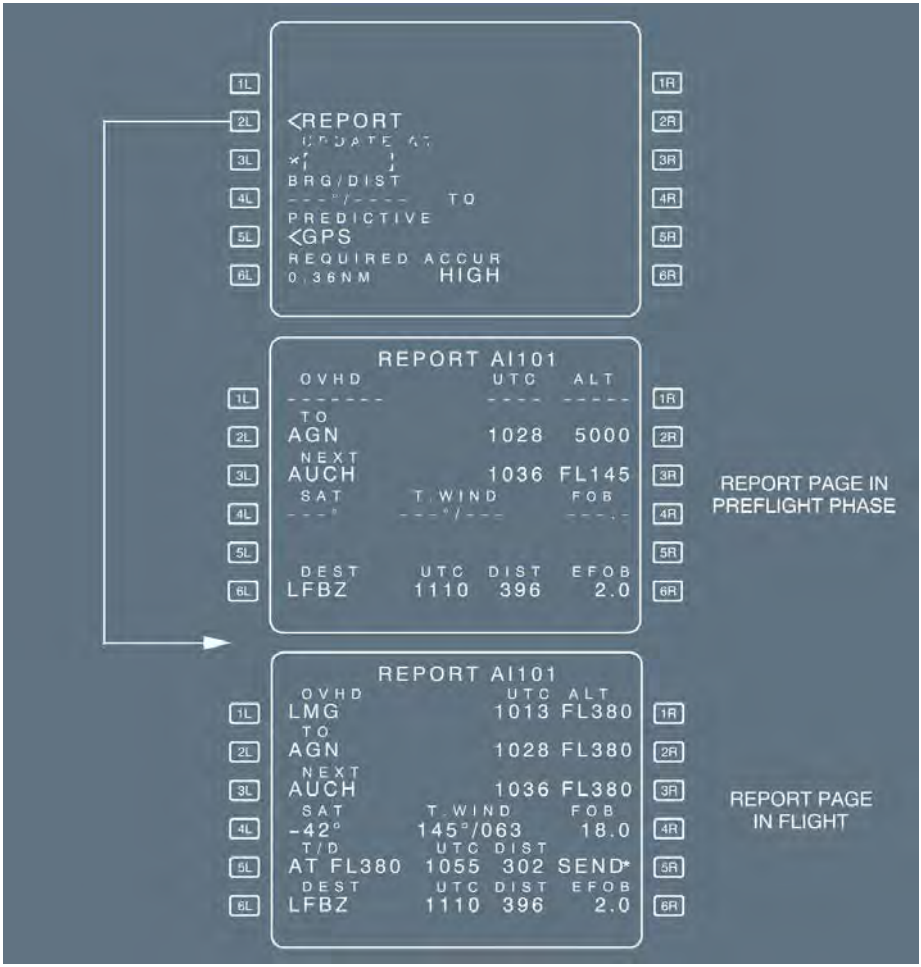
[1R] ETA — This field is defaulted to the Estimated Arrival Time, as computed by the FMS (small blue font). The pilot may enter a value in this field (large blue font). Amber boxes are displayed, when no prediction exists, or the crew entry has been cleared.

Line 2 PRIMARY Y/N	Predicted primary status at destination airport, at the following times: Estimated time of arrival ±5, 10, 15 min. Availability of GPS PRIMARY at the corresponding time is indicated by Y, when PRIMARY is predicted to be available; and, by N, when GPS PRIMARY is predicted not to be available. These fields are blanked when the destination [1L] field, or the time [1R] field is not defined.
[3L] WPT	The pilot may enter a reference waypoint in this field. Blue brackets are displayed, when no entry has been made.
[3R] ETA	When a reference waypoint has been entered in the [3L] field, amber boxes are displayed. The crew is requested to enter a reference time in this field.
Line 4 PRIMARY Y/N	Information equivalent to [2L] / [2R] is displayed for any pilot-selected waypoint. The corresponding time of arrival is also displayed.
Line 5 DESELECTED SATELLITES and Line 6 SATELLITES	Enables the pilot to deselect up to four satellites by inserting the corresponding satellite number ; the number is then displayed in large blue font. When deactivated, the satellites are not considered for predictive GPS availability at destination, or at the selected waypoint. The deselection is cancelled when the entry is cleared (blue brackets are displayed), or the field is overwritten by a different satellite number.

REPORT PAGE

Ident.: DSC-22_20-50-10-25-00000606.0009001 / 14 MAY 12
Applicable to: ALL

The pilot calls this page by pressing the [2L] key on the PROG page:



This page displays information related to the FROM, TO, NEXT and DEST waypoints, as well as the current wind, temperature, distance and time to the next cruise profile change.

TITLE (White) — Displays the flight number. This line displays EO in amber, in case an engine-out is detected.

[1L] OVHD (green) — Displays the last sequenced waypoint. This field never displays the pseudo-waypoints and the F-PLN markers (T-P, PPOS, IN-BND, OUT-BND).

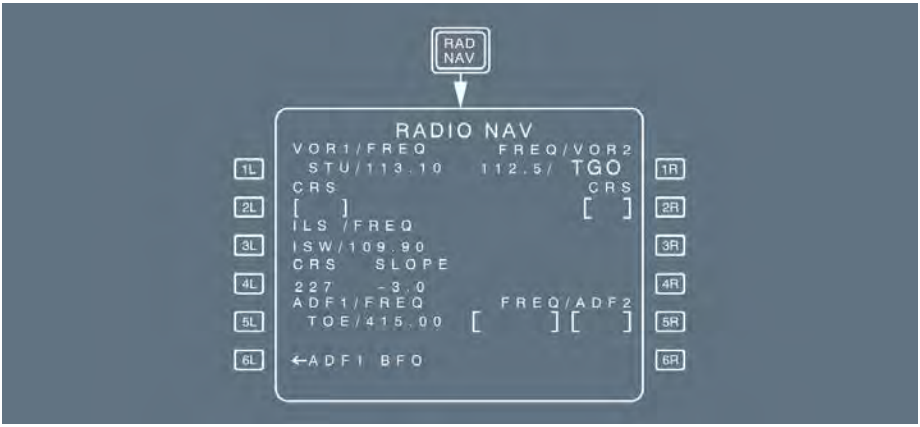
[1R] UTC/TIME ALT (green)	This field displays the time and altitude recorded at the time of sequence.
[2L]-[2R] TO (green)	This field displays the active waypoint, predicted time of arrival and predicted altitude at this waypoint. *Note: Time and altitude values are identical to those values on the F-PLN pages.*
[3L]-[3R] NEXT (green)	Same information for the next waypoint.
[4L] [4R] SAT/T.WIND/FOB (green)	This field displays the static air temperature, the wind direction and velocity, and the FOB recorded at waypoint sequencing.
[5L] T/D/UTC/DIST (green)	This field displays the estimated time, and the distance to go to the next change of the cruise profile (T/D, S/C, S/D). These data are only displayed when the cruise phase is active.
[5R] SEND* (blue)	The crew uses this prompt to downlink a position report. This field may be blank, depending on airline policy.
Line 6 DEST/UTC/DIST/EFOB	This field displays the estimated time of arrival, the distance along the F-PLN, and the estimated fuel on board (DEST EFOB) at destination. The DEST EFOB field will turn to amber, if the EFOB at destination becomes less than the MIN DEST FOB value displayed on the FUEL PRED page.. This display is identical to the information on the F-PLN pages.

Note: No data can be inserted or modified on the REPORT page.

RADIO NAV PAGE

Ident.: DSC-22_20-50-10-25-00000607.0009001 / 06 APR 16
Applicable to: ALL

This page enables the pilot to select or verify the radio NAVAIDs, tuned for display purposes only. These NAVAIDs include: VOR, VOR/DME, TAC, VORTAC, ILS, and ADF.



Line 1 VOR1/FREQ FREQ/VOR2

This line displays the identifiers and frequencies of VORs 1 and 2, whether they are automatically or manually tuned.
To manually tune a VOR, the pilot inserts the IDENT or frequency. If the IDENT is not in the database, the new NAVAID page comes up. A “clear” action reverts the selection to the autotuned NAVAID.

Line 2 CRS

This line displays courses for the NAVAIDs in Line 1.
The pilot can manually enter the courses through these fields.

[3L] LS/FREQ

This field displays the IDENT of an ILS and its frequency (for ILS). It is autotuned, if the ILS is associated to the departure runway, or if the flight plan contains an ILS approach. The flight crew may also enter an ILS manually. When the manually entered ILS differs from the ILS that the FMS would autotune, “RWY-LS MISMATCH” appears.

[4L] CRS SLOPE	CRS: This field displays the course associated with the LS displayed in Line 3. It comes up automatically if an LS is autotuned, or if an LS has been manually tuned via its IDENT. Otherwise, the course must be entered manually. The course may be backbeam (Bxxx) or frontbeam (Fxxx).. SLOPE: This field displays the slope associated with the LS displayed in Line 3. It comes up automatically if an LS is autotuned for approach, or if an LS has been manually tuned via its IDENT.
	Note: *1. The slope does not apply to LOC only, LDA, SDF or Backbeam approaches.* *2. If the flight crew intends to manually tune an ILS that is not in the navigation database or to manually tune an ILS by its frequency (ident not entered), and if they do not enter the course, the flight crew will not be able to arm approach modes.*
Line 5 ADF1/FREQ FREQ/ADF2	This line displays the identifiers and frequencies of ADFs 1 and 2. The pilot can use the IDENT or the frequency to manually tune the ADF.
Line 6 ADF1/BFO BFO/ADF2	When an ADF is selected, these fields display an ADF/BFO prompt. The flight crew presses the key once to erase the arrow and put the ADF in BFO mode. A clear action brings the arrow back and cancels BFO.

Note:
- *The autotune function only works for NAVAIDs stored in the database.*
- *When tuning manually, the operator should use the IDENT, rather than the frequency, unless the NAVAID is not in the database.*
- *Manually-tuned frequencies are displayed in large font.*

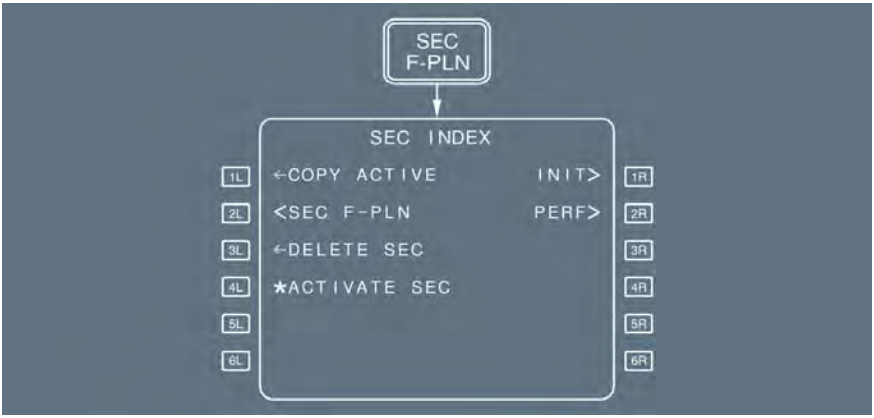
SECONDARY PAGES

Ident.: DSC-22_20-50-10-25-00000608.0009001 / 13 FEB 13
Applicable to: ALL

The SEC F-PLN key on the MCDU console allows the flight crew to call up the secondary index page and the secondary flight plan page. The secondary flight plan is generally for a diversion, for predictable runway changes for takeoff or landing, or for training.
There are two types of secondary index pages. The type selected depends on the presence of a secondary flight plan.

SECONDARY INDEX PAGE

A SECONDARY FLIGHT PLAN IS ALREADY DEFINED



[1L] COPY ACTIVE (blue)	The flight crew presses this key to copy the active flight plan into the secondary flight plan and delete the previous secondary plan.
[2L] SEC F-PLN (white)	The flight crew presses this key to call up the secondary flight plan pages.
[3L] DELETE SEC (blue)	The flight crew presses this key to delete the current secondary flight plan.
[4L] ACTIVATE SEC (amber)	The flight crew presses this key to activate the secondary flight plan as the active flight plan.

Note: *"ACTIVATE SEC" routinely appears if the HDG/TRK mode is active. If the NAV mode is active, "ACTIVATE SEC" appears only if the active and secondary flight plans have a common active leg.*

[1R] INIT (white)	The flight crew presses this key to call up the SEC INIT A page.
[2R] PERF (white)	The flight crew presses this key to call up the performance pages for the secondary flight plan.

A SECONDARY FLIGHT PLAN IS NOT DEFINED

[1L] COPY ACTIVE (blue)	The pilot presses this key to copy the primary active flight plan into the secondary flight plan.
[2L] SEC F-PLN (white)	The pilot presses this key to call up the secondary flight plan pages.
[1R] INIT (white)	The pilot presses this key to call up the secondary INIT page. It is similar to the active INIT page, but blue brackets replace all the amber boxes.

SECONDARY FLIGHT PLAN PAGES

The secondary flight plan pages A and B are identical to those of the active flight plan, but are automatically sequenced, only when the secondary is copied from the primary and their active legs are identical.
The active and secondary flight plans pages differ from each other as follows:

SECONDARY LATERAL REVISION PAGES:

- ERASE and INSERT are not displayed.
- FIX INFO is not available.
- A lateral revision of the secondary flight plan does not create a temporary flight plan: All revisions are directly applied to the secondary flight plan.

SECONDARY VERTICAL REVISION PAGES:

A vertical revision on the secondary flight plan does not create a temporary flight plan.

SECONDARY INIT A AND B PAGES:

- They use blue brackets, instead of amber boxes.
- They have no align prompt.
- They do not provide for slewing or entering data in the 4L-4R fields (airport reference).

SECONDARY STEP ALTITUDE PAGES:

These pages operate as the primary STEP ALTS page, except that optimal step, savings are not available.

SECONDARY WIND PAGES:

They have no history wind page.

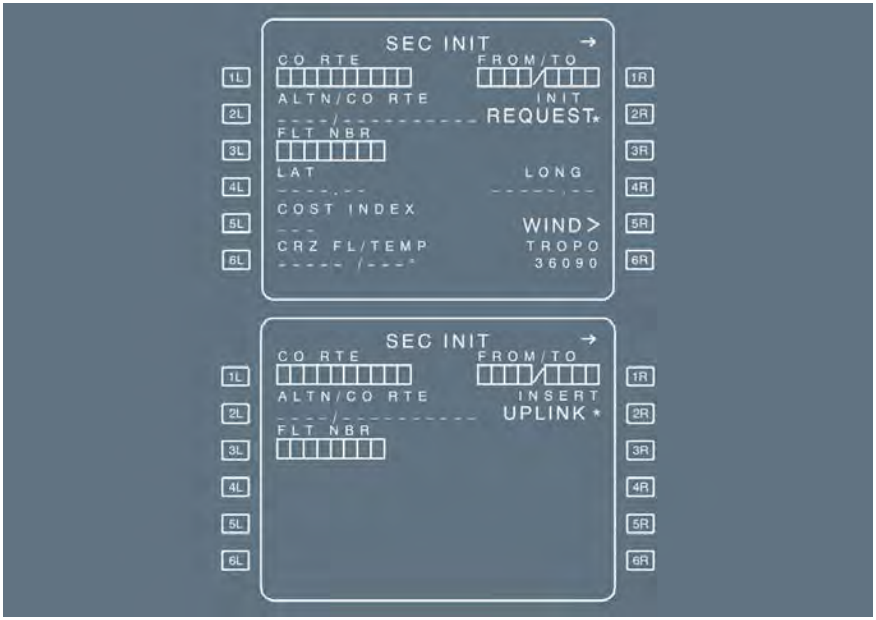
SECONDARY PERFORMANCE PAGES:

- All boxes are replaced by blue brackets.
- They have no engine-out mode, no engine-out long range cruise cost index.
- They have no expedite predictions.
- They have no ACTIVATE/CONFIRM APPROACH PHASE prompt.
- They have no PRED TO ALTN predictions on the PERF CLB and PERF DES pages.
- They have no engine-out drift down, no top of descent, no cabin descent rate information on the PERF CRZ page.

The secondary flight plan has no FUEL PRED page.

SECONDARY INIT A PAGE IS ALSO USED TO REQUEST OR DISPLAY AN UPLINK INIT MESSAGE RECEIVED AFTER ENGINE START.

This uplink INIT message can be cleared or inserted as SECONDARY INIT data.



[2R] INIT REQUEST* Enable to request init data from the ground or,

[2R] INSERT UPLINK* A downlink message has been received following a request. The message can be cleared or entered in the SEC INIT page.

BACK UP NAV PAGES

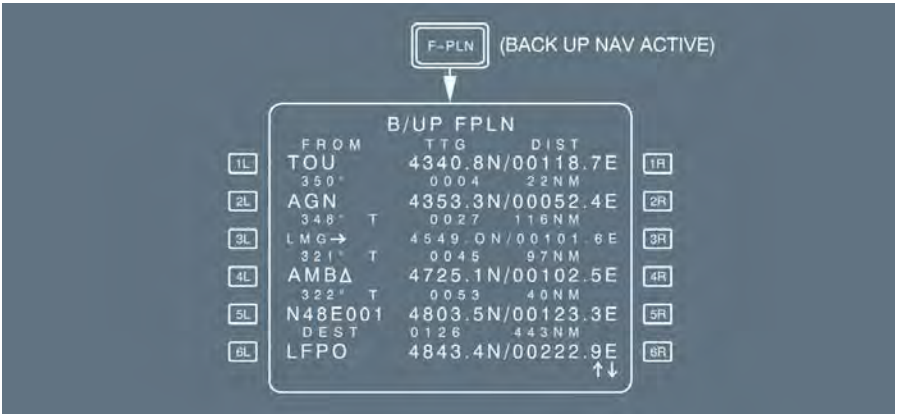
Ident.: DSC-22_20-50-10-25-00013508.0019001 / 29 JAN 13
Applicable to: MSN 3408-4547

The MCDU features a back up navigation function which provides simplified point-to-point GPIRS and IRS based navigation in case of a dual FM failure.
The backup Navigation mode allows limited lateral flight planning within the MCDU, that can be used to drive the Navigation Display and provides relative path position information and auto-sequencing of the Backup Navigation flight plan. The Backup Navigation flight plan reflects, as much as possible, the active primary FM flight plan upon its initial activation.
During FM normal operation, the F-PLN is continuously downloaded in the MCDU memory: the BACK UP NAV function links the MCDU of the failed FM to its onside IRS. All navigation data related to the MCDU F-PLN are displayed on the associated ND.
BACK UP NAV function is activated on the MCDU MENU page by pressing the NAV B/UP prompt.
The MCDU back-up F-PLN may accept a maximum of 165 legs, including information such as waypoint position/identification, leg type, discontinuity, overfly and turn direction information (radial, pattern, heading leg... cannot be part of the MCDU F-PLN). No secondary or temporary F-PLN exists.

BACK UP NAV pages display the data related to the BACK UP NAV function. There are six pages available while BACK UP NAV is active:
- B/UP F-PLN
- B/UP F-PLN for DIRECT TO
- B/UP PROG
- B/UP IRS for onside IRS (1+2)
- B/UP IRS 3
- B/UP GPS (if the GPS is installed)

B/UP F-PLN PAGE

The B/UP F-PLN page displays the MCDU F-PLN data. The pilot calls up this page by pressing the F-PLN key while B/UP NAV is active.



TITLE line 1 to line 5

B/UP F-PLN is displayed in a white large font

Display consecutive waypoints with their associated latitude/longitude.

If a waypoint is to be overflown, an overfly symbol (△) is displayed after the identifier.

If a turn is specified into the next leg, a large font arrow is displayed after the identifier.

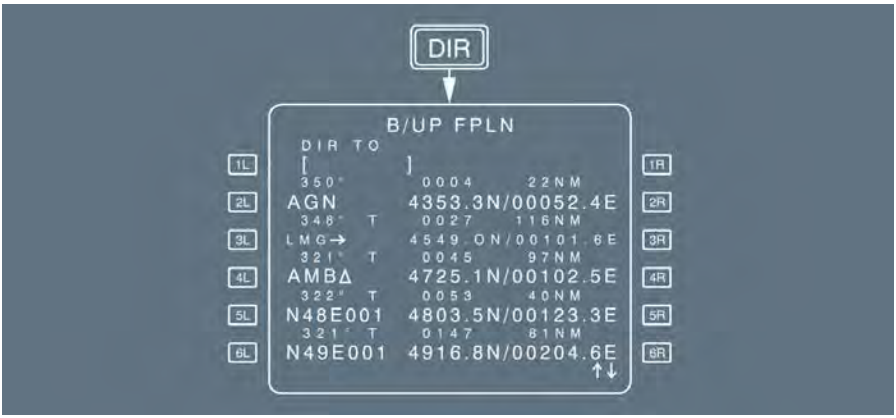
Label lines contain the bearing, time to go and distance to the next waypoint displayed in small font.

white	bearing
green	time to go and distance
BRG	Between FROM and TO waypoints: True or Mag depending on the TRUE pb-sw position. T is displayed when the bearing is true referenced. Between other waypoints: out bound true track of the great circle joining the 2 related waypoints, independant of TRUE pb-sw .
TTG	HHMM limited to 9 959. Time between the 2 related waypoints.
DIST	NM limited to 9 999.

line 6 DEST	DEST airport identifier and associated latitude/longitude. DIST to destination is computed as the direct distance from the aircraft to the active waypoint plus the along flight plan distances. time to go to destination is computed as distance to destination divided by ground speed. TTG and DEST are dashed if aircraft position is unavailable.

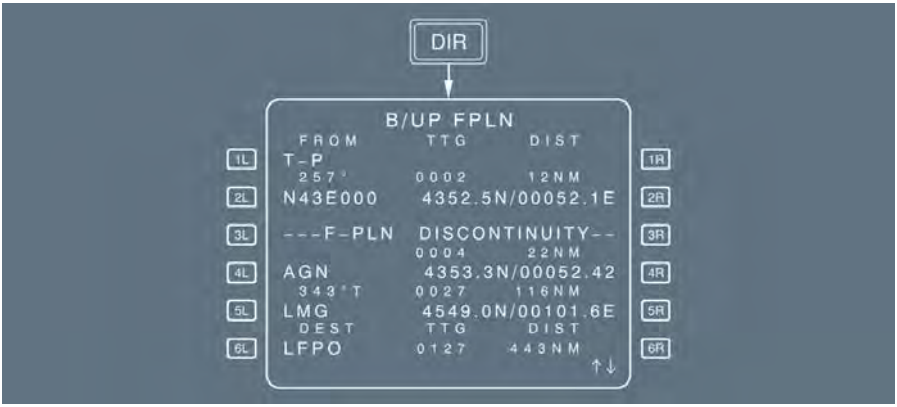
B/UP F-PLN (DIR TO)PAGE

The pilot calls up this page using the DIR key on MCDU while BACK UP NAV is active and aircraft position is valid.



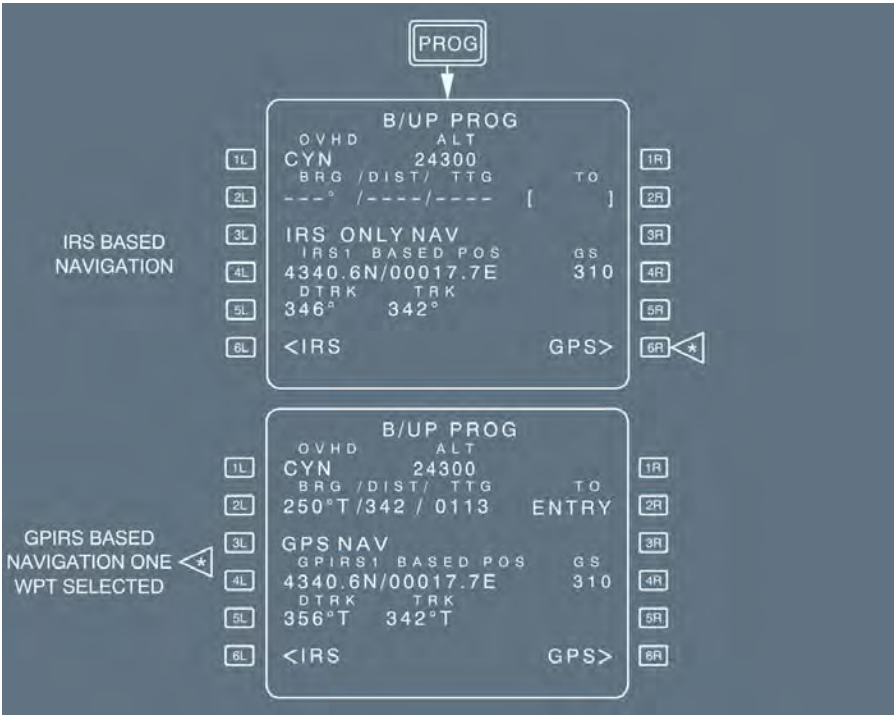
TITLE [1L] DIR TO	B/UP F-PLN is displayed in a white large font Allows DIRECT TO selection to the desired waypoint. This waypoint can be selected from the F-PLN or manually entered through the scratchpad (IDENT/LAT/LONG or LAT/LONG)
line 2 to line 6	Display consecutive waypoints of the F-PLN. Same as the B/UP F-PLN page. The TO WAYPOINT is displayed in [2L]. Vertical slewing function is available.

After a DIR TO selection, the B/UP F-PLN page is modified as following:



B/UP PROG PAGE

It displays flight parameters relative to the F-PLN or a selected waypoint.
The flight crew calls up this page by pressing the PROG key on MCDU when BACK UP NAV is active.



TITLE line 1 OVHD/ALT B/UP PROG is displayed in a white large font.
Displays the identifier of the last sequenced waypoint and the altitude at the time of the sequence.

line 2 BRG/DIST/TTG/TO — Allows the flight crew to enter an existing MCDU F-PLN waypoint identifier or LAT/LONG or IDENT/LAT/LONG.
MCDU then computes bearing, distance and time to go to that waypoint from the present position.
The pilot may modify or clear this entry (2R field).

- BRG True or magnetic outbound track of the great circle joining aircraft present position to the entered waypoint: dependent on the TRUE pb-sw ◁ position.
- DIST limited to 9 999.
- TTG HHMM limited to 9 959. time to go to the entered position computed assuming current ground speed.

These fields are displayed in a green small font.
They are dashed if present position is unavailable.

[3L] — Means of navigation used by the Back-Up Navigation. If GPS is fitted and is the navigation source, “GPS NAV” is displayed, otherwise “IRS ONLY NAV” is displayed.
If the GPS is not installed, this field is blank.

[4L] IRS 1 (2 or 3) BASED POS GPIRS 1 (2 or 3) (green) — Current aircraft position provided by the selected IRS GPIRS
IRS 1 (or 3 if IRS 1 failed) on MCDU 1
IRS 2 (or 3 if IRS 2 failed) on MCDU 2
GPIRS 1 (or GPIRS 3) or MCDU 1 ◁
GPIRS 2 (or GPIRS 3) or MCDU 2 ◁

[4R] GS (green) — Current ground speed from the selected IRS or GPS ◁ .

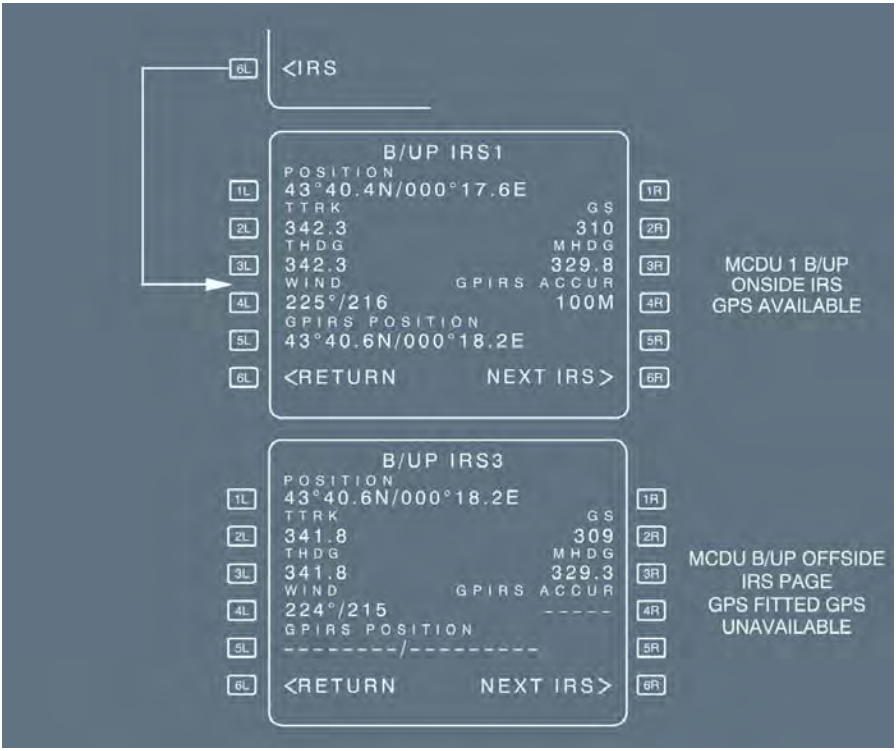
[5L] DTRK/TRK (green) — Desired track of the MCDU F-PLN active leg and current aircraft track from the selected IRS/GPS (True or Mag).
These tracks are true or magnetic depending on TRUE pb-sw ◁ position.

[6L] IRS 1 (2) — Gives access to onside B/UP IRS (1 or 2) page

[6R] GPS — Gives access to B/UP GPS page.
This prompt only appears when the GPS is installed.

B/UP IRS 1 OR 2 OR 3 PAGE

Display IRS 1, 2, 3 navigation data.
The pilot calls up this page from B/UP PROG page, by pressing the corresponding prompt.



TITLE	B/UP IRS 1, 2, 3 displayed in a white large font.
[1L] POSITION	Current aircraft position from selected IRS
[2L] T TRK	True track
[2R] GS	Ground speed
[3L] T HDG	True heading
[3R] M HDG	Magnetic heading Dashed when in polar area.
[4L] WIND	Wind direction and velocity Wind direction is always true referenced.
[4R] GPIRS ACCUR	GPS accuracy in meters as in the IRS page.
[5R] GPIRS POSITION	If GPS is installed, the GPS IRS position is provided as in the IRS page.
[6L] RETURN	Gives access to B/UP PROG page

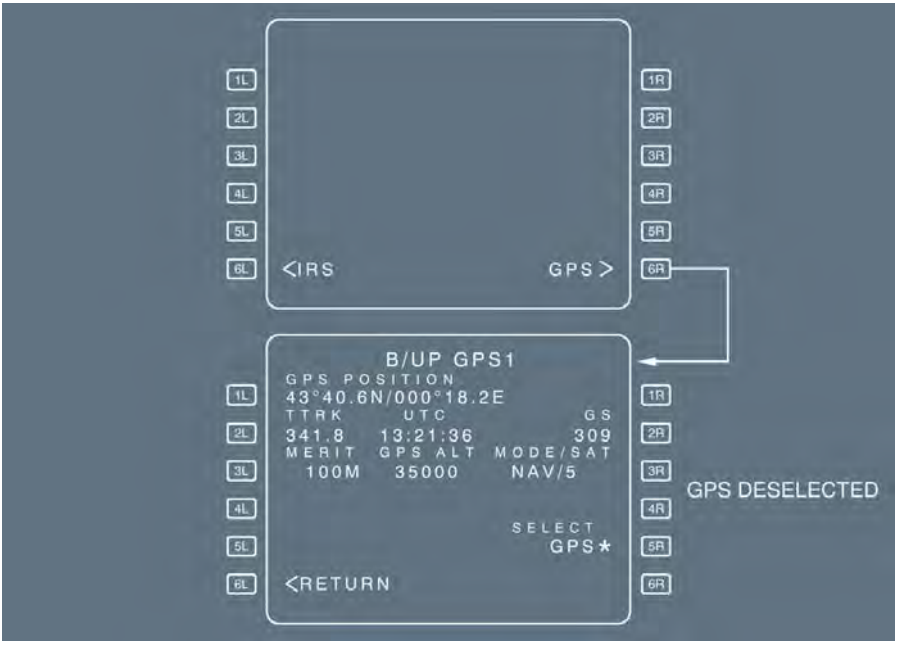
[6R] NEXT IRS — Gives access to the next IRS page.
(Closed loop 1 → 2 → 3 → 1)

This page is not modifiable by the crew.

Note: *The fields [4R] and [5L] are blanked when the GPS is not installed.*

B/UP GPS

Display GPS navigation data.
The flight crew calls up this page from B/UP PROG page, by pressing the corresponding prompt.



TITLE	B/UP GPS 1, 2 displayed in a white large font.
[1L]	GPS POSITION
Line 2:	TTRK GPIRS position (latitude/longitude) UTC: Time GS: Ground Speed
Line 3:	MERIT: GPS figure of merit GPS ALT: GPS altitude MODE/SAT: Navigation mode and number of tracked satellites. These values are displayed as in the FM GPS page.

[5R]	DESELECT/SELECT GPS: The flight crew may select and deselect the GPS for navigation Backup function. The default configuration is GPS selected.

FMS2 Honeywell

MCDU MESSAGE LIST

Ident.: DSC-22_20-50-20-35-00000918.0020001 / 03 NOV 14
Applicable to: MSN 3408-4547

Messages displayed on the MCDU are of two types and displayed in two colors.

Type I : A direct result of a pilot action;

Type II : Information about a situation, or a call for pilot action;

Type II messages are stored in a first-in/first-out message queue (5 messages max)

They are suppressed, if correct data is entered or when they no longer apply

The flight crew can clear all messages by pressing the CLEAR key on the MCDU console.

Amber (A) : Important

White (W) : Less important

MESSAGE	TYPE/COLOR	CONDITIONS
A/C POSITION INVALID	II/A	The aircraft position has become invalid. If the message has been cleared and the flight crew attempts to call up the HOLD at PPOS or DIR TO page while the aircraft position is still invalid, then the message is displayed again.
ACT RTE UPLINK (ACARS msg)	II/W	A flight plan is stored in the active flight plan.
ALIGN IRS	II/A	Appears when the IRS are ready for alignment, but the INIT A page is not displayed on either side of the flight deck. The ALIGN IRS message requires that one of the flight crew call up the IRS INIT page, to align the IRS.
AREA RNP IS XX-XX	II/A	Displayed when the RNP value, manually-entered on the PROG page, is larger than the default RNP value associated to the current flight area and when there is no RNP value defined in the navigation database for the active leg or route.
AWY/WPT MISMATCH	I/W	The pilot entered VIA on the AIRWAYS page does not contain the revised point. If you enter a second airway IDENT, it must contain the first airway ending point.
BLOCK IGNORES RTA	II/W	A time constraint existing at initiation of flight planning, or an entry of a time constraint made after initiation of flight planning, are ignored by the fuel planning function.
CABIN RATE EXCEEDED	II/W	This message appears when the aircraft gets within 200 NM of the destination and the computed rate of descent makes it impossible for the cabin to be repressurized at the maximum rate.
CHECK ALTN WIND (ACARS msg)	II/W	The uplinked alternate cruise flight level differs from the defaulted alternate cruise flight level.

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MESSAGE	TYPE/COLOR	CONDITIONS
CHECK APPR SELECTION *EFIS PFD (FMA)	II/W	Displayed when a NON ILS approach is part of the F-PLN and an ILS is manually tuned on RAD NAV page. This message reminds the flight crew that available guidance modes for the approach are APP NAV/FINAL. Displayed when in cruise at less than 100 NM from the top of descent or in descent or approach phase.
CHECK CO RTE (ACARS msg)	II/W	The uplinked company route identifier differs from the one specified in the request.
CHECK DATA BASE CYCLE	II/W	The current date does not match the effective date of the active database, and someone attempts to enter a FROM/TO or CO RTE.
CHECK IRS 1(2)(3)/FM POSITION	II/A	Each IRS position is compared to the FM position. The difference is greater than a threshold function of time.
CHECK IRS/AIRPORT POS	I/A	The distance between ADIRS alignment position and the NAV Database Airport Reference Point is at least 5 NM
CHECK DEST DATA (ACARS msg)	II/A	The aircraft is at 180 NM from destination and the destination QNH, TEMP or WIND displayed on the PERF APPR page received by ACARS uplink has to be checked. If a modification of these parameters is performed creating a conflict with previous data, the message is triggered again.
CHECK FLT NBR (ACARS msg)	II/A	The uplinked flight number differs from the flight number specified in the request.
CHECK MIN DEST FOB	II/W	This message appears when the flight crew has manually entered the MIN DEST FOB value, and MIN DEST FOB < ALTN + FINAL, being FINAL an ALTN valid data.
CHECK NORTH REF * EFIS ND	II/A	The MAG/TRUE sw does not correspond to the airport MAG/TRUE bearing reference (as stored in the FMGS navigation database), either at the departure airport (during preflight), or at the destination airport (when entering the ARRIVAL area).
CHECK QFE	II/A	This appears at the transition from QNH to QFE reference, when the QFE altitude differs by more than 100 ft from the predicted altitude, with the QNH set on the MCDU by means of the airport elevation in the NAV database.
CHECK TAKEOFF DATA	II/A	Following a flight crew entry or modification of one of the take-off parameters, there may be an inconsistency between the take-off runway or the TO shift and V1, VR, V2, FLEX TO temperature or derated level. The flight crew activated the secondary F-PLN in PREFLIGHT or DONE phase.
CHECK WEIGHT	II/A	The gross weights (GW) computed by the flight management computer (FMC) and the flight augmentation computer (FAC) disagree by more than 7 t (7.7 US tons).

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MESSAGE	TYPE/COLOR	CONDITIONS
CLK IS TAKEOFF TIME	II/W	This appears when the flight crew has entered an Estimated Takeoff Time (ETT), and the actual time is equal to ETT.
CLOCK/GPS TIME DIFF XX	II/A	Aircraft clock time and GPS time differ by more than XX minutes.
CROSSLOAD ABORTED	II/W	Message displayed on the transmitting MCDU, indicating an error in the transmission process.
CROSSLOAD COMPLETE	II/W	The database crossload from one FMGC to the other was successfully completed.
CRZ FL ABOVE MAX FL	II/W	This appears when the flight crew enters a cruise altitude that is above the computed maximum altitude.
CSTR DEL ABOVE CRZ FL	II/W	This appears when a flight plan altitude constraint has been deleted because the flight crew has inserted a cruise flight level, or step-down altitude that is at or below the flight plan constraint.
CSTR DEL UP TO WPT 01	II/W	This appears when constraints get deleted because the aircraft transitions to a go-around flight phase, before the FMGS sequences the flight plan destination.
DECELERATE or T/D REACHED (Also displayed on PFD)	II/W	One of these messages appears when the aircraft has reached the T/D in managed speed and it has not yet begun the descent.
DELETING OFFSET	II/W	This appears when the system is deleting an offset automatically, which it does under certain specific conditions, such as: - Change of active leg due to lateral revision. - Termination of next leg at destination runway and the current distance to go is less than or equal to the distance required to reach the path, or the next leg is not a CF, FM or TF leg.
DEST/ALTN MISMATCH	I/W	The pilot attempts to enter an alternate CO RTE (which starts at an origin that is not the primary flight plan destination).
DEST EFOB BELOW MIN	II/A	The EFOB at destination calculated by the FMS is less than the MIN DEST FOB value specified on the FUEL PRED page, for more than 2 min. The message is triggered in flight, except during Takeoff and Climb phases.
DIR TO IN PROCESS	I/W	The flight crew calls up the vertical or lateral revision page on one MCDU while the direct to page is displayed on the other MCDU.
ENTER DEST DATA	II/A	The flight crew has not entered wind, QNH, or temperature for the destination, and the aircraft is 180 NM out.
ENTRY OUT OF RANGE	I/W	The flight crew attempts to enter data that is out of the range specified for the selected field.
FLT NBR UPLINK (ACARS msg)	II/W	A flight number has been added to the uplink flight plan without previous request.
F-PLN ELEMENT RETAINED	I/W	The flight crew attempts to delete stored NAVAIDs, waypoints or runways that are contained in any flight plan or that are being tuned.

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MESSAGE	TYPE/COLOR	CONDITIONS
F-PLN FULL	II/W	There is not enough memory in the flight plan allotment for the computer to accept more flight plan data.
FMS 1/FMS 2 A/C STS DIFF	II/W	This message always precedes a transition to independent mode, and appears at power-up if the system detects a difference in one of the following: - NAV database serial number - Performance database - FM operational program - Aircraft and airline program pins
FMS 1/FMS 2 GW DIFF	II/W	Onside and offside aircraft weight differ by 2 t or more.
FMS 1/FMS 2 PGM PIN DIFF	II/W	Onside and offside program pins are different.
FMS 1/FMS 2 POS DIFF	II/A	Onside and offside positions differ by 0.5 NM or more (5 NM when GPS is not installed).
FMS 1/FMS 2 SPD TGT DIFF	II/W	Onside and offside target speeds displayed on the PFD differ by 5 kt or more.
FORMAT ERROR	I/W	A data entry does not meet the specified entry format for a given field.
GPS PRIMARY LOST (also displayed on ND)	II/A	Displayed when GPS PRIMARY mode is lost.
GPS PRIMARY	II/W	Displayed when the FMS is transitioning to GPS PRIMARY
GPS IS DESELECTED	II/A	This message appears when GPS has been manually deselected and the aircraft is 80 NM before the top of descent or in approach phase.
INDEPENDENT OPERATION	II/A	The FMGCs operate independently of each other.
INITIALIZE WEIGHT/CG	II/A	The zero-fuel weight or block fuel (FOB) is undefined after engine start.
INVALID FLT NBR UPLINK (ACARS msg)	II/W	The uplink message contains a valid flight plan but no flight number.
INVALID PERF UPLINK (ACARS msg)	II/W	Performance uplink message has been rejected.
INVALID RTE UPLINK (ACARS msg)	II/W	An error was detected into the uplink message and it is rejected.
INVALID TAKEOFF UPLINK (ACARS msg)	II/W	The current uplink takeoff data message is rejected.
INVALID WIND UPLINK (ACARS msg)	II/W	The current uplink wind message is rejected.
LAT DISCONT AHEAD	II/A	The next leg is a discontinuity and the aircraft is 30 s from flying the leg.
LIST OF 10 IN USE	I/W	The flight crew has tried to enter more than ten stored runways into the database, and all of the first ten are included in a flight plan or a pilot-stored route.

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MESSAGE	TYPE/COLOR	CONDITIONS
LIST OF 20 IN USE	I/W	The flight crew has tried to create a PBD, LAT/LONG, or PBX, or store a pilot-defined waypoint or NAVAID when 20 are already in use (in a flight plan or pilot-stored routes).
MACH SEGMENT DELETED	II/W	A constant Mach segment of the active flight plan has been automatically deleted. This occurs when the secondary flight plan or the alternate is activated, or engine out is detected or when the flight phase changes from CRZ to another one.
MCDU OVERHEATED	II/A	This message is displayed for 15 s in case of MCDU overheating.
MORE DRAG (EFIS PFD)	II/W	DES mode is engaged, idle is selected and the aircraft must decelerate in order to recover the path, or to respect an altitude constraint, a speed limit or a speed constraint.
NAV ACCUR DOWNGRAD (also displayed on ND)	II/A	NAV accuracy has been downgraded from HIGH to LOW. (See FMGS principles for an explanation).
NAV ACCUR UPGRAD (*EFIS ND)	II/W	NAV accuracy has been upgraded from LOW to HIGH.
NEW ACC ALT-HHHH	II/W	The acceleration altitude has been changed.
NEW CRZ ALT-HHHHH	II/W	The cruise altitude has been changed.
NEW THR RED ALT-HHHH	II/W	The thrust reduction altitude has been changed.
NO ANSWER TO REQUEST (ACARS msg)	I/W	A crew request, was previously sent to the ground and no answer has been received for 4 min.
NO INTERSECTION FOUND	I/W	The system could not find any common waypoint nor intersection point through the airway.
NON UNIQUE ROUTE IDENT	I/W	The flight crew has tried to enter on the new route page a company route IDENT that is identical to an existing company route IDENT (pilot-defined or in the database).
NOT ALLOWED	I/W	Data entry is not allowed in the selected field, or a selection action is not allowed.
NOT ALLOWED IN NAV	I/W	An attempt to modify the TO waypoint is made while in NAV mode.
NO NAV INTERCEPT	II/A	It is triggered, when NAV mode is armed and, no INTERCEPT waypoint exists before the TO waypoint.
NOT IN DATA BASE	I/W	The pilot is trying to enter or call up a company route IDENT, a FROM/TO pair, a place defined by place-bearing-distance (PBD) or place-bearing/place-bearing (PBX) or an airport NAVAID, waypoint runway, or NAVAID frequency (including pilot-defined elements) that is not in the current database.
NOT XMITTED TO ACARS (ACARS msg)	II/W	A pilot request or a crew report was sent but the communication was not established or not acknowledged.
ONLY SPD ENTRY ALLOWED	I/W	The pilot is trying to enter a Mach number for a preselected speed value on the CLIMB page.

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MESSAGE	TYPE/COLOR	CONDITIONS
OPP FMGC IN PROCESS	II/W	The offside FMGC is unhealthy, and the FM system mode is SINGLE. The message indicates that the MCDU on which the message is displayed is being driven by the FMGC on the other side.
PAGE UPDATE IN PROCESS	I/W	The pilot presses a key on the flight plan page while predictions are being updated.
PERF DATA UPLINK (ACARS msg)	II/W	Performance data are received from ground.
PLACE/D IN TRANSITION	I/W	If a place/distance waypoint is defined within a pre-planned “fixed turn radius” transition, the entry is rejected and the “PLACE/D IN TRANSITION” scratchpad message is displayed.
PLEASE WAIT	I/W	Resynchronization between both FMGCs is in progress.
PROCEDURE RNP IS XX.XX	II/A	Displayed when the RNP value, manually-entered on the PROG page, is larger than the RNP value defined in the navigation database for the active leg or route.
PRINTER NOT AVAILABLE (ACARS msg)	II/W	A printer communication error has been detected while printing a report. The printing is terminated.
RADIONAV IS DESELECTED	II/A	Radio navaids have been manually deselected and the aircraft is 80 NM before the top of descent or in approach phase.
REF/GPS POS DIFF	I/A	This message is displayed when there is a discrepancy between the reference position entered by the pilot and the GPS position.
REF/LAST IRS POS DIFF	I/A	This message is displayed when there is a discrepancy between the reference position entered by the pilot and the last stored IRS position.
REVISIONS NOT STORED	II/W	This message, displayed when a pilot-defined route or company route (active or secondary flight plan) is stored, indicates that the following elements are not retained: - Pilot-entered holds - Offsets - Modifications to terminal area procedures - Pilot-entered constraints - Pseudo waypoints - Step at optimum.

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MESSAGE	TYPE/COLOR	CONDITIONS
RTA DELETED	II/W	A time constraint is automatically deleted: - In case of engine-out - When entering the holding pattern - In case of go-around - At phase transition from descent or approach to climb or cruise - When a time constraint is inserted in the same flight plan at a different waypoint - When the alternate flight plan is activated - When a DIR TO/ABEAM is performed, only if the time constrained waypoint is projected as an ABEAM waypoint - The time constrained waypoint is cleared or sequenced (regardless of active lateral mode) - Valid clock data is lost - The time constraint belongs to the active flight plan and the secondary flight plan is activated - The time constraint belongs to the secondary flight plan and COPY ACTIVE is performed.
RTA EXISTS	I/W	Displayed if the pilot tries to clear an estimated takeoff time defined by the system.
RTE DATALINK IN PROG (ACARS msg)	I/W	A flight plan modification is performed after a F-PLN INIT request has been sent. This message is displayed until the uplink is entirely received.
RWY/LS MISMATCH	II/A	- During climb, cruise, (ILS or MLS) descent approach, or go-around, the LS frequency entered on the RAD NAV page does not match the LS associated with the destination runway. - During preflight or takeoff, the LS frequency entered on the RAD NAV page does not match the LS associated with the takeoff runway.
SEC RTE UPLINK (ACARS msg)	II/W	A flight plan is stored in the secondary flight plan.
SELECT DESIRED SYSTEM	I/W	The MCDU displays its MENU page.
SELECT TRUE (also displayed on the ND)	II/A	The MAG/TRUE sw is set to MAG, while the IRS send true HDG/TRK.
SENSOR IS INVALID	I/W	- The pilot has selected FF or FQ, or FF + FQ, or FQ + FF on the FUEL PRED page and the sole sensor or both of the selected sensors are invalid, or - The flight crew has entered fuel on board only, and the FF sensor is invalid.

Continued on the following page

Continued from the previous page

MESSAGE	TYPE/COLOR	CONDITIONS
SET GREEN DOT SPEED ("SET GREEN DOT" displayed on PFD)	II/W (W)	This message appears when the following conditions are all met: - Engine-out condition - Aircraft in selected speed mode - FCU-selected speed equal to or greater than green-dot speed +10 kt, and ALT* or ALT not active, or FCU-selected speed equal to or less than green-dot speed -10 kt.
SET HOLD SPEED (also displayed on PFD)	II/W (W)	This instruction appears when the aircraft is in selected speed, the pilot has inserted a hold in the flight plan, the aircraft is 30 s or less from the point where it must start decelerating towards hold speed, and the selected speed differs from the hold speed by more than 5 kt.
SET MANAGED SPEED or CHECK SPEED MODE (Also displayed on PFD)	II/W (W)	The target speed is selected for the current phase, but there is no preselected speed for the next flight phase. When this is so, one of these messages is displayed at transitions from climb to cruise, and from climb or cruise to descent. The message is always displayed at the transition to descent from climb or cruise if selected speed is active. It is not displayed if managed speed is active.
SETTING SPD/RTA	II/W	Displayed when the system recomputes its managed speed target to satisfy the RTA constraints.
SPECIF NDB UNAVAIL	II/A	The NDB to be autotuned (specified for a NDB approach) is not available.
SPECIF VOR-D UNAVAIL (also displayed on ND)	II/A	- The VOR, VOR-DME, or VORTAC to be autotuned (specified for an RNAV or VOR approach) has previously been deselected by the flight crew, or - The bearing, the frequency, or the IDENT of the VOR (or VORDME or VORTAC) to be autotuned is invalid.
SPD ERROR AT WPT 01	II/W	In lateral managed flight, the system predicts that the aircraft will miss a speed constraint by more than 10 kt. When the prediction changes to bring the miss within 5 kt, the message is cleared.
SPD LIM EXCEEDED	II/A	The aircraft is more that 150 ft below the speed limit altitude and more than 10 kt over green dot or the speed limit (which ever is smaller).
STEP ABOVE MAX FL	II/W	The pilot has entered a step altitude that is above the predicted maximum altitude.
STEP AHEAD	II/W	Indicates that the aircraft is within 20 NM of the active step point.
STEP DELETED	II/W	A step has been automatically deleted.
STORED ROUTES FULL	I/W	The system already contains five pilot-defined routes. (Only five are allowed.)
TAKEOFF DATA UPLINK (ACARS msg)	II/W	A takeoff data message is received.

Continued on the following page

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MESSAGE	TYPE/COLOR	CONDITIONS
TEMPORARY F-PLN EXISTS	I/W	The flight crew has selected any key (except ERASE or INSERT) or attempted a flight planning operation on the secondary flight plan while the system is displaying a temporary flight plan.
TIME ERROR AT WPT 01	II/W	While the aircraft is in lateral managed flight the FMGC predicts that it will miss a time constraint (*Refer to DSC-22_20-30-20-25 Required Time of Arrival (RTA) - Entering a Required Time of Arrival*).
TIME MARKER LIST FULL	I/W	The system already contains four time markers. (Only four are allowed).
TIME TO EXIT	II/A	The aircraft must leave holding immediately to satisfy fuel reserve requirements. (Extra fuel is zero).
TO SPEED TOO LOW	II/A	This message appears if the inserted V1, VR, V2 speeds do not satisfy the existing regulatory conditions regarding VMC and VS1G speeds.
TOO STEEP PATH AHEAD	II/A	The system displays this message in cruise phase if the aircraft is within 150 NM of its destination or in descent or approach phase and in NAV mode and the descent profile contains a segment that is too steep.
TUNE BBB FFF.FF	II/A	The system cannot autotune the VOR for approach or position because of a manual VOR selection.
TURN AREA EXCEEDANCE	II/A	This message is displayed 1.5 min before entry of the PI leg, when in NAV mode, if the PI lateral path exceed the protection envelope defined in the Navigation database.
UNKNOWN PROGRAM PIN	II/W	The system has been unable to initialize because of an incompatible or undefined aircraft pin program combination (A/C type, engine type, VMO/MMO parity) in the FMGC software.
UPLINK INSERT IN PROG (ACARS msg)	II/W	Displayed when an uplink message is currently inserted in the FMGS.
USING COST INDEX-NNN	I/W	This message is displayed when the system contains a flight plan, and the flight crew tries to enter a zero fuel weight or a gross weight into it before defining a Cost Index (CI). (In this case, the FMS defaults to the Cost Index from the last flight). It is also displayed when the flight crew inserts the ALTN F-PLN (in this case, the FMS defaults the cost index to 0).
V1/VR/V2 DISAGREE	II/A	This message is displayed when the entered V1, VR and V2 speeds do not satisfy the condition V1 ≤ VR ≤ V2.
WAIT FOR SYSTEM RESPONSE	I/W	During the time between a subsystem selection and the display of the subsystem page, the MCDU MENU page remains displayed with this message.
WIND DATA UPLINK (ACARS msg)	II/W	Uplink wind message has been received.
WIND UPLINK EXISTS (ACARS msg)	I/W	A flight plan modification (active or secondary) is attempted when uplink winds are not inserted yet.

Continued on the following page

Continued from the previous page

MESSAGE	TYPE/COLOR	CONDITIONS
WIND UPLINK PENDING (ACARS msg)	II/A	A temporary flight plan exists or a DIR TO page is displayed and a wind uplink is received and stored.
XXXX IS DESELECTED	I/W	The flight crew attempts to enter a deselected NAVAID, via the SELECTED NAVAID page, that has already been deselected.

MCDU MESSAGE LIST

Ident.: DSC-22_20-50-20-35-00000918.0009001 / 03 NOV 14
Applicable to: MSN 1882-2078

Messages displayed on the MCDU are of two types and displayed in two colors.

Type I : A direct result of a pilot action;
Type II : Information about a situation, or a call for pilot action;
Type II messages are stored in a first-in/first-out message queue (5 messages max)
They are suppressed, if correct data is entered or when they no longer apply
The flight crew can clear all messages by pressing the CLEAR key on the MCDU console.
Amber (A) : Important
White (W) : Less important

MESSAGE	TYPE/COLOR	CONDITIONS
A/C POSITION INVALID	II/A	The aircraft position has become invalid. If the message has been cleared and the flight crew attempts to call up the HOLD at PPOS or DIR TO page while the aircraft position is still invalid, then the message is displayed again.
ACT RTE UPLINK (ACARS msg)	II/W	A flight plan is stored in the active flight plan.
ALIGN IRS	II/A	Appears when the IRS are ready for alignment, but the INIT A page is not displayed on either side of the flight deck. The ALIGN IRS message requires that one of the flight crew call up the IRS INIT page, to align the IRS.
AREA RNP IS XX-XX	II/A	Displayed when the RNP value, manually-entered on the PROG page, is larger than the default RNP value associated to the current flight area and when there is no RNP value defined in the navigation database for the active leg or route.
AWY/WPT MISMATCH	I/W	The pilot entered VIA on the AIRWAYS page does not contain the revised point. If you enter a second airway IDENT, it must contain the first airway ending point.
BLOCK IGNORES RTA	II/W	A time constraint existing at initiation of flight planning, or an entry of a time constraint made after initiation of flight planning, are ignored by the fuel planning function.
CABIN RATE EXCEEDED	II/W	This message appears when the aircraft gets within 200 NM of the destination and the computed rate of descent makes it impossible for the cabin to be repressurized at the maximum rate.

Continued on the following page

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MESSAGE	TYPE/COLOR	CONDITIONS
CHECK ALTN WIND (ACARS msg)	II/W	The uplinked alternate cruise flight level differs from the defaulted alternate cruise flight level.
CHECK APPR SELECTION (On PFD: "CHECK APP GUIDANCE" (A), or "CHECK APP SEL" (W) (if CPIP3 ✈)	II/W	Displayed when a NON ILS approach is part of the F-PLN and an ILS is manually tuned on RAD NAV page. This message reminds the flight crew that available guidance modes for the approach are APP NAV/FINAL. Displayed when in cruise at less than 100 NM from the top of descent or in descent or approach phase.
CHECK CO RTE (ACARS msg)	II/W	The uplinked company route identifier differs from the one specified in the request.
CHECK DATA BASE CYCLE	II/W	The current date does not match the effective date of the active database, and someone attempts to enter a FROM/TO or CO RTE.
CHECK IRS 1(2)(3)/FM POSITION	II/A	Each IRS position is compared to the FM position. The difference is greater than a threshold function of time.
CHECK IRS/AIRPORT POS	I/A	The distance between ADIRS alignment position and the NAV Database Airport Reference Point is at least 5 NM
CHECK DEST DATA (ACARS msg)	II/A	The aircraft is at 180 NM from destination and the destination QNH, TEMP or WIND displayed on the PERF APPR page received by ACARS uplink has to be checked. If a modification of these parameters is performed creating a conflict with previous data, the message is triggered again.
CHECK FLT NBR (ACARS msg)	II/A	The uplinked flight number differs from the flight number specified in the request.
CHECK MIN DEST FOB	II/W	This message appears when the flight crew has manually entered the MIN DEST FOB value, and MIN DEST FOB < ALTN + FINAL, being FINAL an ALTN valid data.
CHECK NORTH REF * EFIS ND	II/A	The MAG/TRUE sw does not correspond to the airport MAG/TRUE bearing reference (as stored in the FMGS navigation database), either at the departure airport (during preflight), or at the destination airport (when entering the ARRIVAL area).
CHECK QFE	II/A	This appears at the transition from QNH to QFE reference, when the QFE altitude differs by more than 100 ft from the predicted altitude, with the QNH set on the MCDU by means of the airport elevation in the NAV database.
CHECK TAKEOFF DATA	II/A	Following a flight crew entry or modification of one of the take-off parameters, there may be an inconsistency between the take-off runway or the TO shift and V1, VR, V2, FLEX TO temperature or derated level. The flight crew activated the secondary F-PLN in PREFLIGHT or DONE phase.

Continued on the following page

Continued from the previous page

MESSAGE	TYPE/COLOR	CONDITIONS
CHECK WEIGHT	II/A	The gross weights (GW) computed by the flight management computer (FMC) and the flight augmentation computer (FAC) disagree by more than 7 t (7.7 US tons).
CLK IS TAKEOFF TIME	II/W	This appears when the flight crew has entered an Estimated Takeoff Time (ETT), and the actual time is equal to ETT.
CLOCK/GPS TIME DIFF XX	II/A	Aircraft clock time and GPS time differ by more than XX minutes.
CROSSLOAD ABORTED	II/W	Message displayed on the transmitting MCDU, indicating an error in the transmission process.
CROSSLOAD COMPLETE	II/W	The database crossload from one FMGC to the other was successfully completed.
CRZ FL ABOVE MAX FL	II/W	This appears when the flight crew enters a cruise altitude that is above the computed maximum altitude.
CSTR DEL ABOVE CRZ FL	II/W	This appears when a flight plan altitude constraint has been deleted because the flight crew has inserted a cruise flight level, or step-down altitude that is at or below the flight plan constraint.
CSTR DEL UP TO WPT 01	II/W	This appears when constraints get deleted because the aircraft transitions to a go-around flight phase, before the FMGS sequences the flight plan destination.
DECELERATE or T/D REACHED (Also displayed on PFD)	II/W	One of these messages appears when the aircraft has reached the T/D in managed speed and it has not yet begun the descent.
DELETING OFFSET	II/W	This appears when the system is deleting an offset automatically, which it does under certain specific conditions, such as: - Change of active leg due to lateral revision. - Termination of next leg at destination runway and the current distance to go is less than or equal to the distance required to reach the path, or the next leg is not a CF, FM or TF leg.
DEST/ALTN MISMATCH	I/W	The pilot attempts to enter an alternate CO RTE (which starts at an origin that is not the primary flight plan destination).
DEST EFOB BELOW MIN	II/A	The EFOB at destination calculated by the FMS is less than the MIN DEST FOB value specified on the FUEL PRED page, for more than 2 min. The message is triggered in flight, except during Takeoff and Climb phases.
DIR TO IN PROCESS	I/W	The flight crew calls up the vertical or lateral revision page on one MCDU while the direct to page is displayed on the other MCDU.
ENTER DEST DATA	II/A	The flight crew has not entered wind, QNH, or temperature for the destination, and the aircraft is 180 NM out.
ENTRY OUT OF RANGE	I/W	The flight crew attempts to enter data that is out of the range specified for the selected field.
FLT NBR UPLINK (ACARS msg)	II/W	A flight number has been added to the uplink flight plan without previous request.

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Continued from the previous page

MESSAGE	TYPE/COLOR	CONDITIONS
F-PLN ELEMENT RETAINED	I/W	The flight crew attempts to delete stored NAVAIDs, waypoints or runways that are contained in any flight plan or that are being tuned.
F-PLN FULL	II/W	There is not enough memory in the flight plan allotment for the computer to accept more flight plan data.
FMS 1/FMS 2 A/C STS DIFF	II/W	This message always precedes a transition to independent mode, and appears at power-up if the system detects a difference in one of the following: - NAV database serial number - Performance database - FM operational program - Aircraft and airline program pins
FMS 1/FMS 2 GW DIFF	II/W	Onside and offside aircraft weight differ by 2 t or more.
FMS 1/FMS 2 PGM PIN DIFF	II/W	Onside and offside program pins are different.
FMS 1/FMS 2 POS DIFF	II/A	Onside and offside positions differ by 0.5 NM or more (5 NM when GPS is not installed).
FMS 1/FMS 2 SPD TGT DIFF	II/W	Onside and offside target speeds displayed on the PFD differ by 5 kt or more.
FORMAT ERROR	I/W	A data entry does not meet the specified entry format for a given field.
GPS PRIMARY LOST (also displayed on ND)	II/A	Displayed when GPS PRIMARY mode is lost.
GPS PRIMARY	II/W	Displayed when the FMS is transitioning to GPS PRIMARY
GPS IS DESELECTED	II/A	This message appears when GPS has been manually deselected and the aircraft is 80 NM before the top of descent or in approach phase.
INDEPENDENT OPERATION	II/A	The FMGCs operate independently of each other.
INITIALIZE WEIGHT/CG	II/A	The zero-fuel weight or block fuel (FOB) is undefined after engine start.
INVALID FLT NBR UPLINK (ACARS msg)	II/W	The uplink message contains a valid flight plan but no flight number.
INVALID PERF UPLINK (ACARS msg)	II/W	Performance uplink message has been rejected.
INVALID RTE UPLINK (ACARS msg)	II/W	An error was detected into the uplink message and it is rejected.
INVALID TAKEOFF UPLINK (ACARS msg)	II/W	The current uplink takeoff data message is rejected.
INVALID WIND UPLINK (ACARS msg)	II/W	The current uplink wind message is rejected.
LAT DISCONT AHEAD	II/A	The next leg is a discontinuity and the aircraft is 30 s from flying the leg.

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MESSAGE	TYPE/COLOR	CONDITIONS
LIST OF 10 IN USE	I/W	The flight crew has tried to enter more than ten stored runways into the database, and all of the first ten are included in a flight plan or a pilot-stored route.
LIST OF 20 IN USE	I/W	The flight crew has tried to create a PBD, LAT/LONG, or PBX, or store a pilot-defined waypoint or NAVAID when 20 are already in use (in a flight plan or pilot-stored routes).
MACH SEGMENT DELETED	II/W	A constant Mach segment of the active flight plan has been automatically deleted. This occurs when the secondary flight plan or the alternate is activated, or engine out is detected or when the flight phase changes from CRZ to another one.
MCDU OVERHEATED	II/A	This message is displayed for 15 s in case of MCDU overheating.
MORE DRAG (EFIS PFD)	II/W	DES mode is engaged, idle is selected and the aircraft must decelerate in order to recover the path, or to respect an altitude constraint, a speed limit or a speed constraint.
NAV ACCUR DOWNGRAD (also displayed on ND)	II/A	NAV accuracy has been downgraded from HIGH to LOW. (See FMGS principles for an explanation).
NAV ACCUR UPGRAD (*EFIS ND)	II/W	NAV accuracy has been upgraded from LOW to HIGH.
NEW ACC ALT-HHHH	II/W	The acceleration altitude has been changed.
NEW CRZ ALT-HHHHH	II/W	The cruise altitude has been changed.
NEW THR RED ALT-HHHH	II/W	The thrust reduction altitude has been changed.
NO ANSWER TO REQUEST (ACARS msg)	I/W	A crew request, was previously sent to the ground and no answer has been received for 4 min.
NO INTERSECTION FOUND	I/W	The system could not find any common waypoint nor intersection point through the airway.
NON UNIQUE ROUTE IDENT	I/W	The flight crew has tried to enter on the new route page a company route IDENT that is identical to an existing company route IDENT (pilot-defined or in the database).
NOT ALLOWED	I/W	Data entry is not allowed in the selected field, or a selection action is not allowed.
NOT ALLOWED IN NAV	I/W	An attempt to modify the TO waypoint is made while in NAV mode.
NO NAV INTERCEPT	II/A	It is triggered, when NAV mode is armed and, no INTERCEPT waypoint exists before the TO waypoint.
NOT IN DATA BASE	I/W	The pilot is trying to enter or call up a company route IDENT, a FROM/TO pair, a place defined by place-bearing-distance (PBD) or place-bearing/place-bearing (PBX) or an airport NAVAID, waypoint runway, or NAVAID frequency (including pilot-defined elements) that is not in the current database.
NOT XMITTED TO ACARS (ACARS msg)	II/W	A pilot request or a crew report was sent but the communication was not established or not acknowledged.

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MESSAGE	TYPE/COLOR	CONDITIONS
ONLY SPD ENTRY ALLOWED	I/W	The pilot is trying to enter a Mach number for a preselected speed value on the CLIMB page.
OPP FMGC IN PROCESS	II/W	The offside FMGC is unhealthy, and the FM system mode is SINGLE. The message indicates that the MCDU on which the message is displayed is being driven by the FMGC on the other side.
PAGE UPDATE IN PROCESS	I/W	The pilot presses a key on the flight plan page while predictions are being updated.
PERF DATA UPLINK (ACARS msg)	II/W	Performance data are received from ground.
PLACE/D IN TRANSITION	I/W	If a place/distance waypoint is defined within a pre-planned “fixed turn radius” transition, the entry is rejected and the “PLACE/D IN TRANSITION” scratchpad message is displayed.
PLEASE WAIT	I/W	Resynchronization between both FMGCs is in progress.
PROCEDURE RNP IS XX.XX	II/A	Displayed when the RNP value, manually-entered on the PROG page, is larger than the RNP value defined in the navigation database for the active leg or route.
PRINTER NOT AVAILABLE (ACARS msg)	II/W	A printer communication error has been detected while printing a report. The printing is terminated.
RADIONAV IS DESELECTED	II/A	Radio navaids have been manually deselected and the aircraft is 80 NM before the top of descent or in approach phase.
REF/GPS POS DIFF	I/A	This message is displayed when there is a discrepancy between the reference position entered by the pilot and the GPS position.
REF/LAST IRS POS DIFF	I/A	This message is displayed when there is a discrepancy between the reference position entered by the pilot and the last stored IRS position.
REVISIONS NOT STORED	II/W	This message, displayed when a pilot-defined route or company route (active or secondary flight plan) is stored, indicates that the following elements are not retained: - Pilot-entered holds - Offsets - Modifications to terminal area procedures - Pilot-entered constraints - Pseudo waypoints - Step at optimum.

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MESSAGE	TYPE/COLOR	CONDITIONS
RTA DELETED	II/W	A time constraint is automatically deleted: - In case of engine-out - When entering the holding pattern - In case of go-around - At phase transition from descent or approach to climb or cruise - When a time constraint is inserted in the same flight plan at a different waypoint - When the alternate flight plan is activated - When a DIR TO/ABEAM is performed, only if the time constrained waypoint is projected as an ABEAM waypoint - The time constrained waypoint is cleared or sequenced (regardless of active lateral mode) - Valid clock data is lost - The time constraint belongs to the active flight plan and the secondary flight plan is activated - The time constraint belongs to the secondary flight plan and COPY ACTIVE is performed.
RTA EXISTS	I/W	Displayed if the pilot tries to clear an estimated takeoff time defined by the system.
RTE DATALINK IN PROG (ACARS msg)	I/W	A flight plan modification is performed after a F-PLN INIT request has been sent. This message is displayed until the uplink is entirely received.
RWY/LS MISMATCH	II/A	- During climb, cruise, (ILS or MLS) descent approach, or go-around, the LS frequency entered on the RAD NAV page does not match the LS associated with the destination runway. - During preflight or takeoff, the LS frequency entered on the RAD NAV page does not match the LS associated with the takeoff runway.
SEC RTE UPLINK (ACARS msg)	II/W	A flight plan is stored in the secondary flight plan.
SELECT DESIRED SYSTEM	I/W	The MCDU displays its MENU page.
SELECT TRUE (also displayed on the ND)	II/A	The MAG/TRUE sw is set to MAG, while the IRS send true HDG/TRK.
SENSOR IS INVALID	I/W	- The pilot has selected FF or FQ, or FF + FQ, or FQ + FF on the FUEL PRED page and the sole sensor or both of the selected sensors are invalid, or - The flight crew has entered fuel on board only, and the FF sensor is invalid.

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MESSAGE	TYPE/COLOR	CONDITIONS
SET GREEN DOT SPEED ("SET GREEN DOT" displayed on PFD)	II/W (W)	This message appears when the following conditions are all met: - Engine-out condition - Aircraft in selected speed mode - FCU-selected speed equal to or greater than green-dot speed +10 kt, and ALT* or ALT not active, or FCU-selected speed equal to or less than green-dot speed -10 kt.
SET HOLD SPEED (also displayed on PFD)	II/W (W)	This instruction appears when the aircraft is in selected speed, the pilot has inserted a hold in the flight plan, the aircraft is 30 s or less from the point where it must start decelerating towards hold speed, and the selected speed differs from the hold speed by more than 5 kt.
SET MANAGED SPEED or CHECK SPEED MODE (Also displayed on PFD)	II/W (W)	The target speed is selected for the current phase, but there is no preselected speed for the next flight phase. When this is so, one of these messages is displayed at transitions from climb to cruise, and from climb or cruise to descent. The message is always displayed at the transition to descent from climb or cruise if selected speed is active. It is not displayed if managed speed is active.
SETTING SPD/RTA	II/W	Displayed when the system recomputes its managed speed target to satisfy the RTA constraints.
SPECIF NDB UNAVAIL	II/A	The NDB to be autotuned (specified for a NDB approach) is not available.
SPECIF VOR-D UNAVAIL (also displayed on ND)	II/A	- The VOR, VOR-DME, or VORTAC to be autotuned (specified for an RNAV or VOR approach) has previously been deselected by the flight crew, or - The bearing, the frequency, or the IDENT of the VOR (or VORDME or VORTAC) to be autotuned is invalid.
SPD ERROR AT WPT 01	II/W	In lateral managed flight, the system predicts that the aircraft will miss a speed constraint by more than 10 kt. When the prediction changes to bring the miss within 5 kt, the message is cleared.
SPD LIM EXCEEDED	II/A	The aircraft is more that 150 ft below the speed limit altitude and more than 10 kt over green dot or the speed limit (which ever is smaller).
STEP ABOVE MAX FL	II/W	The pilot has entered a step altitude that is above the predicted maximum altitude.
STEP AHEAD	II/W	Indicates that the aircraft is within 20 NM of the active step point.
STEP DELETED	II/W	A step has been automatically deleted.
STORED ROUTES FULL	I/W	The system already contains five pilot-defined routes. (Only five are allowed.)
TAKEOFF DATA UPLINK (ACARS msg)	II/W	A takeoff data message is received.

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MESSAGE	TYPE/COLOR	CONDITIONS
TEMPORARY F-PLN EXISTS	I/W	The flight crew has selected any key (except ERASE or INSERT) or attempted a flight planning operation on the secondary flight plan while the system is displaying a temporary flight plan.
TIME ERROR AT WPT 01	II/W	While the aircraft is in lateral managed flight the FMGC predicts that it will miss a time constraint (*Refer to DSC-22_20-30-20-25 Required Time of Arrival (RTA) - Entering a Required Time of Arrival*).
TIME MARKER LIST FULL	I/W	The system already contains four time markers. (Only four are allowed).
TIME TO EXIT	II/A	The aircraft must leave holding immediately to satisfy fuel reserve requirements. (Extra fuel is zero).
TO SPEED TOO LOW	II/A	This message appears if the inserted V1, VR, V2 speeds do not satisfy the existing regulatory conditions regarding VMC and VS1G speeds.
TOO STEEP PATH AHEAD	II/A	The system displays this message in cruise phase if the aircraft is within 150 NM of its destination or in descent or approach phase and in NAV mode and the descent profile contains a segment that is too steep.
TUNE BBB FFF.FF	II/A	The system cannot autotune the VOR for approach or position because of a manual VOR selection.
TURN AREA EXCEEDANCE	II/A	This message is displayed 1.5 min before entry of the PI leg, when in NAV mode, if the PI lateral path exceed the protection envelope defined in the Navigation database.
UNKNOWN PROGRAM PIN	II/W	The system has been unable to initialize because of an incompatible or undefined aircraft pin program combination (A/C type, engine type, VMO/MMO parity) in the FMGC software.
UPLINK INSERT IN PROG (ACARS msg)	II/W	Displayed when an uplink message is currently inserted in the FMGS.
USING COST INDEX-NNN	I/W	This message is displayed when the system contains a flight plan, and the flight crew tries to enter a zero fuel weight or a gross weight into it before defining a Cost Index (CI). (In this case, the FMS defaults to the Cost Index from the last flight). It is also displayed when the flight crew inserts the ALTN F-PLN (in this case, the FMS defaults the cost index to 0).
V1/VR/V2 DISAGREE	II/A	This message is displayed when the entered V1, VR and V2 speeds do not satisfy the condition V1 ≤ VR ≤ V2.
WAIT FOR SYSTEM RESPONSE	I/W	During the time between a subsystem selection and the display of the subsystem page, the MCDU MENU page remains displayed with this message.
WIND DATA UPLINK (ACARS msg)	II/W	Uplink wind message has been received.
WIND UPLINK EXISTS (ACARS msg)	I/W	A flight plan modification (active or secondary) is attempted when uplink winds are not inserted yet.

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MESSAGE	TYPE/COLOR	CONDITIONS
WIND UPLINK PENDING (ACARS msg)	II/A	A temporary flight plan exists or a DIR TO page is displayed and a wind uplink is received and stored.
XXXX IS DESELECTED	I/W	The flight crew attempts to enter a deselected NAVAID, via the SELECTED NAVAID page, that has already been deselected.

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MCDU DATA FORMAT LIST

Ident.: DSC-22_20-50-30-00000920.0022001 / 23 JUN 15
Applicable to: MSN 1882-2078

The following chart lists all the data the pilot may enter on the MCDU.
It also shows the acceptable format for the various data items, the acceptable range, the units of entry, and the MCDU pages on which the data can be entered.

The following codes are used to indicate various data formats:

A : letters
N : numbers
X : letters and numbers

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
ACCEL ALT	See ALT		ft (MSL)	TAKEOFF (ACT/SEC (2)) GO AROUND (ACT/SEC (2))
ALT	NNNN or NNNNN (leading zeros must be included)	Max ALT = 39 000 Entry is rounded to the nearest 10 ft	ft (MSL)	PERF CLB PERF DES
ALT CSTR	See ALT	See ALT	ft (MSL)	VERT REV F-PLN A SEC F-PLN A
AIRWAYS (VIA)	XXXX	If not in data base "NOT IN DATA BASE" is displayed	N/A	LAT REV AIRWAYS ◁
ARPT	AAAA 1 character minimum. 4 maximum.	If AAAA is not in the database airport file, the New Runway page is displayed		INIT A (ACT/SEC (2)) LAT REV ALTN F-PLN A-B (ACT/SEC (2)) WAYPOINT DIR TO
BLOCK FUEL	NN.N leading zeros may be omitted.	0-80/0-175.2	Thousands of Kg or thousands of Lb	INIT B (ACT/SEC (2))
CABIN RATE	- NNN (- may be omitted)	100 - 999	ft/min	DES FORECAST or CRUISE PERF PAGE ◁
CG	NN.N	8.0 - 45.0	% MAC	INIT B. (ACT/SEC (2)) FUEL PRED
CHANNEL ◁	NNN	500 - 699		NEW NAVAID RAD NAV

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
CLASS (NAVAID)	AAAAAA (refer to RANGE for exact inputs allowed)	VOR DME VORDME VORTAC LOC, ILS NDB ILSDME MLS ◁✠ TACAN ◁✠	N/A	NEW NAVAID
CO RTE	XXXXXXX 7 or 10 characters (pin program)	If not in the NAVdatabase, a message will be displayed	N/A	INIT A ROUTE SELECTION NEW ROUTE ALTERNATE
COST INDEX	NNN may be entered as 1-3 digits; leading zeros lay be omitted	0 to 999	Kg/Min or 100 lb/Hr	INIT A (ACT/SEC [2]) PERF CLB (ACT/SEC [2]) PERF CRZ (ACT/SEC [2]) PERF DES (ALT/SEC [2])
CRS	See INB CRD	See INB CRS	degrees	RADIO NAV NEW NAVAID NEW RUNWAY
CRZ FL	Must be entered as FLIGHT LEVEL	Maximum FL (See FLIGHT LEVEL)	Hundred of ft	INIT A (ACT/SEC [2]) PROG
CRZ TEMP	See TEMP		See TEMP	INIT A (ACT/SEC [2]) FUEL PREDICTION
CRZ WIND	See WIND DIR/MAG	See WIND DIR/MAG	See WIND DIR/MAG	INIT A (ACT/SEC [2]) FUEL PREDICTION
DH	NNN	0 - 700 No is accepted if an ILS APPR is selected	ft	PERF APPR (ACT/SEC [2])
DIST	NN.N leading and trailing 0's may be omitted.	0 - 99.9 or 0 - 999 (or 9999 ◁✠)	NM NM	HOLD ALTN
DRT TO ◁✠	"D"NN	Eight possible values		PERF TAKEOFF

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
EFF WIND ◁	± NNN "+" may be entered as "T" or "TL" "-" may be entered as "H" or "HD" Leading zeros may be omitted If no sign is input, "+" is taken	0 - 500	kts	CLOSEST AIRPORT EQUI-TIME INIT A SEC INTA
ELV	± NNNN if no sign, + assumed Leading 0's may be omitted	Entry displayed to nearest 10 ft -400 to 20 470 ft (RWY) (or - 1000 to 20 470 ft ◁) -2 000 to 20 470 (NAVAID)	ft (MSL)	NEW RUNWAY NEW NAVAID
ETT/RTA ◁	HH:MM:SS	00:00:00 to 23:59:59	Hour HH Min MM Sec SS	RTA
FF/FQ Sensors	One or both may be entered, Both - /FF + FQ or - / FQ + FF Fuel flow - /FF Fuel Quantity - / FQ		N/A	FUEL PREDICTION
FIG OF MERIT	N	0 - 3	N/A	NEW NAVAID
FINAL/TIME	Only one may be entered at a time. NN.N or (NNN.N ◁) for FINAL NNNN for TIME	FINAL 0 - 10.0 (or 0 - 100 ◁) or 0 - 22.0 0 - 90 TIME	Thousand of kg or Thousand of lb minutes	FUEL PRED INIT B
FLAPS		0, 1, 2, or 3		TAKEOFF

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
FLEX TO TEMP	1. If Derated TO option not implemented: same as TEMP 2. If Derated TO option is implemented: F NN		NN in degrees centigrade	TAKEOFF
FLIGHT LEVEL	FLNNN or NNN Leading zeros on NNN may be omitted	Max FL = 390 (or Max FL = 410 ◁A)	Hundreds of ft (MSL)	F-PLN A-B, PROG VERT REV INIT A (ACT, SEC[2]) PERF CLB PERF DES STEP PRED STEP ALTS ◁A
FLIGHT NUMBER	XXXXXXXX The 8 alphanumeric are not mandatory	N/A	N/A	INIT A F-PLN A-B
FOB	NN.N (leading zeros may be omitted)	See BLOCK	Thousands of kg or Thousands of Lb	FUEL PREDICTION
FREQ	NNN.NN ILS/VOR NNN.N NDB	108.00 - 117.95 190.0 - 1 750.0	MHz KHz	PROG. NEW NAVAID RADIO NAV
FROM/TO	AAAA /AAAA	AAAA must be in data base or message will be displayed	N/A	INIT A (ACT/SEC [2])
GW	NN.N Leading and trailing zeros may be omitted	35 - 99.9 or 77.2 - 218	Thousands of kg or Thousands of Lb	FUEL PREDICTION
IDLE FACTOR ◁A	± N.N Leading and trailing zeros may be omitted	-9.9. +9.9	%	A/C STATUS
INB CRS	NNN Leading zeros may be omitted. An entry of 360 is displayed as 0.	000 - 359	Degrees	HOLD

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
LAT	DDMM.MB or BDDMM.M DD - degrees, MM.M - minutes, B - direction. Leading zeros may be omitted but the direction (B) is necessary. Latitude is displayed as DDMM.MB	B: N or S 0 ≤ DD ≤ 90 0 ≤ MM.M ≤ 59.9	Degree minutes tenths of minutes	INIT A (ACT/SEC (2))
LAT/LONG	LAT/LONG See LAT and See LONG except both must be entered with "/" in between	See LAT and See LONG	See LAT and See LONG	F-PLN A-B (ACT/SEC (2)) PROG NEW WAYPOINT NEW NAVAID DIR TO LAT REV NEW RUNWAY
LENGTH	NNNN Leading zeros may be omitted	1 000 - 8 000 m 3 282 - 9 999 ft	Meters or feet	NEW RUNWAY
LONG	DDDMM.MB or BDDDMM.M DDD - degrees MM.M - minutes B - direction. Leading zeros may be omitted but the direction (B) is necessary	B: E or W 0 ≤ DDD ≤ 180 0 ≤ MM.M ≤ 59	Degree minutes tenths of minutes	INIT A
MACH	.NN The decimal point is necessary. Trailing zeros are not necessary	MAX = 0.82 MIN = 0.15	Mach Number	F-PLN A (ACT/SEC (2)) PERF CLB PERF CRZ PERF DES
MACH/SPD	MACH and SPD must be entered with "/" between (See MACH and See SPD formats)	See MACH and See SPD	See MACH and See SPD	PERF DES (ACT/SEC (2))
MDA	See ALT	LDG elevation to LDG elevation +5 000	ft (MSL)	PERF APPR (ACT/SEC (2))

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
MDH	± NNNNN	0 - 5 000	ft (AGL)	PERF APPR (ACT/SEC (2))
NAVAID	XXXX	Any alphanumeric	N/A	PROG NEW NAVAID NAVAID F-PLN A-B (ACT/SEC (2)) LAT REV DIR TO RADIO NAV SELECTED NAVAIDS
OFST	NNB or BNN NN offset distance B direction	B: L or R 1 < NN < 50	NM	LAT REV
PERF FACTOR	NN.N leading or trailing zeros may be omitted (± N.N)	-10.0 to +10.0 (or -9.9 - +9.9 ◁⊠)	N/A	A/C STATUS
PLACE/BRG/DIST	PLACE can be any data base ARPT, NAVAID or WAYPOINT - BRG must be a 3 digit entry without decimal digit. An entry of BRG = 360 is displayed as 0.	PLACE - If not in data base, a message "NOT IN DATA BASE" is displayed BRG - 000 - 360	N/A degrees	LAT REV(ACT/SEC (2)) NEW WAYPOINT PROG DIR TO F-PLNA-B (ACT/SEC (2)) STEP ALTS ◁⊠
	DIST is NNN.N where leading zeros may be omitted ; all 3 parameters must be entered with "/" between	DIST - 0 - 999.9	NM	
PLACE-BRG/ PLACE-BRG	See PLACE/BRG/ DIST A couple PLACE-BRG is entered with a dash in the middle. 2 couples have to be entered with "/" between	See PLACE/BRG/ DIST	See PLACE/BRG/ DIST	See PLACE/BRG/DIST

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
PLACE/DIST ◁	PLACE: See PLACE/ BRG/DIST DIST: See PLACE/ BRG/DIST	PLACE: See PLACE/ BRG/DIST DIST: 0 - 999.9	N/A NM	F-PLN A and B SEC F-PLN A and B LAT REV NEW WAYPOINT DIR TO STEP ALTS
QNH	NNNN (leading zero may be omitted).	950 - 1 050 (or 745 - 1050 ◁)	Hecto-Pascals (hPa)	PERF APPR (ACT/SEC (2))
	NN.NN (leading and trailing zeros may be omitted).	28.06 - 31.01 (or 22.00 - 31.00 ◁)	In.Hg	
RADIAL ◁	NNN(T) 3 digits entry	000 - 360	Degrees	FIX INFO 1 to 4
RADIAL IN ◁	NNN(T) 3 digits entry	000 - 360	Degrees	DIR TO
RADIAL OUT ◁	NNN(T) 3 digits entry	000 - 360	Degrees	DIR TO FIX INFO 1 to 4
RADIUS ◁	DNNN 3 digits entry D is the identifiant of the circle radius	000 - 256	NM	FIX INFO 1 to 4
REF FIX ◁	See waypoint			FIX INFO 1 to 4
RTE RSV	may be entered as fuel or percentage of trip fuel	Fuel 0 - 10.0 0 - 21.7 % : 0 - 15.0	thousands of kg thousands of lb	INIT B (ACT/SEC (2)) FUEL PRED
RWY	AAAANND Where AAAA is See ARPT. NN is runway number (2 digits) must be entered D is L or R to be included only when there is more than one runway with the same number at ARPT.			RUNWAY NEW RUNWAY F-PLN A-B
SAT/ALT ◁	TEMP/ALT	See TEMP and See ALT	N/A	CRUISE WIND
SET HDG ◁	NNN/N (leading and trailing zeros may be omitted) will always be displayed as NNN/N	000.0 - 360.0	Degrees	IRS MONITOR

Continued on the following page

Continued from the previous page

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
SLOPE ◁	NN.N	00.0 -90.0	Degrees	NEW NAVAID
SPD	NNN (leading zero may be omitted)	MAX = 350 kt MIN = 90 kt	kt (CAS)	SEC F-PLN A PERF CLB PERF CRZ (ACT, SEC (2)) PERF DES
SPD CSTR	See SPD	See SPD	kt (CAS)	F-PLN A (ACT/SEC (2)) VERT REV (ACT/SEC (2))
SPD LIM	SSS/NNNNN SSS is a speed NNNNN is an ALT or FLIGHT LEVEL (See ALT and See FLIGHT LEVEL)	SSS: See SPD	kt/ft (MSL)	VERT REV (ACT/SEC (2))
SPD/MACH	See MACH/SPD	See MACH and See SPD	See MACH and See SPD	PERF DES (ACT/SEC (2))
STATION DEC	NND Where NN is the declination and D is the direction. Leading zeros may be omitted. D is not required for an entry of zero declination.	NN: 01 - 99 D: E or W	Degrees	NEW NAVAID
STEP ALT ◁	SNNN or NNNS (where NNN is in Flight Level) or SNNNNN or NNNNNS (where NNNNN is in ALT) Leading zeros may be omitted	See FLIGHT LEVEL or See ALT	See FLIGHT LEVEL or See ALT	F-PLN A
TAXI	N.N Leading or trailing zeros may be omitted	0 - 9.9	Thousands of kg	INIT B (ACT/SEC (2))
TEMP	± NN If no sign, + assumed	± 99	Degrees celsius	INIT A (ACT/SEC (2)) FUEL PRED PERF APPR
THR RED ALT	See ALT	400 ft AGL mini	ft (MSL)	PERF TAKE OFF
THS	AAN.N or N.NAA where AA is UP or DN	max UP 7.0 max DN 5.0 increment 0.1	degrees	PERF TAKEOFF

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
TRANS ALT	See ALT			PERF GO AROUND
TIME	N.N	0 - 9.9	Minutes	HOLD
TIME MARK. ◁	HHMM	HH: 0 - 23 MM: 0 - 59	Hours Minutes	F-PLN A and B
T.O SHIFT	NNNN	1-Length of origin runway	m or ft	PERF TAKEOFF
TRIP WIND	See EFF WIND		kts	INIT A SET INIT A
TROPO	See ALT	See ALT (or 60 000 ◁)	ft	INIT A FUEL PREDICTION SEC FUEL PREDICTION
UTC CSTR	HH MM Where HH are hours and MM are minutes. Leading zeros may be omitted 1 or 2 digit entry is interpretated as minutes	HH: 0 - 23 MM: 0 - 59	Hours and minutes	VERT REV
V1	See SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC (2))
V2	See SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC (2))
VR	See SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC (2))
WIND	See WIND DIR/ VELOCITY	See WIND DIR/ VELOCITY	See WIND DIR/ VELOCITY	F-PLN B (ACT/SEC (2)) FUEL PREDICTION
WAYPOINT	XXXXX - may be from . 1-5 (1-7 ◁) characters for waypoint. Acceptable as waypoint IDENT: ARPT NAVAID WAYPOINT LAT/LONG, PLACE BRG/ PLACE BRG and PLACE/BRG/ DIST PLACE/DIST ◁ may be entered to define a waypoint			WAYPOINT NEW WAYPOINT F-PLN A and B (ACT/SEC (2)) LAT REV PROG DIR TO FIX INFO ◁ 1 AND 2 EQUI-TIME POINT ◁ STEP ALTS ◁ PREDICTIVE GPS ◁

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
WIND DIR/WIND MAG	NNN/NNN Both must be entered ; leading zeros may be omitted. An entry of WIND DIR = 360 is displayed as 0.	WIND DIRECTION 0 - 360	Degrees	INIT A PERF APPR (ACT/SEC (2)) STEP PRED
		WIND MAG 0 - 200 (or 0 - 500 ◁✠)	Kt	WIND F-PLN B VERT REV
WIND DIRECTION/ MAG/ALT	NNN/NNN/FL NNN or NNN/NNN/NN NNN	Direction and Velocity as above Minimum ALT 1 000	FL in hundred of ft, ALT in ft	DES FORECAST WIND PAGES ◁✠
ZFW	NN.N OR NNN.N Leading and trailing zeros may be omitted	MIN ZFW (1)– Max ZFW (1)	Thousands of kg or thousands of Lb	INIT B (ACT/SEC (2))

(1) *As defined in the Performance Data Base.*

(2) *ACT/SEC = Active or Secondary*

MCDU DATA FORMAT LIST

Ident.: DSC-22_20-50-30-00000920.0051001 / 21 MAR 16
Applicable to: MSN 3408-4547

The following chart lists all the data the pilot may enter on the MCDU.
It also shows the acceptable format for the various data items, the acceptable range, the units of entry, and the MCDU pages on which the data can be entered.

The following codes are used to indicate various data formats:

A : letters
N : numbers
X : letters and numbers

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
ACCEL ALT	See ALT		ft (MSL)	TAKEOFF (ACT/SEC (2)) GO AROUND (ACT/SEC (2))
ALT	NNNN or NNNNN (leading zeros must be included)	Max ALT = 39 000 Entry is rounded to the nearest 10 ft	ft (MSL)	PERF CLB PERF DES

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
ALT CSTR	See ALT	See ALT	ft (MSL)	VERT REV F-PLN A SEC F-PLN A
AIRWAYS (VIA)	XXXX	If not in data base "NOT IN DATA BASE" is displayed	N/A	LAT REV AIRWAYS ◁✱
ARPT	AAAA 1 character minimum. 4 maximum.	If AAAA is not in the database airport file, the New Runway page is displayed		INIT A (ACT/SEC (2)) LAT REV ALTN F-PLN A-B (ACT/SEC (2)) WAYPOINT DIR TO
BARO	Same as ALT	Ldg elevation to ldg elevation + 5000	ft (MSL)	PERF APPR (ACT/SEC(2))
BLOCK FUEL	NN.N leading zeros may be omitted.	0-80/0-175.2	Thousands of Kg or thousands of Lb	INIT B (ACT/SEC (2))
CABIN RATE	- NNN (- may be omitted)	100 - 999	ft/min	DES FORECAST or CRUISE PERF PAGE ◁✱
CG	NN.N	8.0 - 45.0	% MAC	INIT B. (ACT/SEC (2)) FUEL PRED
CHANNEL ◁✱	NNN	500 - 699		NEW NAVAID RAD NAV
CLASS (NAVAID)	AAAAAA (refer to RANGE for exact inputs allowed)	VOR DME VORDME VORTAC LOC, ILS NDB ILSDME MLS ◁✱ TACAN ◁✱	N/A	NEW NAVAID
CO RTE	XXXXXXX 7 or 10 characters (pin program)	If not in the NAVdatabase, a message will be displayed	N/A	INIT A ROUTE SELECTION NEW ROUTE ALTERNATE
COST INDEX	NNN may be entered as 1-3 digits; leading zeros lay be omitted	0 to 999	Kg/Min or 100 lb/Hr	INIT A (ACT/SEC (2)) PERF CLB (ACT/SEC (2)) PERF CRZ (ACT/SEC (2)) PERF DES (ALT/SEC (2))

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
CRS	See INB CRS	See INB CRS	degrees	RADIO NAV NEW NAVAID NEW RUNWAY
CRZ FL	Must be entered as FLIGHT LEVEL	Maximum FL (See FLIGHT LEVEL)	Hundred of ft	INIT A (ACT/SEC (2)) PROG
CRZ TEMP	See TEMP		See TEMP	INIT A (ACT/SEC (2)) FUEL PREDICTION
CRZ WIND	See WIND DIR/MAG	See WIND DIR/MAG	See WIND DIR/MAG	INIT A (ACT/SEC (2)) FUEL PREDICTION
DIST	NN.N leading and trailing 0's may be omitted.	0 - 99.9 or 0 - 999 (or 9999 ◁✠)	NM NM	HOLD ALTN
DRT TO ◁✠	"D"NN	Eight possible values		PERF TAKEOFF
EFF WIND ◁✠	± NNN "+" may be entered as "T" or "TL" "-" may be entered as "H" or "HD" Leading zeros may be omitted If no sign is input, "+" is taken	0 - 500	kts	CLOSEST AIRPORT EQUI-TIME INIT A SEC INT A
ELV	± NNNN if no sign, + assumed Leading 0's may be omitted	Entry displayed to nearest 10 ft -400 to 20 470 ft (RWY) (or - 1000 to 20 470 ft ◁✠) -2 000 to 20 470 (NAVAID)	ft (MSL)	 NEW RUNWAY NEW NAVAID
ETT/RTA ◁✠	HH:MM:SS	00:00:00 to 23:59:59	Hour HH Min MM Sec SS	RTA
FF/FQ Sensors	One or both may be entered, Both - /FF + FQ or - / FQ + FF Fuel flow - /FF Fuel Quantity - / FQ		N/A	FUEL PREDICTION
FIG OF MERIT	N	0 - 3	N/A	NEW NAVAID

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
FINAL/TIME	Only one may be entered at a time. NN.N or (NNN.N ◁) for FINAL NNNN for TIME	FINAL 0 - 10.0 (or 0 - 100 ◁) or 0 - 22.0 0 - 90 TIME	Thousand of kg or Thousand of lb minutes	FUEL PRED INIT B
FLAPS		0, 1, 2, or 3		TAKEOFF
FLEX TO TEMP	1. If Derated TO option not implemented: same as TEMP 2. If Derated TO option is implemented: F NN		NN in degrees centigrade	TAKEOFF
FLIGHT LEVEL	FLNNN or NNN Leading zeros on NNN may be omitted	Max FL = 390 (or Max FL = 410 ◁)	Hundreds of ft (MSL)	F-PLN A-B, PROG VERT REV INIT A (ACT, SEC (2)) PERF CLB PERF DES STEP PRED STEP ALTS ◁
FLIGHT NUMBER	XXXXXXXX The 8 alphanumeric are not mandatory	N/A	N/A	INIT A F-PLN A-B
FOB	NN.N (leading zeros may be omitted)	See BLOCK	Thousands of kg or Thousands of Lb	FUEL PREDICTION
FREQ	NNN.NN ILS/VOR NNN.N NDB	108.00 - 117.95 190.0 - 1 750.0	MHz KHz	PROG. NEW NAVAID RADIO NAV
FROM/TO	AAAA /AAAA	AAAA must be in data base or message will be displayed	N/A	INIT A (ACT/SEC (2))
GW	NN.N Leading and trailing zeros may be omitted	35 - 99.9 or 77.2 - 218	Thousands of kg or Thousands of Lb	FUEL PREDICTION
IDLE FACTOR ◁	± N.N Leading and trailing zeros may be omitted	-9.9. +9.9	%	A/C STATUS

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
INB CRS	NNN Leading zeros may be omitted. An entry of 360 is displayed as 0.	000 - 359	Degrees	HOLD
LAT	DDMM.MB or BDDMM.M DD - degrees, MM.M - minutes, B - direction. Leading zeros may be omitted but the direction (B) is necessary. Latitude is displayed as DDMM.MB	B: N or S 0 ≤ DD ≤ 90 0 ≤ MM.M ≤ 59.9	Degree minutes tenths of minutes	INIT A (ACT/SEC (2))
LAT/LONG	LAT/LONG See LAT and See LONG except both must be entered with "/" in between	See LAT and See LONG	See LAT and See LONG	F-PLN A-B (ACT/SEC (2)) PROG NEW WAYPOINT NEW NAVAID DIR TO LAT REV NEW RUNWAY
LENGTH	NNNN Leading zeros may be omitted	1 000 - 8 000 m 3 282 - 9 999 ft	Meters or feet	NEW RUNWAY
LONG	DDDMM.MB or BDDDMM.M DDD - degrees MM.M - minutes B - direction. Leading zeros may be omitted but the direction (B) is necessary	B: E or W 0 ≤ DDD ≤ 180 0 ≤ MM.M ≤ 59	Degree minutes tenths of minutes	INIT A
MACH	.NN The decimal point is necessary. Trailing zeros are not necessary	MAX = 0.82 MIN = 0.15	Mach Number	F-PLN A (ACT/SEC (2)) PERF CLB PERF CRZ PERF DES

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
MACH/SPD	MACH and SPD must be entered with "/" between (See MACH and See SPD formats)	See MACH and See SPD	See MACH and See SPD	PERF DES (ACT/SEC (2))
NAVAID	XXXX	Any alphanumeric	N/A	PROG NEW NAVAID NAVAID F-PLN A-B (ACT/SEC (2)) LAT REV DIR TO RADIO NAV SELECTED NAVAIDS
OFST	NNB or BNN NN offset distance B direction	B: L or R 1 < NN < 50	NM	LAT REV
PERF FACTOR	NN.N leading or trailing zeros may be omitted (± N.N)	-10.0 to +10.0 (or -9.9 - +9.9 ◁✠)	N/A	A/C STATUS
PLACE/BRG/DIST	PLACE can be any data base ARPT, NAVAID or WAYPOINT - BRG must be a 3 digit entry without decimal digit. An entry of BRG = 360 is displayed as 0.	PLACE - If not in data base, a message "NOT IN DATA BASE" is displayed BRG - 000 - 360	N/A degrees	LAT REV (ACT/SEC (2)) NEW WAYPOINT PROG DIR TO F-PLNA-B (ACT/SEC (2)) STEP ALTS ◁✠
	DIST is NNN.N where leading zeros may be omitted ; all 3 parameters must be entered with "/" between	DIST - 0 - 999.9	NM	

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DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
PLACE-BRG/ PLACE-BRG	See PLACE/BRG/ DIST A couple PLACE-BRG is entered with a dash in the middle. 2 couples have to be entered with "/" between	See PLACE/BRG/DIST	See PLACE/BRG/DIST	See PLACE/BRG/DIST
PLACE/DIST ◁	PLACE: See PLACE/ BRG/DIST DIST: See PLACE/ BRG/DIST	PLACE: See PLACE/ BRG/DIST DIST: 0 - 999.9	N/A NM	F-PLN A and B SEC F-PLN A and B LAT REV NEW WAYPOINT DIR TO STEP ALTS
QNH	NNNN (leading zero may be omitted).	950 - 1 050 (or 745 - 1050 ◁)	Hecto-Pascals (hPa)	PERF APPR (ACT/SEC (2))
	NN.NN (leading and trailing zeros may be omitted).	28.06 - 31.01 (or 22.00 - 31.00 ◁)	In.Hg	
RADIAL ◁	NNN(T) 3 digits entry	000 - 360	Degrees	FIX INFO 1 to 4
RADIAL IN ◁	NNN(T) 3 digits entry	000 - 360	Degrees	DIR TO
RADIAL OUT ◁	NNN(T) 3 digits entry	000 - 360	Degrees	DIR TO FIX INFO 1 to 4
RADIO	NNN	0–700 No is accepted if an ILS / GLS ◁ ; APPR is selected	ft	PERF APPR (ACT/SEC (2))
RADIUS ◁	DNNN 3 digits entry D is the identifiant of the circle radius	000 - 256	NM	FIX INFO 1 to 4
REF FIX ◁	See waypoint			FIX INFO 1 to 4
RTE RSV	may be entered as fuel or percentage of trip fuel	Fuel 0 - 10.0 0 - 21.7 % : 0 - 15.0	thousands of kg thousands of lb	INIT B (ACT/SEC (2)) FUEL PRED

Continued on the following page

Continued from the previous page

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
RWY	AAAANND Where AAAA is See ARPT. NN is runway number (2 digits) must be entered D is L or R to be included only when there is more than one runway with the same number at ARPT.			RUNWAY NEW RUNWAY F-PLN A-B
SAT/ALT ◁	TEMP/ALT	See TEMP and See ALT	N/A	CRUISE WIND
SET HDG ◁	NNN/N (leading and trailing zeros may be omitted) will always be displayed as NNN/N	000.0 - 360.0	Degrees	IRS MONITOR
SLOPE ◁	NN.N	00.0 -90.0	Degrees	NEW NAVAID
SPD	NNN (leading zero may be omitted)	MAX = 350 kt MIN = 90 kt	kt (CAS)	SEC F-PLN A PERF CLB PERF CRZ (ACT, SEC (2)) PERF DES
SPD CSTR	See SPD	See SPD	kt (CAS)	F-PLN A (ACT/SEC (2)) VERT REV (ACT/SEC (2))
SPD LIM	SSS/NNNNN SSS is a speed NNNNN is an ALT or FLIGHT LEVEL (See ALT and See FLIGHT LEVEL)	SSS: See SPD	kt/ft (MSL)	VERT REV (ACT/SEC (2))
SPD/MACH	See MACH/SPD	See MACH and See SPD	See MACH and See SPD	PERF DES (ACT/SEC (2))

Continued on the following page

Continued from the previous page

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
STATION DEC	NND Where NN is the declination and D is the direction. Leading zeros may be omitted. D is not required for an entry of zero declination.	NN: 01 - 99 D: E or W	Degrees	NEW NAVAID
STEP ALT ◁	SNNN or NNNS (where NNN is in Flight Level) or SNNNNN or NNNNNS (where NNNNN is in ALT) Leading zeros may be omitted	See FLIGHT LEVEL or See ALT	See FLIGHT LEVEL or See ALT	F-PLN A
TAXI	N.N Leading or trailing zeros may be omitted	0 - 9.9	Thousands of kg	INIT B (ACT/SEC [2])
TEMP	± NN If no sign, + assumed	± 99	Degrees celsius	INIT A (ACT/SEC [2]) FUEL PRED PERF APPR
THR RED ALT	See ALT	400 ft AGL mini	ft (MSL)	PERF TAKE OFF
THS	AAN.N or N.NAA where AA is UP or DN	max UP 7.0 max DN 5.0 increment 0.1	degrees	PERF TAKEOFF
TRANS ALT	See ALT			PERF GO AROUND
TIME	N.N	0 - 9.9	Minutes	HOLD
TIME MARK. ◁	HHMM	HH: 0 - 23 MM: 0 - 59	Hours Minutes	F-PLN A and B
T.O SHIFT	NNNN	1-Length of origin runway	m or ft	PERF TAKEOFF
TRIP WIND	See EFF WIND		kts	INIT A SET INIT A
TROPO	See ALT	See ALT (or 60 000 ◁)	ft	INIT A FUEL PREDICTION SEC FUEL PREDICTION

Continued on the following page

Continued from the previous page

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
UTC CSTR	HH MM Where HH are hours and MM are minutes. Leading zeros may be omitted 1 or 2 digit entry is interpretated as minutes	HH: 0 - 23 MM: 0 - 59	Hours and minutes	VERT REV
V1	See SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC (2))
V2	See SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC (2))
VR	See SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC (2))
WIND	See WIND DIR/ VELOCITY	See WIND DIR/ VELOCITY	See WIND DIR/ VELOCITY	F-PLN B (ACT/SEC (2)) FUEL PREDICTION
WAYPOINT	XXXXX - may be from . 1-5 (1-7 ◁✻) characters for waypoint. Acceptable as waypoint IDENT: ARPT NAVAID WAYPOINT LAT/LONG, PLACE BRG/ PLACE BRG and PLACE/BRG/ DIST PLACE/DIST ◁✻ may be entered to define a waypoint			WAYPOINT NEW WAYPOINT F-PLN A and B (ACT/SEC (2)) LAT REV PROG DIR TO FIX INFO ◁✻ 1 AND 2 EQUI-TIME POINT ◁✻ STEP ALTS ◁✻ PREDICTIVE GPS ◁✻
WIND DIR/WIND MAG	NNN/NNN Both must be entered ; leading zeros may be omitted. An entry of WIND DIR = 360 is displayed as 0.	WIND DIRECTION 0 - 360	Degrees	INIT A PERF APPR (ACT/SEC (2)) STEP PRED
		WIND MAG 0 - 200 (or 0 - 500 ◁✻)	Kt	WIND F-PLN B VERT REV

Continued on the following page

Continued from the previous page

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
WIND DIRECTION/ MAG/ALT	NNN/NNN/FL NNN or NNN/NNN/NN NNN	Direction and Velocity as above Minimum ALT 1 000	FL in hundred of ft, ALT in ft	DES FORECAST WIND PAGES ◁
ZFW	NN.N OR NNN.N Leading and trailing zeros may be omitted	MIN ZFW See – Max ZFW See	Thousands of kg or thousands of Lb	INIT B (ACT/SEC [2])

(1) *As defined in the Performance Data Base.*

(2) *ACT/SEC = Active or Secondary*

GENERAL

Ident.: DSC-22_20-60-10-00000921.0001001 / 10 DEC 09
Applicable to: ALL

The baro reference selector of the EIS (Electronic Instrument System) allows the pilot to use the standard barometric reference (STD), sea level atmospheric pressure (QNH), or atmospheric pressure at airfield elevation (QFE option) for the barometer setting.
The selected value is displayed in the baro reference display window of the EFIS control panel and on the Primary Flight Display (PFD) below the altitude scale.
The barometer setting is used as a reference for the altimeter of the PFD and for the PFD target altitude. In flight, it affects the predicted altitudes on the MCDU and the descent path computation.

MCDU ALTITUDE PREDICTIONS

Applicable to: ALL

Ident.: DSC-22_20-60-10-A-00000922.0001001 / 10 DEC 09

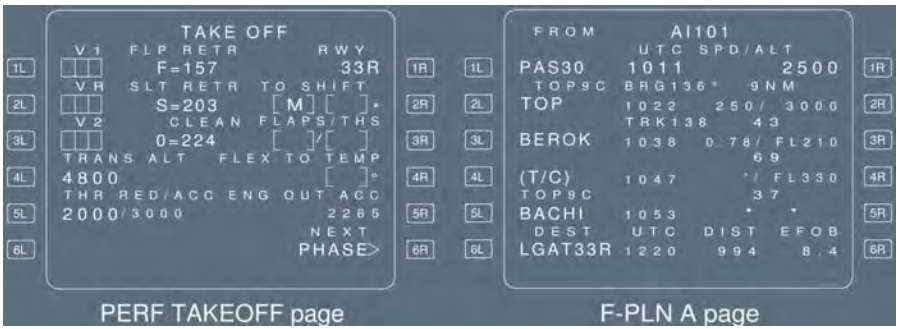
GENERAL

The FMGS predicts at each waypoint of the flight plan an altitude that is a function of all data in the lateral and vertical flight plans.

Ident.: DSC-22_20-60-10-A-00000927.0001001 / 10 DEC 09

ON THE GROUND

The altitude predicted at each waypoint is displayed as altitude in feet above mean sea level (AMSL) when it is below the transition altitude and as flight level when it is above the transition altitude. The altitude constraints are also displayed, and they follow the same rule (feet or flight level).
The predicted altitude is equal to the airport elevation plus the height you must attain in order to reach the waypoint in the applicable mode (climb or descent).



Ident.: DSC-22_20-60-10-A-00000924.0001001 / 16 FEB 11

IN FLIGHT

The predicted altitude is equal to the aircraft altitude (as a function of the barometer setting), plus or minus the height you must attain to reach the waypoint in the applicable mode (climb or descent).

- In climb:
  Altitude predictions and constraints are displayed as altitude in feet above mean sea level (AMSL) at, or below, the transition altitude, and as the flight level above it.
  For example : If the transition altitude is 5 000 ft and you insert an altitude constraint as 8 000 ft, the MCDU F-PLN A page displays it as FL 80
- In descent:
  If “STD” is selected on the EIS control panel, altitude predictions and constraints above the transition level are displayed as flight levels, and those below the transition level are displayed as altitude AMSL.
  If sea level standard pressure (QNH), or field elevation pressure (QFE option), is selected on the EIS control panel, altitude predictions and constraints are displayed as altitudes AMSL, regardless of the transition altitude.
  For example: If the transition level is FL 50 and you insert an altitude constraint of 8 000 ft into the MCDU, the MCDU F-PLNS A page will display it as FL 80, if “STD” is selected, and as 8 000 ft, if “QNH” (or “QFE” option) F-PLN A page is selected.

TARGET ALTITUDE ON PFD

Ident.: DSC-22_20-60-10-00000925.0001001 / 01 OCT 12
Applicable to: ALL

The PFD target altitude may either be:

- The altitude selected on the FCU, or
- A flight management altitude constraint, if the climb mode or descent mode is engaged and the system predicts a level-off at a constraint that comes before reaching the FCU altitude.

The PFD target altitude depends on the barometer setting:

- If “STD” is selected, the target is a flight level
- If “QNH” or “QFE” is selected, the target is an altitude or height.

The aircraft will level off accordingly.

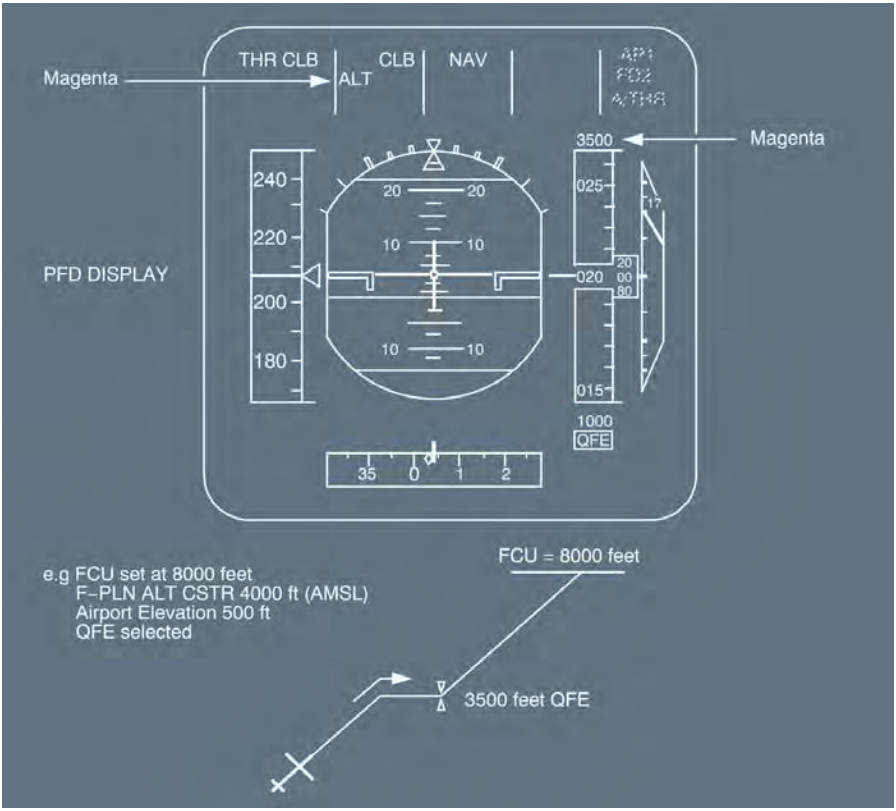
Note: - *If the pilot changes the barometer setting during ALT* or ALT CST*, the aircraft may overshoot the target altitude, because the current value has been changed. However, the ALT* and ALT CST* modes allow the aircraft to regain the FCU altitude. As a general rule, avoid changing the barometer setting when in ALT* or ALT CST**

- *In aircraft equipped to use field elevation pressure (QFE option), switching from STD to QFE (or vice versa) in ALT CST* green changes the target value and may revert the vertical mode into V/S mode.*

NOTE FOR AIRCRAFT WITH QFE (FIELD ELEVATION PRESSURE) PIN PROGRAM

If you select "QFE" on the EFIS control panel:

- The MCDU predictions follow the basic rules (altitudes are AMSL below the transition level, flight levels above it)
- The altitude constraints on the MCDU follow the basic rules
- The target altitude on the PFD is QFE related:
  - If the target altitude has been selected by the FCU, the aircraft will level off there.
  - If the target altitude is an altitude constraint, the PFD automatically shows that constraint as corrected by the airport elevation.



PROCEDURES

Ident.: DSC-22_20-60-10-00000928.0001001 / 16 FEB 11
Applicable to: ALL

a. The altitude constraints in departure and arrival procedures should be defined in the navigation database or by the pilot on the MCDU:
   - in terms of altitude AMSL below the transition altitude
   - in terms of flight level above the transition altitude

If a departure procedure defines an altitude constraint as an AMSL altitude above the transition altitude, you must convert it to STD, because the system and guidance will treat it as a flight level whenever you select the standard barometer setting.

b. In climb you should switch from QNH (or QFE) to STD on both EFIS control panels simultaneously when you reach the transition altitude.
All MCDU altitude predictions and altitude constraints and all PFD altitude targets will be displayed as flight levels.

c. In descent, when ATC clears you to an altitude below the transition altitude, you can select QNH (or QFE) on both EFIS control panels simultaneously.
All MCDU altitude predictions and contraints and PFD targets are now altitude AMSL.

Intentionally left blank

CLEARING THE SCRATCHPAD OF DATA OR MESSAGES

Ident.: DSC-22_20-60-20-00000929.0001001 / 16 FEB 11
Applicable to: ALL

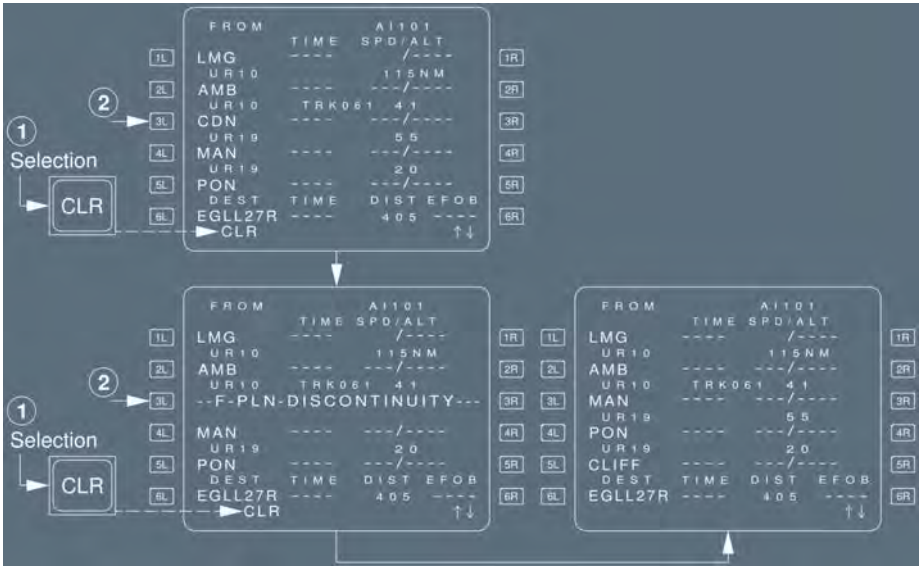
Press the “CLR” key with a single brief touch to erase the last alphanumeric character inserted in the scratchpad.
Press the key for more than three seconds to erase all the data inserted in the scratchpad. If the scratchpad is empty, it displays “CLR”.

CLEARING DATA FIELDS

Ident.: DSC-22_20-60-20-00000930.0001001 / 16 FEB 11
Applicable to: ALL

Clear a data field by pressing the “CLR” key, the scratchpad displays CLR, then select the prompt for the field you want to clear (3L for example).

- You cannot clear all data fields:
  - If the field contains data that has a default value or a value computed by the FMGC, the data reverts to this value.
  - Any attempt to clear the defaulted value has no effect.
- Clearing a constraint on the F-PLN page deletes both the speed constraint and the altitude constraint associated with the waypoint
- If you clear a data field that is a waypoint in the flight plan (primary or secondary), you delete this waypoint from the flight plan and create a discontinuity. The discontinuity can also be cleared in a similar way.


1
Selection
CLR
2
FROM
TIME SPD/ALT
LMG
UR10
AMB
UR10
CDN
UR19
MAN
UR19
PON
DEST TIME DIST EFOB
EGLL27R
CLR
115NM
TRK061 41
55
20
--F-PLN-DISCONTINUITY---
CLIFF

GENERAL

Ident.: DSC-22_20-60-30-00000932.0002001 / 16 FEB 11
Applicable to: ALL

Various features are provided to the crew in order to execute a diversion:
- The EQUITIME POINT
- The CLOSEST AIRPORTS pages
- The SECONDARY F-PLN
- The ENABLE ALTN function
- The NEW DEST revision

EN ROUTE DIVERSION WITH SEVERAL AIRPORTS AVAILABLE

Ident.: DSC-22_20-60-30-00009508.0002001 / 16 FEB 11
Applicable to: ALL

SELECT the CLOSEST AIRPORTS page.

SELECT the EFOB/WIND prompt.
INSERT the effective wind at selected airport.
CHECK the predictions and CHOOSE the adequate diversion airport.
PREPARE the diversion flight plan on the SEC F-PLN.

Note: Fuel/time predictions on the CLOSEST AIRPORTS page assume managed speed profile.

EN ROUTE DIVERSION OVER OCEANIC OR DESERTIC AREA

Ident.: DSC-22_20-60-30-00009528.0001001 / 16 FEB 11
Applicable to: ALL

The diversion airports are usually determined before departure or using the CLOSEST AIRPORTS data.

SELECT the EQUI-TIME POINT page.

ENTER the airport idents in 1L and 3L fields.
ENTER the associated winds in 2L and 4L fields.
CHECK the ETP position and time.
ENTER a predicted time at ETP as time marker.
PREPARE a diversion flight plan on the secondary flight plan.

DIVERSION PREPARATION ON THE SECONDARY FLIGHT PLAN

Ident.: DSC-22_20-60-30-00009530.0002001 / 16 FEB 11
Applicable to: ALL

The following procedure shall be applied for all diversion cases, once the diversion airport has been selected, as well as the “most probable diversion point of the F-PLN”:

PRESS the SEC F-PLN key
PRESS the COPY ACTIVE prompt
SELECT a lateral revision at diversion waypoint
ENTER the ident of the diversion airport in the NEW DEST field.

Then finalize the flight plan between the diversion point and the diversion airport. When the diversion airport is no longer applicable or ETP is sequenced, repeat the same procedure for the next diversion airport.

MISCELLANEOUS

Ident.: DSC-22_20-60-30-00009531.0002001 / 16 FEB 11
Applicable to: ALL

In some cases, the diversion airport may be simply chosen using the airports displayed on ND when AIRPORT is selected on the EIS control panel.

During oceanic or desertic area flights, the flight crew may use the PROG page, as follows:

ENTER the ident of the diversion airport in the 4R field of MCDU 1
ENTER the next diversion airport in the 4R field of MCDU 2

Then, the FMS continuously calculated the BRG/DIST to the selected diversion airports.

UPDATE the PROG pages when sequencing the ETP.

EXECUTION OF THE DIVERSION

Ident.: DSC-22_20-60-30-00009532.0001001 / 16 FEB 11
Applicable to: ALL

When the crew decides to divert:

PRESS the SEC F-PLN key.
SELECT the ACTIVATE SEC prompt.
SELECT DIR TO required point.

DIVERSION TO THE ALTERNATE AIRPORT

Ident.: DSC-22_20-60-30-00009537.0001001 / 16 FEB 11
Applicable to: ALL

The primary F-PLN includes an alternate flight plan from destination to the preferred alternate airport. All fuel prediction and management (EXTRA fuel) take the alternate flight plan into consideration. If the crew decides to divert at the end of the cruise, or beyond the last ETP, or in the descent or go-around phases, this will most probably be to the alternate airport.

When the crew decides to divert:

SELECT a lateral revision at suitable waypoint
SELECT ENABLE ALTN prompt
CHECK the temporary flight plan and INSERT
SELECT DIR TO required waypoint

Note: - *In most cases, the LAT REV shall be selected at the TO WPT. This will facilitate the subsequent selection of the DIR TO waypoint.*
- *The ALTN flight plan shall be finalized, whenever the landing runway is known by the crew (before approach briefing).*
In most cases, this will ensure that the most probable flight plan is displayed on the MCDU once ENABLE ALTN is selected.

GENERAL

Ident.: DSC-22_20-60-40-00000937.0001001 / 16 FEB 11
Applicable to: ALL

When the FMGS detects an engine-out condition, the following occurs:

FLIGHT MANAGEMENT PART

Ident.: DSC-22_20-60-40-00000938.0026001 / 16 MAR 11
Applicable to: MSN 3408, 4100-4547

- The managed target speeds is immediately set to a value that depends upon the flight phase
- All preselected speeds entered in the MCDU are deleted
- Step climb (or step descent), if entered, is deleted
- The time constraint is deleted
- The PROG page shows the engine-out maximum recommended (EO MAX REC) altitude
- The system automatically calls up the current performance page, which has the EO CLR (engine-out clear) prompt displayed in the 1R field (except during takeoff, before the diversion point is reached).
  If the crew presses the EO CLR, the 2 engine predictions and performance will be restored. Reverting back to one engine-out performance is not possible, unless the system detects a new EO condition. Therefore, the pilot should not press the EO CLR key, if an actual engine-out is detected

FLIGHT MANAGEMENT PART

Ident.: DSC-22_20-60-40-00000938.0002001 / 16 FEB 11
Applicable to: MSN 1882-2078, 3467-3518

- The managed target speeds is immediately set to a value that depends upon the flight phase
- All preselected speeds entered in the MCDU are deleted
- Step climb (or step descent), if entered, is deleted
- The time constraint is deleted
- The PROG page shows the engine-out maximum recommended (EO MAX REC) altitude

- The system automatically calls up the current performance page, which has the EO CLR (engine-out clear) prompt displayed in the 1R field (except during takeoff, before the diversion point is reached).
  If the crew presses the EO CLR, the 2 engine predictions and performance will be restored. Reverting back to one engine-out performance is not possible, unless the system detects a new EO condition. Therefore, the pilot should not press the EO CLR key, if an actual engine-out is detected
- It is not permitted to use the autopilot to perform non precision approaches in engine-out in the following modes: FINAL APP, NAV V/S, NAV/FPA. Only FD use is authorized.

FLIGHT GUIDANCE PART

Ident.: DSC-22_20-60-40-00000939.0002001 / 04 JUL 17
Applicable to: ALL

- All selected modes remain available (the “HDG/TRK”, “V/S”, and “OPEN” modes, for example)
- In the speed reference system (SRS) mode, the takeoff speed target is V2, or the current speed if it is higher but no more than V2 +15. The magenta triangle indicates V2 in all cases. The GO Around speed target is VAPP, or the current speed if higher, limited to VLS +15 kt
- The system limits autopilot (AP) and flight director (FD) bank angles during takeoff and approach phases as follows:
  - 15 ° when the aircraft speed is below the maneuvering speeds (F, S, or Green Dot speed) -10 kt , and then
  - In selected lateral guidance:
    - Linear increase to 25 ° up to maneuvering speeds (F, S, or Green Dot speed) -3 kt
    - 25 ° above maneuvering speeds (F, S, or Green Dot speed) -3 kt .
  - In managed lateral guidance:
    - Linear increase to 30 ° up to maneuvering speeds (F, S, or Green Dot speed) -3 kt
    - 30 ° above maneuvering speeds (F, S, or Green Dot speed) -3 kt .

Note: *The engine-out bank angle limits apply, when the FG part of the FMGS has detected an engine-out. It cannot be cleared by the crew through the MCDU EO CLEAR prompt.*

AUTOTHRUST

Ident.: DSC-22_20-60-40-00000940.0001001 / 16 FEB 11
Applicable to: ALL

The system extends the active range of the active engine from idle to maximum continuous thrust (MCT instead of CL thrust).

The Flight Mode Annunciator requests maximum continuous thrust on the live engine at a time that depends on when the engine-out occurs.

ENGINE-OUT CONDITIONS

Ident.: DSC-22_20-60-40-00000941.0001001 / 16 FEB 11
Applicable to: ALL

The FMGS considers the aircraft to be in an engine-out condition, when one of the following conditions is present and the aircraft has commenced takeoff or is in flight:

- One engine master switch off, or
- N2 below idle, or
- One thrust lever angle is below 5 ° with the other above 22 °, or
- The FADEC shows an engine fault.

ENGINE-OUT SID

Applicable to: ALL

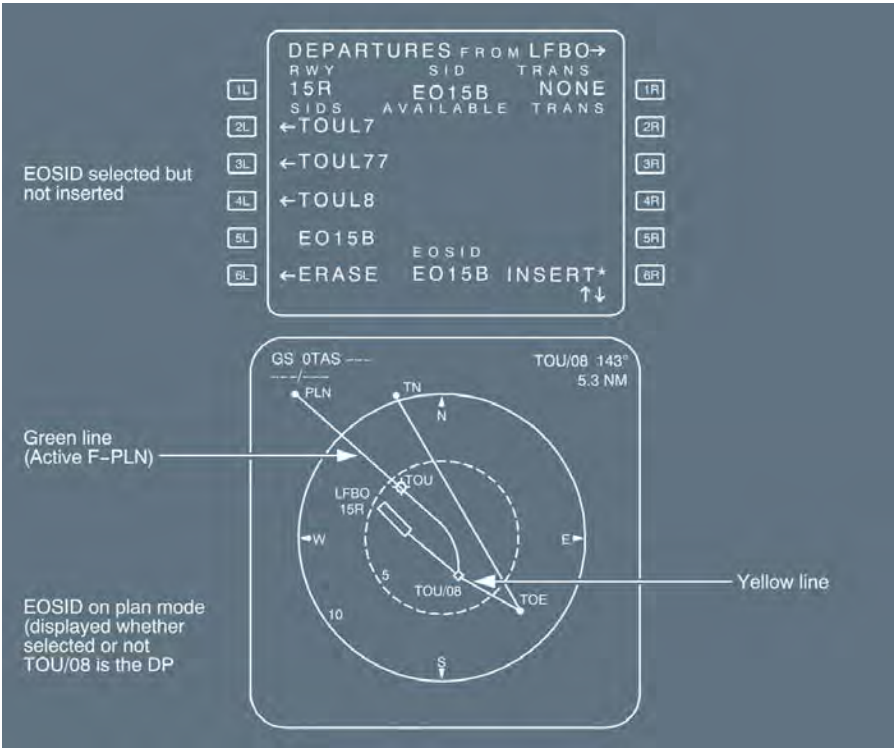
Ident.: DSC-22_20-60-40-A-00000942.0001001 / 14 MAY 12

GENERAL

An engine-out standard instrument departure (EOSID), when defined in the database, is always for a specific runway. It is indicated on the bottom line of the SID page for that runway, and you can select it manually.

The pilot can review the SID either by selecting the PLAN mode on the navigation display (solid yellow line), or by selecting it on the SID page. In the latter case, the navigation display shows the SID as a temporary flight plan.

The last point, if any, that is common to both the SID and engine-out SID is called the diversion point (DP).

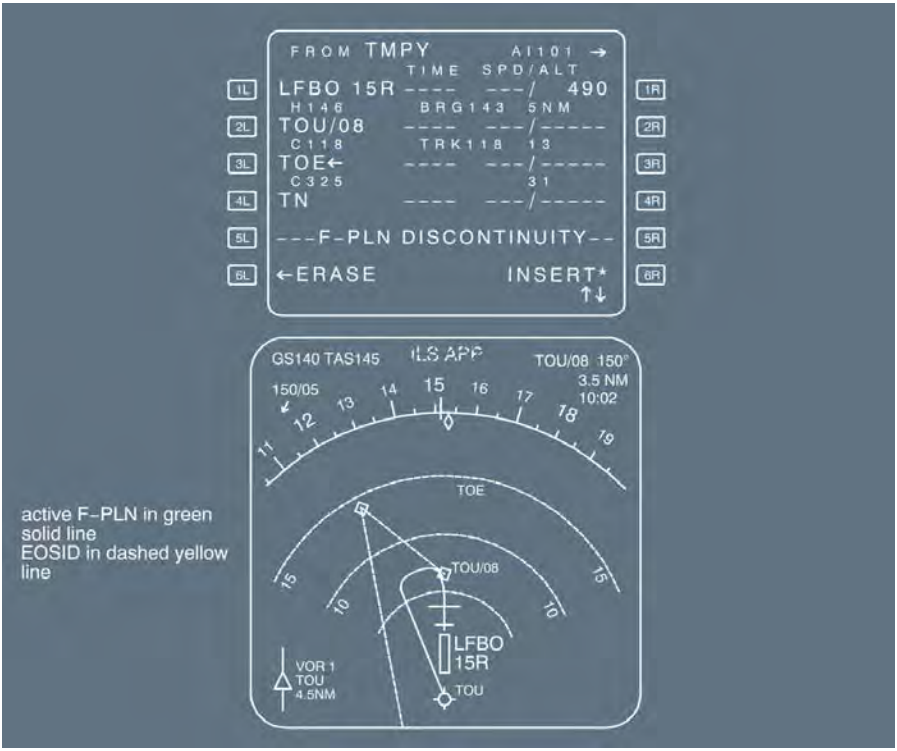


Ident.: DSC-22_20-60-40-A-00000943.0001001 / 14 MAY 12

WHEN AN ENGINE-OUT CONDITION OCCURS BEFORE THE DIVERSION POINT

The MCDU automatically shows the engine-out SID as a temporary flight plan on the F-PLN page and on the ND. The EOSID can be inserted or erased.

Note: *The EOSID Diversion Point is the waypoint at which the EOSID diverges from the active SID.*
If there is no common leg between the SID and the EOSID in the navigation database, the diversion point is by default the runway threshold. Therefore the SID and EOSID common leg(s) before the flight paths separation must be the same type and nature.

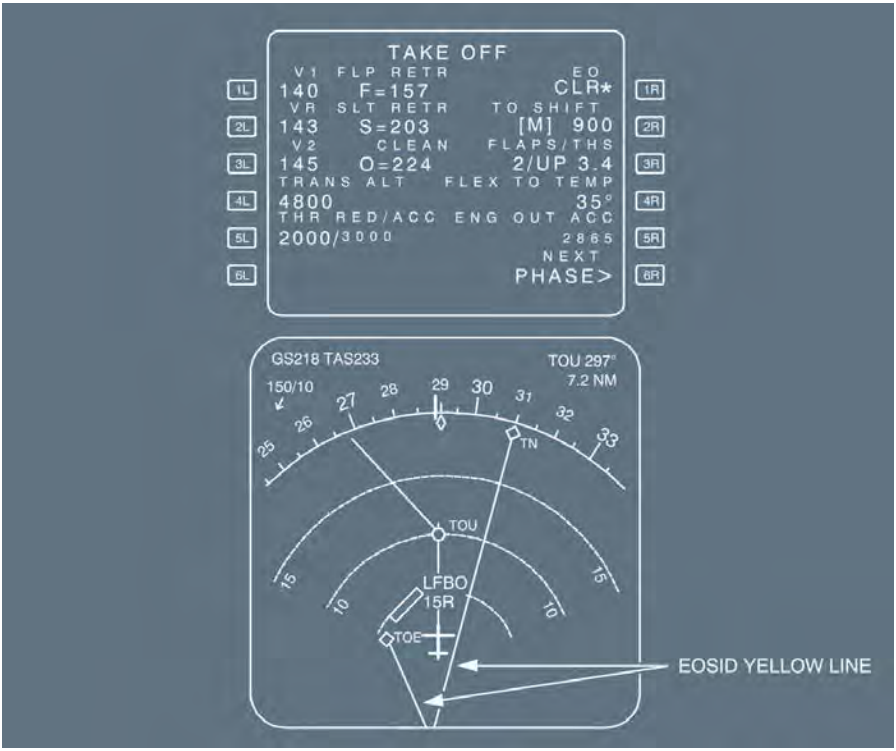


Ident.: DSC-22_20-60-40-A-00000944.0001001 / 14 MAY 12

WHEN AN ENGINE-OUT CONDITION OCCURS AFTER THE DIVERSION POINT

REMAIN on the SID path

Note: *The navigation display shows the engine-out SID as a yellow line for your information. Directing the aircraft to the EOSID should not be performed unless it allows obstacle clearance and the flight crew considers it is the best strategy for a particular case.*



Ident.: DSC-22_20-60-40-A-00000945.0002001 / 14 MAY 12

BELOW THRUST-REDUCTION (THR RED) ALTITUDE

- The managed target speed changes to V2
- The PROG page displays the engine-out maximum recommended altitude

- The PERF TO page comes up on the display automatically with the “EO CLR” prompt in the 1R field
- The MCDU and the navigation display show the engine-out SID as a temporary flight plan, or the navigation display shows it for information only, depending upon the diversion point location.

PROCEDURE

- **When the aircraft reaches the engine-out acceleration altitude**

  PUSH in the V/S knob to level off.

  CLEAN up your configuration as the speed increases toward target speed.

  When the aircraft is clean and has reached Green Dot speed, “LVR MCT” flashes on the FMA,

  PULL out the altitude selector knob to resume the climb.

  The OP CLB. mode engages.

  MOVE the thrust lever for the live engine to “MCT” detent.

Ident.: DSC-22_20-60-40-A-00000946.0006001 / 16 FEB 11

ABOVE THRUST REDUCTION (THR RED) ALTITUDE

- The managed target speed changes to V2
- “LVR MCT” flashes amber on the flight mode annunciator
- The PROG page displays the engine-out maximum recommended altitude
- The PERF TO page displays the “EO CLR*” prompt in the 1R field
- The navigation display shows the EO SID.

PROCEDURE

MOVE the thrust lever of the active engine to the MCT detent.

- **When the aircraft reaches the engine-out acceleration altitude:**
  PUSH the V/S knob, in order to level off.
  CLEAN UP configuration as the speed increases.
- **When the aircraft reaches Green Dot speed:**
  PULL the ALT knob to resume the climb.

  Note: *If necessary, move the thrust lever of the active engine to the TOGA detent. The Flight Mode Annunciator will display "LVR MCT", flashing in white, when the aircraft reaches Green Dot speed.*

ENGINE-OUT IN CLB PHASE (ABOVE ACCELERATION ALTITUDE)

Applicable to: ALL

Ident.: DSC-22_20-60-40-B-00000947.0003001 / 16 FEB 11

ENGINE-OUT OCCURS WHILE AIRCRAFT IS ACTUALLY CLIMBING

- The managed target speed changes to Green Dot speed
- "LVR MCT" flashes white on the Flight Mode Annunciator
- The climb mode reverts to open climb (OP CLB) and the aircraft slowly decelerates down to Green Dot speed
- The MCDU shows the PERF CLB page with an "EO CLR*" (clear engine-out) prompt
- The PROG page shows the engine-out maximum recommended altitude (EO MAX REC ALT).

PROCEDURE

MOVE the thrust lever of the active engine to the MCT detent.
SET the altitude on the Flight Control Unit to an altitude below the engine-out maximum recovery altitude, as cleared by ATC.
INITIATE a diversion, when cleared to do so.

Ident.: DSC-22_20-60-40-B-00000948.0001001 / 16 FEB 11

ENGINE-OUT OCCURS WHILE THE AIRCRAFT IS FLYING IN ALT MODE AT AN ALTITUDE SET ON THE FLIGHT CONTROL UNIT

- The target speed is set to engine-out cruise speed (EO CRZ SPD), computed at the altitude set on the Flight Control Unit, but limited by the limit speed (SPD LIM), if there is one.

Other consequences and procedures are similar to previous engine out climb.

ENGINE-OUT IN CRUISE PHASE

Ident.: DSC-22_20-60-40-00000949.0001001 / 21 MAR 17
Applicable to: ALL

- The system sets the managed target speed to the higher of engine-out cruise Mach number or speed, or current speed.
- "LVR MCT" (or MCT) flashes on the Flight Mode Annunciator.
- The PERF CRZ page appears with the "EO CLR*" (clear engine-out) prompt.
- The PROG page displays the engine-out maximum recommended altitude (EO MAX REC ALT).

PROCEDURE

Perform engine out abnormal procedure.
Refer to PER-OEI-GEN INTRODUCTION "SINGLE ENGINE OPERATIONS"

- *For standard strategy,Refer to FCTM/PR-AEP-ENG Engine Failure During Cruise*
- *For obstacle strategy,Refer to FCTM/PR-AEP-ENG Engine Failure During Cruise*
- *For fixed strategy, Refer to FCTM/PR-AEP-ENG Engine Failure During Cruise*

Initiate a diversion if necessary.

Note: *The engine-out descent strategy requires disconnection of the autothrust, and descent in OPEN DES mode.*
Disconnecting the autothrust prevents an automatic setting of THR IDLE; therefore, the autopilot will fly the target speed in OP DES mode, with a thrust manually selected by the crew.
When reaching the FCU-selected altitude, or whenever normal descent is resumed to a lower altitude, reengage the autothrust.

ENGINE-OUT IN DESCENT PHASE

Ident.: DSC-22_20-60-40-00000951.0001001 / 16 FEB 11
Applicable to: ALL

- The managed target speed remains unchanged (ECON DES Mach number or speed, with any speed limitations).
- "LVR MCT" (or MCT) flashes on the Flight Mode Annunciator.
- The PERF DES page appears, showing the "EO CLR*" prompt.
- The PROG page displays the engine-out maximum recommended altitude (EO MAX REC ALT).
- The descent mode (if engaged) reverts to V/S, if the aircraft is above the EO REC MAX. If not, the descent mode is maintained.

PROCEDURE

MOVE the thrust lever for the live engine to the MCT detent.
If necessary, SELECT a suitable flight mode for descent.
DISCONNECT the autothrust and ADJUST thrust if necessary.

ENGINE-OUT IN APPROACH PHASE

Ident.: DSC-22_20-60-40-00000952.0001001 / 04 JUL 17
Applicable to: ALL

- The aircraft maintains approach speed (VAPP).
- "LVR MCT"(or MCT) flashes on the Flight Mode Annunciator.
- The PERF APPR page appears, showing the "EO CLR*" prompt.
- The progress page displays the engine-out maximum recommended altitude (EO MAX REC ALT).

PROCEDURE

MOVE the thrust lever for the live engine to the MCT detent.

CAUTION	Below maneuvering speed (F, S, Green Dot) – 10 kt, the autopilot or flight director (AP/FD) cannot order a bank angle greater than 15 °. Above maneuvering speed – 10 kt, this limit linearly increases until it reaches: - In selected lateral guidance: 25 ° at maneuvering speed – 3 kt. The limit is then 25 ° for all speeds above maneuvering speed – 3 kt. - In managed lateral guidance: 30 ° at maneuvering speed – 3 kt. The limit is then 30 ° for all speeds above maneuvering speed – 3 kt.

ENGINE-OUT IN GO-AROUND PHASE

Ident.: DSC-22_20-60-40-00000953.0002001 / 16 FEB 11
Applicable to: ALL

The results and procedures for takeoff phase apply, except that the displays do not show the engine-out SID.

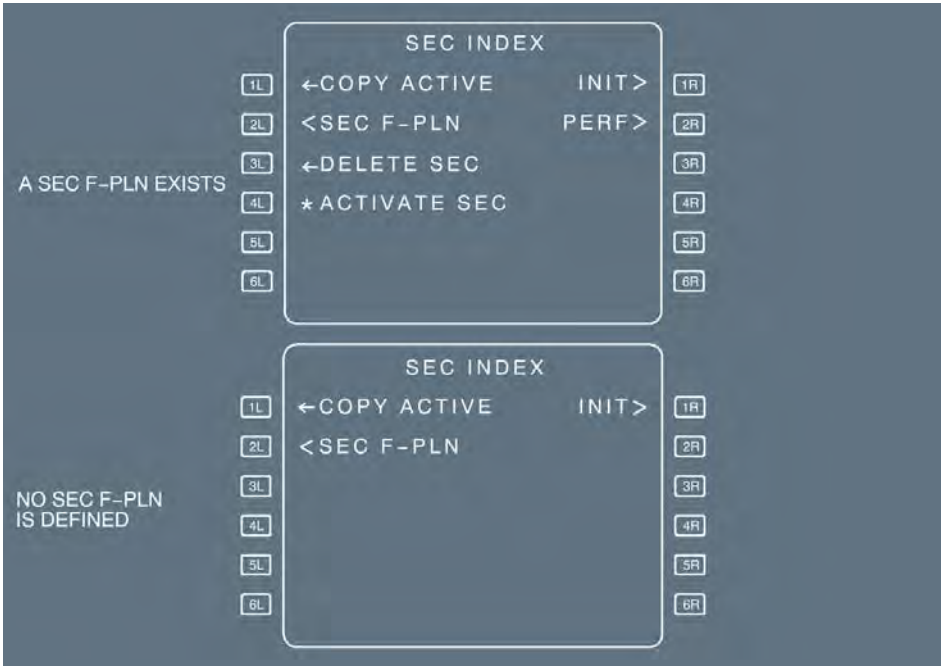
SECONDARY FLIGHT PLAN

Ident.: DSC-22_20-60-50-00000954.0011001 / 14 MAY 12
Applicable to: ALL

The secondary flight plan (SEC F-PLN) is an alternative flight plan which can be activated when required.
It may include all the vertical elements except history wind data.

The flight crew can:
- Create a secondary flight independently from the active flight plan (a secondary flight plan can be created while a temporary flight plan exists).
- Copy it from the active flight plan.
- Delete it completely.

- Activate it, when the “ACTIVATE SEC” prompt is displayed: The secondary flight plan becomes the active flight plan.



- The screen displays the “ACTIVATE SEC” prompt in flight if:
  - HDG (or TRK) mode is engaged, or
  - NAV mode is engaged, and the active leg of the primary and secondary flight plans is the same.

  The FMS sequences the secondary flight plan the same way as the active flight plan, when it is a copy of the active flight plan.

The navigation display shows the secondary flight plan in white. In PLAN mode, the crew can use the slew keys to review the secondary flight plan (as for the primary flight plan).

PREDICTIONS

The FMGS computes predictions using the same performance methods and performance factor it uses for the active flight plan. However, it predicts pseudo waypoints only for the MCDU not for the Navigation Display (ND).

- **When the flight crew initializes the secondary flight plan with the SEC INIT function:**
  The FMGS computes the secondary flight plan predictions as if the aircraft were on ground before engine start. The FMGS computes these predictions one time and does not update them to indicate the progress of the flight (aircraft position, fuel consumption, etc.).
- **When the flight crew initializes the secondary flight plan with the COPY ACTIVE function:**

  The FMGS computes the secondary flight plan predictions as for the active flight plan. However:
  - The FMGS stops the update of the predictions if the first leg of the active flight plan is no longer the same as the active leg (i.e. if both flight plans diverge). The flight phase is the same as the flight phase at the time of the divergence.

    Note: *This does not apply to the preflight phase, when the FMGS computes the predictions if the departure airports are the same, even if the takeoff runways are different.*

- **The flight crew may use the secondary flight plan in the following cases:**
  - At takeoff when an alternate takeoff runway is probable
  - On ground to initialize the FMGS again if the flight that the flight crew initially prepared is replaced by another flight (*Refer to PRO-NOR-SRP-01-05 Introduction*)
  - In flight to prepare a diversion
  - In flight when an alternate landing runway is probable
  - To prepare the next flight.

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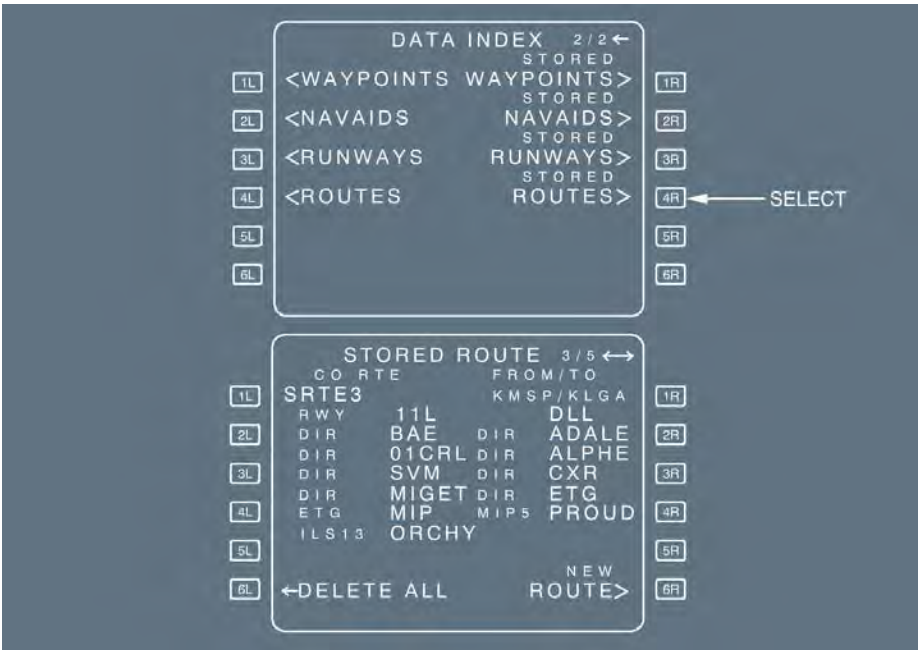
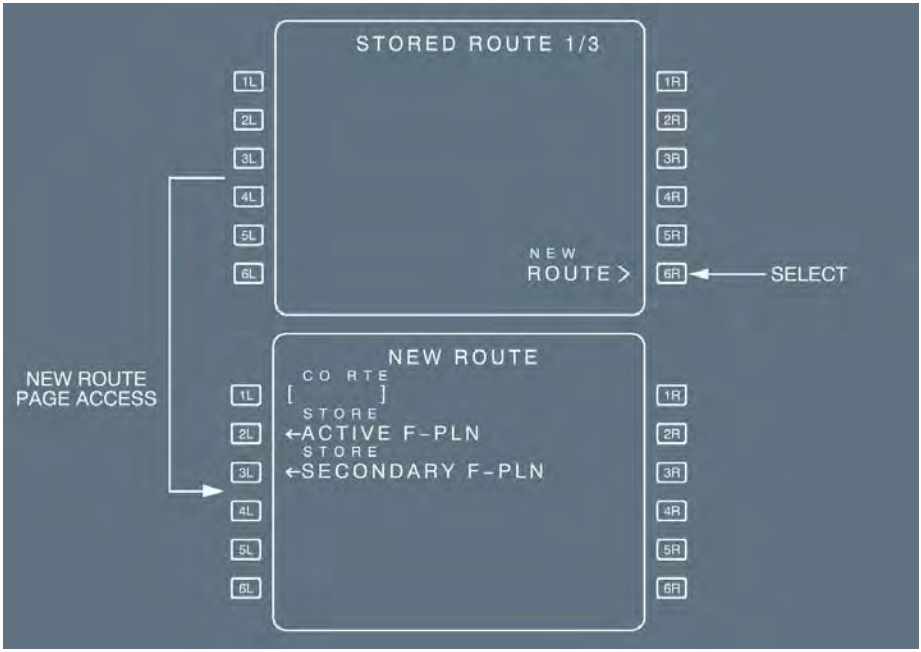
STORED ROUTE FUNCTION

Ident.: DSC-22_20-60-60-00000955.0002001 / 01 OCT 12
Applicable to: ALL

The stored route function allows the pilot to store or review as many as five different routes defined in an active or secondary flight plan.
This also allows the pilot to store a company route that is not yet in the database, but is expected to be flown several times (a charter route, for example).
Access the STORED ROUTES page from the DATA INDEX page.

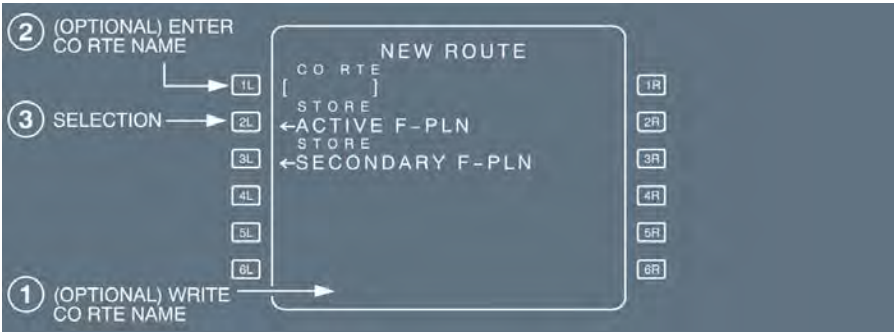


A stored route can be reviewed by using the slew key.
In order to store a new route, first define the route through the active flight plan (on the ground only) or the secondary flight plan (on the ground or in flight) then proceed as described below.



HOW TO STORE THE ACTIVE FLIGHT PLAN (DURING PREFLIGHT ONLY)

SELECT the DATA key on MCDU
PRESS the “STORED ROUTES” key
PRESS the “NEW ROUTE” key
ENTER the name of the company route (optional).
PRESS the “STORE ACTIVE F-PLN” key



HOW TO STORE THE SECONDARY FLIGHT PLAN

SELECT the DATA key on MCDU
PRESS the “STORED ROUTES” key
PRESS the “NEW ROUTE” key
ENTER the company route name (optional)
PRESS the “STORE SECONDARY F-PLN” key

Note:
1. *In either case, you may only store a company route if the active or secondary flight plan is complete from origin to destination.*
2. *If you do not enter a name, the FMGS automatically names the stored route as “SRTE 1 (or 2 ...)” when it is stored.*
3. *The system does not retain several elements of the flight plans, when they are stored:*
   - *Pilot-entered holds*
   - *Offsets*
   - *Pilot-entered constraints*
   - *Modifications to a terminal procedure*
   - *Pseudo waypoints*

   When this happens, it displays “REVISIONS NOT STORED”.
4. *If five routes are already stored the system will reject a new entry and display “STORED ROUTES FULL” on the MCDU. Delete one stored route by clearing the CO RTE name before inserting a new one.*

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GENERAL

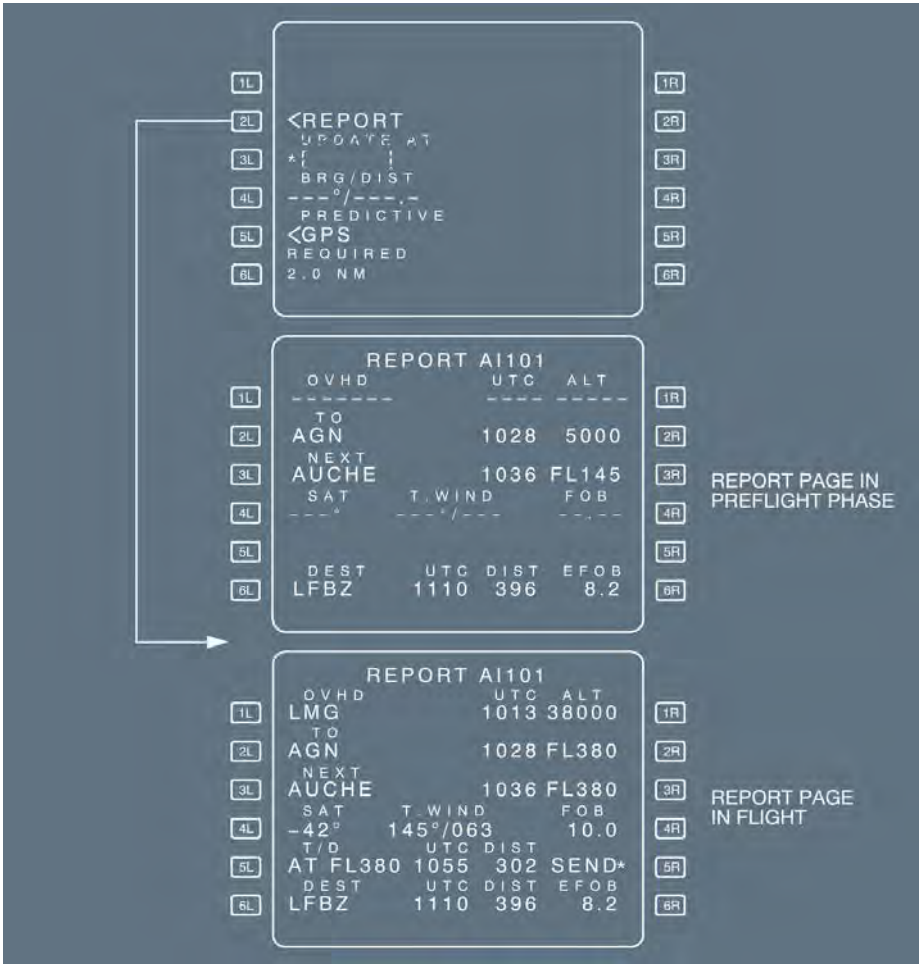
Ident.: DSC-22_20-60-70-00006017.0001001 / 16 FEB 11
Applicable to: ALL

The REPORT page allows the crew to achieve the position reporting.

REPORT PAGE ACCESS

Ident.: DSC-22_20-60-70-00009524.0008001 / 29 SEP 15
Applicable to: ALL

The report page is accessed from the PROG PAGE.



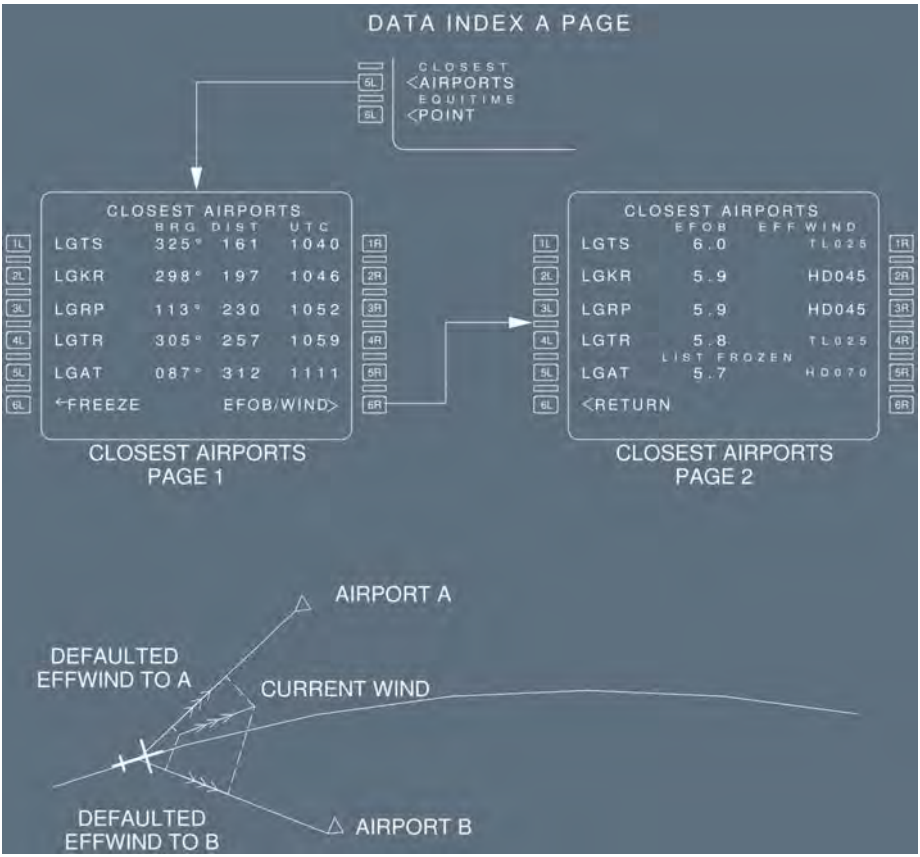
Note: *In case a DIR TO with ABEAM WPTs is achieved, or in case a FIX INFO with ABEAM or RADIAL/CIRCLE intersection is inserted in the F-PLN, the TO WPT (provided on the REPORT page) will be the ABEAM WPT or the RADIAL/CIRCLE intersect waypoint, if any, as on the F-PLN page.*

CLOSEST AIRPORTS

Ident.: DSC-22_20-60-80-00006018.0001001 / 07 APR 11
Applicable to: ALL

The CLOSEST AIRPORTS page displays the four closest airports, from the position of the aircraft, found in the navigation database (*Refer to DSC-22_20-50-10-25 Closest Airports Pages*for the page description), and the 5th airport, as selected by the crew.

For each airport, the FM computes:
- The BRG/DIST/ESTIMATED UTC from the position of the aircraft to the corresponding airport.
- The EFOB at the airport, assuming an EFFECTIVE WIND (defaulted or entered by the pilot).



Note: *When the CLOSEST AIRPORTS page 2 is selected, the list of airports is automatically frozen, as indicated on the page.*

The FUEL/TIME predictions to the closest airports use simplified assumptions:

- Managed speed profile in cruise, with the effective wind from the CLOSEST AIRPORTS page 2. In case of EO, Engine Out condition is considered.
- Continuous descent from CRZ FL down to the airport elevation.

Note: *In case SELECTED SPD is used, the CLOSEST AIRPORTS page still provides good use to choose the applicable closest airport for diversion purposes. However, when SELECTED SPD is significantly different from MANAGED SPD, the predictions in terms of time and fuel must be disregarded since they are misleading.*
The predictions may then be checked on the SEC F-PLN.

GENERAL

Ident.: DSC-22_20-60-90-00006019.0001001 / 16 FEB 11
Applicable to: ALL

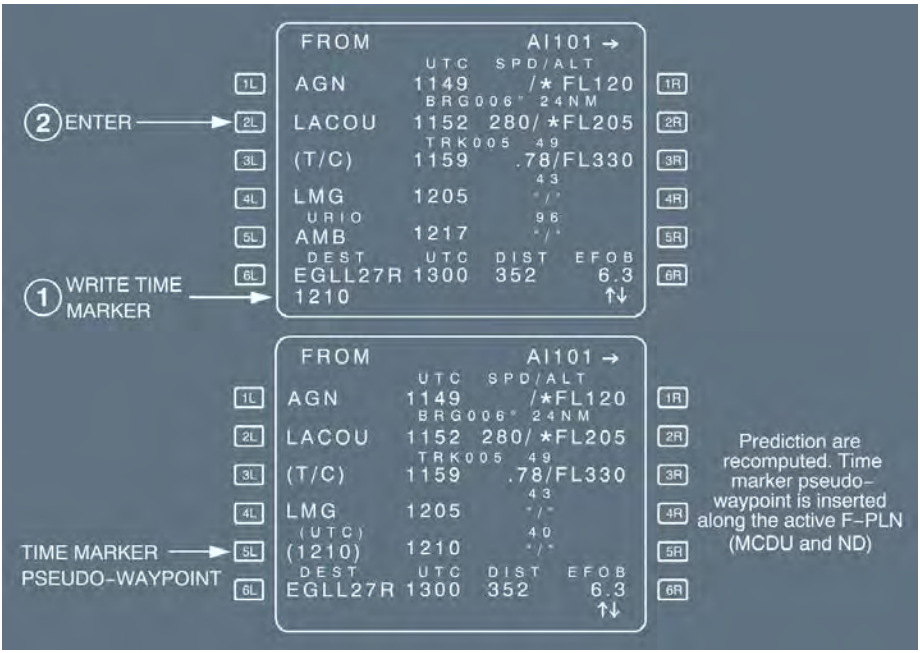
The crew can enter a time marker in the F-PLN A or B page. Once entered, the FMGS displays a pseudo waypoint along the flight plan on the MCDU and on the Navigation Display. This pseudo waypoint shows the predicted location of the aircraft at the entered time.

HOW TO INSERT A TIME MARKER

Ident.: DSC-22_20-60-90-00009522.0001001 / 01 OCT 12
Applicable to: ALL

WRITE the time marker in the scratchpad. The entry format is HHMM.
SELECT any left key of the F-PLN A or B page, to insert the time marker in the active flight plan.

The time marker is inserted in the flight plan according to time criteria, irrespective of the key chosen for entry.



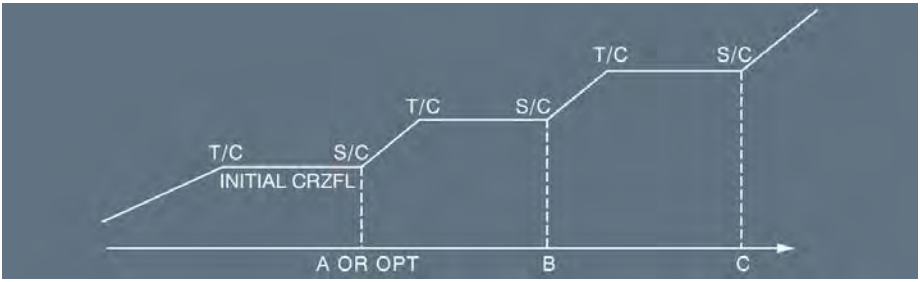
Up to four time markers may exist at a time. An attempt to enter a fifth time marker will cause the "TIME MARKER LIST FULL" message to appear on the scratchpad.

The FMGS updates the time marker position with the predictions.
When the current clock time equals or exceeds the time marker entry, the FMGS sequences the time marker (even in preflight).

STEP CLIMB/STEP DESCENT

Ident.: DSC-22_20-60-100-00006020.0012001 / 12 APR 17
Applicable to: ALL

The STEP ALTS function enables to define the successive cruise Flight Levels. The optimum position to initiate a climb, from the initial (or current) cruise Flight Level to the next one, can also be determined.



PRINCIPLE

GEOGRAPHIC STEPS

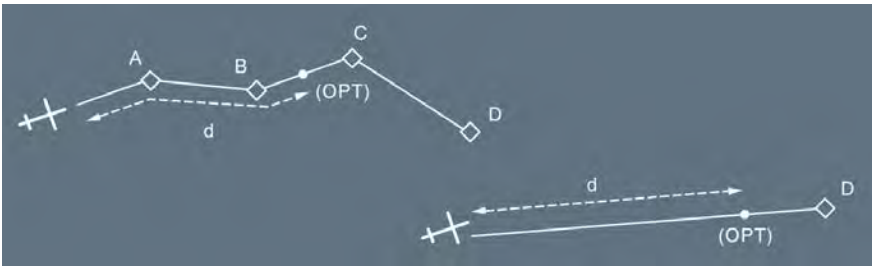
Up to four geographic steps may be defined on the STEP ALTS page. These steps are initiated at the geographical position, along the F-PLN.

Rules

- The minimum step size is 1 000 ft.
- A Step Climb (S/C) cannot follow a Step Descent (S/D).
- A STEP is automatically cleared, if:
  - The S/C (S/D) is sequenced without any level change done by the crew.
  - The crew achieves a LAT REV, which deletes the associated waypoint from the F-PLN
  - By EO condition.
- A STEP is manually cleared:
  - On the STEP ALTS page, by CLEARING the corresponding field.
  - On the F-PLN page, by CLEARING the (S/C) or (S/D) pseudo-waypoints.
- A STEP entry is IGNORED, if the remaining CRZ distance is less than about 50 NM.
- Once the steps are inserted in the F-PLN, they are displayed:
  - On the MCDU, as (S/C), (S/D), (T/C), (T/D) pseudo waypoints.
  - On the ND, by associated , , , white symbols.

OPTIMUM STEP

When geographic steps are inserted, or an altitude is entered, the FM proposes an OPTIMUM STEP start of climb position for the first step climb altitude ahead. Predicted FUEL and TIME savings are displayed when calculated to be greater than 100 kg or 1 min respectively. If no savings are found, no optimum step is proposed.
The OPT STEP is not automatically inserted. The crew must insert it, if appropriate. Once inserted, the OPT STEP point (OPT) becomes a fixed geographical point.
If some F-PLN parameters are subsequently changed (e.g. winds, new waypoints), an update of the optimum position relative to the previous one may be proposed. If savings exist, this new optimum may be inserted to replace the previous optimum step point.
Once an OPT STEP is inserted in the F-PLN, and the crew achieves a lateral F-PLN revision, the FM keeps the (OPT) along the new F-PLN, at the same distance from the aircraft's position, as previously determined.



Rules

- The OPT STEP is only computed by the FM, if data required for the prediction computation are inserted : F-PLN, CRZ FL, CI, GW, CG at least.
- The search of the OPT STEP begins 20 NM beyond (T/C) before Cruise, or ahead of the aircraft's position.
- The search of the OPT STEP ends 20 NM before the next STEP POINT, or 300 NM before the (T/D).
- Only one OPT STEP is computed at a time.

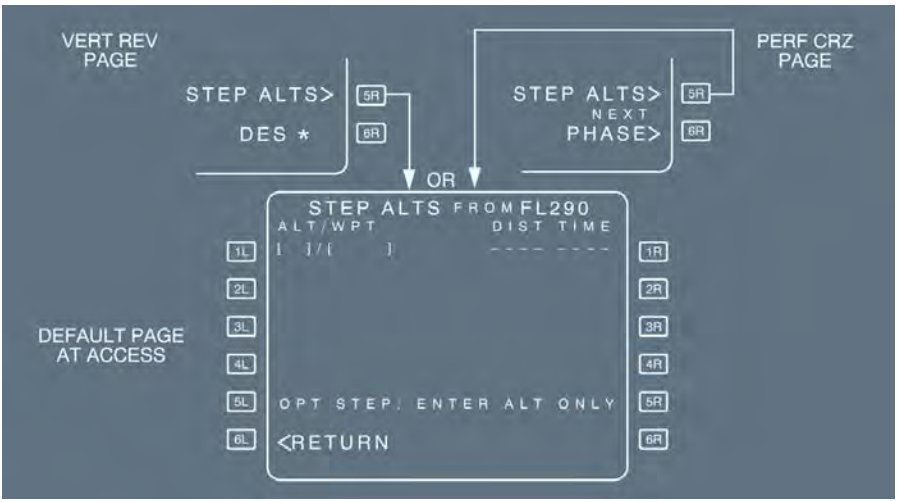
Guidance

When reaching the step point, the steps must be initiated by the crew by selecting the new CRZ FL, and pressing the FCU ALT selector knob. If sequenced without any crew action, the step is automatically deleted.

If the crew initiates the step:
- The CRZ FL is automatically reassigned to its new value.
- The guidance is THR CLB/CLB for a step climb.
  THR IDLE/DES with V/S = -1 000 ft/min for a step descent.

STEP ENTRY

The STEP ALTS page is either accessed from the : - The VERT REV page, or
- PERF CRZ page.



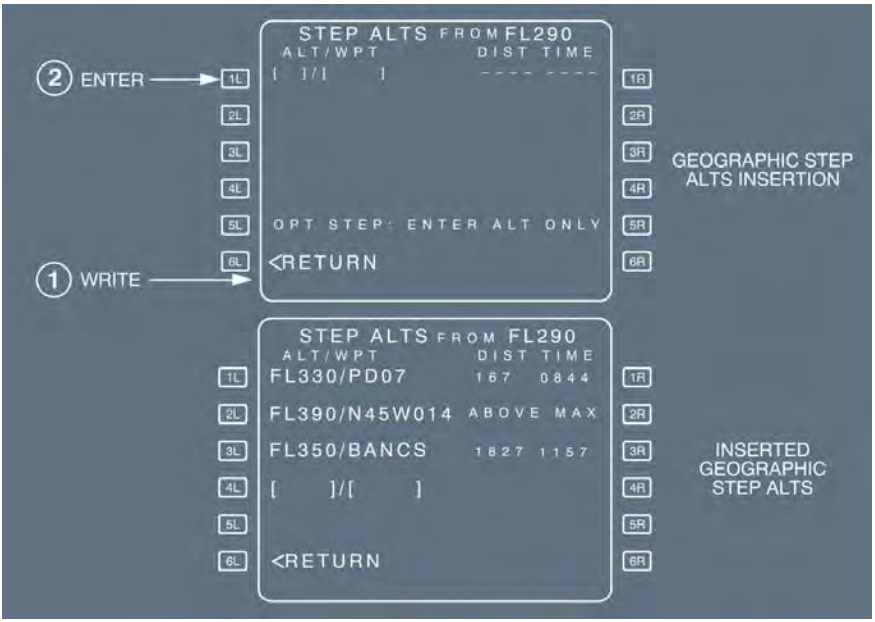
FOR GEOGRAPHIC STEP:

PRESS the F-PLN or PERF key.
SELECT vertical revision at a cruise waypoint.
SELECT the STEP ALTS prompt.

WRITE the ALT/WPT in the scratchpad, and ENTER it in [1L] to [4L].

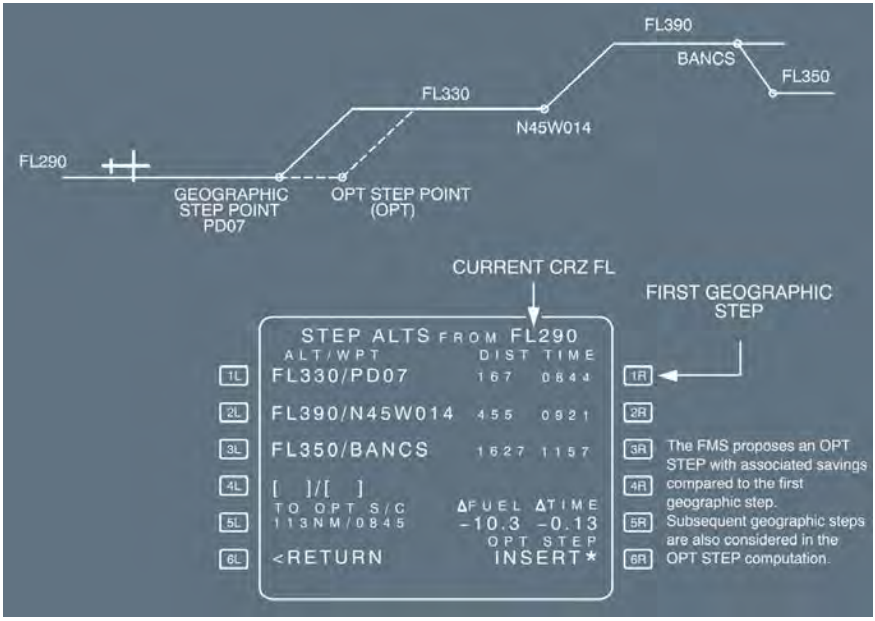
Note:
- *The position may be a waypoint ident, PBD, PD.*
- *The pilot may enter FL 350/LMG/–20. The FM will compute the geographic step 20 NM before LMG to FL 350.*
- *To modify an inserted STEP:*
  - *To modify the CRZ FL only, enter it in the left key, as "FLXXX".*
  - *To modify the position only, enter it in the left key, as "/XXX".*
  - *To modify both, modify the position first, and then the CRZ FL (it is not possible to modify both in a single entry).*

CHECK the PREDICTIONS.



FOR OPTIMAL STEP

Once all geographical steps are inserted, and the predictions are available, the STEP ALTS page displays the FUEL/TIME savings for the first step climb. If no significant savings are predicted, the NO OPTIMAL message is displayed.



To INSERT the proposed OPT STEP displayed in [5L]:

SELECT the INSERT* prompt in [6R].

The computed (OPT) step replaces the initially inserted step position, and is then considered at a fixed geographic position. Savings are no longer displayed, and the UPDATE* prompt replaces the INSERT* prompt. This prompt allows the crew to update the (OPT) step position, considering possible F-PLN or inserted wind changes.

If pressed, a new OPT point is proposed, with the associated SAVINGS and INSERT prompt, or NO OPTIMAL.
UPDATE prompt has been pressed, the new OPT STEP point gives additional savings:

THERE ARE ONLY 2 CRZ FLS IN THE F-PLN:

The pilot may obtain the OPT position of the STEP point, as follows:

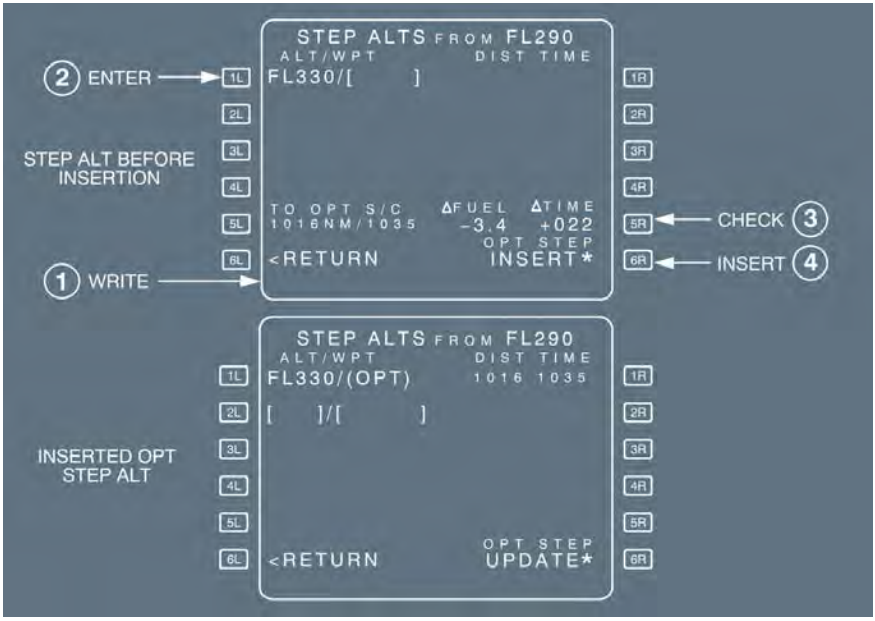
INSERT the initial cruise FL on the INIT A page.
ENSURE that the ZFW, ZFWCG and BLOCK fuel are inserted on the INIT B page.
WRITE the new CRZ FL in the STEP ALTS page, in the [1L] field.

Distance and time to optimum point and fuel/time saving are displayed.

CHECK the fuel and time savings and prediction on the [5R] field.

Savings are computed by comparing the entered step altitude, and the origin altitude of the step.

INSERT, if suitable.



Note: *No OPT STEP is available in the SEC F-PLN.*

MESSAGES

Messages may be displayed in the DIST/TIME field:

- "ABOVE MAX", if the inserted step altitude exceeds the REC MAX ALT.
  The "STEP ABOVE MAX FL" scratchpad message is associated to the "ABOVE MAX" message.
- "IGNORED"

  This message is displayed in the following cases:
  - Step climb is located prior to the top of climb, or after the top of descent.
  - Step end is at less than 50 NM from the top of descent. An optimum step point, < 200 NM from top of descent, cannot be inserted

- "STEP AHEAD", when the distance to the step point is less than 20 NM . A "STEP AHEAD" scratchpad message is also displayed.
  The following message may be displayed in the scratchpad:
- "NOT ALLOWED", if:
  - Four steps already exist in the F-PLN, and an additionnal entry is attempted.
  - Any attempt to enter a step at the FROM waypoint, or at a pseudo waypoint is done.
  - Two consecutive steps are entered at the same waypoint (e.g. step climb after step descent).

GENERAL

Ident.: DSC-22_20-60-110-00006021.0001001 / 01 OCT 12
Applicable to: ALL

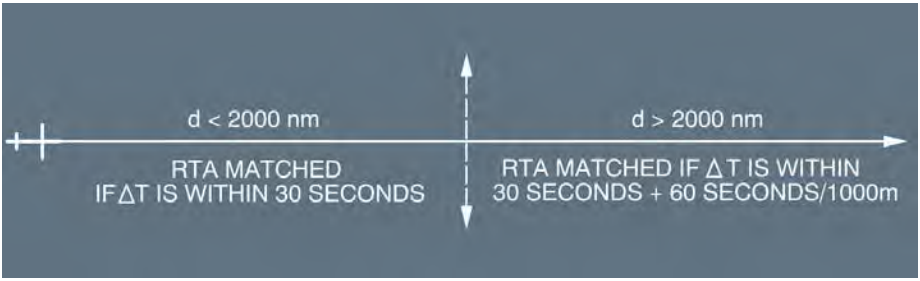
A time constraint (RTA) may be assigned at any waypoint of the F-PLN, downpath of the origin and the FROM waypoint. It can be an "AT", "AT OR BEFORE", or "AT OR AFTER" constraint.
The FMS computes a new managed speed profile from the aircraft position to the constrained waypoint, in order to match the 30 s difference (ΔT) between the time predicted at the constrained waypoint and the RTA. This modified managed speed profile can be checked using the speed prediction, displayed for each waypoint of the F-PLN page.
The RTA function uses a speed range between Green Dot speed and VMO - 10 (or MMO - 0.02).
When the constrained waypoint is sequenced, the ECON SPD/MACH is resumed unless the constrained waypoint is located in a descent segment.

Note: *The FM does not compute a new managed speed profile when a RTA is entered in the descent profile while the aircraft is in cruise within 40 NM from the top of descent.*

The time constraint is inserted on the RTA page. A time constraint may be inserted at any waypoint of the primary or secondary flight plan.
If an engine-out condition is detected, the time constraint is automatically deleted and RTA DELETED message on scratchpad.
If the aircraft enters a holding pattern, the downpath time constraint is deleted.
Once inserted in the F-PLN, the RTA is displayed in magenta on the F-PLN page, as long as no predictions are available.

Once the predictions are available, the time constraint is replaced by the new predicted time at the associated waypoint, and highlighted by a star: (*)
- The (*) is magenta, if the time constraint is matched with the 30 s criteria.
- The (*) is amber, if the time constraint is missed.

Time constraint matching criteria:



Note: *ΔT is the time difference between the time predicted at the constrained waypoint and the RTA.*

TIME CSTR ENTRY

PRESS the F-PLN key.
SELECT vertical revision at the revised waypoint.
SELECT the RTA key.
ENTER a waypoint at which a time constraint is to be defined.
WRITE the time constraint (+/–HHMMSS) into the scratchpad and ENTER
The display automatically reverts to the F-PLN A page.

Note:
- *The TIME CSTR can be directly cleared on the F-PLN A page, using the CLR key.*
- *The time constraint is automatically deleted in the following cases:*
  - *Engine out, or*
  - *When entering a holding pattern, or*
  - *In case of Go-Around, or*
  - *A time constraint is entered at another waypoint, while another time constraint already exists.*

A scratchpad "RTA DELETED" message is displayed.

ESTIMATED TAKEOFF TIME (ETT)

Ident.: DSC-22_20-60-110-00009523.0001001 / 23 JUN 15
Applicable to: ALL

The Estimated Takeoff Time (ETT) may be entered by the pilot during the preflight phase at the origin airport. This time is used as the initialization time for predictions.
The entry is accepted in the preflight phase, if the ETT is greater than the clock time.

PROCEDURE

PRESS the F-PLN key
SELECT a vertical revision at origin
SELECT the RTA page
WRITE the ETT into the scratchpad, and ENTER in the ETT field.

The display automatically reverts to the F-PLN A page.

Note: - *If the current time exceeds the ETT entry, the CLK IS TAKE OFF TIME message is displayed ; the ETT is replaced by the clock time.*
- *At takeoff, the takeoff time is automatically updated using the actual clock time.*
- *An ETT entry is automatically deleted, if the origin airport is modified, or if the clock is inoperative.*
- *If a time constraint is entered at a waypoint in the F-PLN, the takeoff time required to match the constraint is automatically computed by the FM. This result is displayed in magenta as ETT at the origin.*

USE OF TIME/ETT CONSTRAINT

During preflight :
- If an ETT has been entered, time predictions are based on the entered value (or clock time, if greater).
- If both an ETT and a time constraint have been entered, time predictions are based on the entered ETT value (or clock time, if greater). The managed speed profile is computed to match the time constraint, as closely as possible, using a pseudo cost index value. (Not displayed).
- If only a time constraint has been entered:
  - Optimum speeds are computed to determine the ETT, so as to satisfy the time constraint.
  - If necessary, flight time (based on optimum speeds) plus clock time (current) is greater than the time constraint ; optimum speeds are modified to match the time constraint as closely as possible.

After Takeoff : The predictions are based on the current time.
Speeds are adjusted to satisfy the time constraint.

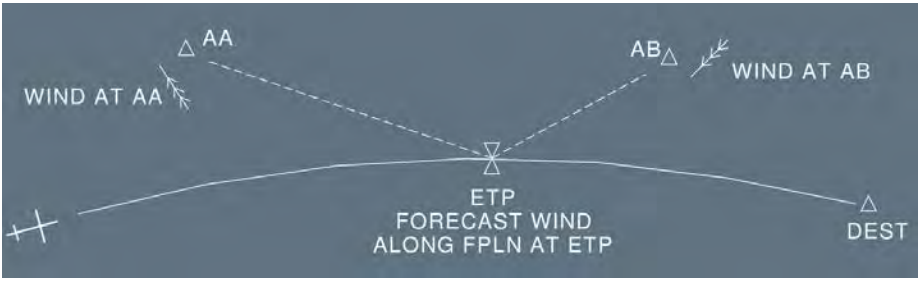
Intentionally left blank

EQUITIME POINT

Ident.: DSC-22_20-60-120-00006015.0001001 / 16 MAR 11
Applicable to: ALL

The equitime point page displays the ETP, computed along the F-PLN route between two referenced positions (airports, waypoints or navaids), defined by the pilot (*Refer to DSC-22_20-50-10-25 Equi - Time Point Page* for the page description).
When first accessing the page, the FMS proposes origin and destination airfields, as defaulted positions.
The pilot may overwrite these two positions and insert the wind in their vicinity at the applicable CRZ FL.
The FMS then computes the resulting ETP, using the managed or selected speed, and blending the forecasted winds along the F-PLN route with the inserted winds.

The FMS provides:
- TIME and DIST from the aircraft position (or origin on ground) to the ETP
- The BRG/DIST from the ETP to the defined positions
- TIME overhead each position, assuming the aircraft flies from the present position to the defined position via the ETP
- (ETP) pseudo waypoint is displayed on the ND along the F-PLN
- ETP location in relation to the subsequent waypoint.



EQUITIME POINT ENTRY

Ident.: DSC-22_20-60-120-00009536.0001001 / 01 OCT 12
Applicable to: ALL

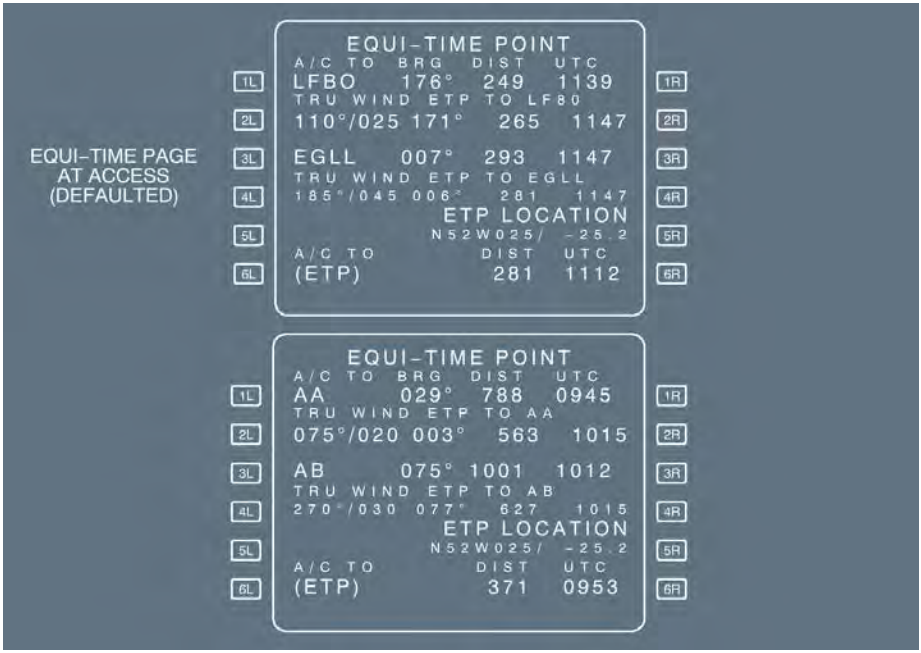
PRESS the DATA key.
SELECT the EQUI-TIME POINT prompt.
The EQUI-TIME POINT page is displayed. The origin and destination airports are used by default.
ENTER the REF POINT 1 in the [1L] field.

ENTER the associated wind in the [2L] field.

The wind to be inserted is the wind in the vicinity of the reference point at the CRZ FL.

ENTER the REF POINT 2 in the [3L] field.
ENTER the associated wind in the [4L] field.

The system displays the ETP location with regards to the next waypoint of the active flight plan following the ETP in the [5R] field, and the A/C TO (ETP) predictions in the [6R] field.



Note: - *The ETP pseudo-waypoint is not displayed on the MCDU F-PLN page. In order to easily locate it, or when closing the applicable ETP, the TIME MARKER may be used; this allows the crew to visualize it in advance on the F-PLN page or, to prepare the next applicable ETP on the Equi-time Point page*
- *The ETP is computed using speed according to the current mode (managed or selected).*

GENERAL

Ident.: DSC-22_20-60-130-00012906.0011001 / 24 FEB 14
Applicable to: MSN 3408-4547

The MCDU NAV B/UP allows to link a MCDU to its associated IRS in order to allow the flight crew to monitor the navigation and to be provided with some basic flight planning functions in case of FM 1 + 2 failure.

CAUTION	The MCDU NAV B/UP is to be used only in case of FM 1 + 2 failure. It can be selected temporarily in case of FM1 or 2 only failure, in order to ensure that the function is available on the failed side. When in MCDU NAV B/UP on both sides, one FG at least must be available to engage AP and A/THR.

The MCDU NAV B/UP function provides:
- Aircraft position using onside IRS or IRS 3
- Aircraft position using GPIRS ◁ position
- F-PLN as memorized in the MCDU
- F-PLN display on ND
- F-PLN automatic sequencing
- Limited lateral revisions
- Mag (True) bearing depending on the pilot selection, from aircraft position to the TO WPT and associated distance
- True track between waypoints
- Time estimates computed with current GS from onside IRS
- Total time and distance to destination

The following features are not provided:
- No DATA BASE available:
  - No autotuning, NAVAIDS must be selected on RMP
  - No radio position
  - No EFIS CTL PANEL options
  - No LDG ELEV (must be manually selected on overhead panel).
- No performance data:
  - No CLB/DES/APP NAV/FINAL modes
  - No SPEED MANAGED
  - No automatic SPD/MACH change over.
- Most of predictions are lost:
  - No EFOB
  - No XTRA
  - No ETA at DEST.
- No multiple lateral F-PLN

- No AP/FD managed modes
- No crosstalk between MCDUs: F-PLN revisions have to be achieved on both MCDUs.

BACK UP NAV SELECTION

Applicable to: MSN 3408-4547

Ident.: DSC-22_20-60-130-A-00012907.0011001 / 16 FEB 11

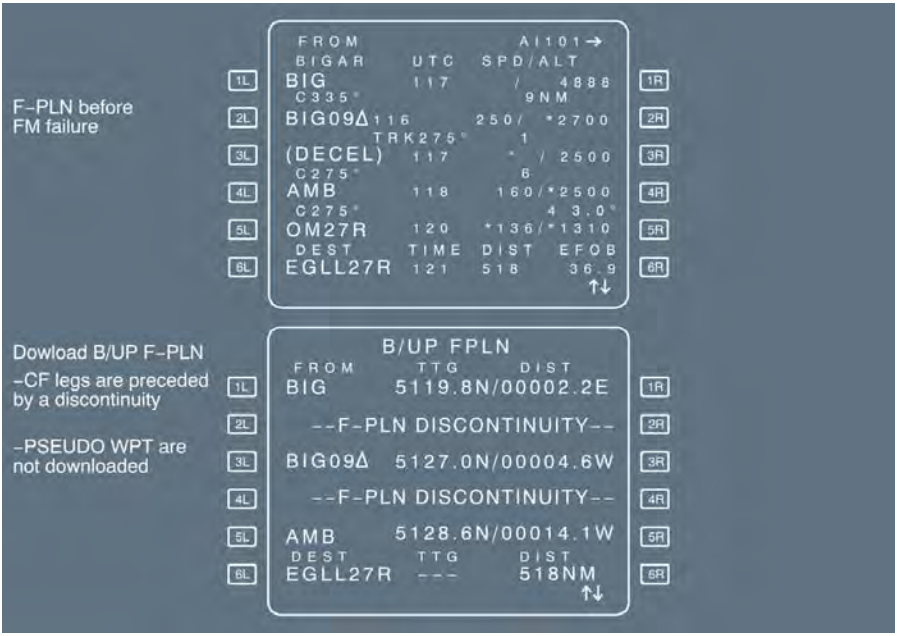
FM F-PLN DOWNLOAD IN MCDU

While BACK UP NAV is not active, the FM downloads permanently a condensed form of the F-PLN in the MCDU.

Downloaded information include:
- Waypoint position
- Waypoint identifier
- Leg type
- Discontinuity
- Overfly
- Turn direction.

Heading legs, course to fix legs, ..., computed INTCPT positions, pseudo waypoints, ..., cannot be downloaded.
They are replaced by discontinuities.
Maximum of 150 waypoints are downloaded.

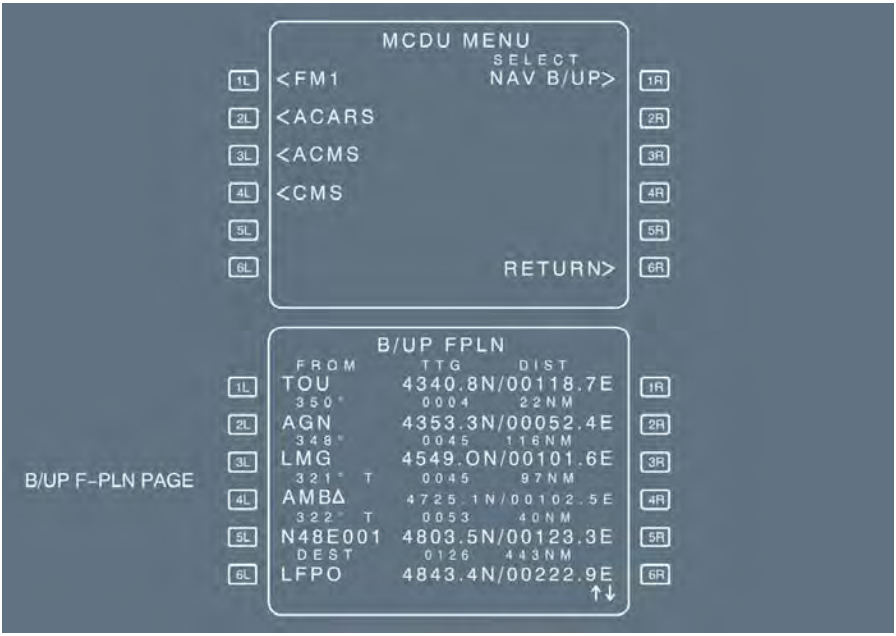
EXAMPLE OF DOWNLOADED F-PLN

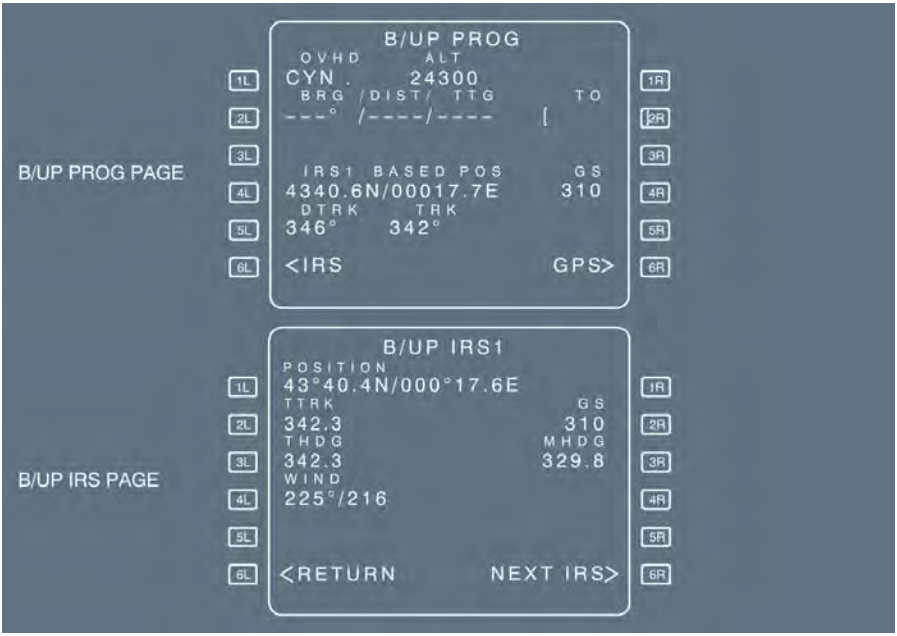


In that procedure, all the legs are coded as CF (Course to Fix) legs. This explains all the discontinuities resulting in the B/UP F-PLN.
These discontinuities may be cleared.
When the second FM fails

REENGAGE and SELECT the required AP and A/THR modes (if disconnected).
SELECT the NAV B/UP prompt on both MCDU.
SELECT NAV on both RMP

Tune the required navaids


MCDU MENU
SELECT
1L <FM1
NAV B/UP> 1R
2L <ACARS 2R
3L <ACMS 3R
4L <CMS 4R
5L 5R
6L RETURN> 6R
B/UP FPLN
FROM TTG DIST
1L TOU 4340.8N/00118.7E 1R
350° 0004 22NM
2L AGN 4353.3N/00052.4E 2R
348° 0045 116NM
3L LMG 4549.0N/00101.6E 3R
321° T 0045 97NM
4L AMBΔ 4725.1N/00102.5E 4R
322° T 0053 40NM
5L N48E001 4803.5N/00123.3E 5R
DEST 0126 443NM
6L LFPO 4843.4N/00222.9E 6R
B/UP F-PLN PAGE



- Only MCDU MENU
  - F-PLN key
  - PROG key
  - DIR key
- B/UP F-PLN page
  - B/UP PROG page
  - B/UP IRS 1, 2, 3 pages are available when BACK UP NAV is selected.
- B/U GPS (if GPS ◁ is installed).

BACK UP NAV OPERATION

Applicable to: MSN 3408-4547

Ident.: DSC-22_20-60-130-B-00012909.0011001 / 16 FEB 11

AP AND A/THR

One FG at least must be available to allow the engagement of AP/FD and A/THR. All FM managed modes are lost as well as managed speed.

As a consequence:
- LAT F-PLN is flown in HDG/TRK modes
- VERT F-PLN is flown in OPEN/V/S/FPA modes
- SPD TARGET is manually SELECTED on the FCU
- SPD/MACH crossover is manually SELECTED on the FCU.

It is recommended to use the TRK/FPA modes:

SELECT the required TRK on FCU at waypoint sequencing (as no AP/FD coupling exists in NAV B/UP). F-PLN sequencing is automatic.
MONITOR the track of the next leg prior reaching the TO waypoint (track between TO and next waypoints is true track).
ADJUST the track to follow the F-PLN with X-TRK = 0
USE OP DES or FPA to descend as suitable.

FPA allows easy altitudes predictions:
DNM = △(FL)/FPA°

Ident.: DSC-22_20-60-130-B-00012910.0011001 / 16 FEB 11

NAVIGATION MONITORING

The navigation accuracy check must be achieved periodically using the same principle as with FM navigation:

COMPARE computed data with raw data
SELECT ON RMP the applicable navaid
PRESS the [PROG] key

B/UP PROG page is displayed

WRITE in the scratchpad then ENTER the navaid LAT/LONG
SELECT associated navaid needle on the EFIS control panel.
COMPARE computed BRG/DIST with RAW DATA on ND

- *If the crosscheck is POSITIVE the ND may be used in ROSE NAV/MAP modes with raw data*
- *If the crosscheck is NEGATIVE the ND must be used in ROSE VOR/ROSE ILS modes.*

Note: B/UP IRS ◁ and B/UP GPS ◁ pages may also be used to check the position.

Ident.: DSC-22_20-60-130-B-00012911.0011001 / 16 FEB 11

FLIGHT PLANNING

The following revisions may be achieved:
- WPT insertion/deletion
- OVERFLY insertion/deletion

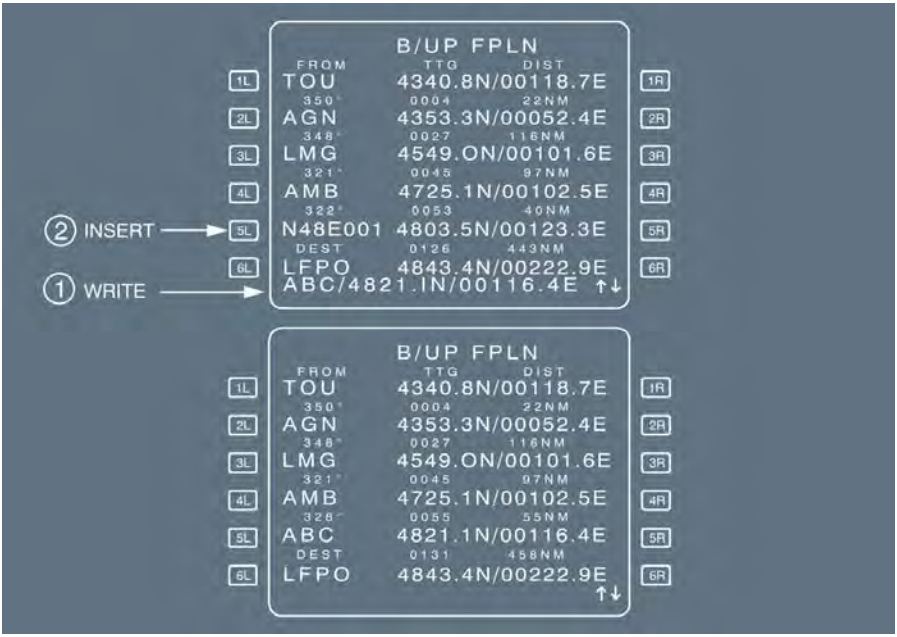
- DIR TO a waypoint
- CLR waypoints/discontinuities.

Waypoint identifiers are either published waypoint identifiers if present in the MCDU active F-PLN, or coded LAT/LONG identifiers resulting from flight crew entries.
All flight planning functions are directly applied on active F-PLN without LAT REV page.

Ident.: DSC-22_20-60-130-B-00012912.0011001 / 23 JUN 15

WAYPOINT INSERTION

Waypoint insertion into the F-PLN is performed via the B/UP F-PLN page by selecting the line key adjacent to the desired point of insertion, whenever a pre-existing waypoint identifier or valid IDENT/LAT/LONG or LAT/LONG entry is displayed in the scratchpad.
Any waypoint entry which causes the number of legs in the route to exceed the maximum allowed results in the “F-PLN FULL” message.



Note: - *If the inserted waypoint is entered only with LAT/LONG, its identifier would be : N48E001*
- *If the flight crew writes a waypoint IDENT/LAT/LONG with an IDENT already used in the F-PLN, a message “NOT ALLOWED" is displayed.*

Ident.: DSC-22_20-60-130-B-00012913.0011001 / 16 FEB 11

WAYPOINT DELETION

Waypoint and discontinuity may be deleted from the B/UP F-PLN page by using the CLR key.

Ident.: DSC-22_20-60-130-B-00012914.0011001 / 16 FEB 11

OVERFLY INSERTION/DELETION

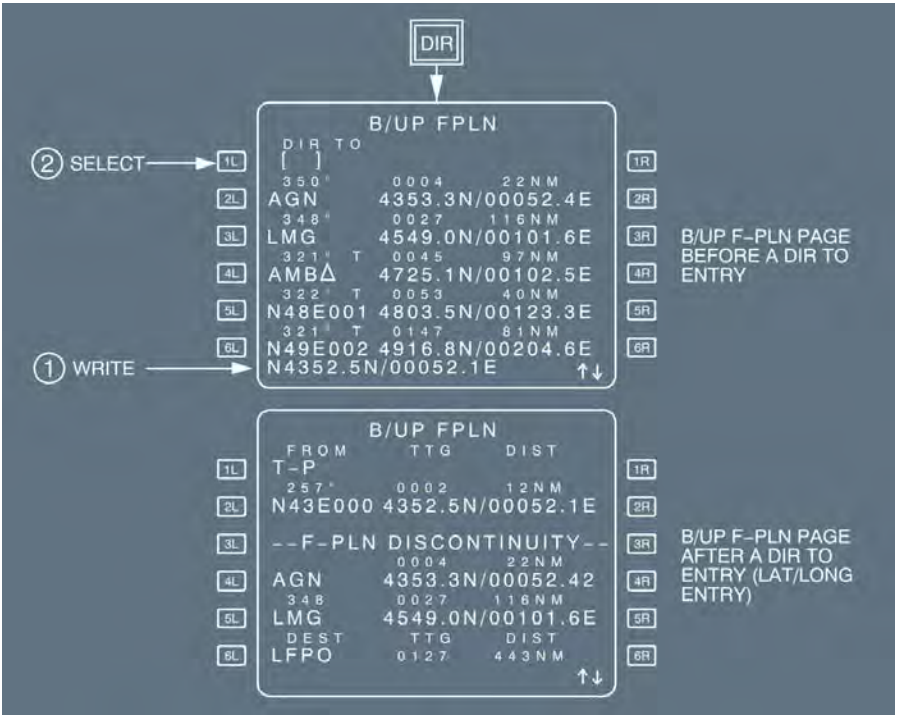
Same as for the FM F-PLN.

Ident.: DSC-22_20-60-130-B-00012915.0011001 / 23 JUN 15

DIRECT TO A WAYPOINT

The DIR TO function operates as for the normal F-PLN, except that RADIAL INTERCEPT and ABEAM functions are not available.

PRESS the DIR key.
WRITE LAT/LONG (or IDENT/LAT/LONG) on the scratchpad then INSERT in [1L].
SELECT the correct track on the FCU in order for the aircraft to turn toward the new TO waypoint.



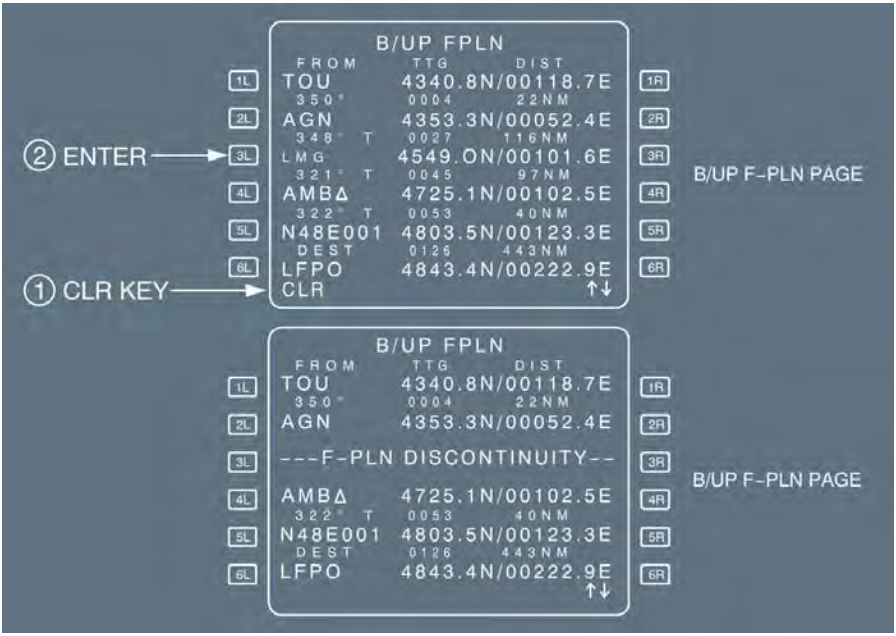
In this example, the entered DIR TO waypoint is a LAT/LONG waypoint.
Due to the fact that this new waypoint is not identical to any waypoint in the F-PLN, a direct leg to that waypoint is created and followed by a discontinuity.
When the DIR TO function is completed, the B/UP F-PLN page is displayed with the DIR TO waypoint as the TO waypoint and the T-P waypoint as the FROM waypoint.
If a DIR TO function is achieved for a waypoint that belongs to the B/UP F-PLN, no F-PLN discontinuity is created.

Note: - *In case of a DIR TO waypoint associated with an OVERFLY condition, the OVERFLY is kept.*

Ident.: DSC-22_20-60-130-B-00012916.0011001 / 14 MAY 12

CLR WAYPOINT/DISCONTINUITY

CLR as for normal operation.



Ident.: DSC-22_20-60-130-B-00012917.0011001 / 23 DEC 14

APPROACHES

- ND display selection rule
  As per normal operation, it depends upon the result of NAV ACCY CROSS CHECK.
  Furthermore it depends also whether the F-PLN is complete, including the approach.

F-PLN	NAV ACCY CHECK	ND	
		PF	PM
Complete with appropriate approach	Positive	ARC or ROSE NAV Ref navaid Raw data	
	Negative	ROSE VOR/ILS	ARC or ROSE NAV or ROSE VOR/ILS Ref Navaid Raw Data
Incomplete	Positive or Negative	ROSE VOR/ILS	

Ident.: DSC-22_20-60-130-B-00012918.0011001 / 16 FEB 11

END OF DESCENT

ADJUST manually the landing elevation on the overhead panel.

SET the MDA on the standby altimeter.

Ident.: DSC-22_20-60-130-B-00012919.0011001 / 23 JUN 15

NON ILS APPROACHES

SELECT on RMP the approach reference navaids.

The autopilot and flight director available modes are TRK-FPA and HDG/VS
The autothrust available speed target is selected speed.

Ident.: DSC-22_20-60-130-B-00012920.0011001 / 16 FEB 11

ILS APPROACHES

Only CAT 1 approaches may be flown since the DH indication is not available.

CHECK the ILS frequency and course on the RMP.
PUSH the LS pb on the EIS control panel.

The autopilot and flight director available modes are APP (LOC – G/S – LAND)
The autothrottle available speed target is selected speed

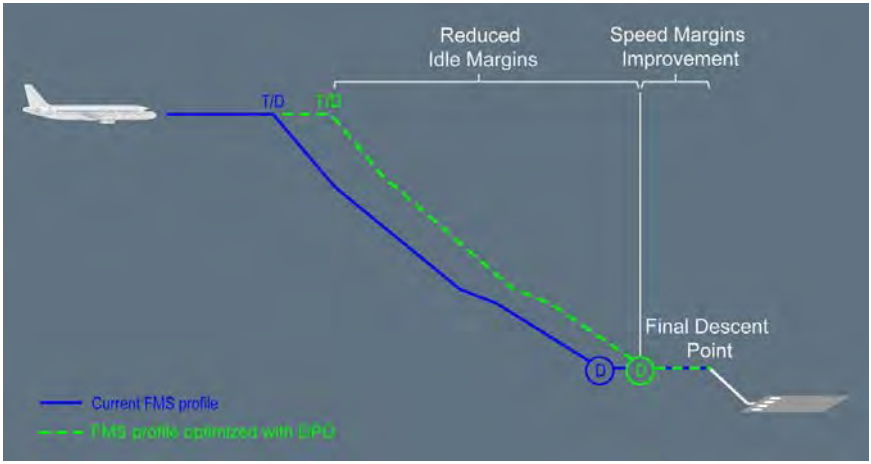
CHECK VAPP in the QRH.

Intentionally left blank

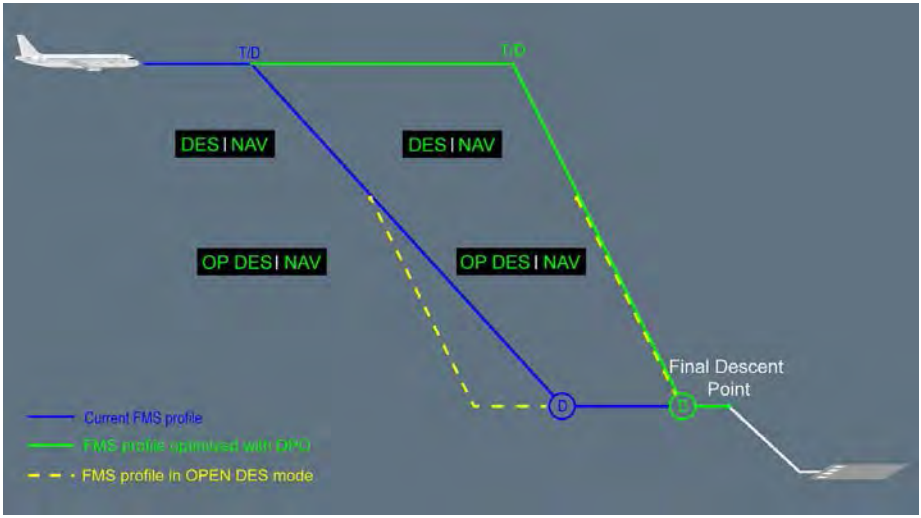
DESCENT PROFILE OPTIMIZATION ⩤

Ident.: DSC-22_20-60-150-00019723.0001001 / 07 JUN 16
Applicable to: ALL

During the idle segment in descent, margins are added to the idle thrust to have more flexibility to maintain the aircraft on the computed descent profile in case of external perturbations such as important wind change.
The Descent Profile Optimization (DPO ⩤) optimizes the computed vertical profile. It decreases the idle thrust margins in descent and the speed margins in approach to reduce fuel burn in descent phase.
With DPO ⩤ , the computed vertical profile is steeper. The T/D is reached later. Before the final approach, the deceleration level-off is shorter.



With DPO ⩤ , along the idle segment, without altitude constraint, the descent profile computed by the FMS is the same as the one flown in OPEN DES mode. Therefore, reverting in OPEN DES mode during the descent does not change the descent rate.



With DPO ⋘ , the FMGS has less flexibility to maintain the aircraft on the computed vertical profile in case of difference between wind entry and effective wind. Therefore, the accurate winds have to be entered in the FMGS before descent.
During descent, the VDEV should be closely monitored. If the aircraft goes above the flight descent profile, the flight crew may have to extend speed brakes to go back on the computed descent profile.
If ENG ANTI ICE or ENG ANTI ICE + WING ANTI ICE are used during descent (inducing an increased idle thrust), the flight crew may have to extend speed brakes to stay on the computed descent profile.

FLIGHT PLAN INITIALIZATION THROUGH ACARS

Ident.: DSC-22_20-70-00000956.0007001 / 01 OCT 12
Applicable to: ALL

REQUEST FOR ACTIVE FLIGHT PLAN INITIALIZATION BEFORE ENGINE START

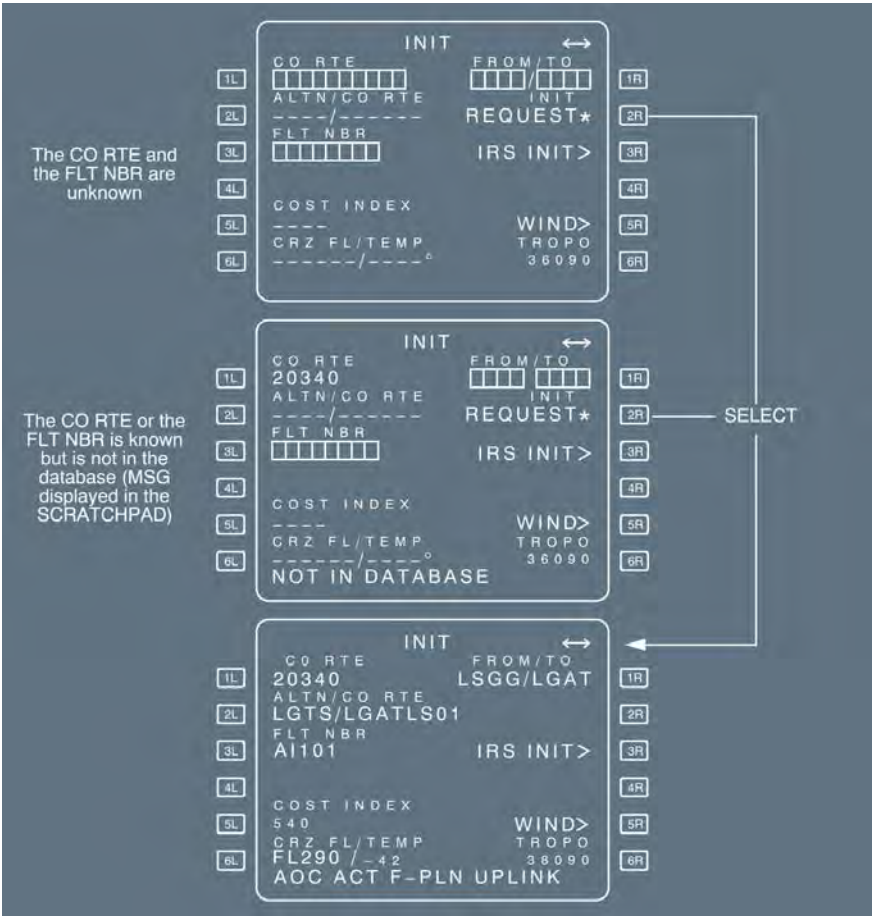
Before engine start, the crew may request a route for the active flight plan. When the route is received, “AOC ACT F-PLN UPLINK” message is displayed on the MCDU indicating that the flight plan has been received and automatically inserted.
After engine start, it is not possible to initialize directly the active flight plan since the received flight plan is automatically routed into the secondary, and the MDCU displays “AOC SEC F-PLN UPLINK”.

PROCEDURE

PRESS the INIT REQUEST * prompt.

The star (*) disappears, all data fields are dashed except:
- *CO RTE, FLT NBR if previously displayed and*
- *Ddefault values.*

The star is not displayed when the FMGS cannot communicate with the ACARS. No request can be sent.
When an active flight plan exists, INIT REQUEST prompt is removed from the active INIT page and no request can be sent for the active flight plan. If a flight plan is entered manually after the request, the uplink message is routed to the secondary.



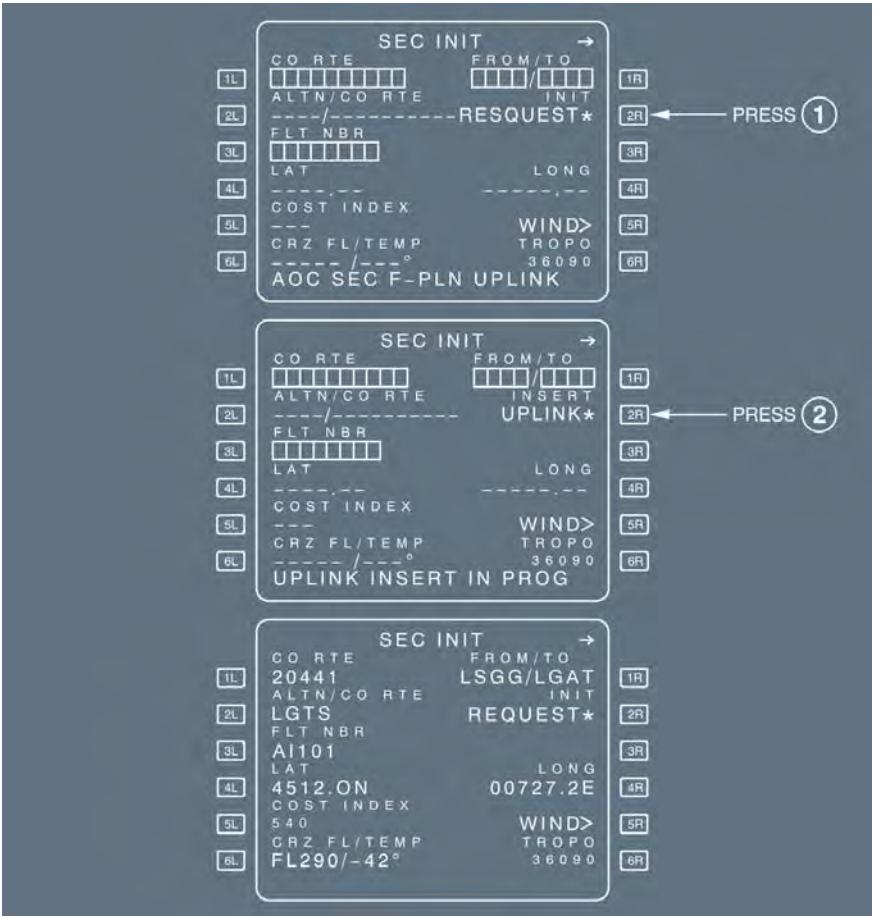
REQUEST FOR SECONDARY FLIGHT PLAN

A request for a secondary flight plan can be initiated anytime. Any flight plan received after engine start is automatically routed into the secondary flight plan.
When the flight plan is received, a message “AOC SEC F-PLN UPLINK” is displayed on the MCDU scratchpad.
Before engine start, and if the SEC F-PLN is empty, any uplinked flight plan is automatically inserted into the secondary flight plan, and no flight crew action is required.

After engine start, or if the SEC F-PLN is not empty, the flight crew must manually insert the uplinked flight plan via INSERT UPLINK prompt.

PROCEDURE TO INSERT OR REJECT A SECONDARY FLIGHT PLAN

When the uplink message is received, the INIT REQUEST prompt of the INIT A page is replaced by INSERT UPLINK (2R field). Pressing the 2R key will insert the flight plan into the secondary. Clearing the prompt will reject it.
If a temporary flight plan or a DIR TO is in progress, the uplink insertion is not accepted until the temporary flight plan or the DIR TO is completed.



TAKEOFF DATA

Applicable to: ALL

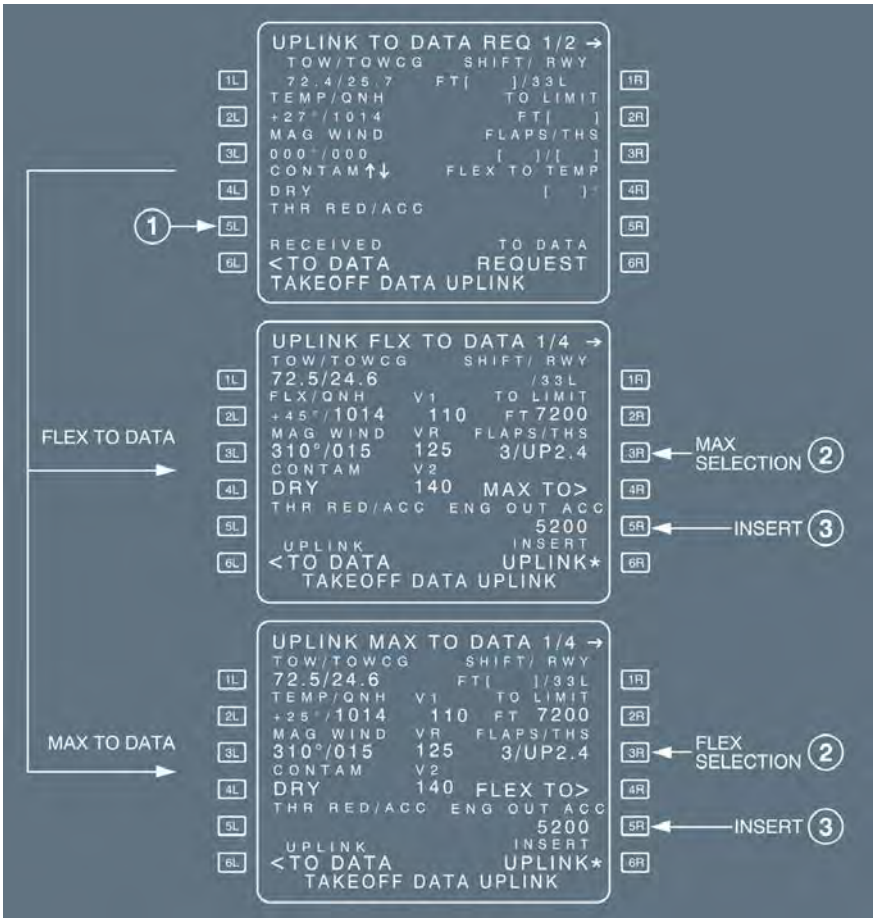
Ident.: DSC-22_20-70-A-00000957.0001001 / 15 FEB 11

GENERAL

The takeoff data may be requested in preflight or done phase for the active flight plan only.
It is always associated with the active flight plan message.

PROCEDURE TO INSERT UPLINK TAKEOFF DATA

PRESS the 6L key "RECEIVED TO DATA" when the message TAKEOFF DATA UPLINK is displayed.



This displays the uplink data on 2 different pages: *UPLINK MAX TO DATA*
UPLINK FLX TO DATA

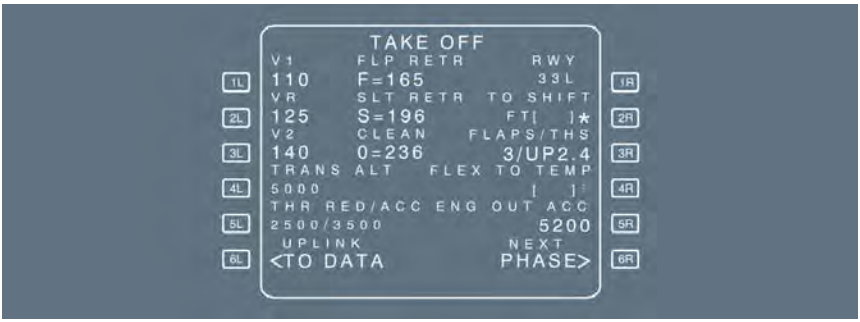
SELECT the data corresponding to the thrust to be used (MAX or FLEX) by pressing [4R].
SELECT the active runway data by slewing the pages (1/4... 4/4).

PRESS the [6R] key “INSERT UPLINK”.

UPLINK MAX TO DATA and UPLINK FLX TO DATA pages are not modifiable.

- **If the takeoff data displayed on this page are not relevant to the active runway entered in the flight plan** , the INSERT UPLINK prompt is not displayed.

- **When the takeoff data have been inserted** , the PERF TO page is amended of the new data.



WIND DATA

Applicable to: ALL

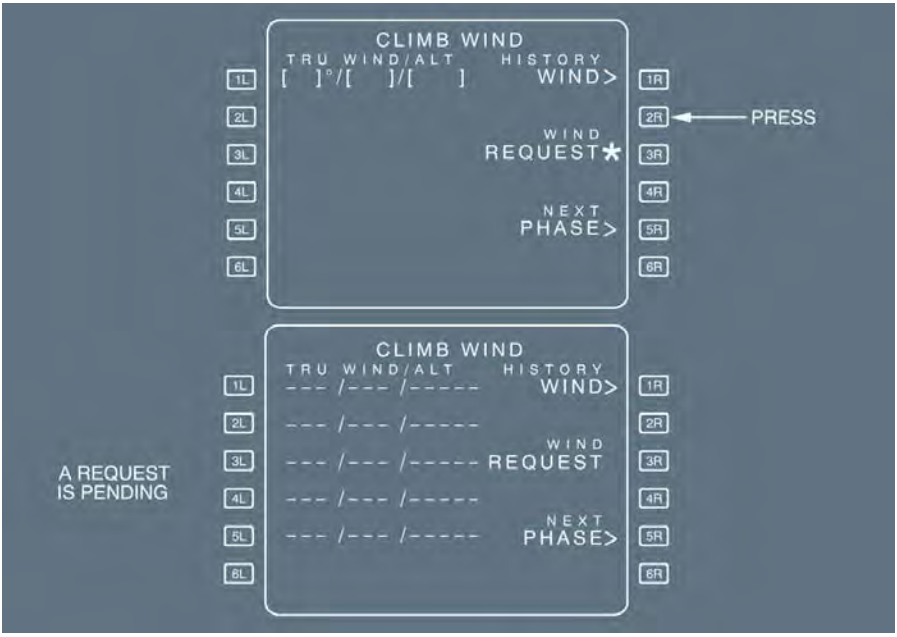
Ident.: DSC-22_20-70-B-00000961.0001001 / 01 OCT 12

REQUEST FOR WIND DATA

To send a wind request, press the “WIND REQUEST” selection key of any wind pages. This request is automatically sent to the ground for one or more flight phases and for the selected flight plan (primary or secondary). The content of the wind request message is not dependent on the selected wind page (CLIMB, CRUISE or DESCENT) but on the flight phase in progress.

- For active flight plan or secondary flight plan that is a “COPY ACTIVE”, a wind request sent by the crew:
  - during preflight or takeoff phase, initiates a demand for climb, cruise, descent and alternate winds.
  - during climb and cruise phase, initiates a demand for cruise, descent and alternate winds.
  - during descent/approach and go around, no wind request is possible.
- For secondary flight plan that is not a “COPY ACTIVE” there is no restriction linked to flight phase.

Before engine start, and if data has not been entered in any WIND page for the flight plan, the uplinked wind data is automatically inserted into the flight plan, and no flight crew action is required.
If the uplinked wind message is received after engine start, or if data has been entered in any WIND page of the flight plan, the flight crew must manually insert the uplinked wind data via the INSERT UPLINK prompt.



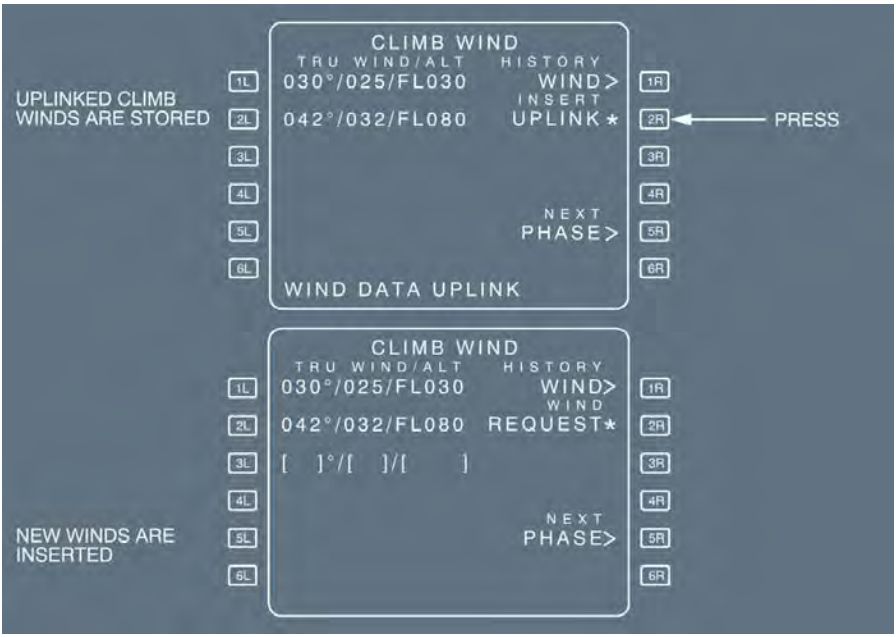
When the amber star following the “WIND REQUEST” is not displayed, the FM is not able to communicate with the ACARS and the pilot cannot send any request.

Ident.: DSC-22_20-70-B-00000962.0020001 / 14 MAY 12

PROCEDURE TO INSERT WIND DATA

When the uplink message is received, the 2R field is modified, the amber “WIND REQUEST” is replaced by the blue “INSERT UPLINK*”. This prompt, when pressed, enables the flight crew to insert the uplink wind data, phase by phase.
To access, review, insert or delete the uplink wind data of other phases, the crew uses “NEXT PHASE” or “PREV PHASE” key.

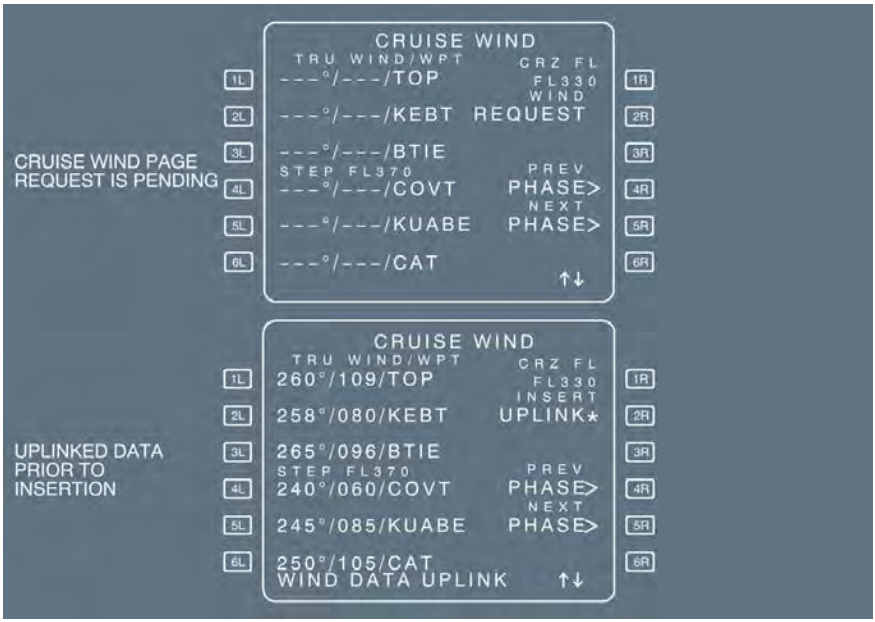
If the crew is not satisfied with the uplink winds, the flight crew will delete the winds, phase by phase clearing the “INSERT UPLINK” prompt. This will delete all the uplinked winds of the selected flight phase.



CLIMB WIND PAGE

When a request is pending, the history WIND page cannot be accessed.
When the climb phase is active, the crew cannot request neither modify the climb winds of the active flight plan or secondary flight plan if it is a copy active.

CRUISE WIND PAGE



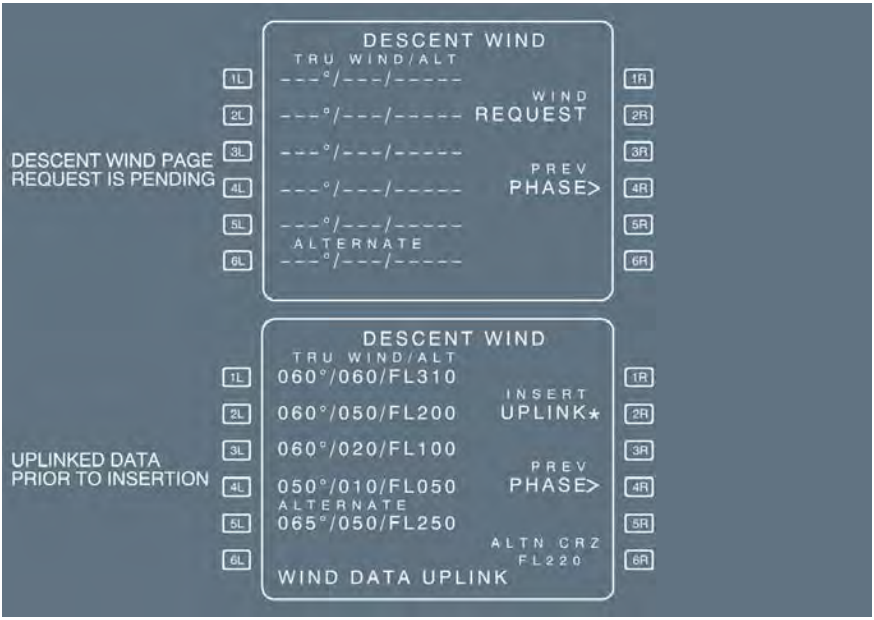
A wind request sent during cruise phase will apply for downpath waypoints of the cruise, descent, approach and alternate phases.

- If the uplink message contains more data and waypoints than the flight plan, the winds at extra waypoints are not considered and automatically discarded. This is transparent to the pilot
- Clearing the INSERT UPLINK* prompt deletes all uplink wind data of the cruise phase. Cruise page reverts to the previous data.

Note: *During cruise, whenever uplink wind data is received and not inserted or cancelled on the CRUISE WIND page, access to the DIR TO function is not possible. The "WIND UPLINK EXISTS" message is displayed on the MCDU scratchpad. Insert or cancel the uplinked wind message first and then access the DIR TO function.*

DESCENT WIND PAGE

The procedures to insert, review or delete descent winds during preflight, climb or cruise phase are described in the above wind general procedure.



If the alternate wind is not available, dashes are displayed in the field.
In descent, approach or go around phases, the pilot cannot request or modify the descent winds of the active flight plan or secondary flight plan if it is a “COPY ACTIVE”.

PRINT FUNCTION

Ident.: DSC-22_20-80-00000964.0009001 / 18 MAR 11
Applicable to: ALL

The PRINT function allows various reports to be printed either automatically (when linked to ACARS ◁ or ATSU ◁) or manually.

The manual PRINT function allows printing of FM-generated flight reports and additional data:

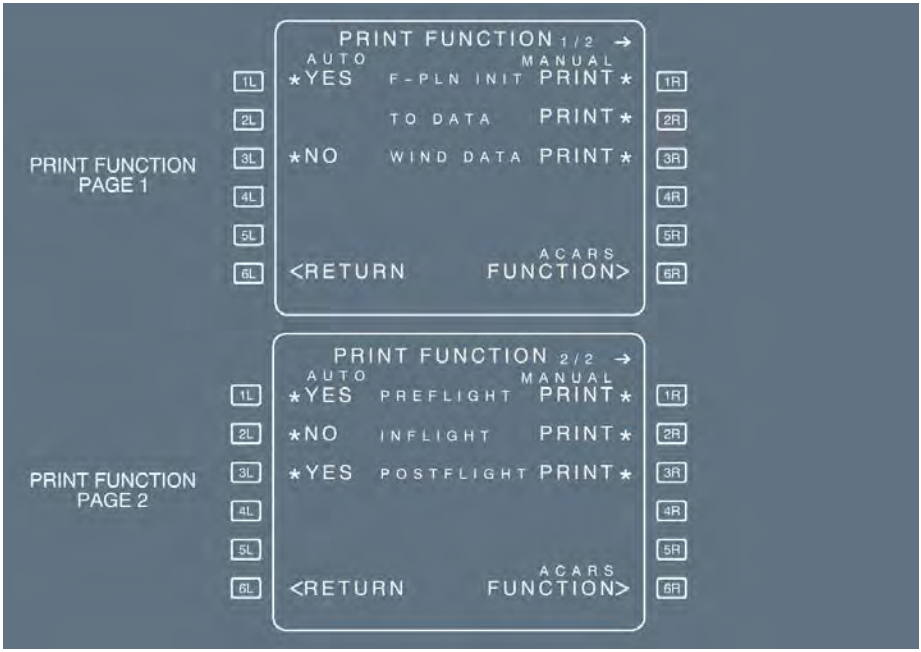
F-PLN	INITialization data
T.O.	Data
WIND	Data
PREFLIGHT	REPORT
IN FLIGHT	REPORT
POSTFLIGHT	REPORT

A detailed description of the PRINT FUNCTION pages is provided in *Refer to DSC-22_20-50-10-25 Print Function Pages*.
The print function is available if ACARS ◁ or ATSU ◁ are available or not.
The various flight reports contain most of the prediction information required by the flight crew to monitor the progress of the flight. The resulting documents can therefore be used as realistic master documents, based on the latest data provided by the flight crew to the computer, in terms of ATC clearances and weather information.

PRINT FUNCTION ACCESS

Ident.: DSC-22_20-80-00000965.0004001 / 01 OCT 12
Applicable to: ALL

The PRINT FUNCTION page is accessed:
- From the DATA INDEX A PAGE, or
- From the AOC FUNCTION page (if ACARS ◁).



Note: For an automatic printing, "time" is the time of the reception of the message. For a manual printing, "time" is the time of the print request.

ON GROUND BEFORE ENGINE START

Ident.: DSC-22_20-80-00000966.0001001 / 23 JUN 15
Applicable to: ALL

When the overall F-PLN data (lateral, vertical including winds, steps, constraints) and the ZFW and ZFWCG values have been inserted:

SELECT the FUEL PLANNING prompt [3R],

- **If the computed BLOCK fuel does not correspond to the actual block fuel required for the flight:**

  ENTER the actual block required for the flight in the [2R] field,

  PRINT the PREFLIGHT report.

  The flight crew may then use the PREFLIGHT report to monitor the progress of the flight.

Note: *Before printing the PREFLIGHT report, the flight crew must check that the F-PLNis complete (all F-PLN discontinuities must be cleared) and that all the F-PLN elements (including winds, steps, constraints, alternate airport) have been inserted, in order to obtain an accurate PREFLIGHT report.*

EXAMPLE (FM PREFLIGHT REPORT)

Ident.: DSC-22_20-80-00000967.0001001 / 18 MAR 11
Applicable to: ALL

FM PREFLIGHT REPORT

DATE : 24 OCT 06
TIME : 07 : 24

A/C TYPE	: A320-200	DATABASE	: AB49402001
ENG TYPE	: CFM56-5B4	CYCLE	: 29 SEP-26 OCT
FLT NUMBER	: AIB 105	FROM/TO	: EINN/LFBO
CO RTE	:	ALTN	: LFBP
ALTN CO RTE	:		
PERF FACTOR	: +1.5	COST INDEX	: 100
IDLE FACTOR	: +0.0		
CRUISE FL/STEP START WPT			
CRZ FL 1	: FL410		

FLIGHT PLAN DATA

	DIST	TIME	CRZ FL		
DEST-LFBO	: 714	01:32	FL410		
ALTN-LFBP	: 80	01:52	FL220		
DEP RWY	: 24		ARV PRC	:	
DEP PRC	:		APR PRC	:	
			ARV RWY	:	

WPT	TIME	SPD/ALT	FOB	T. WIND	TAS	SAT	CRS	DIST
PREDICTED VALUES								
EINN24	00:00	133/-95	13.6	TL/040	-	+11	183	0
1520	00:00	159/1574	13.2	TL/040	163	+12	240	2
SHA	00:02	190/FL70	13.0	TL/040	211	+01	059	3
CRK	00:10	295/FL300	11.4	TL/040	459	-44	173	55
TIVLI	00:16	.82/FL400	11.2	TL/040	467	-57	140	50
LND	00:27	.84/FL410	11.0	TL/040	482	-57	140	99
NAKID	00:33	.84/FL410	10.9	TL/040	482	-57	130	46
LIZAD	00:34	.84/FL410	9.2	TL/040	482	-57	129	14
BALOT	00:38	.84/FL410	8.7	TL/040	482	-57	130	37
BERAT	00:41	.84/FL410	8.2	TL/040	482	-57	129	23
DIN	00:46	.84/FL410	7.6	TL/040	482	-57	128	47
NTS	00:56	.84/FL410	7.3	TL/040	482	-57	173	88
MINEL	01:02	.84/FL410	7.1	TL/040	482	-57	153	46
VENAR	01:05	.84/FL410	6.6	TL/040	482	-57	152	25
CGC	01:08	.84/FL410	6.1	TL/040	482	-57	153	34
VELIN	01:14	320/FL280	5.9	TL/040	482	-41	158	45
AGN	01:25	250/FL60	5.2	TL/040	274	+02	157	72
LFBO	01:32	128/550	5.2	TL/040	129	+14	001	27

FUEL PREDICTIONS

TAXI :	0.2	ZFWCG	: 25.0 %
TRIP (DEST) :	8.4	ZFW	: 51.2
RSV :	1.3	TOW	: 66.5
ALTN :	0.6	LW	: 55.9
FINAL :	1.8	CG	: —.-
EXTRA :	0.8		
BLOCK :	15.5		

MISC PERF DATA

TROPOPAUSE :	36090
CLB TRANS :	5000
CRZ TEMP :	-60

IN FLIGHT

Ident.: DSC-22_20-80-00000968.0007001 / 18 MAR 11
Applicable to: ALL

Once the aircraft has reached the CRZ FL once, all the latest ATC clearances have been inserted in the FM, when all the WINDS/STEPS have been properly updated:

ACCESS the PRINT FUNCTION page
PRINT the INFLIGHT REPORT

The inflight report provides the list of all the overflown F-PLN waypoints (HISTORY VALUES) with their associated data (Time, ALT, Fuel, ...), and the predictions to all the downpath waypoints (PREDICTED VALUES).
This new document replaces the PREFLIGHT report, since it carries all the latest expected F-PLN changes. It is the new applicable master document used to monitor the progress of the flight.
The inflight report will be printed after each important F-PLN modification.

Note: *If the selected Fuel Unit option is pounds, the HISTORY FOB values may be incorrectly printed in tons on the INFLIGHT REPORT. The CURRENT and PREDICTED FOB values, however, are correctly printed in pounds.*

EXAMPLE (FM INFLIGHT REPORT)

Ident.: DSC-22_20-80-00000969.0001001 / 18 MAR 11
Applicable to: ALL

FM INFLIGHT REPORT — DATE : 24 OCT 06 — TIME : 09 : 24

A/C TYPE	: A320-200	DATABASE	: AB49402001
ENG TYPE	: CFM56-5B4	CYCLE	: 29 SEP-26 OCT
FLT NUMBER	: AIB 105	FROM/TO	: LFBO/EINN
CO RTE	:	ALTN	: EIDW
ALTN CO RTE	:		
PERF FACTOR	: +1.5	COST INDEX	: 90
IDLE FACTOR	: +0.0		

CRUISE FL/STEP START WPT
CRZ FL 1 : FL390

FLIGHT PLAN DATA

	DIST	TIME	CRZ FL
DEST-EINN	: 730	10:24	FL390
ALTN-EIDW	: 106	10:50	FL220
DEP RWY	: 14R		ARV PRC : . . . . .
DEP PRC	: LMG3A		APR PRC : . . . . .
			ARV RWY : . . . . .

WPT	TIME	SPD/ALT	FOB	T. WIND	TAS	SAT	CRS	DIST
HISTORY VALUES								
LFB014R	08:29	126/536	13.6	HD/070	-	+12	142	0
1000	08:30	141/982	13.2	056'/003	141	+10	143	2
CURRENT POSITION : N43-37.9/E001-22.0								
	08:32	252FL63	13.6	HD/070	297	-11	350	10
PREDICTED VALUES								
OSKAM	08:34	320/FL130	10.4	HD/070	387	-11	350	14
LMG	08:52	.84/FL390	10.2	HD/070	482	-57	359	119
VERAC	08:59	.84/FL390	10.0	HD/070	482	-57	310	48
MAIXE	09:01	.84/FL390	9.9	HD/070	482	-57	310	18
NTS	09:11	.84/FL390	8.2	HD/070	482	-57	310	70
DIN	09:24	.84/FL390	7.7	HD/070	482	-57	352	88
BERAT	09:31	.84/FL390	7.2	HD/070	482	-57	309	47
BALOT	09:34	.84/FL390	6.6	HD/070	482	-57	309	23
LIZAD	09:40	.84/FL390	6.3	HD/070	482	-57	310	37
NAKID	09:42	.84/FL390	6.1	HD/070	482	-57	309	14
LND	09:48	.84/FL390	5.6	HD/070	482	-57	309	46
TIVLI	10:03	.84/FL390	5.1	HD/070	482	-57	322	99
CRK	10:10	320/FL170	4.9	HD/070	407	-19	319	50
SHA	10:23	128/900	4.2	HD/070	130	+13	353	55
EINN	10:24	128/100	4.2	HD/070	128	+15	001	2

FUEL INFORMATION AT 08:32

WEIGHT	CG	FOB	RSV/RSV%	FINAL	EXTRA
65.0	37.3%	13.6	0.4/5.0%	3.1	2.8

Note: In case of a major failure such as an engine out, a new print will be done when time permits.

REACHING THE GATE AFTER LANDING

Ident.: DSC-22_20-80-00000970.0007001 / 18 MAR 11
Applicable to: ALL

The POSTFLIGHT REPORT gives a complete list of all the overflown waypoints during the flight (HISTORY VALUES).

Furthermore it provides:
- FUEL/TIME summary
- IRS Drift and G/S

When at the gate, after engine shutdown:
- ACCESS the PRINT FUNCTION page
- PRINT the POSTFLIGHT REPORT

Note: *If the selected Fuel Unit option is pounds, the HISTORY FOB values may be incorrectly printed in tons on the POSTFLIGHT REPORT.*

EXAMPLE (FM POSTFLIGHT REPORT)

Ident.: DSC-22_20-80-00000971.0001001 / 18 MAR 11
Applicable to: ALL

FM POSTFLIGHT REPORT

DATE : 24 OCT 06
TIME : 12 : 05

A/C TYPE	: A320-200	DATABASE	: AB49402001
ENG TYPE	: CFM56-5B4	CYCLE	: 29 SEP-26 OCT
FLT NUMBER	: AIB 105	FROM/TO	: EINN/LFBO
CO RTE	:	ALTN	: LFBP
ALTN CO RTE	:		
PERF FACTOR	: +1.5	COST INDEX	: 90
IDLE FACTOR	: +0.0		

FLIGHT PLAN DATA

	DIST	TIME	CRZ FL		
DEST-LFBO	: —	11:52	FL—		
ALTN/——	: —	—:—	FL—		
DEP RWY	: 06		ARV PRC	: AGN2T	
DEP PRC	:		APR PRC	: VOR32L	
			ARV RWY	: 32L	

WPT	TIME	SPD/ALT	FOB	T. WIND	TAS	SAT	CRS	DIST
HISTORY VALUES								
EINN06	10:17	134/44	17.0	043/005	-	+11	053	0
1550	10:18	163/1536	16.9	235'/019	165	+08	050	2
SHA	10:18	161/1691	16.9	236'/019	163	+08	049	0
ABCRK	10:27	305/FL280	15.1	295'/049	459	-41	149	53
TIVLI	10:33	.80/FL330	14.8	298'/057	448	-64	143	46
LND	10:44	.84/FL330	14.1	320'/034	477	-61	129	111
ABLIZAD	10:51	.84/FL330	13.6	326'/034	474	-61	141	47
ABBERAT	10:58	.84/FL330	12.4	313'/029	480	-59	141	21
ABOIN	11:03	.84/FL330	12.2	326'/030	479	-60	142	44
ABNTS	11:13	.84/FL330	12.0	330'/034	481	-60	142	126
ABVENAR	11:21	.84/FL330	10.2	335'/028	479	-60	143	24
CGC	11:25	.84/FL330	9.7	339'/031	476	-61	150	33
VELIN	11:31	.84/FL330	9.2	352'/028	476	-60	154	45
AGN	11:40	312/FL220	8.6	050'/024	429	-26	149	72
SOTAK	11:40	321/FL190	8.3	052'/025	425	-20	141	5
D191K	11:44	253/FL90	8.1	347'/015	288	+00	137	24
D165R	11:46	253/4360	7.6	309'/014	265	+04	103	11
CD32L	11:49	175/2967	6.9	293'/009	180	+05	322	5
FD32L	11:50	253/FL1609	6.2	308'007	132	+08	323	4
LFB032L	11:52	132/674	6.2	326'/006	131	+11	321	3

FUEL AND TIME SUMMARY

START UP		SHUT DOWN	
FUEL : 17.0		FUEL	: 4.2
WEIGHT : 75.8		WEIGHT	: 65.0
TIME : 10.09		TIME	: 12:01
TO TIME : —.-		LDG TIME	: 11:52

IRS DATA AT : LFB032L

	IRS 1	IRS2	IRS 3
AVERAGE DRIFT	- 00.3 NM/H	00.4 NM/H	00.3 NM/H
RESIDUAL GND SPD	- 01.0 KTS	03.0 KTS	1.0 KTS

AUTOMATIC FMGC RESET AND RESYNCHRONIZATION

Ident.: DSC-22_20-90-10-A-00012661.0001001 / 07 MAR 13
Applicable to: ALL

FM RESET

When the FM software cannot work properly or receives instructions to perform impossible operations, it automatically resets itself. A resynchronization with the other FM always follows. When the reset is a minor one, the system will recover by itself. One single reset lasts 2 to 3 s maximum followed by 25 s of resynchronization.

When the reset is a major one:
- Resets recur at short intervals (several in 2 or 3 min)
- The memories are cleared, leading to the loss of F-PLN, GW, CI, CRZ FL, MCDU-entered speeds and NAVAIDs and to database switching.

Note: If three dual FM resets occur in 2 min, pilot-entered data is lost. If a dual reset is identified, it is recommended that the flight crew does not perform again the last MCDU actions for 1 min (in order to avoid a potential second dual reset, leading to the loss of pilot-entered data).

Ident.: DSC-22_20-90-10-A-00012662.0001001 / 10 JAN 11
Applicable to: ALL

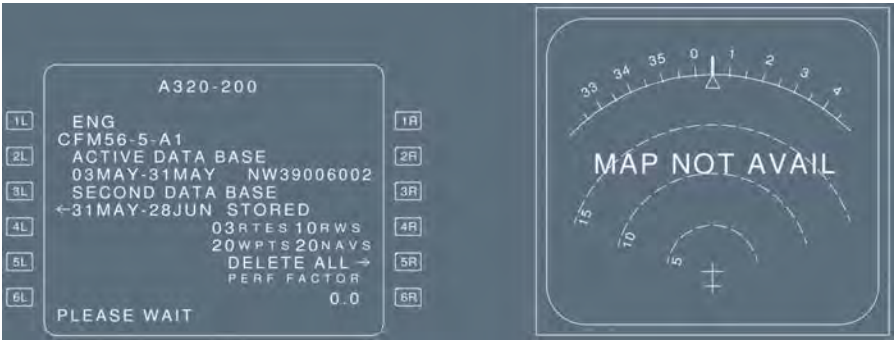
FM RESYNCHRONIZATION

An FM resynchronization automatically occurs after an FM reset but it may occur independently each time self comparisons between FM1 and FM2 reveal discrepancies.
One single resynchronization lasts approximately 25 s.
If 5 several resynchronizations occur within 5 min, independent mode commences.

Ident.: DSC-22_20-90-10-A-00012663.0001001 / 29 SEP 15
Applicable to: ALL

FMGC STATUS DURING A RESET/RESYNCHRONIZATION

While a RESET/RESYNCH occurs:
- The ND shows “MAP NOT AVAIL”
- The MCDU reverts to the A/C STATUS page, with “PLEASE WAIT” displayed in the scratchpad
- Autotuning of Navaids (VOR, DME, ADF) are lost on the failed side
- AP and managed modes may be transiently lost (reversion to HDG/V/S or TRK/FPA)
- If the pilot presses a key while the scratchpad is showing “PLEASE WAIT”, there is no change at MCDU level. This is normal, and the crew should not respond by pulling the MCDU circuit breaker.



Ident.: DSC-22_20-90-10-A-00012664.0001001 / 10 JAN 11
Applicable to: MSN 1882-2078

SINGLE RESET OR DUAL RESET WITH AUTORECOVERY

If the RESET/RESYNCH succeeds, all functions are recovered.

Note: *When an FMGC is recovered, its FD if previously engaged, is also recovered and its status is displayed on the FMA.*

PROCEDURE

RESELECT the convenient MCDU page.
REENGAGE managed modes and the AP.

WAIT 1 min after the "PLEASE-WAIT" message has disappeared, before engaging the AP/FD of the failed FMGC.

If "MAP NOT AVAIL" remains displayed, along with "SET OFFSIDE RNG/MODE" on one ND, temporarily SELECT a different mode on the corresponding EIS control panel.

Ident.: DSC-22_20-90-10-A-00012664.0002001 / 10 JAN 11
Applicable to: MSN 3408-4547

SINGLE RESET OR DUAL RESET WITH AUTORECOVERY

If the RESET/RESYNCH succeeds, all functions are recovered.

Note: *When an FMGC is recovered, its FD if previously engaged, is also recovered and its status is displayed on the FMA.*

PROCEDURE

RESELECT the convenient MCDU page.

REENGAGE managed modes and the AP.

WAIT 1 min after the "PLEASE-WAIT" message has disappeared, before engaging the AP/FD of the failed FMGC.

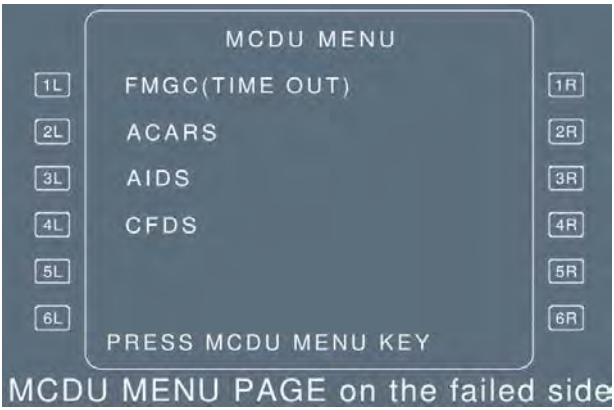
If both "MAP NOT AVAIL" and "SET OFFSIDE RNG/MODE" remain displayed on one ND, or if "OFFSIDE FM CONTROL" remains displayed, temporarily SELECT a different mode or range on the corresponding EIS control panel.

Ident.: DSC-22_20-90-10-A-00012665.0001001 / 10 JAN 11
Applicable to: MSN 1882-2078

SINGLE LATCH

If five successive resets occur, the failing FMGC will latch, and single mode operation will start.

While failed, the following occurs:
- The failed ND side displays "MAP NOT AVAIL" and "SELECT OFFSIDE RNG/MODE" (if the NDs are not both in the same mode or range)
- The MCDU reverts to the MENU PAGE and shows an "FMGC TIME OUT" prompt
- If the AP and FD were previously engaged on the failed side, the AP and FD disengage and the right-hand column of the FMA shows that the operating FD is offside. The ECAM displays the "AP OFF" warning, and the master warning light and audio remind the pilot of the AP disengagement
- All functions are restored on the operative side.



MCDU MENU PAGE on the failed side

PROCEDURE

Select the same range and mode on both NDs to give the failed ND side something to display.

Select any function key on the affected FMGC MCDU. (The page will display “OPP FMGC IN PROGRESS”).

Both MCDUs are now driven by the other FMGC, and only one AP/FD is available. The system works in SINGLE Mode.

Perform a manual reset of the failed FMGC, when convenient.

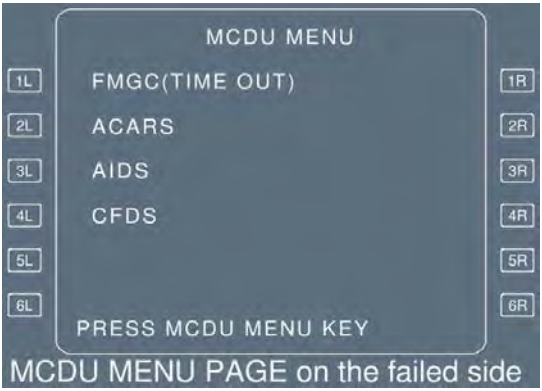
Ident.: DSC-22_20-90-10-A-00012665.0002001 / 16 NOV 11
Applicable to: MSN 3408-4547

SINGLE LATCH

If five successive resets occur, the failing FMGC will latch, and single mode operation will start.

While failed, the following occurs:

- On the ND usually associated with the failed FMGC:
  If the NDs are not both in the same mode or range, the associated ND displays “MAP NOT AVAIL” and “SET OFFSIDE RNG/MODE”. If the NDs are in the same mode and range, the associated ND displays the “OFFSIDE FM CONTROL” amber message
- The MCDU reverts to the MENU PAGE and shows an “FMGC TIME OUT” prompt
- If the AP and FD were previously engaged on the failed side, the AP and FD disengage and the right-hand column of the FMA shows that the operating FD is offside. The ECAM displays the “AP OFF” warning, and the master warning light and audio remind the pilot of the AP disengagement.
- All functions are restored on the operative side.



MCDU MENU PAGE on the failed side

PROCEDURE

Select the same range and mode on both NDs to give the failed ND side something to display.

Select any function key on the affected FMGC MCDU. (The page will display "OPP FMGC IN PROGRESS").

Both MCDUs are now driven by the other FMGC, and only one AP/FD is available. The system works in SINGLE Mode.

Perform a manual reset of the failed FMGC, when convenient.

Ident.: DSC-22_20-90-10-A-00012666.0001001 / 10 JAN 11
Applicable to: MSN 1882-2078

DUAL RESET WITH LOSS OF DATA AND AUTORECOVERY

Three successive dual resets without result erases all pilot-entered data (F-PLN, GW, CRZ FL, CI...).

When FMGS recovery is obtained:
- Database cycle may have switched
- The FM position bias is lost. The FM position returns to the MIX IRS position
- Autotuning the VOR/DME is restored, based on the aircraft's IRS position
- FMGS tuning of the ILS and ADF is not possible
- Lateral and vertical managed mode cannot reengage
- The "CAB PR LDG ELEV FAULT" ECAM message is displayed
- A map display may be lost on one ND.

PROCEDURE

When the system has recovered:

SELECT the initial database.
SELECT DIR TO the required downpath waypoint.
SELECT LAT REV at the downpath waypoint, and redefine the DESTINATION.
SELECT the FUEL PRED page, and enter GW.
SELECT the PROG page, and enter CRZ FL.
SELECT the PERF page, and enter CI.
CHECK or reengage (as appropriate) the relevant speed/Mach target and vertical mode.

Redefine the flight plan for the remainder of the flight, as the opportunity presents itself.

If "MAP NOT AVAIL" remains displayed, along with "SET OFFSIDE RNG/MODE" on one ND, temporarily SELECT a different mode on the corresponding EFIS control panel.
PERFORM a NAV accuracy check, when possible.

A manual FM position update should be considered, if MIX IRS and actual positions differ by more than 20 NM.

Ident.: DSC-22_20-90-10-A-00012666.0012001 / 10 JAN 11
Applicable to: MSN 3408-4547

DUAL RESET WITH LOSS OF DATA AND AUTORECOVERY

Three successive dual resets without result erases all pilot-entered data (F-PLN, GW, CRZ FL, CI...).

When FMGS recovery is obtained:
- Database cycle may have switched
- The FM position bias is lost. The FM position returns to the MIX IRS position
- Autotuning the VOR/DME is restored, based on the aircraft's IRS position
- FMGS tuning of the ILS and ADF is not possible
- Lateral and vertical managed mode cannot reengage
- The "CAB PR LDG ELEV FAULT" ECAM message is displayed
- A map display may be lost on one ND.

PROCEDURE

When the system has recovered:

SELECT the initial database.
SELECT DIR TO the required downpath waypoint.
SELECT LAT REV at the downpath waypoint, and redefine the DESTINATION.
SELECT the FUEL PRED page, and enter GW.
SELECT the PROG page, and enter CRZ FL.
SELECT the PERF page, and enter CI.
CHECK or reengage (as appropriate) the relevant speed/Mach target and vertical mode.

Redefine the flight plan for the remainder of the flight, as the opportunity presents itself.

If both "MAP NOT AVAIL" and "SET OFFSIDE RNG/MODE" remain displayed on one ND, or if "OFFSIDE FM CONTROL" remains displayed, temporarily SELECT a different mode or range on the corresponding EFIS control panel.
PERFORM a NAV accuracy check, when possible.

A manual FM position update should be considered, if MIX IRS and actual positions differ by more than 20 NM.

Ident.: DSC-22_20-90-10-A-00012668.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

DUAL LATCH

- Both FMGCs are inoperative. FM and FG capability are lost
- Both NDs display "MAP NOT AVAILABLE". NAVAID tuning is not performed
- AP/FD, A/THR are lost

- FMGC (TIME OUT) subsystem page is displayed on both MCDUs
- The following messages are displayed on the ECAM:
  "CAB PR LDG ELEV FAULT"
  "AUTO FLT AP OFF", if AP was engaged
  "AUTO FLT A/THR OFF", if A/THR was engaged.

PROCEDURE

FLY raw data.
TUNE necessary NAVAIDs using the RMPs.
PERFORM a manual reset of both FMGCs.

Note: *A recovery will result in the loss of all pilot-entered data.*

Note for all FMGC automatic resets

- A single or double FM auto-reset does not affect an ILS approach below 700 ft AGL. ILS frequency is locked and AP/FDs remain engaged
- Above 700 ft , the loss of ILS tuning due to a dual reset will cause a loss of LOC and G/S, and the disengagement of APs and FDs
- During a non ILS approach, if the master FMGC fails, AP/FD and managed modes are lost and FDs engage in basic modes.

Ident.: DSC-22_20-90-10-A-00012668.0013001 / 17 MAR 17
Applicable to: MSN 3408-4547

DUAL LATCH

- Both FMGCs are inoperative. FM and FG capability are lost
- Both NDs display "MAP NOT AVAILABLE". NAVAID tuning is not performed
- AP/FD, A/THR are lost
- FMGC (TIME OUT) subsystem page is displayed on both MCDUs
- The following messages are displayed on the ECAM:
  "CAB PR LDG ELEV FAULT"
  "AUTO FLT AP OFF", if AP was engaged
  "AUTO FLT A/THR OFF", if A/THR was engaged.

PROCEDURE

FLY raw data.
TUNE necessary NAVAIDs using the RMPs.
PERFORM a manual reset of both FMGCs.

■ **If successful, refer to dual reset with loss of data and auto recovery:**

Note: *A recovery will result in the loss of all pilot-entered data.*

■ **If unsuccessful:**

FLY raw data.

Select the NAV B/UP prompt on both MCDU DATA pages.

*(Refer to DSC-22_20-60-130 General **HOW TO USE**, concerning navigation backup operation).*

SET the landing elevation of the destination on the overhead panel.

Note for all FMGC automatic resets

- A single or double FM auto-reset does not affect an ILS approach below 700 ft AGL. ILS frequency is locked and AP/FDs remain engaged
- Above 700 ft , the loss of ILS tuning due to a dual reset will cause a loss of LOC and G/S, and the disengagement of APs and FDs
- During a non ILS approach, if the master FMGC fails, AP/FD and managed modes are lost and FDs engage in basic modes.

MANUAL FMGC RESET

Applicable to: ALL

Ident.: DSC-22_20-90-10-B-00012669.0001001 / 10 JAN 11

On rare occasions, the FMGC may require manual resetting.
If this occurs in flight, reset one FMGC at a time.

Ident.: DSC-22_20-90-10-B-00020857.0001001 / 17 MAR 17

Refer to System Reset Table - AUTO FLT
for the manual reset procedure of the FMGC.

Ident.: DSC-22_20-90-10-B-00012671.0001001 / 17 MAR 17

MANUAL RESET OF BOTH FMGC

When the aircraft is on ground with the engines stopped, the flight crew may attempt a double and simultaneous CB reset when a single CB reset has failed.

"CHECK WEIGHT" MESSAGE

Ident.: DSC-22_20-90-20-00012677.0001001 / 17 MAR 17
Applicable to: ALL

DESCRIPTION

The "CHECK WEIGHT" message appears on the MCDU when the Gross Weight (GW) computed by the FMGC and the GW computed by the FAC disagree by more than 7 t (16 055 lb).

PROCEDURE

When this message appears:

FMS FOB.....CHECK

CALL UP the MCDU FUEL PRED page and compare the FOB to the FOB from the Computerized F-PLN. Correct it if necessary.

FMS ZFW value..... CHECK

CALL UP the MCDU FUEL PRED page and compare the ZFW to the ZFW on the loadsheet.

- **If the FMS ZFW on the MCDU is not correct:**
  FMS ZFW..... CORRECT/RE-INSERT
  The entry of a correct ZFW will clear the MCDU message.

- **If the FMS ZFW on the MCDU is correct:**
  VLS, F, S, GREEN DOT (PFD)..... DISREGARD
  If the FMS GW is correct, the characteristic speeds computed by the FAC (displayed on PFD) may not be correct.
  QRH OPERATING SPEEDS..... USE
  Refer to QRH/OPS Operating Speeds

Intentionally left blank

MISALIGNMENT OF FMS F-PLN LEGS FOR ILS APPROACHES

Ident.: DSC-22_20-100-20-00013650.0001001 / 23 JUN 15
Applicable to: ALL

For the F-PLN legs belonging to an ILS approach, the FMS incorrectly uses its own Magnetic Variation table instead of the Magnetic Variation of the ILS associated to the approach (coded in the Navigation Data Base). This misbehaviour occurs when the Navaid used for the ILS approach is a DME.

In some cases, it may happen that magnetic variation of the airport differs by a few degrees from the ILS navaid. Thus, the FMS F-PLN does not match with the actual beam of the ILS beam.

When the ILS approach is coded with successive legs, these legs may also appear as not matching with intermediate approach waypoint.

For all approaches affected by this behaviour, the FMS will display an incorrect trajectory on ND for the LS approach. The guidance would also be wrong if the approach legs are flown in NAV instead of LOC mode.

INCORRECT MANAGEMENT OF ETA ENTRY ON PREDICTIVE GPS PAGE

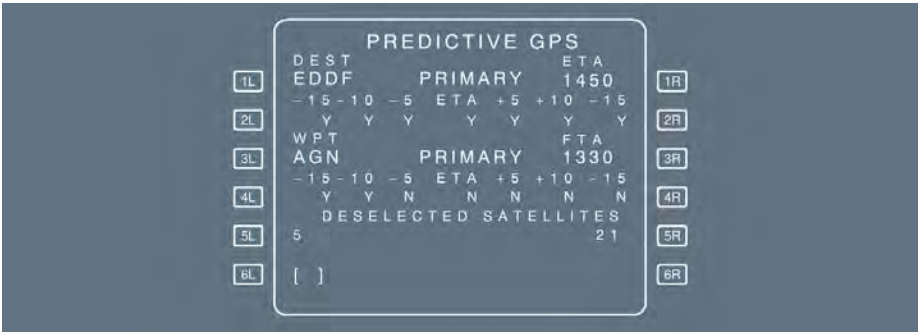
Ident.: DSC-22_20-100-20-00013652.0001001 / 22 MAY 12
Applicable to: ALL

During pre-flight, when a destination airport exists but the FMS does not compute predictions, amber boxes are displayed in the MCDU field ETA of the predicitve GPS page. When the flight crew manually enters an ETA, the value should be displayed in large cyan font.

With the current H2 standard, the FMS does not take into account the manual entry of an ETA (field 1R) for the destination (DEST, field 1L).

The FMS validates the manual entry only when an ETA is already computed by the FMS, when predictions are available (necessary conditions to have some predictions are : entry of a GW, CRZ FL, CI and F-PLN).

This anomaly does not impact the ETA of the WPT field (3L and 3R). An ETA can be entered in the field 3L even if no predictions are computed.



FLIGHT NUMBER ERASED UPON AOC FLIGHT PLAN UPLINK

Ident.: DSC-22_20-100-20-00013653.0001001 / 16 MAR 11
Applicable to: ALL

When a Flight Plan (F-PLN) uplink is performed, if the uplinked F-PLN is inserted as the active F-PLN but does not contain a Flight Number, the previously entered Flight Number is erased. In such a case, the flight crew needs to re-enter the correct Flight Number on the INIT A page.

LOSS OF FMS POSITION FURTHER TO IRS LOSS

Ident.: DSC-22_20-100-20-00013654.0001001 / 23 JUN 15
Applicable to: MSN 3408, 3518-4100

The loss or the failure of an Inertial Reference System (IRS) could result in the loss of the FMS position with the following cockpit effects :

- MAP NOT AVAIL GPS, PRIMARY LOST displayed on ND
- The DIR TO page is unavailable on both MCDU
- During approach, transient ATHR thrust variations at autopilot disconnection (Only applicable in case of IR 1 FAULT).

Technical explanation :
The FMS needs valid data from the IRS in order to compute a position.
The FMS checks the IRS data with a specific parameter coming from the Flight Guidance (FG) part of the FMGC. When an IRS is lost or off (dispatched inoperative), the onside FG erroneously indicates to the FMS that the IRS DATA is still valid.
As a result, the FMS position is lost on the same side than the IRS inoperative (IRS1 for FMS1 and IRS for FMS2). The manual switching on IRS 3 (ATT HDG on CAPT 3 or F/O 3) does not enable to recover the data.

PROCEDURE:

In case of an IR x FAULT ECAM warning in flight with the above mentioned cockpit effects, apply the following procedure :
De-activate (do not perform a reset) the FMS on the same side than the IRS inoperative :

- For IR 1 FAULT : pull FMGC 1 CB B2 (VU 49)
- For IR 2 FAULT : pull FMGC 2 CB M17 (VU 121)

ERRONEOUS FUEL PREDICTION IN THE CASE OF DESCENT WITH TWO ALTITUDE CONSTRAINTS

Ident.: DSC-22_20-100-20-00013655.0001001 / 16 MAR 11
Applicable to: ALL

DESCRIPTION:

If the flight plan has two altitude constraints for the descent, the flight crew may notice erroneous FMS fuel predictions.

EXPLANATION

If the flight plan has two altitude constraints for the descent, the FMS may define a geometric segment between both altitude constraints. If there is a deceleration required within the geometric segment, the FMS may consider that the geometric segment is too steep to fly without speedbrakes. In this case, the FMS tags the entire geometric segment as a speedbrake segment : The FMS assumes that during the entire segment half of the speedbrakes are extended, even for the parts where no deceleration is planned. As a consequence, the FMS will predict an increased thrust for the entire geometric segment. This may lead to erroneous fuel predictions. (a long geometric segment (e.g. above 100 NM) may lead to an error of 1.5 t for the fuel prediction at destination).

Note: *When flying the geometric segment, the predictions become better as the aircraft approaches the end of the geometric segment, and turn back to normal when the aircraft has sequenced the second altitude constraint.*

PROCEDURE:

If the flight crew suspects this behavior in preflight, or during the flight, they can delete and enter again one altitude constraint in descent and compare the fuel predictions of the flight plan with and without the geometric segment. This allows the flight crew to evaluate the impact of the geometric segment on the fuel predictions.
It is not recommended to permanently delete altitude constraints that are stored in the navigation database.

UNEXPECTED SWITCH OF SPEED TARGET WHEN RTA IS USED

Ident.: DSC-22_20-100-20-00013659.0001001 / 16 NOV 11
Applicable to: ALL

An anomaly could be experienced when the RTA (Requested Time of Arrival) function is used.
The MCDU and the PFD could suddenly display an erroneous speed target at the transition altitude when a RTA is entered and if the flight crew performs an action (Vapp entry or altitude constraint modification) that causes a F-PLN profile recomputation.
This scenario could also occur if the flight crew has inserted a RTA and then deleted this RTA (the FMS may erroneously retain the RTA target).
Some cases could happen while the aircraft is in descent (DES mode) in managed speed. This speed target change is significant at high altitude if the RTA speed target is lower than the speed target used before the beginning of the descent.

PROCEDURE

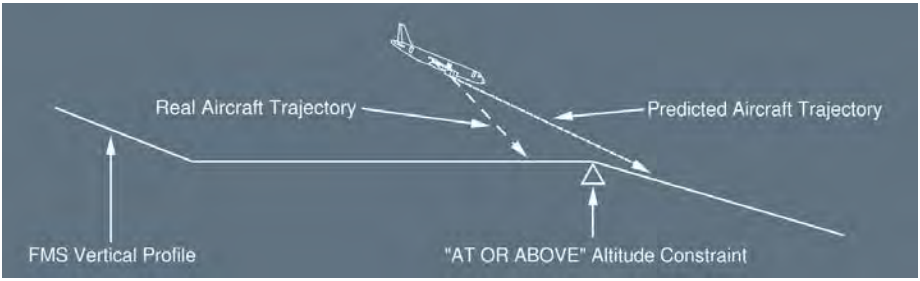
If an erroneous speed target is displayed at high altitude, the flight crew can manually select a speed to continue the descent.

UNDUE AP DISCONNECTION OR REVERSION TO V/S DURING CLIMB AND DESCENT

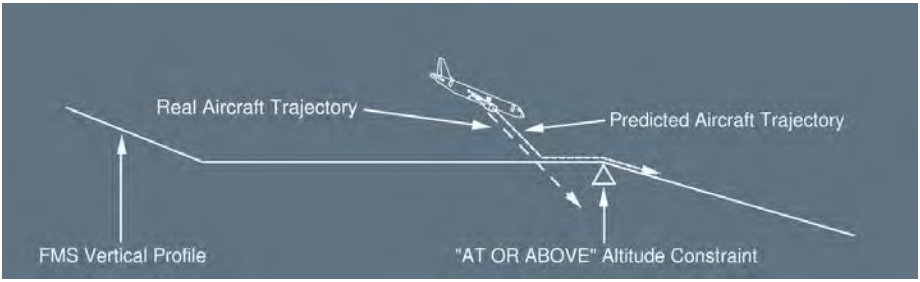
Ident.: DSC-22_20-100-20-00014436.0017001 / 23 JUN 15
Applicable to: ALL

An AP disconnection or a reversion to the V/S mode may occur when the aircraft reaches an altitude constraint in the CLB or DES mode. The following are two situations in which this behavior may occur.

Situation 1: The aircraft is above the vertical profile.
When the aircraft is not on the vertical profile, the FMS makes assumptions in order to compute the FMS predictions. For example, if the aircraft flies in selected speed, the FMS considers an immediate return to managed speed.
These assumptions can result in FMS predictions that are not consistent with the real trajectory of the aircraft. Therefore, the FMS may not anticipate the need to level off, when the FCU selected altitude is above the altitude constraint in climb or below the altitude constraint in descent.



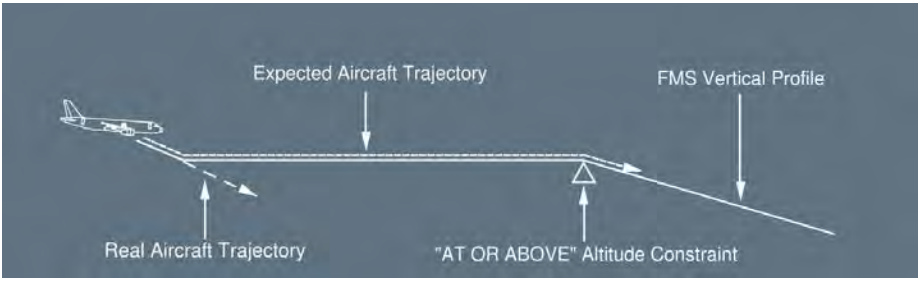
However, the FMS requests the ALT CST* mode, when the aircraft reaches the altitude constraint, in order to level off and comply with the altitude constraint.
Due to problem of communication between the FMS and the FG, the FMGC may unduly revert to the V/S mode. The FWC triggers a triple-click aural warning ◁𝄇 , and the aircraft goes beyond the altitude constraint.



Situation 2: The aircraft levels off at an altitude constraint in descent.
When the aircraft reaches an altitude constraint with the DES mode engaged and the FCU selected altitude below the altitude constraint, the FG engages the ALT CST* mode. The FG also arms the DES mode, in order to resume the descent beyond the waypoint with the altitude constraint.

In very rare cases, the FMS does not see that the FG arms the DES mode:
- If the FINAL APP mode is armed, the FMGC may unduly:
  - Disconnect the AP, or
  - Disconnect the AP and revert to the V/S mode, or
  - Revert to the V/S mode.
- If the FINAL APP mode is not armed, the FMGC may unduly revert to the V/S mode.

In both of the above-mentioned cases, the FWC triggers a triple-click aural warning ◁𝄇 , and the aircraft goes beyond the altitude constraint.
If the AP disconnects, the FWC triggers a cavalry-charge aural warning.



OPERATIONAL RECOMMENDATIONS

Understand your FMA at all times.

- **If the AP disconnects, or if the FMGC reverts to the V/S mode:**

  Adjust the vertical speed or level off in order to comply with the altitude constraint.

VOR/DME AND VOR/TACAN NOT AUTOMATICALLY TUNED

Ident.: DSC-22_20-100-20-00014440.0001001 / 04 MAY 12
Applicable to: ALL

In case there is no NAVAID in the flight plan, nor any recommended NAVAID coded in the inserted procedure, the FMS may not automatically tune the expected Terminal or Low Altitude VOR/DME or VOR/TACAN.
The FMS may not automatically tune the expected NAVAID, if the aircraft is above 12 000 ft for a Terminal VOR/DME or VOR/TACAN, and above 18 000 ft for a Low Altitude NAVAID.
As a consequence, the ND and the MCDU RAD NAV page may not display the NAVAID information.

OPERATIONAL RECOMMENDATIONS

If the flight crew encounters the misbehavior during the flight, the flight crew can manually tune the expected VOR/DME or VOR/TACAN to recover the display on the ND.
As a manual tuning overrides any automatic tuning, the flight crew must clear the manual tuning, when the NAVAID is no longer required, in order to revert to the automatic NAVAID tuning.

OPTIMUM TARGET SPEEDS NOT UPDATED FOLLOWING THE AUTOMATIC DELETION OF A STEP CLIMB

Ident.: DSC-22_20-100-20-00014756.0001001 / 18 DEC 12
Applicable to: ALL

During the FMS climb phase, if the flight crew selects an altitude on the FCU that is above the Cruise Flight Level (CRZ FL) displayed on the PROG page, the altitude selected on the FCU becomes the new CRZ FL.

If this new CRZ FL is at or above the altitude of a Step Climb of the flight plan, the FMS automatically deletes the Step Climb. The FMS displays the "STEP DELETED" message.
As the optimum target speeds (ECON CLIMB speed/Mach and ECON CRUISE speed/Mach) depend on the CRZ FL, the FMS should immediately update the ECON CLIMB speed/Mach and the ECON CRUISE speed/Mach.
Due to a FMS misbehavior, the FMS may not correctly manage the automatic deletion of the Step Climb when the CRZ FL is automatically set to the altitude selected on the FCU. The FMS may not update the ECON CLIMB speed/Mach and the ECON CRUISE speed/Mach accordingly.
If the ECON CRUISE speed/Mach was not correctly updated, the FMS updates the ECON CRUISE speed/Mach when the aircraft reaches the new CRZ FL. However the FMS updates the ECON CRUISE speed/Mach with a rate of 0.01 Mach/min, in order to avoid a sudden increase of the speed target. Therefore the aircraft may take several minutes to reach the new ECON CRUISE speed/Mach.

OPERATIONAL RECOMMENDATIONS

If the flight crew suspects this misbehavior during the flight:
REENTER the Cruise Flight Level (CRZ FL) on the PROG page, or the Cost Index (CI) on the PERF page, in order to activate an immediate update of the optimum target speeds (ECON CLIMB speed/Mach and ECON CRUISE speed/Mach).

ERRONEOUS LATERAL GUIDANCE IN NAV MODE WITH LOC MODE ARMED DURING APPROACH

Ident.: DSC-22_20-100-20-00015035.0001001 / 03 DEC 13
Applicable to: ALL

During approach, the FMS may guide the aircraft along a specific track instead of along the F-PLN with NAV mode green on the FMA, because of the LOC Convergence function (*Refer to DSC-22_30-80-30-10 Precision Approach Modes - APPR Mode*).
The logics of the LOC Convergence function is as follows:

- **If NAV mode is engaged, and LOC mode is armed,**
  and
  The aircraft is within 20 NM of the destination runway,
  and
  The difference between the aircraft track and the QFU is less than 20 °.

  The aircraft is guided with a converging track of 20 ° from the LOC axis.

  The NAV mode remains engaged. However the aircraft no longer follows the F-PLN, but converges towards the LOC axis.

- **If the difference between the aircraft track and the QFU becomes more than 20 ° when the LOC Convergence function is active:**

  The FMS deactivates the LOC Convergence function, and the aircraft follows back the F-PLN.

  It may lead to slight oscillations, since the FMS may successively activate and deactivate the LOC Convergence function.

OPERATIONAL RECOMMENDATIONS

- **If the flight crew considers that the LOC Convergence function may affect the guidance along the F-PLN trajectory in NAV mode:**

  On the intercept trajectory for the LOC axis, the flight crew should push the APPR pb (or the LOC pb-sw) when appropriate.

- **If the flight crew detects that the aircraft does not follow the intended trajectory:**

  The flight crew should revert to HDG/TRK mode, and intercept the LOC axis with the HDG/TRK mode engaged and the LOC mode armed.

UNDUE REDUCTION OF THE SPEED TARGET IN CASE OF DIR TO/ABEAM WHILE FLYING A CONSTANT MACH SEGMENT

Ident.: DSC-22_20-100-20-00015532.0003001 / 18 MAR 14
Applicable to: ALL

The FMS may erroneously command a Mach target of 0, when the following conditions are met:
- The aircraft is flying a Constant Mach Segment (CMS), and
- The TO waypoint is the end of the CMS, and
- The aircraft is close to the TO waypoint, i.e. about 1 NM, and
- The flight crew performs a DIR TO/ABEAM to a waypoint that is not part of the CMS.

In that case, the FMS does not create the abeam of the TO waypoint (end of the CMS), since it is too close from the aircraft.
In addition, the FMS erroneously keeps the CMS until the abeam of the next waypoint, and defines 0 as Mach target on the CMS. The FMS correctly computes the speed target once the abeam of the next waypoint is sequenced.

OPERATIONAL RECOMMENDATIONS

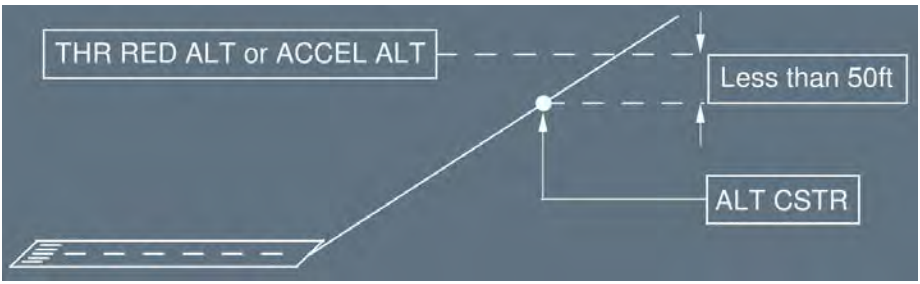
The flight crew should manually clear the CMS on the MCDU VERT REV page.

LOSS OF FUEL AND TIME PREDICTIONS DURING TAKEOFF DATA INSERTION

Ident.: DSC-22_20-100-20-00015602.0001001 / 05 AUG 14
Applicable to: ALL

The flight crew may lose fuel and time prediction when the altitude of the first constraint is less than 50 ft below either the THR RED ALT or the ACC ALT, the update of fuel and time computation predictions may last a long time. The flight crew may think that the predictions are lost (the DEST EFOB and TRIP FUEL are also dashed on the FUEL PRED page).

The flight crew may encounter the situation described above, if one of the following occurs:
- The first altitude constraint of the SID is less than 50 ft below either the THR RED ALT or the ACC ALT.
- The flight crew inserts a THR RED ALT or an ACC ALT less than 50 ft above the first altitude constraint of the F-PLN.
- The flight crew modifies the F-PLN to insert an AT or an AT OR BELOW altitude constraint less than 50 ft below the THR RED ALT or the ACC ALT.



OPERATIONAL RECOMMENDATION:
The flight crew can recover the fuel and time predictions if the flight crew sets the THR RED ALT or ACC ALT value on the PERF TAKEOFF page to the same value as the first altitude constraint of the F-PLN.

ERRONEOUS TRAJECTORY DURING PROCEDURES WITH A TURN DIRECTION ON A LEG WITH AN ALTITUDE TERMINATION

Ident.: DSC-22_20-100-20-00015748.0001001 / 09 SEP 14
Applicable to: ALL

In some very specific operational conditions that depend on the coding in the Navigation Database of the procedure, and on various performance conditions (aircraft weight, flaps, thrust setting, temperature, wind...), the FMS may compute an erroneous trajectory on some Standard Instrument Departures (SID), and on some Missed Approach procedures.

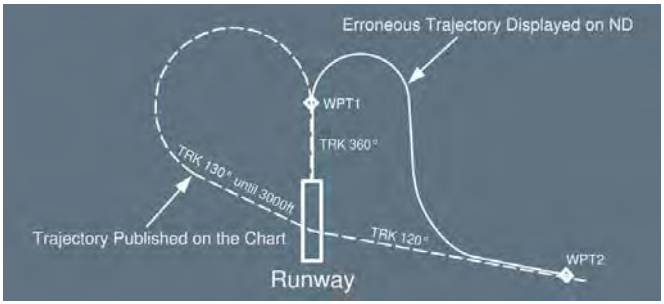
The SIDs and the Missed Approach procedures that may be affected are coded in the Navigation Database with a leg that has a turn direction and an altitude termination. The leg can be one of the following:

- A Course-to-an-Altitude (CA) leg that defines a course to follow to an altitude
- A Fix-to-an-Altitude (FA) leg that defines a track to follow from a waypoint to an altitude
- A Heading-to-an-Altitude (VA) leg that defines a heading to follow to an altitude
- A Holding-to-an-Altitude (HA) leg that defines a holding pattern to an altitude

The turn direction (left or right) that is coded on a leg indicates that the aircraft has to execute a turn in the specified direction to intercept the leg.
In some very specific operational conditions (aircraft weight, wind...), the FMS may predict that the aircraft will reach the altitude that terminates the leg, before the initiation of the leg. In that case, the FMS ignores the leg, and the associated turn direction.
The FMS computes a new trajectory to directly join the next leg. The trajectory may not be consistent with the published trajectory.

Example:

- Leg 1: a Course-to-Fix (CF) leg that defines a track (360 °) to a waypoint (WPT1)
- Leg 2: a Course-to-an-Altitude (CA) leg that defines a track (130 °) to intercept an altitude (3 000 ft). The leg is coded in the Navigation Database with a turn direction (left). The end of the leg depends on the aircraft performance. The turn direction is indicated by an arrow on the line of leg 1 on the MCDU
- Leg 3: a CF leg that defines a track (120 °) to a waypoint (WPT2)



Depending on the aircraft performance, the FMS may predict that the aircraft will reach 3 000 ft before WPT1. In that case, the FMS ignores the leg 2 (CA leg) because the aircraft is already above the altitude that ends leg 2, before the beginning of leg 2. The FMS also ignores the turn direction that is coded on the leg.

As a result, the FMS computes again the trajectory from the end of leg 1, directly to leg 3. As shown on the above illustration, this trajectory includes a right turn, instead of a left turn, because it induces the shortest course change to intercept leg 3 (CF leg).
If the NAV mode is engaged, the aircraft follows this erroneous trajectory.

OPERATIONAL RECOMMENDATIONS

The flight crew should pay particular attention to the check of the flight plan during the Cockpit Preparation, and during the Descent Preparation.

CAUTION	Even if the flight plan is correct during the Cockpit Preparation or during the Descent Preparation, the FMS may compute and display an erroneous trajectory when the FMS updates its predictions after takeoff or after go-around initiation.

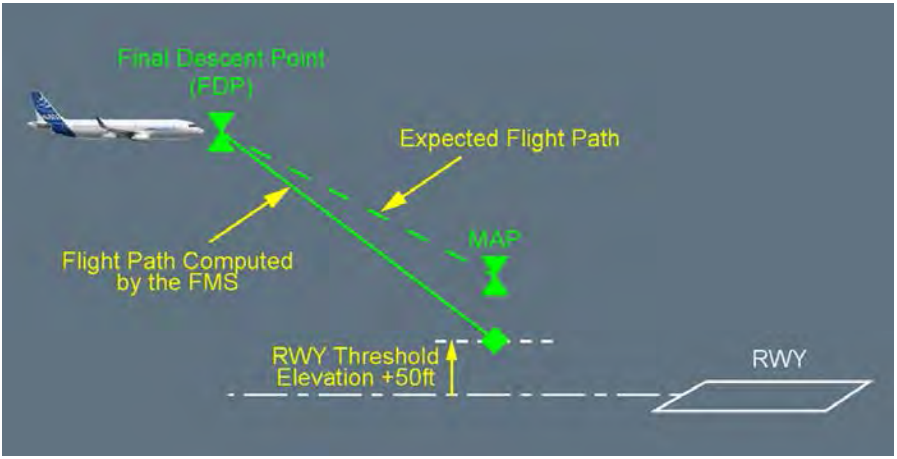
If the flight crew detects that the lateral flight plan does not agree with the published trajectory, the flight crew should revert to the HDG/TRK mode, and monitor NAVAID raw data as appropriate.
The flight crew should reengage the NAV mode when the lateral flight plan is consistent with the published trajectory.

ERRONEOUS VERTICAL PROFILE DURING LOC B/C APPROACHES WITH A MAP LOCATED BEFORE THE RUNWAY THRESHOLD

Ident.: DSC-22_20-100-20-00019782.0001001 / 25 JUL 16
Applicable to: ALL

DESCRIPTION

When the flight crew selects a LOC Back Course (LOC B/C) approach in the arrival page of the MCDU, if the Missed Approach Point (MAP) is located before the runway threshold, the FMS builds the final approach vertical flight path assuming that there is an altitude constraint at the MAP, equal to the runway (RWY) threshold elevation plus 50 ft, disregarding the actual coded MAP altitude.
As a result, the FMS computes an erroneous vertical flight path for the final approach, an erroneous crossing altitude at the MAP, and displays an erroneous vertical deviation indication (V/DEV symbol on the PFD and V/DEV value on MCDU PROG page), when flying the approach.



Therefore, the flight crew must fly the LOC B/C approaches in selected vertical guidance mode (FPA or V/S mode), and they must disregard the V/DEV displayed on the PFD and MCDU PROG page.

PROCEDURE

For LOC B/C approaches, check the position of the MAP on the approach chart:

- **If the MAP is located at the runway threshold:**

  V/DEV symbol can be used to assist the flight crew in flying the vertical flight path in selected mode. Crosscheck the final descent with the published chart using altitude versus distance, as per Standard Operating Procedures (SOPs).

- **If the MAP is located before the runway threshold:**

  DISREGARD the V/DEV symbol, and crosscheck the final descent using the altitude versus the distance to the MAP.

ERRONEOUS PREDICTIONS

Ident.: DSC-22_20-100-40-00012672.0001001 / 17 MAR 17
Applicable to: ALL

The FMGS may display temporary erroneous predictions that can affect such data as ECON speed/Mach, optimum flight level, fuel or time predictions.

PROCEDURE

If erroneous predictions are observed:

ON GROUND, OR IN FLIGHT

Check the cruise temperature (sign and value), the gross weight, and the cruise flight level.
REENTER the same cost index to restart a computation (In descent or approach, a cost index change does not restart a computation), or
MAKE a COPY ACTIVE, then activate the secondary, or
MAKE a DIR TO the “TO” waypoint.

SPURIOUS ENGINE OUT INDICATION

Ident.: DSC-22_20-100-40-00012673.0001001 / 17 MAR 17
Applicable to: ALL

PROCEDURE

If a spurious engine-out is detected:

PRESS the EO CLR prompt of the MCDU PERF page
RE-ENGAGE previous vertical mode
RE-ENTER preselected speeds (if any). No other consequences are to be expected.

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AIRCRAFT SYSTEMS

AUTO FLIGHT - FLIGHT GUIDANCE

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DSC-22_30-70 AP/FD Vertical Modes

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DSC-22_30-100 Flight Mode Annunciator (FMA)

DSC-22_30-110 Temporary Abnormal Behaviors

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GENERAL

Ident.: DSC-22_30-10-00011031.0001001 / 17 AUG 10
Applicable to: ALL

The Flight Guidance (FG) part of the FMGS controls:
- The Flight Director (FD)
- The Autopilot (AP)
- The Autothrust (A/THR).

MODE REVERSIONS

Ident.: DSC-22_30-10-00011032.0001001 / 17 AUG 10
Applicable to: ALL

There are several types of mode reversions. Each one observes a specific logic that is described in the "Mode Reversions" section. (*Refer to DSC-22_30-75 General*).

GUIDANCE MODES

Ident.: DSC-22_30-10-00011033.0002001 / 23 JUN 15
Applicable to: ALL

Two types of autopilot and flight director modes are available to guide the aircraft:
- Managed modes: When the aircraft is using managed targets, the Flight Management and Guidance System (FMGS) guides it along lateral and vertical flight paths and speed profiles computed by the Flight Management function (FM) from data in the MCDU. FM manages the guidance targets.
- Selected modes: When the flight crew is using selected targets, the FMGS guides the aircraft along lateral and vertical flight paths and speed profiles to meet targets that the flight crew has selected manually on the FCU. The flight crew selects the guidance targets.

GUIDANCE	MANAGED modes	SELECTED modes
LATERAL	NAV, APP NAV LOC*, LOC RWY RWY TRK GA TRK ROLL OUT	HDG-TRK
VERTICAL	SRS (TO and GA) CLB, DES ALT CST, ALT CST* ALT CRZ G/S*, G/S FINAL, FINAL APP FLARE	OP CLB, OP DES V/S, FPA ALT*, ALT EXPEDITE
SPEED	FMGC REFERENCE (ECON, Auto SPD, SPD LIM) EXPEDITE	FCU REFERENCE

MODE SELECTION

Ident.: DSC-22_30-10-00011034.0001001 / 23 JUN 15
Applicable to: ALL

MANAGED MODES

- At takeoff, the managed modes engage automatically when the flight crew sets the thrust levers at the TO or FLX detent.
- During flight, the flight crew can arm or engage the managed modes (if the aircraft meets engagement conditions) by pushing in the appropriate knobs on the Flight Control Unit (FCU).
- The flight crew pushes the DIR TO key on the MCDU to insert a DIR TO leg. It engages or maintains the NAV mode.
- The flight crew pushes the APPR pb on the FCU to arm or engage the localizer and glide slope or “APP NAV-FINAL”, depending upon the approach type insert in the flight plan.
- The LOC pb arms or engages only the localizer mode.

SELECTED MODES

The flight crew can engage the selected modes by pulling out the appropriate FCU selection knobs.

LATERAL MODES

Ident.: DSC-22_30-10-00011035.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078

MODE	TYPE	GUIDANCE	REMARK
RWY	MANAGED	Mode used at takeoff to guide the aircraft along the runway centerline, using LOC.	Triggered by the thrust levers at FLX or TOGA position.
RWY TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at mode engagement.	
NAV	MANAGED	Mode used to guide the aircraft along the lateral F-PLN. Available above 30 ft after takeoff.	Automatically armed at takeoff, unless HDG/TRK is preset. In that case, RWY TRK engages after takeoff.
HDG-TRK	SELECTED	Mode used to guide the aircraft on a heading or a track selected by the flight crew. The target value is displayed in the FCU window.	*Note:* *HDG/TRK is called "basic mode" because it is a backup mode for certain situations:* - *F-PLN discontinuity entry* - *AP engagement with no FD* - *Loss of F-PLN.*
LOC* **LOC** **APP NAV**	MANAGED	Mode used to guide the aircraft on the lateral approach path (LOC or F-PLN approach path).	Selected by pressing APPR pb on the FCU ; the mode that engages depends upon the selected approach in the F-PLN. *Note:* *For LOC only approach, do not select the FCU's APPR pb, but rather the LOC pb.*

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MODE	TYPE	GUIDANCE	REMARK
LAND	MANAGED	Common mode engaged below 400 ft RA during an automatic ILS approach.	Engaged only if LOC mode and G/S mode are already engaged.
GA TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at mode engagement.	Triggered by the thrust levers at TOGA with Slats/Flaps in at least CONF 1.
ROLL OUT	MANAGED	Mode used to guide the aircraft on the runway, following an automatic landing.	FD rollout symbol is displayed on the PFD at touchdown.

LATERAL MODES

Ident.: DSC-22_30-10-00011035.0003001 / 23 JUN 15
Applicable to: MSN 3408-4547

MODE	TYPE	GUIDANCE	REMARK
RWY	MANAGED	Mode used at takeoff to guide the aircraft along the runway centerline, using LOC.	Triggered by the thrust levers at FLX or TOGA position.
RWY TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at mode engagement.	
NAV	MANAGED	Mode used to guide the aircraft along the lateral F-PLN. Available above 30 ft after takeoff.	Automatically armed at takeoff, unless HDG/TRK is preset. In that case, RWY TRK engages after takeoff.

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MODE	TYPE	GUIDANCE	REMARK
HDG-TRK	SELECTED	Mode used to guide the aircraft on a heading or a track selected by the flight crew. The target value is displayed in the FCU window.	*Note:* *HDG/TRK is called "basic mode" because it is a backup mode for certain situations:* - *F-PLN discontinuity entry* - *AP engagement with no FD* - *Loss of F-PLN* - *MCDU NAV BACK UP.*
LOC* **LOC** **APP NAV**	MANAGED	Mode used to guide the aircraft on the lateral approach path (LOC or F-PLN approach path).	Selected by pressing APPR pb on the FCU ; the mode that engages depends upon the selected approach in the F-PLN. *Note:* *For LOC only approach, do not select the FCU's APPR pb, but rather the LOC pb.*
LAND	MANAGED	Common mode engaged below 400 ft RA during an automatic ILS approach.	Engaged only if LOC mode and G/S mode are already engaged.
GA TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at mode engagement.	Triggered by the thrust levers at TOGA with Slats/Flaps in at least CONF 1.
ROLL OUT	MANAGED	Mode used to guide the aircraft on the runway, following an automatic landing.	FD rollout symbol is displayed on the PFD at touchdown.

VERTICAL MODES

Ident.: DSC-22_30-10-00011036.0002001 / 23 JUN 15
Applicable to: ALL

MODE	TYPE	GUIDANCE	REMARK
SRS	MANAGED	Mode used at takeoff or go-around to maintain SRS speed (V2, V2+10, VAPP...).	Triggered by the thrust levers at FLX or TOGA position. Disengages automatically at ACC ALT or when another VERT mode is engaged.
CLB	MANAGED	Mode used to climb towards FCU selected altitude along VERT F-PLN taking into account ALT CSTR. Available only if NAV mode engaged. The A/THR is in thrust mode (CLB).	The speed target may be either selected or managed. If managed, SPD CSTR, SPD LIM and HOLD SPD are taken into account. ALT mode is always armed ; displayed in magenta if the next level off is predicted at an ALT CSTR, and in blue if the next level off is predicted at the FCU selected altitude.
DES	MANAGED	Mode used to descend towards FCU selected altitude along the computed descent path taking into account ALT CSTR. Available only if NAV mode engaged. The A/THR may be in THRUST or SPD mode.	
OP CLB **OP DES**	SELECTED	Mode used to climb/descent directly to the FCU selected altitude. These modes disregard all ALT CSTR. The A/THR is in THRUST mode (CLB/IDLE).	The speed target may be either selected or managed. ALT mode is systematically armed and blue. Altitude target is blue on PFD.
EXPEDITE ⩤	SELECTED	Mode used to increase the vertical speed by selecting green dot in climb or 0.80/340 kt in descent.	Used to expedite a climb or descent towards a specific level.
ALT CST* **ALT CST**	MANAGED	Mode automatically engaged when reaching an ALT CSTR before the FCU selected altitude.	CLB/DES mode are systematically armed (blue).
ALT* **ALT** **ALT CRZ**	SELECTED	Mode used to maintain a level flight at the FCU selected altitude.	Soft ALT mode engages when FCU selected altitude = CRZ FL. Soft ALT is part of the managed guidance.

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MODE	TYPE	GUIDANCE	REMARK
V/S-FPA	SELECTED	Mode used to guide the aircraft along a vertical speed or a selected flight path angle.	Altitude target is blue on PFD. V/S-FPA is a basic mode. (*Refer to DSC-22_30-10 Lateral Modes*).
G/S* G/S FINAL	MANAGED	Mode used to guide the aircraft along the final approach path (G/S or non ILS)	Selected by depressing the APPR pb on the FCU. The mode engaged depends upon the selected approach in the F-PLN. Linked to APPR common mode (APPR pb).
FLARE	MANAGED	Common mode which provides the alignment to the runway center line on the yaw axis and the flare on the pitch axis.	Engages below 50 ft RA as a function of the current vertical speed.

INTERACTION BETWEEN AP/FD AND A/THR MODES

Ident.: DSC-22_30-10-00011037.0002001 / 23 JUN 15
Applicable to: ALL

The AP and FD pitch modes can control a target SPD/MACH or a vertical trajectory, and the A/THR mode can control a fixed thrust or a target SPD/MACH. However, the AP/FD and the A/THR cannot both control a target SPD/MACH simultaneously.

Therefore the AP/FD pitch modes and A/THR mode are coordinated as follows:
- If an AP/FD pitch mode controls a vertical trajectory, the A/THR mode controls the target SPD/MACH.
- If an AP/FD pitch mode controls a target SPD or MACH, the A/THR mode controls the thrust.
- If no AP/FD pitch mode is engaged, the A/THR mode reverts to controlling the SPD/MACH mode.

In other words, the selection of an AP/FD pitch mode determines which mode the A/THR controls.

AP/FD pitch modes	A/THR modes
V/S - FPA DES (geometric path) ALT*, ALT ALT CRZ*, ALT CRZ ALT CST*, ALT CST G/S*, G/S FINAL, FINAL APP	SPEED/MACH MODE
AP/FD OFF	

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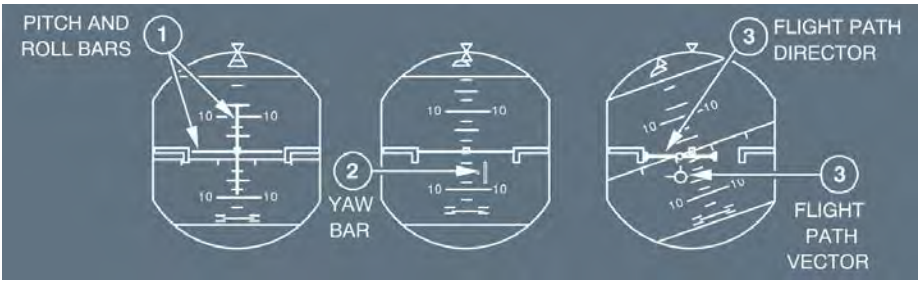
AP/FD pitch modes	A/THR modes
CLB/DES (idle path) OP CLB/OP DES EXP CLB/EXP DES ◁ SRS	THR (CLB, IDLE) MODE
FLARE	RETARD (IDLE)

GENERAL

Ident.: DSC-22_30-20-00012468.0001001 / 14 MAY 12
Applicable to: ALL

The Flight Director (FD) displays guidance commands from the Flight Management and Guidance Computer (FMGC) on the Primary Flight Display (PFD).
The flight crew may manually fly the aircraft, following FMGC guidance commands, or crosscheck the FMGC orders when the autopilot is engaged.
In normal operations, FD1 displays FMGC1 orders on the PFD1 and FD2 displays FMGC2 orders on the PFD2.
The FDs use their respective onside FMGCs.

On the PFD:
1. The FD pitch and roll crossbars show pitch and roll demands.
2. Below 30 ft during landing and takeoff, when a localizer is available, the vertical bar is replaced by a yaw bar that gives lateral orders.
3. The Flight Path Director (FPD) symbol relates to the Flight Path Vector (FPV).



The HDG V/S – TRK FPA pb on the FCU enables the flight crew to select either type of reference and display.
The FD pb on the Electronic Flight Instrument System (EFIS) control panel allows the FD bars to be displayed or removed.

FD BARS (HDG V/S SELECTED ON THE FCU)

- The pitch bar is displayed if a vertical mode is engaged. It gives pitch orders for the vertical guidance
- The roll bar is displayed if a lateral mode is engaged. It gives roll orders for lateral guidance.

FLIGHT PATH DIRECTOR (TRK FPA SELECTED ON THE FCU)

The display is an alternate way of transmitting flight director commands.

- The Flight Path Vector (FPV) symbol illustrates the track and flight path angle actually being flown
- The Flight Path Director (FPD) symbol shows the flight crew how to intercept the required vertical and lateral flight trajectory. When the flight crew superimposes the FPV and the FPD symbols, the aircraft is flying the required trajectory.

YAW BAR

The yaw bar is displayed in RWY mode on takeoff and in FLARE and ROLL OUT modes at landing.

FLIGHT DIRECTOR (FD) ENGAGEMENT

Ident.: DSC-22_30-20-00012469.0008001 / 01 OCT 12
Applicable to: ALL

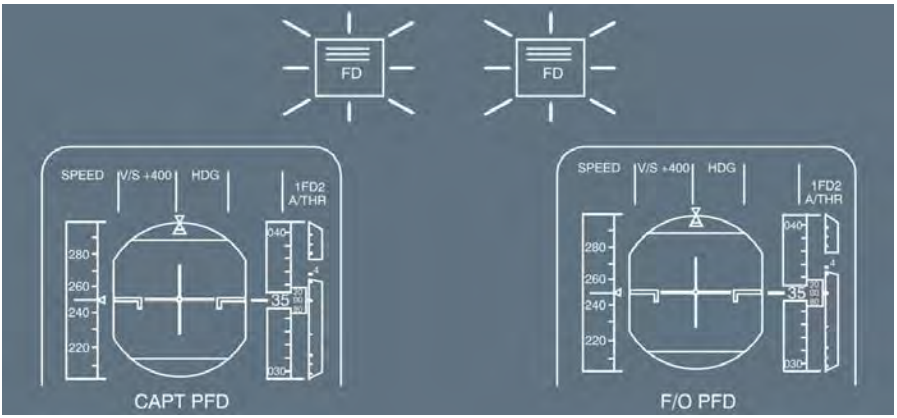
The FDs are engaged automatically when the FMGC powers up.

GROUND ENGAGEMENT

- The "1FD2" symbol appears on both PFDs
- No FD bars appear on the PFDs. (The PFD displays FD orders when a mode is active on the corresponding axis)
- The FCU windows display dashes.

MANUAL FLIGHT ENGAGEMENT

The two FDs engage in the HDG V/S or TRK FPA modes (basic modes).



AUTOMATIC FLIGHT ENGAGEMENT

FD bars are automatically restored in SRS/GA TRK modes at go-around engagement. If FPV/FPD was previously selected, it reverts to FD bars.

FLIGHT DIRECTOR (FD) DISENGAGEMENT

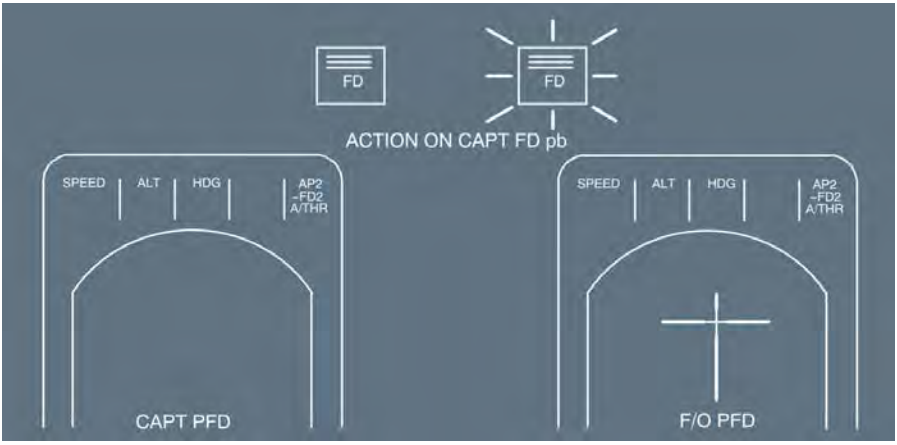
Ident.: DSC-22_30-20-00012470.0006001 / 19 DEC 12
Applicable to: ALL

The flight crew may disengage one or two FDs manually, or FDs may disengage automatically if there is a failure.

MANUAL DISENGAGEMENT

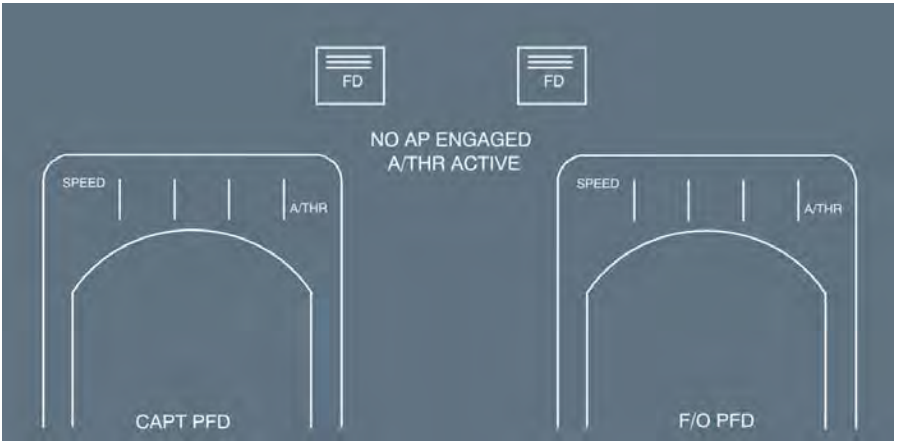
One FD OFF:

- The FD bars no longer appear on the associated PFD.
- The corresponding FD is disengaged.



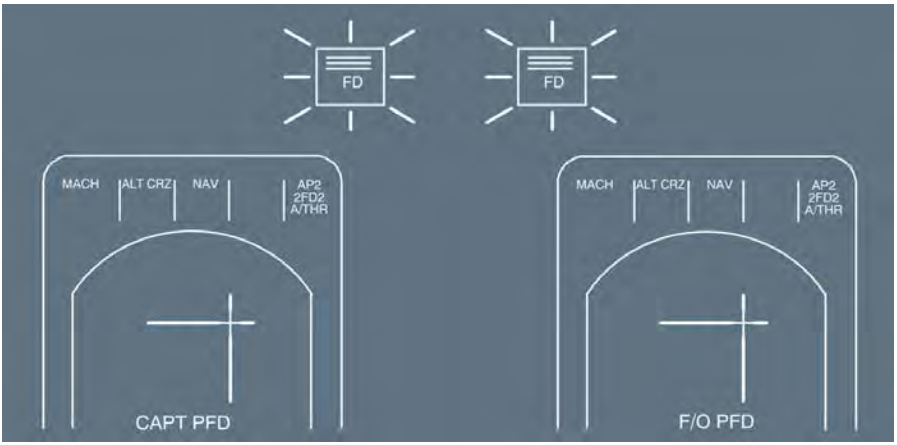
Both FDs OFF:

- The FD bars disappear from both PFDs.
- If no AP was engaged, lateral and vertical modes disengage. The A/THR, if active, automatically reverts to (or remains in) SPEED/MACH mode.
- If one AP was engaged when FDs are switched OFF, this AP remains engaged in the active modes but the FDs are no longer displayed.



AUTOMATIC DISENGAGEMENT

If one FD fails or one FMGC is not valid, both PFDs display the remaining FD.



AUTOMATIC DISENGAGEMENT DUE TO SPEED PROTECTION

When APs are not engaged and the flight crew does not follow the FD bars to maintain the commanded trajectory in climb with CLB or OP CLB (or EXP CLB ◁) engaged or in descent with DES or OP DES (or EXP DES ◁) engaged, the FDs will disengage at the activation of the automatic speed mode protection.

Refer to DSC-22_30-75 Reversion with Global Speed Protection - Automatic Speed Mode Protection in Climb.

AUTOMATIC FD REMOVAL

Ident.: DSC-22_30-20-00012472.0001001 / 28 JAN 14
Applicable to: ALL

- The FD pitch bar is removed when no vertical mode is engaged or when ROLL OUT mode is engaged.
- The FD roll bar is removed when no lateral mode is engaged or when the RWY or ROLL OUT mode is engaged.
- Both FDs are removed when the aircraft pitch exceeds 25 ° up or 13 ° down, or bank angle exceeds 45 °.

FD WARNINGS

Ident.: DSC-22_30-20-00012473.0001001 / 16 MAR 11
Applicable to: ALL

FD bar WARNINGS	CONDITIONS
Pitch FD bar (or FPV) flashes 10 s and then remains steady	- If the ALT* mode is lost further to FCU altitude reference change of more than 250 ft. - When in APPR mode (G/S*, G/S, LAND, FINAL), FD reverts to V/S mode (flight crew action or loss of vertical approach mode). - One AP or one FD is engaged while both AP/FD were previously OFF.
Pitch FD bar (or FPV) flashes permanently	Transmission of the GLIDE data is interrupted when in G/S, G/S* or LAND modes above 100 ft RA.
Roll FD bar (or FPV) flashes 10 s and then remains steady	- When in APPR mode (LOC*, LOC, LAND, APP NAV), FD reverts to HDG mode (flight crew action or loss of lateral approach mode). - One AP or one FD is engaged while both AP/FD were previously OFF.
Roll FD bar (or FPV) flashes permanently	Transmission of the LOC data is interrupted when in LOC, LOC* or LAND modes above 15 ft RA.

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GENERAL

Ident.: DSC-22_30-30-00011816.0001001 / 17 AUG 10
Applicable to: ALL

The AP:
- Stabilizes the aircraft around its center of gravity
- Acquires and tracks a flight path
- Flies the aircraft to an automatic landing or go-around.

The AP commands the:
- Position of the flight control surfaces for pitch, roll and yaw
- Nose wheel position.

AP ENGAGEMENT

Ident.: DSC-22_30-30-00011817.0003001 / 17 AUG 10
Applicable to: MSN 1882-2078

The flight crew can engage AP1 or AP2 by pressing the corresponding pushbutton on the FCU if the aircraft has been airborne for at least 5 s.
When one AP is engaged, the corresponding FCU pushbutton comes on and AP1 (or 2) is displayed on the FMAs.

- One AP can be engaged on ground if the engines are not running. It disengages when one engine is started.
- Two APs may be engaged at a time (AP1 active, AP2 in standby), when the localizer/glide-slope or roll out or go-around mode is armed or engaged.
  Only one AP can be engaged at a time in all other cases.
- If one AP pb is set to ON with both FDs OFF, the AP engages in HDG V/S or TRK FPA mode, depending upon which mode the flight crew has selected on the FCU.
- If one AP pb is set to ON with at least one FD already ON, the AP engages in the current active FD modes.
- At takeoff, the AP cannot be engaged below 100 ft.

AP engagement increases the break out force on the sidestick controllers and on the rudder pedals.
AP engagement is indicated by the lighting of the corresponding FCU pushbutton and by the appearance of AP1 (or 2) on the PFD's FMA.

AP ENGAGEMENT

Ident.: DSC-22_30-30-00011817.0014001 / 16 MAR 11
Applicable to: MSN 3408-4547

The flight crew can engage AP1 or AP2 by pressing the corresponding pushbutton on the FCU if the aircraft has been airborne for at least 5 s.

When one AP is engaged, the corresponding FCU pushbutton comes on and AP1 (or 2) is displayed on the FMAs.
In BACK–UP NAV, AP can be engaged in selected modes if the FG part is available.

- One AP can be engaged on ground if the engines are not running. It disengages when one engine is started.
- Two APs may be engaged at a time (AP1 active, AP2 in standby), when the localizer/glide-slope or roll out or go-around mode is armed or engaged.
  Only one AP can be engaged at a time in all other cases.
- If one AP pb is set to ON with both FDs OFF, the AP engages in HDG V/S or TRK FPA mode, depending upon which mode the flight crew has selected on the FCU.
- If one AP pb is set to ON with at least one FD already ON, the AP engages in the current active FD modes.
- At takeoff, the AP cannot be engaged below 100 ft.

AP engagement increases the break out force on the sidestick controllers and on the rudder pedals.
AP engagement is indicated by the lighting of the corresponding FCU pushbutton and by the appearance of AP1 (or 2) on the PFD's FMA.

AP DISENGAGEMENT

Ident.: DSC-22_30-30-00011818.0009001 / 04 NOV 13
Applicable to: MSN 4379-4547

AP1 or 2 disengages when:
- The flight crew presses the takeover pb on the sidestick, or
- The flight crew presses the corresponding AP pb on the FCU, or
- The flight crew pushes on the sidestick harder than a defined threshold, or moves on the rudder pedals beyond a defined threshold, or
- The flight crew moves the pitch trim wheel beyond a defined threshold, or
- The other AP is engaged, except when localizer/glideslope modes are armed or engaged, or when the rollout or go-around mode is engaged, or
- Both thrust levers are set above the MCT detent and the aircraft is on ground, or
- One of the engagement conditions is lost.

In addition, in normal law with all protections available, the AP will disengage when:
- High speed protection activates, or
- Angle-of-attack protection activates:
  - From the liftoff to 100 ft RA during the landing, when α prot +1 ° is reached, or
  - Below 100 ft RA during the landing, when α MAX is reached, or
- Pitch attitude exceeds 25 ° up, or 13 ° down, or bank angle exceeds 45 °, or
- A rudder pedal deflection is more than 10 ° out of trim.

The standard manner for the flight crew to disengage the AP is to press the takeover pb on the sidestick.
When the AP is OFF, the associated pushbutton on the FCU goes off, and AP1 (or AP2) disappears from the FMA.

AP DISENGAGEMENT

Ident.: DSC-22_30-30-00011818.0008001 / 04 NOV 13
Applicable to: MSN 1882-4100

AP1 or 2 disengages when:
- The flight crew presses the takeover pb on the sidestick, or
- The flight crew presses the corresponding AP pb on the FCU, or
- The flight crew pushes on the sidestick harder than a defined threshold, or moves on the rudder pedals beyond a defined threshold, or
- The flight crew moves the pitch trim wheel beyond a defined threshold, or
- The other AP is engaged, except when localizer/glideslope modes are armed or engaged, or when the rollout or go-around mode is engaged, or
- Both thrust levers are set above the MCT detent and the aircraft is on ground, or
- In a non-precision approach, the aircraft reaches the Missed Approach Point (MAP) with FINAL APP mode engaged, or
- One of the engagement conditions is lost.

In addition, in normal law with all protections available, the AP will disengage when:
- High speed protection activates, or
- Angle-of-attack protection activates:
  - From the liftoff to 100 ft RA during the landing, when α prot +1 ° is reached, or
  - Below 100 ft RA during the landing, when α MAX is reached, or
- Pitch attitude exceeds 25 ° up, or 13 ° down, or bank angle exceeds 45 °, or
- A rudder pedal deflection is more than 10 ° out of trim.

The standard manner for the flight crew to disengage the AP is to press the takeover pb on the sidestick.
When the AP is OFF, the associated pushbutton on the FCU goes off, and AP1 (or AP2) disappears from the FMA.

AP WARNINGS

Ident.: DSC-22_30-30-00011819.0001001 / 17 AUG 10
Applicable to: ALL

When the AP is disengaged, the system warns the flight crew:

- If the flight crew disengages it with the takeover pb on the sidestick, the warnings are temporary
- If the disengagement results from a failure, from the flight crew pushing the pushbutton on the FCU, or from a force on the sidestick, the visual and audio warnings are continual.

		AP DISENGAGEMENT	
		TAKEOVER pb on SIDESTICK	**BY OTHER MEANS**
CONSEQUENCE	**MASTER WARNING light**	Flashing red during 3 s maximum	Flashing red
	ECAM	AP OFF red message 9 s maximum	AUTO FLT AP OFF red warning
	AUDIO	Cavalry charge 0.5 s minimum 1.5 s maximum	Continuous cavalry charge 1.5 s minimum
	CLR pb on ECAM CONTROL PANEL	Extinguished	Illuminated
ACTION	**MASTER WARNING light**	- Extinguishes Master Warning light - Erases ECAM warning - Stops audio if pressed within 1.5 s	- Extinguishes Master Warning light - Stops audio after 1.5 s
	CLR pb on ECAM CONTROL PANEL	No effect	- Extinguishes CLR pb - Erases ECAM message - Calls status
	TAKEOVER pb	- Extinguishes Master Warning light - Erases ECAM warning - Stops audio if pressed within 1.5 s	- Extinguishes Master Warning light - Stops audio after 1.5 s
ECAM STATUS MESSAGE		NO	YES

AUTOLAND WARNING

Ident.: DSC-22_30-30-00011820.0001001 / 09 APR 15
Applicable to: ALL

Below 200 ft RA, an Autoland red light flashes in case of failures that require the interruption of an automatic landing.
Refer to DSC-22_30-80-30-10 Autoland Warning Light for the detailed conditions triggering the Autoland warning.

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GENERAL

Ident.: DSC-22_30-40-00011893.0001001 / 17 AUG 10
Applicable to: ALL

In flight, either the AP/FD pitch control, or autothrust may acquire and hold a target speed or Mach number, depending on the engaged modes.

Speed control is:
- Managed when the target comes from the FMGS
- Selected when the target comes from the SPD/MACH FCU window.

MANAGED SPEED/MACH TARGET

Ident.: DSC-22_30-40-00011894.0001001 / 01 DEC 14
Applicable to: ALL

When the speed target is managed, the SPD/MACH window of the FCU shows dashes, and the corresponding dot is lighted. The PFD speed scale shows the speed target in magenta.

ENGAGEMENT CONDITIONS

The SPD target is managed, whenever AP or FD is engaged, and one of the following occurs:
- The flight crew pushes in the SPD/MACH knob
- EXPEDITE mode is engaged
- V2 is inserted in the MCDU
- The speed reference system (SRS) is engaged (takeoff or go-around mode).

Note: At takeoff, SRS will not engage if V2 is not available.

DISENGAGEMENT CONDITIONS

Managed speed disengages any time the flight crew selects a speed target on the FCU, or if the speed was preselected.

SPEED PROFILE

The form of the managed SPD profile depends on the lateral NAV mode.

- **If NAV mode is engaged, the SPD profile takes into account all the constraints linked to the flight plan.**
  The SPD profile is:
  V2 - SPD LIM - SPD CSTR (if applicable) - ECON CLB SPD/MACH - ECON CRZ MACH - ECON or preset DES MACH/SPD -SPD LIM - SPD CSTR (if applicable) - HOLD SPD (if applicable) - VAPP.
- **If NAV mode is not engaged, the SPD/MACH constraints are not considered.**
  The SPD profile is:

V2 - SPD LIM - ECON CLB SPD/MACH - ECON CRZ MACH - ECON or preset DES MACH/SPD - SPD LIM - VAPP.

Note: *1. When both AP/FDs are OFF, A/THR reverts to selected SPEED mode, except when the approach phase is activated on MCDU where both managed and selected SPD are available.*
2. When expedite mode is engaged, the system disregards SPD LIM and SPD CSTR no matter what lateral mode is engaged.
3. The managed speed/Mach target may be set below maneuvering speed but as long as the speed target is managed, the FMGS limits the aircraft to the maneuvering speed of the current slats/flaps configuration (VAPP, F, S, Green Dot).
4. If the managed speed/Mach target is set above VMAX (VFE, VMO, MMO), the FMGS automatically limits the speed to VMAX.
5. If a SPD/MACH constraint has already been taken into account, it remains applied (until a more restrictive constraint applies).

MINI GROUND SPEED

In approach phase, the managed speed target is the Mini Ground Speed target computed by the Flight Guidance (FG) part of the FMGS. *Refer to DSC-22_30-90 General* for details.

SELECTED SPEED/MACH TARGET

Ident.: DSC-22_30-40-00011895.0002001 / 17 AUG 10
Applicable to: ALL

To use a selected speed/Mach target, the flight crew uses the knob on the FCU to set the target speed, which is then displayed in the FCU window. It is also displayed in blue on the PFD speed scale.

Note: *The selected speed/Mach target may be set beyond VLS or VMAX, but when autothrust is active, the guidance limits the speed to VLS or VMAX.*

Selected speed has priority over managed speed. The only automatic change-over from selected to managed speed target may occur at go-around mode engagement.
In flight, if the situation calls for managed speed, both the PFD and the MCDU display a message proposing a manual change to managed speed (for example, SET MANAGED SPEED, SET HOLD SPEED, or SET GREEN DOT SPEED).

ENGAGEMENT CONDITIONS

The aircraft has a selected speed target under any one of the following conditions:
- The flight crew pulls out the SPD/MACH knob (5 s after lift-off)
- Both AP/FDs are OFF (except in APPR phase)
- The FM speed target is lost (except in SRS, G/S, LAND, and GO AROUND modes)

- The MCDU has a preselected speed for the next phase, and the aircraft transitions into that phase
- The FMGC is powered up in flight.

DISENGAGEMENT CONDITIONS

The selected speed target disengages:
- When the managed SPD engages
- When the aircraft is on ground at engine start.

Note: With engines running, the flight crew can select a speed on the FCU only after takeoff.

AUTO SPD

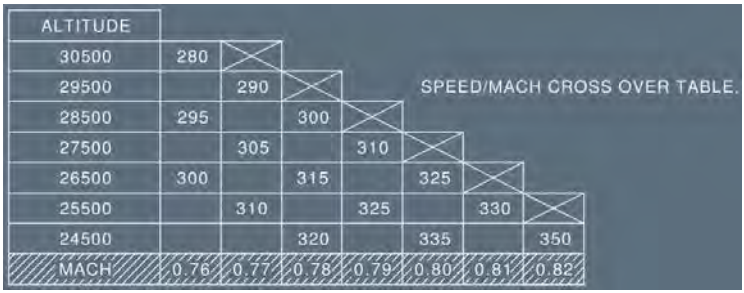
Ident.: DSC-22_30-40-00011896.0001001 / 17 AUG 10
Applicable to: ALL

The flight crew may insert the AUTO SPD (speed or Mach) on the PERF DES page to replace the ECON DES SPD.
In this case, the managed speed profile takes into account the selected value. The top of descent and the descent path are computed on AUTO SPD assumption.

SPEED/MACH SWITCHING

Ident.: DSC-22_30-40-00011897.0001001 / 16 MAR 11
Applicable to: ALL

In managed speed, at the crossover altitude, the FMGC automatically changes the managed speed target to the corresponding MACH target. The FCU displays the Mach number corresponding to the speed at the switching altitude.



ALTITUDE							
30500	280						
29500		290					
28500	295		300				
27500		305		310			
26500	300		315		325		
25500		310		325		330	
24500			320		335		350
MACH	0.76	0.77	0.78	0.79	0.80	0.81	0.82

Note: When the speed is selected, the flight crew has to perform the switching manually by pressing the SPD/MACH pb on the FCU. The FCU then displays the aircraft Mach number.

When the target speed is managed, the FMGC commands the switchover automatically as a function of the ECON MACH value.

MANAGED SPEED TARGET MEMORIZATION

Ident.: DSC-22_30-40-00011898.0001001 / 13 JAN 14
Applicable to: ALL

A dual FM failure has different consequences when it occurs in different phases of the flight.

The system handles target speed and SPD mode as follows:
- During approach with LOC and G/S engaged and radio height < 700 ft, the target speed is set to VAPP as previously memorized, and managed SPD target is maintained.
- At go-around, the target speed becomes the memorized go-around speed, which is the higher of VAPP or the speed when go-around was initiated. Managed SPD target is maintained.
- In all other cases, managed target speed reverts to selected, the value being the speed at the moment of the failure.

SPEED/MACH FCU WINDOW SYNCHRONIZATION

Ident.: DSC-22_30-40-00011899.0001001 / 17 AUG 10
Applicable to: ALL

When the target SPD is managed, the SPD/MACH display of the FCU shows dashes.

However, the window displays the target SPD or MACH in the following situations:
- The flight crew turns the SPD/MACH knob.
  If the flight crew does not pull the knob within 10 s after turning it, the selection reverts to dashes.
- The flight crew manually engages a selected SPD target.
- If the flight crew has manually preselected a speed or Mach number for the next phase on the MCDU PERF page, that preselected SPD/MACH engages when the aircraft enters that phase and the FCU window then displays as the target the preselected speed or Mach.
- If the FMGS is powered up in flight, the synchronized speed/Mach value is the current aircraft speed or Mach number.
- If no V2 is entered at takeoff, the V/S mode engages 5 s after lift-off (no speed reference system). The FCU speed target is the speed at V/S mode engagement. (A/THR becomes active when the thrust levers are set in the active range).

AP/FD MODES GENERAL

Ident.: DSC-22_30-50-00011767.0007001 / 23 JUN 15
Applicable to: ALL

The FMGS has guidance parameters for both AP/FD lateral and vertical modes.

The AP/FD lateral modes are:

RWY, RWY TRK	Runway, Runway track mode
NAV	Nav mode
HDG, TRK	Heading, track mode. Also called basic modes
APP NAV	Approach Nav mode
LOC*, LOC	Loc capture, Loc track mode
LAND	Land mode. Managed submode that includes LOC and G/S modes below 400 ft RA
FINAL APP	Final approach mode. Managed submode that includes APP NAV and FINAL modes during non precision approach
ROLL OUT	Roll out mode (Autoland)
GA TRK	Go-around track mode

The AP/FD vertical modes are:

SRS	SRS mode used for takeoff and go-around
CLB	Climb mode
DES	Descent mode
OP CLB	Open Climb mode
OP DES	Open Descent mode
EXP CLB	Expedite mode in climb
EXP DES	Expedite mode in descent
V/S or FPA	Vertical Speed mode or Flight Path Angle mode. Also called basic modes
ALT*	Altitude capture
ALT	Altitude Hold mode
ALT CST*	Altitude constraint capture
ALT CST	Altitude constraint hold mode
ALT CRZ	Altitude hold of the cruise flight level
G/S*	Glide slope capture
G/S	Glide slope mode
FINAL	Final mode (Non precision approach)
FLARE	Flare mode (Autoland)

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HEADING OR TRACK: HDG - TRK

Ident.: DSC-22_30-60-00012328.0013001 / 29 MAR 12
Applicable to: MSN 3467, 4379-4547

These modes guide the aircraft laterally along a heading or track selected by the flight crew. The HDG/TRK window of the FCU displays the target heading or track. The flight crew uses the HDG V/S -TRK FPA pb to select heading or track.

ENGAGEMENT CONDITIONS

HDG or TRK is engaged when one of the following conditions is met:
- The flight crew pulls out the HDG/TRK knob (not sooner than 5 s after lift-off)
- NAV, APP NAV or FINAL APP modes are disengaged, either by the loss of the lateral flight plan or when the flight crew enters a flight plan discontinuity
- LOC or LOC* mode is lost
- The flight crew engages the AP/FD with no other mode already engaged (basic mode of AP/FD engagement)
- The flight crew presses the LOC pb, when APP NAV or FINAL APP modes are already engaged

HDG engages if the flight crew initiates a go-around below 100 ft and HDG or TRK was already engaged. When the aircraft is at 100 ft or above, HDG or TRK are no longer engaged.

DISENGAGEMENT CONDITIONS

The engagement of any other lateral mode disengages HDG or TRK.

SYNCHRONIZING THE HDG/TRK WINDOW OF THE FCU

The lateral window of the FCU displays a heading or a track value when:
- The HDG/TRK mode is engaged. The displayed value is the current HDG/TRK or the manually selected value of the target
- The flight crew turns the HDG/TRK knob. The value in the window first synchronizes with the current HDG/TRK, then displays the manual selection. It remains displayed for 10 s or 45 s depending upon FCU standard, then vanishes if the flight crew does not pull the knob (except in HDG preset)
- A HDG/TRK is preset (*Refer to DSC-22_30-60 HDG/TRK Preset*)
- AP/FD is lost. The value becomes that of the aircraft current heading or track.

Note: *If HDG is switched to TRK (or vice versa), the value displayed in the window switches from heading to track (or vice versa).*

HEADING OR TRACK: HDG - TRK

Ident.: DSC-22_30-60-00012328.0011001 / 29 MAR 12
Applicable to: MSN 1882-2078

These modes guide the aircraft laterally along a heading or track selected by the flight crew. The HDG/TRK window of the FCU displays the target heading or track. The flight crew uses the HDG V/S -TRK FPA pb to select heading or track.

ENGAGEMENT CONDITIONS

HDG or TRK is engaged when one of the following conditions is met:
- The flight crew pulls out the HDG/TRK knob (not sooner than 5 s after lift-off)
- NAV, APP NAV or FINAL APP modes are disengaged, either by the loss of the lateral flight plan or when the flight crew enters a flight plan discontinuity
- LOC or LOC* mode is lost
- The flight crew engages the AP/FD with no other mode already engaged (basic mode of AP/FD engagement)
- The flight crew presses the LOC pb, when APP NAV or FINAL APP modes are already engaged

DISENGAGEMENT CONDITIONS

The engagement of any other lateral mode disengages HDG or TRK.

SYNCHRONIZING THE HDG/TRK WINDOW OF THE FCU

The lateral window of the FCU displays a heading or a track value when:
- The HDG/TRK mode is engaged. The displayed value is the current HDG/TRK or the manually selected value of the target
- The flight crew turns the HDG/TRK knob. The value in the window first synchronizes with the current HDG/TRK, then displays the manual selection. It remains displayed for 10 s or 45 s depending upon FCU standard, then vanishes if the flight crew does not pull the knob (except in HDG preset)
- A HDG/TRK is preset (*Refer to DSC-22_30-60 HDG/TRK Preset*)
- AP/FD is lost. The value becomes that of the aircraft current heading or track.

Note: If HDG is switched to TRK (or vice versa), the value displayed in the window switches from heading to track (or vice versa).

HEADING OR TRACK: HDG - TRK

Ident.: DSC-22_30-60-00012328.0001001 / 17 AUG 10
Applicable to: MSN 3408, 3518-4100

These modes guide the aircraft laterally along a heading or track selected by the flight crew. The HDG/TRK window of the FCU displays the target heading or track. The flight crew uses the HDG V/S -TRK FPA pb to select heading or track.

ENGAGEMENT CONDITIONS

HDG or TRK is engaged when one of the following conditions is met:
- The flight crew pulls out the HDG/TRK knob (not sooner than 5 s after lift-off)
- NAV is disengaged, either by the loss of the lateral flight plan or by the flight crew entering a flight plan discontinuity
- FINAL mode (armed or engaged) is lost when the aircraft is in APP NAV mode
- LOC or LOC* mode is lost
- The flight crew engages the AP/FD with no other mode already engaged (basic mode of AP/FD engagement)
- LOC mode is armed when APP NAV FINAL were previously engaged.

DISENGAGEMENT CONDITIONS

The engagement of any other lateral mode disengages HDG or TRK.

SYNCHRONIZING THE HDG/TRK WINDOW OF THE FCU

The lateral window of the FCU displays a heading or a track value when:
- The HDG/TRK mode is engaged. The displayed value is the current HDG/TRK or the manually selected value of the target
- The flight crew turns the HDG/TRK knob. The value in the window first synchronizes with the current HDG/TRK, then displays the manual selection. It remains displayed for 10 s or 45 s depending upon FCU standard, then vanishes if the flight crew does not pull the knob (except in HDG preset)
- A HDG/TRK is preset (*Refer to DSC-22_30-60 HDG/TRK Preset*)
- AP/FD is lost. The value becomes that of the aircraft current heading or track.

Note: *If HDG is switched to TRK (or vice versa), the value displayed in the window switches from heading to track (or vice versa).*

HDG/TRK PRESET

Ident.: DSC-22_30-60-00012329.0009001 / 29 MAR 12
Applicable to: MSN 3467, 4379-4547

The system has a HDG/TRK preset function for takeoff and go-around.
If the flight crew chooses not to fly the flight plan after takeoff or go-around, they may preset a HDG or a TRK on the FCU by turning the HDG/TRK knob. The value they set remains displayed in the FCU HDG/TRK window until they pull the knob.

OPERATION AT TAKEOFF

HDG/TRK preset is available before takeoff and up to 30 ft RA. Turning the HDG/TRK knob before 30 ft sets the desired HDG/TRK. As a consequence:
- NAV is disarmed
- At 30 ft, RWY TRK is annunciated until the HDG/TRK knob is pulled.

OPERATION AT GO-AROUND

Whenever the LOC*, LOC, LAND or GA modes are engaged, the HDG preset is available. If the flight crew rotates the HDG/TRK knob to set the value, it will remain displayed in the window. Pull out the HDG/TRK knob to activate the mode and turn the aircraft to the preset value.
When overflying the MAP, HDG/TRK will synchronize with the current value. The HDG/TRK preset function is no longer available.

CANCELLATION

The flight crew can cancel a preset HDG/TRK by:
- Engaging the NAV mode using the DIR TO
- Pushing in the HDG/TRK knob (arming NAV mode)
- Disengaging AP/FD.

HDG/TRK PRESET

Ident.: DSC-22_30-60-00012329.0010001 / 29 MAR 12
Applicable to: MSN 1882-2078

The system has a HDG/TRK preset function for takeoff and go-around.
If the flight crew chooses not to fly the flight plan after takeoff or go-around, they may preset a HDG or a TRK on the FCU by turning the HDG/TRK knob. The value they set remains displayed in the FCU HDG/TRK window until they pull the knob.

OPERATION AT TAKEOFF

HDG/TRK preset is available before takeoff and up to 30 ft RA. Turning the HDG/TRK knob before 30 ft sets the desired HDG/TRK. As a consequence:
- NAV is disarmed
- At 30 ft, RWY TRK is annunciated until the HDG/TRK knob is pulled.

OPERATION AT GO-AROUND

Whenever the LOC*, LOC, LAND or GA modes are engaged, the HDG preset is available. If the flight crew rotates the HDG/TRK knob to set the value, it will remain displayed in the window. Pull out the HDG/TRK knob to activate the mode and turn the aircraft to the preset value.

CANCELLATION

The flight crew can cancel a preset HDG/TRK by:
- Engaging the NAV mode using the DIR TO
- Pushing in the HDG/TRK knob (arming NAV mode)
- Disengaging AP/FD.

HDG/TRK PRESET

Ident.: DSC-22_30-60-00012329.0001001 / 17 AUG 10
Applicable to: MSN 3408, 3518-4100

The system has a HDG/TRK preset function for takeoff and go-around.
If the flight crew chooses not to fly the flight plan after takeoff or go-around, they may preset a HDG or a TRK on the FCU by turning the HDG/TRK knob. The value they set remains displayed in the FCU HDG/TRK window until they pull the knob.

OPERATION AT TAKEOFF

HDG/TRK preset is available before takeoff and up to 30 ft RA. Turning the HDG/TRK knob before 30 ft sets the desired HDG/TRK. As a consequence:
- NAV is disarmed
- At 30 ft, RWY TRK is annunciated until the HDG/TRK knob is pulled.

OPERATION AT GO-AROUND

Whenever the LOC*, LOC, LAND, FINAL APP, or GA modes are engaged, the HDG preset is available. If the flight crew rotates the HDG/TRK knob to set the value, it will remain displayed in the window. Pull out the HDG/TRK knob to activate the mode and turn the aircraft to the preset value.

CANCELLATION

The flight crew can cancel a preset HDG/TRK by:
- Engaging the NAV mode using the DIR TO
- Pushing in the HDG/TRK knob (arming NAV mode)
- Disengaging AP/FD.

NAVIGATION (NAV)

Ident.: DSC-22_30-60-00012330.0005001 / 23 JUN 15
Applicable to: MSN 3467, 4379-4547

NAV mode is a managed mode that steers the aircraft laterally along the flight plan defined in the FMGS. It is designed to have a zero cross-track error. The flight crew can arm or engage the NAV mode if the MCDU contains a lateral flight plan.

ARMING CONDITIONS

Satisfying one of the following conditions arms NAV:

- The aircraft is on ground with no HDG/TRK preset and no other lateral mode except runway mode
- The flight crew pushes in the HDG/TRK knob, unless the LOC mode is engaged
- The flight crew presses the APPR pb, if a non-ILS approach is selected
- A go-around is initiated, unless HDG/TRK is already preset.

DISARMING CONDITIONS

NAV mode disarms if one of the following occurs:

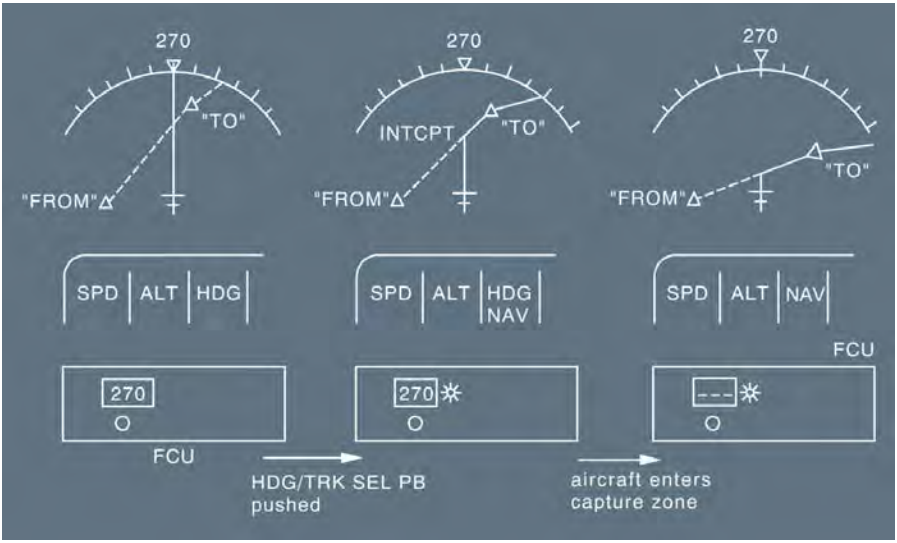
- The flight crew pulls out the HDG/TRK knob
- The flight crew selects a preset HDG/TRK (TO or GA)
- The flight crew arms the LOC mode by pressing the LOC pb
- LAND mode has engaged
- The flight crew presses the APPR pb, if an XLS approach is selected.

ENGAGEMENT CONDITIONS

NAV mode engages:

- Automatically at 30 ft RA after takeoff (if armed on the ground)
- When the flight crew orders “DIR TO" (except below 700 ft RA in LOC mode)
- When the flight crew pushes in the HDG/TRK knob when the aircraft is close to (within ~1 NM of) the active flight plan leg
- Automatically in flight when NAV is armed and the aircraft reaches the capture zone for the active flight plan leg
- Automatically during a go-around, when the aircraft is above 100 ft RA, and within the capture zone for the active flight plan leg, unless a HDG/TRK was preset.

Note: *During a go-around, when the approach was previously flown in NAV, APP NAV or FINAL APP modes, the NAV mode remains engaged, unless a HDG/TRK was preset.*



CAUTION	When NAV is armed, it will automatically engage if: - The aircraft track line intercepts the flight plan before the TO waypoint, and - The intercept waypoint (INTCP) is displayed on the ND, and - The aircraft reaches the active flight plan leg.

Note: The TO waypoint is displayed in white on NDs and MCDUs.

DISENGAGEMENT CONDITIONS

The NAV mode disengages when:
- Any other lateral mode is engaged
- The flight plan is lost or the aircraft enters a flight plan discontinuity.

INTERACTIONS WITH VERTICAL MODES

When NAV mode is engaged, the vertical managed modes CLB or DES or FINAL take into account altitude and speed constraints linked to waypoints on the lateral flight plan. If NAV mode is disengaged, the vertical managed modes are not available and all downpath altitude and speed constraints are ignored.

NAVIGATION (NAV)

Ident.: DSC-22_30-60-00012330.0002001 / 23 JUN 15
Applicable to: MSN 1882-3408, 3518-4100

NAV mode is a managed mode that steers the aircraft laterally along the flight plan defined in the FMGS. It is designed to have a zero cross-track error. The flight crew can arm or engage the NAV mode if the MCDU contains a lateral flight plan.

ARMING CONDITIONS

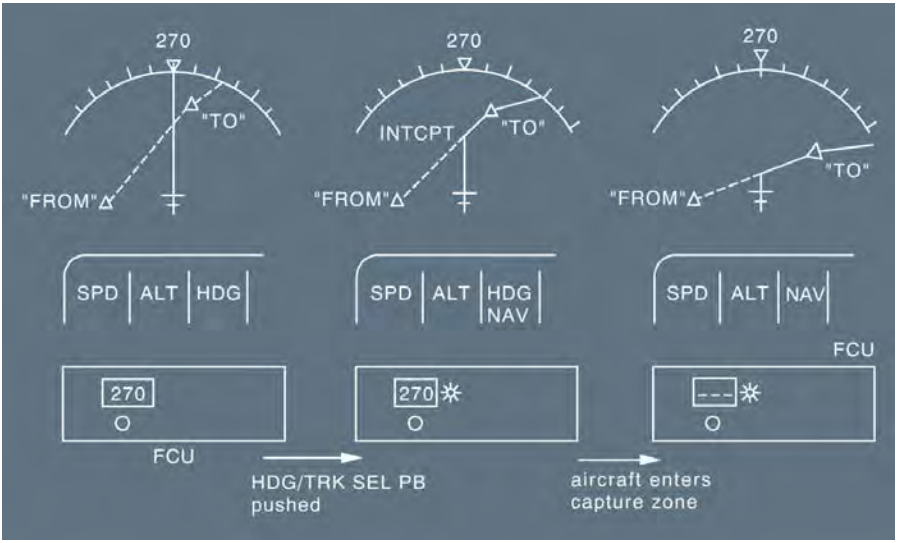
Satisfying one of the following conditions arms NAV:
- The aircraft is on ground with no HDG/TRK preset and no other lateral mode except runway mode
- The flight crew pushes in the HDG/TRK knob, unless the LOC mode is engaged
- The flight crew presses the APPR pb, if a non-ILS approach is selected.

DISARMING CONDITIONS

NAV mode disarms if one of the following occurs:
- The flight crew pulls out the HDG/TRK knob
- The flight crew selects a preset HDG/TRK (TO or GA)
- The flight crew arms the LOC mode by pressing the LOC pb
- The flight crew selects GA mode
- LAND mode has engaged
- The flight crew presses the APPR pb, if an XLS approach is selected.

ENGAGEMENT CONDITIONS

NAV mode engages:
- Automatically at 30 ft RA after takeoff (if armed on the ground)
- When the flight crew orders “DIR TO" (except below 700 ft RA in LOC mode)
- When the flight crew pushes in the HDG/TRK knob when the aircraft is close to (within ~1 NM of) the active flight plan leg
- Automatically in flight when NAV is armed and the aircraft reaches the capture zone for the active flight plan leg.



CAUTION	When NAV is armed, it will automatically engage if: - The aircraft track line intercepts the flight plan before the TO waypoint, and - The intercept waypoint (INTCP) is displayed on the ND, and - The aircraft reaches the active flight plan leg.

Note: The TO waypoint is displayed in white on NDs and MCDUs.

DISENGAGEMENT CONDITIONS

The NAV mode disengages when:
- Any other lateral mode is engaged
- The flight plan is lost or the aircraft enters a flight plan discontinuity.

INTERACTIONS WITH VERTICAL MODES

When NAV mode is engaged, the vertical managed modes CLB or DES or FINAL take into account altitude and speed constraints linked to waypoints on the lateral flight plan. If NAV mode is disengaged, the vertical managed modes are not available and all downpath altitude and speed constraints are ignored.

LOCALIZER MODE THROUGH THE LOC PUSHBUTTON

Ident.: DSC-22_30-60-00012331.0001001 / 17 AUG 10
Applicable to: ALL

This mode captures and tracks a localizer beam independently of the glide path beam. Flight crew use it to fly localizer-only approaches or to initiate an ILS approach when intercepting the glide slope from above.

ARMING CONDITIONS

The flight crew arms the LOC mode by pressing the LOC pb, provided that:
- An ILS is tuned (frequency and runway course)
- The aircraft is above 400 ft RA
- TO or GA mode is not engaged.

DISARMING CONDITIONS

LOC mode is disarmed by:
- Pressing the LOC pb when LOC is armed
- Arming the NAV mode
- Engaging the GA mode.

Note: *Engaging NAV mode by selecting DIR TO does not disarm the LOC mode.*

ENGAGEMENT CONDITIONS

The LOC mode engages automatically when capture conditions are met.

DISENGAGEMENT CONDITIONS

The LOC mode disengages:
- When another lateral mode is engaged
- When the flight crew presses the LOC pb again (engaging the HDG/TRK mode on the current HDG/TRK).

GENERAL

Ident.: DSC-22_30-70-10-00010507.0001001 / 17 AUG 10
Applicable to: ALL

Vertical modes guide the aircraft in the vertical plan.

PRINCIPLES

Ident.: DSC-22_30-70-10-00010508.0001001 / 17 AUG 10
Applicable to: ALL

To leave an FCU selected altitude for another target altitude, the flight crew must turn the Altitude (ALT) knob in order to display the new target altitude and either:

- Pull out the ALT knob to engage the OPEN CLB/DES mode, or
- Push in the ALT knob to engage the CLB/DES mode, or
- Select a target vertical speed (V/S) and pull out the V/S or FPA knob to engage V/S mode, or
- Select EXPEDITE .

This arms ALT mode.

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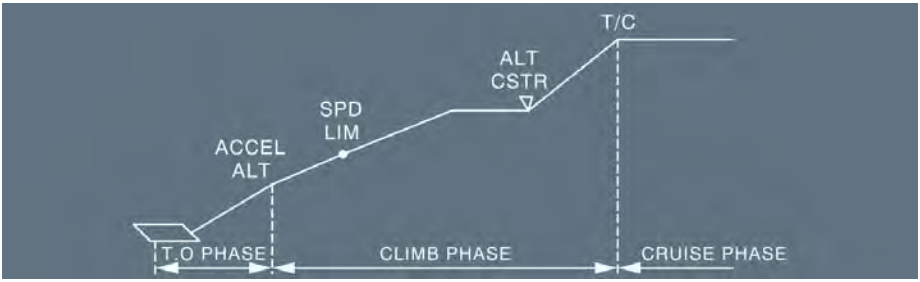
GENERAL

Ident.: DSC-22_30-70-20-00010509.0001001 / 01 OCT 12
Applicable to: ALL

CLB mode guides the aircraft in a managed climb, at either a managed or a selected target speed, to an FCU selected altitude, taking into account altitude constraints at waypoints.
The system also considers speed constraints if the target speed is managed. The vertical flight path may include several segments:



The flight crew can arm the CLB mode during the takeoff, go-around, climb, and cruise phases and engage it during the climb and cruise phases.

ARMING CONDITIONS

Ident.: DSC-22_30-70-20-00010510.0001001 / 17 AUG 10
Applicable to: ALL

The CLB mode is armed:

- On ground or when SRS mode is engaged (TO or GA) if the following conditions are met:
  - No other vertical mode is engaged
  - The ACCEL ALT (defined on the PERF TO or GA MCDU pages) is below the FCU selected altitude and the lowest altitude constraint.
- In flight, when the climb or go-around phase is active, and the following conditions are met:
  - The lateral NAV mode is engaged
  - The FCU selected altitude is above the aircraft's present altitude and the aircraft captures or flies an altitude constraint.

DISARMING CONDITIONS

Ident.: DSC-22_30-70-20-00010511.0002001 / 23 JUN 15
Applicable to: ALL

The CLB mode is disarmed, if one of the following conditions is met:
- Another vertical mode is engaged
- The FCU selected altitude is lower than the present aircraft level
- The FCU selected altitude is set at the altitude constraint while ALT CST* or ALT CST mode is engaged
- The aircraft transitions to DES or APPR phase
- Arming requirements are no longer met
- Vertical flight path validity is lost, or NAV mode is lost while ALT CST* or ALT CST mode is engaged.

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-20-00010512.0001001 / 17 AUG 10
Applicable to: ALL

The CLB mode can be engaged, if the following conditions are all met:
- The aircraft has been in flight for more than 5 s
- The selected FCU level is above the present aircraft level
- The descent, approach, or go-around phase is not active
- NAV mode is engaged
- Glideslope (G/S) mode is not engaged.

CLB mode automatically engages when the aircraft reaches ACC ALT, or sequences a waypoint with an altitude constraint while the CLB mode is armed.
CLB mode manually engages when the flight crew pushes in the ALT knob, with the CLB mode not armed and the current altitude is not an effective altitude constraint of the flight plan.

Note: *When CLB mode is engaged:*
- *The V/S (FPA) window of the FCU shows dashes*
- *The managed LVL/CH dot on the FCU lights up*
- *The Flight Mode Annunciator displays “CLB” in Column 2.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-20-00010513.0001001 / 17 AUG 10
Applicable to: MSN 1882

The CLB mode disengages, if one of the following conditions is met:
- NAV mode is lost or disengaged (OP CLB engages)
- Another vertical mode engages
- The flight crew selects an altitude on the FCU that is lower than the present aircraft altitude. V/S (FPA) engages on the current V/S (FPA).

DISENGAGEMENT CONDITIONS

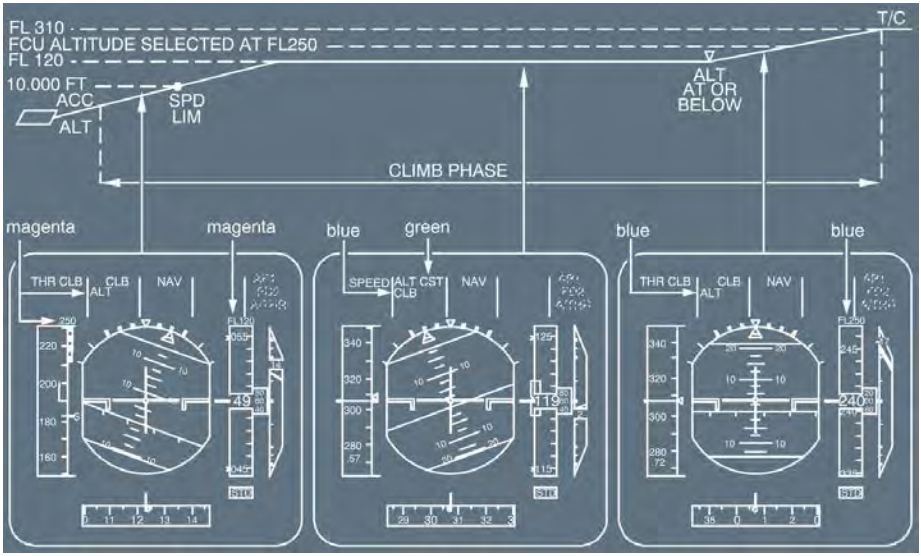
Ident.: DSC-22_30-70-20-00010513.0002001 / 17 AUG 10
Applicable to: MSN 2078-4547

The CLB mode disengages, if one of the following conditions is met:
- NAV mode is lost or disengaged (OP CLB engages). In this case, the reversion to OP CLB is accompanied by a triple click aural warning
- Another vertical mode engages
- The flight crew selects an altitude on the FCU that is lower than the present aircraft altitude. V/S (FPA) engages on the current V/S (FPA).

GUIDANCE

Ident.: DSC-22_30-70-20-00010514.0002001 / 01 OCT 12
Applicable to: ALL

Climb mode gives the aircraft managed vertical guidance to the FCU selected altitude. It meets altitude constraints at waypoints either with managed speed incorporating speed constraints or with selected speed as target speed. The AP/FD pitch controls the speed or Mach number target and the A/THR is in thrust mode (CLB) corresponding to maximum climb thrust. The flight path may include several segments.



- When CLB mode is engaged, the system arms ALT and displays the applicable target altitude on the ALT scale.
  - If the next predicted level-off is an ALT CSTR, ALT is magenta on the FMA and the ALT CSTR is displayed in magenta on the altitude scale
  - If the next predicted level-off is the FCU altitude, ALT is blue on the FMA and the FCU selected altitude is displayed in blue on the altitude scale.

  Note: *The system takes into account all constraints defined by the database or manually entered by the flight crew. Nevertheless this mode has the following particularity: When the aircraft is in CLB mode and the system predicts that it will miss an altitude constraint, it will not modify the target speed in an attempt to meet it. In this case, the flight crew may select an appropriate speed in order to meet the ALT CSTR.*

- The guidance does not modify the target speed in order to satisfy an altitude constraint. Therefore the constraint may not be met and may be predicted as missed
- When the aircraft levels off at the ALT CSTR, CLB mode arms automatically, then engages when the aircraft passes the constrained waypoint (if the FCU altitude is above the constraint altitude).

GENERAL

Ident.: DSC-22_30-70-30-00010515.0001001 / 17 AUG 10
Applicable to: ALL

The OPEN CLB mode is a selected mode. It uses the AP/FD pitch mode to maintain a SPD/MACH (selected or managed) while the autothrust (if active) maintains maximum climb thrust.

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-30-00010516.0001001 / 16 MAR 11
Applicable to: MSN 1882

The OPEN CLB mode can only be engaged, if all of the following conditions are met:
- The aircraft is in flight for more than 5 s
- The LAND mode is not engaged
- The FCU selected altitude is higher than the aircraft's present altitude.

The OPEN CLB mode is engaged, if one of the following conditions occurs:
- The flight crew pulls out the ALT knob
- The flight crew pulls out the SPD/MACH knob, when TOGA mode or EXPED CLB ◁ is engaged
- Acceleration altitude is reached, with CLB armed, and NAV mode not engaged
- Guidance reverts to ensure speed protection
- NAV mode is lost (or disengaged), when previously in CLB mode (*Refer to DSC-22_30-75 General*).

Note: *When OPEN CLB is engaged:*
- *The FMA displays "OP CLB"*
- *The managed LVL/CH dot on the FCU goes out.*

Typical FMA in OPEN CLIMB

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-30-00010516.0002001 / 16 MAR 11
Applicable to: MSN 2078-4547

The OPEN CLB mode can only be engaged, if all of the following conditions are met:
- The aircraft is in flight for more than 5 s
- The LAND mode is not engaged
- The FCU selected altitude is higher than the aircraft's present altitude.

The OPEN CLB mode is engaged, if one of the following conditions occurs:
- The flight crew pulls out the ALT knob
- The flight crew pulls out the SPD/MACH knob, when TOGA mode or EXPED CLB is engaged
- Acceleration altitude is reached, with CLB armed, and NAV mode not engaged
- Guidance reverts to ensure speed protection
- NAV mode is lost (or disengaged), when previously in CLB mode. Reversion to OPEN CLB is accompanied by a triple click aural warning (*Refer to DSC-22_30-75 General*).

Note: *When OPEN CLB is engaged:*
- *The FMA displays "OP CLB"*
- *The managed LVL/CH dot on the FCU goes out.*

Typical FMA in OPEN CLIMB

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-30-00010517.0001001 / 17 AUG 10
Applicable to: ALL

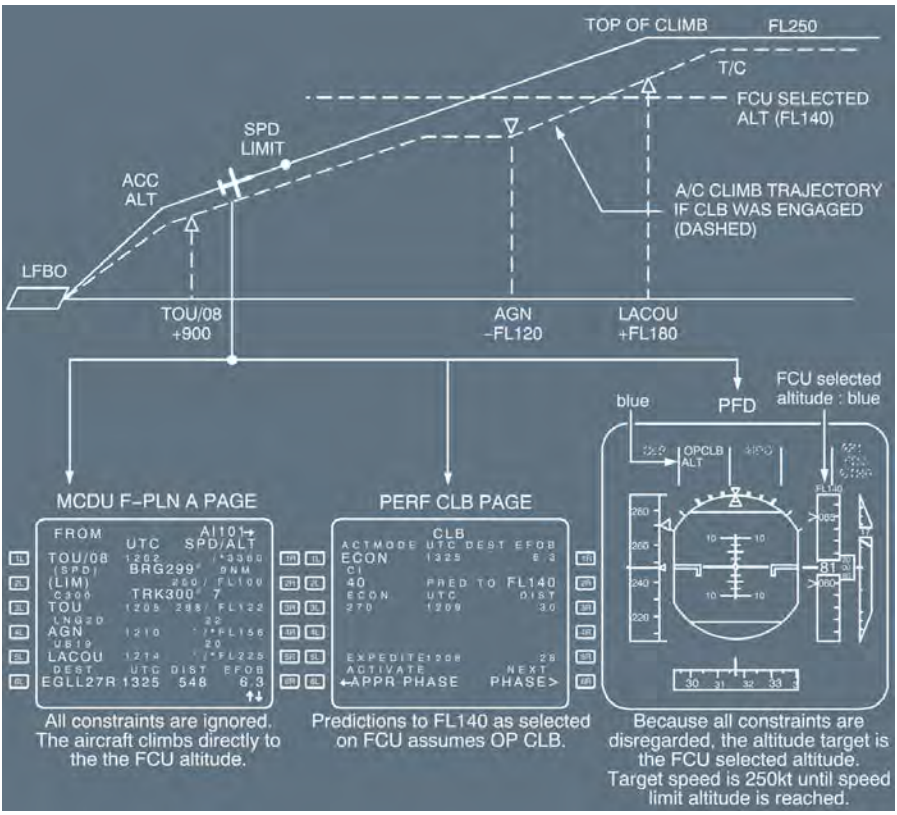
The OPEN CLB mode is disengaged by one of the following conditions:
- Engagement of any other vertical mode
- Reversion to V/S mode (*Refer to DSC-22_30-75 General*)
- Selection of a lower altitude than the current aircraft altitude. V/S (FPA) engages on the current V/S (FPA).

GUIDANCE

Ident.: DSC-22_30-70-30-00010518.0001001 / 01 OCT 12
Applicable to: ALL

When OPEN CLB is engaged, the target speed/Mach is maintained by adjusting the pitch with the elevator, whereas thrust is maintained either by the A/THR, or manually by the flight crew. Speed target may either be selected or managed.
The OPEN CLB mode disregards all altitude constraints up to the FCU selected altitude.

OPEN CLB MODES, MANAGED SPEED



Note: *If the change is less than 1 200 ft in OPEN CLB mode, the aircraft responds with a rate of climb of 1 000 ft/min.*

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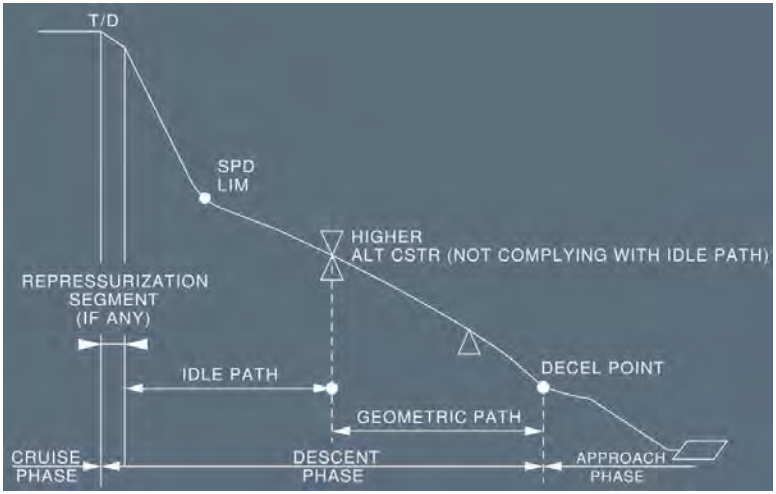
GENERAL

Ident.: DSC-22_30-70-50-00010521.0001001 / 17 AUG 10
Applicable to: ALL

The DES mode guides the aircraft along the descent path computed by the FMGS. The system computes this flight path backwards from the deceleration point up to the top of descent (T/D), with respect to the speed and altitude constraints at the deceleration point, the guidance begins the deceleration to VAPP, to be reached at 1 000 ft above touchdown on the final descent path.
Internally, the computer divides the descent path into various segments, depending on the relative positions of the constraints. It starts at top of descent (T/D) by setting up an “idle” segment that takes the aircraft down to the first constraint, and follows this with “geometric” segments between constraints.
The descent profile takes into account wind data and data from the lateral and vertical flight plans, and it is based upon the managed descent speed profile. It does not take holding patterns into consideration.

The descent profile has several segments:

- A repressurization segment. When necessary, this produces a repressurization rate for the cabin during descent. It is a function of the destination airport altitude and the selected cabin rate (defaulted to -350 ft/min but this can be modified)
- Idle path segment. The AP/FD controls the speed and the autothrust stays at idle thrust. The guidance computes this profile from the top of descent or the end of the repressurization segment to the first vertical constraint that cannot be flown at idle thrust
- Geometric path segments. The AP/FD controls the vertical path, and autothrust controls the speed. These segments take the aircraft from the first constraint to the deceleration point.



The descent mode is a managed mode that may be engaged during cruise. It can be armed or engaged in descent and approach phases (except if the FCU selected altitude is higher than the present aircraft altitude).

ARMING CONDITIONS

Ident.: DSC-22_30-70-50-00010522.0001001 / 17 AUG 10
Applicable to: ALL

The DES mode is armed when an ALT CSTR is captured and all the following conditions are met:
- FCU selected altitude is lower than present altitude
- NAV, LOC* or LOC mode is engaged
- Takeoff or go-around phase is not active
- Flight profile is available.

DISARMING CONDITIONS

Ident.: DSC-22_30-70-50-00010523.0002001 / 23 JUN 15
Applicable to: ALL

The DES mode is disarmed if one of the following conditions is met:
- Engagement of another vertical mode
- FCU selected altitude is set above the aircraft current altitude
- Loss of NAV, LOC*, or LOC mode
- Switching to the go-around phase

- Loss of vertical flight path validity
- Setting the FCU selected altitude at an altitude constraint while ALT CST* was engaged. (ALT* engages and DES mode disarms).

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-50-00010524.0002001 / 23 JUN 15
Applicable to: ALL

The DES mode can be engaged, when the following conditions are met:
- The FCU selected altitude is lower than present altitude
- NAV, LOC*, or LOC mode is engaged
- Takeoff, climb, or go-around phase is not active
- Vertical flight path is valid
- TO, G/S, LAND, FINAL or GA mode is not engaged, and:
  - The aircraft sequences a waypoint with an ALT CSTR, and DES mode is armed. The DES mode engages automatically, or
  - The flight crew presses the ALT knob, while ALT CST* or ALT CST is not engaged, or
  - The flight crew presses the ALT knob, while ALT* or ALT is engaged, but the current altitude is not an effective altitude constraint of the F-PLN.

Note: *When DES mode is engaged:*
- *The V/S - FPA window of the FCU shows dashes*
- *The managed LVL/CH dot on the FCU lights up.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-50-00010525.0001001 / 17 AUG 10
Applicable to: MSN 1882

The DES mode is disengaged, if one of the following conditions is met:
- The NAV mode is lost or disengaged and the V/S or FPA mode engages
- Another vertical mode engages
- The flight crew selects an altitude on the FCU that is higher than the aircraft present altitude and the V/S (FPA) engages on current V/S (FPA)
- NAV mode is lost due to a discontinuity in the descent profile. AP/FD reverts to basic mode.

Refer to DSC-22_30-75 General.

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-50-00010525.0002001 / 17 AUG 10
Applicable to: MSN 2078-4547

The DES mode is disengaged, if one of the following conditions is met:

- The NAV mode is lost or disengaged and the V/S or FPA mode engages. A triple click aural warning will sound
- Another vertical mode engages
- The flight crew selects an altitude on the FCU that is higher than the aircraft present altitude and the V/S (FPA) engages on current V/S (FPA). Same triple click logic, as for the OP DES case
- NAV mode is lost due to a discontinuity in the descent profile. AP/FD reverts to basic mode, and a triple click aural warning sounds. The vertical mode is boxed in white for 10 s.

Refer to DSC-22_30-75 General.

REPRESSURIZATION SEGMENT

Ident.: DSC-22_30-70-50-00010559.0002001 / 14 MAY 12
Applicable to: ALL

The top of descent (T/D) may be updated if the flight crew modifies the cabin rate of descent (default rate is -350 ft/min).
If the flight crew enters a lower cabin rate, the system computes a repressurization segment that takes into account the additional time needed for repressurization.

DESCENT SPEED PROFILE

Ident.: DSC-22_30-70-50-00012563.0002001 / 14 MAY 12
Applicable to: ALL

The descent speed profile is usually the ECON SPD profile, amended by any speed constraints and speed limit contained in the flight plan.

Before the descent phase is active, if flight crew does not intend to fly the ECON speed/Mach profile, a different speed or Mach can be entered to amend the speed profile.
It is obtained by entering a Mach number and/or a speed in the MANAGED field of the PERF DES MCDU page (3L key).

If the flight crew reverts to the SELECTED speed/MACH mode during descent, the profile is not modified and the aircraft flies the same profile at the FCU selected speed/MACH value.

Basic managed SPD/MACH profile in DES mode is:
- ECON MACH, or SELECTED Mach
- ECON SPD, or SELECTED Speed
- SPD CSTR (if any)
- SPD LIMIT
- Green Dot/S/F/VAPP
- VAPP TARGET.

GUIDANCE IN DES MODE

Ident.: DSC-22_30-70-50-A-00010575.0001001 / 17 AUG 10
Applicable to: ALL

DESCENT INITIATION

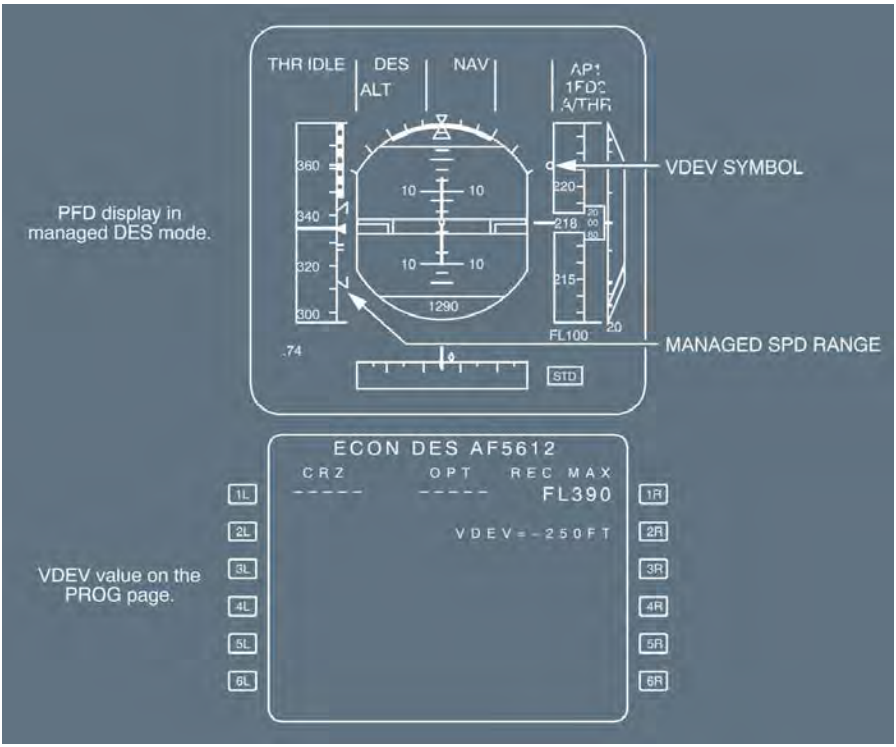
The aircraft will not start its descent automatically when reaching the top of descent (T/D). In order to initiate the descent, the flight crew sets the clearance altitude by turning the ALT knob then pushes the ALT knob.

The aircraft will descend immediately:
- If the top of descent is not reached, the aircraft descends at a constant V/S converging on the descent path
- If the aircraft is at or beyond the T/D, it descends at idle thrust.

DURING THE DESCENT

The flight crew will see a vertical deviation symbol (VDEV) along the ALT scale on the PFD and a VDEV value on the PROG page, so that the aircraft's vertical position can be monitored versus the calculated descent profile.

The aircraft may deviate from the DES profile while DES mode is engaged if:
- Unexpected wind conditions are encountered
- Anti-icing is turned on
- The lateral flight plan is changed.



When the speed is managed, a target speed range displayed on the PFD defines acceptable speed variations around the nominal descent speed target.

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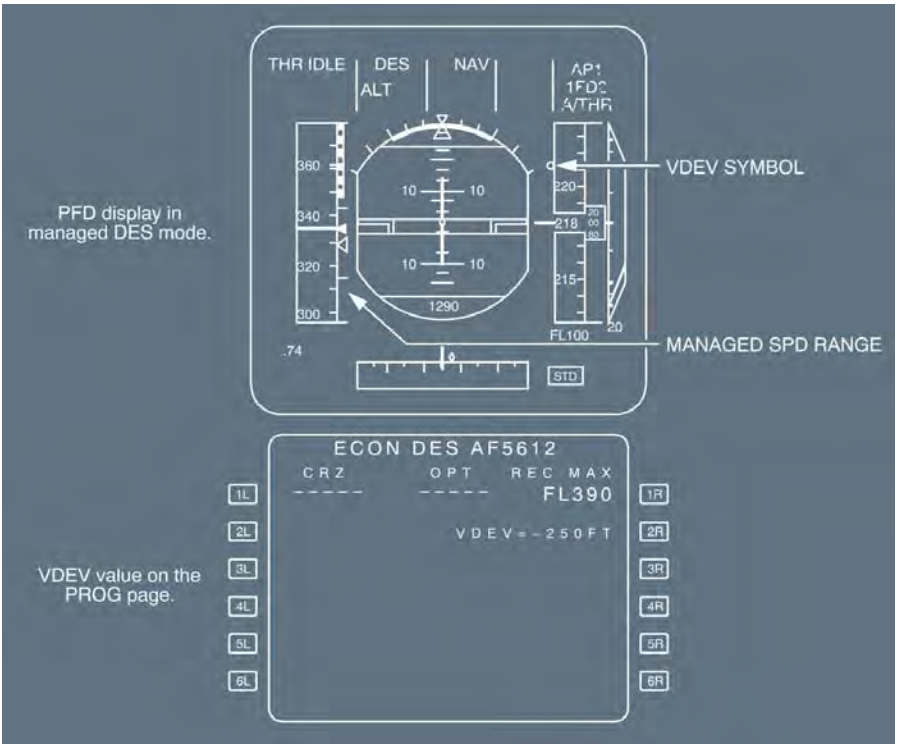


When the speed is managed, a target speed range displayed on the PFD defines acceptable speed variations around the nominal descent speed target.

Ident.: DSC-22_30-70-50-A-00010565.0001001 / 19 DEC 12
Applicable to: ALL

FMA DISPLAY

When DES mode is engaged, the system arms ALT and displays the applicable target altitude on the PFD altitude scale.

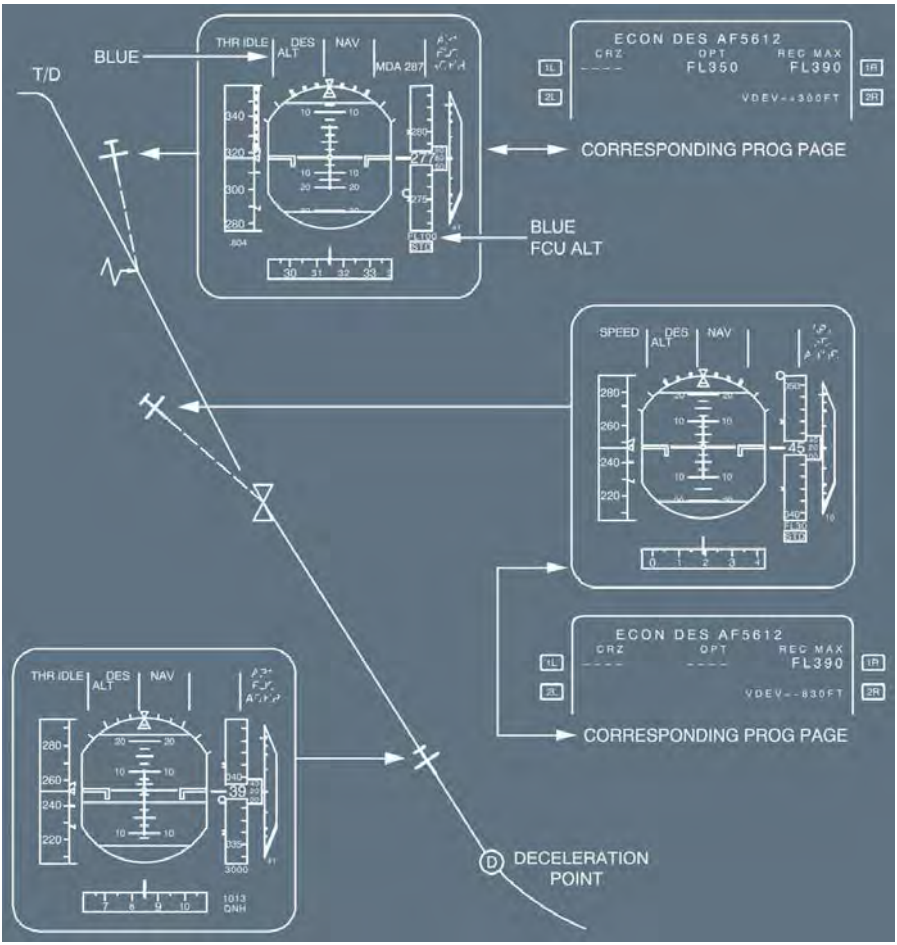
- If the next predicted level-off is an altitude constraint, ALT is magenta on the FMA second line and the PFD displays the altitude constraint magenta above the altitude scale.
  When the aircraft flies at the altitude constraint (ALT CSTR), the system arms DES blue.
  When the aircraft meets the constraint, DES engages again automatically.
- If the next predicted level-off is the FCU altitude, ALT is blue on the FMA and the PFD displays the FCU selected altitude in blue.

Typical FMA in DES

DES MODE PROFILE

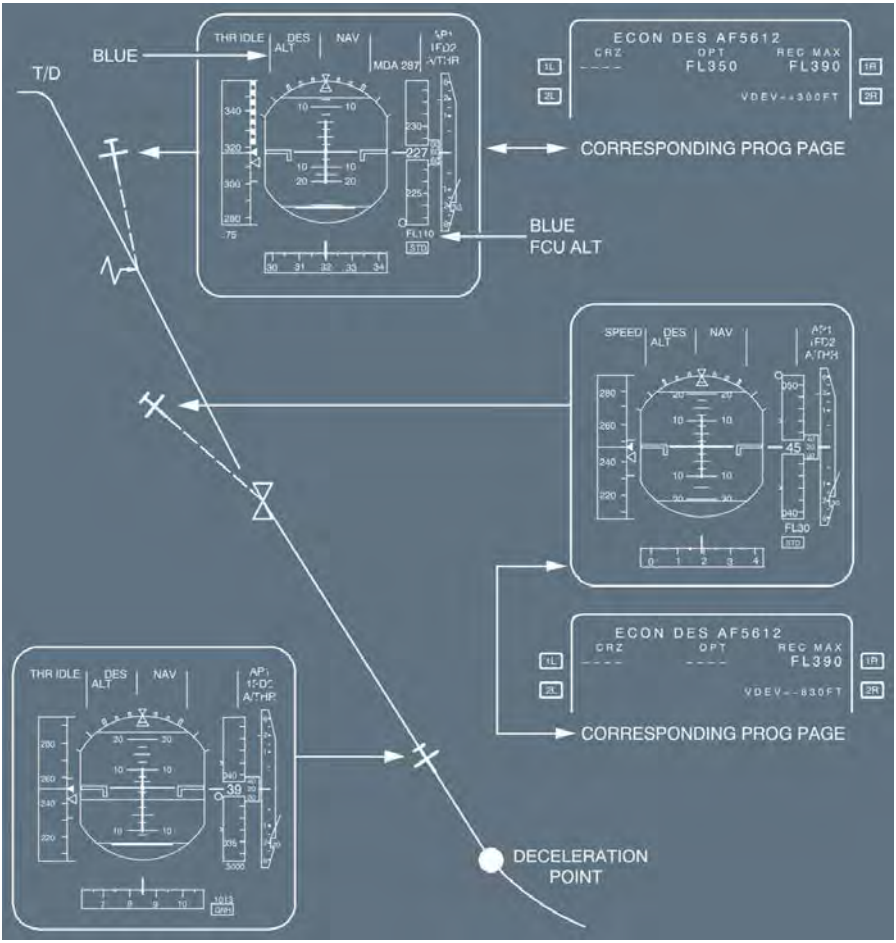
Ident.: DSC-22_30-70-50-B-00010567.0002001 / 01 OCT 12
Applicable to: MSN 1882-2078

GENERAL



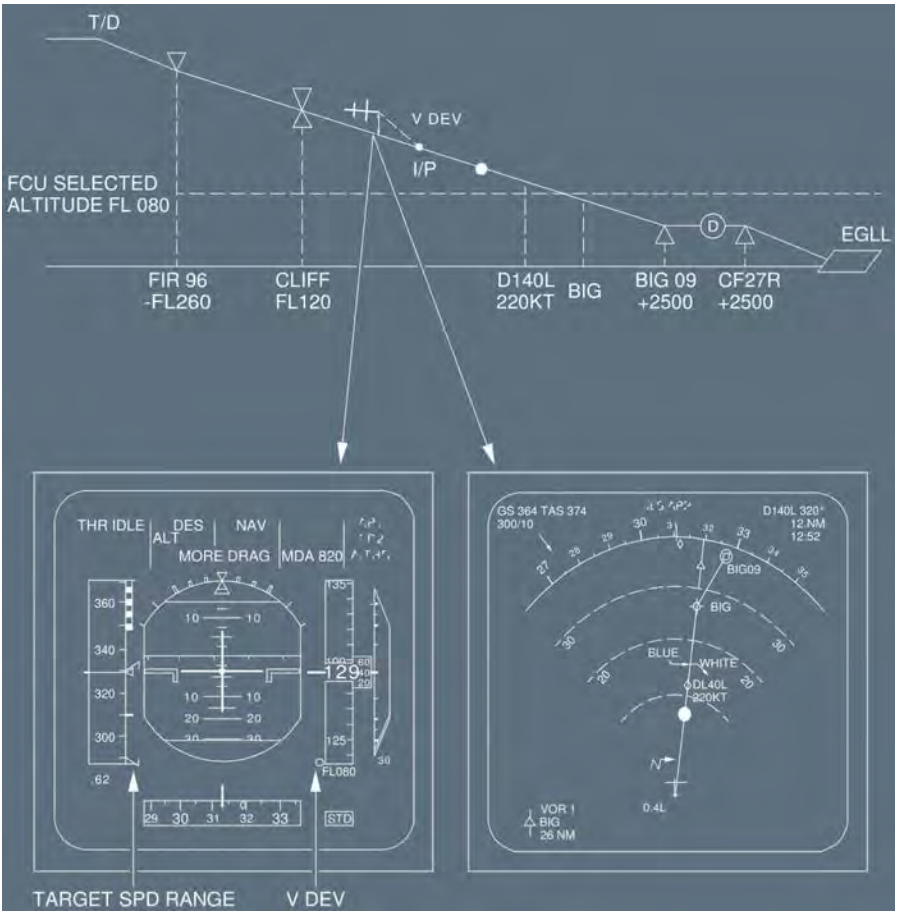
Ident.: DSC-22_30-70-50-B-00010567.0005001 / 01 OCT 12
Applicable to: MSN 3408-4547

GENERAL



INTERCEPT POINT

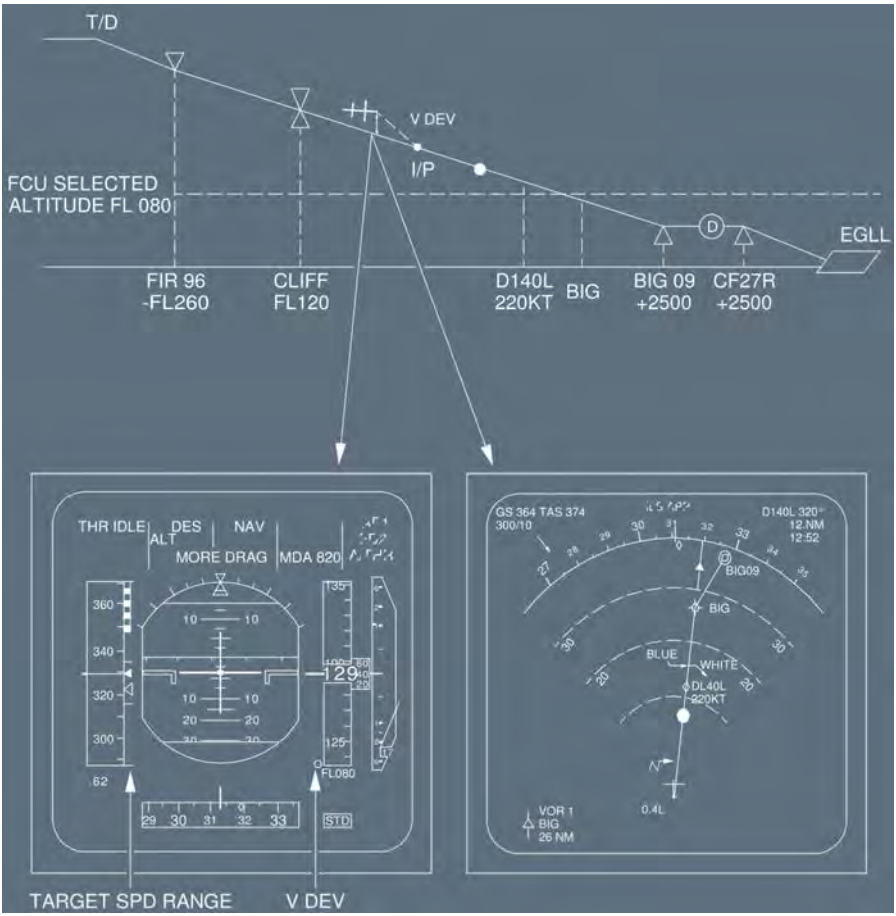
Associated with the VDEV displayed on PFD, the ND shows an intercept point ( ) on the flight plan. It indicates the position where the system predicts that the aircraft will intercept the descent profile.



Ident.: DSC-22_30-70-50-B-00010568.0005001 / 17 AUG 10
Applicable to: MSN 3408-4547

INTERCEPT POINT

Associated with the VDEV displayed on PFD, the ND shows an intercept point ( ) on the flight plan. It indicates the position where the system predicts that the aircraft will intercept the descent profile.



Ident.: DSC-22_30-70-50-B-00010569.0002001 / 01 OCT 12
Applicable to: ALL

AIRCRAFT ABOVE THE DESCENT PROFILE

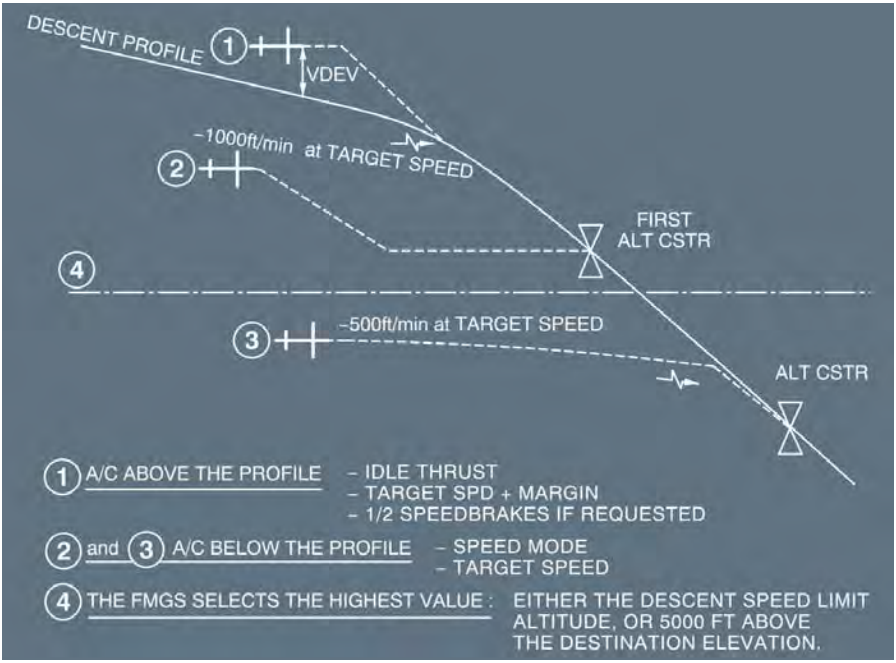
If the aircraft is above the descent profile, the speed will increase toward the upper limit of the managed speed range. If the speed reaches the upper limit, the aircraft will maintain the speed but will deviate from the profile (autothrust at idle).

The navigation display presents a pseudo waypoint  (intercept point) along the flight plan that assumes the aircraft will return to the profile using:

- Idle thrust
- 1/2 speedbrake extension
- ECON speed plus a margin (until intercepting the profile).

If necessary, the message “AIRBRAKES” (old FMGC standard) or “MORE DRAG” comes up on the PFD and the MCDU, and remains there as long as more drag (speedbrakes) is still required. The flight crew should respond to this message by deploying half speedbrakes.
Whenever the intercept point is predicted to be close to a constrained waypoint, the PFD and MCDU display an “AIRBRAKES” or “MORE DRAG” message depending upon the FMGS standard.

Note: With DES mode engaged, the speedbrakes extension will not necessarily increase the descent rate. It increases only if the aircraft is above path.



Ident.: DSC-22_30-70-50-B-00010570.0002001 / 17 AUG 10
Applicable to: ALL

AIRCRAFT BELOW THE DESCENT PROFILE

If the aircraft is below the descent profile, its speed will be maintained at target speed until it reaches the descent profile. The lower margin becomes effective when the aircraft is on the descent profile but has to loose speed in order to stay on it.
The intercept point on the navigation display is based on the following assumptions:

- **If the aircraft is flying at an altitude that is higher than both the descent speed limit altitude and the destination elevation +5 000 ft:**
  The FMGS maintains the V/S at -1 000 ft/min and the target speed, until the aircraft reaches the altitude constraint, or intercepts the descent profile.
- **If the aircraft is flying at an altitude that is lower than either the descent speed limit altitude, or the destination elevation +5 000 ft:**
  The FMGS maintains the V/S at -500 ft/min and the target speed, until the aircraft reaches the altitude constraint or intercepts the descent profile.

Ident.: DSC-22_30-70-50-B-00010572.0001001 / 17 AUG 10
Applicable to: ALL

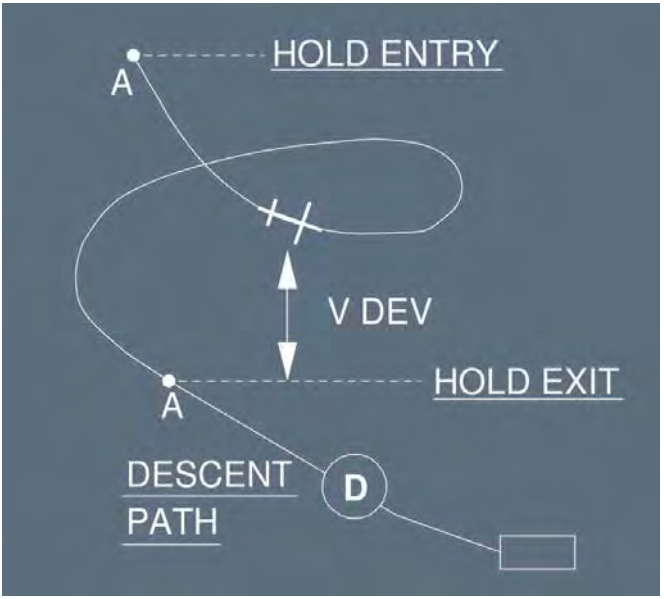
LEVELING OFF AT A CONSTRAINT

If the aircraft levels off at an ALT CSTR, the DES mode arms and remains armed until the aircraft passes the constraint, then reengages (if the FCU altitude is set below the altitude of the constraint).
If the FCU selected altitude is that of a constraint, the flight crew may continue the descent below that altitude by turning the ALT knob and pushing it in. This arms the DES mode, which reengages when the aircraft passes the constraint waypoint.

Ident.: DSC-22_30-70-50-B-00010573.0002001 / 17 AUG 10
Applicable to: ALL

GUIDANCE IN A HOLD

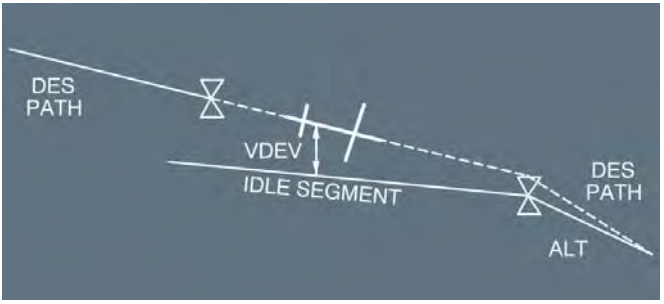
Just before the aircraft enters a holding pattern, the speed target becomes the holding speed.
In the holding pattern, the DES mode commands V/S = -1 000 ft/min while A/THR maintains the holding speed. The aircraft will level off at the next altitude constraint if it is reached during the hold.
The current vertical deviation VDEV is based on the altitude at which the aircraft is supposed to cross the exit fix in order to be properly positioned on the descent profile.
Until the flight crew exits the hold, the FMGS in DES mode will maintain V/S = -1 000 ft/min considering downpath vertical constraint. This means that the aircraft will not descent below the next altitude constraint, neither the FCU selected altitude. If the aircraft reaches the next altitude constraint it will level off and ALT CST mode will engage.



Ident.: DSC-22_30-70-50-B-00010574.0001001 / 01 OCT 12
Applicable to: ALL

TOO STEEP PATH

A descent segment is called “too steep path” when FM predicts that the descent segment between two constraint waypoints is impossible to fly at the planned descent speed with half speedbrakes extended.



When this occurs, the MCDU displays no predictions between the upper and the lower points of the too steep path. Relevant message “TOO STEEP PATH” is displayed on MCDU.

When the aircraft reaches the beginning of the too steep path segment, the FM recomputes the VDEV using an idle segment from the end of the too steep path segment.

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GENERAL

Ident.: DSC-22_30-70-60-00010576.0001001 / 17 AUG 10
Applicable to: ALL

The OPEN DES mode is a selected mode. It maintains a SPD/MACH (selected or managed) with the AP/FD pitch mode while autothrust (if active) maintains IDLE thrust.
It is not to be used for final approach.

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-60-00010577.0002001 / 17 AUG 10
Applicable to: ALL

The OPEN DES mode can be engaged only if the following conditions are met:
- The aircraft has been in flight for more than 5 s
- LAND mode is not engaged
- The FCU selected altitude is lower than present altitude.

The OPEN DES mode is engaged by one of the following:
- Pulling out the ALT knob
- Selecting a manual speed when EXP mode ◁ is engaged.

Note: *When OP DES is engaged:*
- *The FMA displays "OP DES"*
- *The managed LVL/CH dot on the FCU goes out*
- *The system arms the ALT mode.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-60-00010578.0002001 / 17 AUG 10
Applicable to: MSN 1882

The OPEN DES mode is disengaged by one of the following conditions:
- Manual engagement of another vertical mode
- Selection of an altitude higher than present altitude. V/S (FPA) engages on current V/S (FPA).

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-60-00010578.0003001 / 17 AUG 10
Applicable to: MSN 2078-4547

The OPEN DES mode is disengaged by one of the following conditions:

- Manual engagement of another vertical mode
- Selection of an altitude higher than present altitude. V/S (FPA) engages on current V/S (FPA). The vertical mode is boxed white. If within 5 s after the reversion to V/S, the flight crew does not confirm the altitude target change by another expected action, a triple click aural warning sounds, and the V/S (FPA) is boxed white and flashes for 10 s.

GUIDANCE

Ident.: DSC-22_30-70-60-00010579.0002001 / 16 MAR 11
Applicable to: ALL

When OPEN DES is engaged, pitch control maintains the target speed/Mach number, and autothrust maintains idle thrust (or the flight crew maintains it manually). The speed target may be either selected or managed.
The OPEN DES mode disregards all altitude constraints.

Typical FMA in OPEN DES

GENERAL

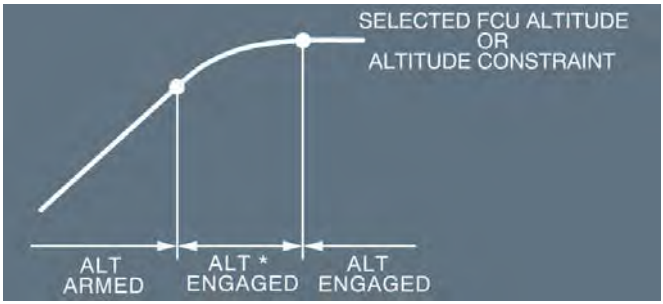
Ident.: DSC-22_30-70-65-00010580.0002001 / 07 APR 17
Applicable to: ALL

ALT* mode guides the aircraft to acquire the FCU selected altitude.
ALT CST* guides the aircraft to acquire an altitude constraint provided by Flight Management. Once the aircraft has reached the altitude, the altitude mode (ALT or ALT CST) engages.

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-65-00010581.0002001 / 23 JUN 15
Applicable to: ALL

The mode engages when the aircraft reaches the altitude capture zone, defined by the aircraft vertical speed (among other parameters).



Note: *ALT* and ALT CST* cannot be engaged below 400 ft, if either the takeoff or the go-around mode is engaged.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-65-00010582.0003001 / 19 DEC 12
Applicable to: MSN 1882

The mode is disengaged by one of the following conditions:
- Engagement of V/S mode on current vertical speed by turning the FCU ALT knob by more than 250 ft.
- Engagement of another vertical mode provided the FCU altitude has been changed by more than 250 ft.

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-65-00010582.0008001 / 19 DEC 12
Applicable to: MSN 2078-4547

The mode is disengaged by one of the following conditions:

- Engagement of V/S mode on current vertical speed by turning the FCU ALT knob by more than 250 ft.

  If within 5 s after reversion to V/S (FPA) the flight crew does not confirm the altitude target change by:
  - Pulling the ALT knob, or
  - Setting a new V/S (FPA) target, or
  - Pushing the V/S or FPA knob on the FCU,

  then, a triple click aural warning sounds, and the V/S (FPA) is boxed white for additional 10 s.
- Engagement of another vertical mode provided the FCU altitude has been changed by more than 250 ft.

GUIDANCE

Ident.: DSC-22_30-70-65-00010583.0006001 / 07 APR 17
Applicable to: ALL

The ALT* and ALT CST* mode have internal V/S guidance that is a direct function of the difference between present altitude and the altitude target.

The system switches automatically to ALT (altitude hold) when the altitude deviation becomes less than 20 ft.
ALT* and ALT CST* modes have internal protections that decreases the vertical speed when VLS or VMAX is reached (VLS or VMAX becomes the priority target).

Note:
- *If the baro setting is changed during ALT* mode, this may lead to an FCU target overshoot due to the change of the current value of the altitude. However ALT* mode will allow the FCU altitude to be regained.*
- *For aircraft equipped with QFE option, a switching from STD to QFE (or vice versa) in ALT CST* mode, will change the target value and a reversion to V/S may occur if the target value is modified of 250 ft or more.*

Intentionally left blank

GENERAL

Ident.: DSC-22_30-70-70-00010584.0001001 / 17 AUG 10
Applicable to: ALL

The ALT mode maintains a target altitude. This target altitude is either the FCU selected altitude or an altitude constraint delivered by Flight Management.

ARMING CONDITIONS

Ident.: DSC-22_30-70-70-00010585.0001001 / 17 AUG 10
Applicable to: ALL

The ALT mode arms automatically whenever the aircraft climbs or descends toward the target altitude.

Note: *The ALT mode arms only if the difference between the current altitude and the FCU selected altitude is at least 250 ft.*

When ALT is armed, the FMA displays the ALT message on its second line:
- Blue when the target altitude is the FCU selected altitude
- Magenta if the target altitude is an altitude constraint.

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-70-00010586.0002001 / 17 AUG 10
Applicable to: ALL

The ALT mode is engaged automatically when the difference between present altitude and the target altitude becomes less than 20 ft with ALT* engaged.

Note: *The ALT mode is displayed on the FMA when the V/S knob is pushed in or is pulled out with V/S-FPA target set to zero but V/S mode is still active. In other words, if V/S knob is dialled up or down, the aircraft will climb or descend without any pulling action.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-70-00010587.0001001 / 17 AUG 10
Applicable to: ALL

The ALT mode disengages when any other vertical mode engages.

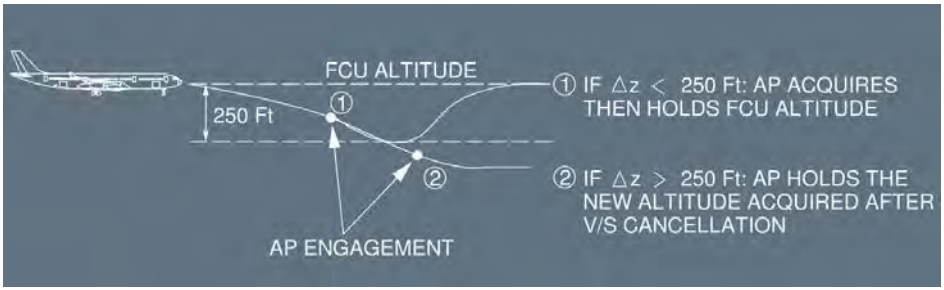
GUIDANCE

Ident.: DSC-22_30-70-70-00010588.0002001 / 23 JUN 15
Applicable to: ALL

- The altitude that ALT mode holds is the altitude it memorized when engaged. It is not affected by a change of reference in the ALT window or by a change in the barometric correction.
- When ALT is engaged, the FMA displays ALT in green (FCU altitude hold) or ALT CST in green if it is an altitude constraint.

Typical FMA in ALT MODE

- If the AP is engaged while FD is already engaged in ALT mode at the FCU selected altitude, the autopilot:
  - Acquires and holds the FCU altitude if present altitude is within 250 ft of it, or
  - Commands a level-off if present altitude is more than 250 ft from the FCU altitude.



SOFT ALTITUDE MODE (CRUISE)

Ident.: DSC-22_30-70-70-00010589.0002001 / 19 DEC 12
Applicable to: ALL

The soft altitude mode engages when the aircraft reaches the FCU altitude set as the cruise flight level (entered in the F-PLN or on PROG page).
The soft altitude mode corrects minor deviations from the Mach target by allowing a ±50 ft variation from the CRZ FL. This feature improves fuel efficiency and passenger comfort and minimizes the changes in thrust.

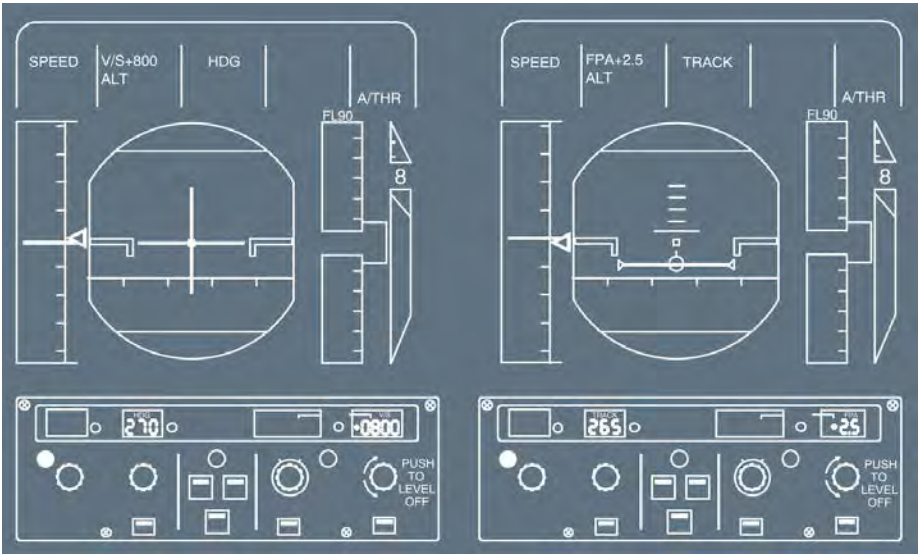

MACH
ALT CRZ
HDG
AP1
1FD2
A/THR
FMA in SOFT ALT HOLD MODE

Intentionally left blank

GENERAL

Ident.: DSC-22_30-70-80-00010611.0004001 / 19 DEC 12
Applicable to: ALL

The V/S - FPA mode is a selected mode. It acquires and holds the vertical speed or the flight path angle displayed in the V/S - FPA window of the FCU.
The HDG V/S -TRK FPA pb on the FCU allows the flight crew to select either type of reference to be used for guidance and for display on the PFD.



ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-80-00010612.0003001 / 17 AUG 10
Applicable to: ALL

The flight crew can engage the mode manually as follows:
- Pull out the V/S or FPA knob (at least 5 s after lift-off) or push it in for an immediate level off (V/S=0)
- Engage the AP and/or FD if AP and FD are not engaged (basic mode of AP/FD engagement)
- Select a different altitude (more than 250 ft from present altitude) when in ALT* mode
- Select a higher altitude than present altitude when in DES, OP DES modes or EXP DES ⋘ mode
- Select a lower altitude than present altitude when in CLB, OP CLB modes or EXP CLB ⋘ mode.

The mode engages automatically:
- 5 s after lift-off, if no other vertical mode is engaged
- Upon loss of G/S* or G/S mode
- Upon loss of FINAL mode
- Upon loss of LOC* or LOC mode
- Upon loss of NAV mode when DES mode is engaged
- Upon loss of vertical flight path in DES mode.

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-80-00010592.0002001 / 17 AUG 10
Applicable to: ALL

The flight crew can disengage the V/S mode manually by:
- Pulling or pushing the Altitude knob, or
- Pushing the EXPED pb , or
- Initiating a go-around.

It disengages automatically:
- When the aircraft reaches the FCU altitude, or
- Upon G/S* engagement.

GUIDANCE

Ident.: DSC-22_30-70-80-00010593.0009001 / 04 JUL 17
Applicable to: ALL

The FMGC pitch mode guides the aircraft to the target V/S or FPA. The corresponding A/THR mode is SPEED or MACH. The FMA displays V/S (FPA).
The V/S (FPA) guidance has priority over the speed guidance. If the selected target V/S or FPA is too high (relative to the current thrust condition and speed), the FMGC will steer the aircraft to the target V/S or FPA, but the aircraft will also accelerate or decelerate.
When the speed reaches its authorized limit, V/S or FPA automatically decreases to maintain the minimum (or maximum) speed limit.

Note: *If the flight crew sets V/S = 0 or pushes the V/S or FPA knob to level off, it automatically sets V/S or FPA target to zero and the aircraft levels off and maintains its altitude.*

Note: *If AP is engaged while a V/S is selected with only FD ON, the V/S will synchronise on the current aircraft V/S.*

GENERAL

Ident.: DSC-22_30-70-90-00010223.0001001 / 17 AUG 10
Applicable to: MSN 3408-4547

Expedite mode is an OPEN mode used in climb or descent to reach the desired altitude with the maximum vertical gradient.

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-90-00010594.0001001 / 17 AUG 10
Applicable to: MSN 3408-4547

The flight crew can engage EXPEDITE if:
- The aircraft has been in flight for more than 5 s
- Managed speed is available.

The flight crew engages EXPEDITE manually by pushing the EXPED pb on the FCU:
- If the FCU selected altitude is higher than present altitude, EXP CLB mode engages
- If the FCU selected altitude is lower than present altitude, EXP DES mode engages.

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-70-90-00010595.0003001 / 17 AUG 10
Applicable to: MSN 3408-4547

The flight crew can disengage EXPEDITE manually by:
- Pulling out the V/S or FPA knob to engage the V/S or FPA mode
- Pulling out the ALT knob to engage OP CLB or OP DES
- Pulling out the SPD/MACH knob to activate the selected speed target and engage OP CLB or OP DES. A white box appears around the longitudinal mode and flashes for 10 s. A triple click sounds
- Pushing in the ALT knob to engage the CLB or DES mode, provided that the engagement conditions are met
- Selecting a higher altitude than present altitude when in EXP DES. If this action is not followed by another expected flight crew action within 5 s, a triple click sounds. A steady white box appears around the longitudinal mode, then flashes for 10 s after the triple click

- Selecting a lower altitude than present altitude when in EXP CLB. If this action is not followed by another expected flight crew action within 5 s, a triple click sounds. A steady white box appears around the longitudinal mode, then flashes for 10 s after the triple click
- Activating a reversion to V/S to protect the aircraft from exceeding VLS or VMAX. A white box appears around the longitudinal mode and flashes for 10 s. A triple click sounds.

Note: *In FD mode only, it the flight crew does not follow the FD orders, a reversion to V/S occurs when reaching VMAX + 4 in EXP CLB or VLS - 2 in EXP DES (VLS - 17 with speedbrakes).* *Refer to DSC-22_30-75 General.*

EXPEDITE disengages automatically with ALT* engagement.

GUIDANCE

Ident.: DSC-22_30-70-90-00010610.0002001 / 19 DEC 12
Applicable to: MSN 3408-4547

When the aircraft is in EXP CLB, the target speed is Green Dot, which is maintained with pitch control. Autothrust, if active, sets the thrust at CLB THRUST automatically.
When the aircraft is in EXP DES, the target speed is 340 kt or M 0.8 which is maintained with pitch control. Autothrust, if active, sets the thrust at IDLE automatically.
When EXPEDITE is engaged, the system disregards SPD CSTR, ALT CSTR, and SPD LIM.

GENERAL

Ident.: DSC-22_30-75-00010633.0001001 / 17 MAR 17
Applicable to: ALL

Mode reversions are automatic mode changes that unexpectedly occur, but are designed to ensure coherent AP, FD and A/THR operations, in conjunction with flight crew input (or when entering a F-PLN discontinuity).
Due to the unexpected nature of their occurrence, the FMA should be closely monitored for mode reversions.

INTERACTION BETWEEN LATERAL MODES, VERTICAL MODES, AND MANAGED SPEED PROFILE

Ident.: DSC-22_30-75-00012054.0002001 / 17 MAR 17
Applicable to: MSN 1882

- **When NAV mode is engaged:**

  The FMGS guides the aircraft along the flight plan and considers the constraints attached to the F-PLN waypoints. As a result:
  - Managed CLB and DES modes are available
  - The managed speed profile includes: V2 - SPD CSTR (if applicable) - SPD LIM - ECON CLB SPD/MACH - ECON CRZ MACH - ECON DES (MANAGED SPD) - SPD/MACH - SPD CSTR - SPD LIM - HOLD SPD - VAPP/GS MIN.

  It is valid for all vertical modes, except EXPEDITE ◁✠ .

- **When NAV mode is not engaged:**

  The FMGS considers that the flight plan is not followed, and ignores all speed and altitude constraints linked to the F-PLN waypoints. As a result:
  - The managed vertical CLB and DES modes are not available
  - The managed SPD profile disregards the speed constraints and includes: V2 - SPD LIM - ECON CLB - ECON CRZ - ECON DES (MANAGED SPD) - SPD LIM - VAPP/GS MIN target.

As a consequence, when NAV mode disengages (manual or automatic):
- CLB mode, when engaged, reverts to OPEN CLB
- DES mode, when engaged, reverts to V/S (FPA) mode on current value
  This reversion to V/S (FPA) mode on the current V/S target does not modify the pitch behavior of the aircraft. It is the flight crew's responsibility to adapt pitch, if necessary.
- Speed and altitude constraints are disregarded (but speed limit is retained).

INTERACTION BETWEEN LATERAL MODES, VERTICAL MODES, AND MANAGED SPEED PROFILE

Ident.: DSC-22_30-75-00012054.0006001 / 17 MAR 17
Applicable to: MSN 2078-4547

- **When NAV mode is engaged:**

  The FMGS guides the aircraft along the flight plan and considers the constraints attached to the F-PLN waypoints. As a result:
  - Managed CLB and DES modes are available
  - The managed speed profile includes: V2 - SPD CSTR (if applicable) - SPD LIM - ECON CLB SPD/MACH - ECON CRZ MACH - ECON DES (MANAGED SPD) - SPD/MACH - SPD CSTR - SPD LIM - HOLD SPD - VAPP/GS MIN.

  It is valid for all vertical modes, except EXPEDITE ⩤ .

- **When NAV mode is not engaged:**

  The FMGS considers that the flight plan is not followed, and ignores all speed and altitude constraints linked to the F-PLN waypoints. As a result:
  - The managed vertical CLB and DES modes are not available
  - The managed SPD profile disregards the speed constraints and includes: V2 - SPD LIM - ECON CLB - ECON CRZ - ECON DES (MANAGED SPD) - SPD LIM - VAPP/GS MIN target.

As a consequence, when NAV mode disengages (manual or automatic):

- CLB mode, when engaged, reverts to OPEN CLB. The lateral mode is boxed white for 10 s. The vertical mode is boxed white.

  If within 5 s, the disengagement of the NAV mode is not confirmed by one of the following flight crew actions:
  - FCU altitude change
  - Level-off
  - Selection of the V/S mode

  then, a triple click aural warning sounds. In addition, a white box flashes around the vertical mode for additional 10 s.
- DES mode, when engaged, reverts to V/S mode on current value.

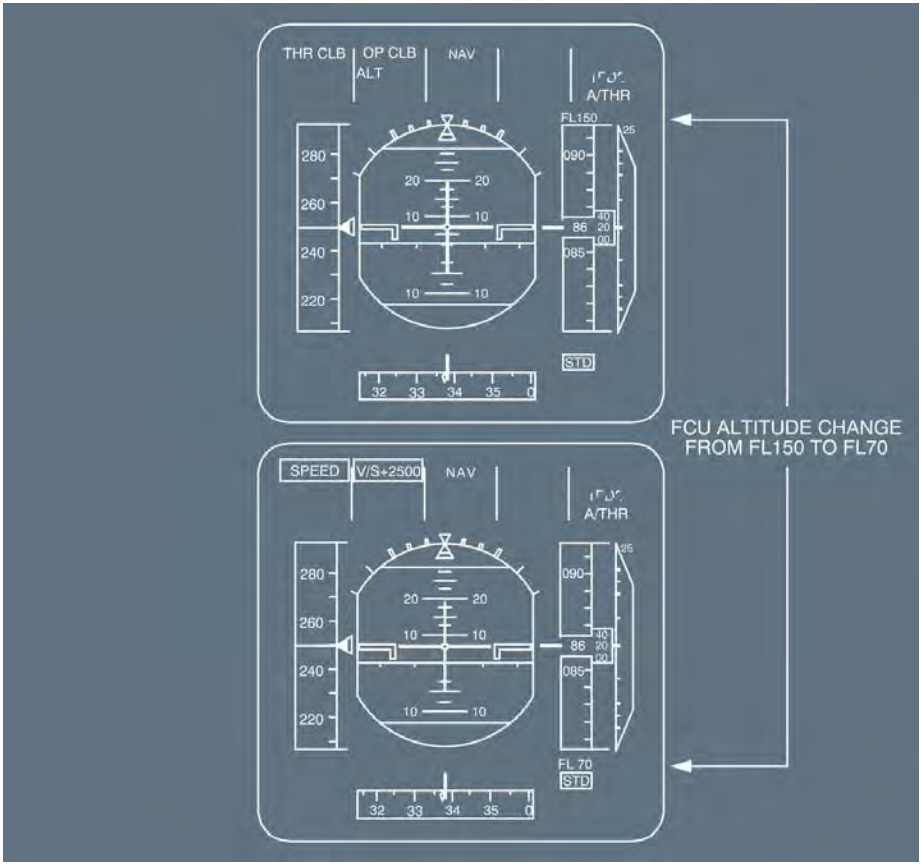
  If within 5 s, the disengagement of the NAV mode is not confirmed by one of the following flight crew actions:
  - FCU altitude change
  - Level-off
  - Selection of the V/S mode

  then, a triple click aural warning sounds. In addition, a white box flashes around the vertical mode for additional 10 s.
  This reversion to V/S (FPA) mode on the current V/S target does not modify the pitch behavior of the aircraft. It is the flight crew's responsibility to adapt pitch, if necessary.
- Speed and altitude constraints are disregarded (but speed limit is retained).

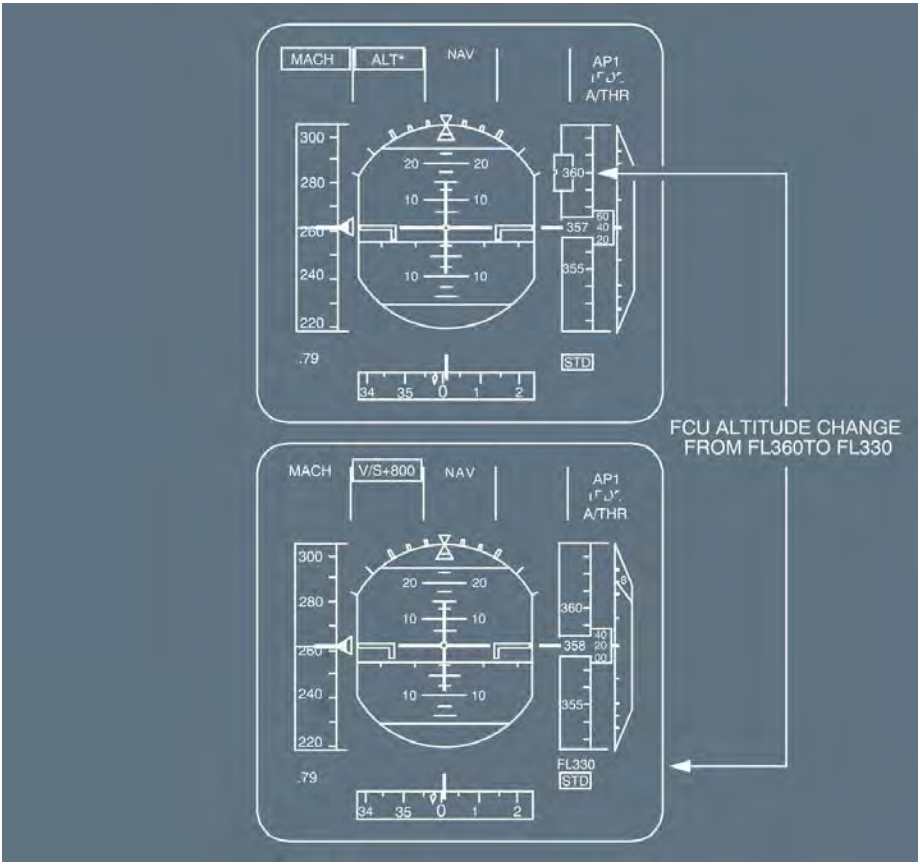
MODE REVERSION DUE TO FCU ALTITUDE CHANGE

Ident.: DSC-22_30-75-00012053.0003001 / 01 OCT 12
Applicable to: MSN 1882

When an OPEN mode is engaged, the aircraft climbs or descends towards the altitude set on the FCU. If the flight crew sets the FCU altitude to a target not compatible with the active open mode, a mode reversion occurs and V/S (or FPA) engages on current V/S (or FPA).
This reversion applies to CLB, OP CLB, DES, OP DES, EXP DES ⋘ , EXP CLB ⋘ .
Example: Reversion from OP CLB to V/S:



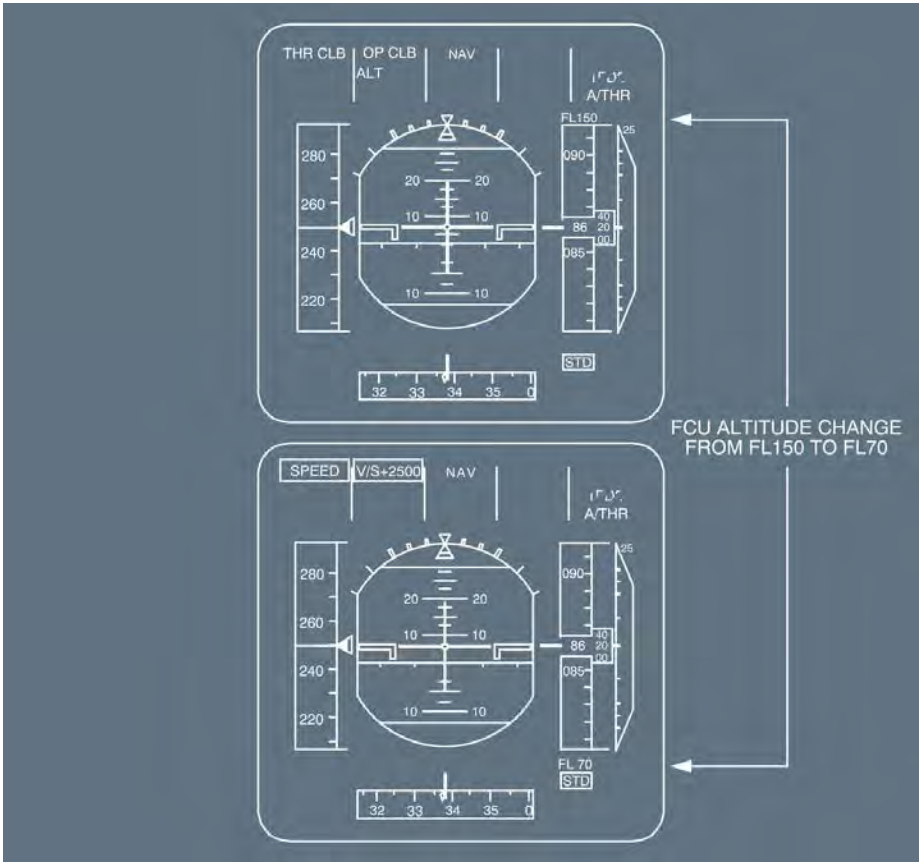
With ALT* engaged, the target altitude is changed by any value greater than 250 ft, V/S (or FPA) engages on currents V/S (or FPA). *Refer to DSC-22_30-75 Mode Reversions (Summary)*.



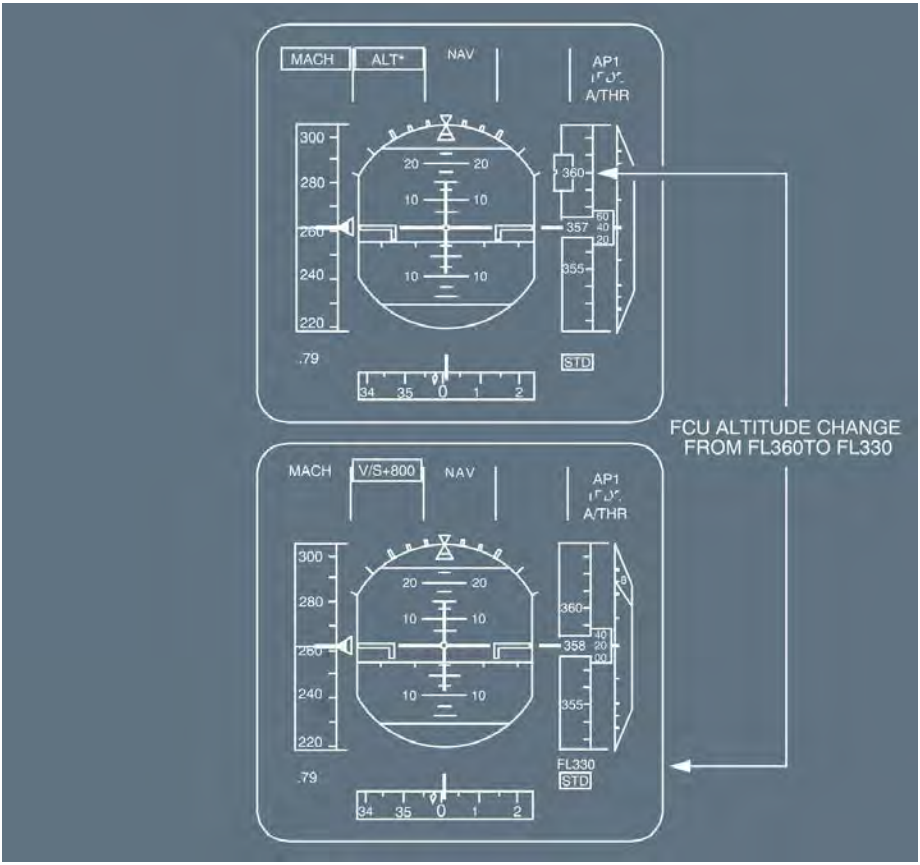
MODE REVERSION DUE TO FCU ALTITUDE CHANGE

Ident.: DSC-22_30-75-00012053.0006001 / 01 OCT 12
Applicable to: MSN 2078-4547

When an OPEN mode is engaged, the aircraft climbs or descends towards the altitude set on the FCU. If the flight crew sets the FCU altitude to a target not compatible with the active open mode, a mode reversion occurs and V/S (or FPA) engages on current V/S (or FPA).
This reversion applies to CLB, OP CLB, DES, OP DES ◁ , EXP DES ◁ , EXP CLB ◁ .
Example: Reversion from OP CLB to V/S:



With ALT* engaged, the target altitude is changed by any value greater than 250 ft, V/S (or FPA) engages on currents V/S (or FPA). *Refer to DSC-22_30-75 Mode Reversions (Summary)*.



If within 5 s after the reversion to V/S (FPA), the flight crew does not confirm the altitude target change by:

- Pulling the ALT knob, or
- Setting a new V/S (or FPA) target, or
- Pushing the V/S or FPA knob on the FCU,

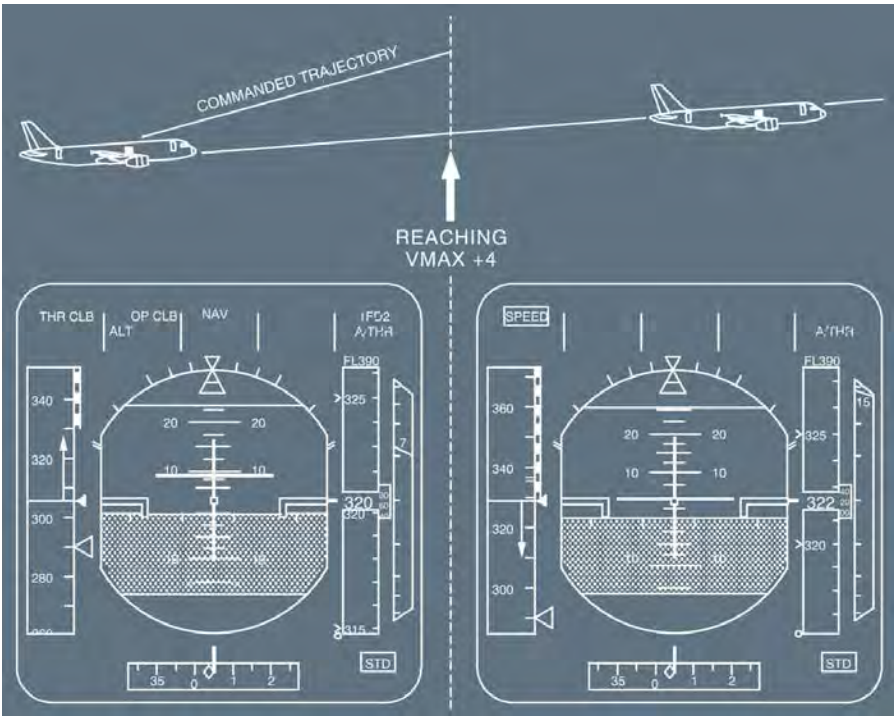
then, a triple click sounds, and the V/S (FPA) is boxed white for additional 10 s.

REVERSION WITH GLOBAL SPEED PROTECTION

Ident.: DSC-22_30-75-A-00012055.0005001 / 19 DEC 12
Applicable to: MSN 1882

AUTOMATIC SPEED MODE PROTECTION IN CLIMB

FDs are engaged in an OPEN mode in climb with AP not engaged.
If FDs are engaged in CLIMB or OPEN CLIMB mode or EXP CLB ◁ and the flight crew does not follow the FD bars to maintain the commanded climb (pitch too low and autothrust in maximum climb thrust), the aircraft accelerates.
Both FDs disengage when VMAX+4 is reached (VMAX being VMO, VLE or VFE). If the A/THR is active, it reverts to SPEED mode and reduces the thrust to recover the speed target.

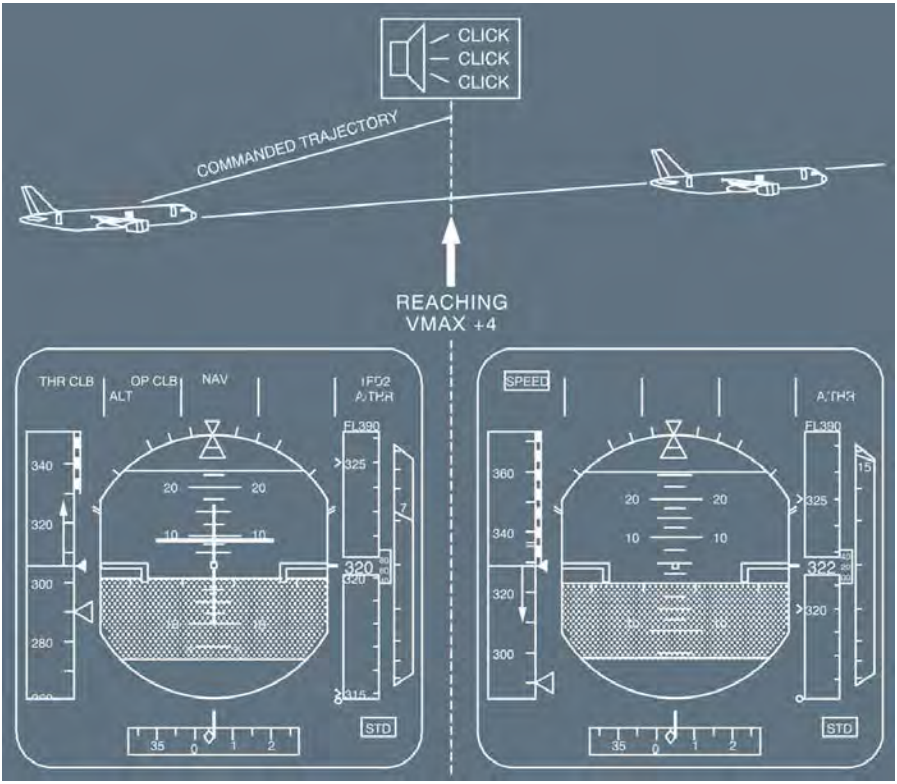


Ident.: DSC-22_30-75-A-00012055.0010001 / 19 DEC 12
Applicable to: MSN 2078-4547

AUTOMATIC SPEED MODE PROTECTION IN CLIMB

FDs are engaged in an OPEN mode in climb with AP not engaged.

If FDs are engaged in CLIMB or OPEN CLIMB mode or EXP CLB and the flight crew does not follow the FD bars to maintain the commanded climb (pitch too low and autothrust in maximum climb thrust), the aircraft accelerates.
Both FDs disengage when VMAX+4 is reached (VMAX being VMO, VLE or VFE). If the A/THR is active, it reverts to SPEED mode and reduces the thrust to recover the speed target.
A triple click aural warning sounds.

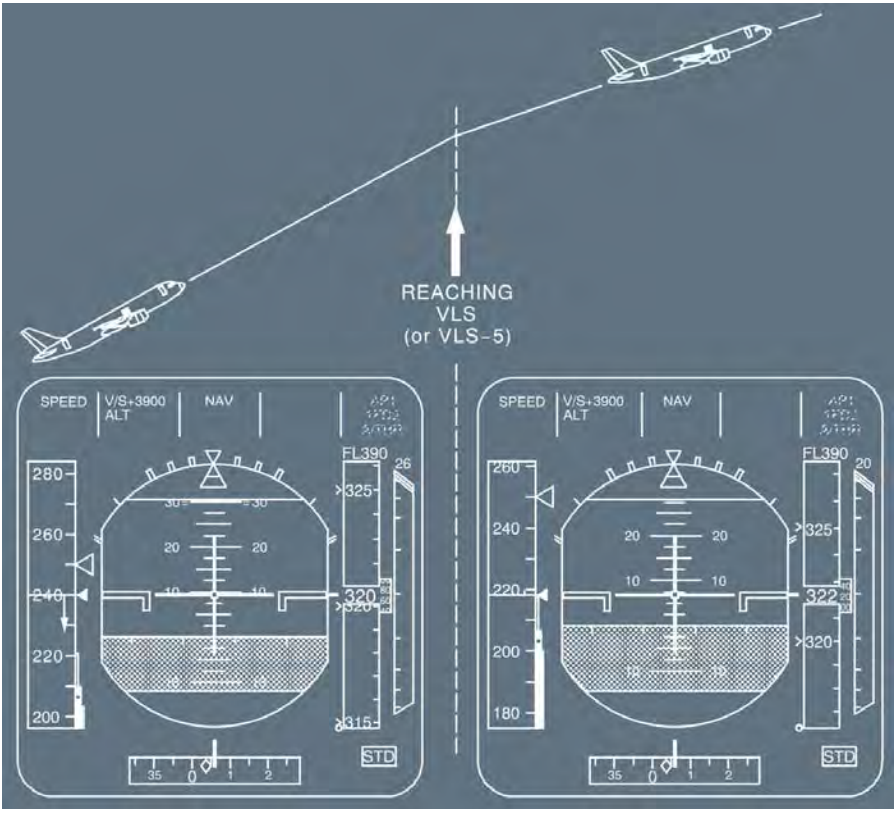


Ident.: DSC-22_30-75-A-00012056.0005001 / 01 OCT 12
Applicable to: MSN 1882

AUTOMATIC SPEED PROTECTION IN V/S (OR FPA) MODE IN CLIMB

When climbing with V/S mode engaged: If the selected V/S value is excessive (with regards to thrust and speed), the FMGS maintains the V/S target, but the airspeed decreases. When reaching VLS (or VLS-5, if the speed target is VLS), the AP temporarily abandons the V/S target,

and automatically decreases the vertical speed to maintain VLS. The same applies if FPA mode is used with an excessive FPA target.



V/S mode remains engaged. The V/S target does not change, but is no longer followed.

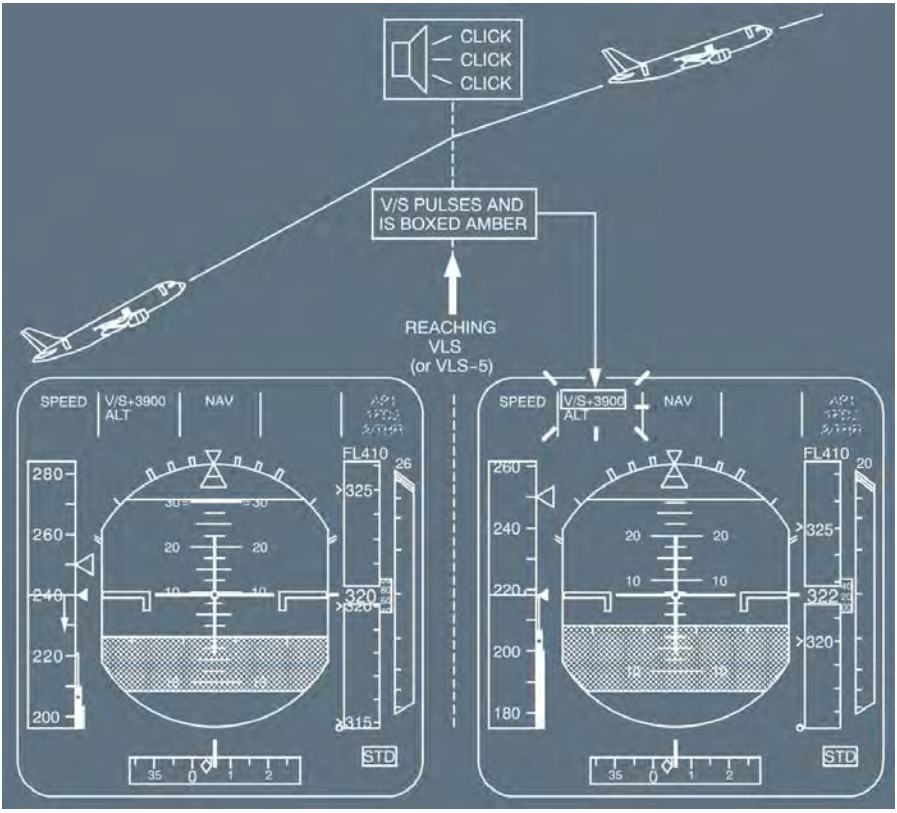
Note: *When flying with FD bars only (AP OFF), the FMGS adjusts the pitch bar so that VLS is maintained.*

Ident.: DSC-22_30-75-A-00012056.0010001 / 01 OCT 12
Applicable to: MSN 2078-4547

AUTOMATIC SPEED PROTECTION IN V/S (OR FPA) MODE IN CLIMB

When climbing with V/S mode engaged: If the selected V/S value is excessive (with regards to thrust and speed), the FMGS maintains the V/S target, but the airspeed decreases. When reaching VLS (or VLS-5, if the speed target is VLS), the AP temporarily abandons the V/S target,

and automatically decreases the vertical speed to maintain VLS. The same applies if FPA mode is used with an excessive FPA target.

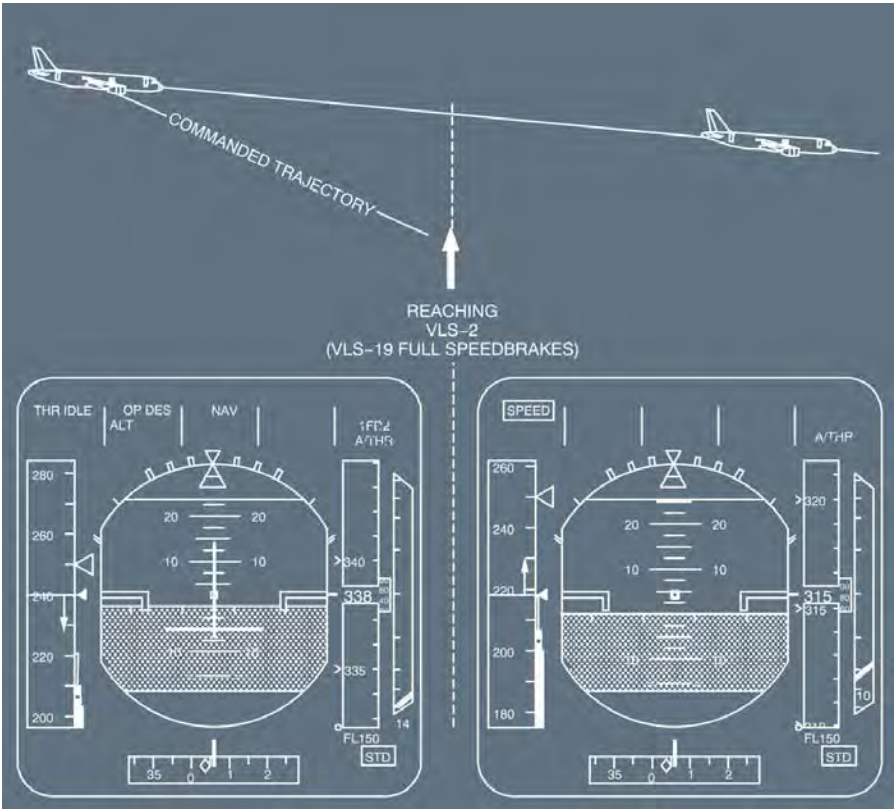


V/S mode remains engaged.
On the FMA, the V/S target is boxed with a flashing amber rectangle, and the V/S value pulses. Besides, an aural triple click is generated.

Note: *When flying with FD bars only (AP OFF), the FMGS adjusts the pitch bar so that VLS is maintained. However, no triple click is generated and the V/S target display on the FMA remains unchanged.*

AUTOMATIC SPEED MODE PROTECTION IN DESCENT

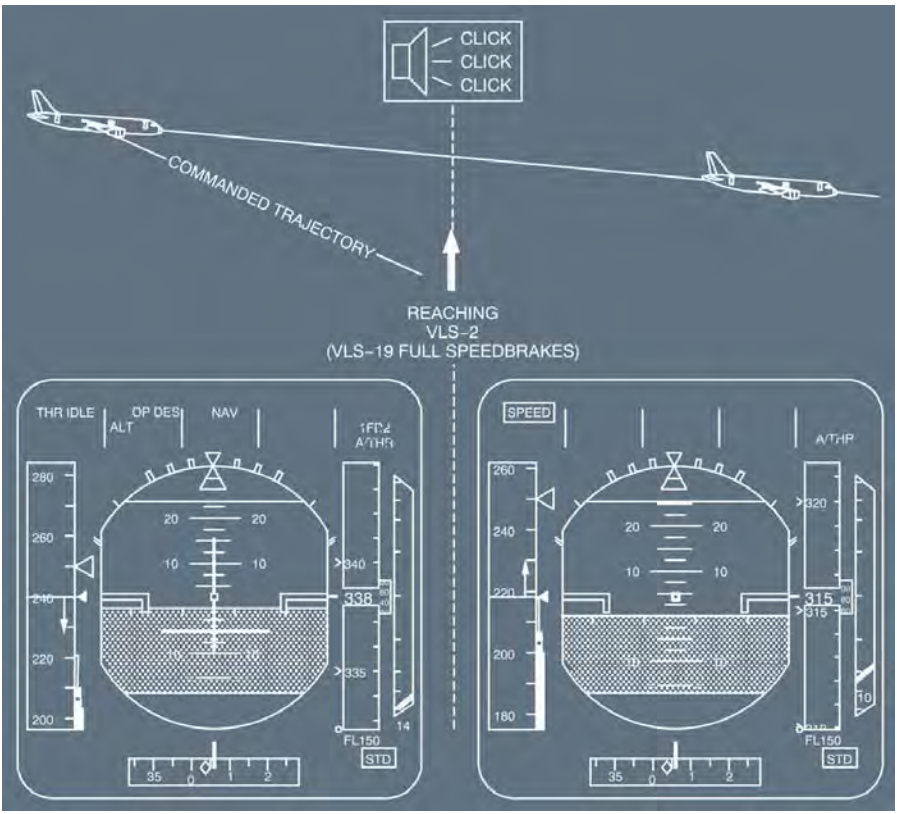
FDs are engaged in an OPEN mode in descent with the AP not engaged.
If the FDs are engaged in DES, or OP DES mode, or EXP DES ⩤ and, if the flight crew does not follow the FD bars to maintain the commanded pitch, the aircraft decelerates (insufficient descent rate and idle thrust).
If the airspeed reaches VLS-2, both FDs disengage. (If speedbrakes are extended, the FDs disengage between VLS-2 and VLS-19, depending on the position of the speedbrakes).
The A/THR, if active, reverts to SPEED mode upon FDs disengagement, and increases thrust to recover the speed target.



Ident.: DSC-22_30-75-A-00012057.0010001 / 01 OCT 12
Applicable to: MSN 2078-4547

AUTOMATIC SPEED MODE PROTECTION IN DESCENT

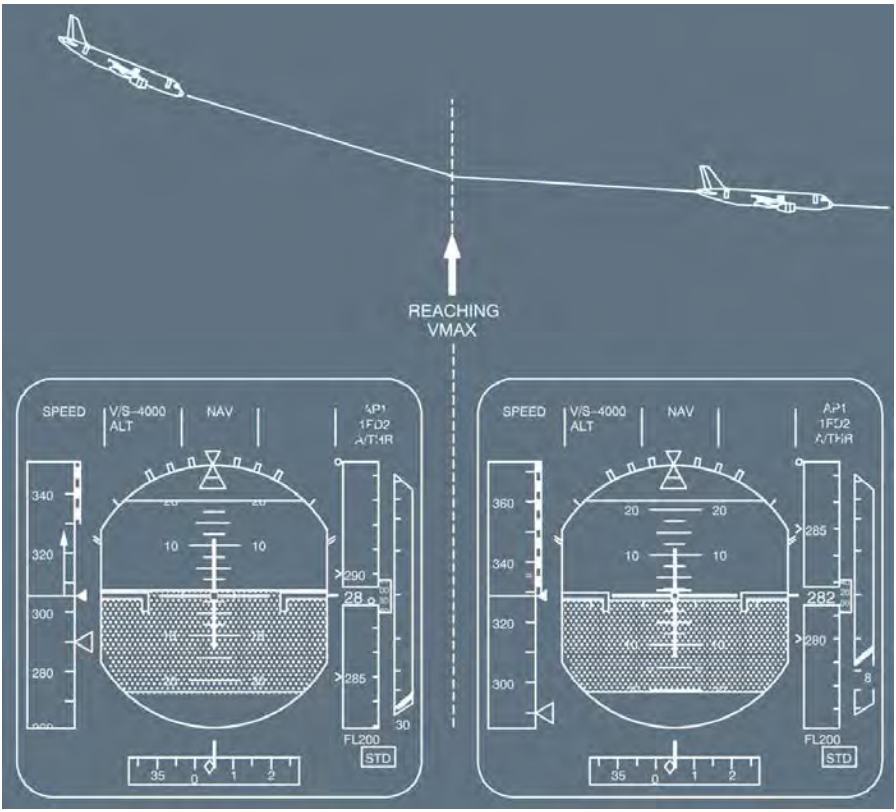
FDs are engaged in an OPEN mode in descent with the AP not engaged.
If the FDs are engaged in DES, or OP DES mode, or EXP DES and, if the flight crew does not follow the FD bars to maintain the commanded pitch, the aircraft decelerates (insufficient descent rate and idle thrust).
If the airspeed reaches VLS-2, both FDs disengage. (If speedbrakes are extended, the FDs disengage between VLS-2 and VLS-19, depending on the position of the speedbrakes).
The A/THR, if active, reverts to SPEED mode upon FDs disengagement, and increases thrust to recover the speed target.
A triple-click aural warning sounds.



Ident.: DSC-22_30-75-A-00012058.0005001 / 01 OCT 12
Applicable to: MSN 1882

AUTOMATIC SPEED PROTECTION IN V/S (OR FPA) MODE IN DESCENT

When descending with V/S mode engaged: If the selected V/S value is excessive (with regards to thrust and speed), the FMGS maintains the V/S target, but the airspeed increases. When reaching VMAX (VMO or VLE in clean, or VFE+4 kt), the AP temporarily abandons the V/S target, and automatically decreases the vertical speed to maintain VMAX.
The same applies if FPA mode is used with an excessive FPA target.



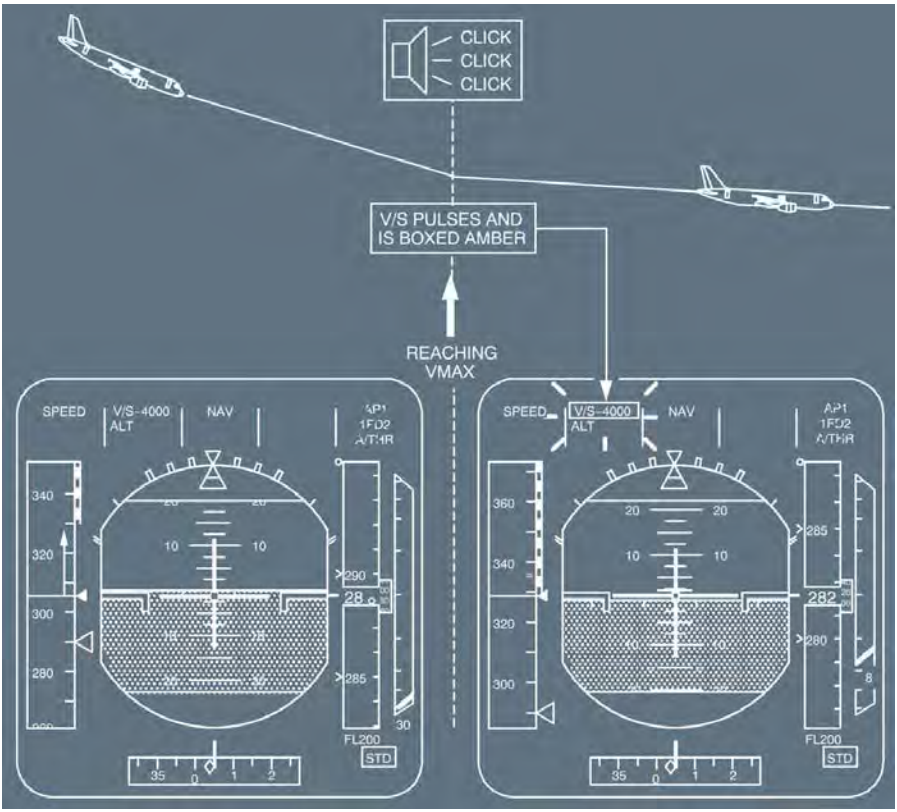
V/S mode remains engaged. The V/S target does not change, but is no longer followed.

Note: When flying with FD bars only (AP OFF), the FMGS adjusts the pitch bar so that VMAX is maintained.

Ident.: DSC-22_30-75-A-00012058.0010001 / 01 OCT 12
Applicable to: MSN 2078-4547

AUTOMATIC SPEED PROTECTION IN V/S (OR FPA) MODE IN DESCENT

When descending with V/S mode engaged: If the selected V/S value is excessive (with regards to thrust and speed), the FMGS maintains the V/S target, but the airspeed increases. When reaching VMAX (VMO or VLE in clean, or VFE+4 kt), the AP temporarily abandons the V/S target, and automatically decreases the vertical speed to maintain VMAX.
The same applies if FPA mode is used with an excessive FPA target.



V/S mode remains engaged.
On the FMA, the V/S target is boxed with a flashing amber rectangle, and the V/S values pulses.
Besides, an aural triple click is generated.

Note: When flying with FD bars only (AP OFF), the FMGS adjusts the pitch bar so that VMAX is maintained. However, no triple click is generated and the V/S target display on the FMA remains unchanged.

MODE REVERSIONS (SUMMARY)

Ident.: DSC-22_30-75-00012052.0008001 / 23 JUN 15
Applicable to: MSN 2078, 3467, 4379-4547

There are only 2 types of vertical mode reversions on aircraft equipped with global speed protection.

REVERSION DUE TO A CHANGE OF THE FCU SELECTED ALTITUDE

Vertical Mode Engaged	FCU Altitude Selection Change	Vertical Mode Switches to
CLB - OP CLB EXP CLB	Below aircraft altitude	V/S on current V/S
DES - OP DES EXP DES	Above aircraft altitude	
ALT* ACTIVE	Any change	

REVERSION DUE TO THE LOSS OF NAV MODE (MANUAL OR AUTOMATIC)

CONDITIONS	EVENT	CONSEQUENCE
CLB engaged	Loss of NAV mode	OP CLB engages
DES engaged		V/S engages

SPEED PROTECTION WHEN FD ORDERS ARE NOT FOLLOWED BY THE FLIGHT CREW (AP NOT ENGAGED)

CONDITIONS	EVENT	CONSEQUENCE
- FD engaged only (no AP), and - OP DES or EXP DES or DES engaged - A/THR active (IDLE thrust)	IAS = VLS-2 (if speedbrakes are extended between VLS-2 and VLS-19)	FD bars disappear. If A/THR active, automatic engagement of SPEED mode on the A/THR. Thrust increases to recover the speed target.
- FD engaged only (no AP), and - OP CLB or EXP CLB or CLB engaged - A/THR active (CLIMB thrust)	IAS = VMAX+4 VMAX = VFE or VLE or VMO/MMO	FD bars disappear. If A/THR active, automatic engagement of SPEED mode on the A/THR. Thrust decreases to recover the speed target.

SPEED PROTECTION DUE TO EXCESSIVE V/S

CONDITIONS	EVENT	CONSEQUENCE
Excessive V/S or FPA selected in climb	IAS = VLS (or VLS-5, if target = VLS)	The selected V/S (or FPA) target is temporarily abandoned to maintain VLS in climb or VMAX in descent.
- Excessive V/S or FPA selected in descent, and - Clean configuration	IAS = VMAX	
- Excessive V/S or FPA < 0 selected in descent, and - Configuration other than clean	IAS = VMAX	

ENHANCED MODE REVERSION ALERTNESS

The following sequences, or mode reversions, are highlighted by a triple click:

- V/S selection in ALT*
- SPD selection in SRS
- CLB (or EXP CLB ⋘) to OP CLB, upon lateral flight crew action while climbing toward a constraint
- ALT* to V/S, upon ALT target change
- FD disengagement in OPEN modes
- Alerting FMA display when V/S-(FPA) target is not held
- CLB to OP CLB reversion, upon profile loss
- Automatic FD re-engagement in basic mode
- DES to V/S upon flight plan loss
- FINAL DES to V/S, upon NAV loss
- Reversion to AP/FD basic modes due to the selection of a new approach, while approach mode is already armed or engaged
- NAV to HDG, upon NAV loss.

MODE REVERSIONS (SUMMARY)

Ident.: DSC-22_30-75-00012052.0005001 / 23 JUN 15
Applicable to: MSN 3408, 3518-4100

There are only 2 types of vertical mode reversions on aircraft equipped with global speed protection.

REVERSION DUE TO A CHANGE OF THE FCU SELECTED ALTITUDE

Vertical Mode Engaged	FCU Altitude Selection Change	Vertical Mode Switches to
CLB - OP CLB EXP CLB	Below aircraft altitude	V/S on current V/S
DES - OP DES EXP DES	Above aircraft altitude	
ALT* ACTIVE	Any change	

REVERSION DUE TO THE LOSS OF NAV MODE (MANUAL OR AUTOMATIC)

CONDITIONS	EVENT	CONSEQUENCE
CLB engaged	Loss of NAV mode	OP CLB engages
DES engaged		V/S engages

SPEED PROTECTION WHEN FD ORDERS ARE NOT FOLLOWED BY THE FLIGHT CREW (AP NOT ENGAGED)

CONDITIONS	EVENT	CONSEQUENCE
- FD engaged only (no AP), and - OP DES or EXP DES or DES engaged - A/THR active (IDLE thrust)	IAS = VLS-2 (if speedbrakes are extended between VLS-2 and VLS-19)	FD bars disappear. If A/THR active, automatic engagement of SPEED mode on the A/THR. Thrust increases to recover the speed target.
- FD engaged only (no AP), and - OP CLB or EXP CLB or CLB engaged - A/THR active (CLIMB thrust)	IAS = VMAX+4 VMAX = VFE or VLE or VMO/MMO	FD bars disappear. If A/THR active, automatic engagement of SPEED mode on the A/THR. Thrust decreases to recover the speed target.

SPEED PROTECTION DUE TO EXCESSIVE V/S

CONDITIONS	EVENT	CONSEQUENCE
Excessive V/S or FPA selected in climb	IAS = VLS (or VLS-5, if target = VLS)	The selected V/S (or FPA) target is temporarily abandoned to maintain VLS in climb or VMAX in descent.
- Excessive V/S or FPA selected in descent, and - Clean configuration	IAS = VMAX	
- Excessive V/S or FPA < 0 selected in descent, and - Configuration other than clean	IAS = VMAX	

ENHANCED MODE REVERSION ALERTNESS

The following sequences, or mode reversions, are highlighted by a triple click:

- V/S selection in ALT*
- SPD selection in SRS
- CLB (or EXP CLB) to OP CLB, upon lateral flight crew action while climbing toward a constraint
- ALT* to V/S, upon ALT target change
- FD disengagement in OPEN modes
- Alerting FMA display when V/S-(FPA) target is not held
- CLB to OP CLB reversion, upon profile loss
- Automatic FD re-engagement in basic mode
- DES to V/S upon flight plan loss
- FINAL DES to V/S, upon NAV loss
- Reversion to V/S when selected ALT crosses the current altitude
- NAV to HDG, upon NAV loss.

MODE REVERSIONS (SUMMARY)

Ident.: DSC-22_30-75-00012052.0002001 / 23 JUN 15
Applicable to: MSN 1882

There are only 2 types of vertical mode reversions on aircraft equipped with global speed protection.

REVERSION DUE TO A CHANGE OF THE FCU SELECTED ALTITUDE

Vertical Mode Engaged	FCU Altitude Selection Change	Vertical Mode Switches to
CLB - OP CLB EXP CLB	Below aircraft altitude	V/S on current V/S
DES - OP DES EXP DES	Above aircraft altitude	
ALT* ACTIVE	Any change	

REVERSION DUE TO THE LOSS OF NAV MODE (MANUAL OR AUTOMATIC)

CONDITIONS	EVENT	CONSEQUENCE
CLB engaged	Loss of NAV mode	OP CLB engages
DES engaged		V/S engages

SPEED PROTECTION WHEN FD ORDERS ARE NOT FOLLOWED BY THE FLIGHT CREW (AP NOT ENGAGED)

CONDITIONS	EVENT	CONSEQUENCE
- FD engaged only (no AP), and - OP DES or EXP DES or DES engaged - A/THR active (IDLE thrust)	IAS = VLS-2 (if speedbrakes are extended between VLS-2 and VLS-19)	FD bars disappear. If A/THR active, automatic engagement of SPEED mode on the A/THR. Thrust increases to recover the speed target.
- FD engaged only (no AP), and - OP CLB or EXP CLB or CLB engaged - A/THR active (CLIMB thrust)	IAS = VMAX+4 VMAX = VFE or VLE or VMO/MMO	FD bars disappear. If A/THR active, automatic engagement of SPEED mode on the A/THR. Thrust decreases to recover the speed target.

SPEED PROTECTION DUE TO EXCESSIVE V/S

CONDITIONS	EVENT	CONSEQUENCE
Excessive V/S or FPA selected in climb	IAS = VLS (or VLS-5, if target = VLS)	The selected V/S (or FPA) target is temporarily abandoned to maintain VLS in climb or VMAX in descent.
- Excessive V/S or FPA selected in descent, and - Clean configuration	IAS = VMAX	
- Excessive V/S or FPA < 0 selected in descent, and - Configuration other than clean	IAS = VMAX	

GENERAL

Ident.: DSC-22_30-80-10-00011875.0001001 / 17 AUG 10
Applicable to: MSN 1882-3408, 3518-4100

These modes are called “common” because they are related to both the lateral and the vertical axes.

The AP/FD common modes are:
- On takeoff: Runway/Runway track associated to SRS vertical modes
- In approach: ILS approach (LAND) or non-ILS approach (APP NAV FINAL)
- In go around: Go around track associated to SRS vertical modes.

These modes are engaged simultaneously on both axes.

<table>
<tr><th colspan="2">COMMON MODES</th><th>VERTICAL</th><th>LATERAL</th></tr>
<tr><td colspan="2">TAKEOFF</td><td>SRS</td><td>RWY
RWY TRK</td></tr>
<tr><td rowspan="3">APPROACH MODES</td><td rowspan="2">ILS APPROACH</td><td>G/S*
G/S</td><td>LOC*
LOC</td></tr>
<tr><td colspan="2">LAND, FLARE,
ROLL OUT</td></tr>
<tr><td>NON-ILS APPROACH</td><td>FINAL</td><td>APP NAV</td></tr>
<tr><td colspan="2">GO AROUND
(GA)</td><td>SRS</td><td>GA TRK</td></tr>
</table>

GENERAL

Ident.: DSC-22_30-80-10-00011875.0003001 / 16 MAR 11
Applicable to: MSN 3467, 4379-4547

These modes are called “common” because they are related to both the lateral and the vertical axes.

The AP/FD common modes are:
- On takeoff: Runway/Runway track associated to SRS vertical modes
- In approach: ILS approach (LAND) or non-ILS approach (APP NAV FINAL)
- In go around: NAV or Go around track associated to SRS vertical modes.

These modes are engaged simultaneously on both axes.

<table>
<tr><th colspan="2">COMMON MODES</th><th>VERTICAL</th><th>LATERAL</th></tr>
<tr><td colspan="2">TAKEOFF</td><td>SRS</td><td>RWY
RWY TRK</td></tr>
<tr><td rowspan="3">APPROACH
MODES</td><td rowspan="2">ILS
APPROACH</td><td>G/S*
G/S</td><td>LOC*
LOC</td></tr>
<tr><td colspan="2">LAND, FLARE,
ROLL OUT</td></tr>
<tr><td>NON-ILS
APPROACH</td><td>FINAL</td><td>APP NAV</td></tr>
<tr><td colspan="2">GO AROUND
(GA)</td><td>SRS</td><td>GA TRK
NAV</td></tr>
</table>

GENERAL

Ident.: DSC-22_30-80-20-00012253.0001001 / 17 AUG 10
Applicable to: ALL

Takeoff mode combines the SRS (Speed Reference System) vertical mode with the RWY lateral mode. Both are simultaneously engaged, but may be disengaged separately.

Takeoff mode is available:
- During the takeoff run and initial climb for FD bars guidance
- 5 s after lift-off for AP use.

SRS (SPEED REFERENCE SYSTEM)

Ident.: DSC-22_30-80-20-A-00012260.0001001 / 17 AUG 10
Applicable to: ALL

GENERAL

The SRS mode controls pitch to steer the aircraft along a path in the vertical plan at a speed defined by the SRS guidance law.

Ident.: DSC-22_30-80-20-A-00012256.0001001 / 23 JUN 15
Applicable to: ALL

ENGAGEMENT CONDITIONS

The SRS mode engages automatically when the thrust levers are set to the TOGA or FLX/MCT detent, providing:
- V2 has been inserted in the MCDU PERF TAKEOFF page
- The slats are extended
- The aircraft has been on ground for at least 30 s.

Ident.: DSC-22_30-80-20-A-00012258.0001001 / 23 JUN 15
Applicable to: MSN 1882

DISENGAGEMENT CONDITIONS

The SRS mode disengages:
- Automatically, at the acceleration altitude (ACC ALT), or if ALT* or ALT CST* mode engages (above 400 ft RA)
- If the flight crew engages another vertical mode.

Note: *In Engine Out conditions, the SRS mode does not automatically disengage at EO ACC ALT. Refer to DSC-22_20-60-40 General.*

Ident.: DSC-22_30-80-20-A-00012258.0002001 / 23 JUN 15
Applicable to: MSN 2078-4547

DISENGAGEMENT CONDITIONS

The SRS mode disengages:
- Automatically, at the acceleration altitude (ACC ALT), or if ALT* or ALT CST* mode engages (above 400 ft RA)
- If the flight crew engages another vertical mode
- If the flight crew selects a speed while in SRS mode: SRS reverts to OP CLB mode, and a triple-click aural warning is heard.

Note: *In Engine Out conditions, the SRS mode does not automatically disengage at EO ACC ALT. Refer to DSC-22_20-60-40 General.*

Ident.: DSC-22_30-80-20-A-00012259.0011001 / 16 MAR 11
Applicable to: ALL

GUIDANCE

In SRS mode, the aircraft maintains a speed target equal to V2+10 kt in normal engine configuration. When the FMGS detects an engine failure, the speed target becomes the highest of V2 or current speed, limited by V2+15 kt.

The SRS guidance law also includes:
- Attitude protection to reduce aircraft nose-up effect during takeoff (18 ° or 22.5 ° maximum in case of windshear)
- Flight path angle protection that ensures a minimum vertical speed of 120 ft/min
- A speed protection limiting the target speed to V2+15 kt.

Note: *If during takeoff the flight crew inadvertently sets an altitude on the FCU below the current altitude, the aircraft will remain in SRS mode until the flight crew takes some other action.*

Typical FMA at takeoff with a Flex temperature

RUNWAY (RWY)

Applicable to: ALL

Ident.: DSC-22_30-80-20-B-00012255.0001001 / 17 AUG 10

GENERAL

The RUNWAY mode has two submodes:
- RWY mode, which gives lateral guidance orders during takeoff roll and initial climb out (up to 30 ft RA) if a LOC signal is available
- RWY TRK mode, which gives lateral guidance on the track the aircraft was flying at mode engagement (at 30 ft RA).

Ident.: DSC-22_30-80-20-B-00012323.0001001 / 17 AUG 10

ENGAGEMENT CONDITIONS

The RWY engagement conditions are:
- The conditions required for SRS mode engagement:
  - V2 is inserted in the MCDU PERF TAKEOFF page
  - Slats are extended
  - The aircraft has been on ground for at least 30 s.
- The aircraft is receiving a LOC signal and LOC deviation is less than 1/2 dot
- The aircraft heading is within 20 ° of the ILS related course
- The ILS course is identical to the runway heading of the origin airport as selected for the active flight plan, if any.

The RWY TRK mode engages automatically at 30 ft (RA) if NAV mode does not engage (NAV not armed prior to takeoff).

Ident.: DSC-22_30-80-20-B-00012324.0001001 / 17 AUG 10

DISENGAGEMENT CONDITIONS

RWY mode disengages if:
- The LOC signal is lost below 30 ft RA or the aircraft heading and the runway heading differ by more than 20 °.
- Another lateral mode is engaged.

Note: *If the takeoff runway has no ILS, RWY mode is not available and the PFD does not display the yaw bar nor "RWY" on FMA.*

Ident.: DSC-22_30-80-20-B-00012325.0002001 / 16 MAR 11

GUIDANCE

The RWY mode uses the LOC signal to guide the aircraft on the runway centerline while the aircraft is on the ground. The PFD displays the FD yaw bar and the FMA displays "RWY".

The RWY TRK mode guides the aircraft on the track the aircraft was flying at mode engagement. The FD displays the conventional guidance bar and the FMA displays “RWY TRK”.

Typical FMA with RWY mode engaged.

General

GENERAL

Ident.: DSC-22_30-80-30-05-00012378.0001001 / 01 OCT 12
Applicable to: MSN 1882-2078

The aircraft can fly different types of approaches:
- Precision approaches: ILS, MLS
- Non-precision approaches: VOR/DME, VOR, NDB (if ADF), RNAV
- Non-precision approaches using a Localizer only: LOC.

The flight crew uses an ARRIVAL lateral revision to insert these approaches into the flight plan:
- For precision approaches, the flight crew uses the APPR pb on the FCU to arm or engage the LOC and G/S guidance modes
- For non-precision approaches, the flight crew uses the APPR pb on the FCU to arm or engage the APP NAV and FINAL guidance modes, except for LOC approaches, where the flight crew only uses the LOC pb to arm or engage the LOC mode.

GENERAL

Ident.: DSC-22_30-80-30-05-00012378.0008001 / 01 OCT 12
Applicable to: MSN 3408-4547

The aircraft can fly different types of approaches:
- Precision approaches: ILS, MLS ◁
- Non-precision approaches: VOR/DME, VOR, NDB (if ADF ◁), RNAV
- Non-precision approaches using a Localizer only: LOC.

The flight crew uses an ARRIVAL lateral revision to insert these approaches into the flight plan:
- For precision approaches, the flight crew uses the APPR pb on the FCU to arm or engage the LOC and G/S guidance modes
- For non-precision approaches, the flight crew uses the APPR pb on the FCU to arm or engage the APP NAV and FINAL guidance modes, except for LOC approaches, where the flight crew only uses the LOC pb to arm or engage the LOC mode.

Precision Approach

PRECISION APPROACH MODES

Ident.: DSC-22_30-80-30-10-A-00012379.0003001 / 01 OCT 12
Applicable to: ALL

GENERAL

The ILS approach mode includes the following modes:

VERTICAL MODE	LATERAL MODE
G/S* (capture) G/S (track)	LOC* (capture) LOC (track)
COMMON MODES: LAND - FLARE - ROLL OUT	

The sequencing of these modes is automatic once the flight crew has pushed the APPR pb and the conditions for engagement are met.

SELECTION

The ILS approach is selected when the APPR pb of the FCU is pressed and:
- An ILS approach or a runway only or no approach is inserted in the Flight Management flight plan (ARRIVAL page), and an ILS frequency is set in on the MCDU, or
- Both radio management panels are set to NAV and each one has the ILS frequency and course set in.

CHECK APPROACH SELECTION MESSAGE

If the flight crew inserts a non-ILS approach into the flight plan, and then uses the RAD NAV page to tune an ILS manually, the MCDU displays “CHECK APPR SELECTION”. This message is a reminder that the available APPR guidance modes are APP NAV and FINAL.

APPR MODE

ARMING CONDITIONS OF LOC AND G/S MODES

The flight crew arms the ILS/GLS ◁ /MLS ◁ /APPR mode (LOC and G/S in blue on the FMA) by pushing the APPR pb on the FCU, provided that:

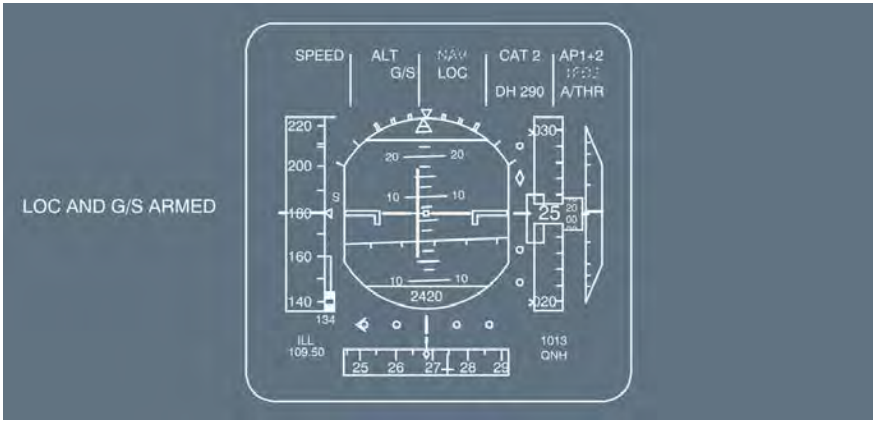
- An ILS/GLS ◁ /MLS ◁ approach is selected
- The aircraft is above 400 ft RA
- The ILS/GLS ◁ and RA are available
- Go-around or takeoff or final mode is not engaged
- ILS/GLS ◁ /MLS ◁ frequency/channel and course are identically set on both receivers.

LOC and G/S blue are displayed on the FMA. Both modes will automatically engage when conditions are met.
Second autopilot may be engaged.
Current landing capability is displayed on the FMA.

DISARMING CONDITIONS OF LOC AND G/S MODES

ILS/GLS ◁ /MLS ◁ APPR mode disarms if the aircraft is above 400 ft, and:

- When the flight crew presses the APPR pb, or when the flight crew selects another approach, both the LOC and the G/S modes disarm.
  The HDG/TRK mode engages if the LOC mode was engaged, and the V/S (FPA) mode engages if the G/S mode was engaged
- When the flight crew presses the LOC pb, only the G/S mode disarms.
  The V/S (FPA) mode engages, if the G/S mode was engaged
- When the flight crew pulls the HDG/TRK knob
- When the flight crew engages the go-around mode.



ENGAGEMENT CONDITIONS OF LOC AND G/S MODES

When ILS/GLS ◁ /MLS ◁ capture conditions are fulfilled:
- LOC* mode engages, and
- G/S* mode engages. No radio altimeter validity is required with this FMGC standard for G/S engagement. The FMA displays “LOC*”, or “G/S*”, or both, in green.

Nevertheless, the G/S* mode cannot engage, if:
- LOC* mode is not engaged, or
- The aircraft is above the glide path and its trajectory does not cross the ILS G/S beam.

When the aircraft is established on the LOC axis, the LOC mode engages.
When the aircraft is established on the G/S axis, the G/S mode engages.
The FMA displays “LOC” and “G/S” in green. The AP/FD guides the aircraft along the G/S down to 30 ft, and along the LOC during the flare and rollout.

Note: *G/S* or G/S modes may be engaged above the operating range of the radio altimeters (8 000 ft for TRT, and 5 000 ft for Collins and Honeywell radio altimeters). The landing capability displayed on the FMA will reflect the lack of RA validity (CAT 1) until the radio altimeters become active.*
But, if the radio altimeters fail, or if the FMGS receives no radio altimeter data, LOC, G/S, and AP/FDs will disengage and FDs will re-engage on basic modes.

DISENGAGEMENT CONDITIONS OF LOC AND G/S MODES

If the aircraft is above 400 ft, the ILS/GLS ◁ /MLS ◁ APPR mode disengages when the flight crew:

- Presses the APPR pb, HDG V/S or TRK FPA engages
- Presses the LOC pb, the LOC mode remains engaged. The system reverts to V/S (FPA), if G/S was engaged
- Pulls out the HDG/TRK knob, HDG V/S or TRK FPA engages
- Engages the go-around mode
- Selects another approach. HDG V/S or TRK FPA modes engage.
- When the LOC or G/S signal has been lost for 7 s or more above 200 ft RA. AP/FDs disengage and FDs reengage in basic modes (HDG V/S or TRK FPA).

DISENGAGEMENT CONDITIONS OF G/S ONLY

- The flight crew pulls out the V/S or FPA knob. LOC mode remains engaged, but G/S mode disengages and V/S or FPA engages.
- The flight crew pushes or pulls the ALT knob. LOC mode remains engaged, and the mode selected by the flight crew engages, as a function of the FCU selected altitude.

LOC CONVERGENCE FUNCTION

The aim of the LOC Convergence function is to help the aircraft intercept and capture the LOC axis.

The aircraft is guided with a converging track of 20 ° from the LOC axis, when all the following conditions are met:

- NAV mode is engaged, and LOC mode is armed
- The aircraft is within 20 NM of the destination runway
- The difference between the aircraft track and the QFU is less than 20 °.

ENHANCED LOC CAPTURE FUNCTION

The Enhanced LOC Capture function enhances the performance of the LOC capture and helps the aircraft to capture the LOC beam without overshoot.

Pre-Capture of the LOC Beam

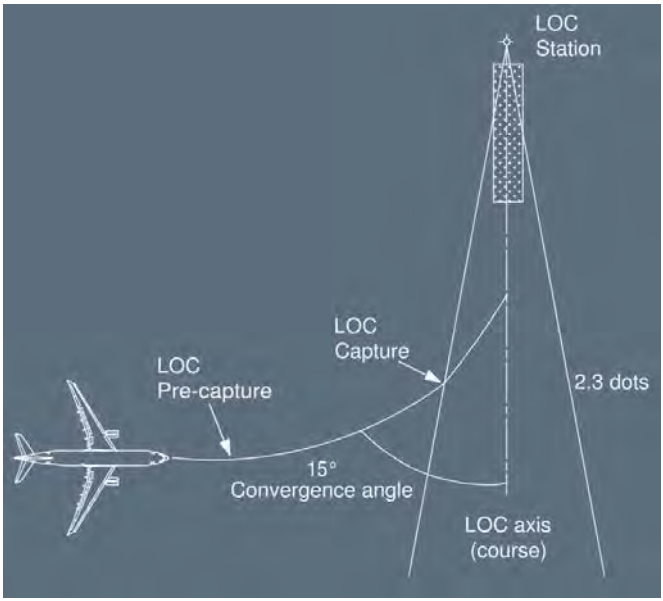
The pre-capture of the LOC beam aims to begin the LOC beam capture sooner.
LOC* mode may engage when LOC mode is armed and when the aircraft reaches the LOC pre-capture zone. The LOC pre-capture zone is a geographical zone around LOC beam where it is possible to guide the aircraft toward the LOC beam, with the help of FMS position data. To ensure the capture of the LOC beam, the aircraft is guided with a 15 ° convergence angle with respect to runway QFU.

The LOC* mode engagement in the pre-capture zone is possible, when :
- The LOC deviation is more than 2.3 dots
- The FMS is in GPS PRIMARY
- The difference between the track and the QFU is between 25 ° and 115 °
- The guidance roll order is such that LOC* will capture the LOC beam without overshoot.

When the LOC deviation becomes lower than 2.3 dots, LOC* mode no longer uses the FMS position data for guidance, but the actual LOC beam deviation to complete the capture of the axis.

Capture of the LOC Beam

Current conditions of LOC beam capture in the capture zone remain the same. This means that if approach conditions of the aircraft (interception angle, speed) do not need activation of the capture assistance, the LOC beam capture will occur as usual based on LOC deviation, aircraft track and guidance roll order conditions.



Note: *On the PFD and on the ND, the flight crew will observe movement of the LOC deviation toward the center of the scale, only when the LOC deviation is less than 2 dots. This occurs when the aircraft is in the capture zone.*

When the ILS/GLS ◁ /MLS ◁ frequency/channel or the ILS/GLS/MLS ident entered on the RAD NAV page differs from the ILS/GLS/MLS of the destination runway entered in the Flight Plan :

- The aircraft loses the LOC capture assistance function
- The "RWY/LS MISMATCH" message is displayed on the scratchpad
- The flight crew should select HDG mode to perform the LOC capture.

Note: *There is no glideslope capture assistance. The flight crew shall ensure that the aircraft flight path intercepts the G/S beam.*

Ident.: DSC-22_30-80-30-10-A-00012380.0067001 / 03 DEC 13
Applicable to: MSN 3408, 3518-4100

APPR MODE

ARMING CONDITIONS OF LOC AND G/S MODES

The flight crew arms the ILS APPR mode (LOC and G/S in blue on the FMA) by pushing the APPR pb on the FCU, provided that:

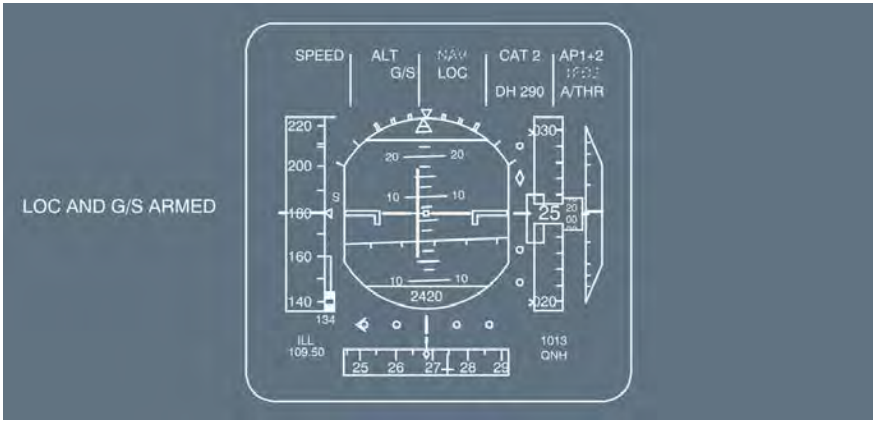
- An ILS approach is selected
- The aircraft is above 400 ft RA
- The ILS and RA are available
- Go-around or takeoff or final mode is not engaged
- ILS frequency and course are identically set on both receivers.

LOC and G/S blue are displayed on the FMA. Both modes will automatically engage when conditions are met.
Second autopilot may be engaged.
Current landing capability is displayed on the FMA.

DISARMING CONDITIONS OF LOC AND G/S MODES

ILS APPR mode is disarmed, if the aircraft is above 400 ft and:

- When the flight crew presses the APPR pb, both the LOC and the G/S modes disarm. The HDG/TRK mode engages if the LOC mode was engaged, and the V/S (FPA) mode engages if the G/S mode was engaged
- When the flight crew presses the LOC pb, only the G/S mode disarms. The V/S (FPA) mode engages, if the G/S mode was engaged
- When the flight crew pulls the HDG/TRK knob
- When the flight crew engages the go-around mode.



ENGAGEMENT CONDITIONS OF LOC AND G/S MODES

When ILS capture conditions are fulfilled:
- LOC* mode engages, and
- G/S* mode engages. No radio altimeter validity is required with this FMGC standard for G/S engagement. The FMA displays “LOC*”, or “G/S*”, or both, in green.

Nevertheless, the G/S* mode cannot engage, if:
- LOC* mode is not engaged, or
- The aircraft is above the glide path and its trajectory does not cross the ILS G/S beam.

When the aircraft is established on the LOC axis, the LOC mode engages.
When the aircraft is established on the G/S axis, the G/S mode engages.
The FMA displays “LOC” and “G/S” in green. The AP/FD guides the aircraft along the G/S down to 30 ft, and along the LOC during the flare and rollout.

Note: G/S or G/S modes may be engaged above the operating range of the radio altimeters (8 000 ft for TRT, and 5 000 ft for Collins and Honeywell radio altimeters). The landing capability displayed on the FMA will reflect the lack of RA validity (CAT 1) until the radio altimeters become active.*
But, if the radio altimeters fail, or if the FMGS receives no radio altimeter data, LOC, G/S, and AP/FDs will disengage and FDs will re-engage on basic modes.

DISENGAGEMENT CONDITIONS OF LOC AND G/S MODES

If the aircraft is above 400 ft, the ILS APPR mode disengages when the flight crew:
- Presses the APPR pb, HDG V/S or TRK FPA engages
- Presses the LOC pb, the LOC mode remains engaged. The system reverts to V/S (FPA), if G/S was engaged

- Pulls out the HDG/TRK knob, HDG V/S or TRK FPA engages
- Engages the go-around mode
- When the LOC or G/S signal has been lost for 7 s or more above 200 ft RA. AP/FDs disengage and FDs reengage in basic modes (HDG V/S or TRK FPA).

DISENGAGEMENT CONDITIONS OF G/S ONLY

- The flight crew pulls out the V/S or FPA knob. LOC mode remains engaged, but G/S mode disengages and V/S or FPA engages.
- The flight crew pushes or pulls the ALT knob. LOC mode remains engaged, and the mode selected by the flight crew engages, as a function of the FCU selected altitude.

LOC CONVERGENCE FUNCTION

The aim of the LOC Convergence function is to help the aircraft intercept and capture the LOC axis.

The aircraft is guided with a converging track of 20 ° from the LOC axis, when all the following conditions are met:
- NAV mode is engaged, and LOC mode is armed
- The aircraft is within 20 NM of the destination runway
- The difference between the aircraft track and the QFU is less than 20 °.

ENHANCED LOC CAPTURE FUNCTION

The Enhanced LOC Capture function enhances the performance of the LOC capture and helps the aircraft to capture the LOC beam without overshoot.

Pre-Capture of the LOC Beam

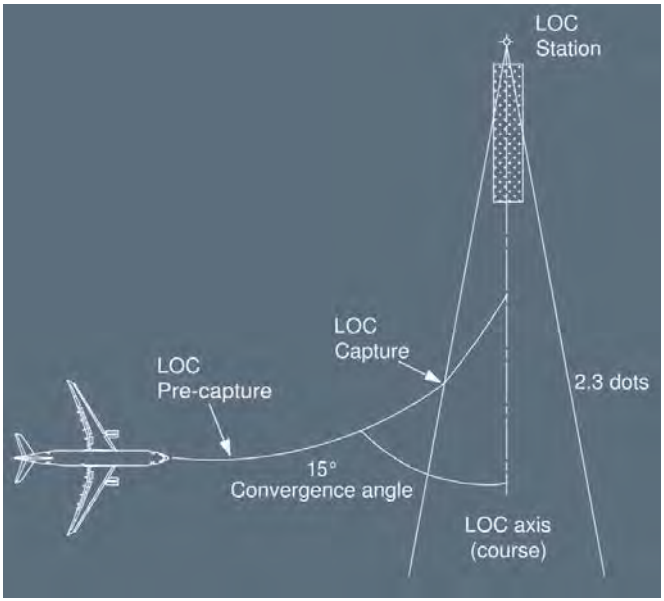
The pre-capture of the LOC beam aims to begin the LOC beam capture sooner.
LOC* mode may engage when LOC mode is armed and when the aircraft reaches the LOC pre-capture zone. The LOC pre-capture zone is a geographical zone around LOC beam where it is possible to guide the aircraft toward the LOC beam, with the help of FMS position data. To ensure the capture of the LOC beam, the aircraft is guided with a 15 ° convergence angle with respect to runway QFU.

The LOC* mode engagement in the pre-capture zone is possible, when :
- The LOC deviation is more than 2.3 dots
- The FMS is in GPS PRIMARY
- The difference between the track and the QFU is between 25 ° and 115 °
- The guidance roll order is such that LOC* will capture the LOC beam without overshoot.

When the LOC deviation becomes lower than 2.3 dots, LOC* mode no longer uses the FMS position data for guidance, but the actual LOC beam deviation to complete the capture of the axis.

Capture of the LOC Beam

Current conditions of LOC beam capture in the capture zone remain the same. This means that if approach conditions of the aircraft (interception angle, speed) do not need activation of the capture assistance, the LOC beam capture will occur as usual based on LOC deviation, aircraft track and guidance roll order conditions.



Note: *On the PFD and on the ND, the flight crew will observe movement of the LOC deviation toward the center of the scale, only when the LOC deviation is less than 2 dots. This occurs when the aircraft is in the capture zone.*

When the ILS frequency or the ILS ident entered on the RAD NAV page differs from the ILS of the destination runway entered in the Flight Plan :

- The aircraft loses the LOC capture assistance function
- The “RWY/LS MISMATCH” message is displayed on the scratchpad
- The flight crew should select HDG mode to perform the LOC capture.

Note: *There is no glideslope capture assistance. The flight crew shall ensure that the aircraft flight path intercepts the G/S beam.*

Ident.: DSC-22_30-80-30-10-A-00012381.0002001 / 17 AUG 10
Applicable to: ALL

LAND MODE

ENGAGEMENT CONDITIONS

LAND mode automatically engages when the LOC and G/S modes are engaged, and the aircraft is below 400 ft RA. The FMA displays “LAND”, indicating that LOC and G/S are locked. No action on the FCU will disengage LAND mode. FLARE and ROLL OUT modes will successively engage.

DISENGAGEMENT CONDITIONS

LAND mode disengages:
- Upon engagement of the go-around mode
- If the flight crew presses the APPR pb, when the aircraft has been on ground for at least 10 s with the autopilot disconnected
- When both AP/FDs are disengaged.

Note: When LAND is not displayed on the FMA, at/or slightly below 400 ft, the landing capability degrades to CAT 1 and the triple click is generated. No autoland is authorized with CAT 1 displayed on the FMA.

Ident.: DSC-22_30-80-30-10-A-00012382.0001001 / 17 AUG 10
Applicable to: ALL

FLARE MODE

Once the aircraft reaches approximately 40 ft RA (the precise value is a function of V/S):
- The FLARE mode engages
- The FMA displays “FLARE” in green.

At 30 ft RA, the AP/FD aligns the yaw axis with the runway centerline and the aircraft flares on the pitch axis. If the autothrust is active, thrust is automatically reduced to IDLE (*Refer to DSC-22_30-90 A/THR Modes - RETARD Mode*).
When both AP/FDs are disengaged, FLARE mode disengages.
After main landing gear touchdown, the autopilot (if engaged) sends a nose down order.

ALIGN SUB-MODE

ALIGN is a sub-mode of LAND mode that lines up the aircraft’s axis with the ILS course. It is not displayed to the flight crew.

Ident.: DSC-22_30-80-30-10-A-00012383.0001001 / 17 AUG 10
Applicable to: ALL

ROLL OUT MODE

At touchdown, the ROLL OUT mode engages and guides the aircraft along the runway centerline. The FMA displays “ROLL OUT” in green, and the PFD displays the yaw bar and no FD bars.

SPEED CONTROL

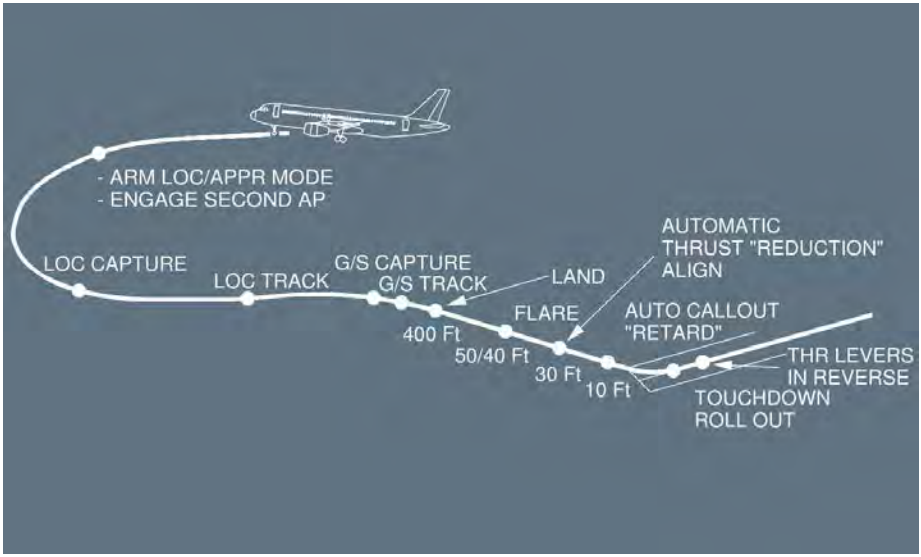
Ident.: DSC-22_30-80-30-10-00012384.0001001 / 17 AUG 10
Applicable to: ALL

The autothrust, when active, controls speed. The approach speed target (VAPP) is either managed by the FMGS or selected by the flight crew:

- When managed, the speed target is computed by the FMGS and may be modified by the flight crew through the MCDU. At 700 ft RA, the current speed target value is memorized by the autothrust, to ensure stabilized speed guidance, even if Flight Management fails. Below 700 ft, any new VAPP or WIND entry in the MCDU has no effect on the speed target.
- When selected, the autothrust always targets the speed selected on the FCU.

TYPICAL ILS APPROACH

Ident.: DSC-22_30-80-30-10-00012385.0001001 / 16 MAR 11
Applicable to: ALL



AUTOLAND WARNING LIGHT

Ident.: DSC-22_30-80-30-10-00012386.0002001 / 09 APR 15
Applicable to: MSN 1882-2078, 3467, 4379-4547

The AUTOLAND warning flashes when:
- At least one RA indicates a height below 200 ft, and
- At least one AP is engaged with LAND or FLARE mode on the FMA, and
- At least one of the following conditions occurs:
  - The LOC deviation exceeds 1/4 dot and the aircraft is above 15 ft RA (the LOC scale flashes on the PFD), or
  - The GLIDE deviation exceeds 1 dot and the aircraft is above 100 ft RA (the GLIDE scale flashes on the PFD), or
  - Loss of LOC signal above 15 ft RA (The FD vertical bar flashes on the PFD), or
  - Loss of GLIDE signal above 100 ft RA (The FD horizontal bar flashes on the PFD), or
  - The difference between both RA indications is greater than 15 ft RA, or
  - The last autopilot disengages, or
  - The FMGS detects a long flare.

AUTOLAND WARNING LIGHT

Ident.: DSC-22_30-80-30-10-00012386.0001001 / 03 JUN 14
Applicable to: MSN 3408, 3518-4100

The following situations, when occurring below 200 ft RA with the aircraft in LAND mode, trigger the flashing Autoland red warning:
- Both APs OFF below 200 ft RA.
- Excessive deviation in LOC (1/4 dot above 15 ft RA) or GLIDE (1 dot above 100 ft RA). In addition, LOC and GLIDE scales flash on the PFD.
- Loss of LOC signal above 15 ft, or loss of GLIDE signal above 100 ft. The FD bars flash on the PFD. The LAND mode remains engaged.
- The difference between both radio altimeter indications is greater than 15 ft.

LANDING CAPABILITIES

Ident.: DSC-22_30-80-30-10-00012387.0001001 / 17 AUG 10
Applicable to: ALL

Each FMGC computes its own automatic landing capability.
The FMA displays “CAT 1”, “CAT 2”, “CAT 3 SINGLE” or “CAT 3 DUAL” messages as soon as the APPR pb is pushed in to arm ILS approach modes.
Refer to PRO-NOR-SRP-01-70 Initial Approach.

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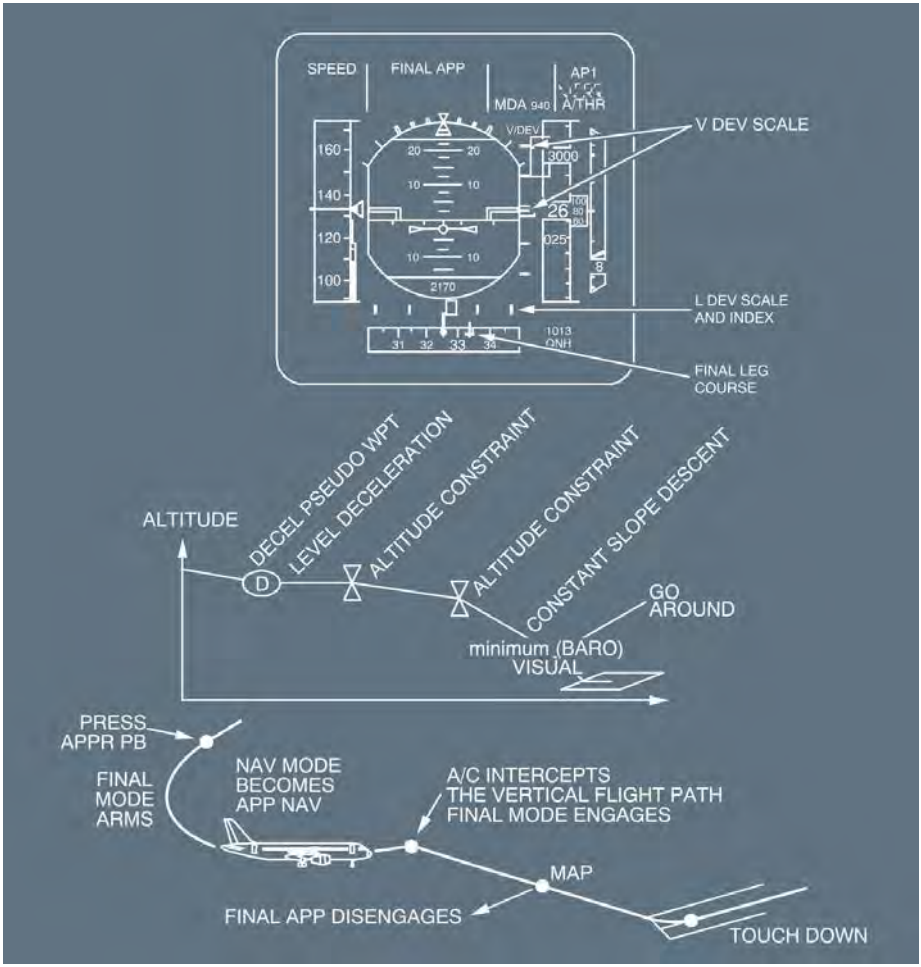
Non Precision Approach

GENERAL

Ident.: DSC-22_30-80-30-20-00012388.0120001 / 04 NOV 13
Applicable to: MSN 3467, 4379-4547

This mode guides the aircraft laterally and vertically down to the minimum along the final descent profile computed by the FMGS.
This mode is used to fly a non-ILS/non-GLS ◁ /non-MLS ◁ approach (VOR, VOR/DME, NDB (if ADF ◁), RNAV...) as inserted into the flight plan.



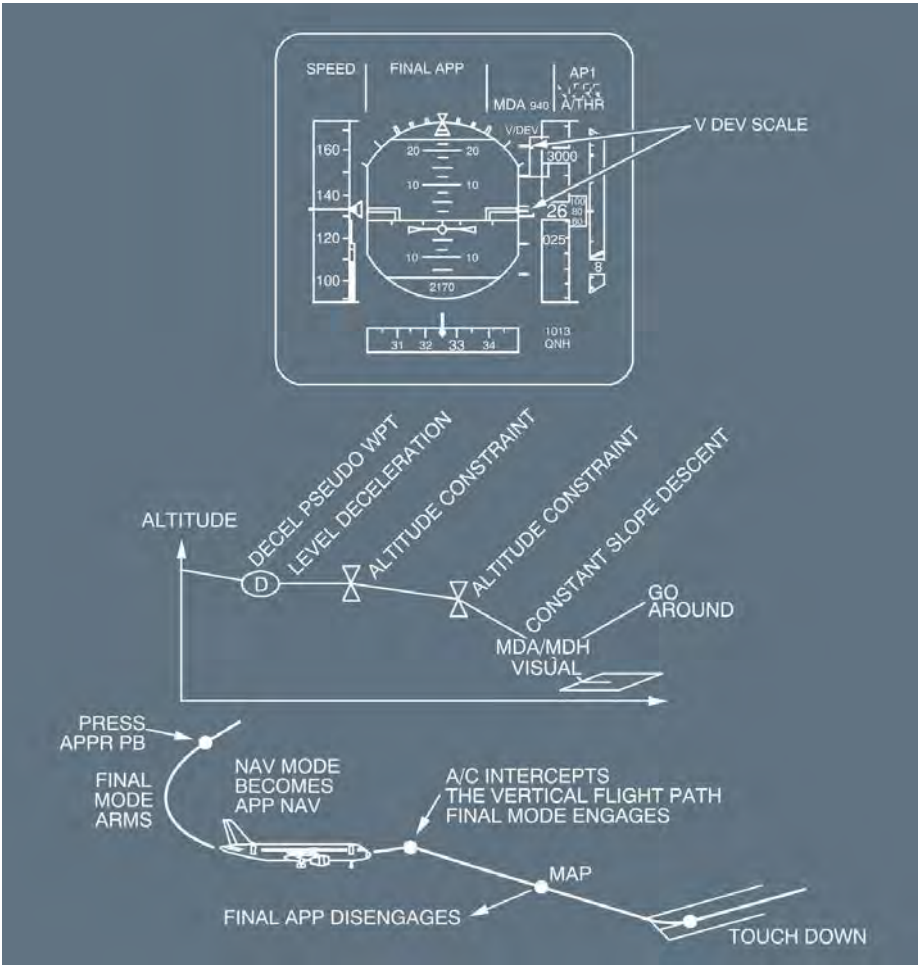
The non-ILS/non-GLS ⋘ /non-MLS ⋘ approach includes the following managed modes:

- APP NAV mode for lateral guidance
- FINAL mode for vertical guidance.

GENERAL

Ident.: DSC-22_30-80-30-20-00012388.0119001 / 25 JAN 17
Applicable to: MSN 1882-2078

This mode guides the aircraft laterally and vertically down to the minimum along the final descent profile computed by the FMGS.
This mode is used to fly a non-ILS/non-GLS ⋘ approach (VOR, VOR/DME, NDB (if ADF ⋘), RNAV...) as inserted into the flight plan.

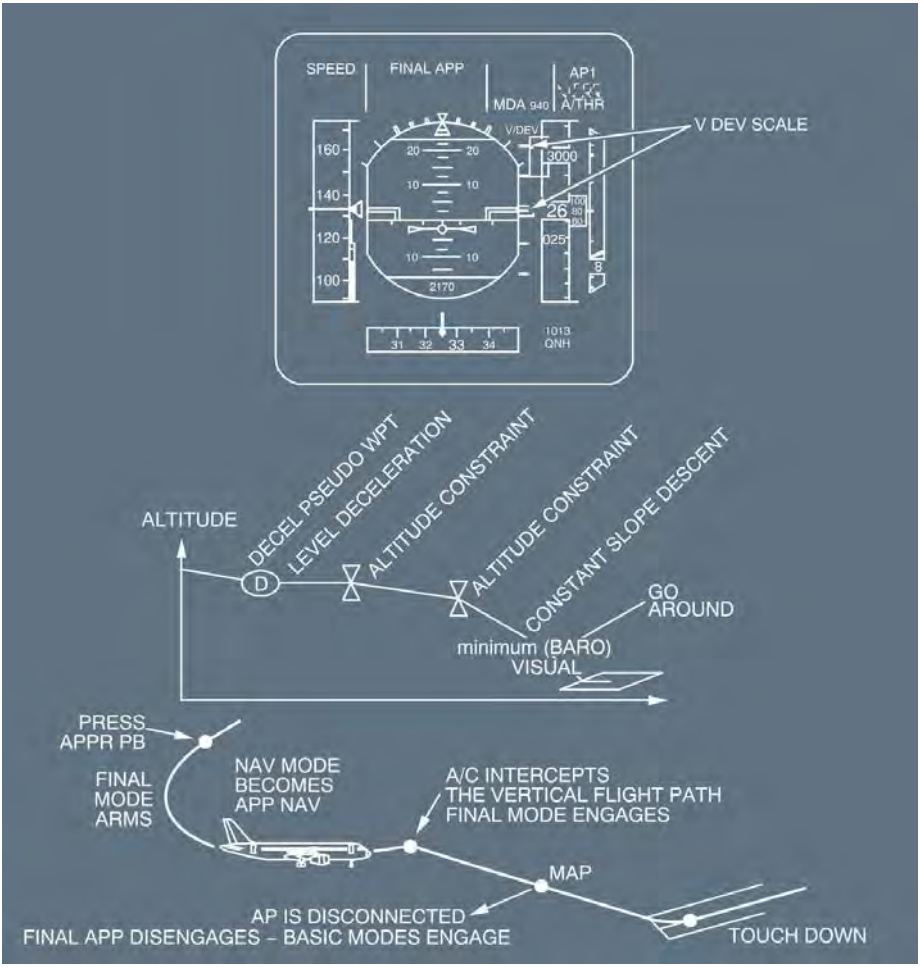


The non-ILS/non-GLS ◁ approach includes the following managed modes:
- APP NAV mode for lateral guidance
- FINAL mode for vertical guidance.

GENERAL

Ident.: DSC-22_30-80-30-20-00012388.0090001 / 01 OCT 12
Applicable to: MSN 3408, 3518-4100

This mode guides the aircraft laterally and vertically down to the minimum along the final descent profile computed by the FMGS.
This mode is used to fly a non-ILS approach (VOR, VOR/DME, NDB (if ADF ◁), RNAV...) as inserted into the flight plan.



The non-ILS approach includes the following managed modes:

- APP NAV mode for lateral guidance
- FINAL mode for vertical guidance.

SELECTION

Ident.: DSC-22_30-80-30-20-00012389.0001001 / 17 AUG 10
Applicable to: ALL

A non-ILS approach (VOR, VOR/DME, NDB (if ADF), RNAV) is selected if the active flight plan calls for it (and it has been inserted in that flight plan).

ARMING CONDITIONS

Ident.: DSC-22_30-80-30-20-00012390.0001001 / 17 AUG 10
Applicable to: ALL

The flight crew arms the APP NAV and FINAL modes by pressing the APPR pb on the FCU, if all of the following conditions are met:
- The aircraft is above 400 ft AGL
- The flight plan is valid (lateral and vertical profile)
- The active flight plan has selected a non-ILS approach
- GA mode is not engaged.

The FMA displays “FINAL” and “APP NAV” in blue.
If NAV mode was already engaged, APP NAV engages immediately.

DISARMING CONDITIONS

Ident.: DSC-22_30-80-30-20-00012391.0001001 / 17 AUG 10
Applicable to: MSN 3408, 3518-4100

FINAL and APP NAV modes are disarmed if the flight crew:
- Presses the APPR pb, or
- Presses the LOC pb arming the LOC mode, or
- Engages the GO AROUND mode.

DISARMING CONDITIONS

Ident.: DSC-22_30-80-30-20-00012391.0006001 / 30 MAY 12
Applicable to: MSN 1882-2078, 3467, 4379-4547

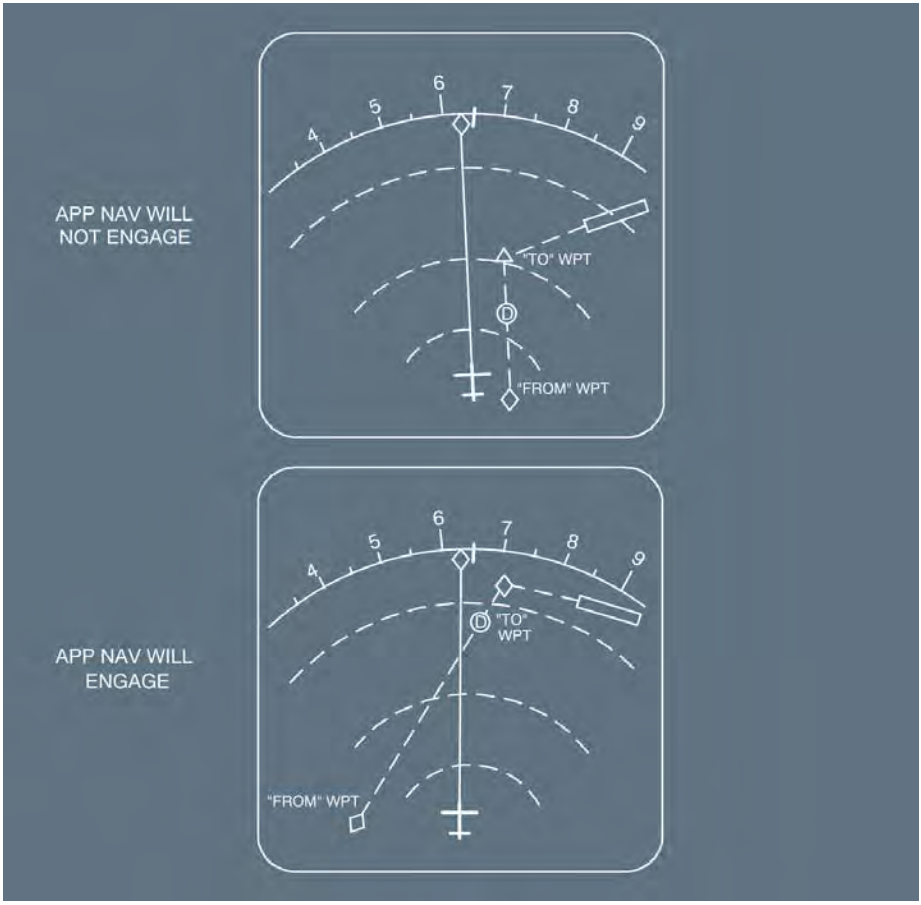
FINAL and APP NAV modes are disarmed when:
- The flight crew presses the APPR pb, or
- The flight crew presses the LOC pb, or
- The flight crew selects a precision approach instead of the approach currently armed, or
- The flight crew engages the GO AROUND mode.

Note: - *after pressing the LOC pb, the LOC mode is armed*
- *after the selection of a precision approach, the flight crew must press the APPR pb to arm the new approach*

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-80-30-20-00012392.0003001 / 08 AUG 17
Applicable to: ALL

APP NAV and NAV modes engage under the same conditions:
If NAV mode was engaged, APP NAV engages immediately. If HDG/TRK is engaged, APP NAV engages when the intercept conditions are met (aircraft track line must intercept the flight plan active leg).
APP NAV will not engage if the "TO" waypoint is not displayed in white on the ND and MCDU.



FINAL APP is a lateral and vertical managed guidance approach mode that aims guiding aircraft from FDP down to MAP along a defined FPA It is thus recommended to arm this mode when the TO waypoint is the FDP.

FINAL APP mode engages when:

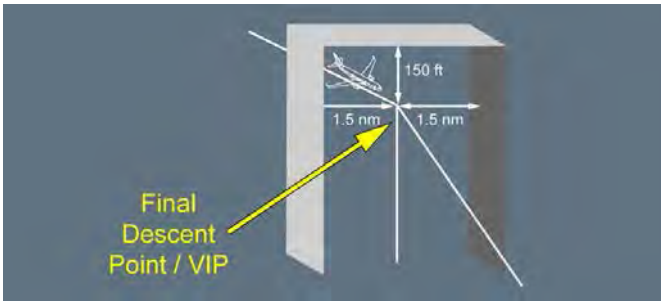
- NAV or APP NAV is engaged,
- FINAL is armed (by pressing APPR on the FCU),
- Predictions are available in FMS,

- APPROACH phase is active,

  Note: *APPROACH phase may have to be manually activated on MCDU PERF page if the approach starts at high altitude above aerodrome level (i.e. RNAV(RNP) approaches).*

- The aircraft is within the capture area of the FMS profile:
  - Laterally: ±1.5 NM from the Final Descent Point.
  - Vertically: +150 ft above the Final Descent Point.
- The aircraft intercepts a descending leg of the vertical flight path.

  Note: *if APPR pb is pressed earlier, FINAL APP mode may engage. As a consequence, resulting speed and altitude management in FINAL APP may be inappropriate before FDP.*



A blue arrow is displayed on NDs to indicate where the FINAL APP engagement conditions are met and where the final descent will begin automatically.
If the same arrow is displayed in white, at least one engagement condition is not fulfilled, FINAL APP will not engage and the aircraft will not descend automatically.

Definition of the Final Descent Point (also called Vertical Intersection Point "VIP" for RNAV (RNP) approaches)

The Final Descent Point is the waypoint from which starts the FMS segment with coded FPA. For RNAV(RNP) approaches, this point may be indicated on the chart as "VIP".

This point is defined in the Navigation Database by:
- A constant vertical flight path beyond this point,
- A coded altitude constraint that may be "at" or "at or above" (e.g. +3 000 ft). This constraint is displayed on ND (in magenta), next to the corresponding waypoint, when the CSTR key is selected on the EFIS Control Panel. It is also shown on the F-PLN page at this WPT.

Note: *The Final Approach Fix (FAF) is the position from where the obstacle clearance is defined relative to an Obstacle Clearance Surface (OCS). Obstacle clearance is only ensured if the aircraft is flying on the defined vertical flight path. Before the FAF, minimum altitudes are published with fixed Minimum Obstacle Clearance (MOC). The Final Descent Point is the point in the procedure at or before the FAF from which a constant vertical flight path is defined.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-80-30-20-00012393.0052001 / 21 MAR 16
Applicable to: MSN 1882-2078, 3467, 4379-4547

The FINAL and APP NAV modes disengage:
- If the flight crew pushes the APPR pb (HDG-V/S or TRK-FPA modes engage), or
- If the flight crew pushes the LOC pb (LOC mode arms if an ILS/MLS ◁ /GLS ◁ is selected and HDG-V/S or TRK-FPA modes engage), or
- If the flight crew pulls out the HDG/TRK knob (the FMGS reverts to HDG-V/S or TRK-FPA basic modes), or
- If the flight crew selects a precision approach (the FMGS reverts to HDG-V/S or TRK-FPA basic modes), or
- Automatically at Missed Approach Point (the FMGS vertical mode reverts to V/S / FPA and the FMGS lateral mode reverts to HDG / TRK or NAV), or
- When the GO AROUND mode engages.

Note:
- *If the flight crew engages V/S or FPA mode, only FINAL mode disengages. NAV mode remains engaged.*
- *In the case the flight crew selects a new approach, the flight crew must press the APPR pb to engage the new approach.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-80-30-20-00012393.0037001 / 17 MAR 15
Applicable to: MSN 3408, 3518-4100

The FINAL and APP NAV modes disengage:
- If the flight crew pushes the APPR pb (HDG-V/S or TRK-FPA modes engage)
- If the flight crew pushes the LOC pb (LOC mode arms if an ILS is selected and HDG-V/S or TRK-FPA modes engage)
- If the flight crew pulls out the HDG/TRK knob, the FMGS reverts to HDG-V/S or TRK-FPA basic modes

- Automatically at missed Approach Point .
- When the GO AROUND mode engages.

Note: *If the flight crew engages V/S or FPA mode, only FINAL mode disengages. NAV mode remains engaged.*

GUIDANCE

Ident.: DSC-22_30-80-30-20-00012394.0027001 / 29 MAR 12
Applicable to: MSN 1882-2078, 4379-4547

The FINAL mode guides the aircraft on the vertical profile down to the minimum.
The FINAL mode displays on the PFD the aircraft vertical deviation from the descent path (VDEV symbol) on a ± 200 ft scale.

The FINAL mode:
- Anticipates leaving the altitude selected by the FCU when the aircraft reaches the Continue Descent symbol (blue arrow on the ND)
- Provides precise vertical guidance on the descent and final path with an internal vertical speed limitation to avoid excessive V/S.

GUIDANCE

Ident.: DSC-22_30-80-30-20-00012394.0026001 / 18 MAR 11
Applicable to: MSN 3467

The FINAL mode guides the aircraft on the vertical profile down to the minimum.

The FINAL mode does the following:
- Displays, on the PFD, a lateral deviation scale (± 0.2 NM) and a lateral symbol (index) showing deviation from the lateral trajectory. When the lateral deviation is greater than 0.2 NM, half index is displayed on the scale limit
- Displays a vertical deviation scale (± 200 ft) on the PFD and a VDEV symbol showing deviation from descent path
- Anticipates leaving the altitude selected by the FCU when the aircraft reaches the Continue Descent symbol (blue arrow on the ND)
- Gives precise vertical guidance on the descent and final path with an internal vertical speed limitation to avoid excessive V/S.

If the autopilot is engaged while you are using the APP NAV/ FINAL modes, it disengages automatically at the Missed Approach Point (MAP).
FD modes revert to HDG-V/S or TRK-FPA basic modes.

GUIDANCE

Ident.: DSC-22_30-80-30-20-00012394.0021001 / 18 MAR 11
Applicable to: MSN 3408, 3518-4100

The FINAL mode guides the aircraft on the vertical profile down to the minimum.

The FINAL mode does the following:
- Displays a vertical deviation scale (± 200 ft) on the PFD and a VDEV symbol showing deviation from descent path
- Anticipates leaving the altitude selected by the FCU when the aircraft reaches the Continue Descent symbol (blue arrow on the ND)
- Gives precise vertical guidance on the descent and final path with an internal vertical speed limitation to avoid excessive V/S.

If the autopilot is engaged while you are using the APP NAV/ FINAL modes, it disengages automatically at the Missed Approach Point (MAP).
FD modes revert to HDG-V/S or TRK-FPA basic modes.

GENERAL

Ident.: DSC-22_30-80-40-00012050.0001001 / 17 AUG 10
Applicable to: MSN 1882-3408, 3518-4100

Go-around mode combines the Speed Reference System (SRS) vertical mode with the GA TRK lateral mode.

GENERAL

Ident.: DSC-22_30-80-40-00012050.0005001 / 16 MAR 11
Applicable to: MSN 3467, 4379-4547

When the flight crew performs a go-around, the Speed Reference System (SRS) vertical guidance mode automatically engages.

In addition:
- The NAV mode is automatically engaged or armed, except if HDG/TRK was preset, or
- The GA TRK lateral mode is automatically engaged until the HDG/TRK knob is pulled if the HDG/TRK mode is preset.

Note: *Below 100 ft , the HDG mode remains engaged with NAV mode armed if HDG/TRK was already engaged during approach.*

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-80-40-00012210.0002001 / 17 AUG 10
Applicable to: MSN 1882-3408, 3518-4100

Setting at least one thrust lever to the TOGA detent engages both SRS/GA TRK modes, if:
- The flaps lever is at least in position 1, and
- The aircraft is in flight, or
- The aircraft has been on ground for less than 30 s (AP disengages and can be re-engaged 5 s after lift-off).

FD bars are automatically restored in SRS/GA TRK modes. If FPV/FPD was previously selected, it reverts to FD bars.
The FMA displays “SRS” and “GA TRK” in green.

ENGAGEMENT CONDITIONS

Ident.: DSC-22_30-80-40-00012210.0004001 / 17 AUG 10
Applicable to: MSN 3467, 4379-4547

Setting at least one thrust lever to the TOGA detent engages both SRS/NAV modes, if:
- The flaps lever is at least in position 1, and
- The aircraft is in flight, or
- The aircraft has been on ground for less than 30 s (AP disengages and can be re-engaged 5 s after lift-off).

FD bars are automatically restored in SRS/NAV modes. If FPV/FPD was previously selected, it reverts to FD bars.
The FMA displays “SRS” and “NAV” in green.

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-80-40-00012220.0028001 / 17 AUG 10
Applicable to: MSN 2078-4547

The SRS mode disengages:
- Automatically, at the Go-around acceleration altitude (GA ACC ALT), or if ALT* mode engages (above 400 ft RA)
- If the flight crew engages another vertical mode
- If the flight crew selects a speed while in SRS mode: SRS reverts to OP CLB mode and a triple-click aural warning is heard.

Note: *In Engine Out conditions, the SRS mode does not automatically disengage at EO ACC ALT. Refer to DSC-22_20-60-40 General.*

GA TRK disengages when the flight crew engages another lateral mode, above 100 ft RA.

Note: *In dual AP configuration, disengagement of the Go-around mode on either axis causes AP2 to disconnect.*

DISENGAGEMENT CONDITIONS

Ident.: DSC-22_30-80-40-00012220.0001001 / 17 AUG 10
Applicable to: MSN 1882

The SRS mode disengages:
- Automatically, at the Go-around acceleration altitude (GA ACC ALT), or if ALT* mode engages (above 400 ft RA)
- If the flight crew engages another vertical mode
- If the flight crew selects a speed while in SRS mode: SRS reverts to OP CLB mode.

Note: In Engine Out conditions, the SRS mode does not automatically disengage at EO ACC ALT. Refer to DSC-22_20-60-40 General.

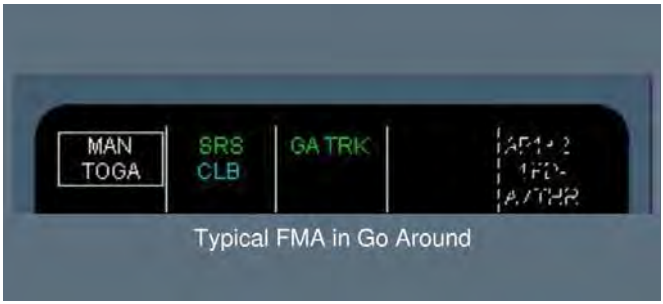
GA TRK disengages when the flight crew engages another lateral mode, above 100 ft RA.

Note: In dual AP configuration, disengagement of the Go-around mode on either axis causes AP2 to disconnect.

GUIDANCE

Ident.: DSC-22_30-80-40-00012213.0009001 / 16 MAR 11
Applicable to: ALL

The SRS law maintains the current speed at Go-around engagement, or VAPP, whichever is higher. Nevertheless, the SRS speed target is limited to VLS+25 kt, in a two-engine configuration, and VLS+15 kt, in an engine-out configuration. When the SRS mode disengages, the target speed becomes the smaller of green dot speed or speed constraints.
GA TRK mode guides the aircraft along the current track at Go-around initiation.



Typical FMA in Go Around

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GENERAL

Ident.: DSC-22_30-90-00011930.0001001 / 17 MAR 17
Applicable to: ALL

The autothrust (A/THR) is a function of the FMGS, it includes two independent A/THR commands, one per FMGC. Each one is able to control the thrust of both engines simultaneously through two Engine Interface Units and two Electronic Engine Controls (IAE engines) or two Engine Control Units (CFM engines). Only one FMGC controls the active A/THR, it is called the master FMGC.

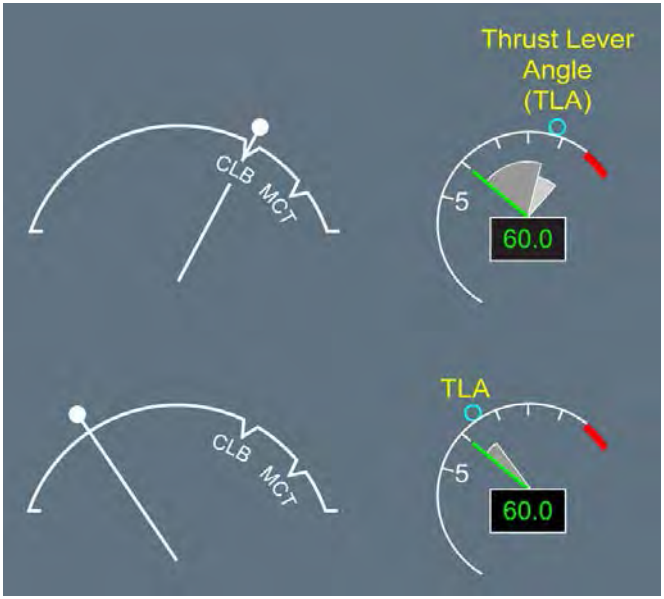
Thrust is controlled:
- Automatically when the A/THR is active
- Manually by the flight crew.

The autothrust is active when the A/THR pb of the FCU is lighted green and A/THR is displayed white in the FMA 5th column.
The position of the thrust levers determines whether A/THR is armed, active, or disconnected.

The autothrust system, when active:
- Maintains a specific thrust in THRUST mode
- Controls the aircraft speed or Mach in SPEED/MACH mode
- Uses ALPHA FLOOR mode to set maximum thrust when the aircraft angle of attack exceeds a specific threshold.

The autothrust system can operate independently or with the AP/FD:
- When performing alone, A/THR always controls the speed
- If the autothrust system is working with the AP/FD, the A/THR mode and AP/FD pitch modes are linked together. *Refer to DSC-22_30-10 Interaction between AP/FD and A/THR Modes*.

When autothrust is active, the FMGS commands the thrust according to the vertical mode logic, but uses a thrust not greater than the thrust commanded by the position of the thrust lever. For example, when the thrust levers are set at the CL (climb) detent, FG can command thrust between idle and max climb.
The autothrust system, when armed, automatically activates if the thrust levers are moved into the active range sector. Outside of this range, thrust levers control thrust directly.



THRUST LEVERS

Ident.: DSC-22_30-90-00011957.0001001 / 23 JUN 15
Applicable to: ALL

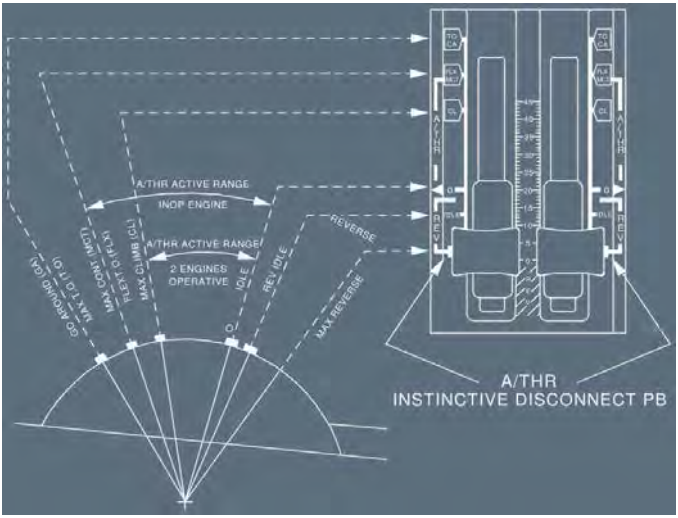
The flight crew uses the thrust levers to do the following:
- Manually select engine thrust
- Arm and activate autothrust (A/THR)
- Engage reverse thrust
- Engage the takeoff and go-around modes.

When autothrust is disconnected, the thrust levers control thrust directly: each lever position corresponds to a given thrust.

Five detents divide each of the thrust lever sectors into four segments. The detents are:

TO GA	:	Max takeoff thrust
FLX MCT	:	Max continuous thrust (or FLX at takeoff)
CL	:	Maximum climb thrust
IDLE	:	Idle thrust for both forward and reverse thrust
MAX REV	:	Maximum reverse thrust

When the thrust levers are at the IDLE position, the flight crew can pull them up to clear the IDLE stop and select reverse thrust. (There is no reverse detent as such).



A/THR ARMING CONDITIONS

Ident.: DSC-22_30-90-00011958.0001001 / 23 JUN 15
Applicable to: ALL

Arming conditions of the A/THR are numerous. The following is a list of the most important ones:

- One FMGC operative
- One FAC operative
- Two ADIRS operative
- Two FADECs operative
- One channel of the FCU operative
- One LGCIU operative
- A/THR is not manually disabled (instinctive disconnect pb has not been pressed for more than 15 s).

The flight crew arms A/THR:
- On ground
  - By pushing the A/THR pb on the FCU when the engines are not running, or
  - By setting the thrust levers at the FLX or TOGA detent when the engines are running.
- In flight
  - By pushing the A/THR pb on the FCU while the thrust levers are out of the active range, or
  - While A/THR is active ("A/THR" white on the FMA), by setting all thrust levers beyond the CL detent or at least one lever above the MCT detent, or
  - By engaging the go around mode.

When the A/THR is armed:
- The FCU's A/THR pb light comes on
- "A/THR" is displayed in blue on the FMA.

Note: *At takeoff, if the thrust levers are set back to idle, the A/THR disengages and cannot be rearmed until the aircraft becomes airborne.*

A/THR ACTIVATION

Applicable to: ALL

Ident.: DSC-22_30-90-A-00011959.0001001 / 14 MAY 12

GENERAL

The A/THR is active when it controls thrust or speed. The position of the thrust lever determines the maximum thrust that the A/THR system can command (except in α-floor condition).

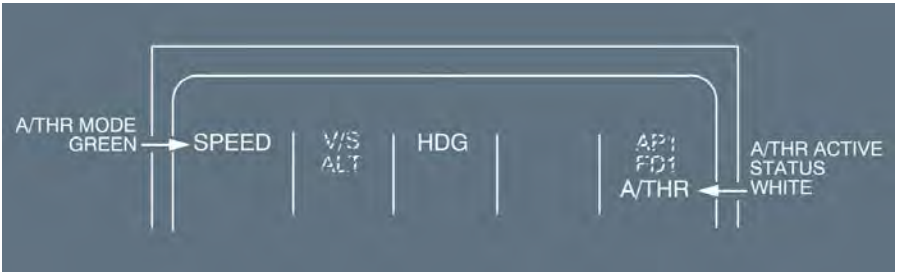
The A/THR being armed, is activated:
- When the flight crew sets both thrust levers between the CL and IDLE detents (two engines operative), or
- When the flight crew sets one thrust lever between the MCT and IDLE detents (one engine inoperative).

The A/THR being disconnected, is activated when the flight crew pushes the A/THR pb on the FCU while the thrust levers are within the active range, including IDLE position.

Note: *When the flight crew sets both thrust levers to IDLE position, the A/THR disconnects but, if the flight crew pushes the A/THR pb of the FCU, they will simultaneously arm and activate the autothrust. Due to the thrust levers position, IDLE thrust will be maintained.*

When ALPHA FLOOR is activated, regardless of the initial status of A/THR and the position of the thrust levers, the A/THR activates.

When A/THR is active:
- The A/THR pb on the FCU lights up
- The FMA displays A/THR mode in green in the first column and "A/THR" in white in the fifth column.



Ident.: DSC-22_30-90-A-00011960.0002001 / 16 MAR 11

EFFECTS OF THRUST LEVER MOVEMENT DURING A/THR ACTIVATION

While A/THR is active:

- When both thrust levers are set above the CL detent (both engines operative) or one thrust lever is set above MCT (one engine operative), the A/THR reverts from active to armed.
  "A/THR" turns to blue on the FMA and the thrust levers control thrust directly.
  The FMA displays "MAN THR" in white in its first column.
  The thrust levers provide the flight crew with an immediate increase of thrust when both thrust levers are pushed above the CL detent (two engines) or the active thrust lever above the MCT detent (one engine operative).
- When both thrust levers are set below the CL detent (both engines operative) or one thrust lever is set below MCT (one engine operative), a repeating warning (amber caution, single chime, "A/THR LIMITED" ECAM message) is activated every 5 s until the flight crew moves the lever back into the detent. "LVR CLB" (both engines operative) or "LVR MCT" (one engine operative) flashes white in the first column of the FMA.
  This device reminds the flight crew that the normal operating position of the thrust levers, when A/THR active, is the CL detent (two engines) or the MCT detent (one engine operative).
- When one thrust lever is in the CL detent and the other one out of detent, the "LVR ASYM" amber message comes up until both levers are set in the CL detent (only with both engines operative).

A/THR DISCONNECTION

Applicable to: ALL

Ident.: DSC-22_30-90-B-00011961.0001001 / 17 AUG 10

GENERAL

When the A/THR is disconnected, it is neither armed nor active.

The A/THR can be disconnected in two ways:

- Standard disconnection:
  - The flight crew pushes the instinctive disconnect pb on the thrust levers, or
  - The flight crew sets both thrust levers to IDLE detent.
- Non-standard disconnection:
  - The flight crew pushes the A/THR pb on the FCU while A/THR is active/armed, or
  - The system loses one of the arming conditions.

CAUTION	If the flight crew pushes and holds one instinctive disconnect pb for more than 15 s, the A/THR system is disconnected for the remainder of the flight. All A/THR functions including ALPHA FLOOR are lost, and they can be recovered only at the next FMGC power-up (on ground).

THRUST LOCK FUNCTION

Ident.: DSC-22_30-90-00011963.0002001 / 17 AUG 10
Applicable to: ALL

The Thrust Lock function is activated when the thrust levers are in the CL detent (or the MCT detent with one engine out), and:

- The flight crew pushes the A/THR pb on the FCU, or
- The A/THR disconnects due to a failure.

The thrust is locked at its level prior to disconnection. Moving the thrust levers out of CL or MCT suppresses the thrust lock and gives the flight crew manual control with the thrust levers.

When the Thrust Lock function is active:

- "THR LK" flashes amber on the FMA
- ECAM "ENG THRUST LOCKED" flashes every 5 s
- ECAM displays "THR LEVERS.....MOVE"
- A single chime sounds and the Master Caution light flashes every 5 s.

All warnings cease when the flight crew moves the thrust levers out of the detent.

A/THR DISCONNECTION CAUTION

Ident.: DSC-22_30-90-00011964.0002001 / 17 AUG 10
Applicable to: ALL

		A/THR DISCONNECTION	
		BY INSTINCTIVE DISCONNECT pb OR SETTING TWO LEVERS TO IDLE (if above 50 ft RA)	**BY OTHER MEANS**
CONSEQUENCE	**MASTER CAUTION light**	Illuminated 3 s maximum	Illuminated
	ECAM MESSAGE	A/THR OFF amber message 9 s maximum	Flashing ENG THRUST LOCKED amber caution, AUTO FLT A/THR OFF amber caution, blue "THR LEVERS.....MOVE"
	AUDIO	Single chime	Single chime
	CLR pb on ECAM CONTROL PANEL	Extinguished	Illuminated
ACTION	**MASTER CAUTION light**	- Extinguishes MASTER CAUTION light - Erases ECAM message	Extinguishes MASTER CAUTION light
	CLR pb on ECAM CONTROL PANEL	No effect	- Extinguishes MASTER CAUTION light and CLR pb - Erases ECAM message - Calls status
	INSTINCTIVE DISCONNECT pb	- Extinguishes MASTER CAUTION light - Erases ECAM message	Extinguishes MASTER CAUTION light
ECAM STATUS MESSAGE		NO	YES

The standard disconnection triggers temporary ECAM message and caution light. Single chime sounds.

The non standard disconnection triggers caution light and ECAM message removed only by a flight crew action. Single chime sounds.

A/THR MODES

Applicable to: ALL

Ident.: DSC-22_30-90-C-00011965.0002001 / 23 JUN 15

GENERAL

Except in takeoff and go-around situations, normal operation of the A/THR system requires the thrust levers to be:

- In the CL detent for the two-engine configuration. If they are not set in the CL detent, “LVR CLB” flashes white on the FMA.
- In MCT detent when in the one-engine-out configuration. If the appropriate lever is not set in the MCT detent, “LVR MCT” flashes white on the FMA.

The A/THR modes are selected automatically in conjunction with the AP/FD modes (except for ALPHA FLOOR):

A/THR in THRUST mode	AP/FD pitch mode maintains the speed: OP CLB - OP DES - CLB - EXP CLB ◁ - EXP DES ◁ - SRS - FLARE and DES (IDLE path)
A/THR in SPEED/MACH mode	If neither AP nor FD is engaged
	If AP/FD controls a vertical path: V/S - FPA - ALT* - ALT CST* - ALT - ALT CRZ - G/S* - G/S - FINAL and DES (geometric path)
A/THR in RETARD mode	AP/FD engaged in LAND mode during an automatic landing

Ident.: DSC-22_30-90-C-00011966.0002001 / 23 JUN 15

THRUST MODE

In THRUST mode, autothrust commands a specific thrust level in conjunction with the AP/FD pitch mode. This thrust level is limited by thrust lever position.

FMA Display	Meaning
THR MCT	Single engine thrust in climb. The live engine is at maximum continuous thrust (thrust lever in MCT detent)
THR CLB	Climb thrust in two engine configuration (at least one thrust lever in the CL detent, the other one below CL)
THR LVR	Undetermined thrust (neither CLB nor MCT thrust)
THR IDLE	Minimum thrust (both engines at IDLE thrust)

Note: When the A/THR is armed for takeoff or go-around, the FMA displays “MAN TOGA” (or “MAN FLX”) in white to remind the flight crew that the thrust levers have been positioned properly.

Ident.: DSC-22_30-90-C-00011967.0001001 / 27 JAN 12

RETARD MODE

The RETARD mode is only available during automatic landing (AP engaged in LAND mode). At approximately 40 ft RA, the RETARD mode engages and remains engaged after touchdown. The A/THR commands IDLE thrust during the flare, and the FMA and engine warning display "IDLE". If the autopilot is disengaged during the flare before touchdown, the SPEED mode replaces the RETARD mode, and the flight crew has to manually reduce thrust.

Note: *In an automatic landing, the system generates a "RETARD" callout at 10 ft RA, which prompts the flight crew to move the thrust levers to IDLE in order to confirm thrust reduction. In manual landing conditions, the system generates this callout at 20 ft RA, as a reminder.*

Ident.: DSC-22_30-90-C-00011968.0002001 / 17 AUG 10

ALPHA FLOOR

ALPHA FLOOR is a protection that commands TOGA thrust, regardless of the thrust levers' positions. This protection is available from lift-off to 100 ft RA on approach.

ALPHA FLOOR calls up the following indications:
- "A FLOOR" in green, surrounded by a flashing amber box on the FMA, and in amber on the engine warning display, (as long as α-floor conditions are met)
- "TOGA LK" in green, surrounded by a flashing amber box on the FMA, when the aircraft leaves the α-floor conditions. TOGA thrust is frozen.

To cancel ALPHA FLOOR or TOGA LK thrust, the flight crew must disconnect the autothrust.

Ident.: DSC-22_30-90-C-00011969.0001001 / 17 AUG 10

SPEED/MACH MODE

In SPEED/MACH mode, the A/THR adjusts the thrust in order to acquire and hold a speed or Mach target.

The speed or Mach target may be:
- Selected on the FCU by the flight crew
- Managed by the FMGC.

When in SPEED/MACH mode, the A/THR does not allow speed excursions beyond the following limits, regardless of the target speed or Mach number:
- For a selected speed target, the limits are VLS and VMAX (VMO-MMO, VFE-VLE, whichever applies)
- For a managed speed target, the limits are maneuvering speed (Green Dot, S, F, whichever applies) and maximum speed (340/0.80-VFE-VLE, whichever applies).

The changeover from SPEED to MACH mode is either automatic, performed by the FMGC, or manual, with the flight crew pushing the SPD/MACH pb.
The FMA displays “SPEED” or “MACH”.

APPROACH AUTOTHRUST:

Below 3 200 ft RA, with at least CONF 1, the A/THR logic is modified to be more responsive to speed variation. This is referred to as approach autothrust.

SPEED MODE IN APPROACH PHASE

Applicable to: ALL

Ident.: DSC-22_30-90-D-00011970.0001001 / 17 AUG 10

GENERAL

When the aircraft flies an approach in managed speed, the speed target displayed on the PFD in magenta is variable during the approach.
This managed speed target is computed in the FMGS using the “ground speed mini function”.

Ident.: DSC-22_30-90-D-00011971.0002001 / 17 MAR 17

GROUND SPEED MINI FUNCTION PRINCIPLE

The purpose of the "ground speed mini function" is to take advantage of the aircraft inertia when the wind conditions vary during the approach. It does so by providing the flight crew with an adequate indicated speed target. When the aircraft flies this indicated speed target, the energy of the aircraft is maintained above a minimum level ensuring standard aerodynamic margins versus stall.
If the A/THR is active in SPEED mode, it will automatically follow the IAS target, ensuring an efficient thrust management during the approach.
The minimum energy level is the energy level the aircraft will have at touch down if it lands at VAPP speed with the tower reported wind as inserted in the PERF APPR page.
The minimum energy level is represented by the Ground Speed the aircraft will have at touch down. This Ground Speed is called “GROUND SPD MINI”.
During the approach, the FMGS continuously computes the speed target using the wind experienced by the aircraft in order to keep the ground speed at or above the “Ground Speed Mini”.
The ground speed mini enables an efficient management of the thrust in gusts or longitudinal shears. Thrust varies in the right sense, but in a smaller range (± 15 % N1) in gusty situations, which explains why it is recommended in such situations.
It provides additional but rational safety margins in shears.
It allows pilots "to understand what is going on" in perturbed approaches by monitoring the target speed magenta bugs: when target goes up = head wind gust.

The speed target is displayed on the PFD speed scale in magenta when approach phase and managed speed are active. It is independent of the AP/FD and/or A/THR engagements.
Wind is a key factor in the "ground speed mini function".

Ident.: DSC-22_30-90-D-00011972.0001001 / 17 AUG 10

TWR WIND

It is the MAG WIND entered in the PERF APPR page. It is the average wind as provided by the ATIS or the tower. Gusts must not be inserted, they are included in the ground speed mini computation.

Ident.: DSC-22_30-90-D-00011973.0001001 / 17 AUG 10

TWR HEADWIND COMPONENT

The TWR HEADWIND COMPONENT is the component of the MAG WIND projected on the runway axis (landing runway entered in the flight plan). It is used to compute VAPP and GS mini.

Ident.: DSC-22_30-90-D-00011974.0001001 / 17 AUG 10

CURRENT HEADWIND COMPONENT

The actual wind measured by ADIRS is projected on the aircraft axis to define the CURRENT HEADWIND COMPONENT (instantaneous headwind).
The CURRENT HEADWIND COMPONENT is used to compute the variable speed target during final (IAS target).

Ident.: DSC-22_30-90-D-00011975.0002001 / 17 AUG 10

VAPP COMPUTATION

VAPP, automatically displayed on the MCDU PERF APPR page, is computed as follows:
- VAPP = VLS+1/3 of the TWR HEADWIND COMPONENT, or
- VAPP = VLS +5 kt, whichever is the highest.

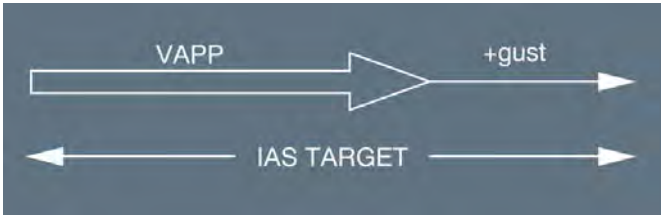
"1/3 of the TWR HEADWIND COMPONENT" has two limits:
- 0 kt as the minimum value (no wind or tailwind)
- +15 kt as the maximum value.

The flight crew can manually modify the VAPP and TWR wind values on the PERF APPR page.

Ident.: DSC-22_30-90-D-00011976.0002001 / 01 OCT 12

SPEED TARGET COMPUTATION

The FMGS continuously computes a speed target (IAS target) that is the MCDU VAPP value plus an additional variable gust.



The gust is the instantaneous difference between the CURRENT HEADWIND COMPONENT and the TWR HEADWIND COMPONENT. It is always positive (or equal to zero for no wind or tailwind).
The IAS target is displayed on the PFD as a magenta triangle moving with the gust variation.

The IAS targets have 2 limits:
- VAPP, as the minimum value
- VFE -5 kt in CONF FULL, or VFE of the next configuration in CONF 1, 2 or 3 as the maximum value.

Ident.: DSC-22_30-90-D-00011977.0001001 / 17 MAR 17

GROUND SPEED MINI (GS MINI) COMPUTATION

Ground speed mini concept has been defined to prevent the aircraft energy from dropping below a minimum level during final approach. The GS mini value is not displayed to the flight crew.

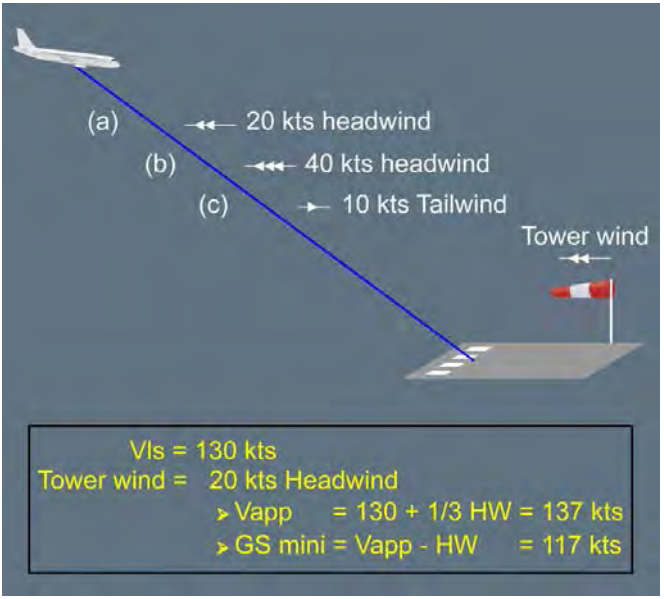
This minimum energy level is the energy the aircraft will have at landing with the expected tower wind; it is materialized by the ground speed of the aircraft at that time which is called GS mini:

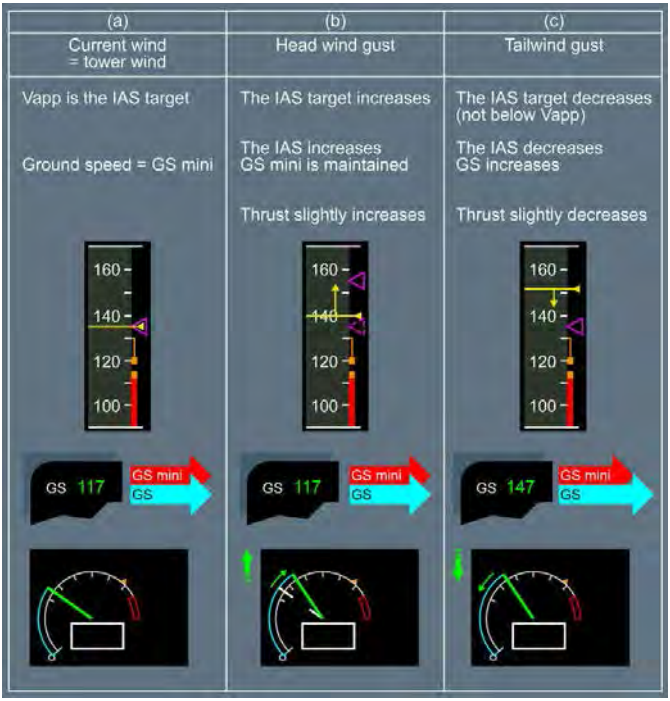
GS mini = VAPP - Tower head wind component

In order to achieve that goal, the aircraft ground speed should never drop below GS mini in the approach, while the winds are changing. Thus the aircraft IAS must vary while flying down, in order to cope with the gusts or wind changes. In order to make this possible for the pilot or for the A/THR, the FMGS continuously computes an IAS target speed, which ensures that the aircraft ground speed is at least equal to GS mini; the FMGS uses the instantaneous wind component experienced by the aircraft:

IAS Target Speed = GS mini + Current headwind component

This target speed is limited by VAPP in case of tailwind or if instantaneous wind is lower than the tower wind.


(a)
20 kts headwind
(b)
40 kts headwind
(c)
10 kts Tailwind
Tower wind
Vls = 130 kts
Tower wind = 20 kts Headwind
Vapp = 130 + 1/3 HW = 137 kts
GS mini = Vapp - HW = 117 kts


(a)
Current wind
= tower wind
Vapp is the IAS target
Ground speed = GS mini
160
140
120
100
GS 117
GS mini
GS
(b)
Head wind gust
The IAS target increases
The IAS increases
GS mini is maintained
Thrust slightly increases
160
140
120
100
GS 117
GS mini
GS
(c)
Tailwind gust
The IAS target decreases
(not below Vapp)
The IAS decreases
GS increases
Thrust slightly decreases
160
140
120
100
GS 147
GS mini
GS

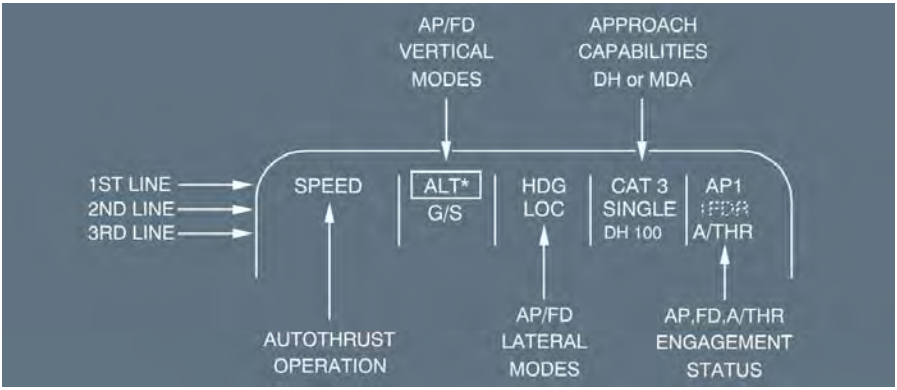
Intentionally left blank

FLIGHT MODE ANNUNCIATOR (FMA)

Ident.: DSC-22_30-100-A-00012356.0001001 / 19 DEC 12
Applicable to: MSN 1882

GENERAL

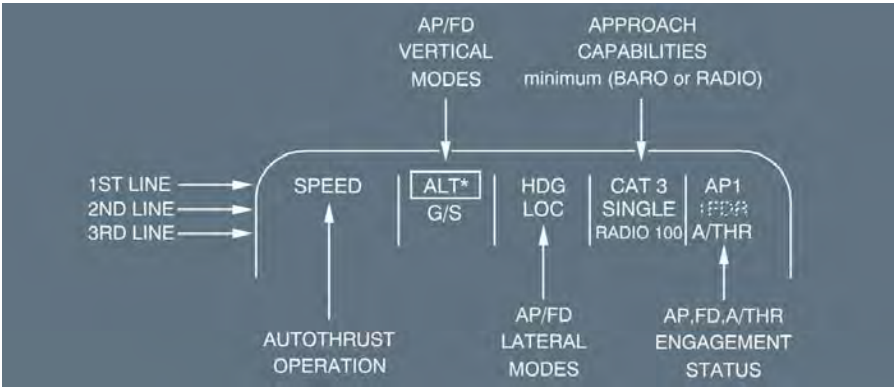
The Flight Mode Annunciator (FMA) which is just above the PFDs, shows the status of the A/THR, the AP/FD vertical and lateral modes, the approach capabilities, and the AP/FD-A/THR engagement status.
After each mode change, the FMA displays a white box around the new annunciation for 10 s.



Ident.: DSC-22_30-100-A-00012356.0012001 / 19 DEC 12
Applicable to: MSN 2078-4547

GENERAL

The Flight Mode Annunciator (FMA) which is just above the PFDs, shows the status of the A/THR, the AP/FD vertical and lateral modes, the approach capabilities, and the AP/FD-A/THR engagement status.
A white box is displayed for 10 s around each new annunciation. The white box display time may be increased to 15 s in some mode reversion cases associated with an aural triple click.



Ident.: DSC-22_30-100-A-00012357.0002001 / 17 AUG 10
Applicable to: ALL

THE THREE LEFT COLUMNS

The first line shows the engaged modes in green.
The second line shows the armed modes in blue or magenta.
Magenta indicates that the modes are armed or engaged because of a constraint.

The third line displays special messages:
- Messages related to flight controls have first priority:
  - "MAN PITCH TRIM ONLY" in red, flashing for 9 s, then steady
  - "USE MAN PITCH TRIM" in amber, pulsing for 9 s, then steady.
- Messages related to the FMGS have second priority.

Ident.: DSC-22_30-100-A-00012358.0002001 / 16 MAR 11
Applicable to: MSN 1882-2078

THE FOURTH COLUMN

Displays approach capabilities in white.
Displays DH or MDA/MDH in blue.

Note: The DH or MDA/MDH value on the FMA is not rounded off: The exact value appears on the FMA, and is the same value as the one inserted in the MCDU PERF APPR page.

Ident.: DSC-22_30-100-A-00012358.0014001 / 16 MAR 11
Applicable to: MSN 3408-4547

THE FOURTH COLUMN

Displays approach capabilities in white.
Displays minimum in blue.

Note: The BARO or RADIO value on the FMA is not rounded off: The exact value appears on the FMA, and is the same value as the one inserted in the MCDU PERF APPR page.

Ident.: DSC-22_30-100-A-00012359.0001001 / 17 AUG 10
Applicable to: ALL

THE FIFTH COLUMN

Displays the engagement status of AP, FD, and A/THR in white.
Displays a box around FD for 10 s in case of automatic FMGC switching.
Displays A/THR in blue when autothrust is armed but not active.

Note: The FMGS synchronizes A/THR mode, AP/FD modes and approach capability to provide identical information on both PFDs.

AUTOTHRUST ANNUNCIATIONS (FMA COLUMN 1)

Applicable to: ALL

Ident.: DSC-22_30-100-B-00012360.0002001 / 23 JUN 15

FIRST LINE

DISPLAY	COLOR	MEANING
MAN TOGA	White White box	A/THR is armed, at least one thrust lever is in TOGA detent.
MAN FLX XX	White White box Blue numbers	A/THR is armed, at least one thrust lever is in MCT/FLX detent with FLXTO temp set at XX°. The other thrust lever is at or below the MCT/FLX detent.
MAN MCT	White White box	A/THR is armed, at least one thrust lever is in the MCT/FLX detent, the other is at, or below this detent.
MAN THR	White Amber box	A/THR is armed, and the most advanced thrust lever is above CL detent (two engines operative), or one above MCT/FLX (engine-out) and not in a detent.
THR MCT	Green	A/THR is active in thrust mode and the most advanced thrust lever is in the MCT/FLX detent (engine-out).
THR CLB	Green	A/THR is active in thrust mode and the most advanced thrust lever is in the CL detent.
THR IDLE	Green	A/THR is active in thrust mode and commands idle thrust.
THR LVR	Green	A/THR is active in thrust mode with both thrust levers below CL detent, or the live thrust lever (one engine) below MCT.
SPEED or MACH	Green	A/THR is active in SPEED or MACH mode.
A. FLOOR	Green Amber box	A/THR is active and commands TOGA thrust while α FLOOR conditions are met.
TOGA LK	Green Amber box	A/THR is active and TOGA thrust is locked (α FLOOR conditions are no longer met).

Ident.: DSC-22_30-100-B-00012361.0002001 / 17 AUG 10

SECOND LINE

Not used with this standard.

Ident.: DSC-22_30-100-B-00012362.0002001 / 16 NOV 15

THIRD LINE

DISPLAY	COLOR	MEANING
LVR CLB (flashing)	White	Request to set the thrust levers in CL detent in the case not in position while the aircraft is above the altitude of thrust reduction with both engines running.
LVR MCT (flashing)	White	Request to set the live thrust lever in MCT/FLX detent in the case not in position after an engine failure (with speed above green dot).
LVR ASYM	Amber	(Two engines only). One thrust lever in CL or MCT/FLX detent and the other one is not in this detent.
THR LK (flashing)	Amber	After A/THR disconnection (action of the flight crew on FCU or failure) resulting in thrust being frozen. Both thrust levers being in CL detent or one in MCT/FLX (engine out) detent.

Note: The amber caution light flashes and a single chime sounds every 5 s, as long as the flight crew takes no appropriate action in the following cases:
- *THR LK*
- *LVR CLB (if the thrust levers are below the CLB detent)*
- *LVR MCT (if the thrust levers are below the FLX/MCT detent).*

AP/FD VERTICAL MODES (FMA COLUMN 2)

Ident.: DSC-22_30-100-C-00012363.0007001 / 23 JUN 15
Applicable to: MSN 1882

FIRST LINE

DISPLAY	COLOR	MEANING
SRS	Green	Takeoff or go-around mode is engaged.
CLB	Green	Climb mode is engaged. The FMGS target altitude is higher than the actual altitude. ALT CSTR are taken into account.
OP CLB	Green	Open Climb mode is engaged. The FCU selected altitude is higher than the actual altitude. ALT CSTR are disregarded.
ALT* or ALT CST*	Green	ALT CAPTURE is engaged: - ALT* green in case of FCU selected altitude capture - ALT CST* green in case of ALT CSTR capture (vertical profile).

Continued on the following page

Continued from the previous page

DISPLAY	COLOR	MEANING
ALT or ALT CST	Green	ALTITUDE HOLD mode is engaged: - ALT is green when the FCU selected altitude is held - ALT CST is green when an ALT CSTR is held (vertical profile).
ALT CRZ	Green	ALT mode is engaged and CRZ FL is held.
DES	Green	Descent mode is engaged. The FMGS target altitude is lower than the actual altitude. ALT CSTR are taken into account.
OP DES	Green	Open Descent mode is engaged. The FCU selected altitude is lower than the actual altitude. ALT CSTR are disregarded.
G/S*	Green	Glide Slope capture mode is engaged.
G/S	Green	Glide Slope mode is engaged.
V/S±XXXX	Green + blue numbers	Vertical speed mode is engaged to acquire and hold the V/S selected on the FCU. ALT CSTR are disregarded.
FPA±XX	Green + blue numbers	Flight Path Angle mode is engaged to acquire and hold the FPA selected on the FCU. ALT CSTR are disregarded.

Ident.: DSC-22_30-100-C-00012363.0006001 / 23 JUN 15
Applicable to: MSN 3408-4547

FIRST LINE

DISPLAY	COLOR	MEANING
SRS	Green	Takeoff or go-around mode is engaged.
CLB	Green	Climb mode is engaged. The FMGS target altitude is higher than the actual altitude. ALT CSTR are taken into account.
OP CLB	Green	Open Climb mode is engaged. The FCU selected altitude is higher than the actual altitude. ALT CSTR are disregarded.
EXP CLB	Green	Expedite Climb is engaged. The selected altitude is higher than the actual altitude. Green dot speed is maintained, ALT CSTR are disregarded.
ALT* or ALT CST*	Green	ALT CAPTURE is engaged: - ALT* green in case of FCU selected altitude capture - ALT CST* green in case of ALT CSTR capture (vertical profile).
ALT or ALT CST	Green	ALTITUDE HOLD mode is engaged: - ALT is green when the FCU selected altitude is held - ALT CST is green when an ALT CSTR is held (vertical profile).
ALT CRZ	Green	ALT mode is engaged and CRZ FL is held.
DES	Green	Descent mode is engaged. The FMGS target altitude is lower than the actual altitude. ALT CSTR are taken into account.

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DISPLAY	COLOR	MEANING
OP DES	Green	Open Descent mode is engaged. The FCU selected altitude is lower than the actual altitude. ALT CSTR are disregarded.
EXP DES	Green	Expedite Descent is engaged, the selected altitude is lower than the actual altitude. M 0.80 or 340 kt is maintained. ALT CSTR are disregarded.
G/S*	Green	Glide Slope capture mode is engaged.
G/S	Green	Glide Slope mode is engaged.
V/S±XXXX	Green + blue numbers	Vertical speed mode is engaged to acquire and hold the V/S selected on the FCU. ALT CSTR are disregarded. If the aircraft reaches VLS or VMAX and cannot maintain the target, the indication is boxed amber and flashes, and the target pulses.
FPA±XX	Green + blue numbers	Flight Path Angle mode is engaged to acquire and hold the FPA selected on the FCU. ALT CSTR are disregarded. If the aircraft reaches VLS or VMAX and cannot maintain the target, the indication is boxed amber and flashes, and the target pulses.

Ident.: DSC-22_30-100-C-00012363.0011001 / 23 JUN 15
Applicable to: MSN 2078

FIRST LINE

DISPLAY	COLOR	MEANING
SRS	Green	Takeoff or go-around mode is engaged.
CLB	Green	Climb mode is engaged. The FMGS target altitude is higher than the actual altitude. ALT CSTR are taken into account.
OP CLB	Green	Open Climb mode is engaged. The FCU selected altitude is higher than the actual altitude. ALT CSTR are disregarded.
ALT* or ALT CST*	Green	ALT CAPTURE is engaged: - ALT* green in case of FCU selected altitude capture - ALT CST* green in case of ALT CSTR capture (vertical profile).
ALT or ALT CST	Green	ALTITUDE HOLD mode is engaged: - ALT is green when the FCU selected altitude is held - ALT CST is green when an ALT CSTR is held (vertical profile).
ALT CRZ	Green	ALT mode is engaged and CRZ FL is held.
DES	Green	Descent mode is engaged. The FMGS target altitude is lower than the actual altitude. ALT CSTR are taken into account.
OP DES	Green	Open Descent mode is engaged. The FCU selected altitude is lower than the actual altitude. ALT CSTR are disregarded.
G/S*	Green	Glide Slope capture mode is engaged.
G/S	Green	Glide Slope mode is engaged.

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DISPLAY	COLOR	MEANING
V/S±XXXX	Green + blue numbers	Vertical speed mode is engaged to acquire and hold the V/S selected on the FCU. ALT CSTR are disregarded. If the aircraft reaches VLS or VMAX and cannot maintain the target, the indication is boxed amber and flashes, and the target pulses.
FPA±XX	Green + blue numbers	Flight Path Angle mode is engaged to acquire and hold the FPA selected on the FCU. ALT CSTR are disregarded. If the aircraft reaches VLS or VMAX and cannot maintain the target, the indication is boxed amber and flashes, and the target pulses.

Ident.: DSC-22_30-100-C-00012364.0002001 / 23 JUN 15
Applicable to: ALL

SECOND LINE

DISPLAY	COLOR	MEANING
CLB	Blue	Climb mode is armed.
ALT	Blue or Magenta	Altitude mode is armed: - Blue when the target altitude is the FCU selected altitude - Magenta when the target altitude is an ALT CSTR.
DES	Blue	Descent mode is armed before the descent phase.
G/S	Blue	Glide Slope mode is armed.
FINAL	Blue	Final descent mode is armed.
ALT G/S	Blue/Blue	ALT and G/S modes are armed.
ALT G/S	Magenta/ Blue	ALT CST and G/S modes are armed.
ALT FINAL	Blue/Blue	ALT and FINAL modes are armed.
ALT FINAL	Magenta/ Blue	ALT CST and FINAL modes are armed.
DES G/S	Blue/Blue	DES and G/S modes are armed.
DES FINAL	Blue/Blue	DES and FINAL modes are armed.

Ident.: DSC-22_30-100-C-00012365.0001001 / 17 AUG 10
Applicable to: ALL

THIRD LINE

DISPLAY	COLOR	MEANING
SPEED SEL:XXX	Blue	Indicates a preset speed associated with the cruise or climb phase.
MACH SEL:.XX	Blue	Indicates a preset Mach associated with the cruise or climb phase.

Note: These two messages use both the first and second columns (third line).

AP/FD LATERAL MODES (FMA COLUMN 3)

Applicable to: ALL

Ident.: DSC-22_30-100-D-00012366.0002001 / 16 MAR 11

FIRST LINE

DISPLAY	COLOR	MEANING
RWY	Green	RWY mode is engaged.
RWY TRK	Green	RWY mode is engaged once airborne at or above 30 ft RA.
HDG	Green	HEADING mode is engaged.
TRK	Green	TRACK mode is engaged.
NAV	Green	NAV mode is engaged to guide the aircraft along the FM lateral F-PLN.
LOC*	Green	LOC capture mode is engaged.
LOC	Green	LOC track mode is engaged.
APP NAV	Green	NAV mode is engaged during a non-ILS approach.
GA TRK	Green	GO-AROUND TRACK mode is engaged.

Ident.: DSC-22_30-100-D-00012367.0001001 / 17 AUG 10

SECOND LINE

DISPLAY	COLOR	MEANING
NAV	Blue	NAV mode is armed.
LOC	Blue	LOC mode is armed.
APP NAV	Blue	NAV mode is armed for a non-ILS approach.

AP/FD COMMON MODES (FMA COLUMNS 2 AND 3)

Ident.: DSC-22_30-100-00012368.0002001 / 17 AUG 10
Applicable to: ALL

DISPLAY	COLOR	MEANING
LAND	Green	Land mode is engaged below 400 ft RA.
FLARE	Green	Flare mode is engaged.
ROLL OUT	Green	Roll out mode is engaged.
FINAL APP	Green	APP NAV and Final modes are engaged during a non-ILS approach.

APPROACH CAPABILITIES (FMA COLUMN 4)

Ident.: DSC-22_30-100-E-00012369.0002001 / 17 AUG 10
Applicable to: ALL

FIRST LINE

DISPLAY	COLOR	MEANING
CAT 1	White	CAT 1 capability available.
CAT 2	White	CAT 2 capability available.
CAT 3	White	CAT 3 capability available.

Ident.: DSC-22_30-100-E-00012370.0002001 / 17 AUG 10
Applicable to: ALL

SECOND LINE

DISPLAY	COLOR	MEANING
SINGLE	White	CAT 3 capability available, with FAIL PASSIVE condition.
DUAL	White	CAT 3 capability available, with FAIL OPERATIONAL condition.

Ident.: DSC-22_30-100-E-00012371.0002001 / 17 AUG 10
Applicable to: MSN 1882-2078

THIRD LINE

DISPLAY	COLOR	MEANING
MDA/MDH XXXX	White Blue	Minimum Descent Altitude or Minimum Descent Height as inserted by the flight crew on the MCDU PERF APPR page.
DH XXX/NO DH	White Blue	Decision Height as inserted by the flight crew on the MCDU PERF APPR page. NO DH: when NO inserted on the MCDU PERF APPR page.

Ident.: DSC-22_30-100-E-00012371.0009001 / 16 MAR 11
Applicable to: MSN 3408-4547

THIRD LINE

DISPLAY	COLOR	MEANING
BARO XXXX	White Blue	Minimum Descent Altitude or Minimum Descent Height as inserted by the flight crew on the MCDU PERF APPR page.
RADIO XXX/NO DH	White Blue	Decision Height as inserted by the flight crew on the MCDU PERF APPR page. NO DH: when NO inserted on the MCDU PERF APPR page.

AP/FD - A/THR ENGAGEMENT STATUS (FMA COLUMN 5)

Applicable to: ALL

Ident.: DSC-22_30-100-F-00012372.0001001 / 17 AUG 10

FIRST LINE

DISPLAY	COLOR	MEANING
AP1 + 2	White	Autopilot 1 and 2 are engaged.
AP1	White	Autopilot 1 is engaged.
AP2	White	Autopilot 2 is engaged.

Ident.: DSC-22_30-100-F-00012373.0002001 / 17 AUG 10

SECOND LINE

DISPLAY	COLOR	MEANING
X FD Y	White	X and Y give the FD engagement status on PFD1 and PFD2. X and Y can be 1, 2, or –: - –: No FD is engaged on the corresponding PFD - 1: FD 1 is engaged on the corresponding PFD - 2: FD 2 is engaged on the corresponding PFD. The normal status (FD 1 and 2 engaged) is 1 FD 2.

Ident.: DSC-22_30-100-F-00012374.0001001 / 17 AUG 10

THIRD LINE

DISPLAY	COLOR	MEANING
A/THR	White	A/THR is active.
A/THR	Blue	A/THR is armed.

SPECIAL MESSAGES (FMA COLUMNS 2 AND 3)

Ident.: DSC-22_30-100-00012539.0033001 / 05 NOV 15
Applicable to: MSN 3467, 4379-4547

The third line displays three types of messages:
- It gives first priority to Flight Control messages
- It gives second priority to vertical Flight Management messages
- It gives last priority to EFIS reconfiguration messages.

DISPLAY	COLOR	MEANING
MAN PITCH TRIM ONLY	Red	Displayed in case of loss of L+R elevators.
USE MAN PITCH TRIM	Amber	F/CTL are in direct law.

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DISPLAY	COLOR	MEANING
DISCONNECT AP FOR LDG	Amber	This message is displayed when, during a Non Precision Approach, the AP/FD remains engaged at: - Minimum minus 50 ft, or - 400 ft AGL (if no minimum entered) This message is a reminder to the flight crew that AP must be disconnected before landing.
CHECK APPR SELECTION	White	The aircraft is in cruise at less than 100 NM from the Top of Descent or in descent or in approach and: - A non-ILS/non-GLS ◁ approach has been selected - An ILS frequency/GLS ◁ channel is tuned on the MCDU RAD NAV page.
SET MANAGED SPEED or CHECK SPEED MODE (Also displayed on PFD)	White	The SPEED target is selected but a preselected SPEED does not exist for the next flight phase.
SET GREEN DOT SPEED	White	The aircraft is in Engine Out mode and the SPEED target is selected. This message is displayed if the FCU selected speed is: ≤ Green Dot -10 kt, or ≥ Green Dot +10 kt, except in ALT* and ALT mode.
SET HOLD SPEED	White	The aircraft is in selected SPEED control, a Holding pattern is inserted in the F-PLN and the aircraft is 30 s before the deceleration point to the precomputed HOLD SPEED.
DECELERATE or T/D REACHED (Also displayed on PFD)	White	This message is displayed if the thrust is not reduced when passing the top of descent and the aircraft is above the descent profile.
MORE DRAG	White	DES mode is engaged, idle is selected, and either: - The aircraft is above the vertical profile and the predicted intercept point of the theoretical profile is at less than 2 NM from the next ALT CSTR, or - In auto speed control and the aircraft enters a speedbrake decelerating segment.

SPECIAL MESSAGES (FMA COLUMNS 2 AND 3)

Ident.: DSC-22_30-100-00012539.0017001 / 05 NOV 15
Applicable to: MSN 3408, 3518-4100

The third line displays three types of messages:
- It gives first priority to Flight Control messages
- It gives second priority to vertical Flight Management messages
- It gives last priority to EFIS reconfiguration messages.

DISPLAY	COLOR	MEANING
MAN PITCH TRIM ONLY	Red	Displayed in case of loss of L+R elevators.
USE MAN PITCH TRIM	Amber	F/CTL are in direct law.
CHECK APPR SELECTION	White	The aircraft is in cruise at less than 100 NM from the Top of Descent or in descent or in approach and: - A non-ILS/non-GLS ◁ approach has been selected - An ILS frequency/GLS ◁ channel is tuned on the MCDU RAD NAV page.
SET MANAGED SPEED or CHECK SPEED MODE (Also displayed on PFD)	White	The SPEED target is selected but a preselected SPEED does not exist for the next flight phase.
SET GREEN DOT SPEED	White	The aircraft is in Engine Out mode and the SPEED target is selected. This message is displayed if the FCU selected speed is: ≤ Green Dot -10 kt, or ≥ Green Dot +10 kt, except in ALT* and ALT mode.
SET HOLD SPEED	White	The aircraft is in selected SPEED control, a Holding pattern is inserted in the F-PLN and the aircraft is 30 s before the deceleration point to the precomputed HOLD SPEED.
DECELERATE or T/D REACHED (Also displayed on PFD)	White	This message is displayed if the thrust is not reduced when passing the top of descent and the aircraft is above the descent profile.
MORE DRAG	White	DES mode is engaged, idle is selected, and either: - The aircraft is above the vertical profile and the predicted intercept point of the theoretical profile is at less than 2 NM from the next ALT CSTR, or - In auto speed control and the aircraft enters a speedbrake decelerating segment.

SPECIAL MESSAGES (FMA COLUMNS 2 AND 3)

Ident.: DSC-22_30-100-00012539.0006001 / 03 NOV 14
Applicable to: MSN 1882-2078

The third line displays three types of messages:
- It gives first priority to Flight Control messages
- It gives second priority to vertical Flight Management messages
- It gives last priority to EFIS reconfiguration messages.

DISPLAY	COLOR	MEANING
MAN PITCH TRIM ONLY	Red	Displayed in case of loss of L+R elevators.
USE MAN PITCH TRIM	Amber	F/CTL are in direct law.
CHECK APP SEL	White	The aircraft is in cruise at less than 100 NM from the Top of Descent or in descent or in approach and: - A non-ILS approach has been selected - An ILS frequency is tuned on the MCDU RAD NAV page.
SET MANAGED SPEED or CHECK SPEED MODE (Also displayed on PFD)	White	The SPEED target is selected but a preselected SPEED does not exist for the next flight phase.
SET GREEN DOT SPD	White	The aircraft is in Engine Out mode and the SPEED target is selected. This message is displayed if the FCU selected speed is: ≤ Green Dot -10 kt, or ≥ Green Dot +10 kt, except in ALT* and ALT mode.
SET HOLD SPD	White	The aircraft is in selected SPEED control, a Holding pattern is inserted in the F-PLN and the aircraft is 30 s before the deceleration point to the precomputed HOLD SPEED.
DECELERATE or T/D REACHED (Also displayed on PFD)	White	This message is displayed if the thrust is not reduced when passing the top of descent and the aircraft is above the descent profile.
MORE DRAG	White	DES mode is engaged, idle is selected, and either: - The aircraft is above the vertical profile and the predicted intercept point of the theoretical profile is at less than 2 NM from the next ALT CSTR, or - In auto speed control and the aircraft enters a speedbrake decelerating segment.

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CAT 3 DUAL INOPERATIVE

Ident.: DSC-22_30-110-00012674.0001001 / 28 JUN 17
Applicable to: ALL

"CAT 3 DUAL" INOP SYS is triggered in particular if one ADR or IR is rejected by FAC or FMGC.
If "CAT 3 DUAL" is displayed in INOP SYS without any other failure being detected:

CHANGE the AP in command. It may allow the CAT 3 DUAL function to be recovered.

If unsuccessful:

SET FAC 1 pb to OFF, and back to ON
WAIT for FAC 1 fault ECAM warning to disappear, and
APPLY the same sequence for FAC 2.

Note: *1. Do not reset the FACs with the C/Bs.*
2. If the CAT 3 DUAL INOP SYS is associated to another ECAM message (in particular ADR FAULT or IR FAULT...), it means that the root cause is not an ADR or IR rejection by FAC or FMGC. And consequently the AP switch or FAC reset will not clear the CAT 3 DUAL inop.

LEFT TURN NOT EXPECTED WHILE IN HDG OR TRK MODE

Ident.: DSC-22_30-110-00015029.0001001 / 08 AUG 13
Applicable to: MSN 3408, 3518-4100

The AP/FD may erroneously order a left turn if the following conditions are fulfilled:
- The aircraft is in a right turn in HDG or TRK mode
- Within 180 ms, the difference between the target selected on the FCU and the current aircraft heading/track, initially above 85 °:
  1. First goes below 85 °
  2. Then goes above 95 °.

The flight crew may encounter this misbehavior in two different situations:
- The flight crew requests a right turn, then rapidly reduces and increases again the target selected on the FCU
- The flight crew increases the target selected on the FCU according to the above conditions, while the aircraft is already in a right turn.

The misbehavior may affect either one AP/FD or both AP/FD.

OPERATIONAL RECOMMENDATIONS:

The flight crew must immediately take appropriate actions:

- The flight crew must disconnect the AP and the FD, and manually turn.
- When established on the intended trajectory, the flight crew can reengage the FD first, and then the AP.

AIRCRAFT SYSTEMS

AUTO FLIGHT - FLIGHT AUGMENTATION

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GENERAL

Ident.: DSC-22_40-10-00000840.0001001 / 24 FEB 15
Applicable to: ALL

The aircraft has two flight augmentation computers (FACs) that perform four main functions:

- Yaw function
  - Yaw damping and turn coordination
  - Rudder trim
  - Rudder travel limitation
- Flight envelope function
  - PFD speed scale management
    - Minimum/maximum speed computation
    - Maneuvering speed computation
  - Alpha-floor protection
- Low-Energy Aural Alert function ◁✻
- Windshear detection function ◁✻

In performing these functions the FAC uses independent channels :
Yaw damper
Rudder trim
Rudder travel limit
Flight envelope

Each FAC interfaces with the elevator aileron computers (ELACs) when the APs are disengaged, or with the FMGS when at least one AP is engaged.
Both FACs engage automatically at power-up.
The pilot can disengage or reset each FAC (in case of failure) by means of a pushbutton on the flight control overhead panel.
When a FAC is disengaged (FAC pushbutton set off) but still valid, the flight envelope function of the FAC remains active.
If both FACs are valid, FAC1 controls the yaw damper, turn coordination, rudder trim, and rudder travel limit, and FAC2 is in standby.
FAC1 keeps the aircraft within the flight envelope through FD1 ; FAC2 performs this function through FD2.
If a failure is detected on any channel of FAC1, FAC2 takes over the corresponding channel.

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YAW DAMPING

Ident.: DSC-22_40-20-00000851.0001001 / 18 MAR 11
Applicable to: ALL

Yaw damping stabilizes the aircraft in yaw and coordinates its turns.
In automatic flight (AP engaged) during takeoff and go around, it assists rudder application after an engine failure (short-term yaw compensation).

Note: *When the AP is engaged, the FMGS sends orders to the FAC to give :*
- *Yaw damping during approach*
- *Yaw control for runway alignment in ROLL OUT mode*

RUDDER TRIM

Ident.: DSC-22_40-20-00000855.0001001 / 09 DEC 09
Applicable to: ALL

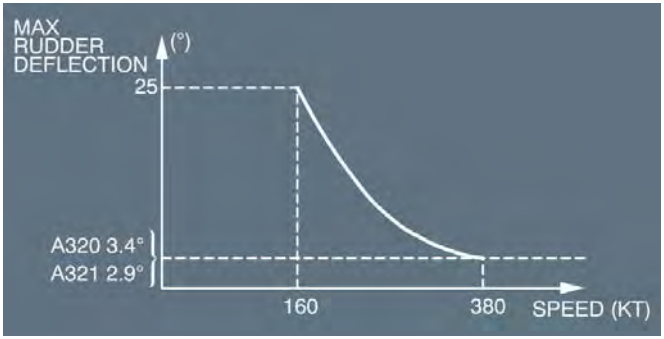
The rudder trim function :
- Executes trim orders, entered by the pilot by using the manual trim knob.
- When AP is engaged
  - executes trim orders from the FMGS.
  - Assists the system in recovering from engine failure (long-term yaw compensation) in all flight guidance modes.
  - If the pilot pushes the rudder more than 10 ° out of trim, it disengages the AP.

Note: *When the AP is engaged, the rudder trim knob is inoperative : the master FMGC sends rudder trim orders to the FAC.*

RUDDER TRAVEL LIMITATION

Ident.: DSC-22_40-20-00000857.0001001 / 01 OCT 12
Applicable to: MSN 3408, 4100-4547

This function limits rudder deflection is based on speed in order to avoid high structural loads. It is governed by the following law :

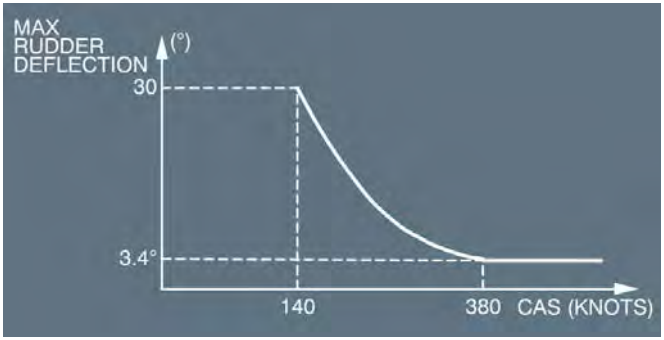


If both FACs lose the rudder travel limitation function, the value of the rudder deflection limit is locked at the time of the second failure.
When the slats are extended, the FACs automatically set the rudder deflection limit at the low-speed setting (maximum authorized deflection).

RUDDER TRAVEL LIMITATION

Ident.: DSC-22_40-20-00000857.0003001 / 01 OCT 12
Applicable to: MSN 1882-2078, 3467-3518

This function limits rudder deflection is based on speed in order to avoid high structural loads. It is governed by the following law :



If both FACs lose the rudder travel limitation function, the value of the rudder deflection limit is locked at the time of the second failure.
When the slats are extended, the FACs automatically set the rudder deflection limit at the low-speed setting (maximum authorized deflection).

GENERAL

Ident.: DSC-22_40-30-00000859.0001001 / 09 DEC 09
Applicable to: ALL

As long as one Flight Augmentation Computer (FAC) is valid, it governs the flight envelope function, the rudder position display, and the rudder trim indication regardless of what the flight crew does with the FAC pushbutton.

PFD SPEED SCALE MANAGEMENT

Ident.: DSC-22_40-30-00000860.0001001 / 21 MAR 17
Applicable to: ALL

The FAC controls the speed scale on the PFD (*Refer to DSC-31-40 Attitude Data*).
When both FACs are operative, FAC1 supplies data to PFD1 and FAC2 supplies it to PFD2.

The FAC computes:
- The minimum and maximum speeds:
  - VSW (stall warning)
  - VLS
  - VFE and VFE for the next configuration
  - VLE
  - VMO/MMO
- The maneuvering speeds:
  - Green Dot Speed
  - S speed
  - F speed

The FAC also computes the speed trend and displays it as an arrow on the PFD speed scale.
The PFD displays these various speeds as appropriate, and they also go to the FMGC to be used as limits for various guidance modes.

Note: The principle of the speed computation is as follows:
- *First, the FAC computes VS1G (stall speed). From VS1G it computes the Gross Weight (GW) which is also sent to the Elevator Aileron computers:*
  - *When the aircraft is below 14 500 ft and 250 kt, it computes this from current angle of attack, speed/Mach, altitude, thrust, and CG.*
  - *When the aircraft is above 14 500 ft or 250 kt, it computes this out of the GW, which it has memorized and updated with a fuel consumption model set in the FAC.*
- *Finally the FAC computes the various minimum and maneuvering speeds, Vα prot and Vsw.*
- *The accuracies of the various minimum and maximum speeds are functions of the accuracy with which the FAC computes aircraft gross weight. Normal accuracy for VLS in CONFIG FULL is about ± 3 kt.*

ALPHA-FLOOR PROTECTION

Ident.: DSC-22_40-30-00006198.0015001 / 17 MAR 17
Applicable to: MSN 2078, 3467-4100

Alpha-floor protection automatically sets the thrust at TOGA thrust, when the aircraft reaches a very high angle of attack.
The Flight Augmentation Computer (FAC) generates the signal that triggers the alpha-floor mode. This, in turn, sets TOGA thrust on the engines, regardless of the thrust lever positions (*Refer to DSC-22_30-90 A/THR Modes - General*).

The FAC sends this signal when:
- The angle of attack is above a predetermined threshold, that is a function of the configuration.
- In CONF 3 and CONF FULL, this threshold decreases as a function of the aircraft deceleration rate (down to – 3 °).

Alpha-floor is available from lift-off until the aircraft reaches 100 ft RA in approach.

Note: The αfloor is activated through the A/THR system, when:
- *α is greater than αfloor (9.5 ° in configuration 0; 15 ° in configuration 1, 2; 14 ° in configuration 3; 13 ° in configuration FULL), or*
- *Sidestick deflection is greater than 14 ° nose up, with either the pitch attitude or the angle-of-attack protection active.*
  The αfloor function is available from lift-off to 100 ft RA before landing.

Alpha-floor is inhibited above M 0.6.

Note: - *Alpha-floor is lost, when one of the following combinations of failures occurs:*
SFCC1 and FAC2, or
SFCC2 and FAC1, or
Both FCU channels, or
1 EIU, or
Both FMGCs.
- *Alpha-floor is lost under alternate or direct flight control law.*
- *Alpha-floor is lost in engine-out, when slats/flaps are extended.*

ALPHA-FLOOR PROTECTION

Ident.: DSC-22_40-30-00006198.0001001 / 17 MAR 17
Applicable to: MSN 1882, 3408, 4379-4547

Alpha-floor protection automatically sets the thrust at TOGA thrust, when the aircraft reaches a very high angle of attack.
The Flight Augmentation Computer (FAC) generates the signal that triggers the alpha-floor mode. This, in turn, sets TOGA thrust on the engines, regardless of the thrust lever positions (*Refer to DSC-22_30-90 A/THR Modes - General*).

The FAC sends this signal when:
- The angle of attack is above a predetermined threshold, that is a function of the configuration.
- In CONF 3 and CONF FULL, this threshold decreases as a function of the aircraft deceleration rate (down to – 3 °).

Alpha-floor is available from lift-off until the aircraft reaches 100 ft RA in approach.

Note: *The αfloor is activated through the A/THR system, when:*
- *α is greater than αfloor (9.5 ° in configuration 0; 15 ° in configuration 1, 2; 14 ° in configuration 3; 13 ° in configuration FULL), or*
- *Sidestick deflection is greater than 14 ° nose up, with either the pitch attitude or the angle-of-attack protection active.*
The αfloor function is available from lift-off to 100 ft RA before landing.

Note: - *Alpha-floor is lost, when one of the following combinations of failures occurs:*
SFCC1 and FAC2, or
SFCC2 and FAC1, or
Both FCU channels, or
1 EIU, or
Both FMGCs.
- *Alpha-floor is lost under alternate or direct flight control law.*
- *Alpha-floor is lost in engine-out, when slats/flaps are extended.*

LOW - ENERGY AURAL ALERT

Ident.: DSC-22_40-30-00006197.0001001 / 24 FEB 15
Applicable to: ALL

An aural low-energy “SPEED SPEED SPEED” alert, repeated every 5 s, warns the pilot that the aircraft’s energy level is going below a threshold under which he has to increase thrust, in order to regain a positive flight path angle through pitch control.

It is available in Configuration 2, 3, and FULL. The FAC computes the energy level with the following inputs:
- Aircraft configuration
- Horizontal deceleration rate
- Flight path angle.

The aural alert is inhibited when:
- TOGA is selected, or
- Below 100 ft RA, or
- Above 2 000 ft RA, or
- Alpha-floor, or the ground proximity warning system alert is triggered, or
- In alternate or direct law, or
- If both radio altimeters fail.

During deceleration, the low-energy aural alert is triggered before alpha floor (unless alpha floor is triggered by stick deflection). The amount of time between the two alerts depends on the deceleration rate.

WINDSHEAR DETECTION FUNCTION

Ident.: DSC-22_40-40-00006194.0001001 / 07 JUL 11
Applicable to: ALL

The windshear detection function is provided by the Flight Augmentation Computer (FAC) in takeoff and approach phase in the following conditions:

- At takeoff, 3 s after liftoff, up to 1 300 ft RA
- At landing, from 1 300 ft RA to 50 ft RA
- With at least CONF 1 selected.

The warning consists of:

- A visual “WINDSHEAR” red message displayed on both PFDs for a minimum of 15 s.
- An aural synthetic voice announcing “WINDSHEAR” three times.

WINDSHEAR DETECTION PRINCIPLES

Ident.: DSC-22_40-40-00006195.0001001 / 23 JUN 15
Applicable to: ALL

The FACs generate the windshear warning whenever the predicted energy level for the aircraft falls below a predetermined threshold.
In computing this energy level prediction, the FACs use data from different sources. From ADIRS comes data such as vertical speed, air and ground speeds and slope ; from other sources come such derived parameters as total slope, longitudinal wind gradient, and vertical wind.
The FACs express this energy level as an angle of attack and compare it with an angle-of-attack threshold above which windshear conditions are most likely and pilot action is required.

GUIDANCE

Ident.: DSC-22_40-40-00006196.0001001 / 09 DEC 09
Applicable to: ALL

In windshear conditions, flight guidance acts on specially adapted FD pitch orders received from the speed reference system (SRS). The pilot must set go around thrust immediately (which also triggers the FD SRS mode), and follow the pitch order to execute the optimum escape maneuver.

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FAC ENGAGEMENT

Ident.: DSC-22_40-50-00000861.0001001 / 09 DEC 09
Applicable to: ALL

Refer to DSC-27-10-20 Yaw Control - General

RUDDER TRIM OPERATION

Ident.: DSC-22_40-50-00000862.0001001 / 09 DEC 09
Applicable to: ALL

Refer to DSC-27-10-20 Yaw Control - General

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AIRCRAFT SYSTEMS

AUTO FLIGHT - AOC FUNCTIONS

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GENERAL

Ident.: DSC-22_45-00000864.0001001 / 18 MAR 11
Applicable to: ALL

The FMS AOC function gives an interface between a ground station and one onboard FMGC, allowing data transmission between these two computers via the ACARS Management Unit or the ATSU.

Two different sets of message can be exchanged:

UPLINK messages from the ground station. They consist in reception of data requested or directly sent to the crew.

DOWNLINK messages from the FMGC (master). They consist in reports or requests sent to the ground station.

The FMGS/ACARS or FMGS/ATSU interface enables the following AOC capabilities.

- F-PLN initialization (flight plan and performance data)
- Takeoff data
- Wind data
- Flight reports
- Broadcast data

Crews can send message using ACARS FUNCTION pages or relevant MCDU pages.
Only one FMGC talks to the ground station. This FMGC is called FMGC “master”.

GENERAL SCRATCHPAD MESSAGES

NOT XMITTED TO ACARS:		A crew request or report was sent to the ground but the communication was not established or not acknowledged.
NO ANSWER TO REQUEST	:	A crew request was previously sent to the ground and no answer (uplink message) was received within 4 min.

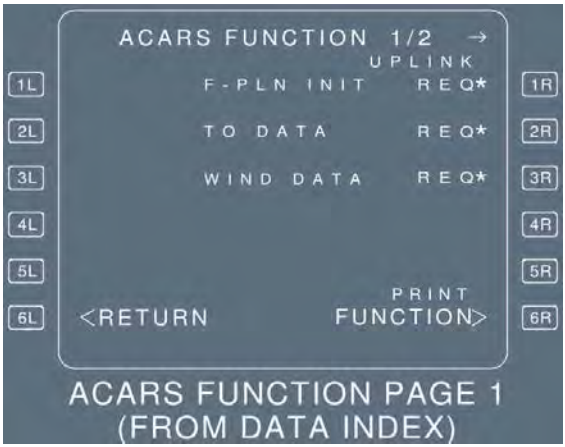
FLIGHT PLAN INITIALIZATION FUNCTION

Ident.: DSC-22_45-00000865.0001001 / 18 MAR 11
Applicable to: ALL

This function enables lateral and vertical flight plan data as well as initialization data to be exchanged between the aircraft and a ground station. The aircraft may send flight plan requests for active and secondary flight plan. (downlink messages). The ground station may send flight plan and initialization data (uplink messages) either under aircraft request or automatically without any request.
Each uplink message concerns either the active or secondary flight plan but never both flight plans at the same time. The data sent to the aircraft are checked for flight plan consistency.
A MCDU message comes up when an uplink message is received. “ACT (or SEC) RTE UPLINK”.

If an error prevents the decoding process of the message, “INVALID RTE UPLINK” is displayed on MCDUs.
An uplink message can be routed to the active flight plan if no engine is started and no active flight plan exists. Otherwise, it is routed to the secondary. The crew will insert it into the secondary flight plan or will reject it using the CLR key.

Note: The flight plan may also be initialized using the ACARS FUNCTION page selected from DATA INDEX page.



PERFORMANCE DATA

On ground and before engine start, the ground station may also send performance data to the aircraft.
Performance data are always associated with the uplink flight plan. It is either automatically inserted with the active flight plan data, or stored in the secondary with the corresponding flight plan.
This message contains part or all of the following data:
ZFW, ZFWCG, taxi fuel, block fuel, cruise flight level, tropopause altitude, cruise temperature, transition altitude, cost index, performance factor.

Note: After engine start an uplink performance data message is rejected automatically without any scratchpad message.

SCRATCHPAD MESSAGES RELATED TO FLIGHT PLAN AND PERFORMANCE

INVALID RTE UPLINK	An error is detected, the uplink message is rejected.
ACT or SEC RTE UPLINK	A F-PLN is stored in the active or secondary flight plan.

FLT NUMBER UPLINK	FLT NBR has been initialized within a F-PLN message without previous request.
CHECK FLT NUMBER	The uplinked FLT NBR differs from the one specified in the request.
CHECK CO RTE	The uplinked CO RTE ident differs from the one specified in the request.
INVALID FLT NBR UPLINK	The uplink contains a valid F-PLN but the FLT NBR is invalid.
PERF DATA UPLINK	Performance data is received
INVALID PERF UPLINK	Performance uplink message has been rejected
RTE DATALINK IN PROG	A flight plan modification is performed after a F-PLN INIT request has been sent; this message is displayed until the uplink is received.
UPLINK INSERT IN PROG	This message is displayed during insertion of a Flight Plan.

TAKEOFF DATA FUNCTION

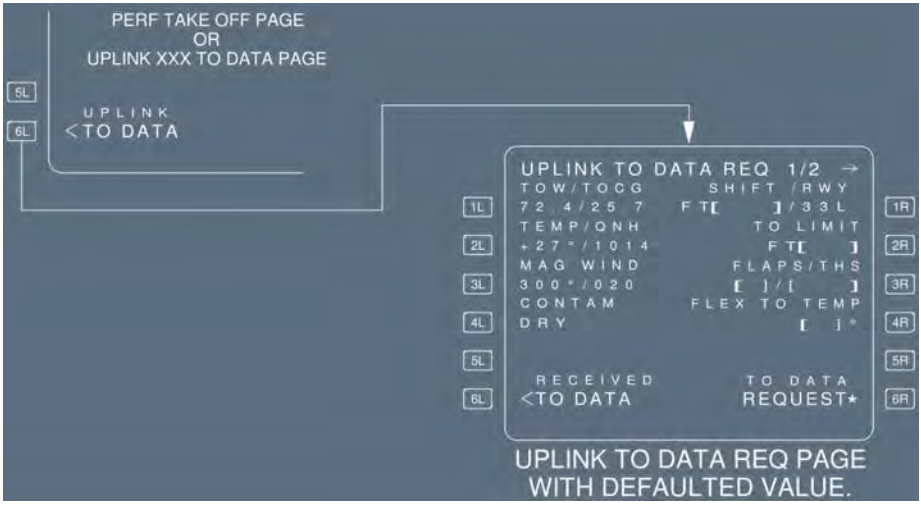
Ident.: DSC-22_45-00000866.0001001 / 18 MAR 11
Applicable to: ALL

The takeoff data function is available for the active flight plan only. It is used to request to the ground station, information data for up to 2 runways and to receive this data for up to 4 runways.
The crew sends a request indicating the departure airport, runway idents, CG, GW and weather conditions (such as BARO setting wind, temperature...). In response he receives the takeoff speeds for up to 4 runways but only one set of data may be inserted in the active flight plan for the selected active runway.
Takeoff speeds are computed for max and flex takeoff.

The takeoff data function has required the modification of the standard PERF TAKEOFF page and the addition of 2 news pages:

- UPLINK TO DAT REQ page that enables the crew to specify a request to the ground.
- UPLINK XXX TO DATA page (XXX for MAX or FLEX)

These 2 pages are accessed from the PERF TAKEOFF page in PREFLIGHT and DONE phase only.



SCRATCHPAD MESSAGES RELATED TO TAKEOFF DATA

TAKEOFF DATA UPLINK	:	Takeoff data uplink message is received
INVALID TAKEOFF UPLINK	:	The UPLINK message is rejected

WIND DATA FUNCTION

Ident.: DSC-22_45-00000867.0001001 / 18 MAR 11
Applicable to: ALL

This function enables the crew to request and to receive forecasted winds associated to the active or secondary flight plan.
The uplink message (ground station to aircraft) may be received upon crew request or automatically without crew request.
The request is initiated from WIND pages or from ACARS FUNCTION page (*Refer to DSC-22_20-70 Wind Data - Request for Wind Data*).

The uplink wind data when received are directly displayed on the wind pages but not inserted in the flight plan, one set for each flight phase: CLIMB, CRUISE, DESCENT. The alternate wind at alternate cruise flight level is displayed on DESCENT page.

- Winds are associated to altitude for climb an descent phases
- Winds are associated to waypoint for cruise phase and step level. One wind per waypoint.
  - On ground and without entered winds, an uplink message is directly inserted in the flight plan.
  - In flight, winds are temporary stored until the crew inserts it phase per phase.
    Phase of flight is indicated in the WIND title page.
  - Clearing the INSERT UPLINK* prompt using the CLR key deletes the uplink wind data for the selected phase.

When uplink winds are deleted, the wind page reverts to the previous status.
The flight plan B page is modified of the uplink wind only after it is inserted by the crew. AOC uplink winds are then considered as crew manual entries (large font).

SCRATCHPAD MESSAGES RELATED TO WIND DATA

INVALID WIND UPLINK	An error is detected, the uplink is rejected.
WIND DATA UPLINK	Uplinked winds are received.
WIND UPLINK PENDING	A temporary flight plan exists or a DIR TO page is displayed when a wind uplink is received. The message is stored.
WIND UPLINK EXISTS	A F-PLN modification (active or secondary) is attempted when uplink winds are not inserted. This message disappears automatically when the wind uplink is inserted or deleted.
CHECK DEST DATA	The aircraft is at 180 NM from destination, and the destination QNH, TEMP or WIND displayed on the PERF APPR page was received by AOC uplink or, if following insertion of a descent wind uplink, a conflict concerning the above parameters exists.
CHECK ALTN WIND	The uplinked alternate cruise flight level differs from the default alternate cruise flight level.

FLIGHT REPORTS

Ident.: DSC-22_45-00000868.0001001 / 01 OCT 12
Applicable to: ALL

Flight reports provide real time information to the ground concerning the aircraft current situation and position.

Several types of flight reports are available:

- The Position report : provides current aircraft position
- the Progress report : provides data relative to the destination

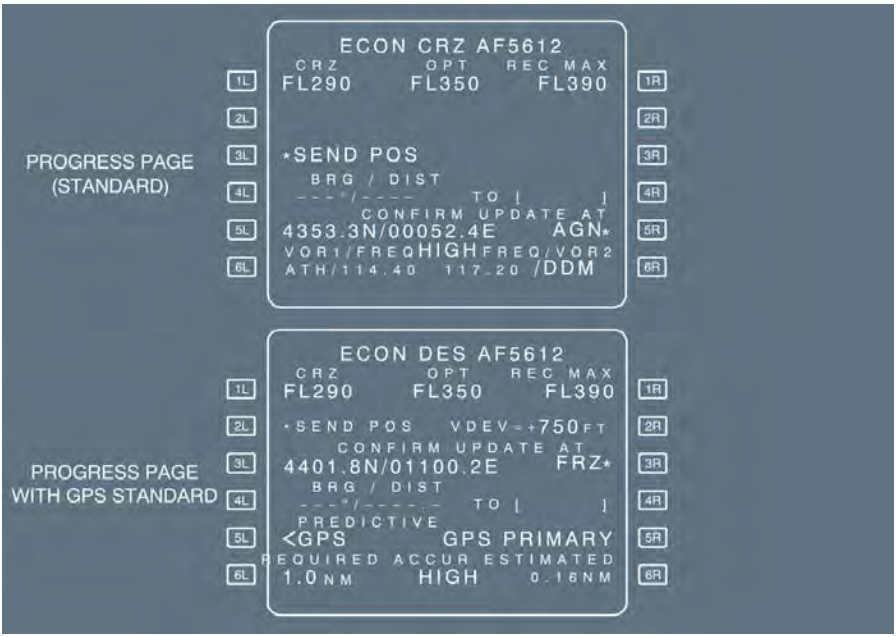
- The Flight-Plan report : provides the active route
- the Performance Data report : provides performance data currently used by FMS.

These reports may be manually initiated via a dedicated prompt or automatically sent in response to a ground request or upon specific conditions.

POSITION REPORT

This report is sent:
- manually via a MCDU prompt or
- following a ground request or
- automatically upon sequencing a designated reporting fix (designated by the ground in a uplink message).

The manual POSITION REPORT downlink prompt is displayed on the PROG page. (SEND POS prompt).



Note: *Position report are initiated from active flight plan only.*

POSITION REPORT CONTENT

- Aircraft position
- Overfly reporting waypoint
- Time of report (UTC)
- Aircraft altitude
- Next reporting waypoint
- ETA at next reporting waypoint
- Reporting waypoint following next report
- SAT
- Current wind
- Remaining fuel

PROGRESS REPORT

A progress report contains data relative to the aircraft arrival time and EFOB at destination for the active F-PLN.

This downlink message is automatically sent following:
- a ground request or
- a change of destination or
- a change of runway or
- a specific event. The possible events that can be selected in the navigation database policy file are :
  - X minutes to Top of Descent
  - Z minutes to Destination
  - ETA changes more than W minutes from the previous report.
    X, Z and W are minutes of time set in the navigation database policy file.

The progress report cannot be manually sent by the crew via a dedicated MCDU prompt.

PROGRESS REPORT CONTENT

- Flight Number
- Arrival Airport Ident
- Destination Runway Ident
- Predicted remaining fuel
- ETA at destination
- Reason for report (specific event, ground request...).

FLIGHT PLAN REPORT

The F-PLN report broadcasts flight plan data to the ground. Only data from the active flight plan can be sent.

This downlink message is sent to the ground:
- automatically following a ground request
- manually by the crew using a prompt displayed on the ACARS FUNCTION page (DSC-22_20 Auto Flight - Flight Management/50 Controls and Indicators/10 MCDU - Page Description/25 FMS2 Honeywell/ACARS Function Page). This prompt may be invalidated through the navigation database policy file.

The Flight Plan report can be downlinked either while on ground or in flight during any flight phase.

FLIGHT PLAN REPORT CONTENT

The report contains the active and alternate flight plan.

PERFORMANCE DATA REPORT

The Performance Data report is a downlink message that allows the transmission of performance data (CG, FUEL, CG...) relative to the active F-PLN.
This message is automatically sent following a ground request. Manual sending is not possible.

PERFORMANCE DATA REPORT CONTENT

Sends to the ground:
- Current GW
- Cruise Altitude
- Current CG
- Fuel on Board
- Block Fuel
- Reserve Fuel
- Cost Index
- Top of Climb Temperature
- Climb Transition Altitude
- Tropopause Altitude
- Taxi Fuel
- ZFW
- ZFWCG

AIRCRAFT SYSTEMS

AUTO FLIGHT - PRINT INTERFACE

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PRINT FUNCTION

Ident.: DSC-22_46-00000869.0003001 / 01 APR 11
Applicable to: ALL

The print function enables several types of data and report to be printed :

- Flight plan initialization data
- Takeoff data
- Wind data
- Preflight report
- In flight report
- Post flight report

The 3 first reports may differ when automatically or manually printed for the following reason :
The automatic process prints the uplink message although the manual process prints the current active data as displayed on the relevant MCDU pages.
The last 3 reports being processed from the same sources are identical in automatic or manual printing.

Note: *ACARS is not necessary linked to printing process. The printing function may be activated within the FMGS and selected independently from the ACARS.*

- One or several print functions may be deactivated *Refer to DSC-22_20-50-10-25 Print Function Pages*.
- If an ACARS function is not active, (not selected in the nav database policy file) the printing process is invalidated for this specific ACARS function.

AOC/PRINTER PROGRAMMING OPTIONS

Ident.: DSC-22_46-00000870.0002001 / 11 FEB 11
Applicable to: ALL

Option programming for the AOC/PRINTER functions is obtained through the Navigation Data Base policy file or the Airline Modifiable Information (AMI) file.

The list summarizes the possible options:

Data Link (ACARS or AOC) Inhibit	Disables AOC function
F-PLN Data Request Inhibit	Disables uplink and downlink requests of F-PLN initialization data
Performance Data Request Inhibit	Disables uplink and downlink requests of Performance Initialization data
Takeoff Data Request Inhibit	Disables uplink and downlink request of Takeoff Initialization data
Wind Data Request Inhibit	Disables uplink and downlink request of predicted wind data

Flight Number Enable	Flight Number is included within the F-PLN Request or Progress Report downlinks
Position Report Inhibit	Disables a manual Position Report downlink
Progress Report Triggers	Defines the triggers for the automatic downlink of the Progress Report
F-PLN Report Inhibit	Disables the manual downlink of the F-PLN Report
Auto Print of ACARS or AOC uplinks	Selects/Deselects the automatic printing of the F-PLN, INIT, TO and wind data uplinks. If Autoprint is selected, the crew can deselect it manually. If auto printing is deselected, the crew cannot manually reselect it.
Auto Print of Flight Reports	Selects/Deselects the automatic printing of the Preflight, Inflight, Postflight reports. If selected, the crew can deselect it manually. If autoprint is deselected, the crew cannot manually preselected it.

AIRCRAFT SYSTEMS

COMMUNICATIONS

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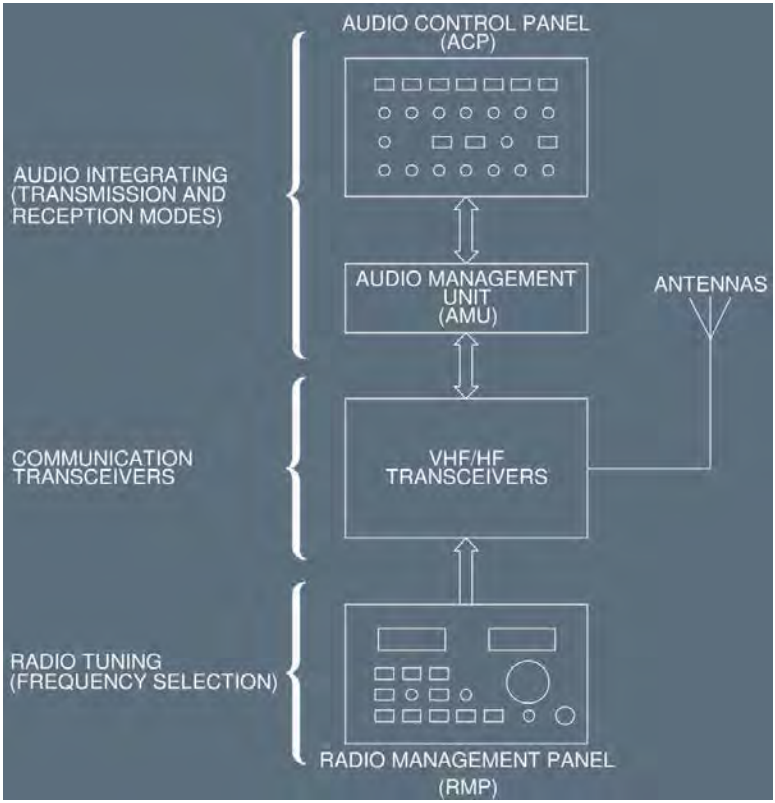
INTRODUCTION

Ident.: DSC-23-10-10-00018503.0001001 / 17 MAR 17
Applicable to: ALL

The communications system comprises the following subsystems :

- VHF/HF transceivers
- Radio tuning systems (Radio Management Panels).
- Audio integrating system (Audio Management Unit, Audio Control Panels).



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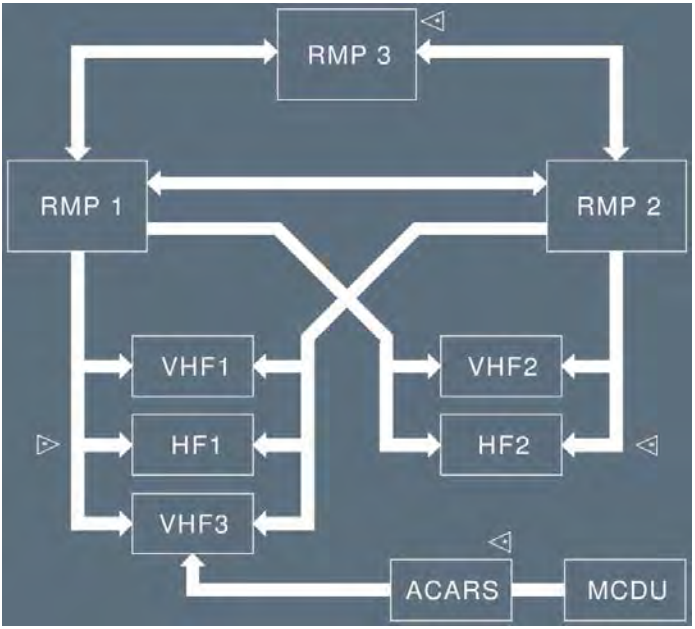
DESCRIPTION

Ident.: DSC-23-10-20-00018494.0001001 / 17 MAR 17
Applicable to: ALL

Identical Radio Management Panels (RMPs):
- Give the flight crew control of all VHF radio communication systems (HF systems ◁).
- Provide backup to the FMGCs for controlling radio navigation systems (*Refer to DSC-34-NAV-30-10 General*).

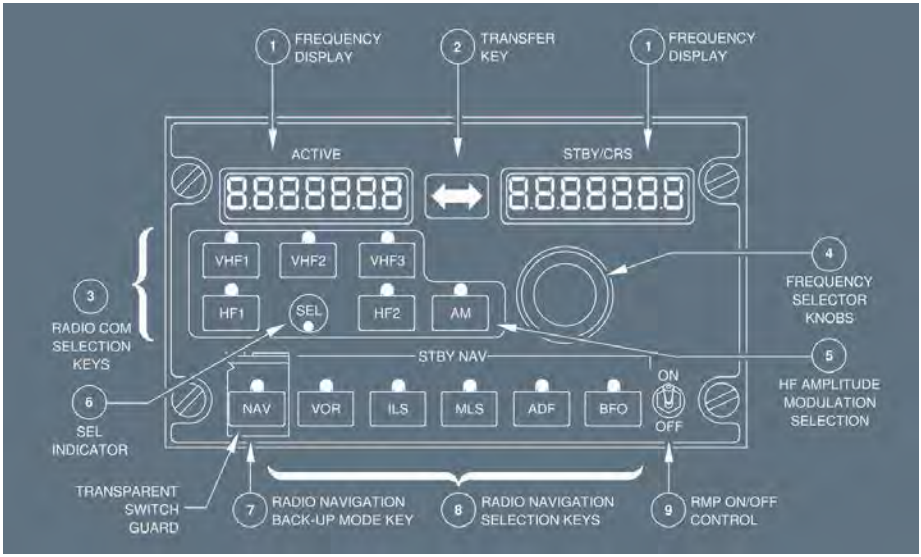
The two RMPs are on the center pedestal (and the third ◁ is on the overhead panel).
Each RMP can control any VHF (HF ◁) transceiver. RMP1 and RMP2 are connected directly to all VHF (HF ◁) transceivers, (whereas RMP3 ◁ is connected to them via RMP1 and RMP2). RMPs are connected together so that each RMP is updated to the selections made on the other RMPs.
Only RMP1 functions in EMER ELEC CONFIG.



If one RMP fails, the remaining one controls all the VHF (HF ◁) transceivers.

RADIO MANAGEMENT PANEL

Ident.: DSC-23-10-20-00018495.0001001 / 22 MAR 17
Applicable to: MSN 1882-2078



(1) Frequency displays
The ACTIVE display window shows the active frequency of the selected radio, which is identified by a green light on the selection key.
The STBY/CRS (standby/course) display window shows a standby frequency that the pilot can activate by pressing the transfer key or change by rotating the tuning knobs. (For a description of the CRS function *Refer to DSC-34-NAV-30-30 Radio Management Panel (RMP)*).

(2) Transfer key
Pressing this key moves the active frequency to the standby window and the standby frequency to the active window.
This tunes the selected receiver to the new active frequency.

(3) Radio com selection keys

When the pilot presses one of these keys:
- The ACTIVE window displays the frequency set on that radio.
- The STBY/CRS window displays the selected standby frequency or course.
- The selected key displays a green monitor light.

(4) Frequency selector knobs
The pilot uses these concentric knobs to select the STBY frequency or CRS.
The outer knob controls whole numbers; the inner knob controls decimal fractions.

(5) AM pushbutton
If the aircraft has HF radios and the flight crew has selected an HF tranceiver, this switch selects the AM mode. (The default mode is the SSB, or single side-band mode).
This key displays a green monitor light when the AM mode is active.

(6) SEL indicator

The SEL indicator on both RMPs comes on amber when a transceiver, normally associated with one RMP, is tuned by another:

- If 2 RMP installed:
  - VHF1 (VHF3, ◁ , HF1 ◁), tuned by RMP2,
  - VHF2 (HF2 ◁), tuned by RMP1.
- If 3 RMP installed:
  - VHF1 tuned by RMP2 or RMP3,
  - VHF2 tuned by RMP1 or RMP3,
  - VHF3, HF1, (HF2 ◁) tuned by RMP1 or RMP2.

(7) NAV pushbutton (with transparent switchguard)
The pilot presses this key to select navigation receivers and courses through the RMP.
It does not affect the selection of communication radios and their frequencies. (*Refer to DSC-34-NAV-30-30 Radio Management Panel (RMP)*, for additional information).

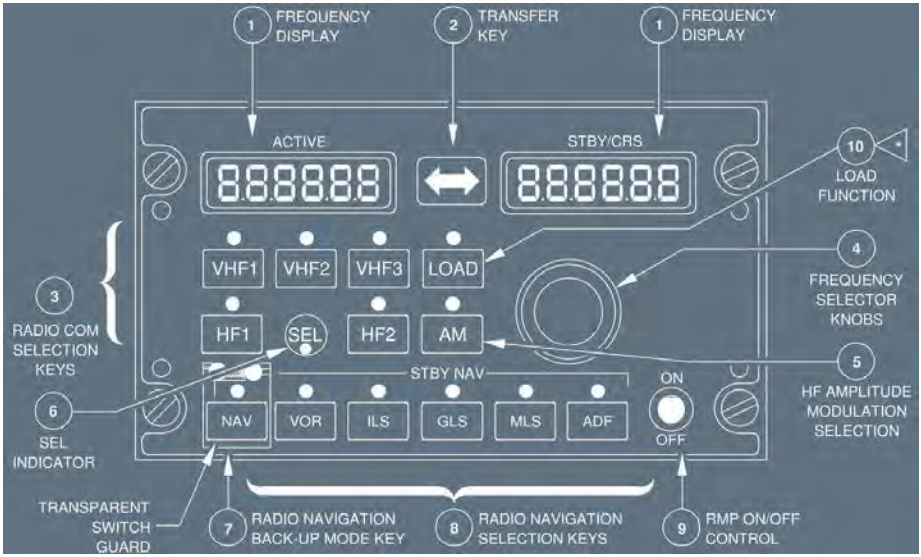
(8) Radio navigation selection keys
The pilot presses one of these keys to select a navigation radio to control through this RMP.
This turns on the key's green monitor light.
Refer to DSC-34-NAV-30-30 Radio Management Panel (RMP), for additional information.

(9) ON/OFF switch
This switch controls the RMP power supply.

Note: RMP3 is able to control VHF and HF transceivers through RMP1 and RMP2 even when either of the latter is OFF.

RADIO MANAGEMENT PANEL

Ident.: DSC-23-10-20-00018495.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547



(1) Frequency displays
The ACTIVE display window shows the active frequency of the selected radio, which is identified by a green light on the selection key.
The STBY/CRS (standby/course) display window shows a standby frequency that the pilot can activate by pressing the transfer key or change by rotating the tuning knobs. (For a description of the CRS function *Refer to DSC-34-NAV-30-30 Radio Management Panel (RMP)*).

(2) Transfer key
Pressing this key moves the active frequency to the standby window and the standby frequency to the active window.
This tunes the selected receiver to the new active frequency.

(3) Radio com selection keys

When the pilot presses one of these keys:
- The ACTIVE window displays the frequency set on that radio.
- The STBY/CRS window displays the selected standby frequency or course.
- The selected key displays a green monitor light.

(4) Frequency selector knobs
The pilot uses these concentric knobs to select the STBY frequency or CRS.
The outer knob controls whole numbers; the inner knob controls decimal fractions.

(5) AM pb-sw
If the aircraft has HF radios and the flight crew has selected an HF tranceiver, this switch selects the AM mode. (The default mode is the SSB, or single side-band, mode).
This key displays a green monitor light when the AM mode is active.

(6) SEL indicator

The SEL indicator on both RMPs comes on amber when a transceiver normally associated with one RMP is tuned by another:
- VHF 1 tuned by RMP 2 or RMP 3,
- VHF 2 tuned by RMP 1 or RMP 3.
- VHF 3, HF 1, HF 2 (◁) tuned by RMP 1 or RMP 2.

(7) NAV pb sw (with transparent switchguard)
The pilot presses this key to be able to select navigation receivers and courses through the RMP. It does not affect the selection of communication radios and their frequencies. (*Refer to DSC-34-NAV-30-30 Radio Management Panel (RMP)*, for additional information).

(8) Radio navigation selection keys
The pilot presses one of these keys to select a navigation radio to control through this RMP. This turns on the green monitor light in the key.
Refer to DSC-34-NAV-30-30 Radio Management Panel (RMP), for additional information.

(9) ON/OFF sw
This switch controls the power supply to the RMP.

Note: *RMP 3 is able to control VHF and HF transceivers through RMP 1 and RMP 2 even when they are OFF.*

(10) LOAD FUNCTION ◁
When the ATC sends (CONTACT or MONITOR) CPDLC messages to the flight crew, a white light above the LOAD key comes on to indicate that the sent frequency is available to be loaded.
Press on this LOAD key before closing the CONTACT/MONITOR messages to load this VHF frequency to the STBY/CRS window.

Note: *When a frequency from the ATC services (sent label via datalink) has been received, the ATSU validates the frequency and simultaneously sends the information to all the RMP in order to activate the LOAD function.*
When the LOAD function is activated, the flight crew can repeatedly load the frequency on each RMP as often as necessary; except if DATA is present on standby window.

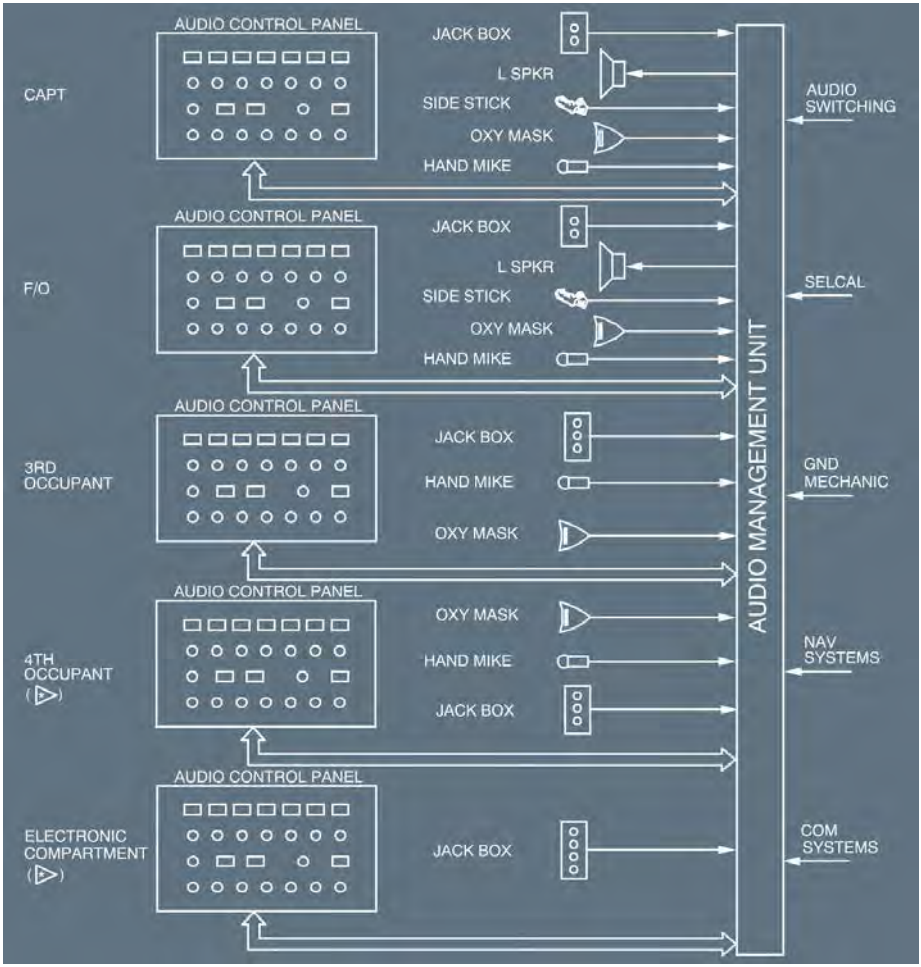
AUDIO MANAGEMENT SYSTEM

Ident.: DSC-23-10-30-00018496.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

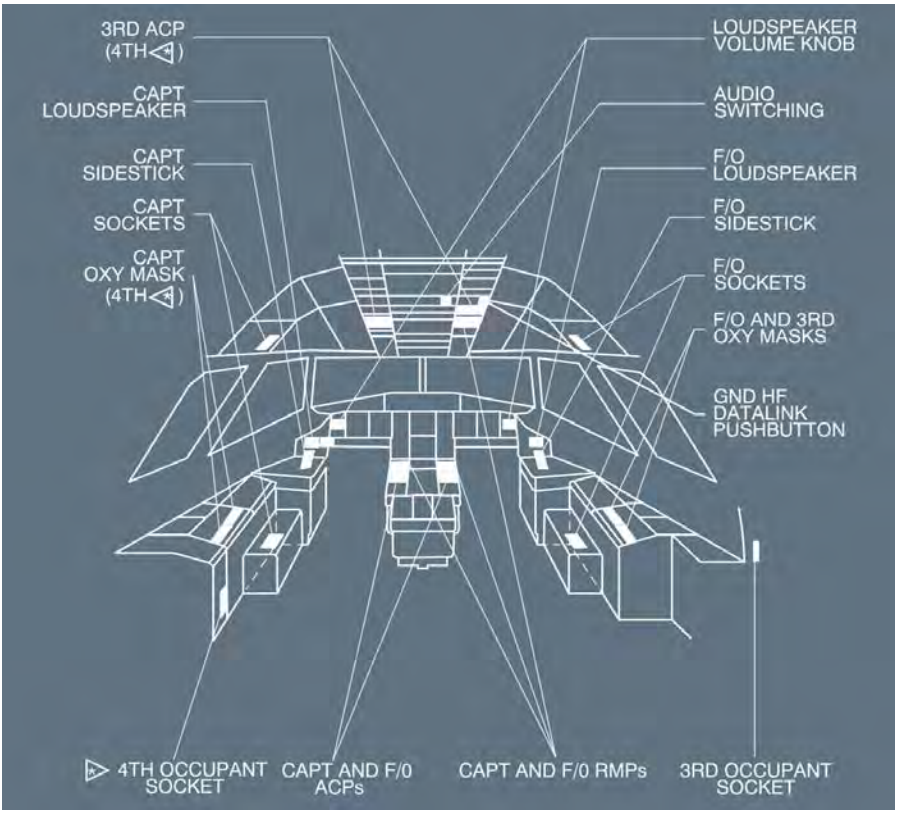
The audio management system allows the flight crew to use :
- All the radio communication and radio navigation facilities installed on the aircraft in transmission and reception mode.
- The interphone systems.
- The call systems.
- The passenger address system.

The audio management system includes :
- An audio management unit (AMU).
- Three audio control panels (ACPs) (fourth and fifth optional).
- Sockets at each station:
  - Headset jack and boomset connector (hand microphone connector ◁) for pilot, copilot, and third occupant.
  - Headset jack for fourth occupant.
- One interphone jack at the ground power receptacle.
- Boomsets for the pilot, copilot, and third occupant, and three hand microphones (fourth ◁).
- Three cockpit oxygen mask microphones.
- One radio press-to-talk switch on each sidestick.
- One SELCAL code selection panel (avionics compartment).
- Two cockpit loudspeakers with separate volume controls.
- If installed, a jack panel in the electronic compartment that groups the headset jack, service interphone jack, hand mike connector, and boomset.
- An audio switching facility.

If audio channel 1 or 2 fails due to a failure either in an ACP or the corresponding AMU, the crew can use the AUDIO SWITCHING selector to select the third audio channel.


AUDIO CONTROL PANEL
CAPT
JACK BOX
L SPKR
SIDE STICK
OXY MASK
HAND MIKE
AUDIO CONTROL PANEL
F/O
JACK BOX
L SPKR
SIDE STICK
OXY MASK
HAND MIKE
AUDIO CONTROL PANEL
3RD OCCUPANT
JACK BOX
HAND MIKE
OXY MASK
AUDIO CONTROL PANEL
4TH OCCUPANT
OXY MASK
HAND MIKE
JACK BOX
AUDIO CONTROL PANEL
ELECTRONIC COMPARTMENT
JACK BOX
AUDIO MANAGEMENT UNIT
AUDIO SWITCHING
SELCAL
GND MECHANIC
NAV SYSTEMS
COM SYSTEMS

LOCATION OF COMPONENTS (PILOT'S STATION)



AUDIO MANAGEMENT SYSTEM

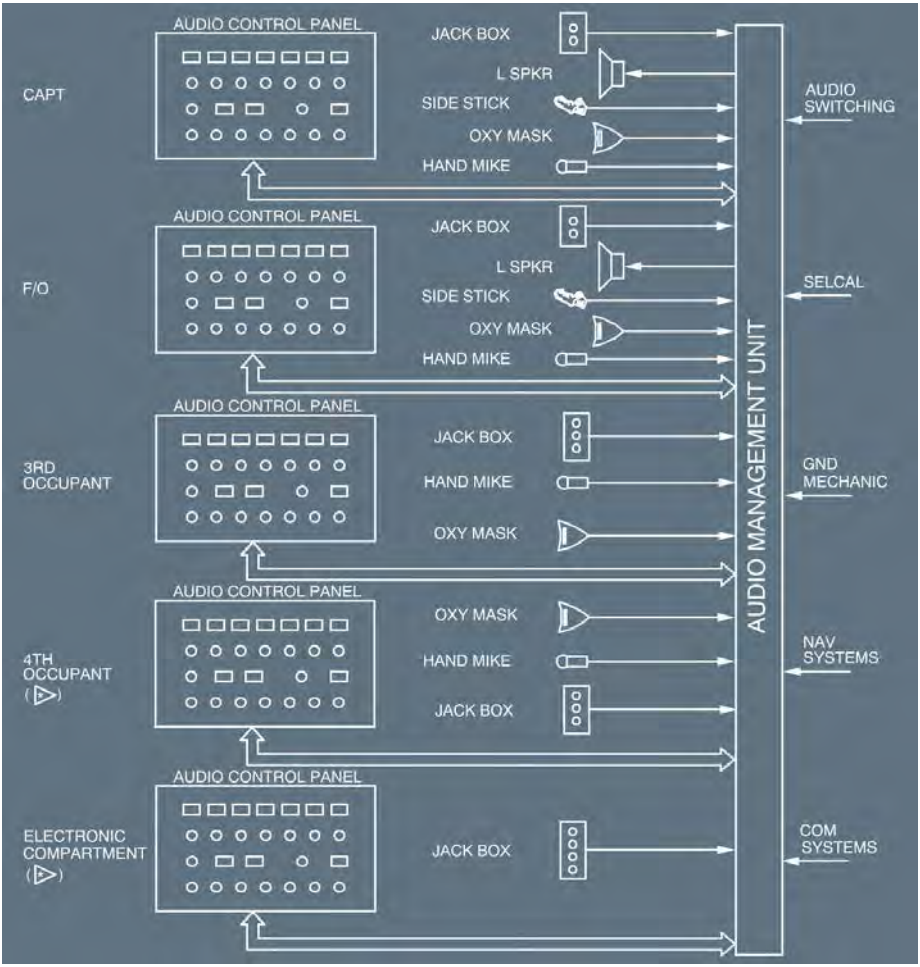
Ident.: DSC-23-10-30-00018496.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

The audio management system allows the flight crew to use :

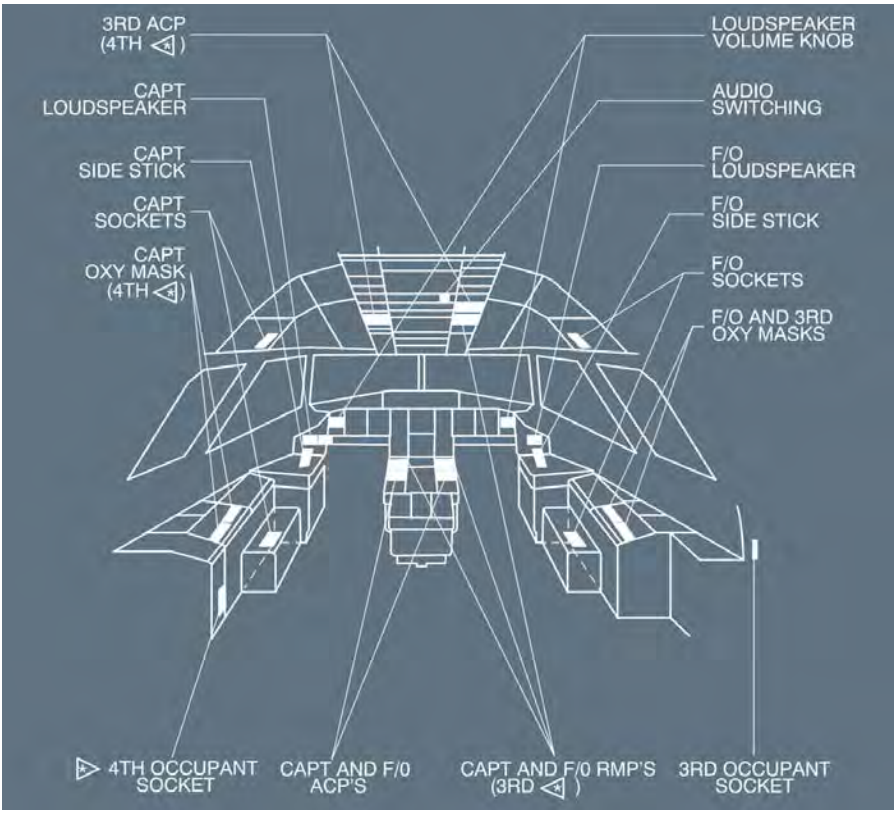
- All the radio communication and radio navigation facilities installed on the aircraft in transmission and reception mode.
- The interphone systems
- The call systems
- The passenger address system

The audio management system includes :
- An audio management unit (AMU)
- Three audio control panels (ACPs) (fourth and fifth optional)
- Sockets at each station
  - Headset jack and boomset connector (hand microphone connector ◁) for pilot, copilot, and third occupant
  - Headset jack for fourth occupant
- One interphone jack at the ground power receptacle
- Boomsets for the pilot, copilot, and third occupant, and three hand microphones (fourth ◁)
- Three cockpit oxygen mask microphones
- One radio press-to-talk switch on each sidestick
- One SELCAL code selection panel (avionics compartment)
- Two cockpit loudspeakers with separate volume controls
- If installed, a jack panel in the electronic compartment that groups the headset jack, service interphone jack, hand mike connector, and boomset
- An audio switching facility

If audio channel 1 or 2 fails due to a failure either in an ACP or the corresponding AMU, the crew can use the AUDIO SWITCHING selector to select the third audio channel.


AUDIO CONTROL PANEL
CAPT
JACK BOX
L SPKR
SIDE STICK
OXY MASK
HAND MIKE
AUDIO CONTROL PANEL
F/O
JACK BOX
L SPKR
SIDE STICK
OXY MASK
HAND MIKE
AUDIO CONTROL PANEL
3RD OCCUPANT
JACK BOX
HAND MIKE
OXY MASK
AUDIO CONTROL PANEL
4TH OCCUPANT
OXY MASK
HAND MIKE
JACK BOX
AUDIO CONTROL PANEL
ELECTRONIC COMPARTMENT
JACK BOX
AUDIO MANAGEMENT UNIT
AUDIO SWITCHING
SELCAL
GND MECHANIC
NAV SYSTEMS
COM SYSTEMS

LOCATION OF COMPONENTS (PILOT'S STATION)



CABIN INTERCOMMUNICATION DATA SYSTEM

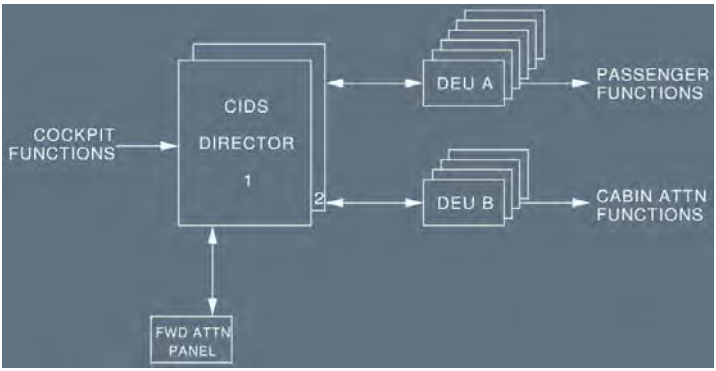
Ident.: DSC-23-10-30-00018497.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

The Cabin Intercommunication Data System (CIDS) transmits, controls, and processes signals for the following cabin systems:

- Cabin and service interphone
- Passenger address
- Passenger lighted signs
- Reading light
- General cabin illumination

- Emergency evacuation signalling
- Lavatory smoke indication
- Passenger entertainment music and video ◁
- Escape slide bottle pressure monitoring ◁

The CIDS has the following main components:
- Two CIDS directors connected in parallel, one active, and the other on standby.
- Forward attendant panel for control of the cabin systems.
- Programming and test module that allows the system to be reprogrammed after changes are made in the cabin configuration.



Decoder/Encoder Units (DEUs) linked to the two directors.
- Type A units (for passengers) installed along each side of the passenger cabin. The loudspeakers, lighted signs, call buttons, call lights and general illumination ballast units are divided into small groups, each connected to a type A DEU.
- Type B units (for attendants) installed near the exit doors. The Area Call panels, attendant handsets, slide and door pressure sensors, and attendant indicator panels, are connected to type B DEUs.

CABIN INTERCOMMUNICATION DATA SYSTEM

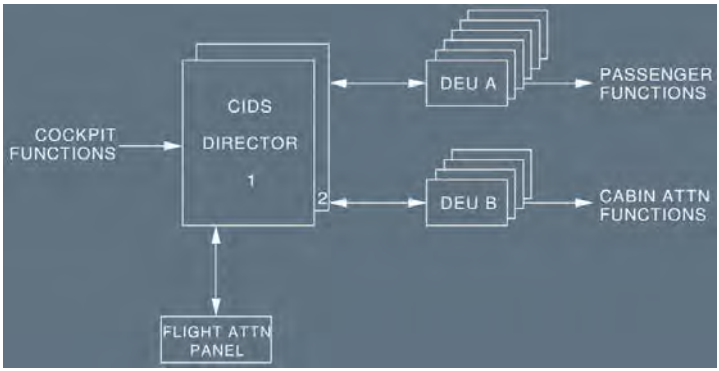
Ident.: DSC-23-10-30-00018497.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

The Cabin Intercommunication Data System (CIDS) transmits, controls, and processes signals for the following cabin systems :
- Cabin and service interphone
- Passenger address
- Passenger lighted signs
- Reading lights (LED technology)

- General cabin illumination
- Emergency evacuation signalling
- Lavatory smoke detectors and indicators
- Passenger entertainment music and video
- Escape slide bottle pressure monitoring
- Vacuum system control function
- Cargo and lavatory smoke detection function

The CIDS has the following main components :
- Two CIDS directors connected in parallel ; one active, and the other on standby.
- Flight Attendant Panel (FAP) to monitor and control the cabin systems.
- Attendant Indication Panels (AIP), After Attendant Panels (AAP) and Area Call Panels (ACP)
- Decoder/Encoder Units (DEUs) linked to the two directors.

  • Type A units (for passengers) installed along the cabin.
  The loudspeakers, lighted signs, call buttons, call lights and general illumination ballast units are divided into small groups, each connected to a type A DEU.
  • Type B units (for attendants) installed near the exit doors. The Area Call panels, smoke detectors, attendant handsets, slide and door pressure sensors, and attendant indicator panels, are connected to type B DEUs.



DESCRIPTION

Ident.: DSC-23-10-40-00018569.0002001 / 17 MAR 17
Applicable to: ALL

The cockpit voice recorder (CVR) records :
- direct conversations between crew members in the cockpit
- all aural warnings sounded in the cockpit
- audio communications received and transmitted
- intercommunications conversations between crew members
- announcements transmitted over the passenger address system, if PA reception is selected on at least one audio control panel.

Only the last 2 h of recording are retained.

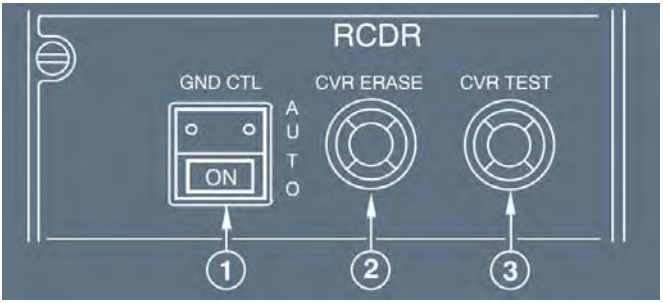
The CVR system consists of :
- a remote microphone behind the overhead panel
- a “hot mike” function, which records the crew members voice directly from their microphone, even if the push to talk switch is not activated.
- a crashproof four-track recorder, equipped with an underwater locating beacon, in the aft section of the aircraft
- a control panel on the overhead panel.

It is energized automatically :
- on the ground during the first 5 min after the aircraft electrical network is energized
- on the ground with one engine running
- in flight

On the ground, it is stopped automatically 5 min after the last engine shutdown provided the CVR jack is not used.
On the ground, the crew can energize the CVR manually by pressing the GND CTL pushbutton.

CONTROLS AND INDICATORS

Ident.: DSC-23-10-40-00018570.0001001 / 17 MAR 17
Applicable to: ALL



(1) GND CTL switch (spring-loaded)

ON : The CVR, DFDR, and QAR ⋖ are on.
The ON light comes on blue.

AUTO : The CVR, DFDR, and QAR ⋖ are on, according to the logic. (*Refer to DSC-23-10-40 Description*).

(2) CVR ERASE pb ⋖

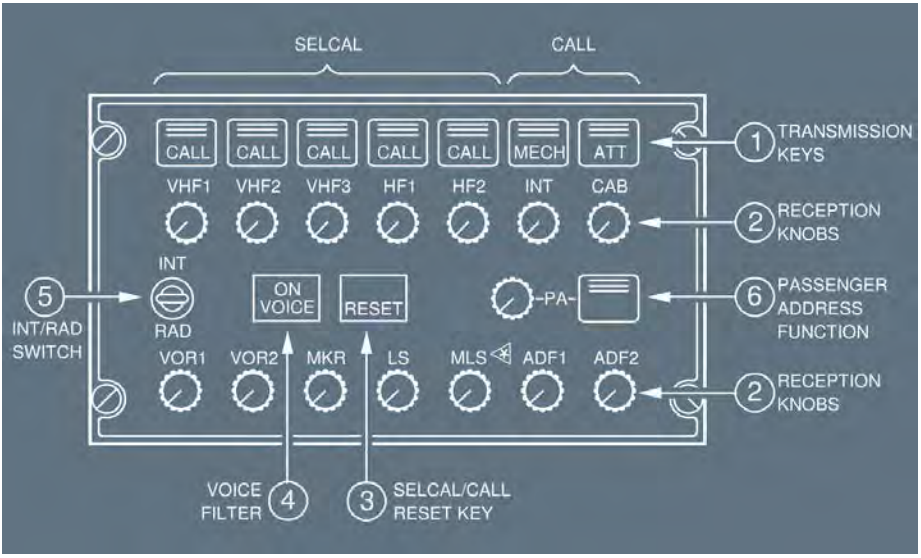
Pressed for 2 s : This completely erases the tape, if :
- The aircraft is on the ground, and
- The parking brake is on.

(3) CVR TEST pushbutton

Pressed and held : This activates the test, if the CVR is on (the GND CTL pushbutton pressed, or during the first 5 min after energization of the aircraft electrical network), and the parking brake is on.
Refer to PRO-NOR-SOP-06 Overhead Panel - RCDR for additional information.

AUDIO CONTROL PANEL

Ident.: DSC-23-10-50-00018498.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078



(1) Transmission keys

Pressed : The associated channel is selected for transmission.
The three green lines come on.
The pilot deselects the channel by pressing the pushbutton again, or by selecting another channel.

CALL : The legend flashes amber (and buzzer sounds) when the SELCAL system detects a call.

MECH : The legend flashes amber (and buzzer sounds) for a call from the nose gear bay. The MECH light goes off after 60 s, if it is not reset.

ATT : The legend flashes amber (and buzzer sounds) for a call from a cabin attendant. The ATT light goes off after 60 s, if it is not reset.

(2) Reception knobs

- Pressing and releasing the knob (knob out) selects the associated audio reception channel and the integral white light comes on
- Rotating the knob adjusts the volume

- The INTEG LT knob or ANN LT knob controls the brightness
- Pressing the knob (knob stays in) disconnects the associated audio reception channel.

Note: *To receive DME audio navigation signals that are associated with an ILS or MLS station: the flight crew must select the ILS pb (or LS pb) on the FCU. On some aircraft, the VOR reception channel must also be active on the ACP.*

(3) SELCAL/CALL RESET key
Pressing this key extinguishes CALL, MECH, and ATT lights.

(4) ON VOICE key
This key allows the flight crew to inhibit the audio navigation signals (VOR, ADF)
Pressing this key filters out IDENT signals and turns on the green ON light.

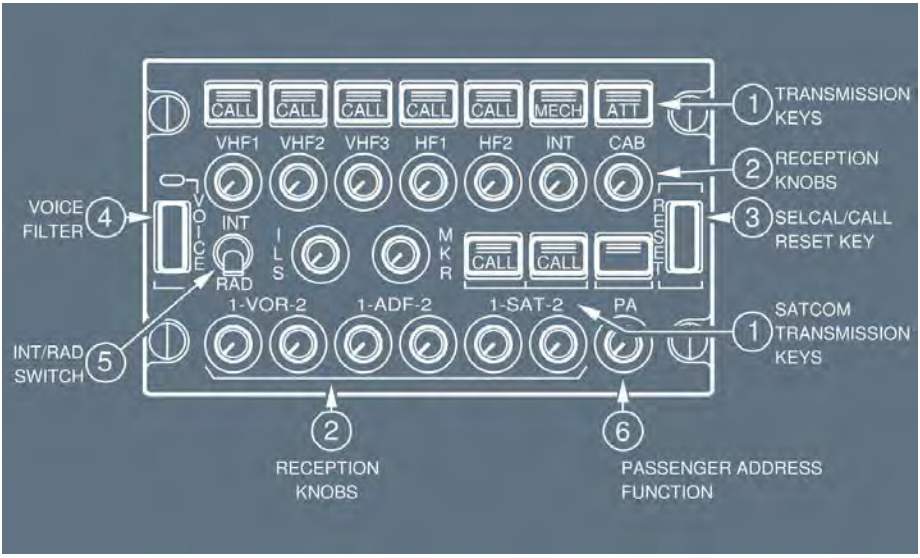
(5) INT/RAD switch
This switch operates as a press-to-talk switch for boom mike or oxygen mask mike.

INT	:	Boom and mask mikes transmit on interphone regardless of which transmission key is selected. For reception on interphone, the crew member must have INT selected (INT reception knob out).
Neutral	:	Reception is normal. Boom and mask mikes do not transmit.
RAD (press and hold)	:	Boom and mask mikes transmit on the radio selected on the audio control panel.

(6) Passenger address (PA) function
(*Refer to DSC-23-20-40 Description*)

AUDIO CONTROL PANEL

Ident.: DSC-23-10-50-00018498.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547



(1) Transmission keys

Pressed	:	The associated channel is selected for transmission. The three green lines come on. The pilot deselects the channel by pressing the pushbutton again, or selecting another channel.
CALL	:	The legend flashes amber (and buzzer sounds) when the SELCAL system detects a call.
MECH	:	The legend flashes amber (and buzzer sounds) for a call from the nose gear bay. The MECH light goes off after 60 s, if it is not reset.
ATT	:	The legend flashes amber (and buzzer sounds) for a call from a cabin crew member. The ATT light goes off after 60 s, if it is not reset.
SAT CALL lt	:	The legend flashes amber when the SATCOM system detects a call. The three green lines flash during the establishment of air to ground calls, or when SATCOM calls are on hold. After call establishment, the three green lines remain steady.

(2) Reception knobs

- Pressing and releasing the knob (knob out) selects the associated audio reception channel and the integral white light comes on
- Rotating the knob adjusts the volume
- The INTEG LT knob or ANN LT knob controls the brightness
- Pressing the knob (knob stays in) disconnects the associated audio reception channel.

Note: To receive DME audio navigation signals that are associated with an ILS or MLS or GLS station: the flight crew must select the ILS pb (or LS pb) on the FCU. On some aircraft, the VOR reception channel must also be active on the ACP.

(3) SELCAL/CALL RESET key
Pressing this key extinguishes CALL, MECH, and ATT lights.

(4) ON VOICE key
This key allows the flight crew to inhibit the audio navigation signals (VOR, ADF)
Pressing this key filters out IDENT signals and turns on the green ON light.

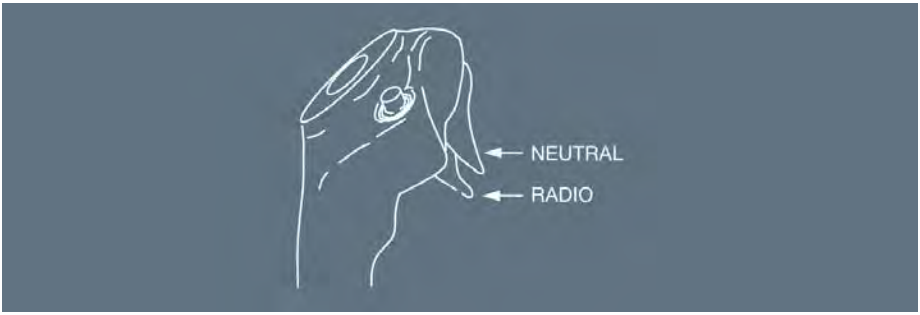
(5) INT/RAD switch
This switch operates as a press-to-talk switch for boom mike or oxygen mask mike.

INT	:	Boom and mask mikes transmit on interphone regardless of which transmission key is selected. For reception on interphone, the crew member must have INT selected (INT reception knob out).
Neutral	:	Reception is normal. Boom and mask mikes do not transmit.
RAD (press and hold)	:	Boom and mask mikes transmit on the radio selected on the audio control panel.

(6) Passenger address (PA) function
(*Refer to DSC-23-20-40 Description*).

SIDE STICK RADIO SELECTOR

Ident.: DSC-23-10-50-00018499.0001001 / 17 MAR 17
Applicable to: ALL



This selector has the same function as the INT/RAD switch on the ACP.

NEUTRAL (spring-loaded) : Boom and mask mikes are dead.
Reception is normal.

RADIO (squeezed) : Boom and mask mikes transmit through the equipment selected by the transmission key on the ACP.

Note: If RADIO is selected on the side stick when the INT/RAD switch is on INT, the radio function has priority over the interphone function.

LOUDSPEAKER VOLUME KNOB

Ident.: DSC-23-10-50-00018500.0001001 / 17 MAR 17
Applicable to: ALL

This knob adjusts the volume of the loudspeaker for radio communication.

OFF : Loudspeaker does not respond to signals from the aircraft's radio equipment.

Clockwise rotation : Loudspeaker broadcasts signals from the aircraft's radio equipment at increasing volume.

Note: *This knob does not control the loudness of aural alert and voice messages.*
In the case of acoustic feedback (i.e. Larsen effect) from the cockpit loudspeaker, the flight crew should reduce the volume of the cockpit loudspeaker. However, the flight crew should ensure that the volume of the cockpit loudspeaker is sufficient to hear radio communication.

AUDIO SWITCHING

Ident.: DSC-23-10-50-00018501.0001001 / 17 MAR 17
Applicable to: ALL

The crew can switch to the third ACP if ACP1 or ACP2 fails.
When the crew does this, it takes away the third occupant's access to the acoustic equipment.
AUDIO 3 XFRD appears in green on the ECAM MEMO display.

NORM : Each crew member uses his dedicated communication equipment.

CAPT 3: The pilot uses his acoustic equipment and the third occupant's ACP.

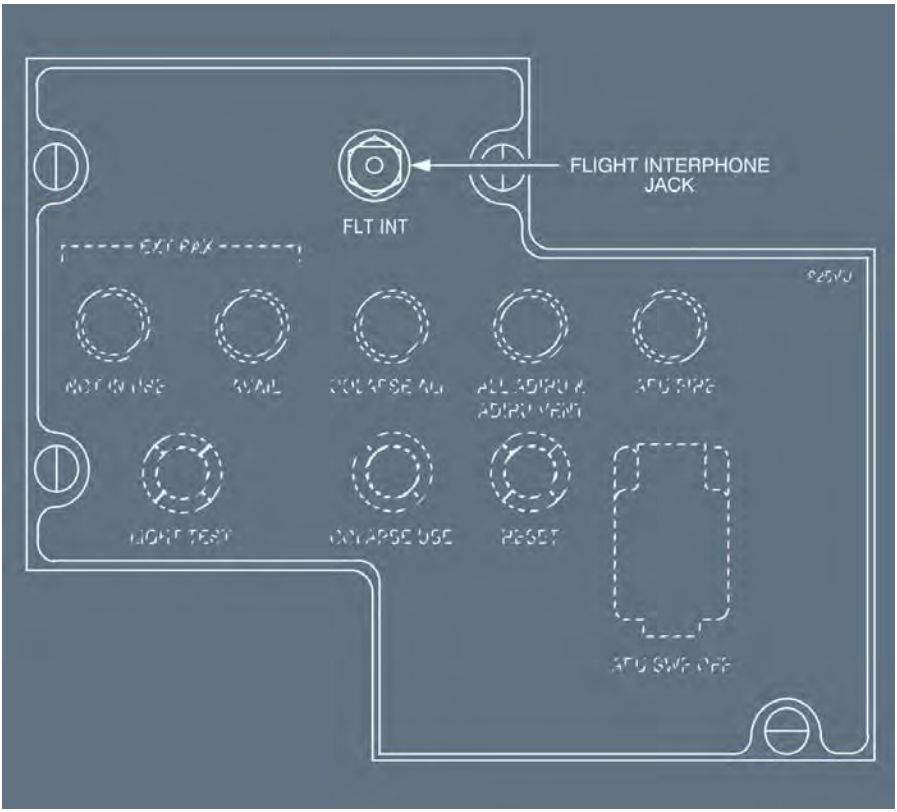
F/O 3 : The copilot uses his acoustic equipment and the third occupant's ACP.

FLIGHT CREW INTERPHONE SYSTEM

Ident.: DSC-23-20-10-00019716.0001001 / 17 MAR 17
Applicable to: ALL

This system allows the flight crew members to communicate among themselves and, through a jack on the external power panel, with the ground mechanic.

EXTERNAL POWER PANEL (FORWARD OF THE NOSE L/G BAY)



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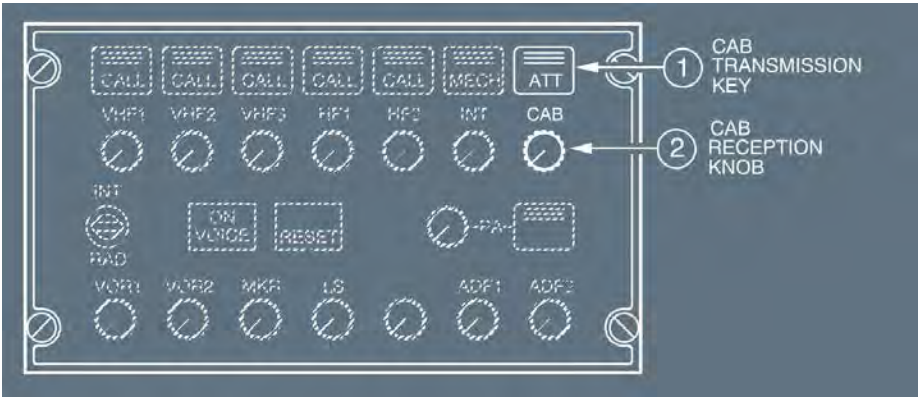
INTRODUCTION

Ident.: DSC-23-20-20-00018481.0001001 / 20 JUL 17
Applicable to: ALL

The system allows the flight crew to communicate with the flight attendants, and the flight attendants to communicate among themselves.

Note: Cabin interphone monitoring may be deactivated in flight depending on CIDS customization.



(1) CAB transmission key

Pressed: Three green lines come on.
Boom, mask, and hand mikes may be used for cabin interphone.

(2) CAB reception knob

Pressed and released (knob out) : The integral white light comes on.
The station receives audio signals from the cabin.
Rotating the knob adjusts the volume.

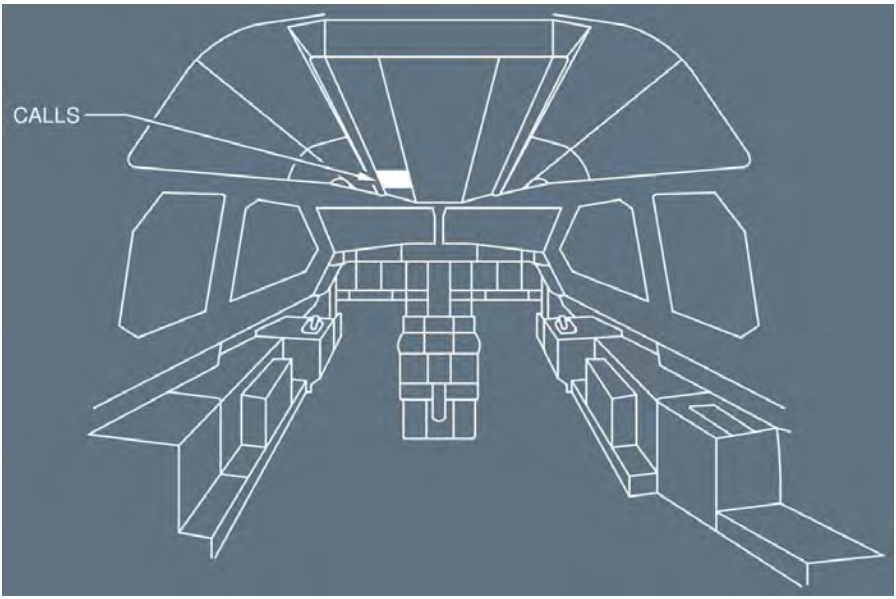
Pressed (knob in) : The white light goes out.
The cabin interphone is disconnected.

CABIN CALL SYSTEM

Ident.: DSC-23-20-20-10-00018482.0001001 / 02 NOV 16
Applicable to: ALL

CALLS FROM THE COCKPIT

The pushbuttons described here below are installed on the CALLS panel located on the overhead panel.



PURS ⏪ /FWD/MID ⏪ /EXIT ⏪ /AFT PUSHBUTTON

When pressed, the following aural and visual alerts will trigger in the cabin:
- Two lights come on in pink on the related area of the CALLS panel, as applicable.
- On the Attendant Indication Panel (AIP), the “CAPTAIN CALL” message appears and a light comes on in green.
- A high-low chime sounds in the related section of the cabin, as applicable.

ALL pb

When pressed, all the stations simultaneously respond, as indicated above.

EMER pb-sw (GUARDED)

When pressed, the following aural and visual alerts will trigger in the cabin:
- Two pink lights flash on all area call panels.
- The “EMERGENCY CALL” message appears on all AIPs.
- A high-low chime sounds three times, on all of the loudspeakers.

Depending on aircraft configuration, on the cockpit CALLS panel, the white ON light and the amber CALL light come on.

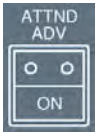
The following aural and visual alerts will trigger in the cockpit, when an emergency call is made from the cabin to the cockpit:
- On the EMER pb-sw: The amber CALL light flashes.
- The ATT lights will flash on all Audio Control Panels (ACPs).
- Three buzzers will sound consecutively (for approx. three seconds each).

The cabin call system will reset, when the cabin crewmember hangs up the handset.

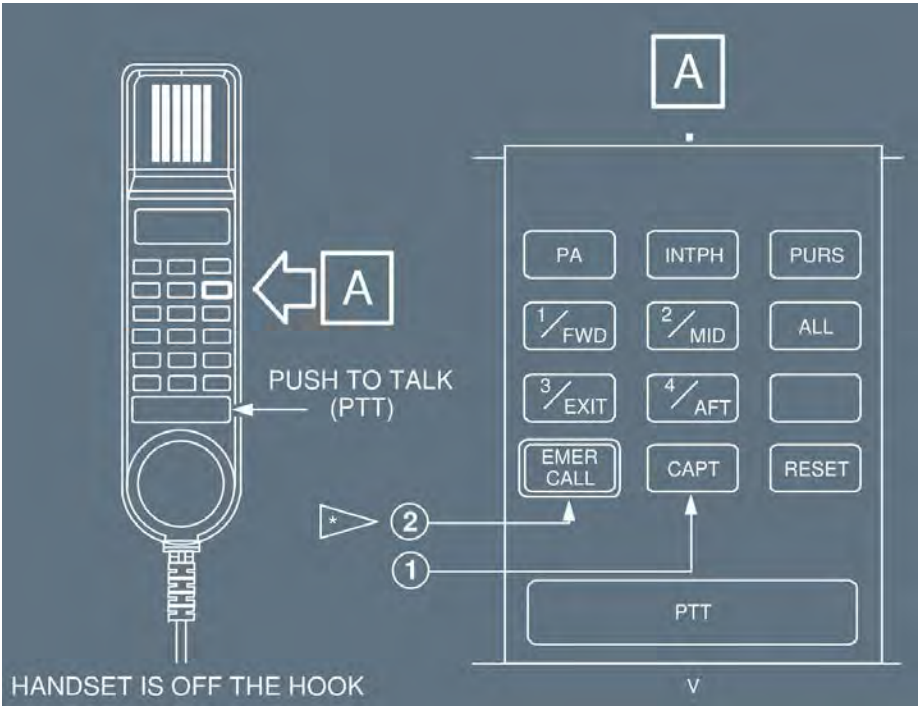
TT light ⋖

When the TT pb on the FWD or AFT Attendant Panel is pressed, the TT light on the cockpit CALLS panel comes ON and a buzzer sounds three times in the cockpit.

ATTND ADV pb ⋖



When pressed, in the case of an imminent takeoff or landing, the ON light comes on in blue, in addition to a green light on the area call panel in the cabin.



(1) CAPT key

When pressed, the following aural and visual alerts will trigger in the cockpit:
- The ATT lights will flash on all Audio Control Panels (ACPs).
- A buzzer (inhibited during takeoff and landing) will sound.

In the cabin, the “CAPTAIN” message will appear on the Attendant Indication Panel (AIP) for which the CAPT key was pressed.

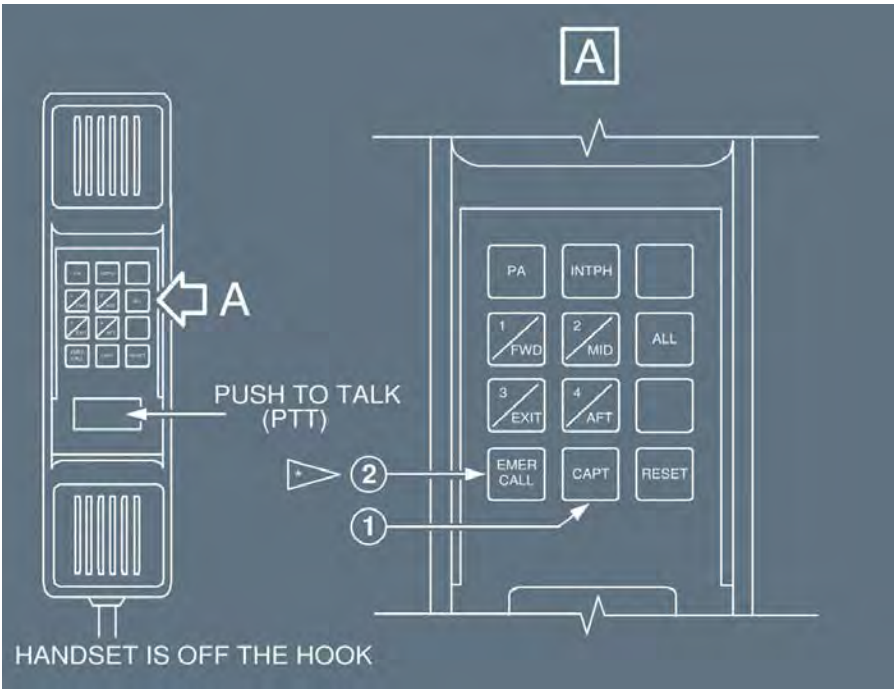
(2) EMER CALL key

When pressed, the following aural and visual alerts will trigger in the cockpit:
- On the EMER pb-sw: The ON light flashes in white, and the CALL light flashes in amber.
- The ATT lights will flash on all ACPs.
- Three buzzers (inhibited during takeoff and landing) will sound consecutively.

In the cabin, the “EMERGENCY CALL” message will appear on all AIPs or on the AIP of the originating station based on its customization.

Ident.: DSC-23-20-20-10-00018483.0002001 / 17 MAR 17
Applicable to: MSN 1882-2078, 3467-3518

CALLS FROM THE CABIN



(1) CAPT key

When pressed, the following aural and visual alerts will trigger in the cockpit:
- The ATT lights will flash on all Audio Control Panels (ACPs).
- A buzzer (inhibited during takeoff and landing) will sound.

In the cabin, the “CAPTAIN” message will appear on the Attendant Indication Panel (AIP) for which the CAPT key was pressed.

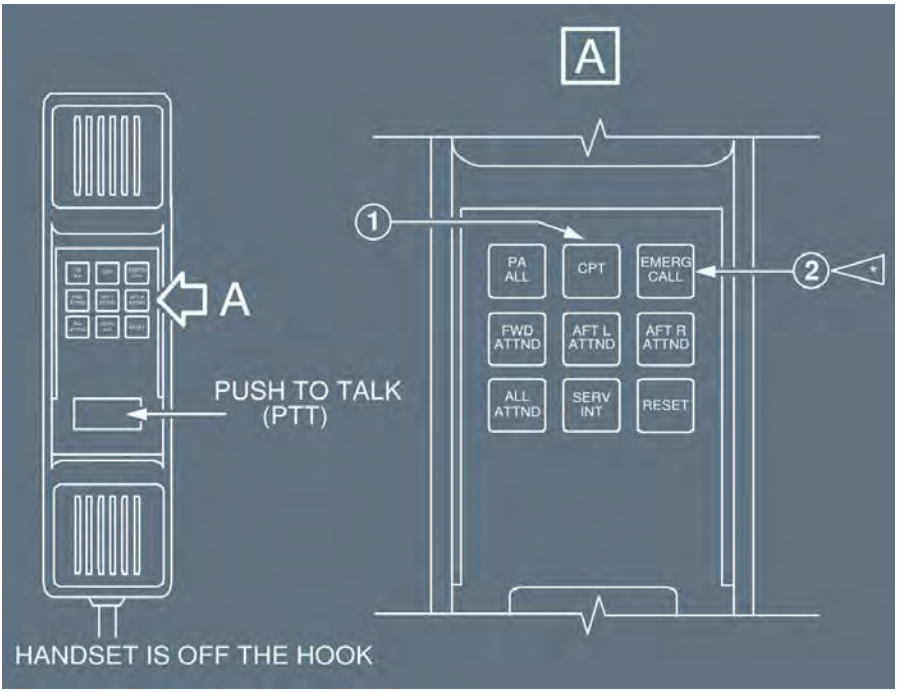
(2) EMER CALL key

When pressed, the following aural and visual alerts will trigger in the cockpit:
- On the EMER pb-sw: The ON light flashes in white, and the CALL light flashes in amber.
- The ATT lights will flash on all ACPs.
- Three buzzers (inhibited during takeoff and landing) will sound consecutively.

In the cabin, the “EMERGENCY CALL” message will appear on all AIPs or on the AIP of the originating station based on its customization.

Ident.: DSC-23-20-20-10-00018483.0001001 / 17 MAR 17
Applicable to: MSN 3408

CALLS FROM THE CABIN



(1) CPT key

When pressed, the following aural and visual alerts will trigger in the cockpit:
- The ATT lights will flash on all Audio Control Panels (ACPs).
- A buzzer (inhibited during takeoff and landing) will sound.

In the cabin, the “CAPTAIN” message will appear on the Attendant Indication Panel (AIP) for which the CPT key was pressed.

(2) EMER CALL key

When pressed, the following aural and visual alerts will trigger in the cockpit:
- On the EMER pb-sw: The ON light flashes in white, and the CALL light flashes in amber.
- The ATT lights will flash on all ACPs.
- Three buzzers (inhibited during takeoff and landing) will sound consecutively.

In the cabin, the “EMERGENCY CALL” message will appear on all AIPs or on the AIP of the originating station based on its customization.

INTRODUCTION

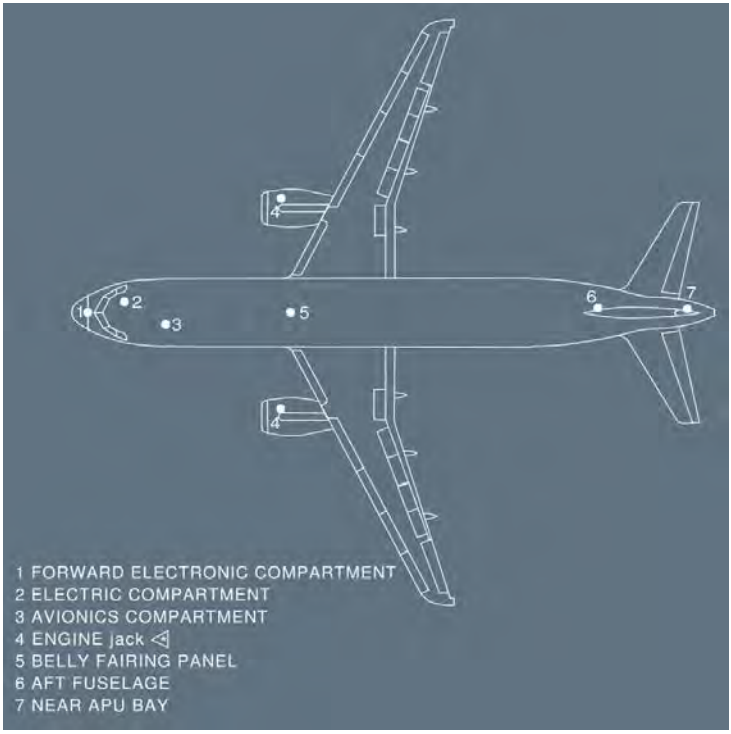
Ident.: DSC-23-20-30-00018485.0001001 / 20 JUL 17
Applicable to: ALL

The system allows for communication between :
- The flight crew and the service interphone jacks.
- The flight attendant stations and the service interphone jacks.
- The different service interphone jacks.

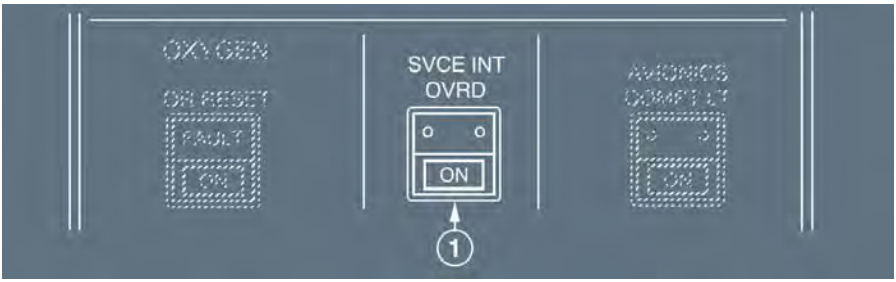
The Service Interphone system has :
- Seven interphone jacks.
- An OVRD switch located on the overhead panel.

The audio lines from the interphone jacks are connected to both CIDS directors.

LOCATION OF INTERPHONE JACKS



CONTROLS AND INDICATORS AT OVERHEAD PANEL



(1) SVCE INT OVRD pushbutton switch

Auto : Ground personnel can communicate with the flight crew by means of the service interphone jacks 10 s after the aircraft has landed. The landing gear must be compressed.

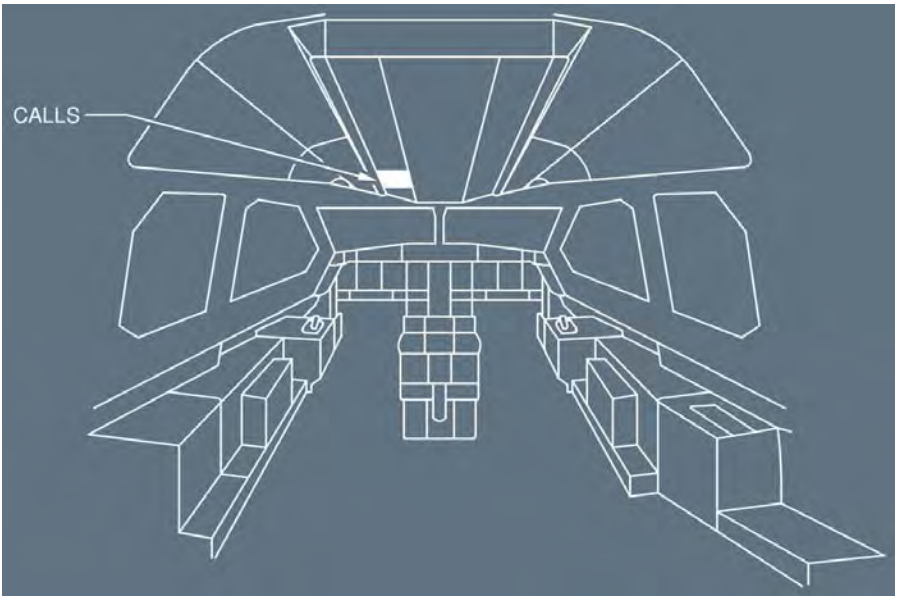
ON : Communication is possible when the landing gear is not compressed. The ON light is white.

GROUND MECHANIC CALL SYSTEM

Applicable to: ALL

Ident.: DSC-23-20-30-10-00018486.0001001 / 17 MAR 17

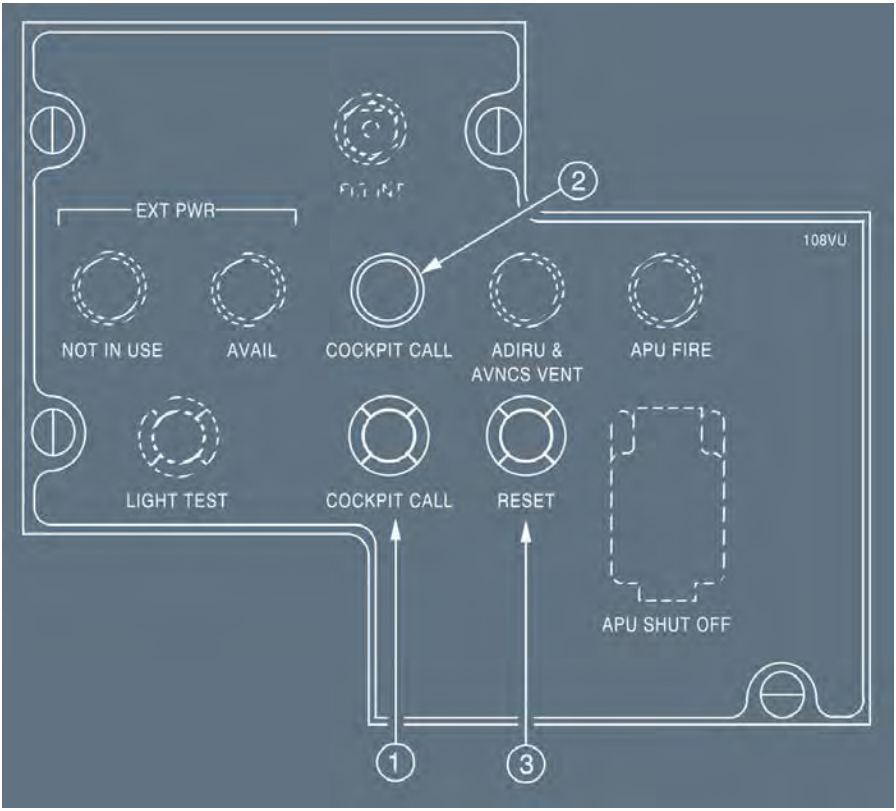
CONTROLS AND INDICATORS ON OVERHEAD PANEL



MECH pb

Pressed (and held)	:	COCKPIT CALL lights up blue on the external power panel in the nose L/G bay. An external horn sounds.
Released	:	COCKPIT CALL remains lighted. The ground mechanic can extinguish it by pressing the RESET button on the external power panel. The external horn stops sounding.

CONTROLS AND INDICATORS ON THE EXTERNAL POWER PANEL



(1) COCKPIT CALL pushbutton

Pressed : This calls the cockpit.
The MECH lights flash amber on the ACPs and a buzzer sounds.

Released : The MECH lights go out after 60 s if they are not reset on the ACPs.
The buzzer stops.

(2) COCKPIT CALL light

The blue light appears when cockpit calls the ground mechanic. An external horn also sounds.

(3) RESET pushbutton

Pressed The COCKPIT CALL light goes out.

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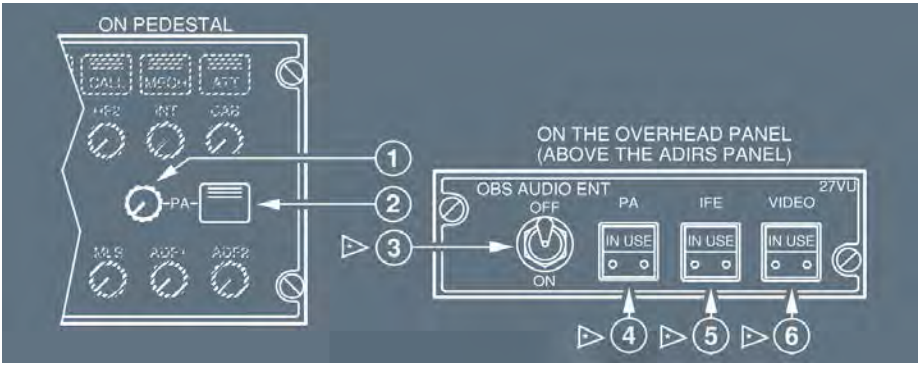
DESCRIPTION

Ident.: DSC-23-20-40-00018685.0001001 / 17 MAR 17
Applicable to: ALL

The passenger address allows all crew members to make announcements to passengers in the cabin through loudspeakers. It can be operated from the cockpit (with ACP or handset) or from the cabin (attendant stations).

CONTROLS AND INDICATORS

Ident.: DSC-23-20-40-00018686.0001001 / 20 JUL 17
Applicable to: ALL



(1) PA reception knob

Pressed and released (knob out) : The message goes to the loudspeakers, and the integral white light comes on.
The flight crew can turn the knob to adjust the volume.

Pressed (knob in) : The PA reception to the loudspeakers is disconnected.
The white light goes out.

(2) PA transmission key

Pressed and held : The flight crew may use a boom, mask, or hand mike to make an announcement.
Three green lines come on.

Note: The flight crew may use a cockpit handset to make PA announcements without action on the ACPs.

(3) OBS AUDIO ENT sw

ON : Announcement from the cockpit can be heard through channel 9 of Passenger Entertainment System (PES).

OFF : Normal functionning of PES is restored.

(4) PA IN USE light
The light comes on when the PA is activated from the cockpit or from the cabin (cabin attendant or prerecorded announcement).

(5) IFE IN USE light
The light comes on when the IFE system is in use.

(6) VIDEO IN USE light
The light comes on when the video system is in use.

The flight crew can also use the cockpit handset, located at the bottom of the pedestal, for PA announcements.

Note: *Due to numerous customizations of the handset and keypad, their functions are not described in detail.*

DESCRIPTION

Ident.: DSC-23-30-10-00018475.0001001 / 17 MAR 17
Applicable to: ALL

Either of the two Radio Management Panels (RMPs) (third RMP ◁) can be used to tune each transceiver.
To transmit, the flight crew uses the Audio Control Panel (ACP) to select a VHF or HF system. The ACP works through the Audio Management Unit (AMU). Each system is connected to the RMPs, for frequency selection, and to the AMU for connection to the audio integrating and SELCAL (selective calling) systems.

VHF

Ident.: DSC-23-30-10-00018472.0001001 / 27 APR 17
Applicable to: ALL

Two identical VHF communication systems (third VHF system ◁) are installed.
Each system has a transceiver in the avionics compartment, and an antenna on the fuselage. Only VHF1 functions in EMER ELEC CONFIG. Its range is from 118.0 to 136.975 MHz.

HF

Ident.: DSC-23-30-10-00018473.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

Two identical HF communication systems are optional. Each has a transceiver in the avionics compartment, and a common tuner and antenna in the vertical stabilizer. Its range is from 2.8 to 24 MHz.

HF

Ident.: DSC-23-30-10-00018473.0003001 / 04 JUL 17
Applicable to: MSN 3408-4547

Two identical HF communication systems are optional. Each has a transceiver in the avionics compartment, and a common tuner and antenna in the vertical stabilizer. Its range is from 2.8 to 24 MHz.
The HF DATA transmission is inhibited on ground. A GND HF DATALINK pb, located on the overhead panel, may override the inhibition. HF must not be used during refueling.
The HF VOICE MODE is not inhibited on ground. The use of HF on ground must be limited to operational needs. It is important to check that nobody stays in the direct vicinity of the antennas if the HF is use on ground.

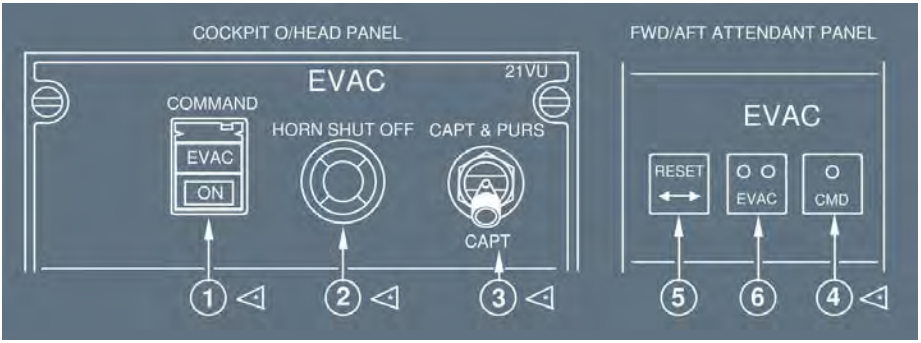
SELCAL (SELECTIVE CALLING)

Ident.: DSC-23-30-10-00018476.0001001 / 17 MAR 17
Applicable to: ALL

Upon receiving a call code corresponding to that of the aircraft, the SELCAL system aurally and visually advises the flight crew that a ground station is calling the aircraft.
The aural warning is inhibited during takeoff and landing.

CONTROLS AND INDICATORS

Ident.: DSC-23-40-10-00018468.0001001 / 18 MAY 17
Applicable to: ALL



(1) COMMAND pb (guarded)

ON : In the cockpit :
- EVAC light flashes red.
- Depending on aircraft configuration, horn sounds.

In the cabin :
- EVAC lights flash at FWD and AFT attendant panels.
- Evacuation tone sounds.

OFF : The alert is stopped.
The EVAC light flashes red when the alert is activated.

(2) HORN SHUT OFF pb
Pressing this button silences the cockpit horn.

(3) CAPT and PURS/CAPT sw

CAPT and PURS : The alert may either be activated from the cockpit or the cabin.

CAPT : The alert may only be activated from the cockpit.
If one of the cabin CMD pb is pressed, only the cockpit horn sounds for 3 s.

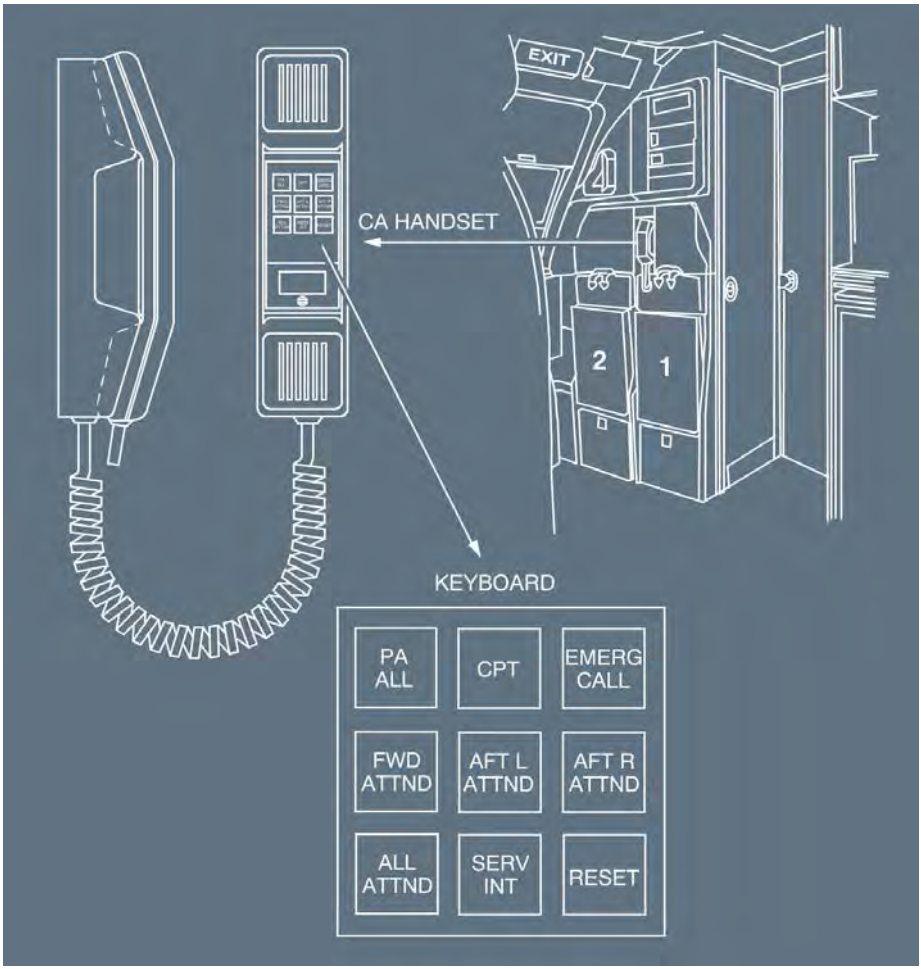
(4) CMD pb
Pressing this button activates the alert, if the cockpit switch is at the CAPT & PURS position.
Pressing it again stops the alert.

(5) RESET pb
Pressing this button silences the EVAC tone.

(6) EVAC light
This light flashes when the alert is activated.

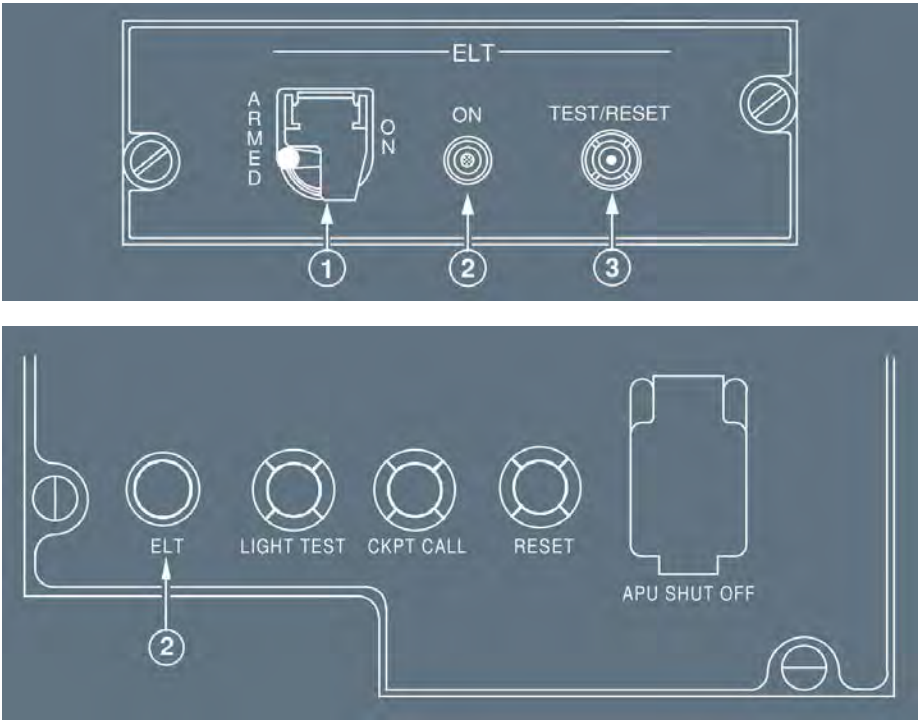
PURSER STATION

Ident.: DSC-23-40-10-00018469.0001001 / 17 MAR 17
Applicable to: ALL



CONTROLS AND INDICATORS

Ident.: DSC-23-40-30-00018516.0003001 / 17 MAR 17
Applicable to: MSN 1882-2078



(1) ELT sw
The guard keeps this switch in the ARMED position.

ON : The Emergency Locator Transmitter (ELT) transmits an emergency signal.

ARMED : In the case of impact, the ELT transmits an emergency signal (on 121.5, 243 and 406.025 MHz).

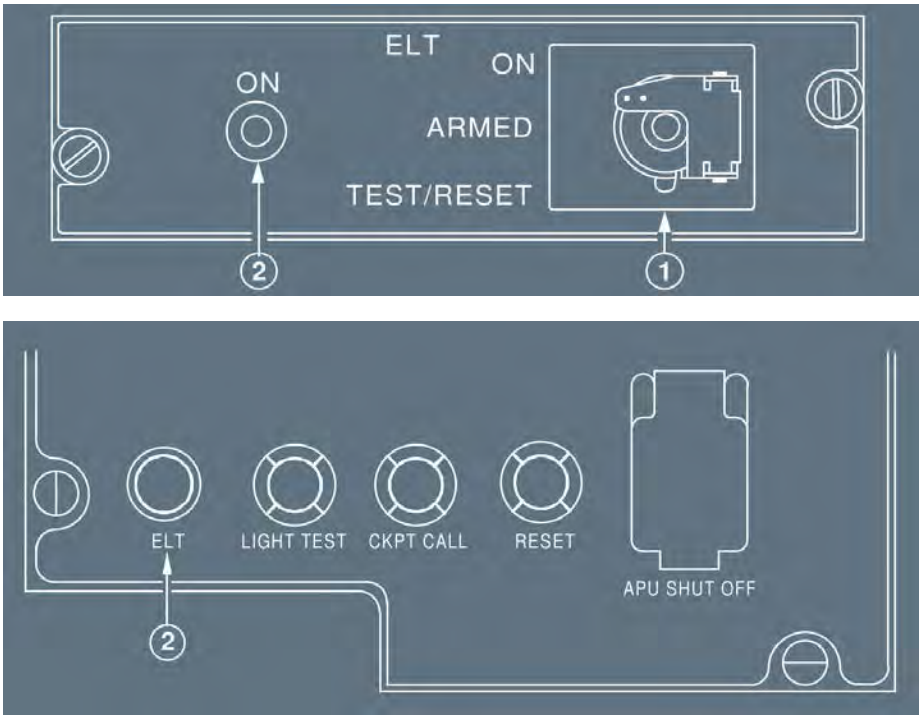
(2) ON and ELT light
These lights come on amber either when the emergency signal is transmitted, or during ELT autotest.

(3) TEST/RESET pb
Pressing this pushbutton starts the ELT auto test.

Note: If the ELT is unduly triggered in ARMED mode (by an external impact, hard landing, etc.), select the TEST/RESET position to reset the ELT and stop signal transmission.

CONTROLS AND INDICATORS

Ident.: DSC-23-40-30-00018516.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547



(1) ELT selector

ON : The Emergency Locator Transmitter (ELT) transmits an emergency signal.

ARMED : In case of impact, the ELT transmits an emergency signal (on 121.5, 243 and 406 MHz).

TEST/RESET : Starts the ELT autotest.

Note: If the ELT is unduly triggered in ARMED mode (by an external impact, hard landing, etc.), select the TEST/RESET position to reset the ELT and stop signal transmission.

(2) ON light and ELT light

These lights come on amber either when the emergency signal is transmitted, or during ELT autotest.

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ACARS

Ident.: DSC-23-50-00018505.0001001 / 31 AUG 17
Applicable to: ALL

ACARS CALL : This memo appears in green when ACARS has received a message from the ground requesting a voice communication on VHF. This message is pulsing green during 60 s then steady.

VHF 3 VOICE : This memo appears in green when VHF 3 is operating in voice mode and ACARS communication is interrupted.

ACARS MSG : This memo appears in green when ACARS has received a message from the ground. This message is pulsing green during 60 s then steady.

ACARS STBY : This memo appears in green when ACARS communications between the aircraft and the ground are lost, or when a failure occurs at ATSU initialization to indicate to the crew to enter some initialization parameters.

ATSU

Ident.: DSC-23-50-00018506.0001001 / 31 AUG 17
Applicable to: ALL

VHF 3 VOICE : This memo appears in green, if VHF 3 is operating in voice mode and ACARS communication is interrupted.

HF VOICE : This memo appears in green, if both HFs are operating in voice mode. This message flashes for 10 s and then steady.

AUDIO 3 XFRD

Ident.: DSC-23-50-00018507.0001001 / 17 MAR 17
Applicable to: ALL

AUDIO 3 XFRD : This memo appears in green, if the AUDIO SWITCHING selector is not on NORM.

SATCOM

Ident.: DSC-23-50-00018508.0001001 / 31 AUG 17
Applicable to: ALL

SATCOM ALERT : This memo appears in green when a message with priority level below 4 is received from the ground.

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AIRCRAFT SYSTEMS

ELECTRICAL

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DSC-24-10 Description

DSC-24-20 Controls and Indicators

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GENERAL

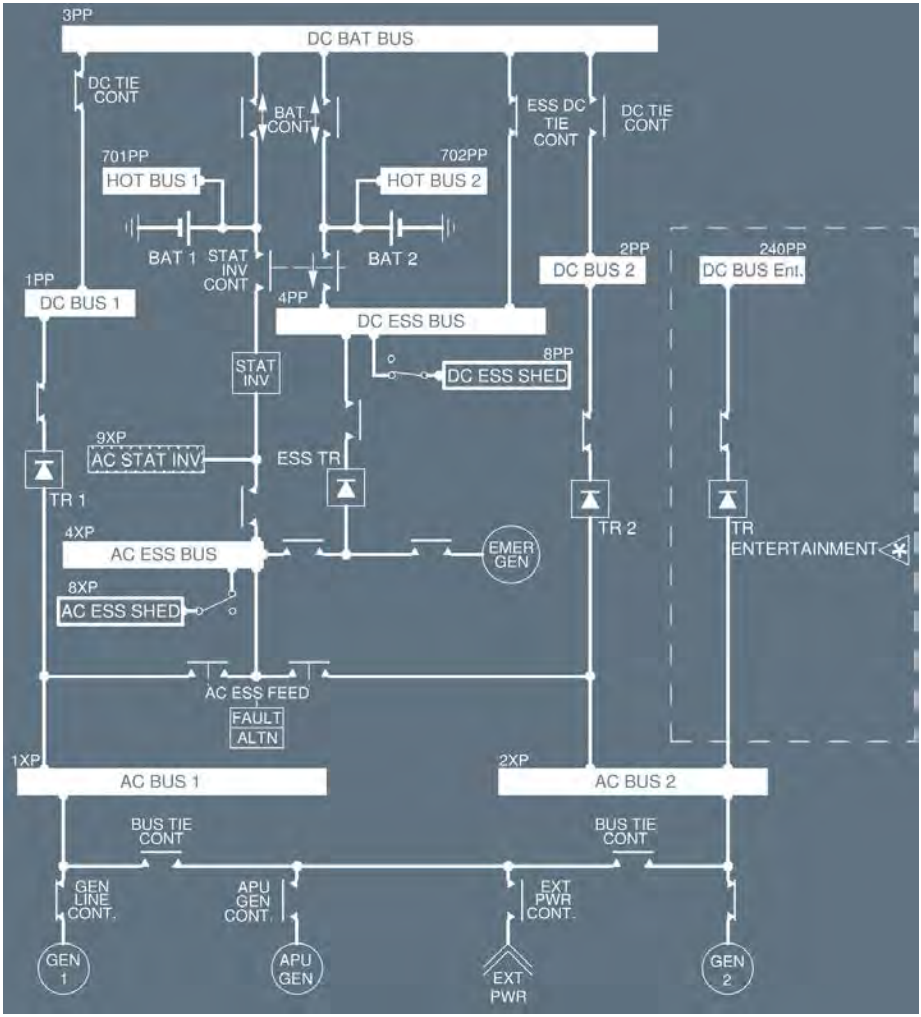
Ident.: DSC-24-10-10-00017750.0001001 / 21 MAR 16
Applicable to: ALL

The electrical power system consists of a three-phase 115/200 V 400 Hz constant-frequency AC system and a 28 V DC system. Electrical transients are acceptable for equipment. Commercial supply has secondary priority.

In normal configuration, the electrical power system provides AC power. The electrical power system is constituted of 2 engine generators and 1 APU generator. Each generator can provide AC power to all electrical bus bars. A part of this AC power is converted into DC power for certain applications.

In the event that normal AC power is not available, an emergency generator can provide AC power.

In the event that all AC power is not available, the electrical power system can invert DC power from the batteries into AC power.


3PP
DC BAT BUS
DC TIE CONT
BAT CONT
ESS DC TIE CONT
DC TIE CONT
701PP
HOT BUS 1
702PP
HOT BUS 2
BAT 1
STAT INV CONT
BAT 2
1PP
DC BUS 1
4PP
2PP
DC BUS 2
240PP
DC BUS Ent.
DC ESS BUS
STAT INV
8PP
DC ESS SHED
9XP
AC STAT INV
ESS TR
TR 1
TR 2
TR ENTERTAINMENT
4XP
AC ESS BUS
EMER GEN
8XP
AC ESS SHED
AC ESS FEED
FAULT
ALTN
1XP
AC BUS 1
2XP
AC BUS 2
BUS TIE CONT
BUS TIE CONT
GEN LINE CONT.
APU GEN CONT.
EXT PWR CONT.
GEN 1
APU GEN
EXT PWR
GEN 2

AC GENERATORS

Ident.: DSC-24-10-20-00017751.0001001 / 21 MAR 16
Applicable to: ALL

ENGINE – DRIVEN GENERATORS

Two AC generators (GEN 1, GEN 2), one driven by each main engine through an integrated drive, supply aircraft electrical power. Each generator can supply up to 90 KVA of three phase 115/200 V 400 Hz power.

Two Generators Control Units (GCU) control the output of their respective generator. The main functions of each GCU are :
- Control the frequency and voltage of the generator output.
- Protect the network by controlling the associated generator line contactor.

APU GENERATOR AND EXTERNAL POWER

A third generator (APU GEN), driven directly by the APU and producing the same output as each main engine generator, can replace either or both main engine generators at any time.
A ground power connector near the nosewheel allows ground power to be supplied to all busbars.

A Ground Power Control Unit (GPCU) :
- Protects the network by controlling the external power contactor, or

A Ground and Auxiliary Power Control Unit (GAPCU) ◁ :
- Regulates, via the APU Electronic Control Box, the frequency and voltage of the APU generator.
- Protects the network by controlling the external power contactor and the APU generator line contactor.

EMERGENCY GENERATOR

The blue hydraulic circuit drives an emergency generator that automatically supplies emergency AC power to the aircraft electrical system, if all main generators fail. This generator supplies 5 KVA of three-phase 115 and 200 V 400 Hz power.

A Generator Control Unit (GCU) :
- Keeps the emergency generator at a constant speed,
- Controls the generator's output voltage,
- Protects the network by the controlling the emergency generator line contactor, and
- Controls the emergency generator start-up.

STATIC INVERTER

A static inverter transforms DC power from Battery 1 into one KVA of single-phase 115 V 400 Hz AC power, which is then supplied to part of the AC essential bus. When the aircraft speed is above

50 kt, the inverter is automatically activated, if only the batteries are supplying electrical power to the aircraft, regardless of the BAT 1 and BAT 2 pushbutton positions.
When the aircraft speed is below 50 kt, the inverter is activated, if only the batteries are supplying electrical power to the aircraft, and both BAT 1 and BAT 2 pushbuttons are on.

DC GENERATION

Ident.: DSC-24-10-20-00017752.0001001 / 21 MAR 16
Applicable to: ALL

TRANSFORMER RECTIFIERS (TRS)

Two main transformer rectifiers, TR 1 and TR 2, supply the aircraft's electrical system, with up to 200 A of DC current.
A third (identical) Transformer Rectifier, the ESS TR, can power the essential DC circuit from the emergency generator, if the engine and APU generators all fail, or if TR 1 or TR 2 fails.
Each TR controls its contactor by internal logic.
A fourth Transformer Rectifier (TR Entertainment ◁) powers the DC Entertainment bus bar dedicated to the In-Flight Entertainment system (IFE) in order to take into account IFE needs.

BATTERIES

Two main batteries, each with a normal capacity of 23 Ah, are permanently connected to the two hot buses.
Each battery has an associated Battery Charge Limiter (BCL).
The BCL monitors battery charging and controls its battery contactor.

CIRCUIT BREAKERS (C/BS)

Ident.: DSC-24-10-20-00000874.0002001 / 15 FEB 11
Applicable to: ALL

The aircraft has two types of C/Bs:
- Monitored (green): When out for more than 1 min, the C/B TRIPPED warning is triggered on the ECAM.
- Non-monitored (black).

The Wing Tip Brake (WTB) C/Bs have red caps on them to prevent them from being reset.
The C/B TRIPPED warning on the ECAM indicates the location of the affected C/B. The following panels are monitored: OVHD PNL, L(R) ELEC BAY, REAR PNL J-M or N-R or S-V or W-Z.

Note: *The flight crew can clear the ECAM C/B TRIPPED caution by pressing:*

- *The EMER CANC pb: When pressed, this pushbutton clears and inhibits the ECAM C/B TRIPPED caution for the remainder of the flight, or*
- *The CLR pb: When pressed, this pushbutton only clears the ECAM C/B TRIPPED caution. If the C/B remains pulled, any additional tripped circuit breakers on the same panel will not be detected, and the ECAM will not trigger the caution. However, if the C/B is pushed, any additional tripped circuit breakers will be detected, and the ECAM will trigger the caution again.*

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General

GENERAL

Ident.: DSC-24-10-30-10-00017759.0001001 / 21 MAR 16
Applicable to: ALL

GEN 1 and 2 when operating have priority over the APU generator and over external power.
External power has priority over the APU generator when the EXT PWR pb switch is ON.
The APU generator or external power can supply the entire network.
One engine generator can supply the entire network, except the DC BUS Entertainment.
The generators cannot be connected in parallel.

Note: *Two generators are needed to supply the DC BUS Entertainment ◁ , except on ground, where the APU generator (if not overloaded) or the external power is sufficient.*

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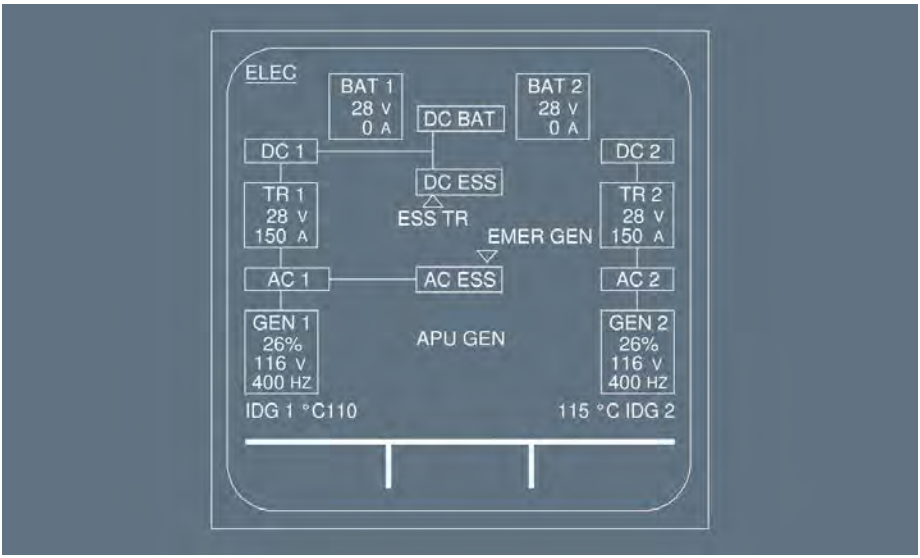
Normal Configuration

IN FLIGHT

Ident.: DSC-24-10-30-20-00000876.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

Each engine-driven generator supplies its associated AC BUS (1 and 2) via its generator line contactor (GLC 1 and GLC 2).
AC BUS 1 normally supplies the AC ESS BUS via a contactor.
TR 1 normally supplies DC BUS 1, DC BAT BUS, and DC ESS BUS.
TR 2 normally supplies DC BUS 2.
The two batteries are connected to the DC BAT BUS, if they need charging. When they are fully charged, the battery charge limiter disconnects them.

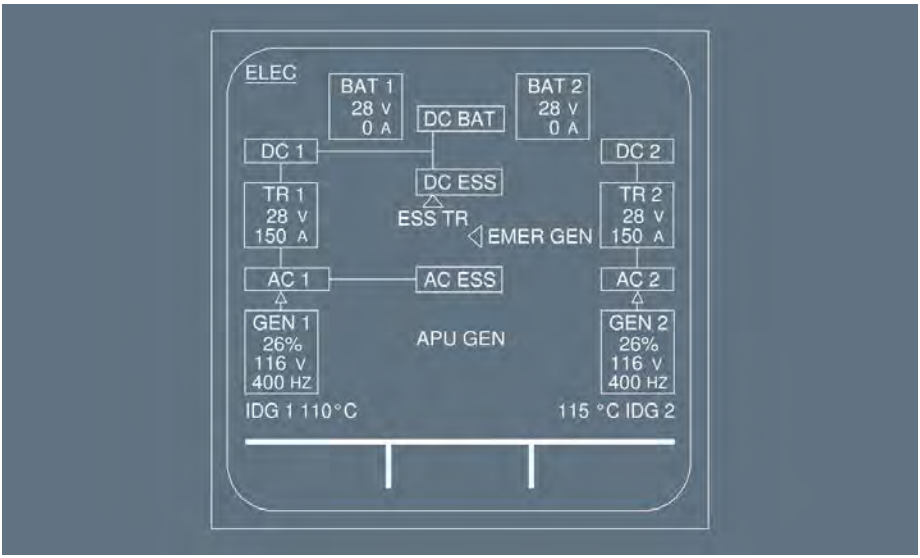


IN FLIGHT

Ident.: DSC-24-10-30-20-00000876.0002001 / 09 OCT 12
Applicable to: MSN 3408-4547

Each engine-driven generator supplies its associated AC BUS (1 and 2) via its generator line contactor (GLC 1 and GLC 2).
AC BUS 1 normally supplies the AC ESS BUS via a contactor.

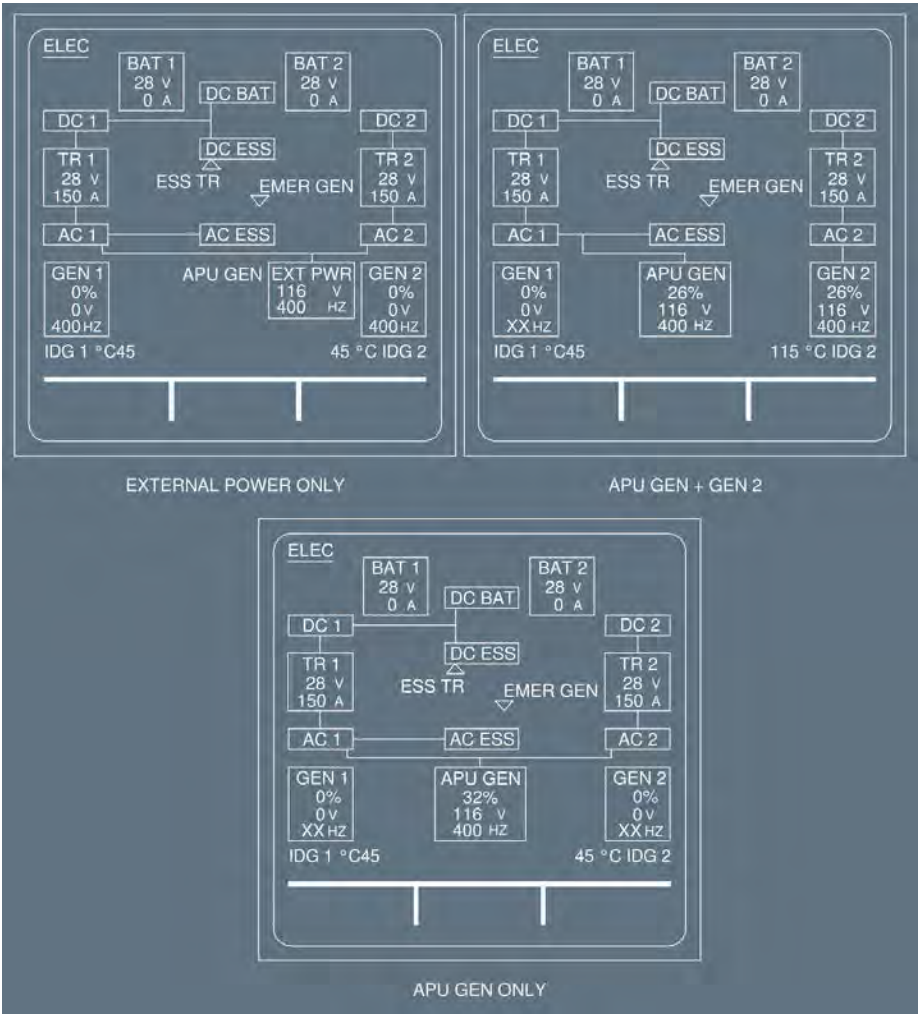
TR 1 normally supplies DC BUS 1, DC BAT BUS, and DC ESS BUS.
TR 2 normally supplies DC BUS 2.
The two batteries are connected to the DC BAT BUS, if they need charging. When they are fully charged, the battery charge limiter disconnects them.



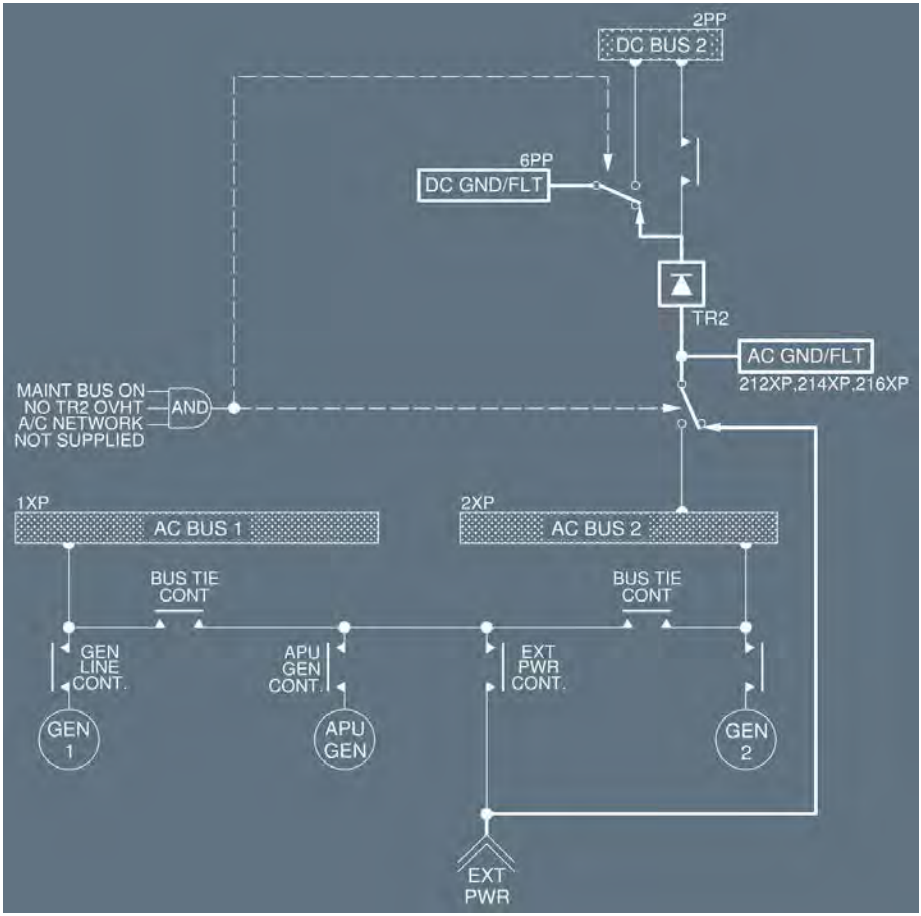
ON GROUND

Ident.: DSC-24-10-30-20-00000877.0001001 / 22 MAY 12
Applicable to: MSN 1882-2078

Either the APU generator, or external power, may supply the complete system.



On ground, when only ground services are required, external power can supply the AC and DC GND/FLT BUSES directly without supplying the entire aircraft network.
Personnel select this configuration with the MAINT BUS switch in the forward entrance area.



ON GROUND

Ident.: DSC-24-10-30-20-00000877.0002001 / 22 MAY 12
Applicable to: MSN 3408-4547

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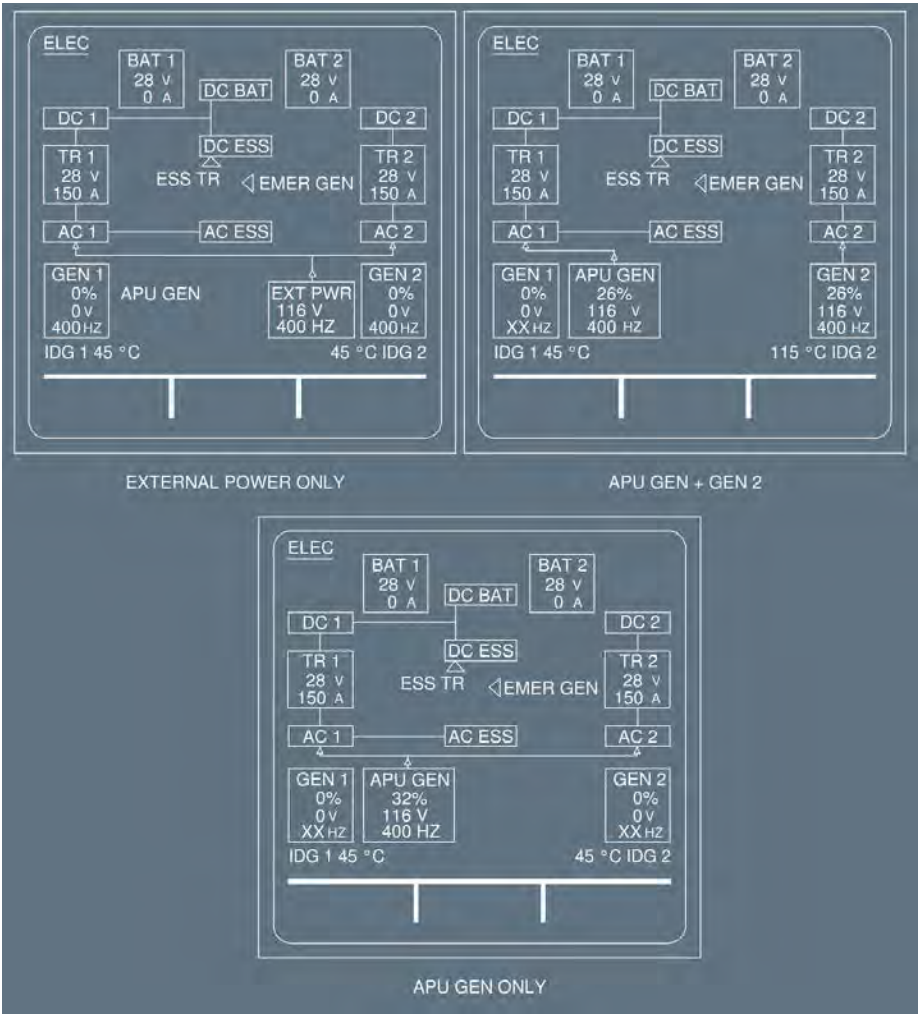
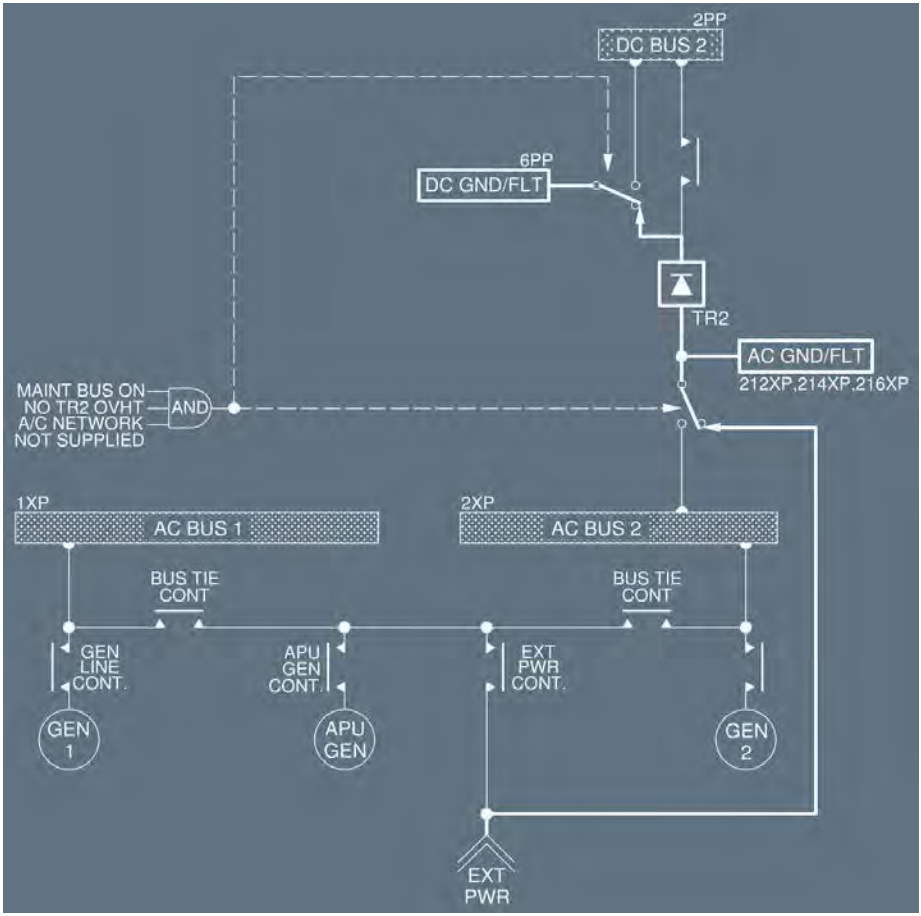


On ground, when only ground services are required, external power can supply the AC and DC GND/FLT BUSES directly without supplying the entire aircraft network.
Personnel select this configuration with the MAINT BUS switch in the forward entrance area.


2PP
DC BUS 2
6PP
DC GND/FLT
TR2
AC GND/FLT
212XP,214XP,216XP
MAINT BUS ON
NO TR2 OVHT
A/C NETWORK
NOT SUPPLIED
AND
1XP
AC BUS 1
2XP
AC BUS 2
BUS TIE
CONT
BUS TIE
CONT
GEN
LINE
CONT.
APU
GEN
CONT.
EXT
PWR
CONT.
GEN
1
APU
GEN
GEN
2
EXT
PWR

Abnormal Configurations

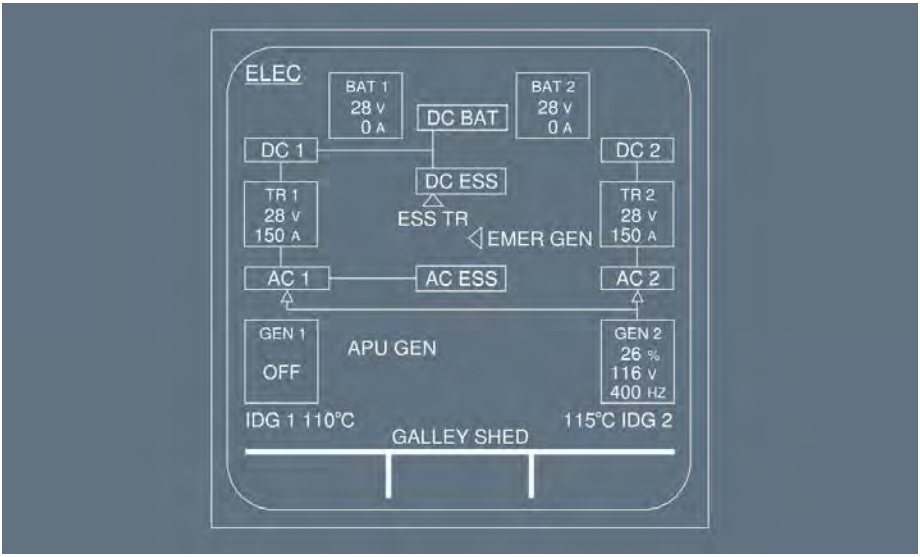
FAILURE OF ONE ENGINE GENERATOR

Ident.: DSC-24-10-30-30-00017760.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

The system automatically replaces the failed generator, with the :
- APU GEN, if available, or
- Other engine generator.

Part of the galley load and the DC BUS Ent ◁ are automatically shed.

Note: The Galley Load Automatic Shedding ◁ allows all the galley load to be automatically shed.



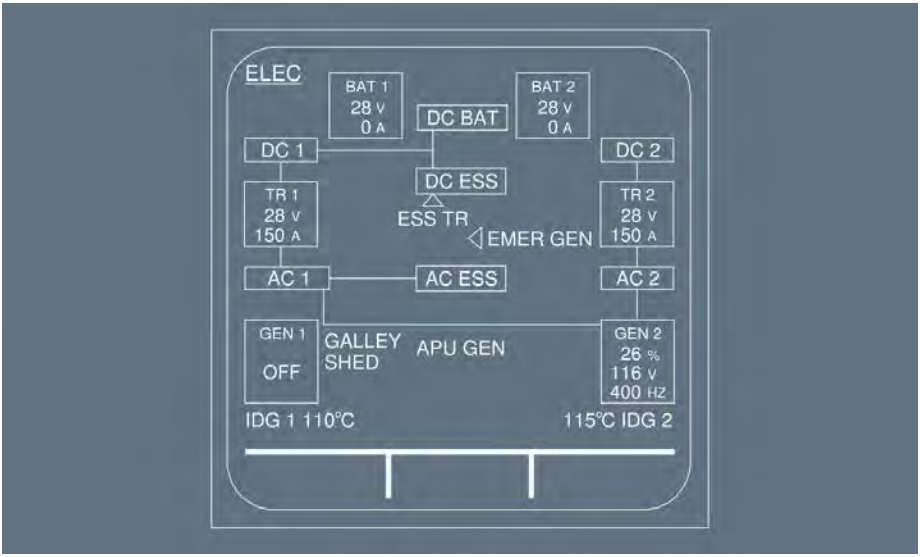
FAILURE OF ONE ENGINE GENERATOR

Ident.: DSC-24-10-30-30-00017760.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The system automatically replaces the failed generator, with the :
- APU GEN, if available, or
- Other engine generator.

Part of the galley load and the DC BUS Ent ◁ are automatically shed.

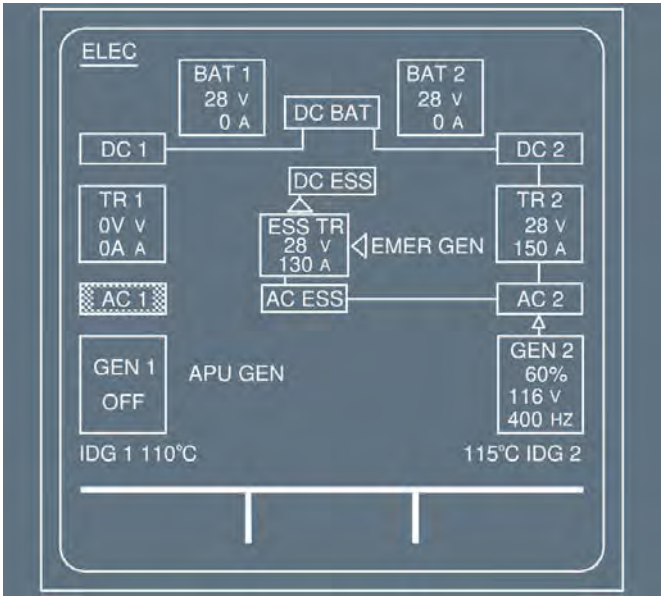
Note: The Galley Load Automatic Shedding ◁ allows all the galley load to be automatically shed.



FAILURE OF AC BUS 1

Ident.: DSC-24-10-30-30-00017761.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

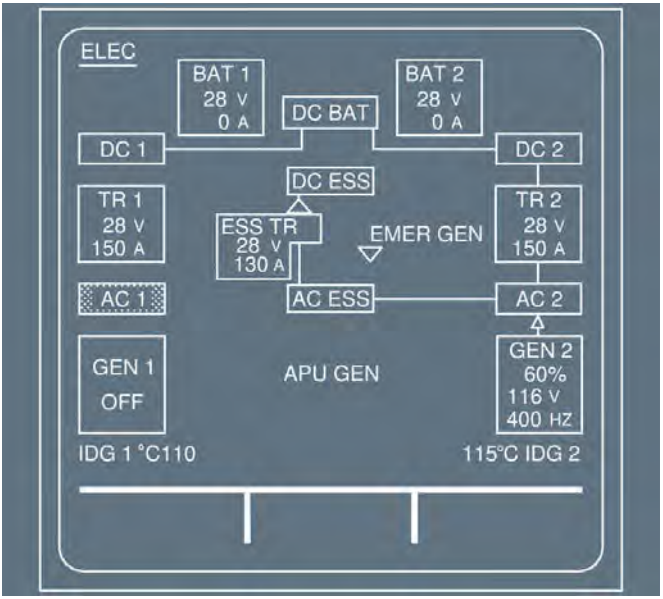
- AC BUS 2 can supply AC ESS BUS, and ESS TR can supply DC ESS BUS, both via the AC ESS FEED pb. This is done automatically with the AC ESS FEED Auto Switching ◁ .
- DC BUS 2 supplies DC BUS 1 and DC BAT BUS automatically after 5 s.



FAILURE OF AC BUS 1

Ident.: DSC-24-10-30-30-00017761.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

- AC BUS 2 can supply AC ESS BUS, and ESS TR can supply DC ESS BUS, both via the AC ESS FEED pb. This is done automatically with the AC ESS FEED Auto Switching ⋘ .
- DC BUS 2 supplies DC BUS 1 and DC BAT BUS automatically after 5 s.

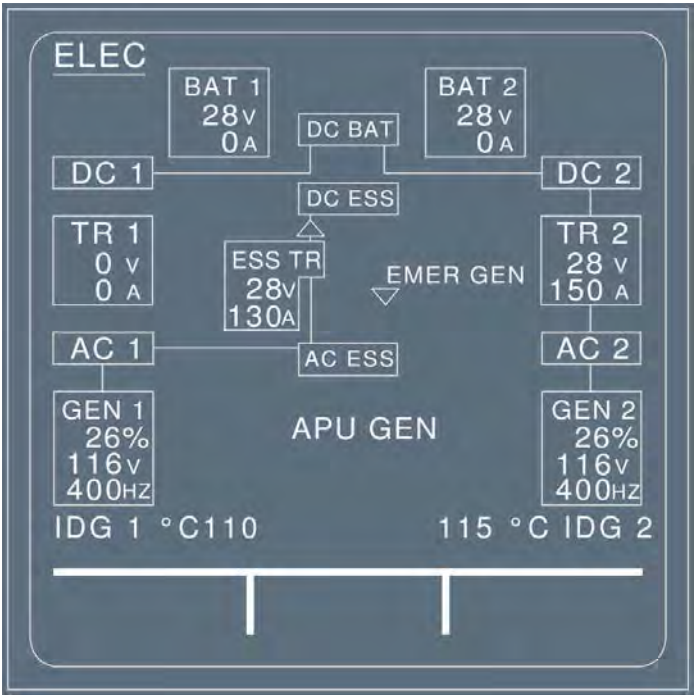


FAILURE OF ONE TR

Ident.: DSC-24-10-30-30-00000880.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The contactor of each TR opens automatically, in case of :
- Overheat
- Minimum current

The other TR automatically replaces the faulty one.
The ESS TR supplies the DC ESS BUS.

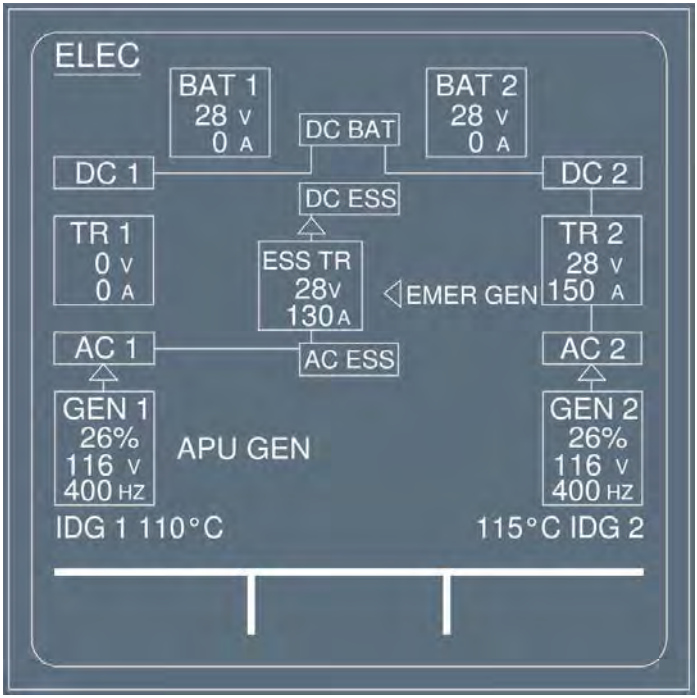


FAILURE OF ONE TR

Ident.: DSC-24-10-30-30-00000880.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

The contactor of each TR opens automatically, in case of :
- Overheat
- Minimum current

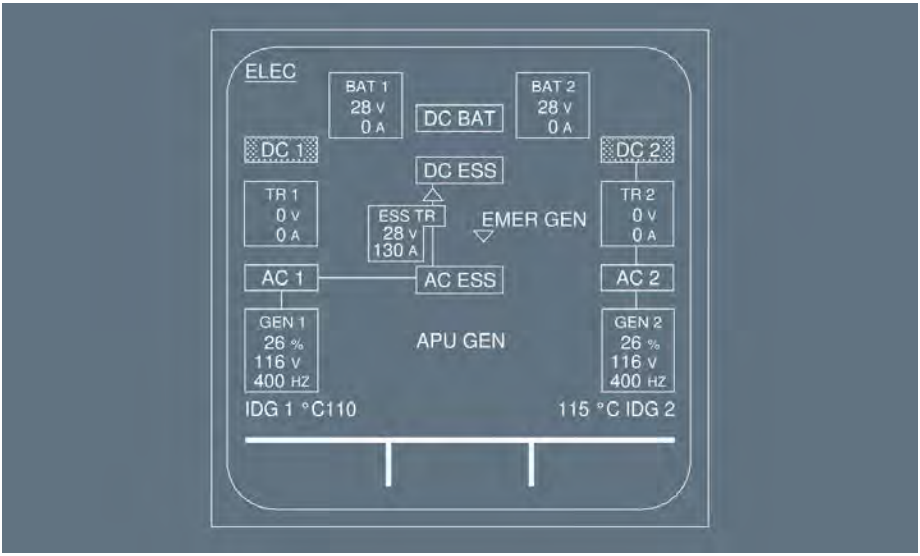
The other TR automatically replaces the faulty one.
The ESS TR supplies the DC ESS BUS.



FAILURE OF TR 1 AND TR 2

Ident.: DSC-24-10-30-30-00000881.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

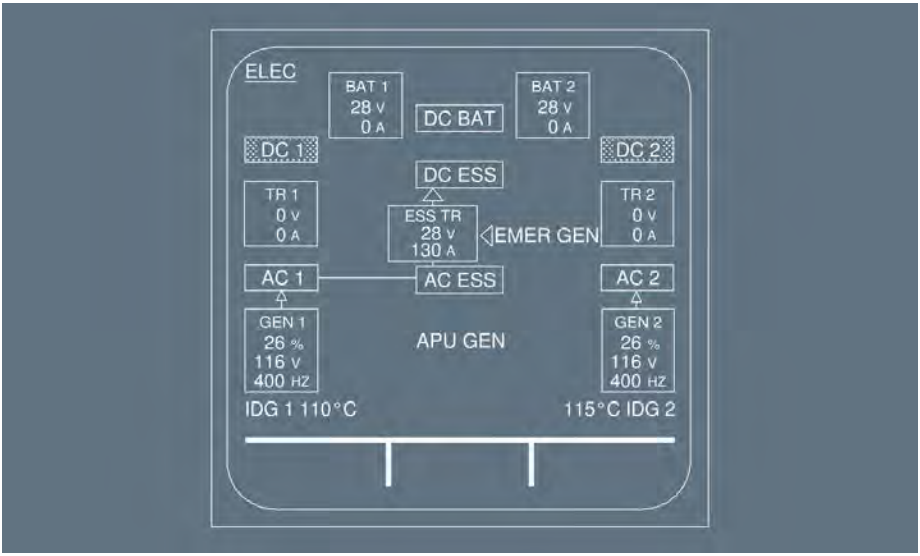
If TR 1 and TR 2 are lost, DC BUS 1, DC BUS 2, and DC BAT BUS are lost. The DC ESS BUS is supplied by the ESS TR.



FAILURE OF TR 1 AND TR 2

Ident.: DSC-24-10-30-30-00000881.0002001 / 09 OCT 12
Applicable to: MSN 3408-4547

If TR 1 and TR 2 are lost, DC BUS 1, DC BUS 2, and DC BAT BUS are lost. The DC ESS BUS is supplied by the ESS TR.



EMERGENCY GENERATION AFTER LOSS OF ALL MAIN GENERATORS

Ident.: DSC-24-10-30-30-00000882.0002001 / 21 MAR 16
Applicable to: ALL

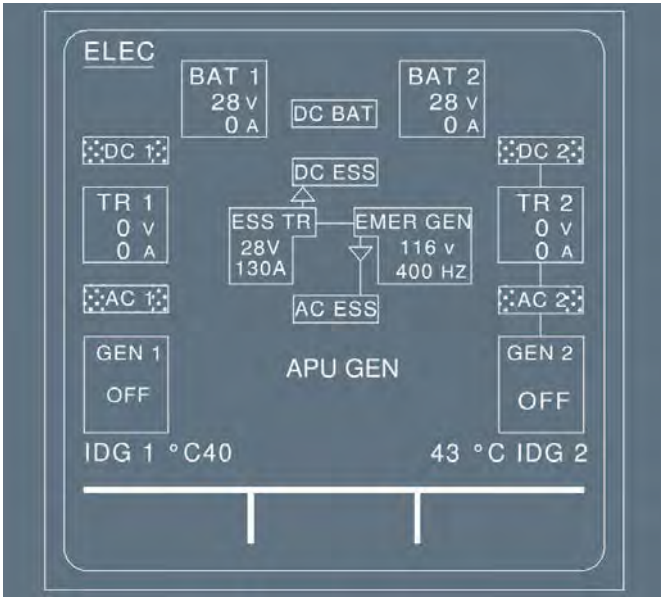
If both AC BUS 1 and AC BUS 2 are lost and the aircraft speed is above 100 kt, the Ram Air Turbine (RAT) extends automatically. This powers the blue hydraulic system, which drives the emergency generator by means of a hydraulic motor. This generator supplies the AC ESS BUS, and the DC ESS BUS via the ESS TR.
If the RAT stalls, or if the aircraft is on the ground with a speed below 100 kt, the emergency generator has nothing to drive it. The emergency generation network automatically transfers to the batteries and static inverter, and the system automatically sheds the AC SHED ESS and DC SHED ESS buses.

When the aircraft is on ground :
- Below 100 kt, DC BAT BUS is automatically connected to the batteries.
- Below 50 kt, AC ESS BUS is automatically shed, leading to the loss of all display units.

Note: *1. During RAT extension and emergency generator coupling (about 8 s), the batteries power the emergency generation network.*
2. On ground, if only the batteries are powering the emergency generation network, APU start is only available when the speed is below 100 kt.

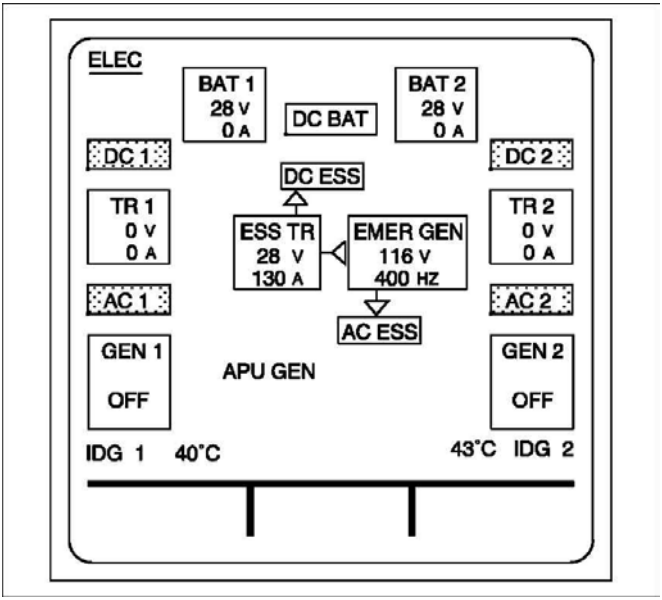
EMER GEN RUNNING

Ident.: DSC-24-10-30-30-00000883.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



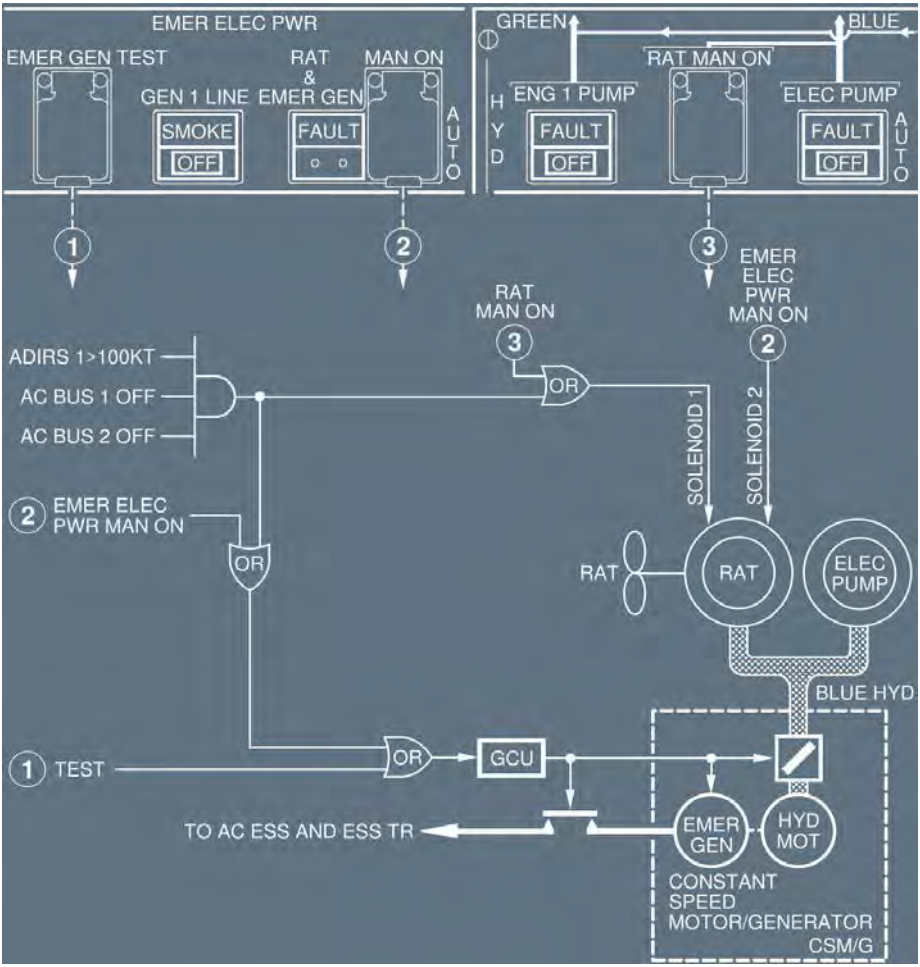
EMER GEN RUNNING

Ident.: DSC-24-10-30-30-00000883.0002001 / 17 MAR 11
Applicable to: MSN 3408-4547



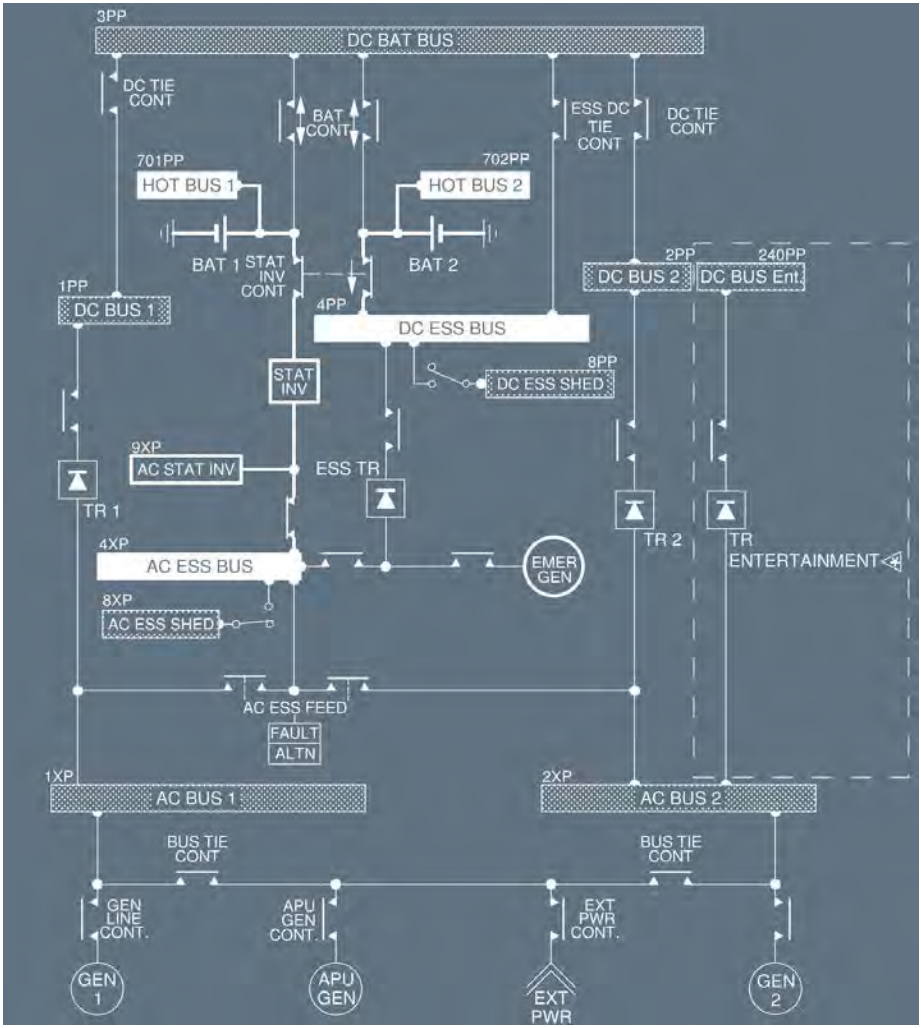
EMER GEN RUNNING (CONT'D)

Ident.: DSC-24-10-30-30-00000884.0002001 / 21 MAR 16
Applicable to: ALL



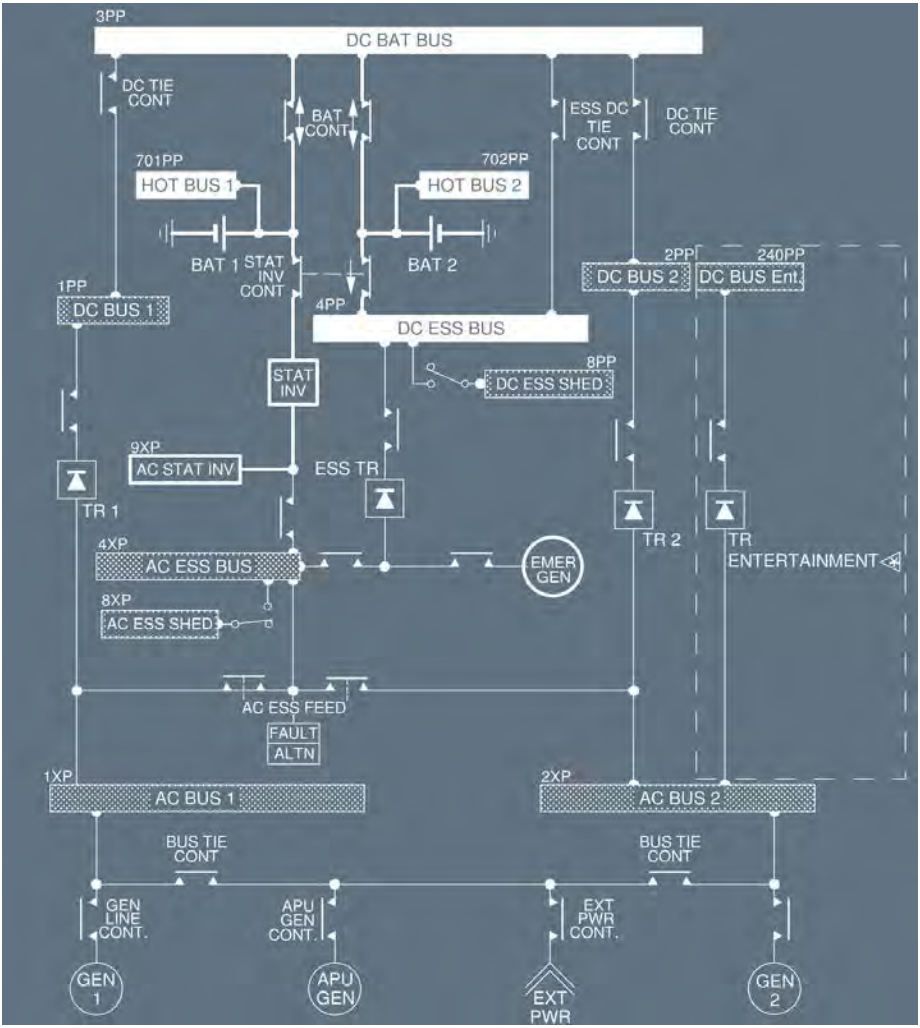
FLIGHT WITH BATTERIES ONLY

Ident.: DSC-24-10-30-30-00017762.0001001 / 21 MAR 16
Applicable to: ALL



ON GROUND, BATTERIES ONLY (SPEED < 50 KT)

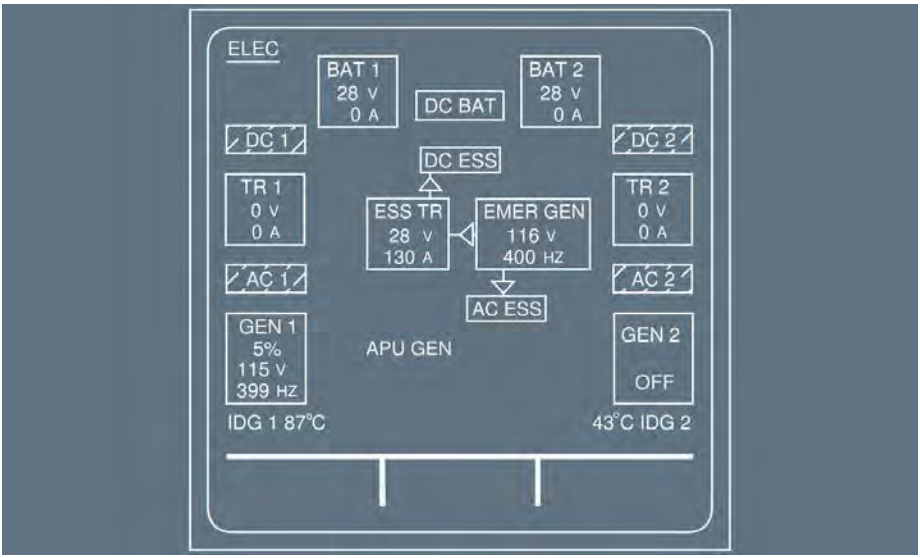
Ident.: DSC-24-10-30-30-00017763.0001001 / 21 MAR 16
Applicable to: ALL

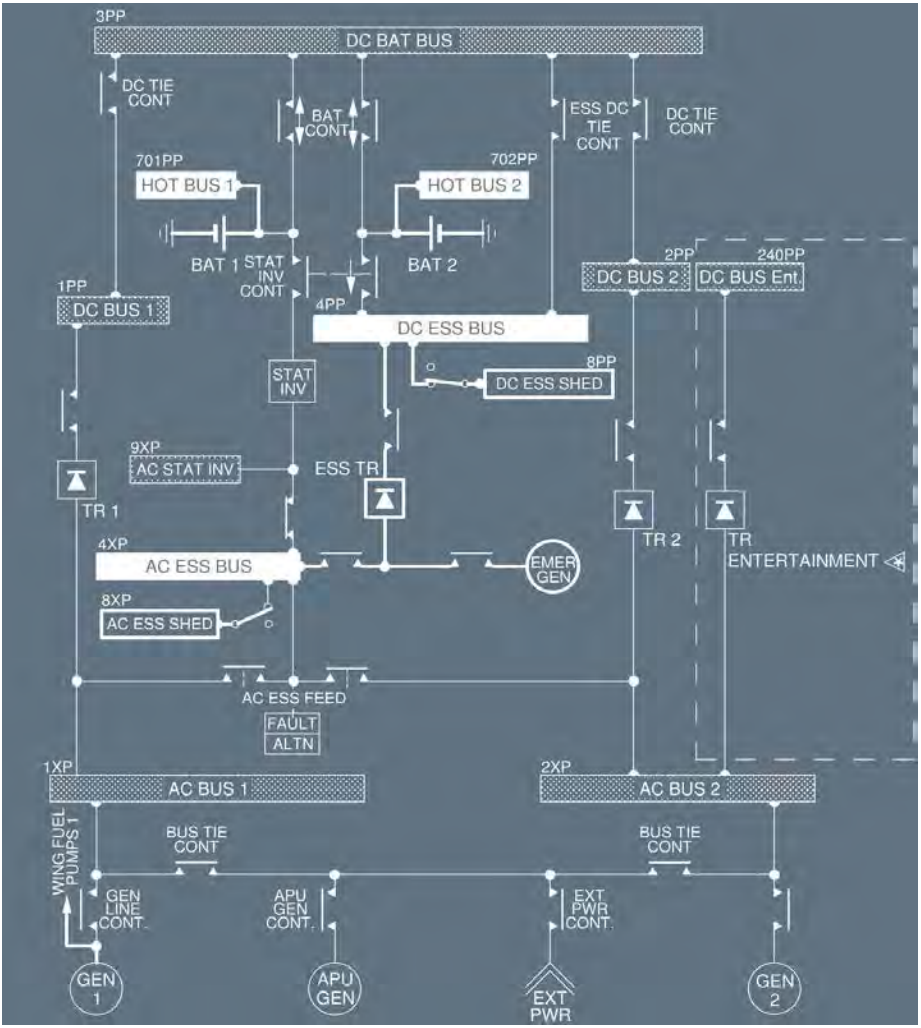


SMOKE CONFIGURATION

Ident.: DSC-24-10-30-30-00017764.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

In this configuration the main busbars are shed. The electrical distribution is the same as it is in the emergency electrical configuration (loss of main generators), except the fact that in smoke configuration the fuel pumps are connected upstream of the GEN 1 line connector.
The procedure sheds approximately 75 % of electrical equipment. All equipment that remains powered is supplied via the circuit breakers on the overhead panel (except for equipment supplied by hot buses).



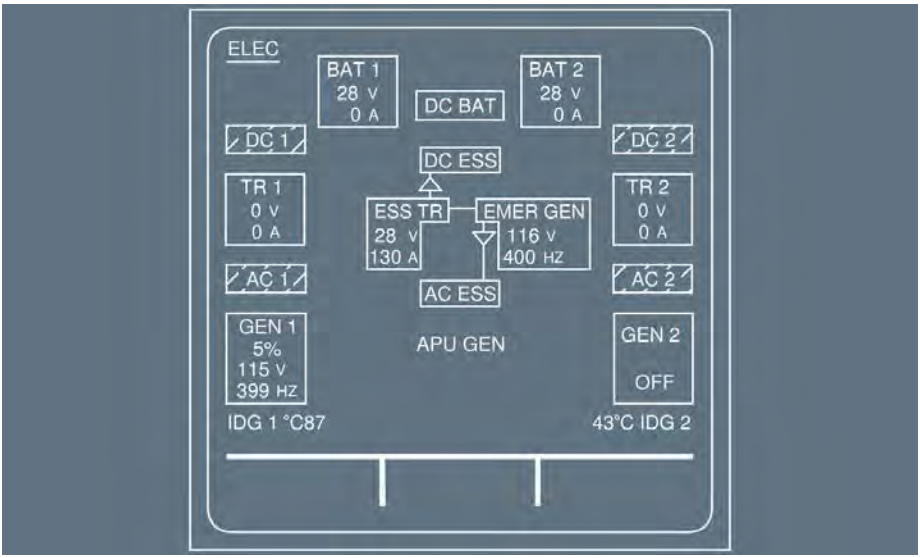


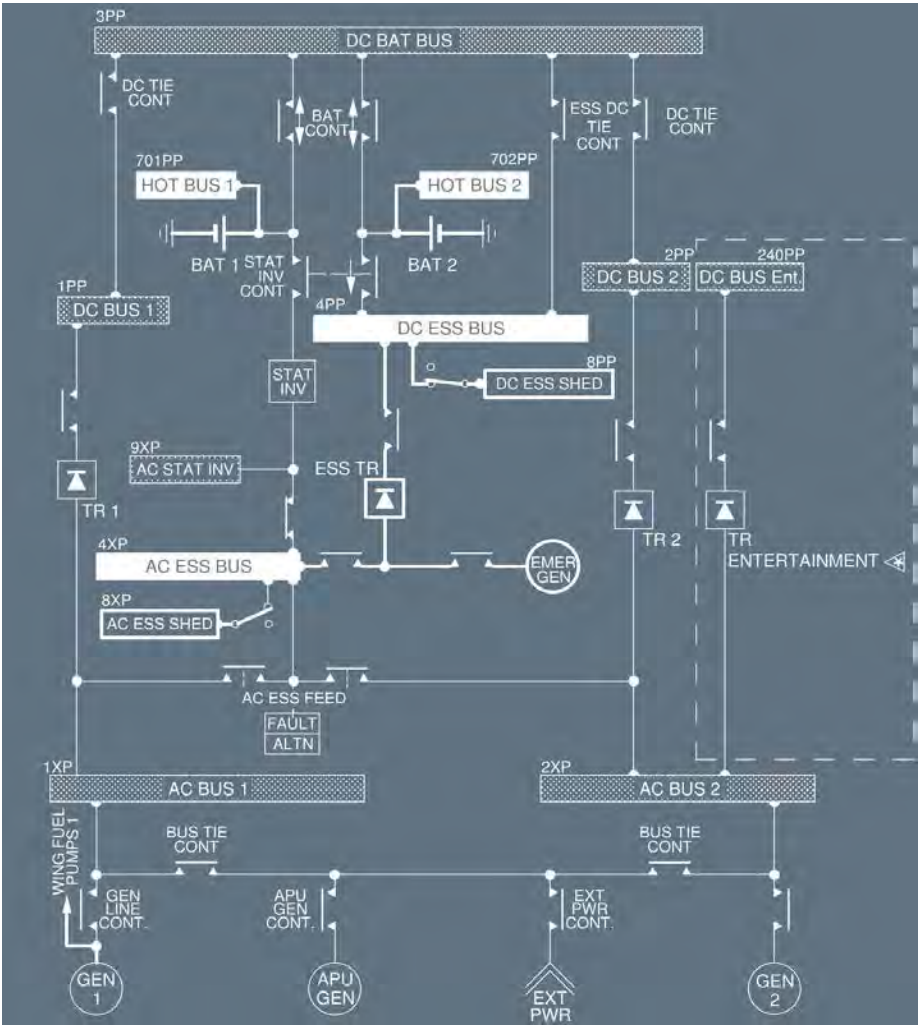
Note: *ECAM ELEC page is identical to that for emergency generator running.*

SMOKE CONFIGURATION

Ident.: DSC-24-10-30-30-00017764.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

In this configuration the main busbars are shed. The electrical distribution is the same as it is in the emergency electrical configuration (loss of main generators), except the fact that in smoke configuration the fuel pumps are connected upstream of the GEN 1 line connector.
The procedure sheds approximately 75 % of electrical equipment. All equipment that remains powered is supplied via the circuit breakers on the overhead panel (except for equipment supplied by hot buses).





Note: *ECAM ELEC page is identical to that for emergency generator running.*

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Distribution Table

DISTRIBUTION TABLE

Ident.: DSC-24-10-30-40-00017765.0002001 / 21 MAR 16
Applicable to: ALL

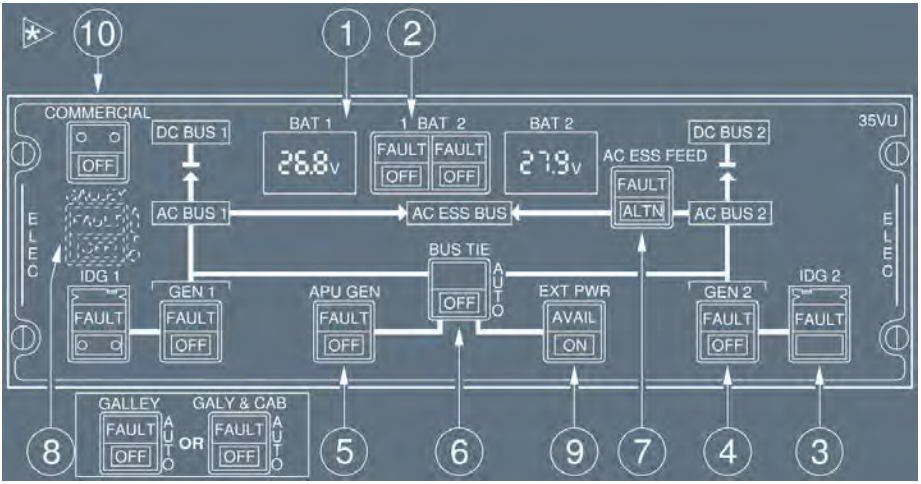
	AC BUS 1	AC BUS 2	AC ESS BUS	AC SHED ESS	AC STAT INV	TR 1	TR 2	ESS TR	TR Ent. (1)	DC BUS 1	DC BUS 2	DC BUS Ent. (1)	DC BAT BUS	DC ESS BUS	DC SHED ESS	HOT BUS 1	HOT BUS 2
NORM CONF	GEN 1	GEN 2	GEN 1	GEN 1	-	GEN 1	GEN 2	-	GEN 2	TR 1 GEN 1	TR 2 GEN 2	REN GEN 2	TR 1 GEN 1	TR 1 GEN 1	TR 1 GEN 1	BAT 1	BAT 2
ONE GEN INOP AVAIL-X- (1, 2 or APU)	GEN X	GEN X	GEN X	GEN X	-	GEN X	GEN X	-	GEN X	TR 1 GEN X	TR 2 GEN X	REN GEN X	TR 1 GEN X	TR 1 GEN X	TR 1 GEN X	BAT 1	BAT 2
EMER CONF • BEFORE EMER GEN AVAILABILITY (about 8 s)	-	-	ST INV BAT 1	-	ST INV BAT 1	-	-	-	-	-	-	-	-	BAT 2	-	BAT 1	BAT 2
• EMER GEN RUNNING	-	-	EMER GEN	EMER GEN	-	-	-	EMER GEN	-	-	-	-	-	ESS TR EMER GEN	ESS TR EMER GEN	BAT 1	BAT 2
TR 1 FAULT	GEN 1	GEN 2	GEN 1	GEN 1	-	-	GEN 2	GEN 1	-	TR 2 GEN 2	TR 2 GEN 2	-	TR 2 GEN 2	ESS TR GEN 1	ESS TR GEN 1	BAT 1	BAT 2
TR 2 FAULT	GEN 1	GEN 2	GEN 1	GEN 1	-	GEN 1	-	GEN 1	-	TR 1 GEN 1	TR 1 GEN 1	-	TR 1 GEN 1	ESS TR GEN 1	ESS TR GEN 1	BAT 1	BAT 2
TR 1 + 2 FAULT	GEN 1	GEN 2	GEN 1	GEN 1	-	-	-	GEN 1	-	-	-	-	-	ESS TR -GEN 1	ESS TR -GEN 1	BAT 1	BAT 2

(1) *Two generators are needed to supply the DC BUS Entertainment ◁ , except on ground, where the APU generator (if not overloaded) or the external power is sufficient.*

ON GROUND BAT. ONLY	AC BUS 1	AC BUS 2	AC ESS BUS	AC SHED ESS	AC STAT INV	TR 1	TR 2	ESS TR	TR Ent. ◁	DC BUS 1	DC BUS 2	DC BUS Ent.	DC BAT BUS	DC ESS BUS	DC SHED ESS	HOT BUS 1	HOT BUS 2
Speed >100 kt	-	-	EMER GEN	EMER GEN	-	-	-	EMER GEN	-	-	-	-	-	ESS TR EMER GEN	ESS TR EMER GEN	BAT 1	BAT 2
Rat stall or 50 kt ≤ speed ≤ 100 kt	-	-	ST INV BAT 1	-	ST INV BAT 1	-	-	-	-	-	-	-	BAT 1-2	BAT 2	-	BAT 1	BAT 2
Speed < 50 kt	-	-	-	-	ST INV BAT 1	-	-	-	-	-	-	-	BAT 1-2	BAT 2	-	BAT 1	BAT 2

OVERHEAD PANEL

Ident.: DSC-24-20-00017766.0004001 / 21 MAR 16
Applicable to: ALL



(1) BAT 1(2) ind.
Shows battery voltage in white.

(2) BAT 1(2) pb-sw
Controls the operation of the corresponding battery charge limiter.

Auto : The battery charge limiter controls automatically the connection and the disconnection of the corresponding battery to the DC BAT BUS (3 PP) by closing and opening of the battery line contactor.

- The batteries are connected to the DC BAT BUS in the following cases:
  - APU starting (MASTER SW pb-sw at ON and N < 95 %).

    Note: *The connection is limited to 3 min when the emergency generator is running.*

  - Battery voltage below 26.5 V (battery charge). The charging cycle ends when battery charge current goes below 4 A.
    - On ground, immediately
    - In flight, after a time delay of 30 min.
  - Loss of AC BUS 1 and 2 when below 100 kt (EMER GEN not supplying).
- If AC BUS 1 and 2 are not energized and the EMER GEN is not supplying:
  - Battery 1 supplies the AC STAT INV BUS, and, if speed is greater than 50 kt, the AC ESS BUS.
  - Battery 2 supplies the DC ESS BUS.

    Note: *In normal configuration the batteries are disconnected most of the time.*

    Note: *A battery automatic cut-off logic prevents the batteries from discharging completely when the aircraft is on the ground (parking).*

    Automatic battery contactors open when:
    - *The aircraft is on the ground*
    - *The BAT pb switches are at AUTO*
    - *The main power supply (EXT PWR + GEN) is cut off*
    - *Battery voltage is low.*

    The flight crew can reset the contactors by switching the BAT pb-sw to OFF then to AUTO.

OFF : The battery charge limiter is not operating: the battery line contactor is open. OFF comes on white if the DC BAT BUS is supplied. Hot buses remain supplied.

FAULT light : Comes on amber, accompanied by an ECAM caution, when the charging current for the corresponding battery is outside limits.
In this case the battery contactor opens.

(3) IDG 1(2) (Integrated Drive Generator) pb-sw (guarded)

CAUTION	1. Maintaining the IDG pb-sw during more than 3 s may damage the IDG disconnection mechanism. 2. Disconnect the IDG only when the engine is running or windmilling. If not, the IDG will be damaged when starting the engine.

The IDG switches are normally springloaded out.
Pressing this switch disconnects the IDG from its driveshaft: only maintenance personnel can reconnect it.

FAULT light : Lights up amber, and ECAM caution comes on, if:
- IDG oil outlet overheats (above 185 °C), or
- IDG oil pressure is low (inhibited at low engine speed: N2 below 14 %).

It extinguishes when the IDG is disconnected.

(4) GEN 1 (2) pb-sw

ON : The generator field is energized and the line contactor closes if electrical parameters are normal.

OFF : The generator field is de-energized and the line contactors opens. The fault circuit is reset.

FAULT light : Lights up amber, and an ECAM caution comes on, if:
- The associated generator control unit (GCU) trips it.

Note: If a differential fault trips the protection, reset action has no effect after two attempts.

- Opening of the line contactor (except if the GEN pb-sw is selected OFF).

(5) APU GEN pb-sw

ON : The APU generator field is energized and the line contactor closes if parameters are normal and the EXT PWR line contactor is open.
The bus tie contactor 1(2) closes automatically if GEN 1(2) is not operating.

OFF : The generator field is de-energized and the line contactor opens. The fault circuit is reset.

FAULT light : Same as GEN 1 or 2 FAULT
The APU GEN FAULT light is inhibited when APU speed is too low or if the APU GEN line contactor opens after EXT PWR or ENG GEN takes over.

(6) BUS TIE pb

AUTO : The bus tie contactors (BTCs) automatically open or close to maintain power supply to both AC BUS 1 and 2.
- One contactor is closed, when:
  - One engine generator supplies the associated AC BUS, and
  - The APU generator, or external power supplies the other side.
- Both contactors are closed during single-engine operation, or operation on the APU generator, or external power supply.

OFF : Both bus tie contactors open.

(7) AC ESS FEED pb

NORMAL : The AC ESS BUS is supplied by AC BUS 1.

ALTN : The AC ESS BUS is supplied by AC BUS 2. The light comes on when manually selected.

Note: With the AC ESS FEED Auto Switching ◁ , AC BUS 2 will automatically supply AC ESS BUS when AC BUS 1 is lost.

FAULT light : The amber light, and ECAM caution come on, when the AC ESS BUS is not electrically-supplied.

Note: In case of a total loss of the main generators, the AC ESS BUS is automatically supplied by the emergency generator, or by the static inverter, if the emergency generator is not available.

(8) GALLEY pb or GALY & CAB pb

AUTO : Main galley, secondary galley, in-seat power supply ◁ and IFE ◁ system (prerecorded announcement, telephone system, video/airshow, music…), are supplied.

The main galley, the in-seat power supply ◁ and the IFE ◁ systems are automatically shed:
- In flight: When only one generator is operating.
- On ground: When only one engine generator is operating. (All galleys are available when the APU GEN or EXT PWR is supplying power.)

Note: With the Galley Load Automatic Shedding ◁ the secondary galley is also automatically shed.

OFF : The main galley, secondary galley, in-seat power supply ◁ and IFE ◁ system (prerecorded announcement, telephone system, video/airshow, music ....) are not supplied.
The electrical supply of the heating floor panels is shed.

FAULT light : The amber light, and ECAM caution come on, when the load on any generator is more than 100 % of rated output.

(9) EXT PWR pb

AVAIL light comes on green, if:
- External power is plugged in, and
- External power parameters are normal.

When pressed:
- If the AVAIL light was on:
  - The external power line contactor closes
  - The AVAIL light goes off
  - The ON light comes on blue.
- If the ON light was on:
  - The external power line contactor opens
  - The ON light goes off
  - The AVAIL light comes on.

Note: *1. External power has priority over the APU generator. The engine generators have priority over external power.*
2. The ON light stays on, even when the engine generators supply the aircraft.

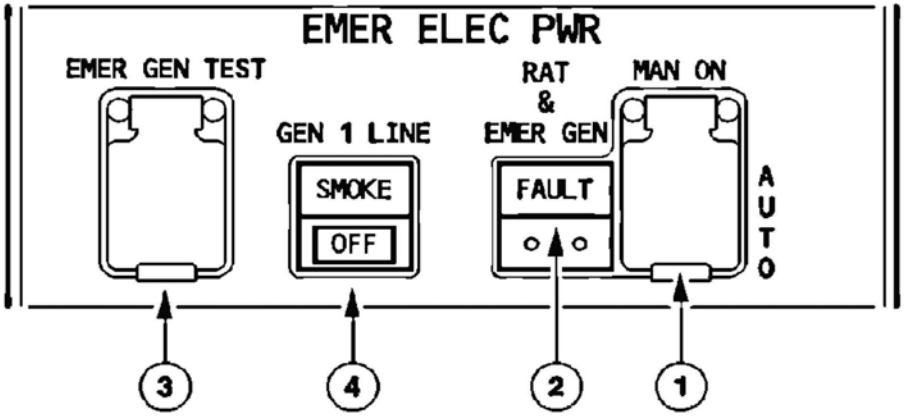
(10) COMMERCIAL pb ◁

ON : All aircraft commercial electrical loads are supplied:
- Cabin and cargo lights
- Water and toilet system
- Drain mast ice protection
- Galley
- Passenger's entertainment
- Semi-automatic cargo loading ◁

OFF : Switches off all aircraft commercial electrical loads.

OVERHEAD PANEL (CONT'D)

Ident.: DSC-24-20-00017778.0002001 / 21 MAR 17
Applicable to: ALL



(1) MAN ON pb (guarded)

AUTO : When the following conditions are met:
- AC BUS 1 is not electrically supplied, and
- AC BUS 2 is not electrically supplied, and
- Aircraft speed is greater than 100 kt.

  • The RAT extends, and
  • The blue hydraulic system drives the emergency generator.

As soon as the emergency generator electrical parameters are within tolerance the emergency generator is connected to the aircraft network.

Pressed : This selects manual RAT extension.
Emergency generator coupling occurs 3 s after the RAT supplies the emergency generator.

(2) FAULT light

This light comes on red if the emergency generator is not supplying power when AC BUS 1 and AC BUS 2 are not powered.

(3) EMER GEN TEST pb (guarded)

Pressed and held:
- If AC NORMAL BUSES are supplied:
  - The EMER GEN is driven hydraulically if the blue electric pump is running.
    The AC ESS BUS and the DC ESS BUS are connected to the emergency generator.
    (The DC ESS SHED and AC ESS SHED buses are not powered.)
  - ECAM displays the ELEC page automatically (only on the ground).
- If only the batteries supply the aircraft:
  - The static inverter powers the AC ESS BUS.

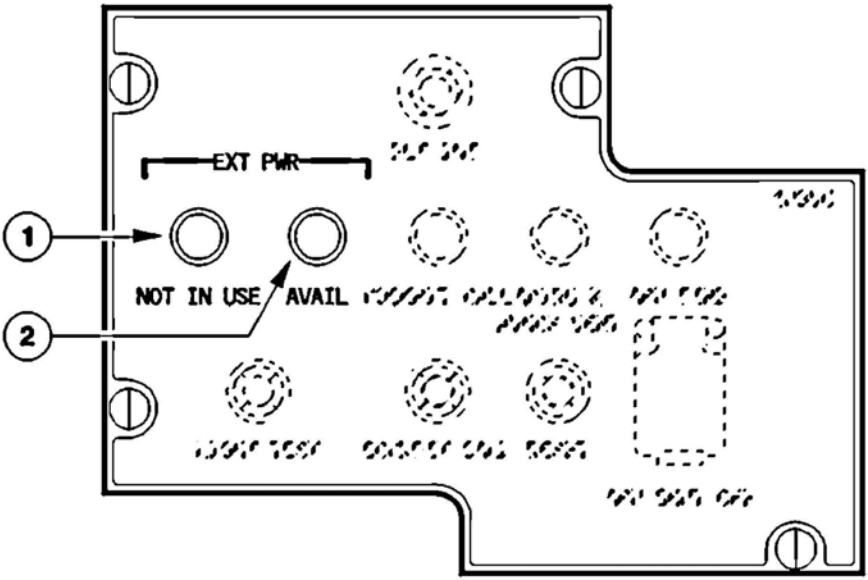
(4) GEN 1 LINE pb-sw

OFF : GEN 1 line contactor opens.
The AC BUS 1 channel is supplied from GEN 2 through bus tie contactors. This is used for smoked drill.

SMOKE light : *Refer to DSC-26-30-20 GEN 1 LINE pb-sw*.

EXTERNAL POWER PANEL

Ident.: DSC-24-20-00000891.0001001 / 21 MAR 16
Applicable to: ALL



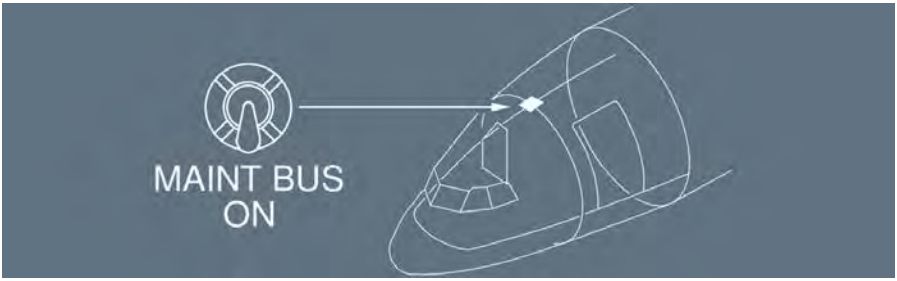
(1) EXT PWR NOT IN USE
This white light comes on to inform ground personnel that the ground power unit is not supplying the aircraft network and can be removed.

(2) EXT PWR AVAIL
This amber light comes on to indicate that external power is available and the voltage is correct.

FORWARD CABIN

Ident.: DSC-24-20-00000892.0001001 / 22 MAY 12
Applicable to: ALL

MAINT BUS SW:



This switch allows personnel to energize electrical circuits for ground servicing without energizing the entire aircraft electrical system.

ON : The switch latches magnetically if external power is connected and normal (AVAIL light on).

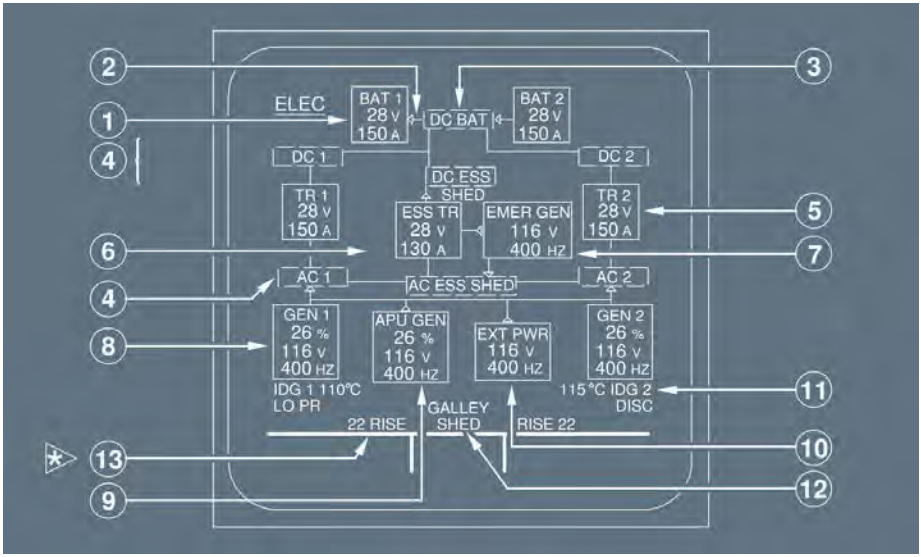
The AC and DC GND/FLT buses have power and the following loads can be energized:
- passenger compartment lighting
- galley lighting
- entrance area lights
- lavatory lighting and service
- vacuum cleaner sockets
- flight compartment service outlets
- hydraulic pump (yellow system)
- flight compartment flood lighting
- fuel quantity indications
- refueling
- cargo hold lighting
- main and nose landing gear compartment lighting
- belly fairing panel service outlets
- ground call
- equipment compartment lights and service outlets
- navigation lights.

The switch trips when the external source is removed.

OFF : The AC and DC GND/FLT buses are connected to AC BUS 2 and DC BUS 2.

ECAM ELEC PAGE

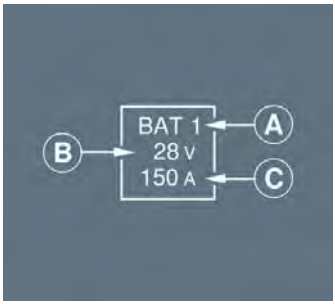
Ident.: DSC-24-20-00017780.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) Battery indications

- BAT pb-sw at OFF:
  Legend is in white.

- BAT pb-sw at Auto:



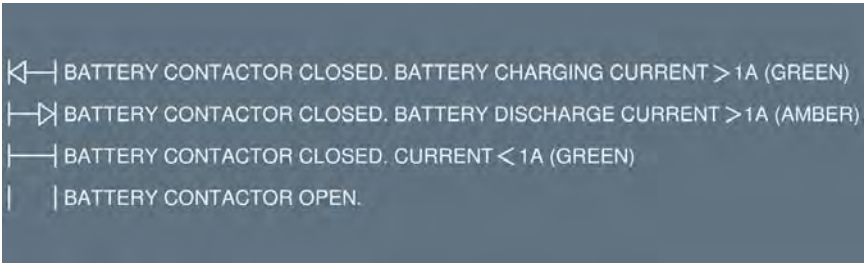
(A)

Legend is normally white, but becomes amber:
- when voltage and current indications change to amber, or
- in case of a BAT FAULT alert.

(B) Battery voltage is normally green, but becomes amber if V > 31 V or V < 25 V.

(C) Battery current is normally green, but becomes amber if discharge current > 5 A.

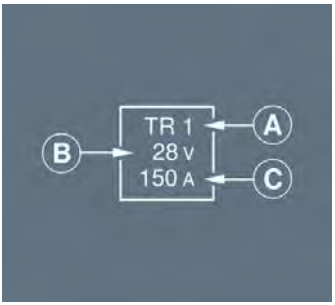
(2) Battery charge/discharge indication



(3) DC BAT indication
It is normally in green. It becomes amber, if DC BAT voltage ≤ 25 V.

(4) Bus bar indication
The bus bar indication is normally green. It becomes amber when the corresponding bus bar is not powered.
SHED appears in amber, when AC or DC SHED ESS BUS is shed.

(5) TR 1 (2) indication



(A) Normally white, this legend becomes amber when legends B and C do.

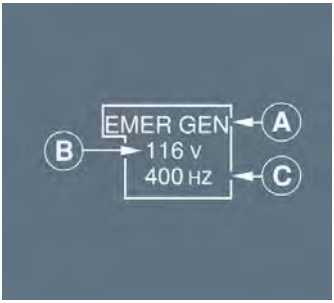
(B) The TR voltage is normally in green. It becomes amber, if V > 31 V, or V < 25 V.

(C) The TR current is normally in green. It becomes amber, when the TR current ≤ 5 A.

(6) ESS TR indication

This legend follows the logic of the above-noted TR 1 (2) legend.
The voltage and current are not displayed, when the essential TR contactor is open.

(7) EMER GEN indication



(A) This legend is normally in white. It becomes amber when either the voltage or frequency legend becomes amber.

(B)

This legend is normally in green. It becomes amber, if:
- V > 120 V or
- V < 110 V.

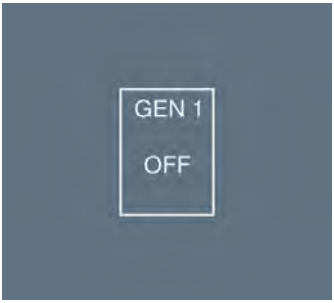
(C)

This legend is normally in green. It becomes amber, if:
- F > 410 Hz or
- F < 390 Hz .

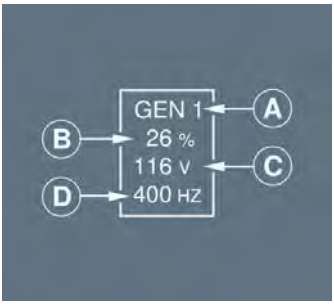
Voltage and frequency indications are not displayed, when the EMER GEN line contactor is open.

(8) GEN 1(2) indications

- GEN pb-sw is OFF:
  GEN is amber.
  OFF indication is white
  1 or 2 indication is white if the associated engine is running, amber if it is not.



- GEN pb-sw is ON.



(A) GEN 1 or GEN 2, normally white, becomes amber if any of the following legends become amber.

(B) The load legend, normally green, becomes amber if load > 100 %.

(C) The voltage legend, normally green, becomes amber if V > 120 V or V < 110 V.

(D) The frequency legend, normally green, becomes amber if F > 410 Hz or F < 390 Hz.

(9) APU GEN indications

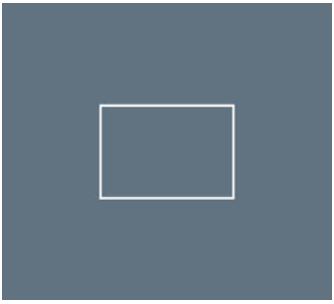
- When the APU MASTER sw is OFF this legend is white regardless of the position of the APU GEN pb-sw.

- When the APU MASTER sw is ON, and the APU GEN pb-sw is OFF:
  The APU GEN legend is amber.
  The OFF legend is white.

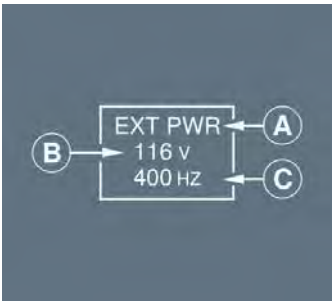
- When the APU MASTER sw is ON and the APU GEN pb-sw is ON:
  The indications are the same as for GEN 1 (2).

(10) EXT PWR indications

- External power is not available.



- When external power is available:



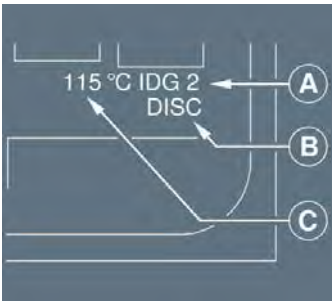
(A) This legend is normally white, but becomes amber, if either of the following legends turns amber.

(B) This legend is normally green, but becomes amber, if V > 120 V or if V < 110 V.

(C) This legend is normally green, but becomes amber, if F > 410 Hz or if F < 390 Hz.

- This legend appears during the static inverter test, and when pressing the ELEC pb on the ECAM control panel while ESS BUSES are supplied by the batteries. It is normally green, but becomes amber, if:
  V < 110 V or V> 120 V.
  F < 390 Hz or F > 410 Hz.

(11) IDG indications



(A) IDG1 (2) legend

The IDG legend is normally white, but becomes amber, if:
- Oil outlet temperature > 185 °C.
- Oil pressure gets too low.
- IDG becomes disconnected.

The 1 or 2 is white if the corresponding engine is running, amber if it is not and the FADEC is powered.

(B) DISC/LO PR indication

The DISC legend appears in amber, when the IDG is disconnected.
LO PR appears in amber, when IDG low pressure is detected and the associated engine is running.

(C) Oil outlet temperature

This legend is normally in green, but appears amber, if T > 185 °C.
It flashes, if 147 °C < T < 185 °C (advisory).

(12) GALLEY SHED indication

This legend appears in white when:
- The GALLEY pb-sw is OFF, or
- The main galleys are shed, meaning:
  - In flight, only one generator is operating.
  - On ground, the aircraft is being supplied by one engine generator only.

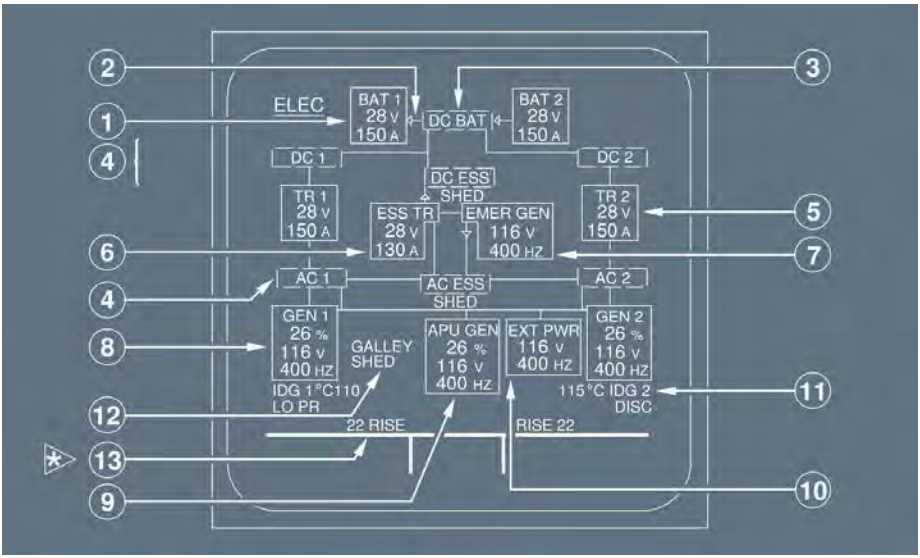
The legend is not displayed, when the aircraft is in its normal configuration.

(13) RISE indication ◁✻

This number, displayed in green, is the difference between the temperature at the IDG inlet and that at the IDG outlet.

ECAM ELEC PAGE

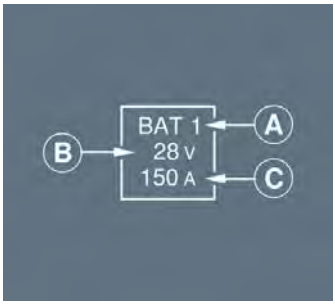
Ident.: DSC-24-20-00017780.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) Battery indications

- BAT pb-sw at OFF:
  Legend is in white.

- BAT pb-sw at Auto:



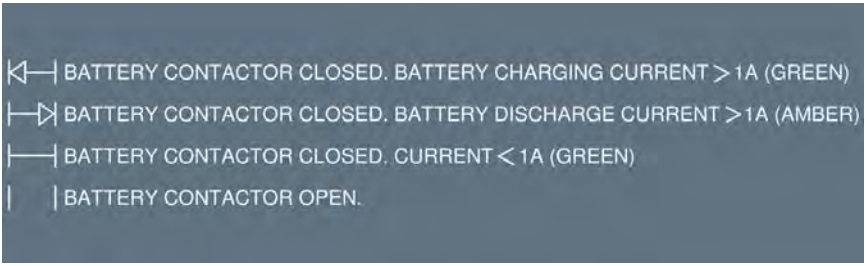
(A)

Legend is normally white, but becomes amber:
- when voltage and current indications change to amber, or
- in case of a BAT FAULT alert.

(B) Battery voltage is normally green, but becomes amber if V > 31 V or V < 25 V.

(C) Battery current is normally green, but becomes amber if discharge current > 5 A.

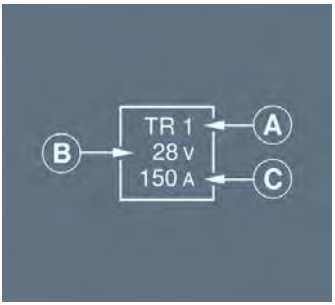
(2) Battery charge/discharge indication



(3) DC BAT indication
It is normally in green. It becomes amber, if DC BAT voltage ≤ 25 V.

(4) Bus bar indication
The bus bar indication is normally green. It becomes amber when the corresponding bus bar is not powered.
SHED appears in amber, when AC or DC SHED ESS BUS is shed.

(5) TR 1 (2) indication



(A) Normally white, this legend becomes amber when legends B and C do.

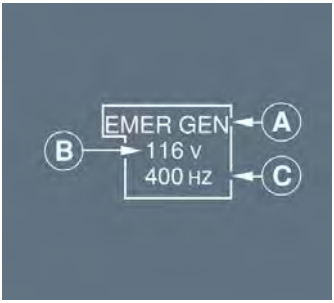
(B) The TR voltage is normally in green. It becomes amber, if V > 31 V, or V < 25 V.

(C) The TR current is normally in green. It becomes amber, when the TR current ≤ 5 A.

(6) ESS TR indication

This legend follows the logic of the above-noted TR 1 (2) legend.
The voltage and current are not displayed, when the essential TR contactor is open.

(7) EMER GEN indication



(A) This legend is normally in white. It becomes amber when either the voltage or frequency legend becomes amber.

(B)

This legend is normally in green. It becomes amber, if:
- V > 120 V or
- V < 110 V.

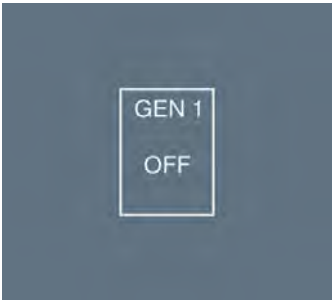
(C)

This legend is normally in green. It becomes amber, if:
- F > 410 Hz or
- F < 390 Hz .

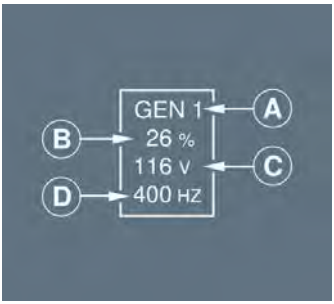
Voltage and frequency indications are not displayed, when the EMER GEN line contactor is open.

(8) GEN 1(2) indications

- GEN pb-sw is OFF:
  GEN is amber.
  OFF indication is white
  1 or 2 indication is white if the associated engine is running, amber if it is not.



- GEN pb-sw is ON.



(A) GEN 1 or GEN 2, normally white, becomes amber if any of the following legends become amber.

(B) The load legend, normally green, becomes amber if load > 100 %.

(C) The voltage legend, normally green, becomes amber if V > 120 V or V < 110 V.

(D) The frequency legend, normally green, becomes amber if F > 410 Hz or F < 390 Hz.

(9) APU GEN indications

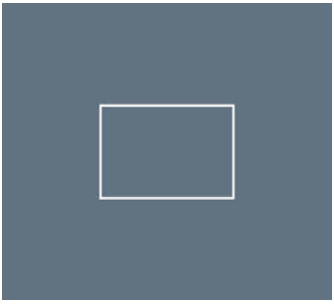
- When the APU MASTER sw is OFF this legend is white regardless of the position of the APU GEN pb-sw.

- When the APU MASTER sw is ON, and the APU GEN pb-sw is OFF:
  The APU GEN legend is amber.
  The OFF legend is white.

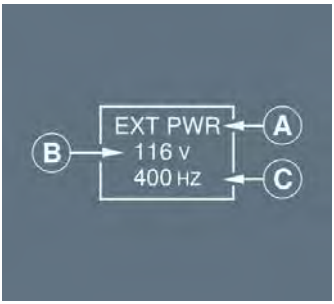
- When the APU MASTER sw is ON and the APU GEN pb-sw is ON:
  The indications are the same as for GEN 1 (2).

(10) EXT PWR indications

- External power is not available.



- When external power is available:



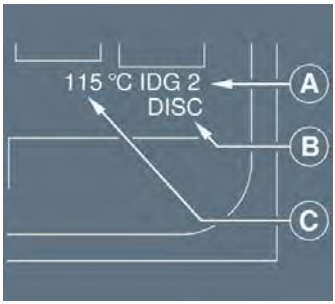
(A) This legend is normally white, but becomes amber, if either of the following legends turns amber.

(B) This legend is normally green, but becomes amber, if V > 120 V or if V < 110 V.

(C) This legend is normally green, but becomes amber, if F > 410 Hz or if F < 390 Hz.

- This legend appears during the static inverter test, and when pressing the ELEC pb on the ECAM control panel while ESS BUSES are supplied by the batteries. It is normally green, but becomes amber, if:
  V < 110 V or V> 120 V.
  F < 390 Hz or F > 410 Hz.

(11) IDG indications



(A) IDG1 (2) legend

The IDG legend is normally white, but becomes amber, if:
- Oil outlet temperature > 185 °C.
- Oil pressure gets too low.
- IDG becomes disconnected.

The 1 or 2 is white if the corresponding engine is running, amber if it is not and the FADEC is powered.

(B) DISC/LO PR indication

The DISC legend appears in amber, when the IDG is disconnected.
LO PR appears in amber, when IDG low pressure is detected and the associated engine is running.

(C) Oil outlet temperature

This legend is normally in green, but appears amber, if T > 185 °C.
It flashes, if 147 °C < T < 185 °C (advisory).

(12) GALLEY SHED indication

This legend appears in white when:
- The GALLEY pb-sw is OFF, or
- The main galleys are shed, meaning:
  - In flight, only one generator is operating.
  - On ground, the aircraft is being supplied by one engine generator only.

The legend is not displayed, when the aircraft is in its normal configuration.

(13) RISE indication ◁

This number, displayed in green, is the difference between the temperature at the IDG inlet and that at the IDG outlet.

MEMO DISPLAY

Ident.: DSC-24-20-00016808.0001001 / 21 MAR 16
Applicable to: ALL

EMER GEN : This memo appears in green, when the emergency generator is running.

AIRCRAFT SYSTEMS

EQUIPMENT

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GENERAL

Ident.: DSC-25-10-10-00020853.0001001 / 17 MAR 17
Applicable to: ALL

The aircraft and system controls, required for piloting the aircraft, are arranged in such a way that the crew faces forward and all crewmembers can monitor instruments and systems.
The designers concentrated system controls on the overhead panel by making extensive use of pushbuttons, directly installed in the system synoptic.

Note: *This chapter describes the panels and equipment of the basic aircraft configuration, and may not correspond to the customized configuration of a specific aircraft.*
For more information on the installed equipment or panels, refer to the relevant chapter's system description.

PRINCIPLES FOR PUSHBUTTONS WITH INTEGRATED INDICATIONS

Ident.: DSC-25-10-10-00000983.0001001 / 21 MAR 16
Applicable to: ALL

Whenever possible, pushbuttons used for corrective actions, have integrated status and failure indications.

The pushbutton positions, and their illuminated indications, follow the "lights out" principle.

- While corresponding to particular aircraft configurations, indications also have the following color codes :
  - Warnings
    RED : A failure requiring immediate action.
  - Cautions
    AMBER : A failure, of which the flight crew should be aware, but does not call for immediate action.
  - Indications
    GREEN : For normal system operation.
    BLUE : For normal operation of a system used temporarily
    WHITE : - For an abnormal pushbutton position.
    - For a test result or maintenance information.

  When the aircraft is in a normal configuration, only green lights can be permanently lit, whereas blue lights can be intermittently.
- Pushbutton positions :

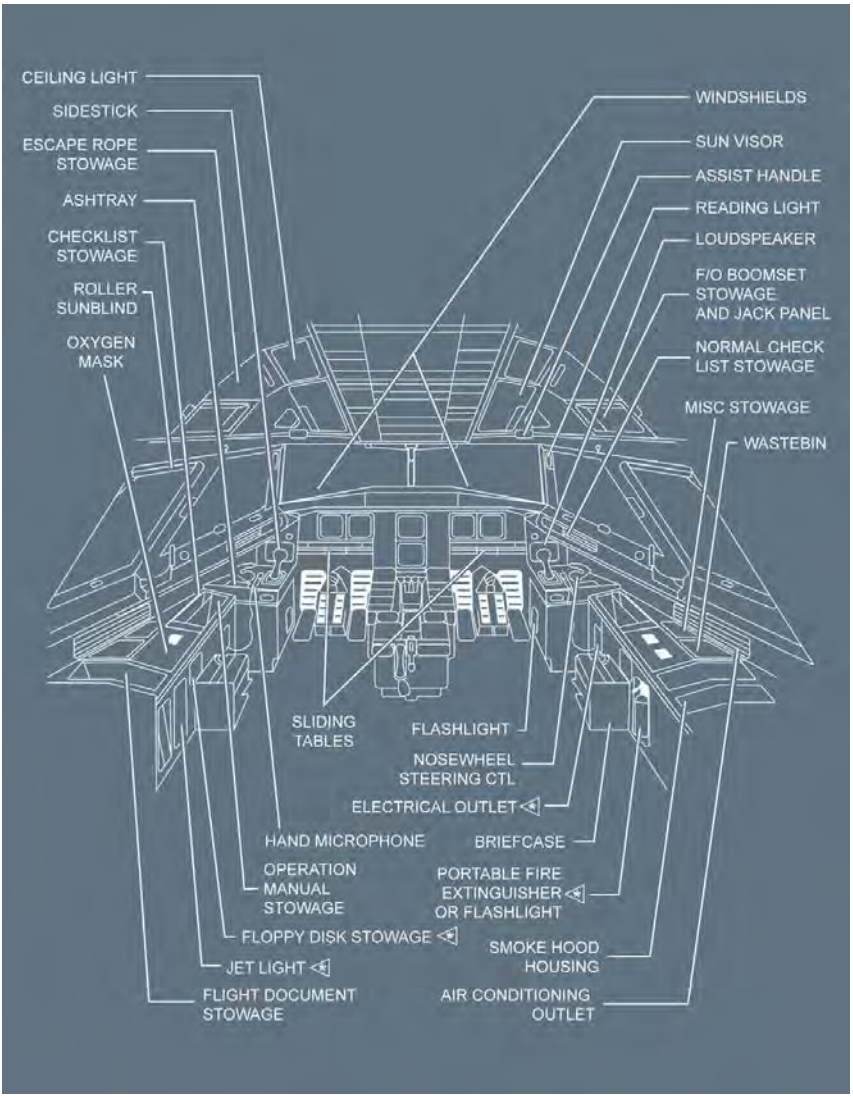
POSITION	BASIC FUNCTION
Pressed In	ON, AUTO, OVRD, OPEN
Released Out	OFF, MAN, ALTN, SHUT

Note: 1. Certain pushbutton lights have two dots, indicating that the corresponding part of the pushbutton is not used.
2. Certain pushbuttons do not remain pressed in. These are referred to as "Momentary Action" pushbuttons.

GENERAL ARRANGEMENT

Ident.: DSC-25-10-10-00018419.0001001 / 17 MAR 17

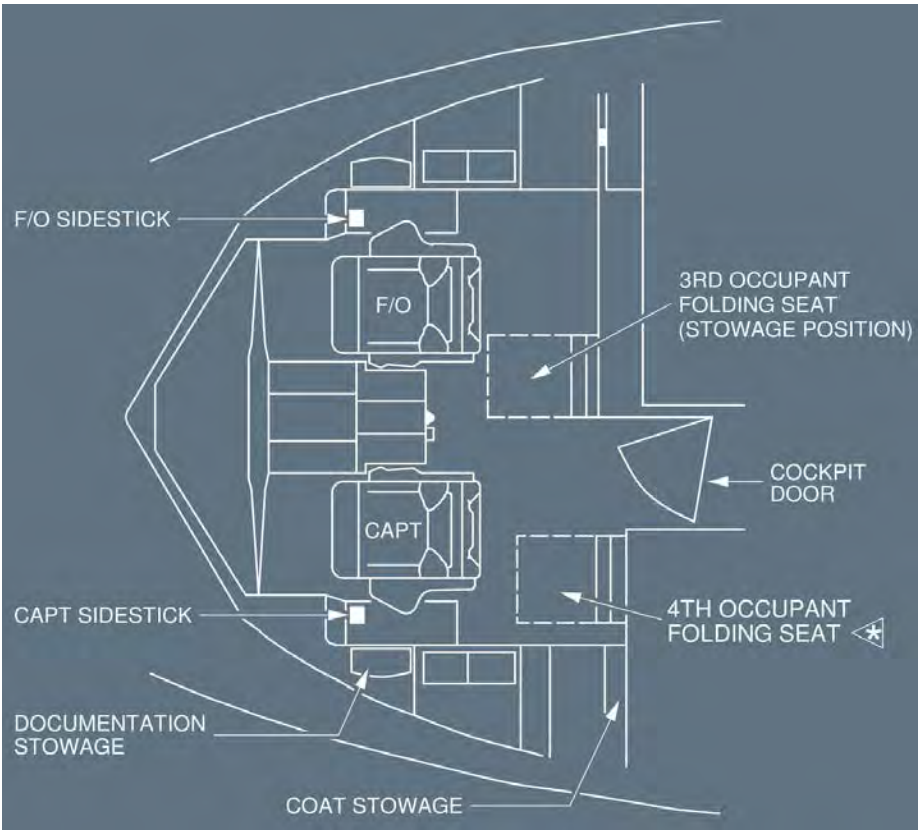
Applicable to: ALL



GENERAL

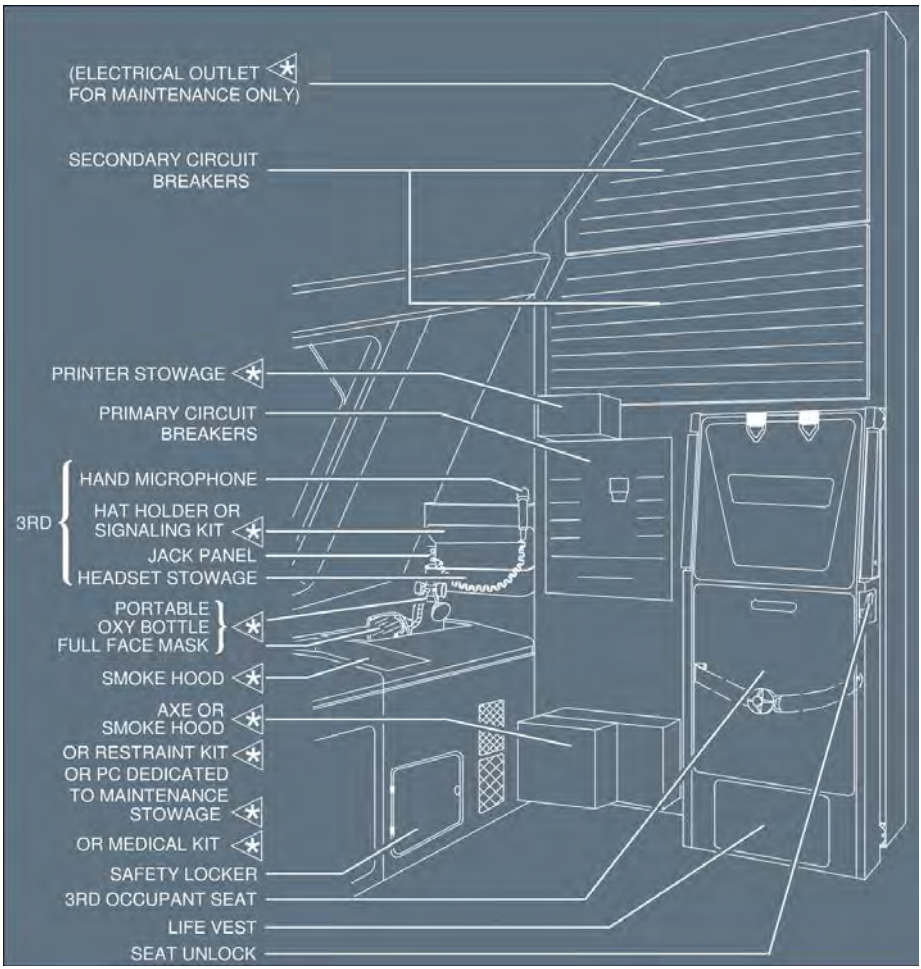
Ident.: DSC-25-10-20-00017002.0001001 / 17 MAR 17
Applicable to: ALL

The cockpit can accommodate two crewmembers, plus a third and fourth occupant ⋖ .
The two pilot seats are mounted on columns.
The third and fourth occupant seats are folding seats.



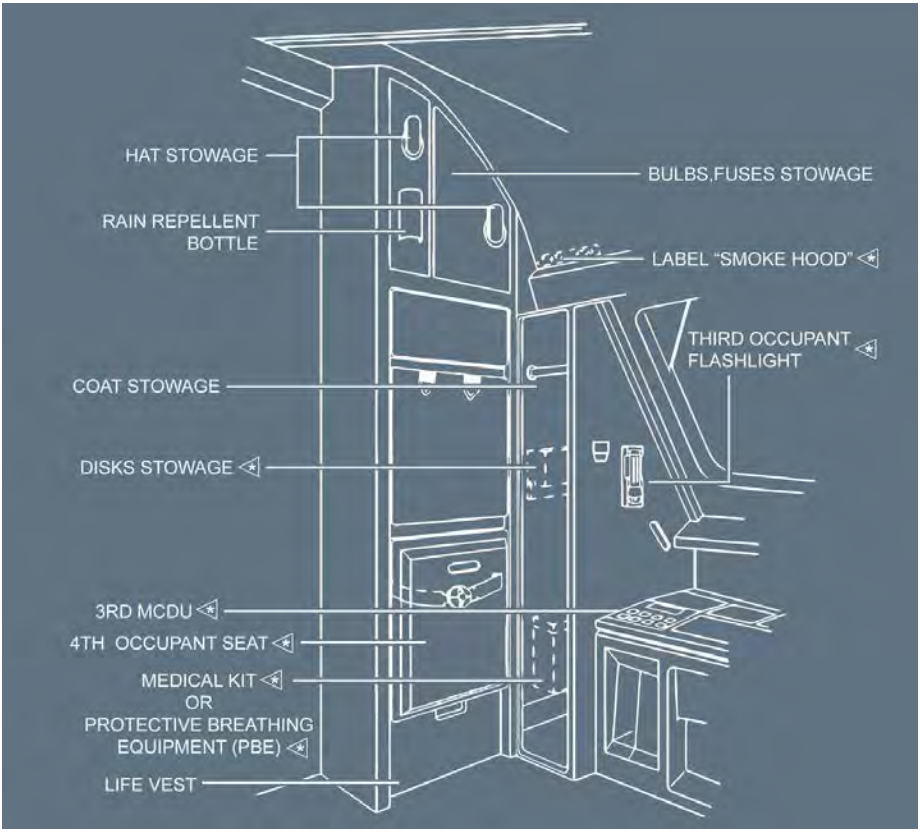
RIGHT REAR CORNER

Ident.: DSC-25-10-20-00000986.0001001 / 06 DEC 16
Applicable to: ALL



LEFT REAR CORNER

Ident.: DSC-25-10-20-00018428.0001001 / 17 MAR 17
Applicable to: ALL



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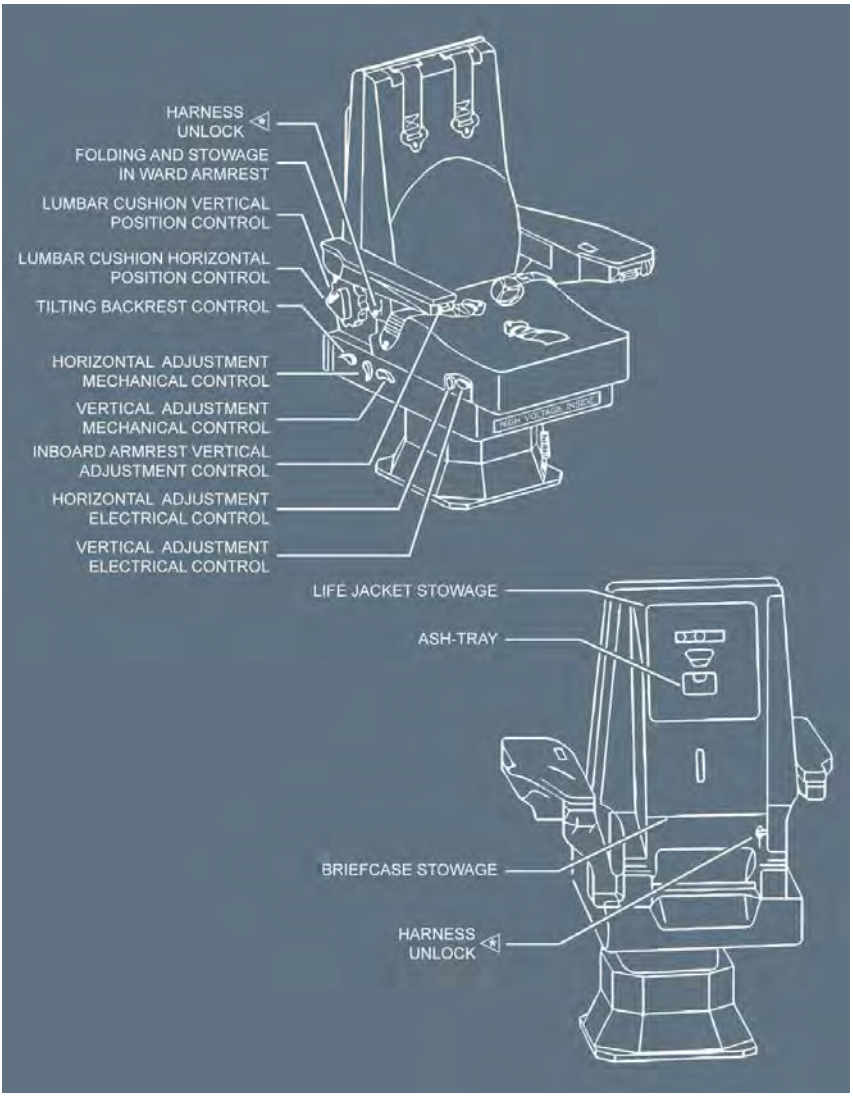
PILOT SEATS

Ident.: DSC-25-10-30-00018429.0002001 / 17 MAR 17

Applicable to: ALL



PILOT SEAT MECHANICAL ADJUSTMENT

Ident.: DSC-25-10-30-00000989.0001001 / 22 MAR 17
Applicable to: ALL

To adjust a seat mechanically, the occupant must lift the appropriate control handle. This unlocks the seat so that it may be moved. Releasing the control handle returns it to springloaded locked position. On electrically-powered seats, the mechanical adjustment is a backup: The seat should be adjusted electrically.

PILOT SEAT ELECTRICAL ADJUSTMENT ⋖

Ident.: DSC-25-10-30-00018405.0001001 / 17 MAR 17
Applicable to: ALL

To adjust a seat electrically, the occupant must press the appropriate control switch in the desired direction, and release it when the seat reaches the desired position. The switch then returns to the springloaded neutral position.

To adjust the vertical position of the lumbar cushion, the occupant must:
- Pull the control out to the unlocked position
- Turn the control to adjust the position of the cushion
- Push the control into the locked position.

HEAD REST ADJUSTMENT ⋖

Ident.: DSC-25-10-30-00018406.0001001 / 17 MAR 17
Applicable to: ALL

To adjust the headrest in inclination, the occupant presses the inclination control button, and releases it to lock the position.
To control the height of the headrest, the occupant must push it horizontally, adjust the height, and release it to lock the position.

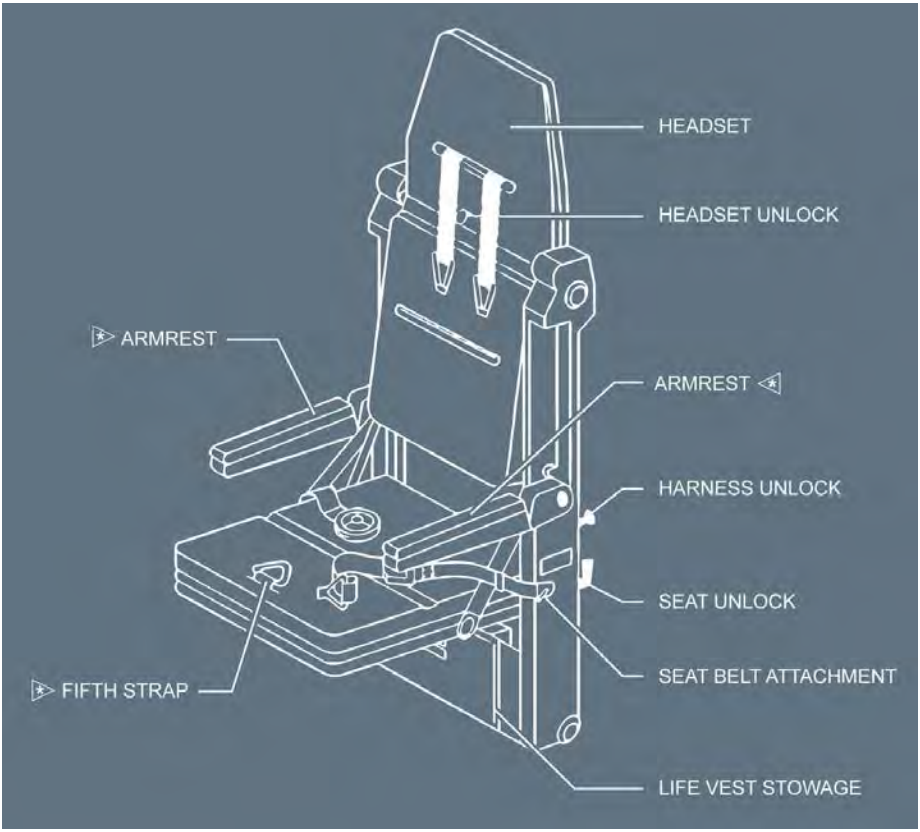
ARMREST ADJUSTMENT

Ident.: DSC-25-10-30-00000993.0001001 / 21 MAR 17
Applicable to: ALL

To adjust the inboard armrest, the occupant must turn the knurled knob, located on the bottom surface of the armrest.

OBSERVER SEAT

Ident.: DSC-25-10-30-00018430.0001001 / 17 MAR 17
Applicable to: ALL



OBSERVER SEAT ADJUSTMENT

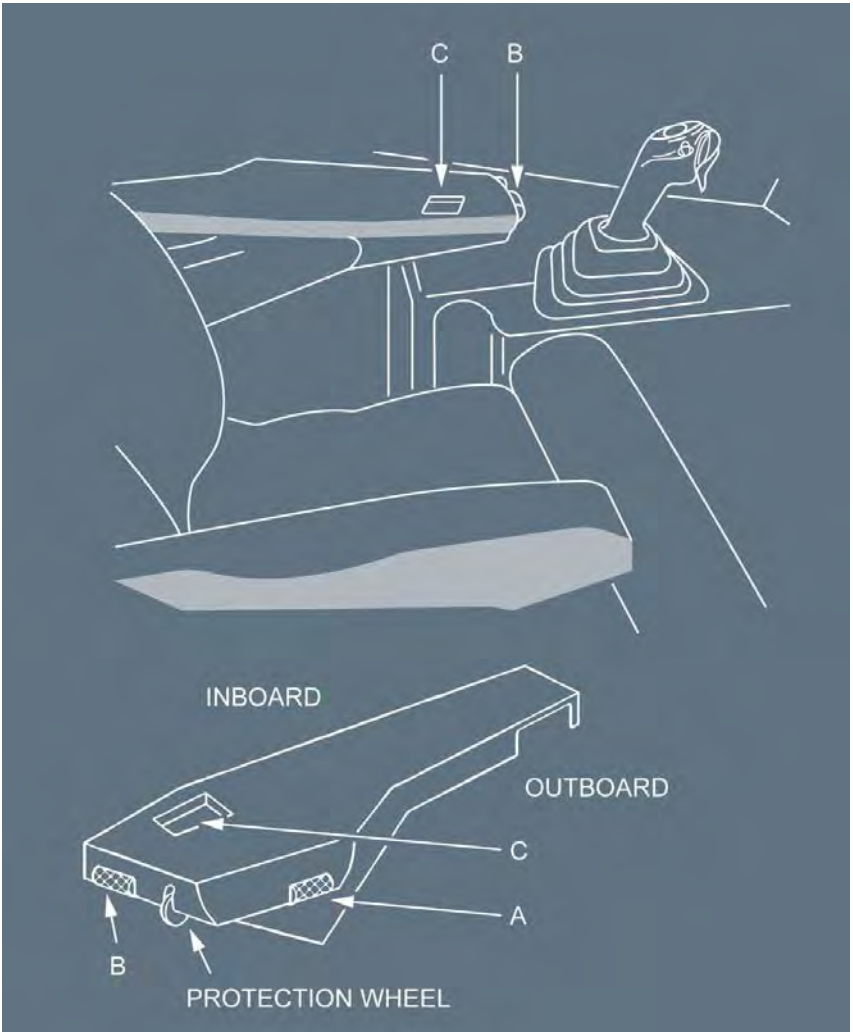
Ident.: DSC-25-10-30-00000995.0001001 / 21 MAR 17
Applicable to: ALL

This seat has three positions :

- Normal : Centered on aircraft axis.
- Intermediate : Clear of the cockpit entrance.
- Stowed : Seat vertical and headrest folded back. The seat is usable in this position, and does not impede access to the documents and equipment on the right side of the cockpit.

ARMREST

Ident.: DSC-25-10-30-00018431.0001001 / 17 MAR 17
Applicable to: ALL



The position of the armrest is adjustable as follows:
A. Height adjustment
B. Pitch adjustment

The armrest also has a memory display (C) that shows pitch and height.

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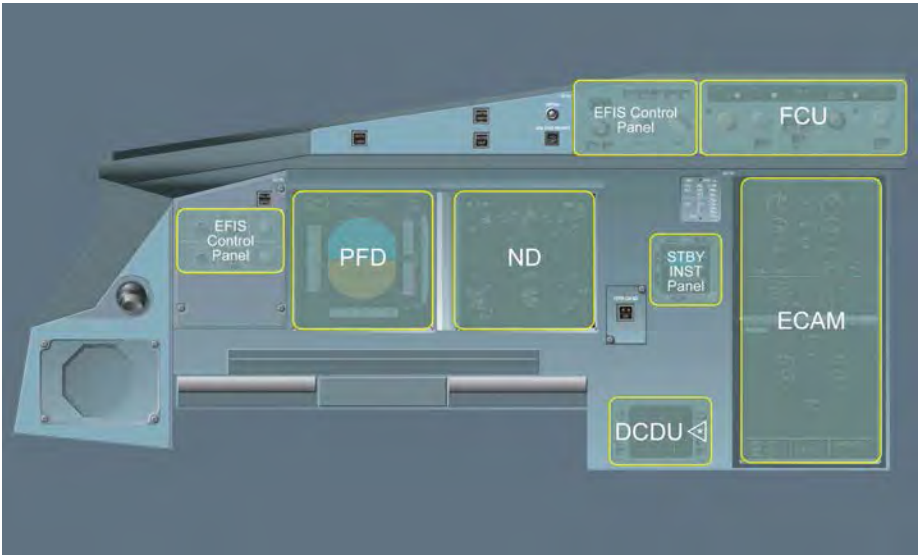
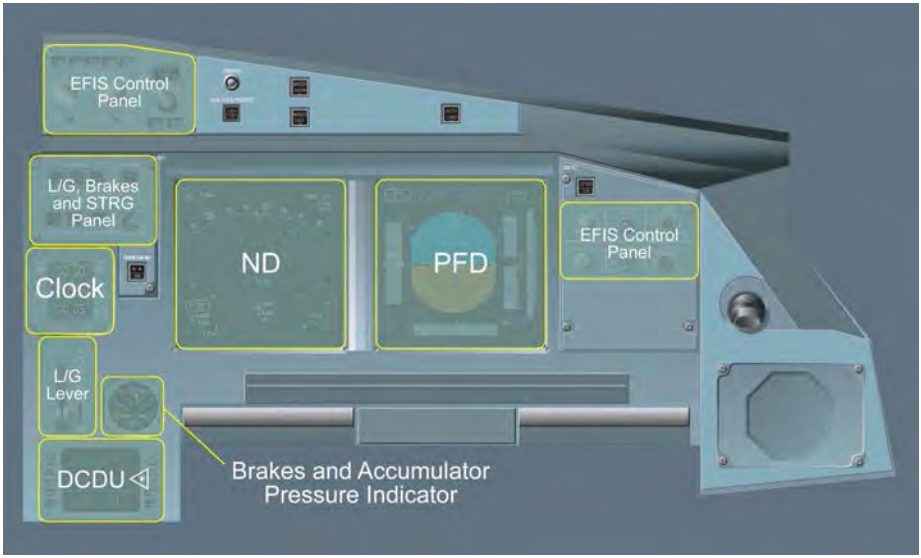
MAIN INSTRUMENT PANEL - CAPTAIN SIDE

Ident.: DSC-25-10-40-00020851.0001001 / 21 MAR 17
Applicable to: ALL



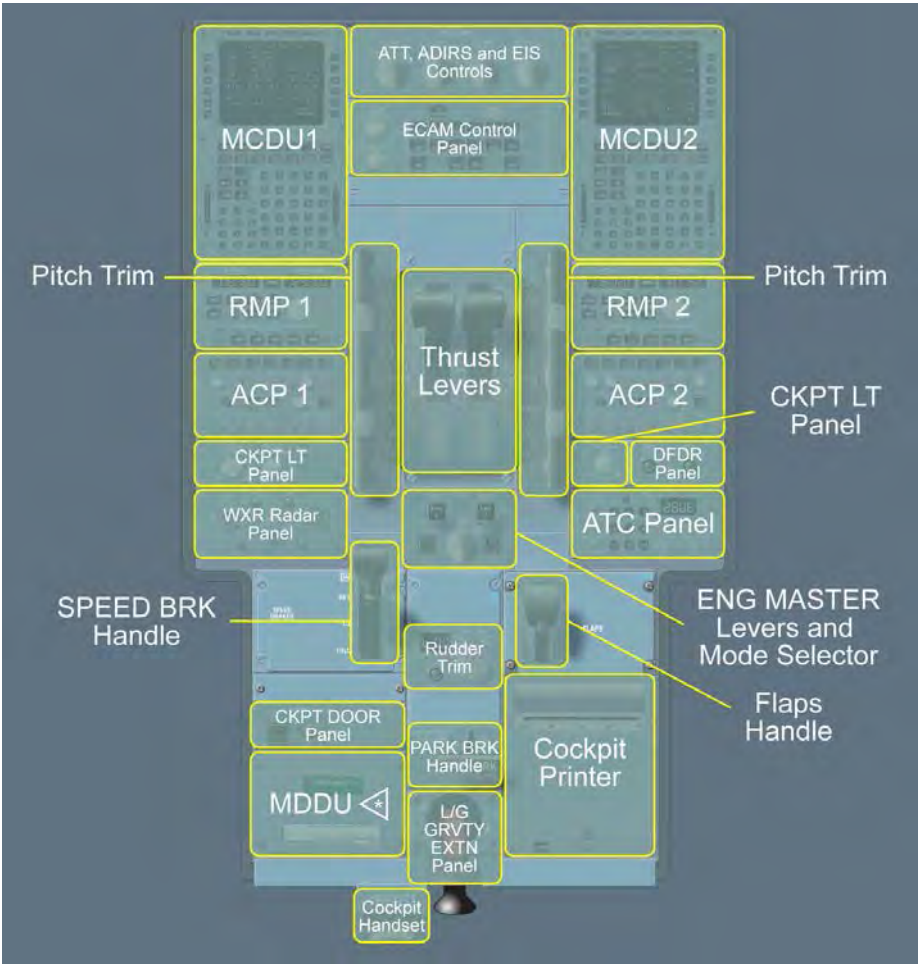
MAIN INSTRUMENT PANEL - FIRST OFFICER SIDE

Ident.: DSC-25-10-40-00020852.0001001 / 21 MAR 17
Applicable to: ALL



PEDESTAL

Ident.: DSC-25-10-50-00020854.0001001 / 17 MAR 17
Applicable to: ALL



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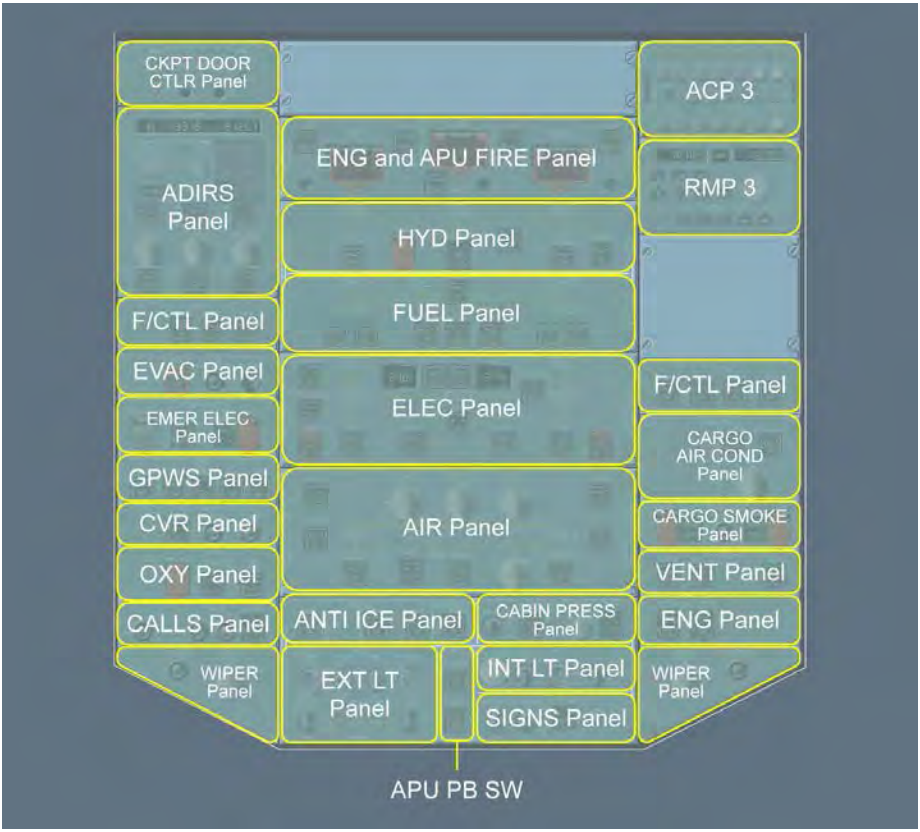
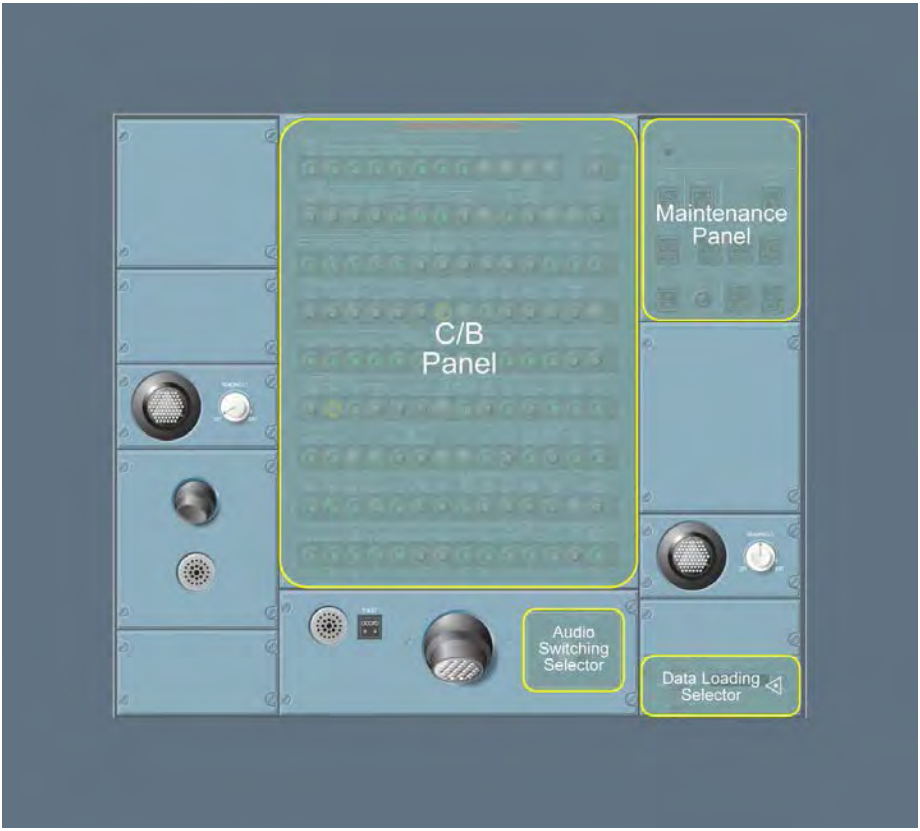
OVERHEAD PANEL

Ident.: DSC-25-10-60-00020855.0001001 / 17 MAR 17
Applicable to: ALL

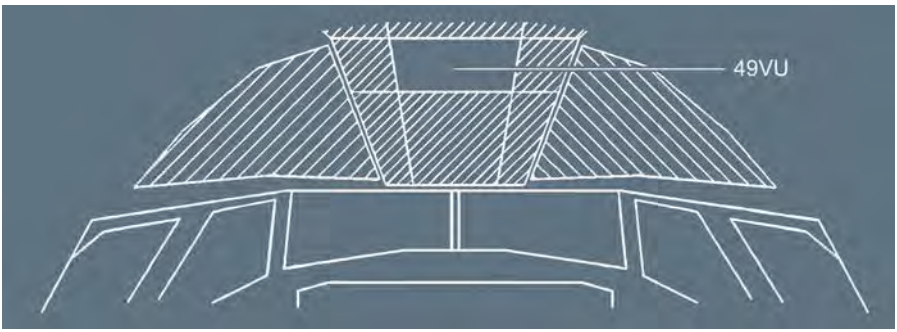



Maintenance Panel
C/B Panel
Audio Switching Selector
Data Loading Selector

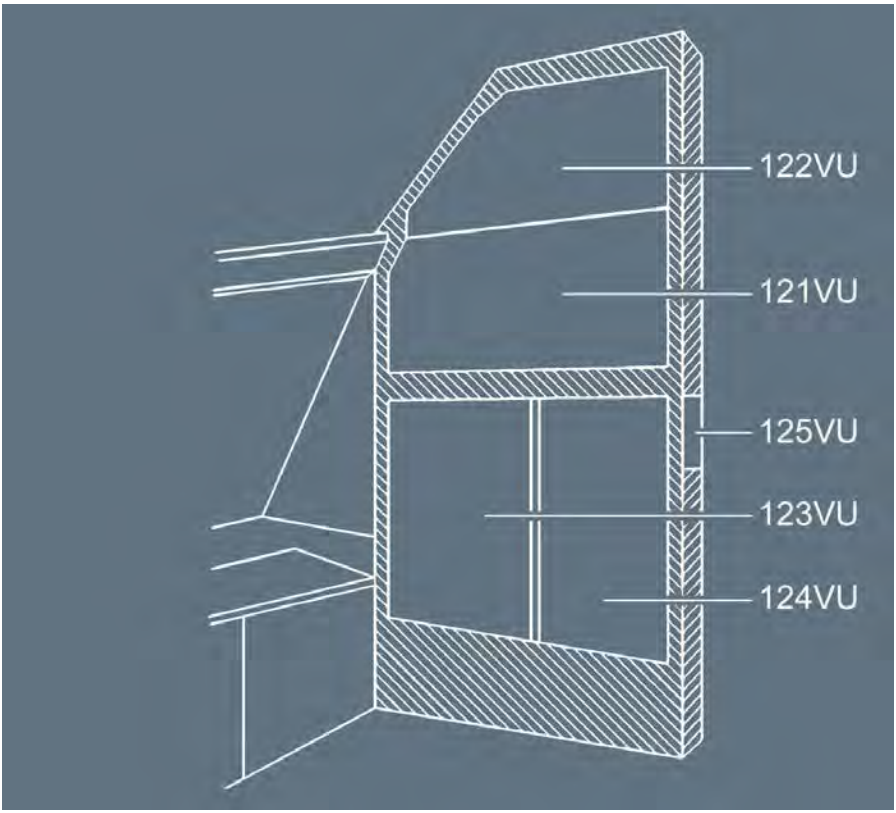
C/B PANELS

Ident.: DSC-25-10-70-00018436.0001001 / 17 MAR 17
Applicable to: ALL

OVERHEAD PANEL



RIGHT REAR PANEL



GENERAL

Ident.: DSC-25-10-80-00017009.0001001 / 17 MAR 17
Applicable to: ALL

The foot warmer system ⋖ has a heating panel attached to each pedal. The temperature of the panels is about 20 °C (68 °F).

CONTROLS

Ident.: DSC-25-10-80-00017008.0001001 / 17 MAR 17
Applicable to: ALL

The Foot Warmer ON/OFF control switch ⋖ is located on the main instrument panel, on the captain's and first officer's side.

FOOT WARMER sw

Operation of the associated heating panel on captain's pedals or first officer's pedals.

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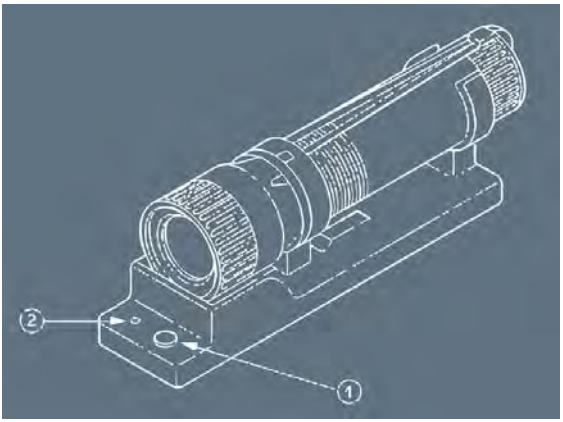
FLASHLIGHTS

Ident.: DSC-25-20-00018439.0001001 / 17 MAR 17
Applicable to: ALL

Emergency flashlights are installed in a bracket at each lateral console.
Each flashlight comes on automatically when it is removed from its bracket.
A push-to-test button and its associated red/green LED indicate the battery status.



(1) Push-to-Test Button
Pressing this button indicates the battery status.

(2) Charge Indicator (LED)

When the Push-to-Test button is pressed:
- If the LED comes on in green (flashes green one time), the flashlight battery is charged
- If the LED comes on in red (flashes red one time), the battery is low, and should be changed
- If the LED does not come on, the flashlight system has a failure and must be repaired.

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AIRCRAFT SYSTEMS

FIRE PROTECTION

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DESCRIPTION

Ident.: DSC-26-10-00021387.0006001 / 17 MAR 17
Applicable to: ALL

The fire and smoke protection system includes:

- Fire and overheat detection for the engines and APU
- Smoke detection for the cargo compartments, the lavatories, and the avionics bay
- Fire extinguishing for the cargo compartments, the engines, the APU, and the lavatories.

In addition, the aircraft includes portable fire extinguishers in the cockpit and in the cabin areas.

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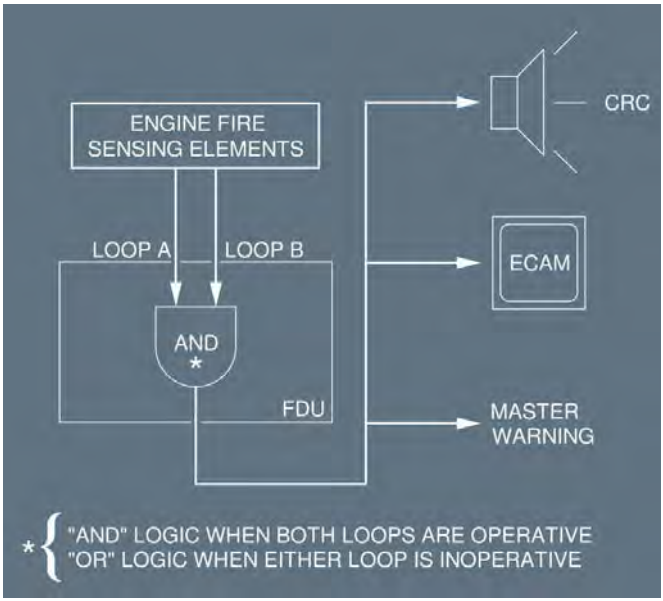
FIRE DETECTION

Ident.: DSC-26-20-10-00021393.0001001 / 17 MAR 17
Applicable to: ALL

The engines and the APU each have a fire and overheat detection system consisting of:
- Two identical detection loops (A and B) mounted in parallel
- A Fire Detection Unit (FDU).

The fire detection loops consist of:
- Three or four (as installed) engine fire sensing elements, in the pylon nacelle, in the engine core, and in the engine fan section
- One fire sensing element in the APU compartment.



When a sensing element is subjected to heat, it sends a signal to the FDU. As soon as loops A and B detect temperature above a preset level, the fire warning system is triggered.
A fault in one loop (break or loss of electrical supply) does not affect the warning system and the unaffected loop still protects the aircraft.

EXTINGUISHING

Ident.: DSC-26-20-10-00021395.0001001 / 04 JUL 17
Applicable to: ALL

ENGINES

Each engine has two fire extinguisher bottles, with electrically-operated squibs to discharge their agents. Each squib has a dual electric supply. The flight crew controls the discharge of the fire extinguisher bottles from the FIRE panel in the cockpit.

APU

The APU has one fire extinguisher bottle, with two electrically-operated squibs to discharge its agent. The flight crew controls the discharge of the fire extinguisher bottle from the FIRE panel in the cockpit. When an APU fire is detected on the ground, the APU automatically shuts down, and the extinguisher bottle discharges automatically.

FIRE DETECTION AND DETECTION FAULT LOGIC

Ident.: DSC-26-20-10-00021394.0001001 / 17 MAR 17
Applicable to: ALL

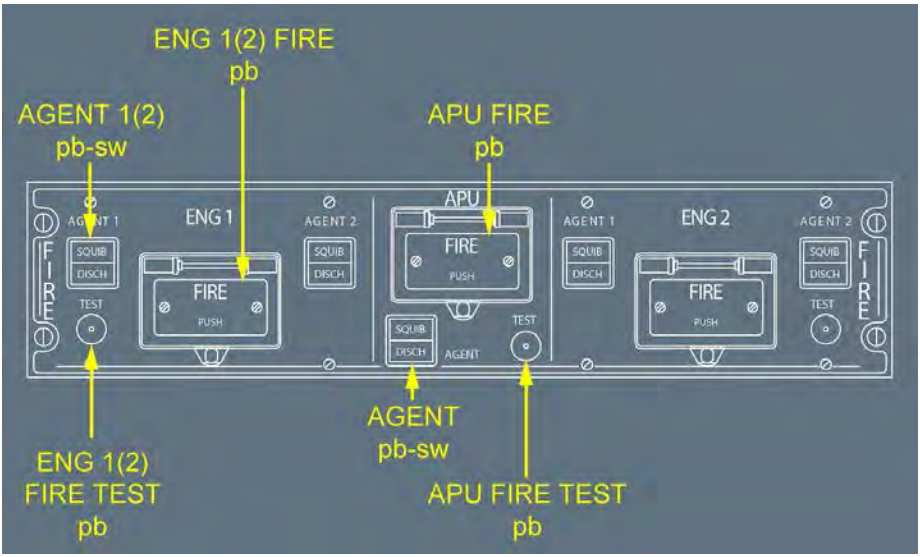
Fire detection units process all the warnings and cautions originating in the sensing elements.

- A fire warning appears, if:
  - Both loops A and B send a fire signal, or
  - One loop sends a fire signal and the other one is failed, or
  - Breaks occur in both loops within 5 s of each other (flame effect), or
  - A test is performed on the FIRE panel
- A loop-fault caution appears, if:
  - One loop is failed, or
  - Both loops are failed, or
  - The FDU fails.

FIRE PANEL

Applicable to: ALL

Ident.: DSC-26-20-20-10-00021396.0002001 / 17 MAR 17



Ident.: DSC-26-20-20-10-00021415.0001001 / 17 MAR 17

ENG 1(2) FIRE PB

The pushbutton normal position is in, and guarded. When the flight crew pushes it, the pushbutton is released and sends an electrical signal that performs the following for the corresponding engine:

- Silences the aural fire warning
- Arms the fire extinguisher squibs
- Closes the low-pressure fuel valve
- Closes the hydraulic fire shut off valve
- Closes the engine bleed valve
- Closes the pack flow control valve
- Cuts off the FADEC power supply
- Deactivates the IDG.

The red lights come on, regardless of the pushbutton position, whenever the fire warning for the corresponding engine is activated.

Ident.: DSC-26-20-20-10-00021420.0001001 / 17 MAR 17

AGENT 1(2) PB-SW

Both AGENT pushbutton-switches of an affected engine become active when the flight crew releases the ENG 1(2) FIRE pb.
A brief push on the pushbutton-switch discharges the corresponding fire agent.

- "SQUIB" comes on white when the flight crew releases the ENG 1(2) FIRE pb to help the flight crew identify the AGENT pb-sw to be activated.
- "DISCH" comes on amber when the corresponding fire extinguisher bottle has lost pressure.

Ident.: DSC-26-20-20-10-00021421.0001001 / 17 MAR 17

ENG 1(2) FIRE TEST PB

This pushbutton tests the operation of the fire detection and extinguishing system for ENG 1(2).

When pressed:
- A continuous repetitive chime (CRC) sounds
- The MASTER WARNING lights flash
- ENG FIRE warning appears on ECAM.
- On the FIRE panel:
  - The ENG 1(2) FIRE pb lights up red
  - The SQUIB lights come on white if discharge supplies are available
  - The DISCH lights come on amber.
- On the ENG MASTER panel (pedestal):
  - The FIRE lights come on red.

Ident.: DSC-26-20-20-10-00021423.0001001 / 17 MAR 17

APU FIRE PB

The pushbutton normal position is in, and guarded. When the flight crew pushes it, the pushbutton is released and sends an electrical signal that performs the following for the APU:
- Shuts down the APU
- Silences the aural warning
- Arms the squib on the APU fire extinguisher
- Closes the low-pressure fuel valve
- Shuts off the APU fuel pump
- Closes the APU bleed valve and X bleed valve and deactivates the APU generator.

The red lights come on, regardless of the pushbutton position, whenever an APU fire warning is activated.

Ident.: DSC-26-20-20-10-00021424.0001001 / 17 MAR 17

AGENT PB-SW

The APU AGENT pb-sw becomes active when the flight crew releases the APU FIRE pb.
A brief push on the pushbutton-switch discharges the corresponding fire agent.

- "SQUIB" comes on white when the pilot releases the APU FIRE pb.
- "DISCH" comes on amber when the fire extinguisher bottle has lost pressure.

Note: *A red disk, which is outside at the rear of the fuselage, signals that the agent is not discharged overboard due to bottle overpressure.*

Ident.: DSC-26-20-20-10-00021425.0001001 / 17 MAR 17

APU FIRE TEST PB

This pushbutton tests the operation of the APU fire detection and extinguishing system.

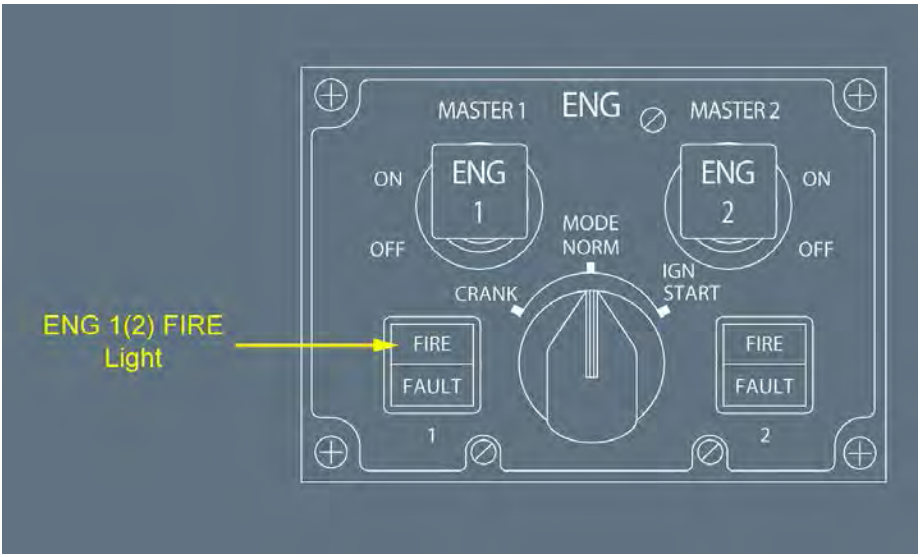
When pressed:
- A continuous repetitive chime (CRC) sounds
- The MASTER WARNING lights flash
- APU FIRE warning appears on ECAM.
- On the FIRE panel:
  - The APU FIRE pb lights up red
  - The SQUIB light comes on white if discharge supplies are available
  - The DISCH light comes on amber.

Note: *The automatic shutdown of the APU on the ground does not occur when the flight crew performs this test.*

ENG MASTER PANEL

Applicable to: ALL

Ident.: DSC-26-20-20-20-00021427.0001001 / 17 MAR 17



Ident.: DSC-26-20-20-20-00021428.0001001 / 17 MAR 17

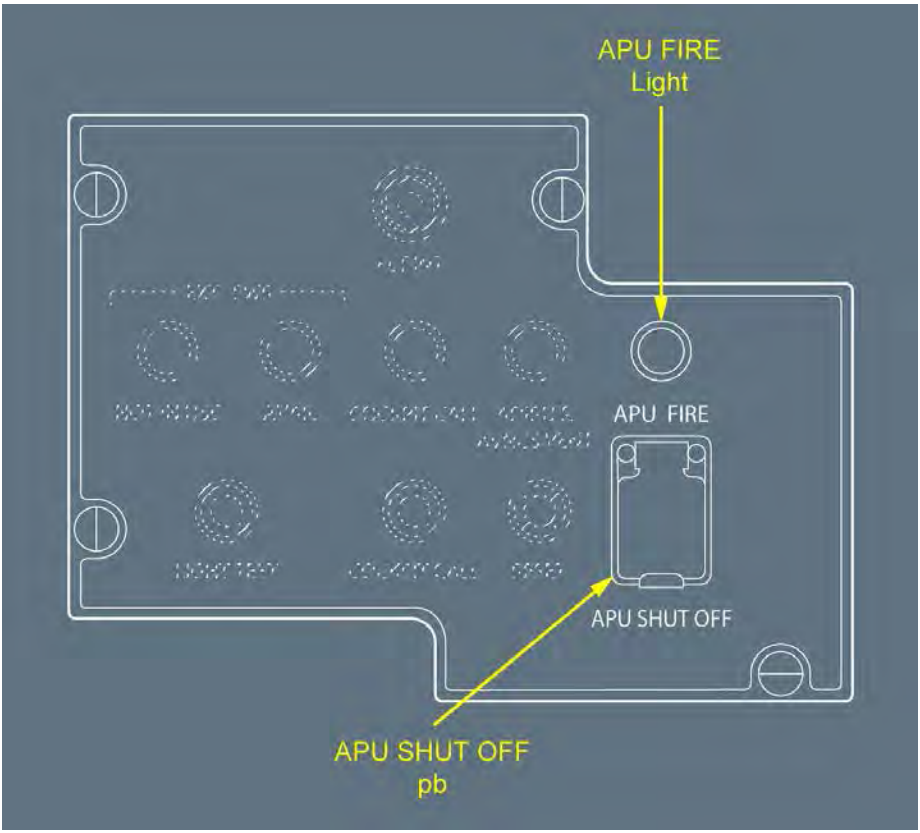
ENG 1(2) FIRE LIGHT

This light identifies the engine to be shutdown in the case of fire.
The light comes on red when an engine fire warning is triggered.

EXTERNAL POWER PANEL

Applicable to: ALL

Ident.: DSC-26-20-20-30-00021429.0001001 / 17 MAR 17



Ident.: DSC-26-20-20-30-00021430.0001001 / 17 MAR 17

APU FIRE LIGHT

The red APU FIRE light comes on and an external warning horn sounds when the system detects an APU fire.
The APU fire extinguisher discharges automatically 3 s after the appearance of the fire warning.
The light goes out when the fire has been extinguished.

Ident.: DSC-26-20-20-30-00021431.0001001 / 17 MAR 17

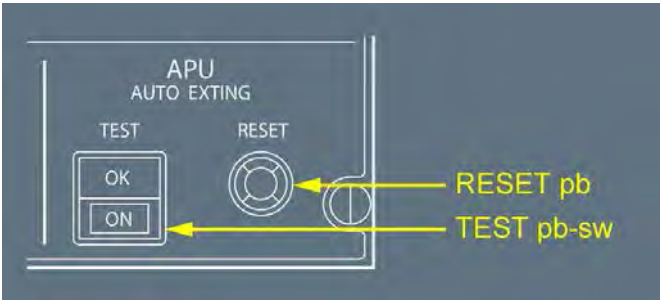
APU SHUT OFF PB

This pushbutton is used for manual APU emergency shutdown, if an emergency situation is detected on ground by the ground crew. When this pushbutton is pressed, the APU low pressure fuel shutoff valve closes, and the ECB receives a signal that starts the shutdown sequence. The shutdown sequence is the same as the APU automatic shutdown sequence, except that there is no cool down cycle. Pressing this pushbutton also silences the external warning horn.

MAINTENANCE PANEL

Applicable to: ALL

Ident.: DSC-26-20-20-40-00021432.0001001 / 17 MAR 17



Ident.: DSC-26-20-20-40-00021435.0001001 / 17 MAR 17

TEST PB-SW

When pressed, tests the following APU circuits:
- Fire warning
- Auto extinguishing
- Shutdown.

During the test sequence, the APU MASTER sw must be ON.
If all circuits are operating correctly, the OK light comes on.

Note: *If the APU was running, it shuts down.*

Ident.: DSC-26-20-20-40-00021436.0001001 / 17 MAR 17

RESET PB

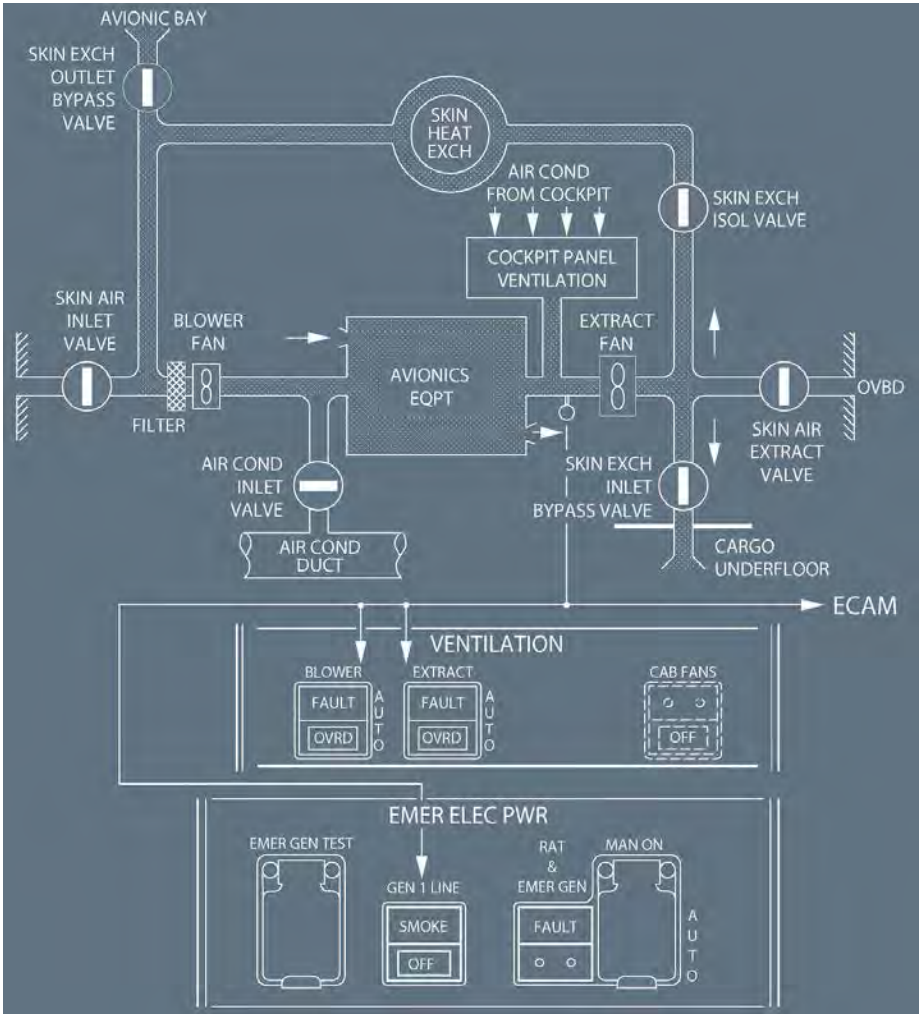
When pressed, resets the test circuit.

SMOKE DETECTION

Ident.: DSC-26-30-10-00021401.0001001 / 17 MAR 17
Applicable to: ALL

The air extraction duct of the avionics ventilation system has one smoke detector.

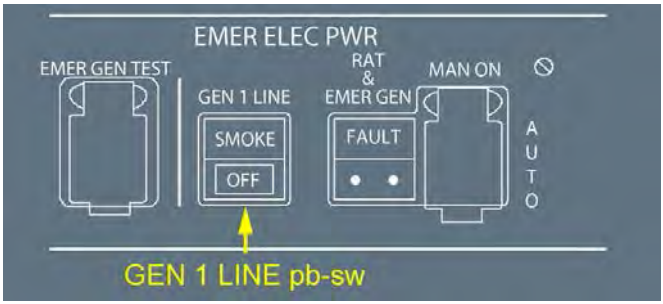
When smoke is detected for more than 5 s:
- The Single Chime (SC) sounds
- The MASTER CAUTION lights flash
- The ECAM AVIONICS SMOKE alert triggers
- On the EMER ELEC PWR panel, the SMOKE light of the GEN 1 LINE pb-sw comes on
- On the VENTILATION panel, the FAULT lights of the BLOWER pb-sw and the EXTRACT pb-sw come on.


AVIONIC BAY
SKIN EXCH OUTLET BYPASS VALVE
SKIN HEAT EXCH
AIR COND FROM COCKPIT
SKIN EXCH ISOL VALVE
COCKPIT PANEL VENTILATION
SKIN AIR INLET VALVE
BLOWER FAN
EXTRACT FAN
AVIONICS EQPT
OVBD
FILTER
SKIN AIR EXTRACT VALVE
AIR COND INLET VALVE
SKIN EXCH INLET BYPASS VALVE
AIR COND DUCT
CARGO UNDERFLOOR
ECAM
VENTILATION
BLOWER
EXTRACT
CAB FANS
FAULT
OVRD
AUTO
OFF
EMER ELEC PWR
EMER GEN TEST
GEN 1 LINE
SMOKE
RAT & EMER GEN
MAN ON

EMER ELEC PWR PANEL

Applicable to: ALL

Ident.: DSC-26-30-20-A-00021439.0001001 / 17 MAR 17



Ident.: DSC-26-30-20-A-00021440.0001001 / 17 MAR 17

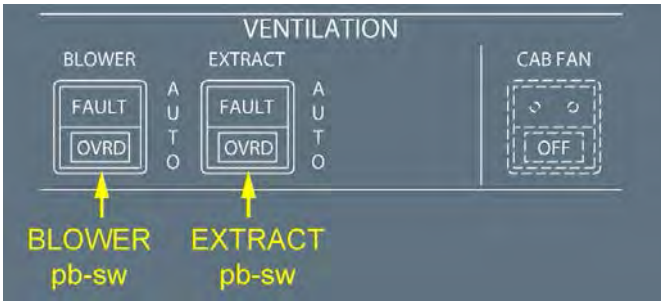
GEN 1 LINE PB-SW

SMOKE light on : The amber light comes on when smoke is detected in the avionics ventilation duct.

VENTILATION PANEL

Applicable to: ALL

Ident.: DSC-26-30-20-B-00021402.0001001 / 17 MAR 17



Ident.: DSC-26-30-20-B-00021437.0001001 / 17 MAR 17

BLOWER PB-SW

FAULT light on : The amber light comes on when smoke is detected in the avionics ventilation duct.

Ident.: DSC-26-30-20-B-00021438.0001001 / 17 MAR 17

EXTRACT PB-SW

FAULT light on : The amber light comes on when smoke is detected in the avionics ventilation duct.

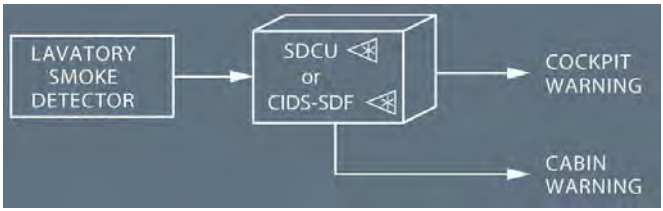
SMOKE DETECTION

Ident.: DSC-26-40-10-00021441.0001001 / 17 MAR 17
Applicable to: ALL

The lavatory smoke detection system consists of:

- One smoke detector, in the air extraction duct of the lavatory
- A double channel Smoke Detection Control Unit (SDCU) ◁ or a Cabin Intercommunication Data Systems (CIDS) with a Smoke Detection Function (SDF) ◁ that triggers the applicable alerts (cockpit and cabin).

In the case of smoke in a lavatory, the detector sends a signal to the SDCU or CIDS, which transmits it to the Flight Warning Computer (FWC) for warning in the cockpit and in the cabin.



WASTEBIN FIRE EXTINGUISHING

Ident.: DSC-26-40-10-00001034.0001001 / 21 MAR 16
Applicable to: ALL

Each lavatory wastebin has an automatic fire extinguishing system.

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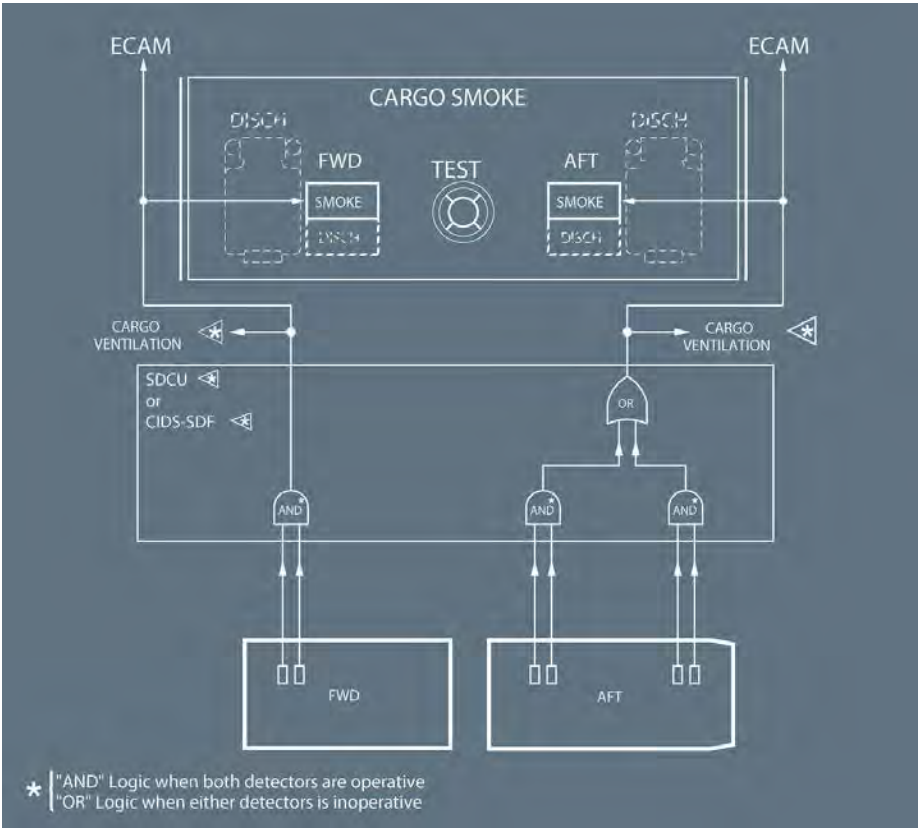
SMOKE DETECTION

Ident.: DSC-26-50-10-00021442.0003001 / 17 MAR 17
Applicable to: ALL

The forward and aft cargo compartments smoke detection system consists of:
- Two smoke detectors that are in the forward cargo compartment ceiling panel cavities. Each detector is linked to one of the two detection loops (dual loop principle).
- Four smoke detectors that are in the aft cargo compartment ceiling panel cavities. Each detector is linked to one of the two detection loops (dual loop principle).
- A Smoke Detection Control Unit (SDCU) ◁✻ with two identical channels, or a Cabin Intercommunication Data Systems (CIDS) with a Smoke Detection Function (SDF) ◁✻ , that receives signals from the smoke detectors, and transmits it to the ECAM.

Smoke in one cavity activates the cargo smoke warning if:
- Both smoke detectors detect smoke, or
- One smoke detector detects smoke and the other is inoperative.

Cargo isolation valves ◁✻ close automatically, and the extraction fan ◁✻ stops when the cargo smoke warning is activated.



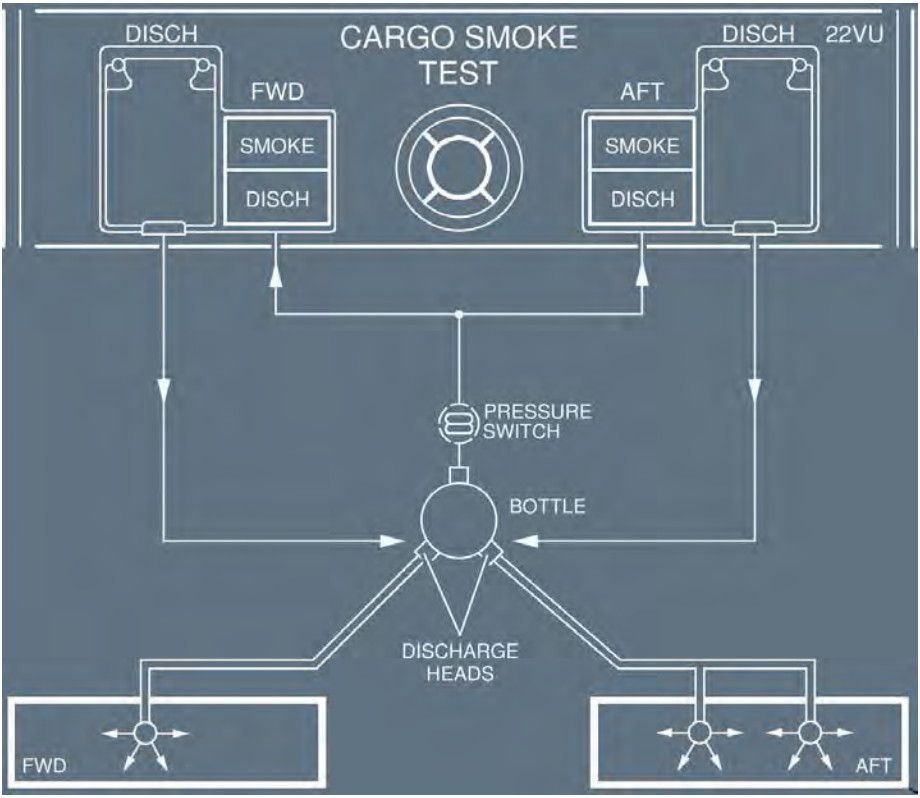
FIRE EXTINGUISHING

Ident.: DSC-26-50-10-00021443.0005001 / 17 MAR 17
Applicable to: ALL

A fire extinguishing system protects the forward and aft cargo compartments.

One fire bottle with two discharge heads, one for each compartment, supplies three nozzles:
- One nozzle in the forward cargo compartment
- Two nozzles in the aft cargo compartment.

When the flight crew presses the FWD(AFT) DISCH pb, the action ignites the corresponding squib on the fire bottle, which then discharges the extinguisher agent into that cargo compartment. When the bottle is empty, the DISCH light comes on amber.


DISCH
CARGO SMOKE TEST
DISCH
22VU
FWD
SMOKE
DISCH
AFT
SMOKE
DISCH
PRESSURE SWITCH
BOTTLE
DISCHARGE HEADS
FWD
AFT

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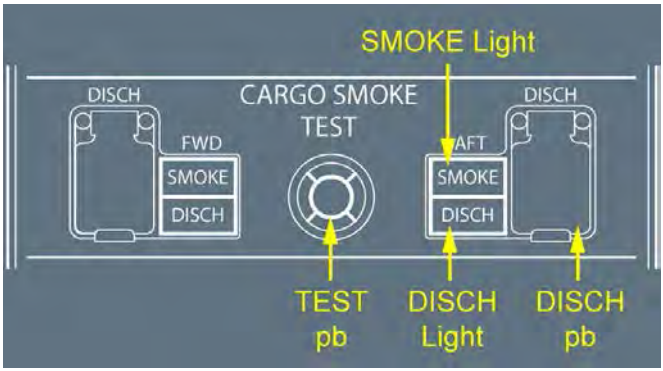
CARGO SMOKE PANEL

Applicable to: ALL

Ident.: DSC-26-50-20-10-00021446.0005001 / 17 MAR 17



Ident.: DSC-26-50-20-10-00021450.0001001 / 17 MAR 17

SMOKE LIGHT

This red light, and the associated ECAM warning, come on when the system detects smoke in the indicated cargo compartment. This light comes on, if:

- Both channels detect smoke, or
- One channel detects smoke and the other channel is faulty.

Ident.: DSC-26-50-20-10-00021451.0002001 / 17 MAR 17

TEST PB

Tests the operation of the cargo smoke detection system.

When pressed for at least 3 s, and until released:

- Tests the smoke detectors in sequence
- Turns on the red SMOKE lights twice, and displays the ECAM warning
- Closes the isolation valves of the cargo ventilation system ◁
- The DISCH lights come on in amber.

Ident.: DSC-26-50-20-10-00021452.0001001 / 17 MAR 17

DISCH LIGHT

Within 60 s after pressing the discharge pushbutton, the amber DISCH light comes on when the associated bottle is fully discharged.

Ident.: DSC-26-50-20-10-00021454.0001001 / 17 MAR 17

DISCH PB

The DISCH pb ignites the squib, thereby discharging the extinguishing agent in the affected cargo compartment.

AIRCRAFT SYSTEMS

FLIGHT CONTROLS

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DSC-27-10 General

DSC-27-20 Flight Control System

Continued on the following page

Continued from the previous page

GENERAL

Ident.: DSC-27-10-10-00001043.0001001 / 21 MAR 16
Applicable to: ALL

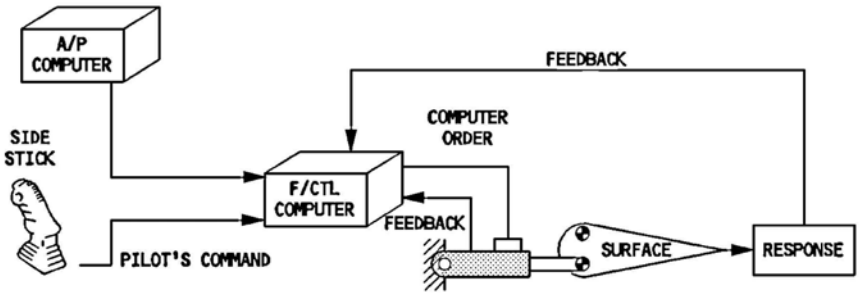
The fly-by-wire system was designed and certified to render the new generation of aircraft even more safe, cost effective, and pleasant to fly.

BASIC PRINCIPLE

Ident.: DSC-27-10-10-00001044.0001001 / 21 MAR 16
Applicable to: ALL

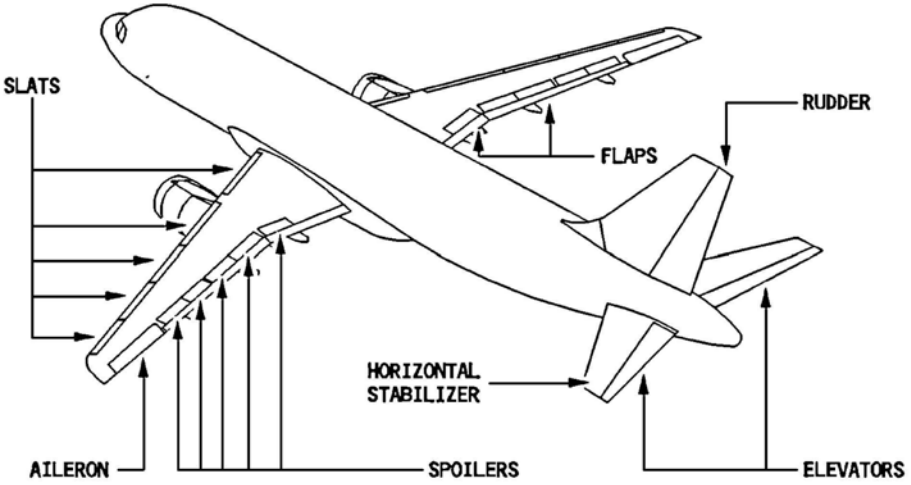
Flight control surfaces are all :
- Electrically-controlled, and
- Hydraulically-activated.

The stabilizer and rudder can also be mechanically-controlled.
Pilots use sidesticks to fly the aircraft in pitch and roll (and in yaw, indirectly, through turn coordination).
Computers interpret pilot input and move the flight control surfaces, as necessary, to follow their orders.
However, when in normal law, regardless of the pilot's input, the computers will prevent excessive maneuvers and exceedance of the safe envelope in pitch and roll axis.
However, as on conventional aircraft, the rudder has no such protection.



CONTROL SURFACES

Ident.: DSC-27-10-10-00001045.0001001 / 21 MAR 16
Applicable to: ALL



The flight controls are electrically or mechanically controlled as follows :

PITCH AXIS

Elevator = Electrical
Stabilizer = Electrical for normal or alternate control. Mechanical for manual trim control

ROLL AXIS

Ailerons = Electrical
Spoilers = Electrical

YAW AXIS

Rudder = Mechanical, however control for yaw damping, turn coordination and trim is electrical.

SPEED BRAKES

Speed brakes = Electrical

Note: All surfaces are hydraulically actuated.

COCKPIT CONTROLS

Ident.: DSC-27-10-10-00001046.0001001 / 21 MAR 16
Applicable to: ALL

- Each pilot has a sidestick controller with which to exercise manual control of pitch and roll. These are on their respective lateral consoles.
  The two sidestick controllers are not coupled mechanically, and they send separate sets of signals to the flight control computers.
- Two pairs of pedals, which are rigidly interconnected, give the pilot mechanical control of the rudder.
- The pilots control speed brakes with a lever on the center pedestal.
- The pilots use mechanically interconnected handwheels on each side of the center pedestal to control the trimmable horizontal stabilizer.
- The pilots use a single switch on the center pedestal to set the rudder trim.
- There is no manual switch for trimming the ailerons.

COMPUTERS

Ident.: DSC-27-10-10-00001047.0001001 / 21 MAR 16
Applicable to: ALL

Seven flight control computers process pilot and autopilot inputs according to normal, alternate, or direct flight control laws.
The computers are :

2 ELACs

(Elevator Aileron Computer)

For : Normal elevator and stabilizer control.
Aileron control.

3 SECs

(Spoilers Elevator Computer)

For : Spoilers control.
Standby elevator and stabilizer control.

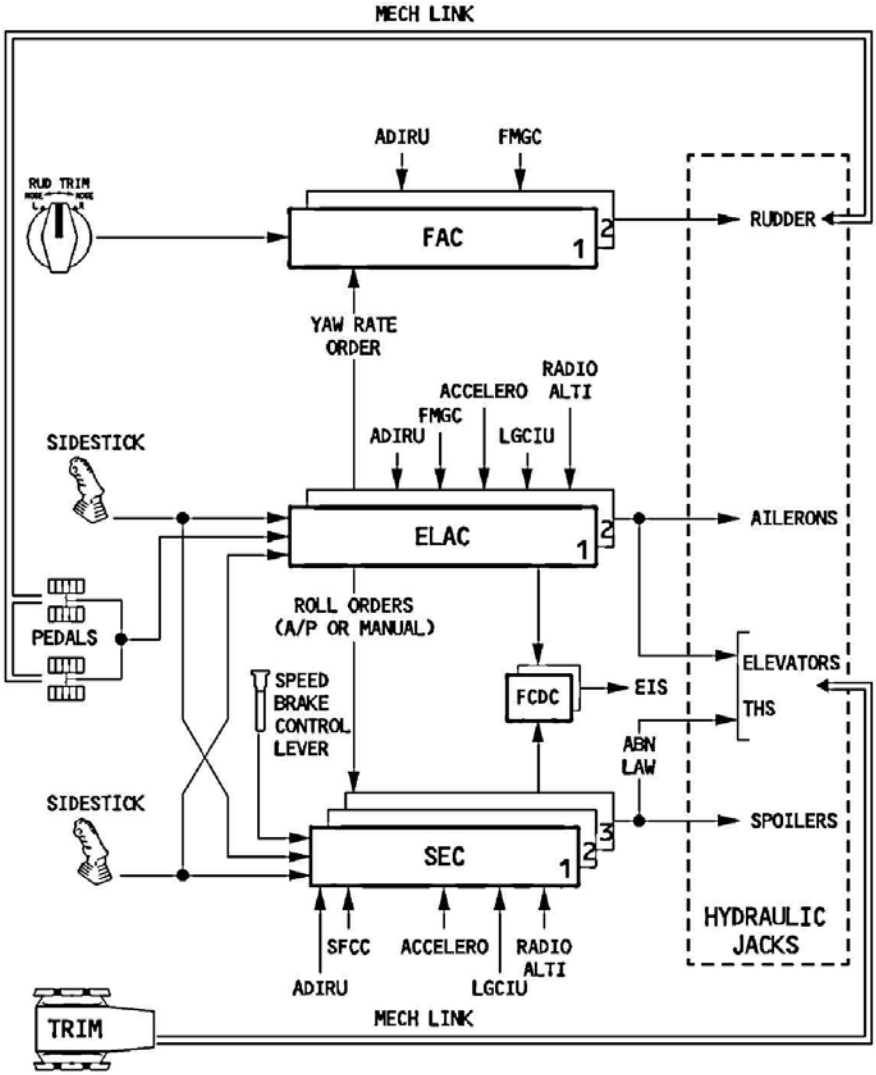
2 FACs

(Flight Augmentation Computer)

For : Electrical rudder control.

IN ADDITION 2 FCDC

Flight Control Data Concentrators (FCDC) acquire data from the ELACs and SECs and send it to the electronic instrument system (EIS) and the centralized fault display system (CFDS).


MECH LINK
ADIRU
FMGC
RUD TRIM
FAC
1
2
RUDDER
YAW RATE
ORDER
RADIO
ALTI
ACCELERO
FMGC
ADIRU
LGCIU
SIDESTICK
ELAC
1
2
AILERONS
PEDALS
ROLL ORDERS
(A/P OR MANUAL)
ELEVATORS
SPEED
BRAKE
CONTROL
LEVER
FCDC
EIS
THS
ABN
LAW
SIDESTICK
SEC
1
2
3
SPOILERS
HYDRAULIC
JACKS
SFCC
ACCELERO
RADIO
ALTI
ADIRU
LGCIU
TRIM
MECH LINK

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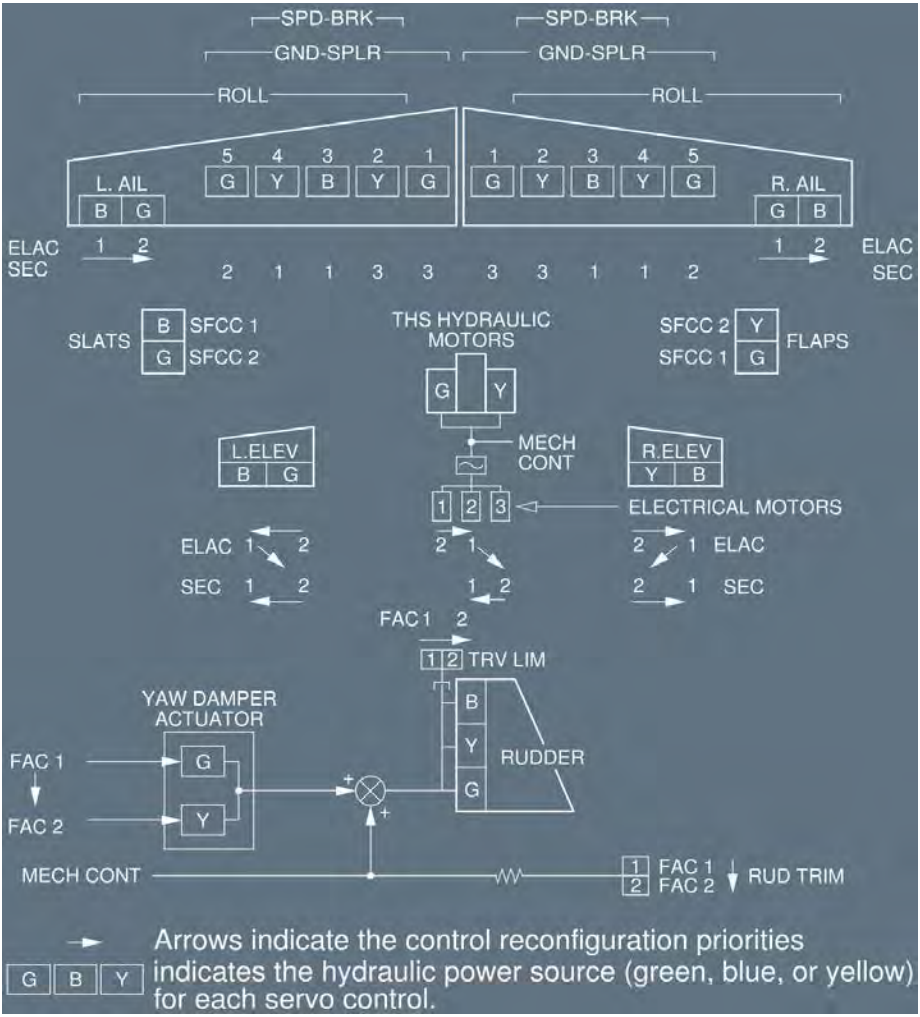
GENERAL ARCHITECTURE

Ident.: DSC-27-10-20-00001048.0002001 / 13 JAN 14
Applicable to: ALL

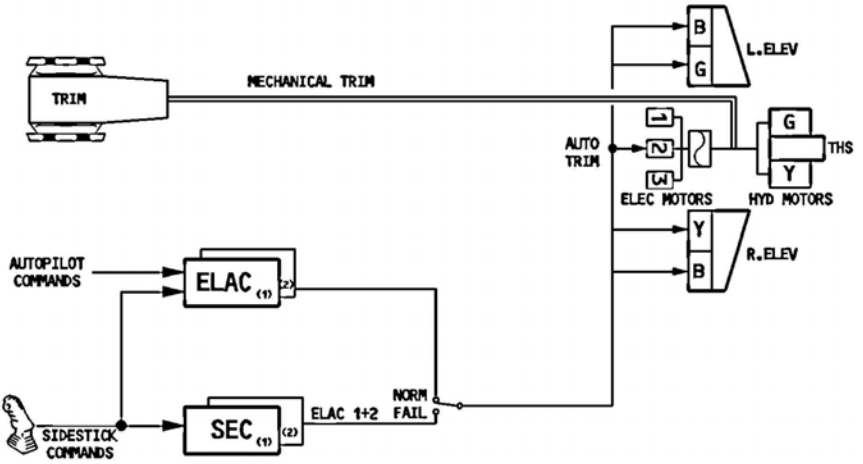


PITCH CONTROL

Applicable to: ALL

Ident.: DSC-27-10-20-A-00001049.0001001 / 21 MAR 16

GENERAL



Two elevators and the Trimmable Horizontal Stabilizer (THS) control the aircraft in pitch. The maximum elevator deflection is 30 ° nose up, and 17 ° nose down. The maximum THS deflection is 13.5 ° nose up, and 4 ° nose down.

Ident.: DSC-27-10-20-A-00001050.0001001 / 21 MAR 16

ELECTRICAL CONTROL

- In normal operations, ELAC2 controls the elevators and the horizontal stabilizer, and the green and yellow hydraulic jacks drive the left and right elevator surfaces respectively.
  The THS is driven by N° 1 of three electric motors.
- If a failure occurs in ELAC2, or in the associated hydraulic systems, or with the hydraulic jacks, the system shifts pitch control to ELAC1. ELAC1 then controls the elevators via the blue hydraulic jacks and controls the THS via the N° 2 electric motor.
- If neither ELAC1 nor ELAC2 is available, the system shifts pitch control either to SEC1 or to SEC2, (depending on the status of the associated circuits), and to THS motor N° 2 or N° 3.

In case of failure, the actuators are reconfigured, *Refer to DSC-27-10-20 Pitch Control - Schematic*.

Ident.: DSC-27-10-20-A-00001051.0001001 / 21 MAR 16

MECHANICAL CONTROL

Mechanical control of the THS is available from the pitch trim wheel at any time, if either the green or yellow hydraulic system is functioning.
Mechanical control from the pitch trim wheel has priority over electrical control.

Ident.: DSC-27-10-20-A-00001053.0002001 / 21 MAR 16

ACTUATION

ELEVATORS

- Two electrically-controlled hydraulic servojacks drive each elevator.

  Each servojack has three control modes :
  - Active : The jack position is electrically-controlled.
  - Damping : The jack follows surface movement.
  - Centering : The jack is hydraulically retained in the neutral position.

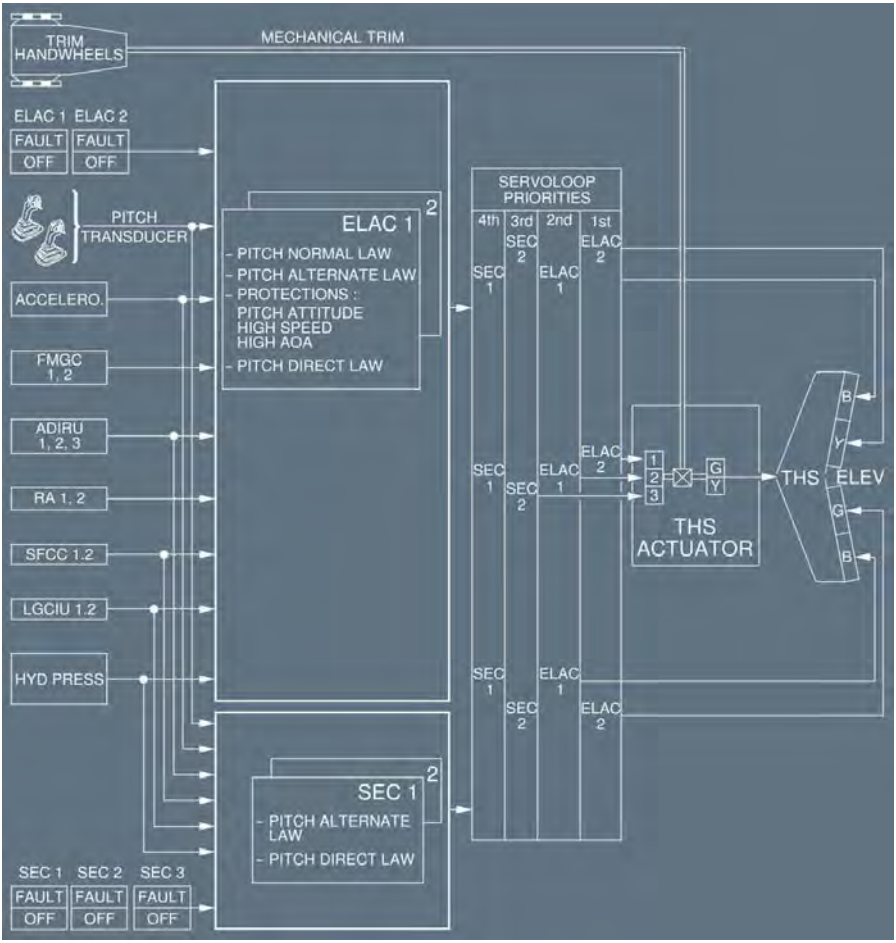
- In normal operation :
  - One jack is in active mode.
  - The other jack is in damping mode.
  - Some maneuvers cause the second jack to become active.
- If the active servojack fails, the damped one becomes active, and the failed jack is automatically switched to damping mode.
- If neither jack is being controlled electrically, both are automatically switched to the centering mode.
- If neither jack is being controlled hydraulically, both are automatically switched to damping mode.
- If one elevator fails, the deflection of the remaining elevator is limited in order to avoid putting excessive asymmetric loads on the horizontal tailplane or rear fuselage.

STABILIZER

- A screwjack driven by two hydraulic motors drives the stabilizer.
- The two hydraulic motors are controlled by :
  - One of three electric motors, or
  - The mechanical trim wheel.

Ident.: DSC-27-10-20-A-00001054.0001001 / 09 OCT 12

SCHEMATIC

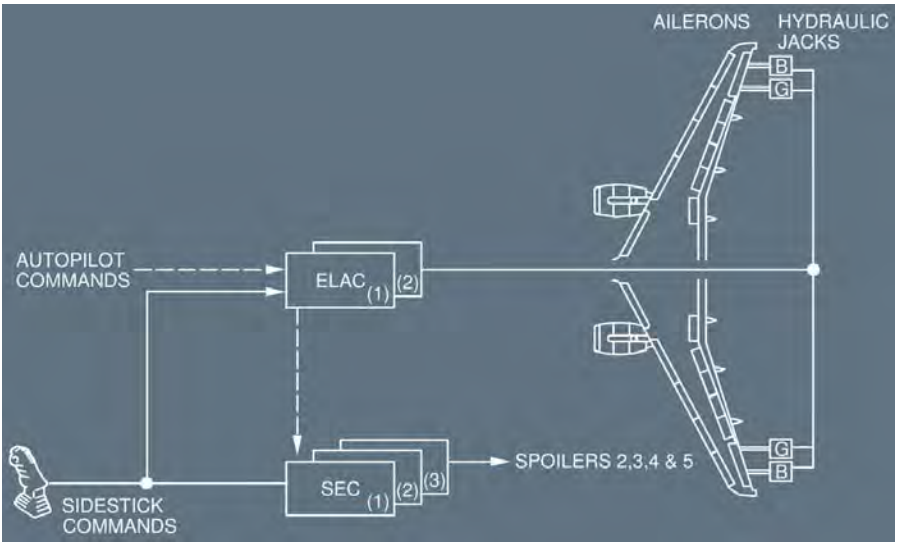


ROLL CONTROL

Applicable to: ALL

Ident.: DSC-27-10-20-B-00001055.0003001 / 09 OCT 12

GENERAL



One aileron and four spoilers on each wing control the aircraft about the roll axis.
The maximum deflection of the ailerons is 25 °.
The ailerons extend 5 ° down when the flaps are extended (aileron droop).
The maximum deflection of the spoilers is 35 °.

Ident.: DSC-27-10-20-B-00001056.0001001 / 21 MAR 16

ELECTRIC CONTROL

- The ELAC 1 normally controls the ailerons.
  If ELAC1 fails, the system automatically transfers aileron control to ELAC2.
  If both ELACs fail, the ailerons revert to the damping mode.
- SEC3 controls the N° 2 spoilers, SEC1 the N° 3 and 4 spoilers, and SEC2 the N° 5 spoilers.
  If a SEC fails, the spoilers it controls are automatically retracted.

Ident.: DSC-27-10-20-B-00001057.0001001 / 21 MAR 16

ACTUATION

AILERONS

Each aileron has two electrically controlled hydraulic servojacks.
One of these servojacks per aileron operates at a time.

Each servojack has two control modes :

Active : Jack position is controlled electrically
Damping : Jack follows surface movement.

The system automatically selects damping mode, if both ELACs fail or in the event of blue and green hydraulic low pressure.

SPOILERS

A servojack positions each spoiler. Each servojack receives hydraulic power from either the green, yellow, or blue hydraulic system, controlled by the SEC1, 2 or 3 (*Refer to DSC-27-10-20 General Architecture* diagram).
The system automatically retracts the spoilers to their zero position, if it detects a fault or loses electrical control.
If the system loses hydraulic pressure, the spoiler retains the deflection it had at the time of the loss, or a lesser deflection if aerodynamic forces push it down.
When a spoiler surface on one wing fails, the symmetric one on the other wing is inhibited.

SPEED BRAKES AND GROUND SPOILERS

Ident.: DSC-27-10-20-C-00001058.0011001 / 26 MAY 14
Applicable to: MSN 3408, 4100-4547

SPEED BRAKE CONTROL

The pilot controls the speedbrakes with the speed brake lever.
The speedbrakes are actually spoilers 2, 3 and 4.

Speedbrake extension is inhibited, if:
- SEC 1 and SEC 3 both have faults, or
- An elevator (L or R) has a fault, or
- Angle-of-attack protection is active, or
- Flaps are in configuration FULL, or
- Thrust levers above MCT position, or
- Alpha Floor activation.

If an inhibition occurs when the speedbrakes are extended, they retract automatically and stay retracted until the inhibition condition disappears and the pilots reset the lever. (The speedbrakes can be extended again 10 s or more after the lever is reset).
When a speedbrake surface on one wing fails, the symmetric one on the other wing is inhibited.

Note: 1. For maintenance purposes, the speedbrake lever will extend the N° 1 surfaces when the aircraft is stopped on ground, whatever the slat/flap configuration.
2. When the aircraft is flying faster than 315 kt or M 0.75 with the autopilot engaged, the speedbrake retraction rate is reduced (Retraction from FULL to in takes about 25 s).

L3 The maximum speedbrake deflection in manual flight is:
40 ° for spoilers 3 and 4
20 ° for spoiler 2.

The maximum speedbrake deflection with the autopilot engaged is:
25 ° for spoilers 3 and 4
12.5 ° for spoiler 2.

The maximum speedbrake deflection achievable with the autopilot engaged is obtained by setting the speedbrake lever to the half way position. On setting the position of the speedbrake lever from half to full, no increase in speedbrake deflection will be achieved.
For these surfaces (which perform both roll and speedbrake functions) the roll function has priority. When the sum of a roll order and a simultaneous speedbrake order on one surface is greater than the maximum deflection available in flight, the same surface on the other wing is retracted until the difference between the two surfaces is equal to the roll order.

Ident.: DSC-27-10-20-C-00001058.0014001 / 26 MAY 14
Applicable to: MSN 1882-2078, 3467-3518

The pilot controls the speedbrakes with the speedbrake lever.
The speedbrakes are actually spoilers 2, 3 and 4.

Speedbrake extension is inhibited, if:
- SEC1 and SEC3 both have faults, or
- An elevator (L or R) has a fault, or
- Angle-of-attack protection is active, or
- Flaps are in configuration FULL, or
- Thrust levers above MCT position, or
- Alpha Floor activation.

If an inhibition occurs when the speedbrakes are extended, they automatically retract and remain retracted until the inhibition condition disappears and the pilots reset the lever. (The speedbrakes can be extended again, 10 s or more after the lever is reset).
When a speedbrake surface on one wing fails, the symmetric one on the other wing is inhibited.

Note: *1. For maintenance purposes, the speedbrake lever will extend the N° 1 surfaces when the aircraft is stopped on ground, regardless of the slat/flap configuration.*
2. When the aircraft is flying faster than 315 kt or M 0.75 with the autopilot engaged, the speedbrake retraction rate is reduced (Retraction from FULL to in takes about 25 s).

L3 The maximum deflection for the spoilers is:

- 25 ° for spoilers 3 and 4;
- 12.5 ° for spoiler 2 in configuration 3, and 17.5 ° in other configurations.

For these surfaces (which perform both roll and speedbrake functions) the roll function has priority. When the sum of a roll order and a simultaneous speedbrake order on one surface is greater than the maximum deflection available in flight, the same surface on the other wing is retracted until the difference between the two surfaces is equal to the roll order.

Ident.: DSC-27-10-20-C-00017787.0002001 / 28 APR 16
Applicable to: ALL

GROUND SPOILER CONTROL

The ground spoiler function involves all spoilers (full extension) and ailerons (Aileron Anti Droop ◁✻).
When a ground spoiler surface on one wing fails, the symmetric ground spoiler surface on the other wing is inhibited.

ARMING

The pilot arms the ground spoilers by pulling the speedbrake control lever up into the armed position.

FULL EXTENSION – REJECTED TAKEOFF PHASE

- If the ground spoilers are armed and the speed exceeds 72 kt, the ground spoilers will automatically extend as soon as both thrust levers are reset to idle.
- If the ground spoilers are not armed and the speed exceeds 72 kt, the ground spoilers will automatically extend as soon as reverse is selected on one engine (the other thrust lever remains at idle).

FULL EXTENSION - LANDING PHASE

The ground spoilers will automatically extend when the following conditions are met:
- Speed brake lever not in the retracted position or ground spoilers armed and:
  - Both main landing gears on ground,
  - Both thrust levers at or below Idle position, or Reverse selected on at least one engine (and the other thrust lever below MCT position).
- Speed brake lever in the retracted position but ground spoilers not armed and:
  - Both main landing gears on ground,
  - Reverse selected on at least one engine (and the other thrust lever below MCT position).

The ailerons are fully-extended (Aileron Anti Droop ⩤), provided one aileron servocontrol is available on each side, when:
- The ground spoilers are fully extended
- Flaps are not in clean CONF
- Pitch attitude is lower than 2.5 °
- Flying manually
- In normal law only.

PARTIAL EXTENSION

In order to accelerate the full spoiler extension, the Phased Lift Dumping (PLD) function allows the ground spoilers to deploy with a reduced deflection when the following conditions are met:
- Speed brake lever not in the retracted position or ground spoilers armed and:
  - One main landing gear on ground,
  - Both thrust levers at or below Idle position.
- Speed brake lever in the retracted position but ground spoilers not armed and:
  - One main landing gear on ground,
  - Reverse selected on at least one engine (and the other thrust lever below MCT position).

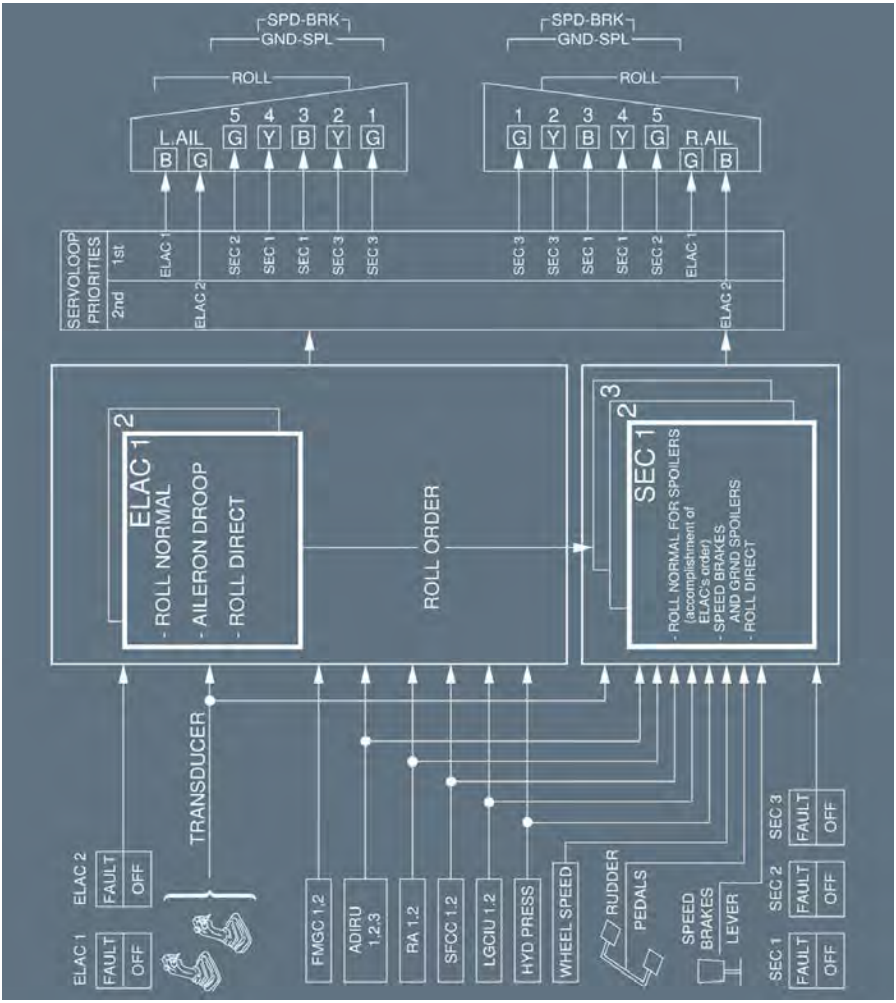
In order to reduce the bounce severity at landing in the case of an inappropriate thrust lever handling during flare, ground spoilers are also partially deployed when the following conditions are met:
- Ground spoilers armed,
- Both main landing gears on ground,
- Both thrust levers at or below the Climb position.

RETRACTION

The ground spoilers retract:
- After landing,
- After a rejected takeoff, when the ground spoilers are disarmed.
- During a touch and go, when at least one thrust lever is advanced above 20 °.

Ident.: DSC-27-10-20-C-00001060.0002001 / 22 MAY 12
Applicable to: ALL

ROLL CONTROL - SCHEMATIC

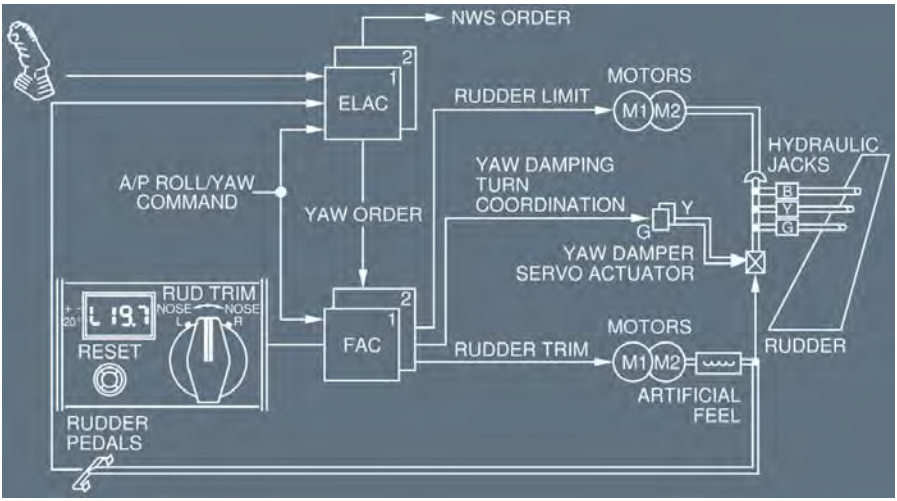


YAW CONTROL

Applicable to: ALL

Ident.: DSC-27-10-20-D-00001061.0001001 / 09 OCT 12

GENERAL



One rudder surface controls yaw.

Ident.: DSC-27-10-20-D-00001062.0001001 / 21 MAR 16

ELECTRICAL RUDDER CONTROL

The yaw damping and turn coordination functions are automatic.
The ELACs compute yaw orders for coordinating turns and damping yaw oscillations, and transmit them to the FACs.

Ident.: DSC-27-10-20-D-00001063.0001001 / 21 MAR 16

MECHANICAL RUDDER CONTROL

The pilots can use conventional rudder pedals to control the rudder.

Ident.: DSC-27-10-20-D-00001064.0001001 / 21 MAR 16

RUDDER ACTUATION

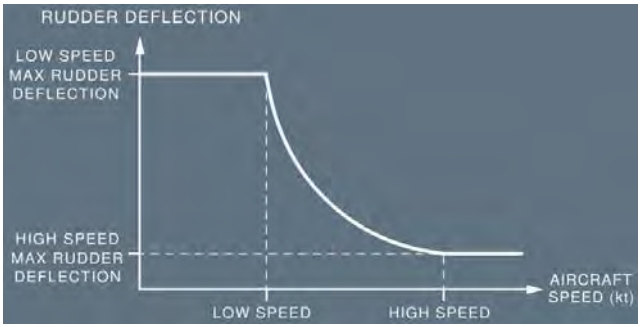
Three independent hydraulic servojacks, operating in parallel, actuate the rudder. In automatic operation (yaw damping, turn coordination) a green servo actuator drives all three servojacks. A yellow servo actuator remains synchronized and takes over if there is a failure.

There is no feedback to the rudder pedals from the yaw damping and turn coordination functions.

Ident.: DSC-27-10-20-D-00001065.0003001 / 21 MAR 16

RUDDER TRAVEL LIMIT

The maximum rudder travel deflection gradually reduces as the speed increases, to avoid structural loads:



In the case of a failure that causes loss of the Rudder Travel limit system, the rudder deflection limit stops at the last value reached. At slats extension, full rudder travel authority is recovered.
In all cases, the available rudder deflection provides sufficient yaw control within the entire flight envelope. This includes the case of maximum asymmetric thrust.

Ident.: DSC-27-10-20-D-00015506.0001001 / 21 MAR 16

RELATIONSHIP BETWEEN SIDESLIP/RUDDER DEFLECTION/RUDDER PEDAL TRAVEL

Regardless of the aircraft speed, therefore the maximum rudder deflection, full rudder pedal travel remains available. However, except at low speed, maximum rudder deflection is achieved before reaching maximum rudder pedal travel.

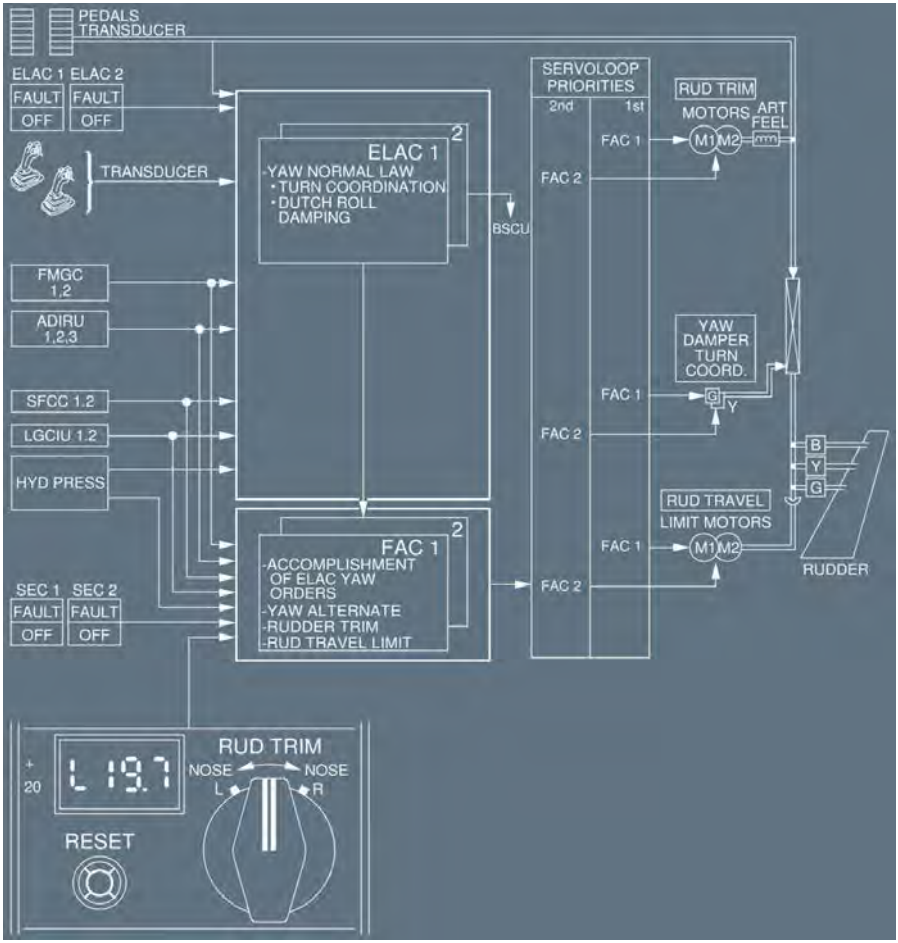
Ident.: DSC-27-10-20-D-00001066.0002001 / 21 MAR 16

RUDDER TRIM

The two electric motors that position the artificial feel unit also trim the rudder. In normal operation, motor N° 1 (controlled by FAC1), powers the trim, and FAC2 with motor N° 2 remains synchronized as a backup.
In manual flight, the pilot can apply rudder trim via the rotary RUD TRIM switch on the pedestal. The pilot can use a button on the RUD TRIM panel to reset the rudder trim to zero.

Note: *With the autopilot engaged, the FMGC computes the rudder trim orders. The rudder trim rotary switch and the rudder trim reset pushbutton are not active.*

SCHEMATIC


PEDALS TRANSDUCER
ELAC 1 ELAC 2
FAULT
OFF
TRANSDUCER
FMGC 1,2
ADIRU 1,2,3
SFCC 1,2
LGCIU 1,2
HYD PRESS
SEC 1 SEC 2
ELAC 1
-YAW NORMAL LAW
• TURN COORDINATION
• DUTCH ROLL DAMPING
FAC 1
-ACCOMPLISHMENT OF ELAC YAW ORDERS
-YAW ALTERNATE
-RUDDER TRIM
-RUD TRAVEL LIMIT
BSCU
SERVOLOOP PRIORITIES
2nd
1st
FAC 1
FAC 2
RUD TRIM
MOTORS
ART FEEL
M1
M2
YAW DAMPER TURN COORD.
RUD TRAVEL LIMIT MOTORS
RUDDER
B
Y
G
RUD TRIM
NOSE L
NOSE R
RESET

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General

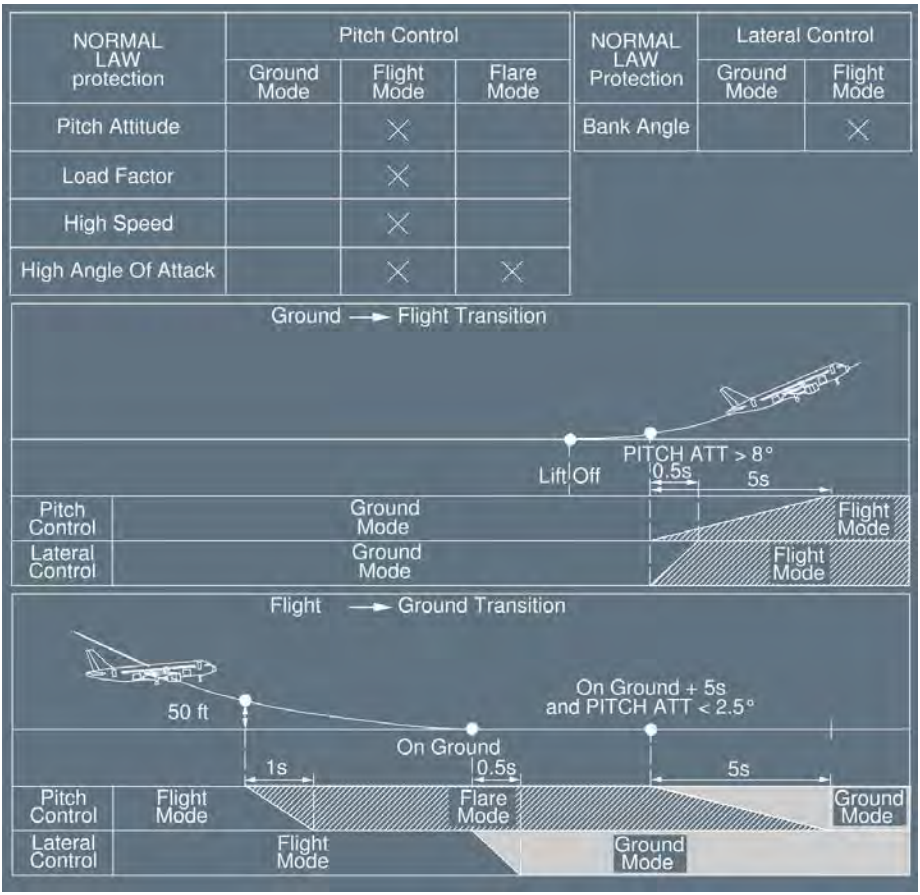
GENERAL

Ident.: DSC-27-20-10-10-00001068.0001001 / 17 MAR 17
Applicable to: ALL

Flight control normal law covers:
- three-axis control
- flight envelope protection
- alleviation of maneuver loads

NORMAL LAW protection	Pitch Control		
	Ground Mode	Flight Mode	Flare Mode
Pitch Attitude		X	
Load Factor		X	
High Speed		X	
High Angle Of Attack		X	X

NORMAL LAW Protection	Lateral Control	
	Ground Mode	Flight Mode
Bank Angle		X



One of the PF's primary tasks is to maintain the aircraft within the limits of the normal flight envelope. However, some circumstances, due to extreme situations or aircraft mishandling, may provoke the violation of these limits.
Despite system protections, the PF must not exceed deliberately the normal flight envelope. In addition, these protections are not designed to be structural limit protections (e.g. opposite rudder pedal inputs). Rather, they are designed to assist the PF in emergency and stressful situations, where only instinctive and rapid reactions will be effective.

Protections are intended to:

- Provide full authority to the PF to consistently achieve the best possible aircraft performance in extreme conditions
- Reduce the risks of overcontrolling, or overstressing the aircraft
- Provide PF with an instinctive and immediate procedure to ensure that the PF achieves the best possible result.

Pitch Control

GROUND MODE

Ident.: DSC-27-20-10-20-00001069.0001001 / 20 SEP 13
Applicable to: ALL

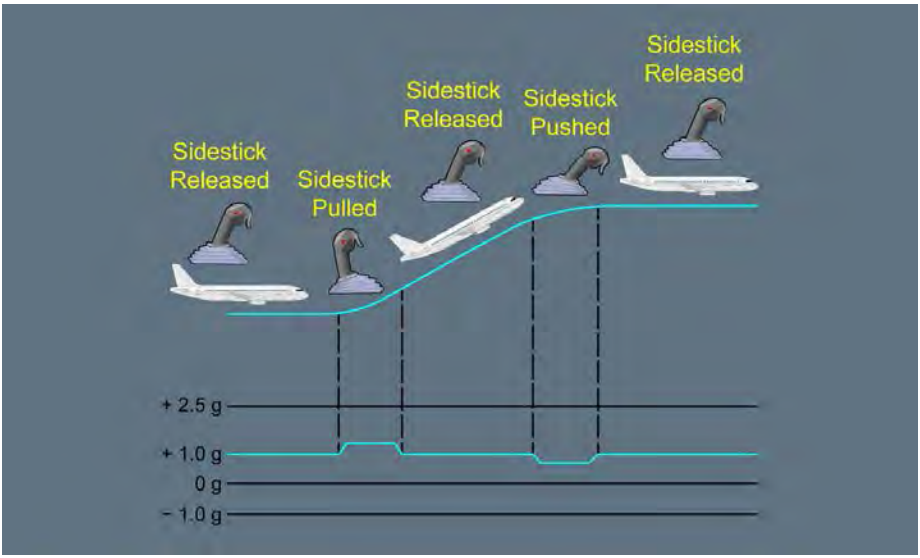
Ground mode is a direct relationship between sidestick deflection and elevator deflection, without auto trim.
It automatically sets the trimmable horizontal stabilizer (THS) at 0 ° (inside the green band).
A setting that the pilot enters manually to adjust for CG has priority for takeoff.
When the aircraft reaches 75 kt during the takeoff roll, the system reduces the maximum up elevator deflection from 30 ° to 20 °.

FLIGHT MODE

Ident.: DSC-27-20-10-20-00001070.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078, 3467-3518

The normal-law flight mode is a load-factor-demand mode with automatic trim and protection throughout the flight envelope.
Following normal law, the sidestick controllers set the elevator and THS to maintain load factor proportional to stick deflection and independent of speed.
With the sidestick at neutral, wings level, the system maintains 1 g in pitch (corrected for pitch attitude), and there is no need for the pilot to trim by changing speed or configuration. Therefore pilots only need to perform minor corrections on the sidestick, if the aircraft deviates from its intended flight path. If the pilot senses an overcontrol, the sidestick should be released.

Airbus Pitch Characteristic



Pitch trim is automatic both in manual mode and when the autopilot is engaged. In normal turns (up to 33 °C of bank) the pilot does not have to make any pitch corrections once the turn is established. The flight mode is active from takeoff to landing, and follows the logic shown schematically (*Refer to DSC-27-20-10-10 General*).

Automatic pitch trim freezes in the following situations:
- The pilot enters a manual trim order.
- The radio height is below 50 ft (100 ft with autopilot engaged).
- The load factor goes below 0.5 g.
- The aircraft is under high-speed or high-Mach protection.

When angle-of-attack protection is active, the THS setting is limited between the setting at the aircraft's entry into this protection and 3.5 ° nose down. (Neither the pilot nor the system can apply additional nose-up trim).
Similarly, when the load factor is higher than 1.25 g or when the aircraft exceeds 33 ° of bank, the THS setting is limited to values between the actual setting and 3.5 ° nose down.

CONTROL WITH AUTOPILOT ENGAGED

- The ELACs and SECs limit what the autopilot can order.
- The pilot has to overcome a restraining force in order to move the sidestick when the autopilot is engaged. If he overcomes this force and does move the sidestick, he disconnects the autopilot.

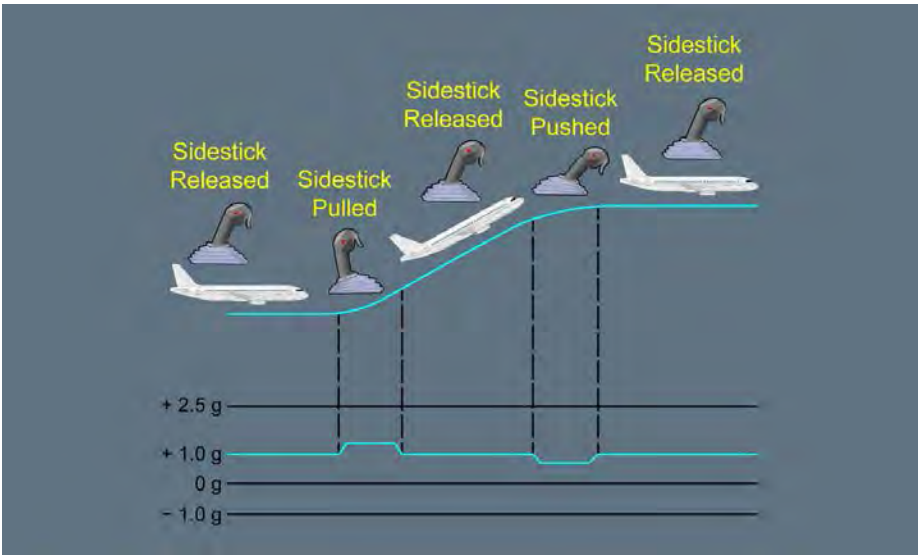
- The pilot can also disconnect the autopilot by pushing on the rudder pedals (10 ° out of trim), or by moving the pitch trim wheel beyond a certain threshold.
- All protections of normal laws remain effective except pitch attitude protection.

FLIGHT MODE

Ident.: DSC-27-20-10-20-00001070.0003001 / 17 MAR 17
Applicable to: MSN 3408, 4100-4547

The normal-law flight mode is a load-factor-demand mode with automatic trim and protection throughout the flight envelope.
Following normal law, the sidestick controllers set the elevator and THS to maintain load factor proportional to stick deflection and independent of speed.
With the sidestick at neutral, wings level, the system maintains 1 g in pitch (corrected for pitch attitude), and there is no need for the pilot to trim by changing speed or configuration. Therefore pilots only need to perform minor corrections on the sidestick, if the aircraft deviates from its intended flight path. If the pilot senses an overcontrol, the sidestick should be released.
Pitch trim is automatic both in manual mode and when the autopilot is engaged. In normal turns (up to 33 ° of bank) the pilot does not have to make any pitch corrections once the turn is established.
The flight mode is active from takeoff to landing, and follows the logic shown schematically (*Refer to DSC-27-20-10-10 General*).

Airbus Pitch Characteristic



Automatic pitch trim freezes in the following situations:
- The pilot enters a manual trim order.
- The radio height is below 50 ft (100 ft with autopilot engaged).
- The load factor goes below 0.5 g.

When angle-of-attack protection is active, the THS setting is limited between the setting at the aircraft's entry into this protection and 3.5 ° nose down. (Neither the pilot nor the system can apply additional nose-up trim).
Similarly, when the load factor is higher than 1.25 g or when the aircraft exceeds 33 ° of bank, the THS setting is limited to values between the actual setting and 3.5 ° nose down.
When High Speed or High Mach Protection is active, the THS Setting is limited between the setting at the aircraft's entry into this protection and 11 ° nose-up.

CONTROL WITH AUTOPILOT ENGAGED

- The ELACs and SECs limit what the autopilot can order.
- The pilot has to overcome a restraining force in order to move the sidestick when the autopilot is engaged. If he overcomes this force, he disconnects the autopilot.
- The pilot can also disconnect the autopilot by pushing on the rudder pedals (10 ° out of trim), or by moving the pitch trim wheel beyond a certain threshold.
- All protections of normal laws remain effective except pitch attitude protection.

FLARE MODE

Ident.: DSC-27-20-10-20-00001071.0001001 / 21 MAR 16
Applicable to: ALL

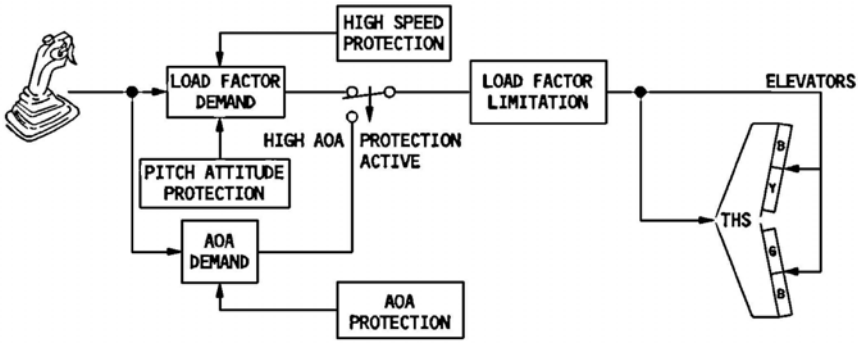
When the aircraft passes 50 ft RA, the THS is frozen and the normal flight mode changes to flare mode as the aircraft descends to land. Flare mode is essentially a direct stick-to-elevator relationship (with some damping provided by the load factor and the pitch rate feedbacks).
The system memorizes the aircraft's attitude at 50 ft, and it becomes the initial reference for pitch attitude control.
As the aircraft descends through 30 ft, the system begins to reduce the pitch attitude to -2 °nose down over a period of 8 s. Consequently, to flare the aircraft, a gentle nose-up action by the pilot is required.

PROTECTIONS

Ident.: DSC-27-20-10-20-A-00001072.0001001 / 21 MAR 16
Applicable to: ALL

GENERAL

The normal law protects the aircraft throughout the flight envelope, as follows :
- load factor limitation
- pitch attitude protection
- high-angle-of-attack (AOA) protection
- high-speed protection.



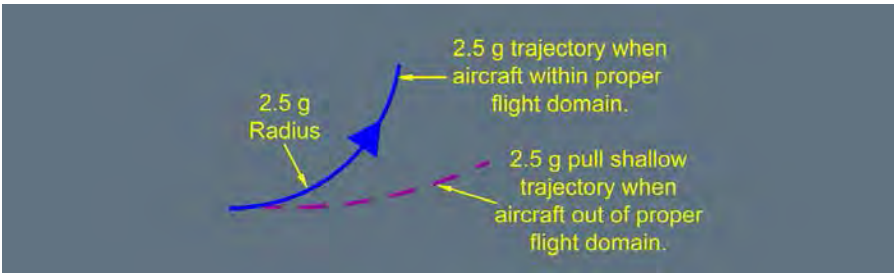
Ident.: DSC-27-20-10-20-A-00001073.0001001 / 17 MAR 17
Applicable to: ALL

LOAD FACTOR PROTECTION

High load factors can be encountered during evasive maneuvers due to potential collisions, or CFIT …
Pulling "g" is efficient, if the resulting maneuver is really flown with this "g" number. If the aircraft is not able to fly this trajectory, or to perform this maneuver, pulling "g" will be detrimental.

The load factor is automatically limited to:
+2.5 g to -1 g for clean configuration.
+2 g to 0 for other configurations.

Airbus LOAD FACTOR PROTECTION AND SAFETY



On most commercial aircraft, the potential for an efficient 2.5 g maneuver is very remote. Furthermore, as G Load information is not continuously provided in the cockpit, airline pilots are not used to controlling this parameter. This is further evidenced by inflight experience, which reveals that: In emergency situations, initial PF reaction on a yoke or sidestick is hesitant, then aggressive.

With load factor protection, the PF may immediately and instinctively pull the sidestick full aft: The aircraft will initially fly a 2.5 g maneuver without losing time. Then, if the PF still needs to maintain the sidestick full aft stick, because the danger still exists, then the high AOA protection will take over. Load factor protection enhances this high AOA protection.

Load factor protection enables immediate PF reaction, without any risk of overstressing the aircraft.

Flight experience has also revealed that an immediate 2.5 g reaction provides larger obstacle clearance, than a hesitant and delayed high G Load maneuver (two-second delay).

Ident.: DSC-27-20-10-20-A-00001074.0001001 / 17 MAR 17
Applicable to: ALL

PITCH ATTITUDE PROTECTION

Excessive pitch attitudes, caused by upsets or inappropriate maneuvers, lead to hazardous situations:

- Too high a nose-up ▸ Very rapid energy loss
- Too low a nose-down ▸ Very rapid energy gain

Furthermore, there is no emergency situation that requires flying at excessive attitudes. For these reasons, pitch attitude protection limits pitch attitude:

- 30 ° nose up in conf 0 to 3 (progressively reduced to 25 ° at low speed).
- 25 ° nose up in conf FULL (progressively reduced to 20 ° at low speed).
- 15 ° nose down (indicated by green symbols “=” on the PFD’s pitch scale).

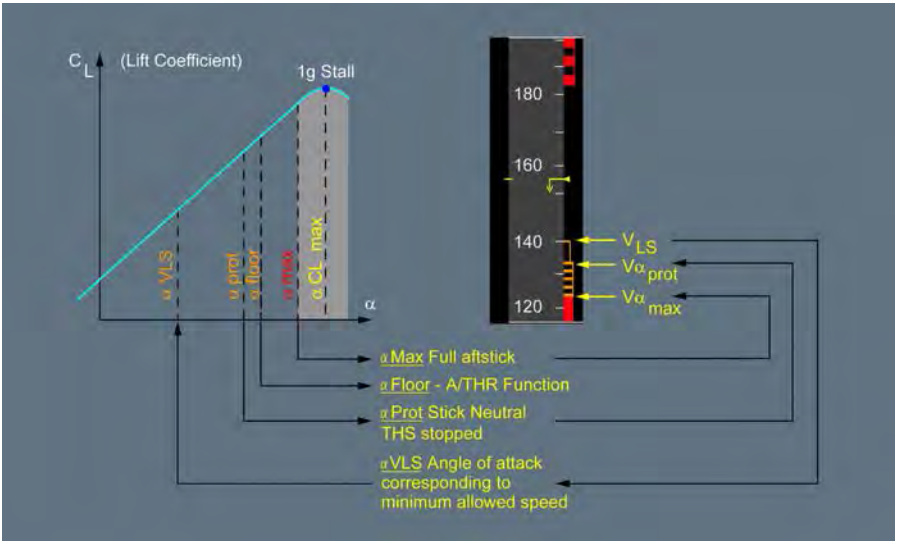
The flight director bars disappear from the PFD when the pitch attitude exceeds 25 ° up or 13 ° down. They return to the display when the pitch angle returns to the region between 22 ° up and 10 ° down.
Pitch attitude protection enhances high speed protection, high load factor protection, and high AOA protection.

Ident.: DSC-27-20-10-20-A-00001075.0002001 / 17 MAR 17
Applicable to: ALL

HIGH ANGLE-OF-ATTACK PROTECTION

In the normal law, the aircraft is protected against stall, in dynamic maneuvers or gusts. When the current angle-of-attack becomes greater than αPROT, the high angle-of-attack (AOA) protection activates.
Without pilot input, the F/CTL computers will maintain the AOA equal to αPROT. The AOA can be further increased by the pilot input, up to a maximum value equal to αMAX. When the High AOA protection is activated, the normal law demand is modified and the side stick input is an angle-of-attack demand, instead of a load factor demand.
The PF must not deliberately fly the aircraft in the High AOA, except for brief periods, when maximum maneuvering speed is required.

Airbus AOA Protection



Vα PROT, Vα floor, Vα MAX are mainly computed based on the AOA, and therefore they vary with configuration, weight and load factor.

Refer to DSC-22_10-50-20 Characteristic Speeds for more information.

The angle-of-attack will not exceed αMAX, even if the pilot gently pulls the sidestick all the way back. The pilot can hold full back stick, if it is needed, and the aircraft stabilizes at an angle-of-attack close to but less than the 1 g stall. When flying at αMAX, the PF can make gentle turns, if necessary. If the pilot releases the sidestick, the angle-of-attack returns to αPROT and stays there. As the aircraft enters protection at the amber and black strip (αPROT), the system inhibits further nose-up trim beyond the point already reached. The nose-down trim remains available, if the pilot pushes the stick forward.

Note: At takeoff, the αPROT is equal to the αMAX for 5 s.

This High AOA protection has priority over all other protections.

The aircraft can also enter αPROT at a high flight level, where it protects the aircraft from the buffet boundary. As at a low speed or low flight level, if the sidestick is merely released to neutral, the aircraft maintains the alpha for αPROT. This value of alpha is not the same as the value used at the low speed. Alpha for αPROT is reduced as a function of Mach, so that a typical cruise value is about 3.5 ° for the A318 and A321 aircraft, or 4.5 ° for the A319 and A320 aircraft. Therefore, the aircraft may climb with the sidestick free, when leaving a turn after entering αPROT.

If the pilot flies into αPROT, he should leave it as soon as other considerations allow, by easing forward on the sidestick to reduce alpha below the value of αPROT, while simultaneously adding power (if the αfloor has not yet been activated, or cancelled).

To deactivate the angle of attack protection, the pilot must push the sidestick:
- Greater than 8 ° forward, or,
- Greater than 0.5 ° for at least 0.5 s when α < αMAX.

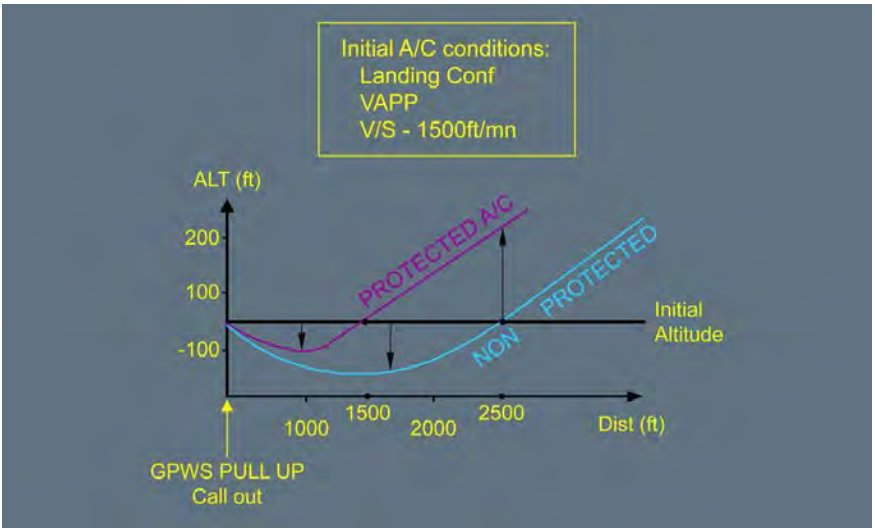
In addition, below 200 ft, the angle of attack protection is also deactivated, when:
- Sidestick deflection is less than half nose-up, and
- Actual α is less than αPROT – 2 °.

Between the αPROT and αMAX, αfloor protection may automatically set the go-around thrust. The αfloor will usually be triggered just after entering αPROT, and the go-around thrust will automatically be applied. Therefore, if the sidestick is held aft, either inadvertently or deliberately, the aircraft will start to climb at a relatively constant low airspeed. To recover a normal flight condition, the αPROT should be exited by easing forward on the sidestick, as described above, and the αfloor should be cancelled by using the disconnect pushbutton on either thrust lever as soon as a safe speed is regained. *Refer to DSC-22_40-30 Alpha-Floor Protection* for more information.

GPWS / WINDSHEAR CASE:

In the case of application of GPWS or windshear procedures, aircraft protections provide maximum lift / maximum thrust / minimum drag. Therefore, CFIT escape manoeuvres will be much more efficient.

Protected A/C Versus Non-protected A/C Go-around Trajectory



The above-illustrated are typical trajectories flown by protected or not protected aircraft, when the PF applies the escape procedure after an aural " GPWS PULL UP" alert.
The graph demonstrates the efficiency of the protection, to ensure a duck-under that is 50 % lower, a bucket-distance that is 50 % shorter, a safety margin that more than doubles (due to a quicker reaction time), and a significant altitude gain (± 250 ft). These characteristics are common to all protected aircraft, because the escape procedure is easy to achieve, and enables the PF to fly the aircraft at a constant AOA, close to the max AOA. It is much more difficult to fly the stick shaker AOA on an aircraft that is not protected.

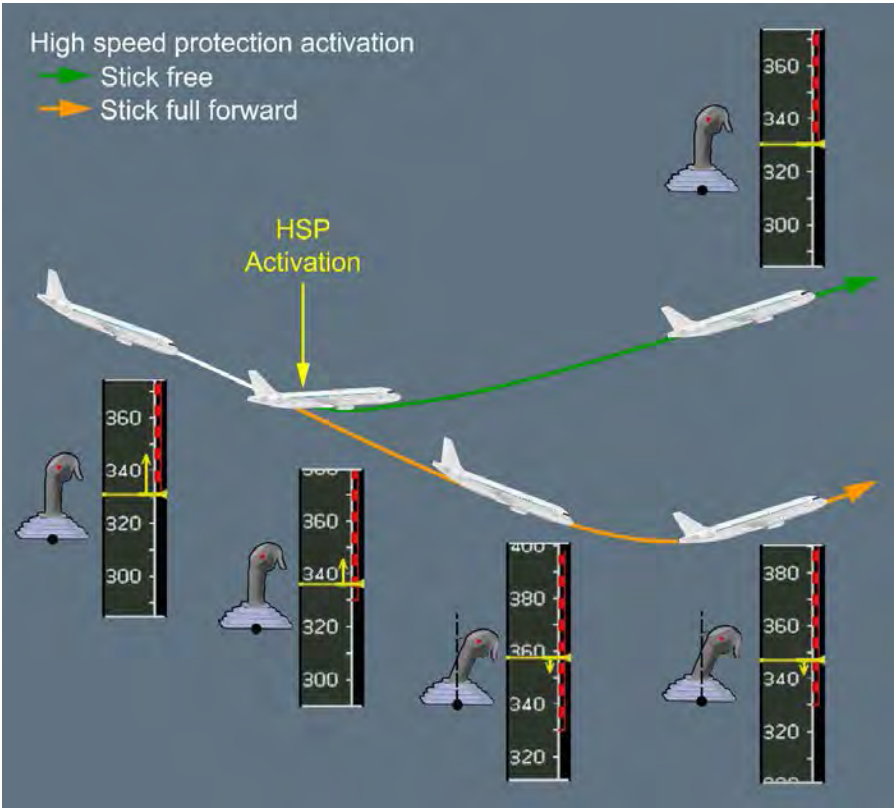
Ident.: DSC-27-20-10-20-A-00001076.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078, 3467-3518

HIGH SPEED PROTECTION

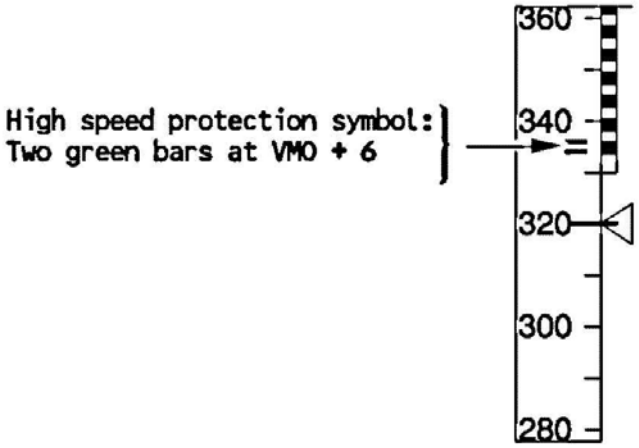
The aircraft automatically recovers, following a high speed upset. Depending on the flight conditions (high acceleration, low pitch attitude), High Speed Protection is activated at/or above VMO/MMO.
When it is activated, the pitch trim is frozen. Positive spiral static stability is introduced to 0 ° bank angle (instead of 33 ° in normal law), so that with the sidestick released, the aircraft always returns to a bank angle of 0 °. The bank angle limit is reduced from 67 ° to 40 °.
As the speed increases above VMO/MMO, the sidestick nose-down authority is progressively reduced, and a permanent nose-up order is applied to aid recovery to normal flight conditions.

Therefore, in a dive situation:

- If there is no sidestick input on the sidestick, the aircraft will slightly overshoot VMO/MMO and fly back towards the envelope.
- If the sidestick is maintained full forward, the aircraft will significantly overshoot VMO/MMO. At approximately VMO +16 / MMO +0.04, the pitch nose-down authority smoothly reduces to zero (which does not mean that the aircraft stabilizes at that speed).



The PF, therefore, has full authority to perform a high speed/steep dive escape maneuver, when required, via a reflex action on the sidestick.
High Speed Protection is deactivated, when the aircraft speed decreases below VMO/MMO, where the usual normal control laws are recovered.
The autopilot disconnects at VMO + 15 kt and MMO + 0.04.



Note: *1. The ECAM displays an "O/SPEED" warning at VMO + 4 kt and MMO + 0.006.*
2. At high altitude, this may result in activation of the angle of attack protection. Depending on the ELAC standard, the crew may have to push on the stick to get out of this protection law.

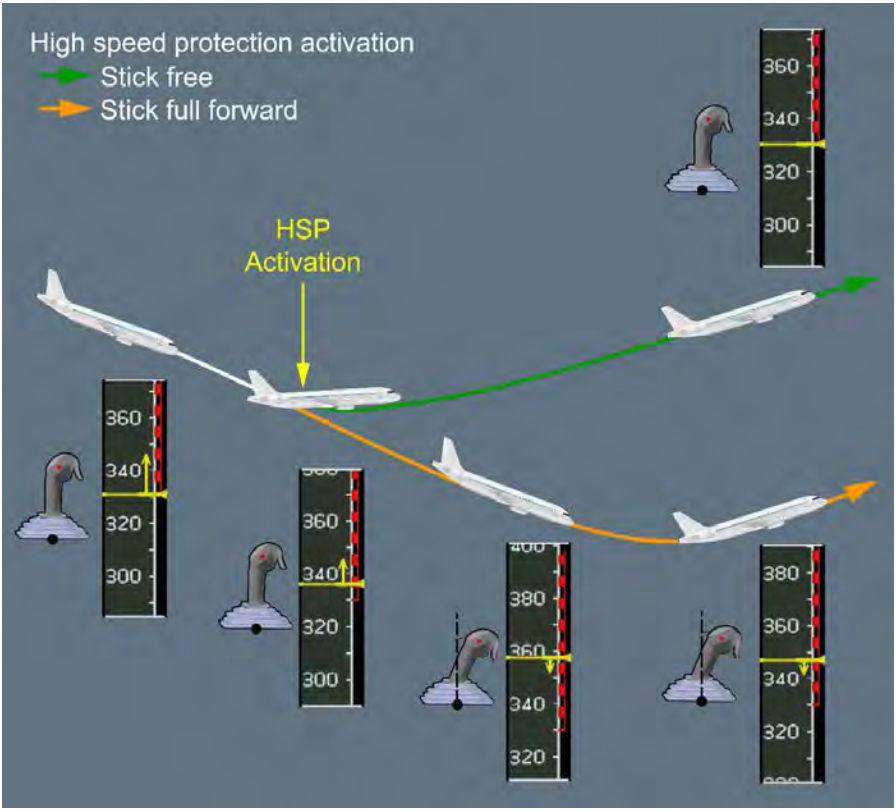
Ident.: DSC-27-20-10-20-A-00001076.0002001 / 17 MAR 17
Applicable to: MSN 3408, 4100-4547

HIGH SPEED PROTECTION

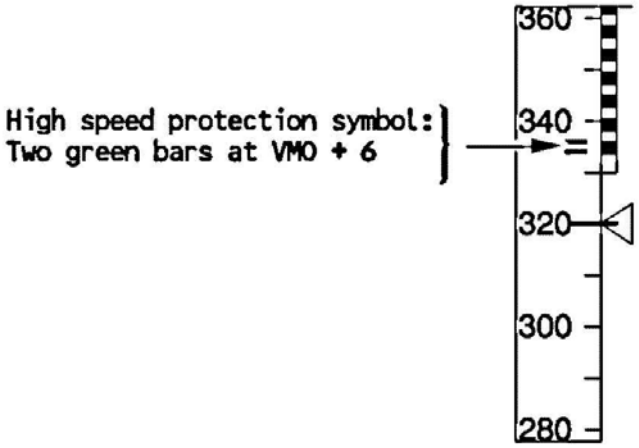
The aircraft automatically recovers, following a high speed upset. Depending on the flight conditions (high acceleration, low pitch attitude), High Speed Protection is activated at/or above VMO/MMO.
When it is activated, the THS setting is limited between the setting at the aircraft's entry into this protection and 11 ° nose-up. Positive spiral static stability is introduced to 0 ° bank angle (instead of 33 ° in normal law), so that with the sidestick released, the aircraft always returns to a bank angle of 0 °. The bank angle limit is reduced from 67 °to 40 °.
As the speed increases above VMO/MMO, the sidestick nose-down authority is progressively reduced, and a permanent nose-up order is applied to aid recovery to normal flight conditions.

Therefore, in a dive situation:

- If there is no sidestick input on the sidestick, the aircraft will slightly overshoot VMO/MMO and fly back towards the envelope.
- If the sidestick is maintained full forward, the aircraft will significantly overshoot VMO/MMO. At approximately VMO +16 / MMO +0.04, the pitch nose-down authority smoothly reduces to zero (which does not mean that the aircraft stabilizes at that speed).



The PF, therefore, has full authority to perform a high speed/steep dive escape maneuver, when required, via a reflex action on the sidestick.
High Speed Protection is deactivated, when the aircraft speed decreases below VMO/MMO, where the usual normal control laws are recovered.
The autopilot disconnects at VMO + 15 kt and MMO + 0.04.



Note: *1. The ECAM displays an "O/SPEED" warning at VMO + 4 kt and MMO + 0.006.*
2. At high altitude, this may result in activation of the angle of attack protection. Depending on the ELAC standard, the crew may have to push on the stick to get out of this protection law.

Ident.: DSC-27-20-10-20-A-00001077.0001001 / 21 MAR 16
Applicable to: ALL

LOW ENERGY AURAL ALERT (IF INSTALLED)

The low energy aural alert is computed by the FAC (*Refer to DSC-22_40-10 General*).

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Lateral Control

NORMAL LAW

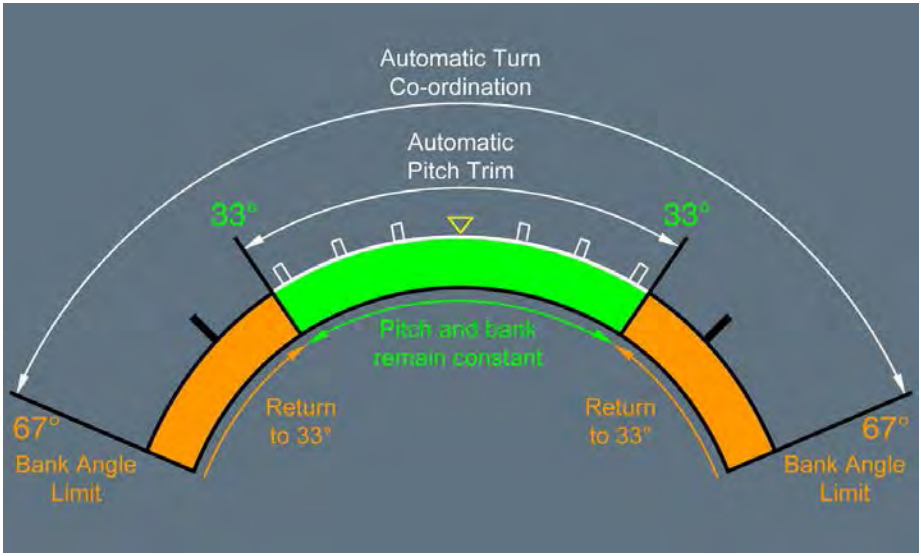
Ident.: DSC-27-20-10-30-00001078.0001001 / 17 MAR 17
Applicable to: ALL

When the aircraft is on the ground (in “on ground” mode), the sidestick commands the aileron and roll spoiler surface deflection. The amount of control surface deflection that results from a given amount of sidestick deflection depends upon aircraft speed. The pedals control rudder deflection through a direct mechanical linkage. The aircraft smoothly transitions to “in flight” mode shortly after liftoff.
When the aircraft is in the “in flight” mode, normal law combines control of the ailerons, spoilers (except N° 1 spoilers), and rudder (for turn coordination) in the sidestick. The pilot does not need to use the rudder for turn coordination. While the system thereby gives the pilot control of the roll and heading, it also limits the roll rate and bank angle, coordinates the turns, and damps the dutch roll.
The roll rate requested by the pilot during flight is proportional to the sidestick deflection, with a maximum rate of 15 °/s when the sidestick is at the stop.
When the aircraft is in “flare” mode, the lateral control is the same as in “in flight” mode.
After touchdown, the aircraft smoothly transitions from “in flight” mode to “ground” mode.

BANK ANGLE PROTECTION

Ident.: DSC-27-20-10-30-00001079.0001001 / 17 MAR 17
Applicable to: ALL

Inside the normal flight envelope, the system maintains positive spiral static stability for bank angles above 33 °. If the pilot releases the sidestick at a bank angle greater than 33 °, the bank angle automatically reduces to 33 °. Up to 33 °, the system holds the roll attitude constant when the sidestick is at neutral. If the pilot holds full lateral sidestick deflection, the bank angle goes to 67 ° and no further.
If Angle-of-Attack protection is active, and the pilot maintains full lateral deflection on the sidestick, the bank angle will not go beyond 45 °. If High Speed Protection is active, and the pilot maintains full lateral deflection on the sidestick, the bank angle will not go beyond 40 °. If high speed protection is operative, the system maintains positive spiral static stability from a bank angle of 0 °, so that with the sidestick released, the aircraft always returns to a bank angle of 0 °.
When bank angle protection is active, auto trim is inoperative.
If the bank angle exceeds 45 °, the autopilot disconnects and the FD bars disappear. The FD bars return when the bank angle decreases to less than 40 °.



During a normal turn (bank angle less than 33 °), in level flight:

- The PF moves the sidestick laterally (the more the sidestick is moved laterally, the greater the resulting roll rate - e.g. 15 °/s at max deflection)
- It is not necessary to make a pitch correction
- It is not necessary to use the rudder.

In the case of steep turns (bank angle greater than 33 °), the PF must apply:

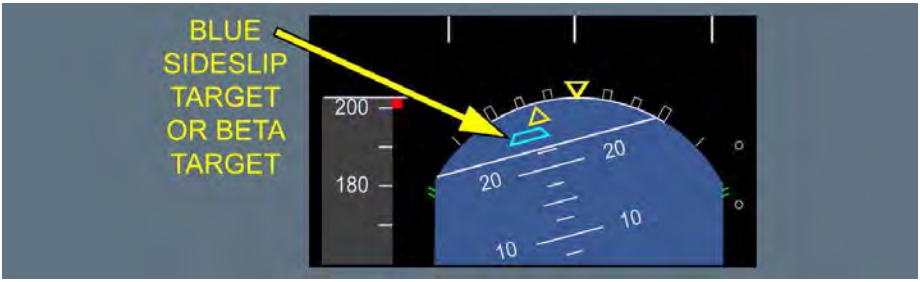
- Lateral pressure on the sidestick to maintain bank
- Aft pressure on the sidestick to maintain level flight.

Sideslip Target

SIDESLIP TARGET

Ident.: DSC-27-20-10-50-00001081.0001001 / 17 MAR 17
Applicable to: ALL

If one engine fails, the FAC modifies the sideslip indication slightly to show the pilot how much rudder to use to get the best climb performance (ailerons to neutral and spoilers retracted).
In the case of an engine failure at takeoff, or at go-around, the sideslip index on the PFD changes from yellow to blue (to provide the conditions for the blue display of the sideslip target, *Refer to DSC-31-40 Attitude Data*).



In flight, the lateral normal law commands some rudder surface deflection to minimize the sideslip. The pilot's response is normal and instinctive: zero the slip indication by applying the right amount of rudder to get the best climb performance.

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Aircraft Trimming

AIRCRAFT TRIMMING

Ident.: DSC-27-20-10-70-00002179.0001001 / 09 DEC 09
Applicable to: ALL

When the aircraft is :

- In normal cruise range (around M .77),
- In straight flight,
- With the autopilot engaged,
- With symmetrical engine thrust, and
- With fuel in the wing tanks distributed symmetrically,

the rudder trim should stay between 1 ° right and 2.3 ° left.

Note: *This indication corresponds to a true rudder deflection within ± 1.5 °, taking into account the permanent offset of rudder trim indication, when the aircraft is in cruise conditions. (average 0.5 ° right, 0.8 ° left).*
An indicated, rudder trim above 1 ° right or 2.3 ° left is acceptable, if maintenance personnel establishes that the corresponding real rudder position is within 1.5 ° left, and 1.5 ° right.

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GENERAL

Ident.: DSC-27-20-20-00001082.0001001 / 17 MAR 17
Applicable to: ALL

Depending on the failures occuring to the flight control system, or on its peripherals, there are 3 levels of reconfiguration :

- Alternate law
  They are two levels of alternate law : with and without reduced protections.
- Direct law
- Mechanical

The ECAM and PFD indicate any control law degradation.

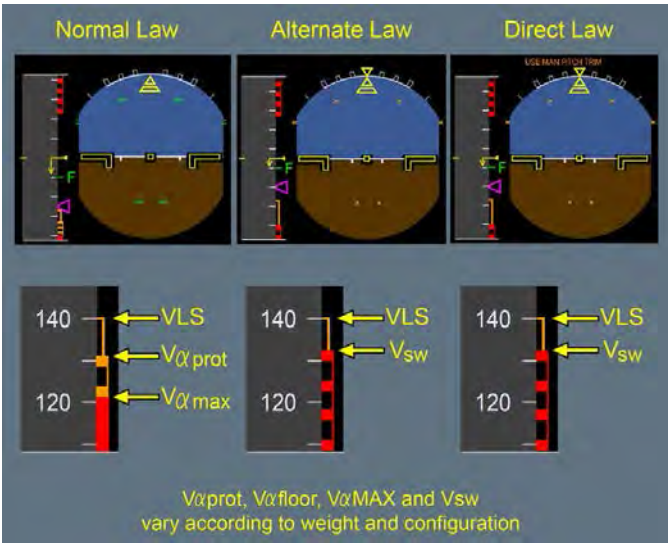
ON THE ECAM

- **In ALTN Law:**
  FLT CTL ALTN LAW (PROT LOST)
  MAX SPEED 320 kt (320 kt/M 0.77 on A318)
- **In Direct Law:**
  FLT CTL DIRECT LAW (PROT LOST)
  MAX SPEED 320 kt/M 0.77
  MAN PITCH TRIM USE

ON THE PFD

The PFD enhances the PF's awarness of the status of flight controls.
Specific symbols (= in green), and specific formatting of low speed information on the speed scale in normal law, indicate which protections are available.
When protections are lost, amber crosses (X) appear, instead of the green protection symbols (=).
When automatic pitch trim is no longer available, the PFD indicates this with an amber "USE MAN PITCH TRIM" message below the FMA.

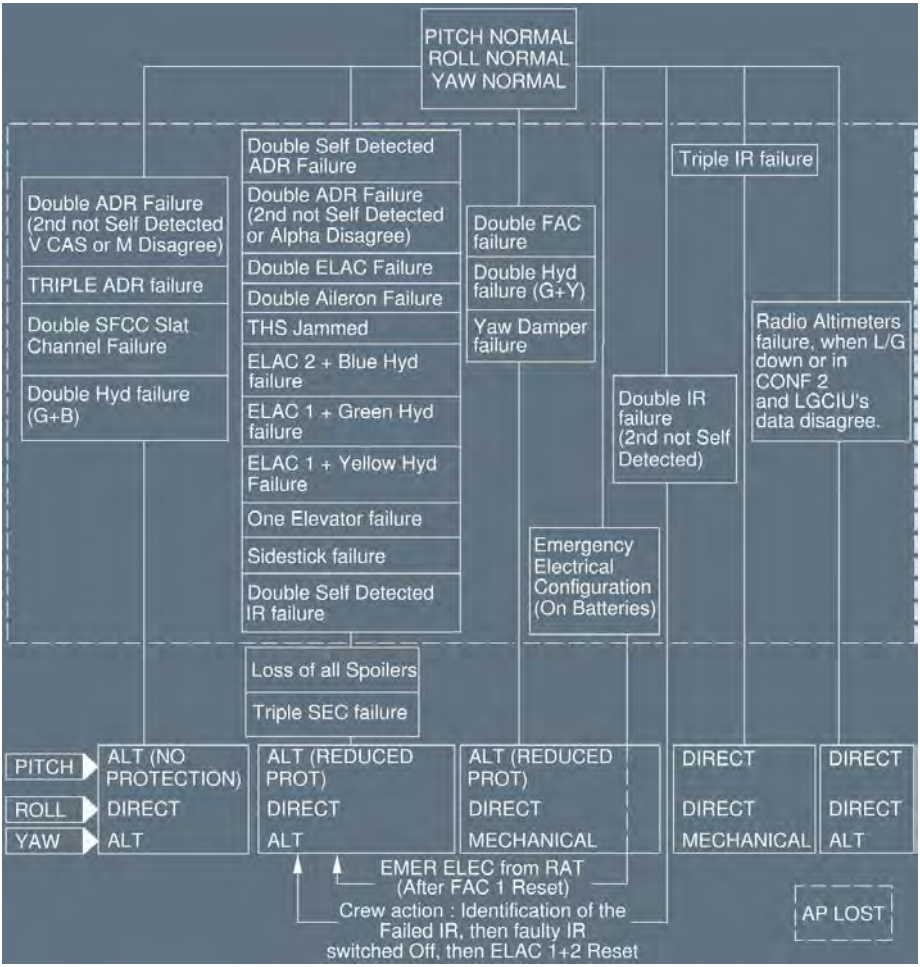
Fly-by-Wire Status Awareness via the PFD



Therefore, by simply looking at this main instrument (PFD), the flight crew is immediately aware of the status of flight controls, and the operational consequences.

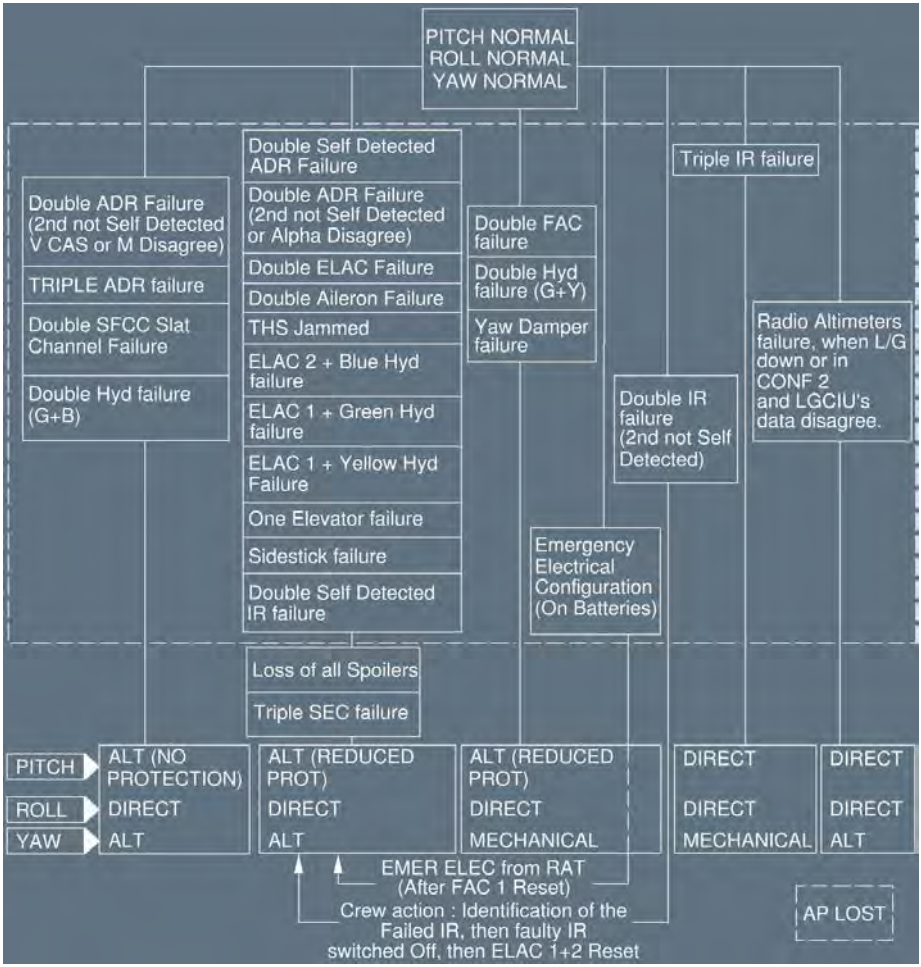
FLIGHT CONTROLS LAW RECONFIGURATION

Ident.: DSC-27-20-20-00001083.0001001 / 22 MAY 12
Applicable to: MSN 3408, 4100-4547



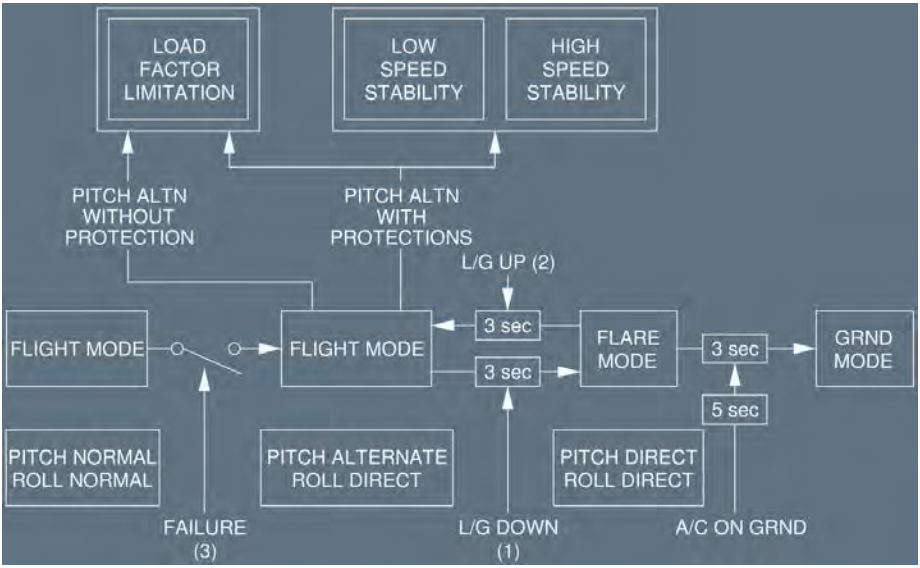
FLIGHT CONTROLS LAW RECONFIGURATION

Ident.: DSC-27-20-20-00001083.0002001 / 22 MAY 12
Applicable to: MSN 1882-2078, 3467-3518



ALTERNATE LAW

Ident.: DSC-27-20-20-00001084.0001001 / 21 AUG 15
Applicable to: ALL



(1) OR SLATS OR FLAPS ≥ 2 IF L/G INFORMATION NO LONGER AVAILABLE (LGCIU 1+2 FAULT OR SEC 1+2+3 FAULT)

(2) OR SLATS OR FLAPS < 2 IF L/G INFORMATION NO LONGER AVAILABLE (LGCIU 1+2 FAULT OR SEC 1+2+3 FAULT)

(3) *Refer to DSC-27-20-20 Flight Controls Law Reconfiguration.*

PITCH CONTROL

GROUND MODE

Under alternate law the ground mode becomes active on the ground 5 s after touchdown. It is identical to the ground mode of the normal law.

FLIGHT MODE

In flight, the alternate law pitch mode follows a load-factor demand law much as the normal law pitch mode does, but it has less built-in protection (reduced protections).

FLARE MODE

In pitch alternate law the flight mode changes to the flare mode when the pilot selects landing gear down. The flare mode is a direct stick-to-elevator relationship. (*Refer to DSC-27-20-20 Direct Law*).

LATERAL CONTROL

When the aircraft flying in pitch alternate law, lateral control follows the roll direct law associated with yaw alternate or mechanical.

ROLL DIRECT LAW

Refer to DSC-27-20-20 Direct Law.

YAW ALTERNATE LAW

Only the yaw damping function is available. Damper authority is limited to ±5 ° of rudder deflection.

REDUCED PROTECTIONS

LOAD FACTOR LIMITATION

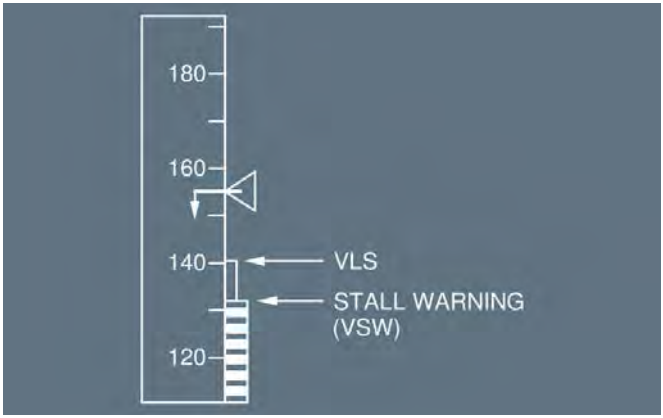
The load factor limitation is similar to that under normal law.

PITCH ATTITUDE PROTECTION

There is no pitch attitude protection. Amber Xs replace the green double bars "=" on the PFD.

LOW SPEED STABILITY

An artificial low speed stability replaces the normal angle-of-attack protection. It is available for all slat/flap configurations, and the low speed stability is active from about 5 kt up to about 10 kt above stall warning speed, depending on the aircraft's gross weight and slats/flaps configuration.
A gentle progressive nose down signal is introduced, which tends to keep the speed from falling below these values. The pilot can override this demand.
The system also injects bank-angle compensation, so that operation effectively maintains a constant angle of attack.
In addition, audio stall warnings (crickets + "STALL" synthetic voice message) is activated at an appropriate margin from the stall condition.
The PFD speed scale is modified to show a black/red barber pole below the stall warning.
The α floor protection is inoperative.



HIGH SPEED STABILITY

Above VMO or MMO, a nose up demand is introduced to avoid an excessive increase in speed. The pilot can override this demand.
In addition, the aural overspeed warning (VMO + 4 or MMO + 0.006) remains available.

BANK ANGLE PROTECTION

Not provided.

Note: *The AP will disconnect, if speed exceeds VMO/MMO, or if the bank angle exceeds 45 °.*

ALTERNATE LAW WITHOUT REDUCED PROTECTION

Ident.: DSC-27-20-20-00001085.0001001 / 21 MAR 16
Applicable to: ALL

This is identical to alternate law except that it does not include the low-speed stability or the high-speed stability. It includes only the load factor limitation.

DIRECT LAW

Ident.: DSC-27-20-20-00001086.0001001 / 21 MAR 16
Applicable to: ALL

PITCH CONTROL

The pitch direct law is a direct stick-to-elevator relationship (elevator deflection is proportional to stick deflection).
In all configurations the maximum elevator deflection varies as a function of CG.

It is a compromise between adequate controllability with the CG forward, and not-too-sensitive control with the CG aft.
There is no automatic trim : the pilot must trim manually.
The PFD displays in amber the message “USE MAN PITCH TRIM”.
No protections are operative.
The α floor function is inoperative.
Overspeed and stall warnings are available as for alternate law.

LATERAL CONTROL

When flying in “direct law”, the roll direct law associated with mechanical yaw control governs lateral control.

ROLL DIRECT LAW

The roll direct law is a direct stick-to-surface-position relationship. System gains are set automatically to correspond to slat/flap configuration.
With the aircraft in the clean configuration, the maximum roll rate is about 30 °/s.
With slats extended, it is about 25 °/s.
To limit roll rate, the roll direct law uses only ailerons and spoilers N° 4 and 5.
If spoiler N° 4 has failed, spoiler N° 3 replaces it.
If the ailerons have failed, all roll spoilers become active.

YAW MECHANICAL CONTROL

The pilot controls yaw with the rudder pedals.
The yaw damping and turn coordination functions are lost.

ABNORMAL ATTITUDE LAWS

Ident.: DSC-27-20-20-00001087.0002001 / 18 JAN 17
Applicable to: ALL

If for any reason the aircraft goes far outside the normal flight envelope and reaches an extreme attitude, the flight control law will be modified.
The abnormal attitude law will engage and will provide the PF with maximum efficiency to recover normal attitude.

L2 The abnormal attitude law engages when one of the following values is reached:
- Bank angle above 125 °
- Pitch attitude above 50 ° nose up or below 30 ° nose down
- Speed below 60 to 90 kt (depending on the aircraft pitch attitude), or above 440 kt
- Mach above 0.91
- Angle of attack above 30 ° to 40 °, or below -10 °

L1 When the abnormal attitude law engages:

- The pitch alternate law is active with no protection, except load–factor protection and without autotrim.
- The roll direct law is active
- The yaw mechanical law is active.

When the aircraft returns within the normal flight envelope, the abnormal attitude law disengages and the following conditions remains for the remainder of the flight:

- The pitch alternate law is active with no protection and with autotrim.
- The roll direct law is active
- The yaw alternate law is active.

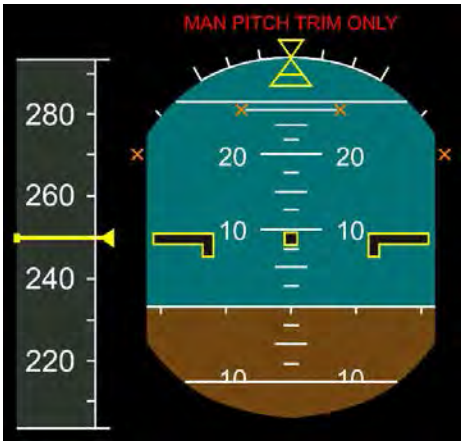
MECHANICAL BACK-UP

Ident.: DSC-27-20-20-00001088.0001001 / 17 MAR 17
Applicable to: ALL

The purpose of the mechanical backup is to achieve all safety objectives in MMEL dispatch condition: to manage a temporary and total electrical loss, the temporary loss of five fly-by-wire computers, the loss of both elevators, or the total loss of ailerons and spoilers.

PITCH

The pilot manually applies trim to the THS to control the aircraft in pitch.
The PFDs display “MAN PITCH TRIM ONLY” in red.

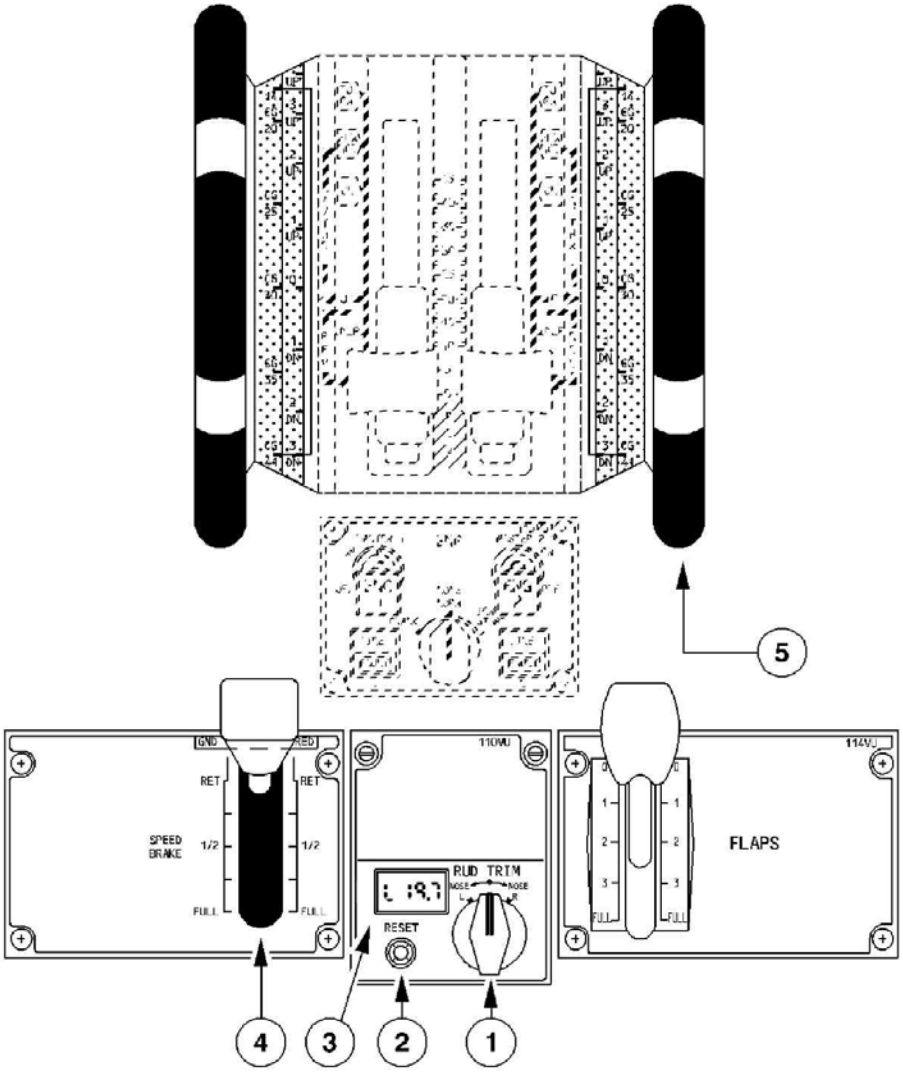


LATERAL

The pilot uses the rudder pedals as the mechanical backup to laterally control the aircraft .

PEDESTAL

Ident.: DSC-27-20-30-00001090.0002001 / 08 JUL 15
Applicable to: ALL



(1) RUD TRIM rotary selector
Controls the rudder trim actuator, which moves the neutral point of the artificial feel by the equivalent of one degree of rudder travel per second.

Note: The rudder trim rotary selector has no effect, when the autopilot is engaged.

(2) RESET pb
By pushing the RESET pb, the zero trim position is ordered at 1.5 °/s.
After the reset, an indication of up to 0.3° (L or R) may be observed in the rudder trim position indication.

Note: The RESET pb is not active, when the autopilot is engaged.

(3) Position Indicator
Displays the rudder trim direction (L or R) and value.

(4) SPEEDBRAKE lever

The lever controls:
- The position of the speedbrake surfaces.
  To set speedbrake surfaces to a required position, the lever has to be pushed down and set to the required position. A “hardpoint” is provided at “½” SPEEDBRAKE position.
- The manual preselection of the ground spoilers.
  To arm the ground spoilers, the lever must be pulled up when in the RET position.
  When the lever is armed (or reverse thrust is selected), all spoiler's surfaces will automatically extend at landing, or in case of a rejected takeoff.

(5) PITCH TRIM Wheel
Both pitch trim wheels provide mechanical control of the THS and have priority over electrical control. A pilot action on the pitch trim wheel disconnects the autopilot.

Note: Crew action on the pitch trim wheel does not disconnect the ELACs (micro-switches, actuated by the override mechanism, ensure that the computers remain synchronized with the manually-selected position).

The THS is manually-controlled on ground for the THS setting, before takeoff and in flight, when in direct law.

- Before takeoff, the pilot sets the THS to the angular value, determined as a function of the aircraft CG, using the CG scale on the wheel. The relationship between the aircraft CG and the THS setting shown on the trim wheel is only applicable for takeoff. The limits of the THS normal setting range for takeoff are indicated by a green band on the pitch trim wheel.
- In flight, when in direct law, the pilot uses the THS conventionally to fly in trim. In flight, the aircraft pitch trim setting depends on aircraft CG, weight, altitude and speed. Consequently, the relation between the aircraft CG, and the THS setting displayed on the pitch trim wheel, does not apply in flight.

Following nosewheel touchdown, as the pitch attitude becomes less than 2.5 ° for more than 5 s, pitch trim is automatically reset to zero.

Note: This function is inoperative, when the green or yellow hydraulic system is not pressurized.

LATERAL CONSOLES

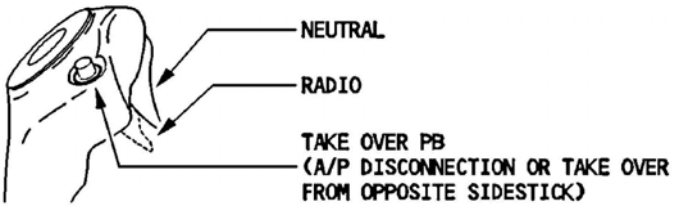
Ident.: DSC-27-20-30-00001091.0004001 / 17 MAR 17
Applicable to: ALL

SIDESTICKS

Each pilot has on his lateral console a sidestick he can use to control pitch and roll manually. Each sidestick is springloaded to neutral.
When the autopilot is engaged, a solenoid-operated detent locks both sidesticks in the neutral position. If the pilot applies a force above a given threshold (5 daN in pitch, 3.5 daN in roll) the stick becomes free and the autopilot disengages.

The hand grip has two switches:

- Autopilot disconnect and sidestick takeover pushbutton.
- Push-to-talk button.



Sidestick priority logic

- When only one pilot operates the sidestick, it sends his control signals to the computers.
- When the pilots move both side stick simultaneously in the same or opposite direction and neither takes priority, the system adds the signals of both pilots algebraically. The total is limited to the signal that would result from the maximum deflection of a single sidestick.

Note: In the event of simultaneous input on both sidesticks (2 ° deflection off the neutral position in any direction) the two green SIDE STICK PRIORITY lights on the glareshield come on and "DUAL INPUT" voice message is activated.

A pilot can deactivate the other stick and take full control by pressing and keeping pressed his priority takeover pushbutton.
For latching the priority condition, it is recommended to press the takeover push button for more than 40 s.
This allows the pilot to release his takeover push button without losing priority.
However, a pilot can at any time reactivate a deactivated stick by momentarily pressing the takeover push button on either stick.
If both pilots press their takeover pushbuttons, the pilot that presses last gets priority.
In case of a "SIDE STICK FAULT" ECAM warning, due to an electrical failure, the affected sidestick order (sent to the computer) is forced to zero. This automatically deactivates the affected sidestick. This explains why there is no procedure associated with this warning.

Note: If an autopilot is engaged, any action on a takeover pushbutton disengages it.

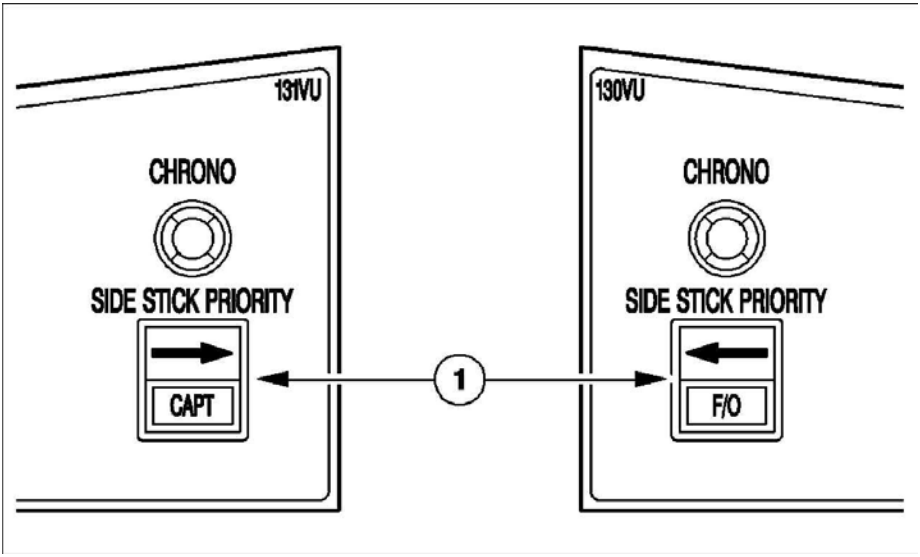
In a priority situation

- A red light comes on in front of the pilot whose stick is deactivated.
- A green light comes on in front of the pilot who has taken control, if the other stick is not in the neutral position (to indicate a potential and unwanted control demand).

Note: If the aircraft is on the ground and commencing its takeoff run and one stick is deactivated, this triggers the takeoff "CONFIG" warning.

GLARESHIELD

Ident.: DSC-27-20-30-00001092.0002001 / 21 MAR 16
Applicable to: ALL



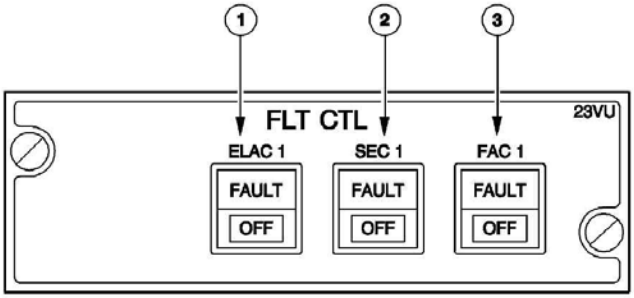
(1) SIDE STICK PRIORITY lt

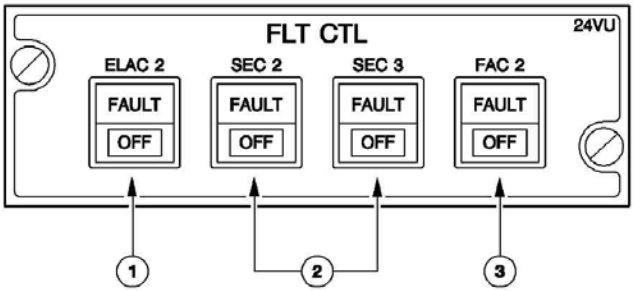
Red arrow light : - comes on in front of the pilot losing authority.
- goes out if he has recovered his authority
  - if the other pilot releases his TAKEOVER pushbutton prior the priority condition is latched.
    or
  - If he has used his takeover push button to cancel a latched priority situation.
    Sidestick priority audio : A “PRIORITY LEFT” or “PRIORITY RIGHT” audio voice message is given each time priority is taken.

Green CAPT and F/O lights :
- Both lights flash when the pilots move both sidesticks simultaneously and neither takes priority.
- When a pilot has taken priority by pressing the takeover pushbutton and the other pilot's sidestick is not at neutral, the light in front of the pilot with priority lights up. It goes out when the other pilot returns his stick to the neutral position.

OVERHEAD PANEL

Ident.: DSC-27-20-30-00017869.0001001 / 19 SEP 16
Applicable to: ALL





(1) ELAC 1(2) pushbutton
Controls the Elevator and Aileron Computer (ELAC) 1(2).

ON : ELAC 1(2) performs the following functions :
- Normal pitch and roll, normal LAF ◁
- Alternate pitch, alternate LAF ◁
- Direct pitch and roll
- Abnormal attitude
- Aileron droop
- Acquisition of autopilot orders.

OFF : The corresponding computer is not active. Switching it OFF, then ON, resets the computer.

FAULT : Comes on amber, along with an ECAM caution:
- When a failure is detected
- During ELAC power-up test (eight seconds).

Note: The ELAC power-up test occurs when electrical power is turned on, or after the occurrence of an electrical transient lasting longer than 25 ms.

The FAULT light goes off, when the pilot selects OFF, or at the end of the ELAC power-up test, if its results are satisfactory.

(2) SEC 1(2)(3) pushbutton
Controls the Spoiler and Elevator Computer (SEC) 1(2)(3).

ON : SEC 1(2)(3) performs the following functions:
- Normal roll (by controlling the spoilers)
- Speed brakes and ground spoilers
- Alternate pitch (SEC 1 and SEC 2 only)
- Direct pitch (SEC 1 and SEC 2 only)
- Direct roll
- Alternate LAF ◁
- Abnormal attitude.

OFF : The corresponding computer is not active. Switching it OFF, then ON, resets the computer.

FAULT : Comes on amber, along with an ECAM caution, when a failure is detected. The FAULT light goes off, when the pilot selects OFF.

(3) FAC 1(2) pushbutton
Controls the Flight Augmentation Computer (FAC) 1(2).

ON : Both FACs perform the following functions:
- Normal roll (coordinating turns and damping dutch roll)
- Rudder trim
- Rudder travel limit
- Alternate yaw

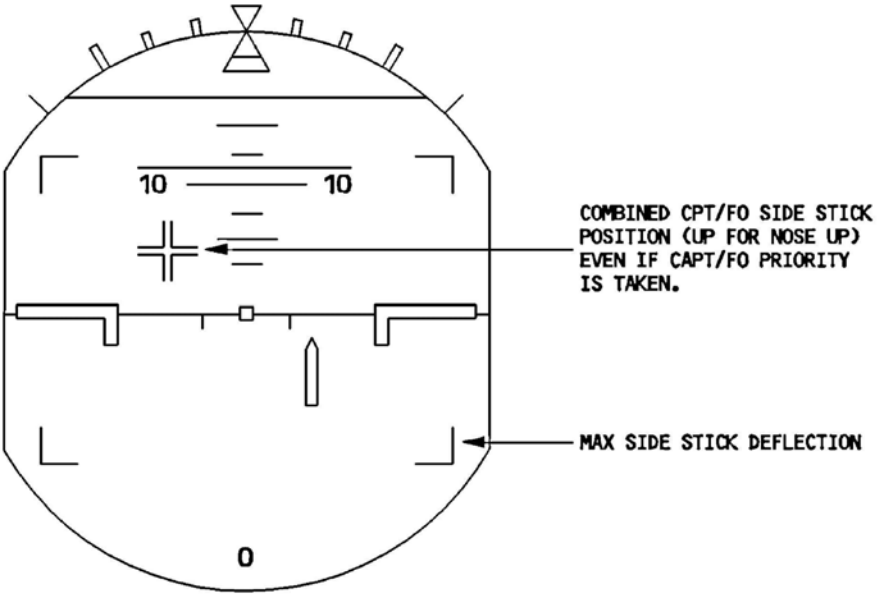
OFF : The corresponding computer is not active. Switching it OFF, and then ON, resets the computer.

FAULT : Comes on amber, along with an ECAM caution, when a failure is detected. The FAULT light goes off, when the pilot selects OFF.

SIDE STICK INDICATIONS ON PFD

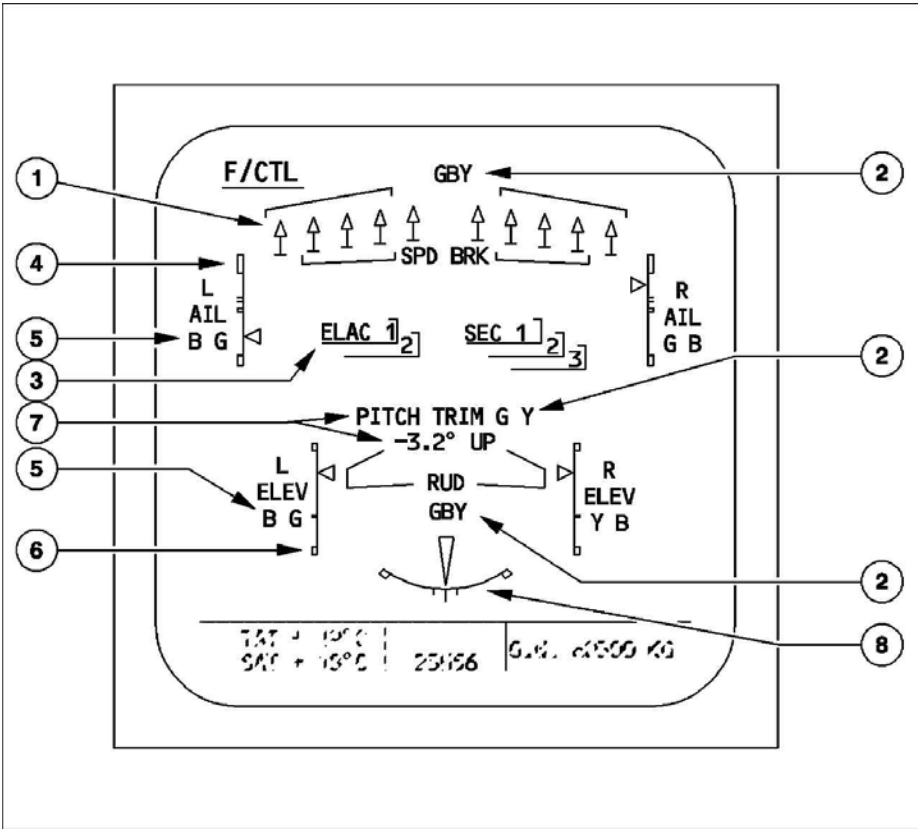
Ident.: DSC-27-20-30-00001094.0001001 / 21 MAR 16
Applicable to: ALL

On the ground, after the first engine start, sidestick position indications appear white on both PFDs. The indications disappear when the aircraft goes from the ground into flight.



ECAM F/CTL PAGE

Ident.: DSC-27-20-30-00001095.0002001 / 15 OCT 12
Applicable to: MSN 1882-2078



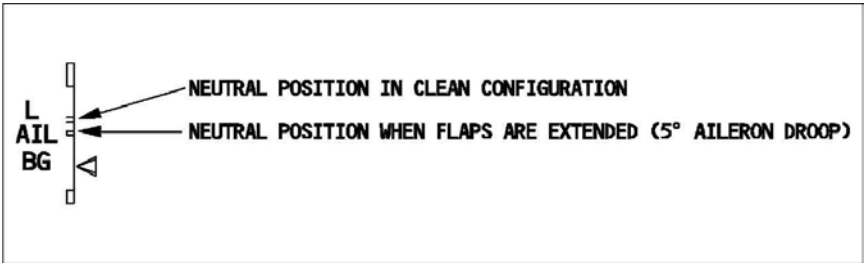
(1) Spoilers/Speed brakes Indication

- Δ : Spoiler deflected by more than 2.5 ° (green)
- – : Spoiler retracted (green)
- Δ : Spoiler fault deflected (amber)
- 1 : Spoiler fault retracted (amber)
- × : Spoiler position not valid (amber)

(2) Hydraulic System Pressure Indication
It is normally green. It becomes amber, if the hydraulic system's pressure decreases.

(3) ELAC/SEC Indication
Normally green. Changes to amber if there is a failure in the ELAC or the SEC, or if ELAC or SEC pushbutton is off, or if both flight control data concentrators (FCDCs) fail.
The surrounding box is normally grey. It changes to amber if the ELAC or SEC indication does.

(4) Aileron position indication
It is indicated with a white scale and green index. It changes to amber, when neither (green nor blue) servojack is available.

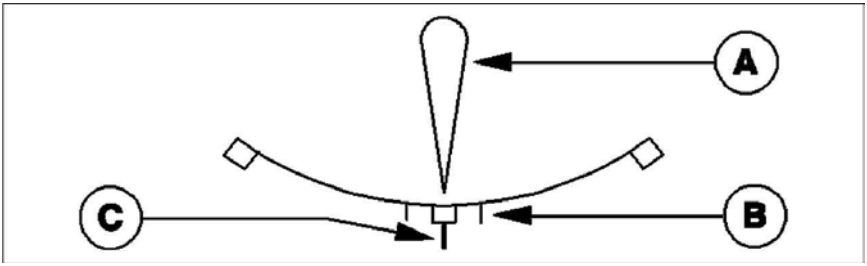


(5) Aileron and elevator actuator indication
"G" and "B" are normally displayed in green.
The color changes to amber, in case of a green or blue hydraulic system low pressure.
The partial box also changes to amber, if the associated computer or actuator fails.

(6) Elevator position indication
It is indicated with a white scale and green index. The index becomes amber, when both associated actuators are not available.

(7) Pitch trim position indication
The pitch trim numbers are in green. They become amber, if green and yellow hydraulic system pressure decreases.
The "PITCH TRIM" legend is in white. It becomes amber, if the pitch trim jams.

(8) Yaw control indications



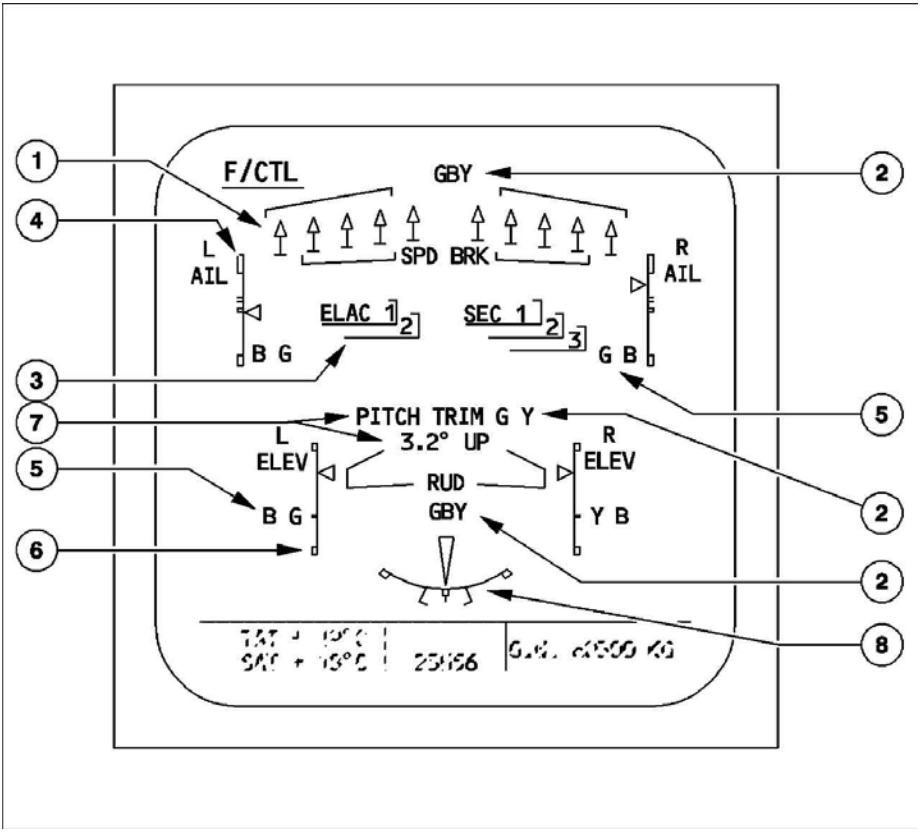
(A) Rudder position indication
It is normally in green. The rudder symbol becomes amber, if the blue, green, and yellow hydraulic pressures are low.

(B) Rudder travel limiter
It is normally in green. It becomes amber when travel limiter 1 and 2 are faulty.

(C) Rudder trim position
It is normally in blue. It becomes amber, if the rudder trim reset fails.

ECAM F/CTL PAGE

Ident.: DSC-27-20-30-00001095.0004001 / 15 OCT 12
Applicable to: MSN 3408-4547



(1) Spoilers/Speedbrakes' Indication

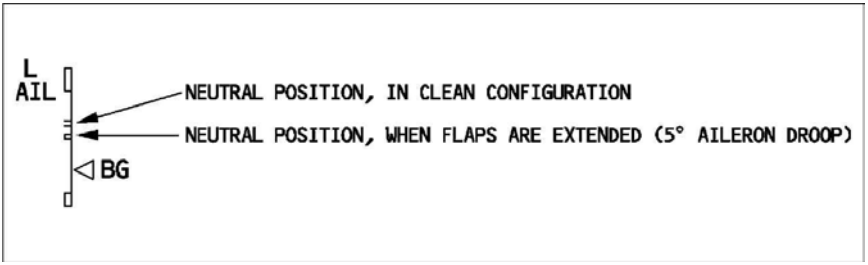
- Δ : Spoiler deflected by more than 2.5 ° (green)
- – : Spoiler retracted (green)
- Δ : Spoiler fault deflected (amber)
- 1 : Spoiler fault retracted (amber)
- × : Spoiler position not valid (amber)

(2) Hydraulic System Pressure Indication
It is normally green. It becomes amber, if the hydraulic system's pressure decreases.

(3) ELAC/SEC Indication

- ELAC and SEC labels are always displayed in white
- The computer number is normally in green, and boxed in grey.
  The number and box become amber, if the computer fails, or is switched OFF.

(4) Aileron position indication
It is indicated with a white scale and green index. It changes to amber, when neither (green nor blue) servojack is available.

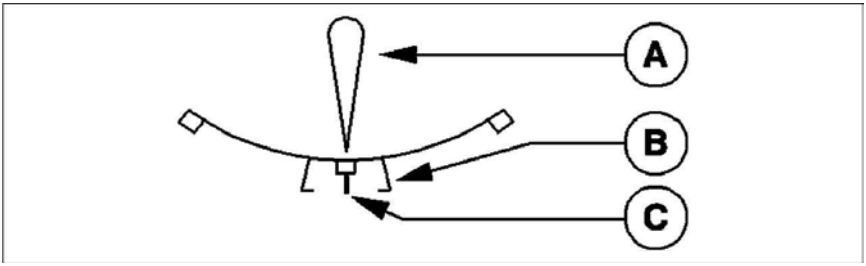


(5) Aileron and elevator actuator indication
"G" and "B" are normally displayed in green.
They become amber, in the case of a green or blue hydraulic system low pressure. The partial box also becomes amber, if the associated computer or actuator fails.

(6) Elevator position indication
It is indicated with a white scale and green index. The index becomes amber, when both associated actuators are not available.

(7) Pitch trim position indication
The pitch trim numbers are in green. They become amber, if green and yellow hydraulic system pressure decreases.
The "PITCH TRIM" legend is in white. It becomes amber, if the pitch trim jams.

(8) Yaw control indications



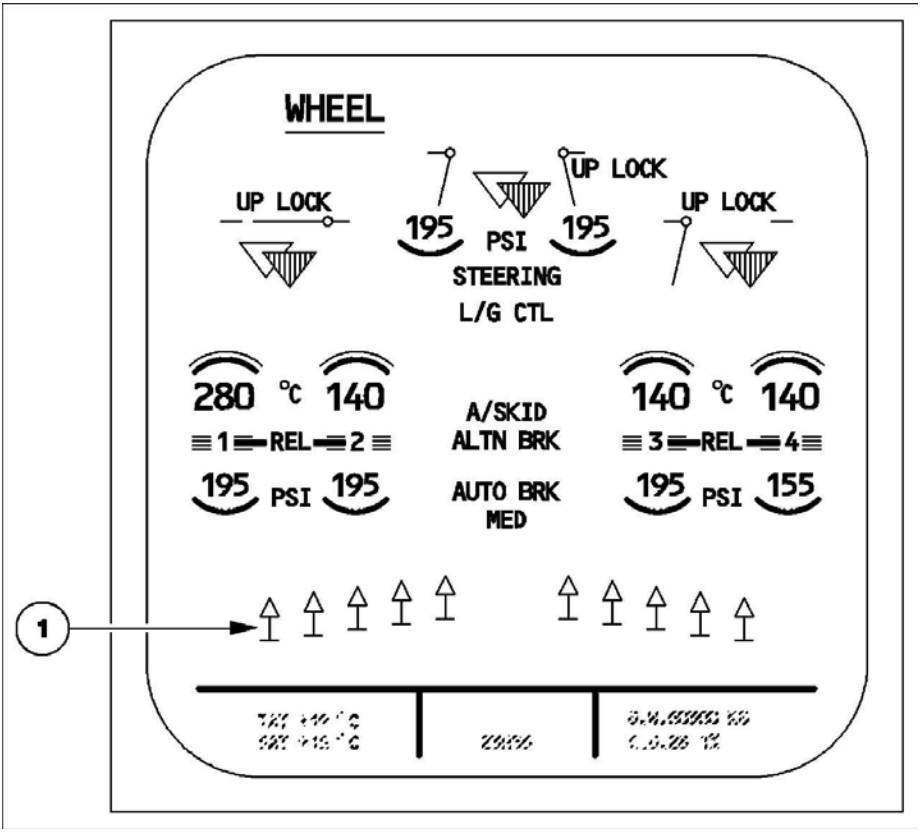
(A) Rudder position indication
It is normally in green. The rudder symbol becomes amber, if the blue, green, and yellow hydraulic pressures are low.

(B) Rudder travel limiter
It is normally in green. It becomes amber when travel limiter 1 and 2 are faulty.
Two TLU messages are displayed in amber when the TLU indexes are suppressed.

(C) Rudder trim position
It is normally in blue. It becomes amber, if the rudder trim reset fails.

ECAM WHEEL PAGE

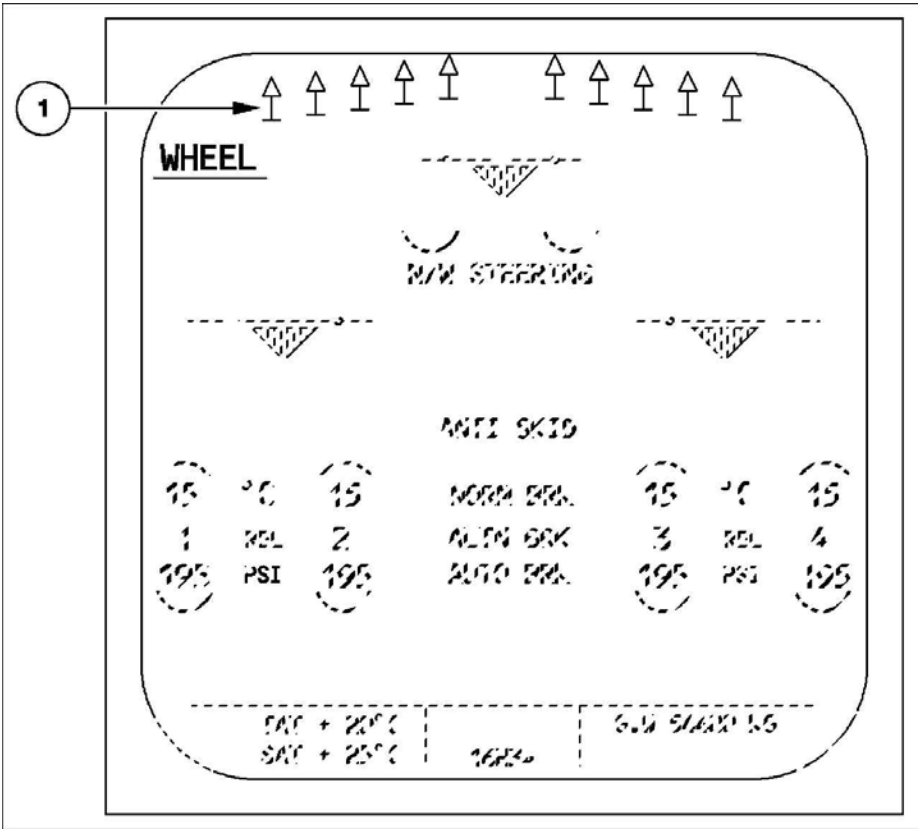
Ident.: DSC-27-20-30-00001096.0001001 / 15 FEB 11
Applicable to: MSN 1882-2078



(1) Spoilers/Speedbrakes' Indication
These indications are identical to those displayed on the FLT CTL page.

ECAM WHEEL PAGE

Ident.: DSC-27-20-30-00001096.0002001 / 15 FEB 11
Applicable to: MSN 3408-4547



(1) Spoilers/Speedbrakes' Indication
These indications are identical to those displayed on the FLT CTL page.

MEMO DISPLAY

Applicable to: ALL

Ident.: DSC-27-20-30-A-00016860.0001001 / 21 MAR 16

GND SPLRS ARMED : This memo appears in green when the ground spoilers are armed.

SPEED BRK : This memo appears in green when the speedbrakes are extended.

SPEED BRK : This memo appears in amber when the speedbrakes should be retracted.

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GENERAL

Ident.: DSC-27-30-10-00001097.0001001 / 21 MAR 16
Applicable to: ALL

Each wing has the following lift augmentation devices :
- Two flap surfaces.
- Five slat surfaces.

These surfaces are electrically controlled and hydraulically operated.
The pilot extends slats and flaps by moving the FLAPS lever on the center pedestal.
It has five positions.

MAIN COMPONENTS

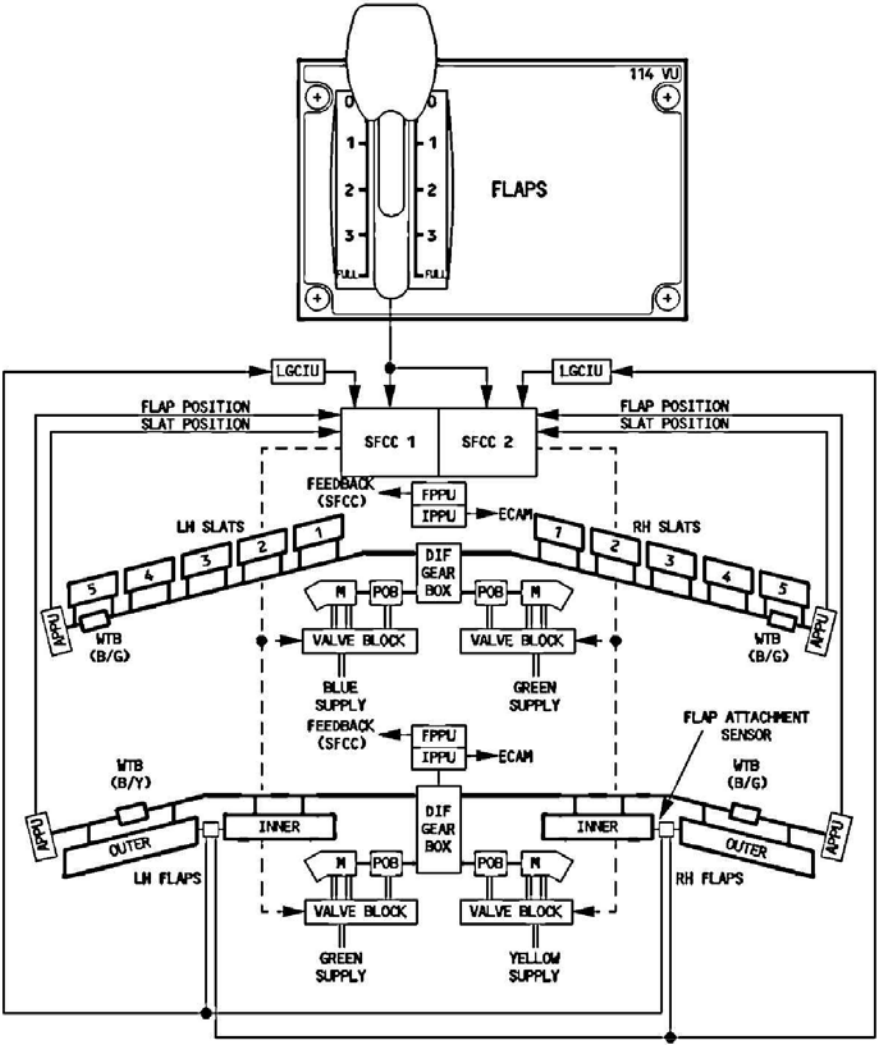
Ident.: DSC-27-30-10-00001098.0001001 / 21 MAR 16
Applicable to: ALL

The slat and flap systems are similar, comprising :
- Two slat flap control computers (SFCCs), each containing one slat channel and one flap channel.
- A power control unit (PCU) consisting of two independent hydraulic motors coupled by a differential gearbox.
  The motors use green and blue hydraulic power for the slats and yellow and green power for the flaps.
  Pressure-off brakes (POBs) lock the transmission when the slat or flap surfaces have reached the selected position or if hydraulic power fails.
- Five slat surfaces and two flap surfaces per wing.
- An assymetry position pick-off unit (APPU) that measures the assymetry between the left and right wings.
- A flap disconnect detection system, which detects attachment failure and inhibits flap operation in order to prevent further damage. A sensor detects the failure by measuring excessive differential movement between the inner and the outer flaps.
- Wingtip brakes (WTBs), activated in case of assymetry, mechanism overspeed, symmetrical runaway, or uncommanded movement of the surfaces. They cannot be released in flight.
  They use blue and green hydraulic power for the slats and for the right wing flaps, and blue and yellow hydraulic power for the left wing flaps.
- Feedback position pick-off units (FPPUs) that feed back position information to the SFCCs.
- An instrumentation position pick-off unit (IPPU) that sends position data to the ECAM.

Note: *If the flap wingtip brakes are on, the pilot can still operate the slats, and if the slat wingtip brakes are on, he can still operate the flaps.*
If one SFCC is inoperative, slats and flaps both operate at half speed.
If one hydraulic system is inoperative, the corresponding surfaces (slats or flaps) operate at half speed.

ARCHITECTURE

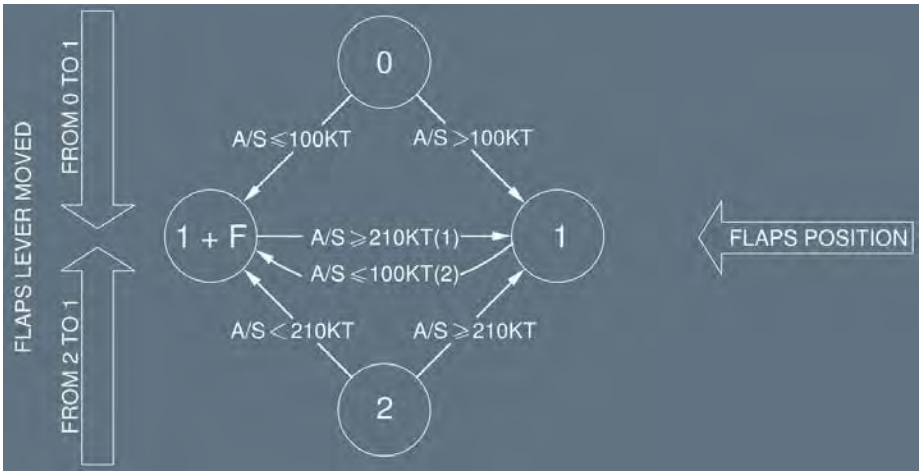
Ident.: DSC-27-30-10-00001099.0001001 / 21 MAR 16
Applicable to: ALL



CONFIGURATIONS

Ident.: DSC-27-30-10-00001100.0001001 / 09 OCT 12
Applicable to: ALL

The FLAPS lever has five positions: 0, 1, 2, 3 and FULL.
Two configurations correspond to position 1: Configuration 1 and Configuration 1 + F.
The pilot selects these as follows:



(1) When in Configuration 1 + F, the flaps retract to 0 ° automatically at 210 kt (before the airspeed reaches VFE).

(2) When in configuration 1, the flaps extend to 10 ° automatically at 100 kt.

ALPHA/SPEED LOCK FUNCTION (SLATS)

Ident.: DSC-27-30-10-00001101.0001001 / 13 SEP 16
Applicable to: ALL

This function inhibits slat retraction at high angles-of-attack and low speeds.
The SFCCs use corrected angle-of-attack (alpha) or airspeed information from the ADIRUs to inhibit slat retraction.

When the FLAPS lever is set to 0, the slats alpha/speed lock function activates and inhibits slats retraction, if:
- The AOA is above 8.5 °, or
- The speed is less than 148 kt.

Note: *If the FLAPS lever is already set to 0, when either of the above conditions occurs, the function will not activate therefore the slats will continue to retract or will remain at 0.*

Once the slats alpha/speed lock function is active, the slats retract to 0 when:
- The AOA is less than 7.6 ° and
- The speed is above 154 kt.

Note: *When the aircraft is on ground and its speed is less than 60 kt, then the function will not activate.*

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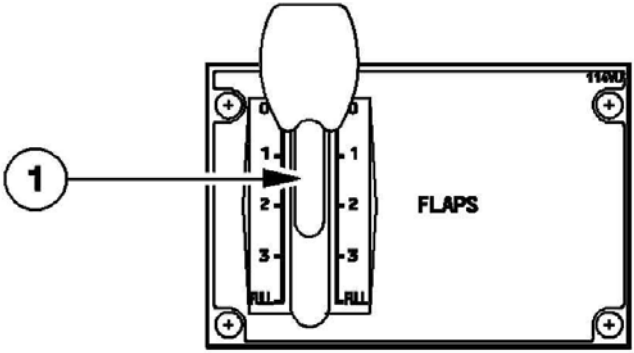
PEDESTAL

Ident.: DSC-27-30-20-00001102.0001001 / 18 MAR 11
Applicable to: MSN 3408, 4100-4547



The five lever positions correspond to the following surface positions :

Position	SLATS	FLAPS	Indications on ECAM			
0	0	0			CRUISE	HOLD
1	18	0	1			
		10	1 + F			
2	22	15	2	TAKEOFF		APPR
3	22	20	3		LDG	
FULL	27	35	FULL			

Before selecting any position, the pilot must pull the lever out of the detent. Balks at positions 1 and 3 prevent the pilot from calling for excessive flap/slat travel with a single action.

Note: *The pilot cannot select an intermediate lever position.*

TAKEOFF IN CONFIGURATION 1

1 + F (18 °/10 °) is selected. If the pilot does not select configuration 0 after takeoff, the flaps retract automatically at 210 kt.

TAKEOFF OR GO-AROUND IN CONFIGURATION 2 OR 3

If the pilot selects configuration 1, he gets 1 + F (18 °/10 °) if airspeed is under 210 kt.
If the pilot does not select configuration 0 after takeoff, the flaps retract automatically at 210 kt.

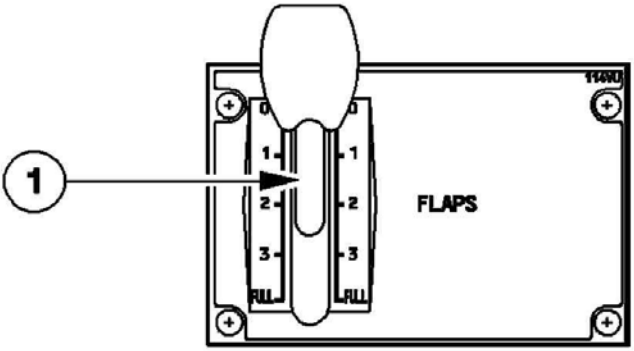
CONFIGURATION 0 TO CONFIGURATION 1 IN FLIGHT

Configuration 1 (18 °/0 °) is selected.

Note: After flap retraction, configuration 1 + F is no longer available until the airspeed is 100 kt or less, unless configuration 2, 3, or FULL has been selected previously.

PEDESTAL

Ident.: DSC-27-30-20-00001102.0002001 / 18 MAR 11
Applicable to: MSN 1882-2078, 3467-3518



(1) FLAPS lever
The FLAPS lever selects simultaneous operation of the slats and flaps.

The five lever positions correspond to the following surface positions:

Position	SLATS	FLAPS	Indications on ECAM			
0	0	0			CRUISE	HOLD
1	18	0	1			
		10	1 + F	TAKEOFF		
2	22	15	2			APPR
3	22	20	3		LDG	
FULL	27	40	FULL			

Before selecting any position, the pilot must pull the lever out of the detent. Balks at positions 1 and 3 prevent the pilot from calling for excessive flap/slat travel with a single action.

Note: The pilot cannot select an intermediate lever position.

TAKEOFF IN CONFIGURATION 1

1 + F (18 °/10 °) is selected. If the pilot does not select configuration 0 after takeoff, the flaps retract automatically at 210 kt.

TAKEOFF OR GO-AROUND IN CONFIGURATION 2 OR 3

If the pilot selects configuration 1, he gets 1 + F (18 °/10 °) if airspeed is under 210 kt.
If the pilot does not select configuration 0 after takeoff, the flaps retract automatically at 210 kt.

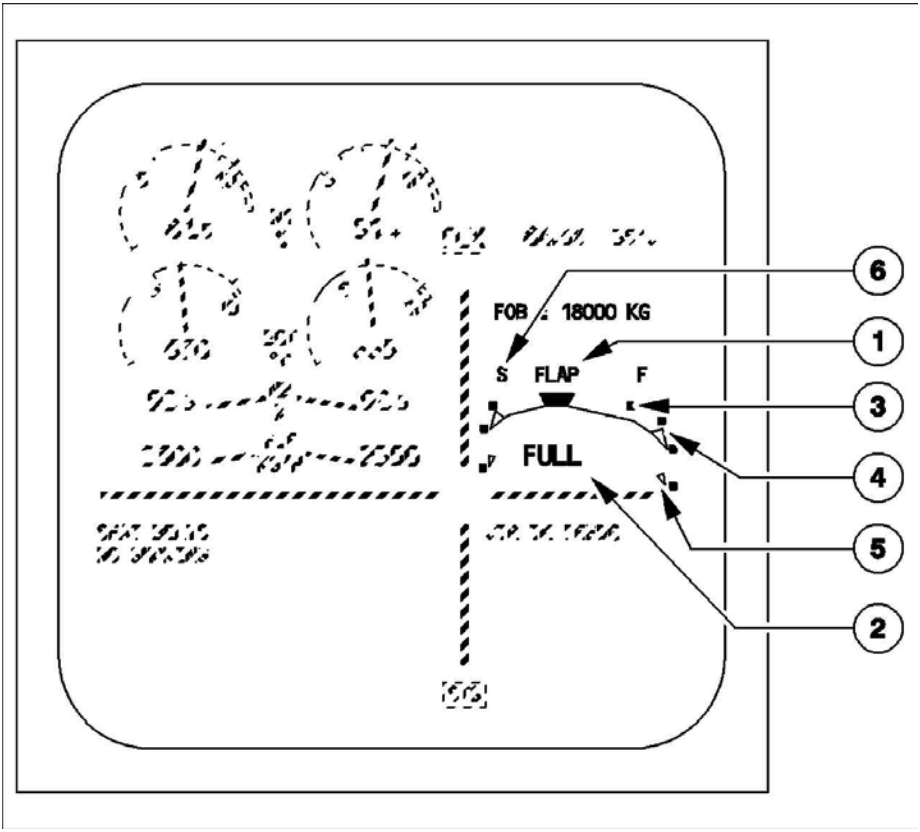
CONFIGURATION 0 TO CONFIGURATION 1 IN FLIGHT

Configuration 1 (18 °/0 °) is selected.

Note: After flap retraction, configuration 1 + F is no longer available until the airspeed is 100 kt or less, unless configuration 2, 3, or FULL has been selected previously.

ECAM UPPER DISPLAY

Ident.: DSC-27-30-20-00001103.0001001 / 18 MAR 11
Applicable to: MSN 1882-2078



(1) FLAP indication

The "FLAP" legend appears when the slats or the flaps are not fully retracted.
- The legend is white when the slats and flaps are in the selected position.
- The legend is cyan when the slats and flaps are in transit.
- The legend is amber if:
  - Both relevant hydraulic systems go down (except on the ground with engines stopped).
  - The wingtip brakes are on.
  - There is a fault in the slats or flaps.

(2) Flap lever position

The "0", "1 + F", "1", "2", "3", or "FULL" appears.
- It is green, when the slats and flaps are in the selected position. "0" is not displayed, when the aircraft attains clean configuration.
- The legend is cyan when the slats and flaps are in transit.
  The legend "S (F) LOCKED" appears in amber, associated with an ECAM caution, when the wingtip brakes are applied or when the system detects a non-alignment between two flaps.
  The legend "A-LOCK" pulses in cyan when the slat alpha/speed-lock function is active.

(3) Position indexes

These white points indicate that the slats and flaps are in a selectable position. They do not appear when the aircraft is in the clean configuration.

(4) Slat and flap position

These green triangles indicate the actual position of the slats and flaps.

They change to amber if:
- Both relevant hydraulic systems go down, unless the aircraft is on the ground with both engines stopped.
- The wingtip brakes are on.
- There is a fault in the slats or flaps.

(5) Selected surface position

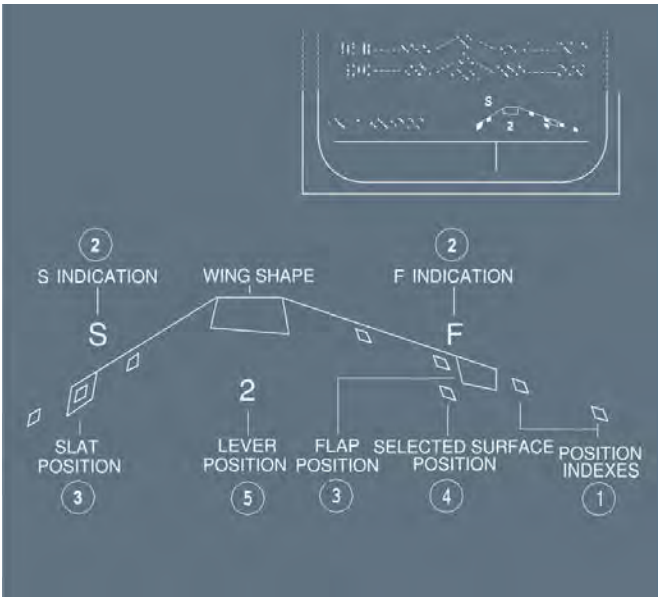
These blue triangles indicate the position the pilot has selected.
(With the current standard display management computer, the blue triangles may disappear before the slats and flaps are all completely in the selected position).

(6) S and F indications

The “S” and “F” normally appear in green. They become amber if:
- Both relevant hydraulic systems go down, unless the aircraft is on the ground with both engines stopped.
- The wingtip brakes are on.
- There is a fault in the slats or flaps.

ECAM UPPER DISPLAY

Ident.: DSC-27-30-20-00001103.0002001 / 14 NOV 11
Applicable to: MSN 3408-4547



(1) Position indexes

These white points indicate that the slats and flaps are in a selectable position. They do not appear, when the aircraft is in clean configuration.

(2) F and S

"F" and "S" normally appear in white. They become amber, if:
- Both relevant hydraulic systems fail, unless the aircraft is on ground with both engines stopped.
- The wingtip brakes are on.
- There is a slats or flaps fault.
  "S (F) LOCKED" legend, appears in amber, in association with an ECAM caution, when the wingtip brakes are applied, or when the system detects a non-alignment between two flaps.
  The "A-LOCK" legend pulses in green, when the slat alpha/speedlock function is active.

(3) Flaps/Slats' actual position

These green boxes indicate the actual flaps/slats position.

They become amber, if:
- Both relevant hydraulic systems fail, unless the aircraft is on ground with both engines stopped.
- The wingtip brakes are on.
- There is a slats or flaps fault.

(4) Selected position

It is in blue, when the surfaces are in transit.
It disappears, when the selected position is reached.

(5) Flap lever position

The "0", "1 + F", "1", "2", "3", or "FULL" legend appears.
- It is green, when the slats and flaps are in the selected position. "0" is not displayed, when the aircraft attains clean configuration.
- It becomes cyan, when the slats and flaps are in transit.

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AIRCRAFT SYSTEMS

FUEL

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GENERAL

Ident.: DSC-28-10-10-00001107.0001001 / 13 NOV 13
Applicable to: ALL

The fuel system :

- Stores fuel in the tanks.
- Supplies fuel, in the correct quantities, to the fuel tanks during refueling.
- Supplies fuel to the engines and the Auxiliary Power Unit (APU).
- Circulates fuel to cool the Integrated Drive Generator (IDG).
- Keeps fuel in the outer tanks for wing bending and flutter relief.

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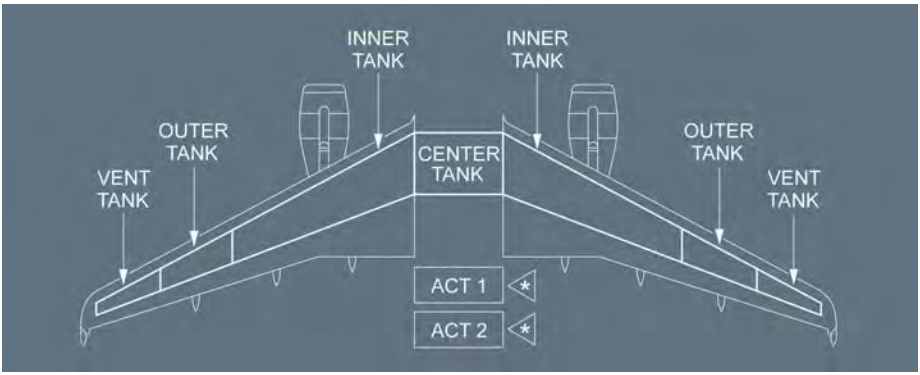
TANKS

Ident.: DSC-28-10-20-A-00020195.0001001 / 17 MAR 17
Applicable to: ALL

The fuel is stored in the wings, in the center tank, and in the Additional Center Tank (ACT ✻).
The wings have inner and outer tanks.
There is a vent surge tank outboard of the outer tank in each wing.
When the aircraft has been refueled to maximum capacity, the fuel can expand by 2 % (20 °C temperature rise) without spilling.
There is an overpressure protector in each vent, outer and inner tank and between the center tank and the left inner tank.



Ident.: DSC-28-10-20-A-00020196.0003001 / 17 MAR 17
Applicable to: MSN 3408-4547

		USABLE FUEL						
		OUTER TANKS	INNER TANKS	CENTER TANK	ACT	TOTAL WITH		
						NO ACT	1 ACT	2 ACTs
VOLUME	(liters)	880 x 2	7 099 x 2	8 250	2 992	24 209	27 201	30 193
	(US gallons)	232 x 2	1 875 x 2	2 179	790	6 395	7 185	7 975
WEIGHT(1)	(KG)	691 x 2	5 573 x 2	6 476	2 349	19 004	21 353	23 702
	(LB)	1 523 x 2	12 286 x 2	14 278	5 175	41 893	47 068	52 243

(1) *Fuel density : 0.785 kg/l or 6.551 lb/US Gal.*

Ident.: DSC-28-10-20-A-00020196.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

USABLE FUEL								
		OUTER TANKS	INNER TANKS	CENTER TANK	ACT	TOTAL WITH		
						NO ACT	1 ACT	2 ACTs
VOLUME	(liters)	880 x 2	6 924 x 2	8 250	2 992	23 859	26 851	29 843
	(US gallons)	232 x 2	1 829 x 2	2 179	790	6 303	7 093	7 883
WEIGHT (1)	(KG)	691 x 2	5 435 x 2	6 476	2 349	18 729	21 078	23 427
	(LB)	1 523 x 2	11 983 x 2	14 278	5 175	41 289	46 464	51 639

(1) *Fuel density : 0.785 kg/l or 6.551 lb/US Gal.*

GENERAL

Ident.: DSC-28-10-30-00001109.0002001 / 10 DEC 09
Applicable to: ALL

The main fuel pump system supplies fuel from the center tank or the inner wing tanks to the engines. The system has six main fuel pumps.

MAIN COMPONENTS

Applicable to: ALL

Ident.: DSC-28-10-30-A-00001110.0002001 / 01 FEB 13

TANK PUMPS

In normal operation each engine is supplied by one pump in the center tank or two pumps in its own side inner tank.
All wing tank pumps remain on throughout the flight. They are fitted with pressure relief sequence valves which ensure that, when all pumps are running, the center tank pumps will deliver fuel preferentially.

Ident.: DSC-28-10-30-A-00001111.0001001 / 31 JAN 13

INTERTANK TRANSFER VALVES

Two electrical transfer valves are mounted in each wing to permit fuel transfer from outer to inner tank.

Ident.: DSC-28-10-30-A-00001112.0001001 / 10 DEC 09

CROSS FEED VALVE

A cross feed valve controlled by a double motor allows both engines to be fed from one side or one engine to be fed from both sides.

Ident.: DSC-28-10-30-A-00001113.0001001 / 20 MAR 17

ENGINE LP VALVES

The engine fuel flow can be stopped by its low pressure (LP) fuel valve. The LP fuel valve is closed by either :
- The engine master switch, or
- The ENG FIRE PUSH pushbutton.

Ident.: DSC-28-10-30-A-00001114.0002001 / 29 MAR 12

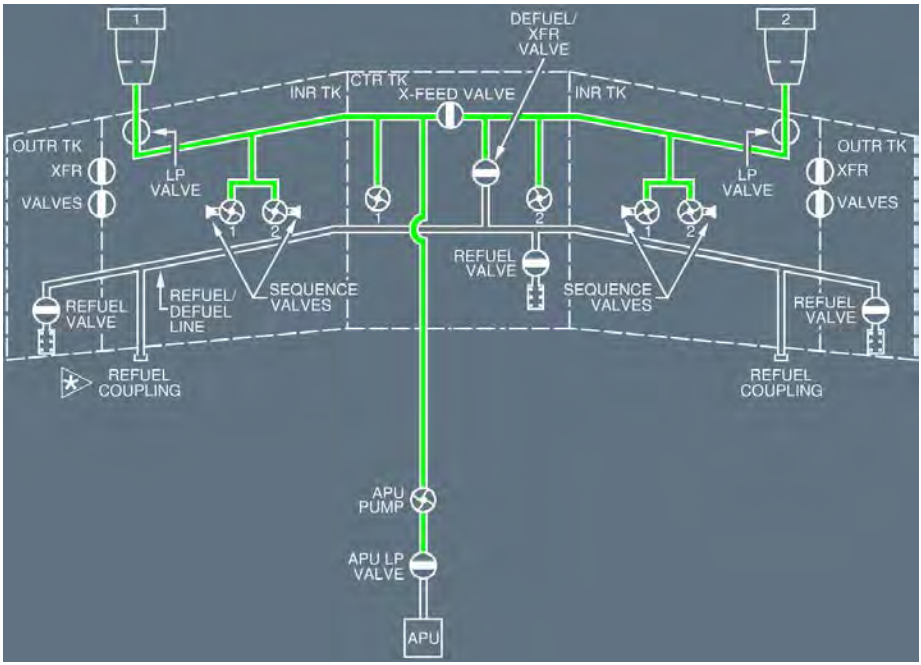
SUCTION VALVES

Closed by pumps pressure in normal operation, they allow engines to be fed by gravity if the inner tank pumps fail.

Note: *Center tank pumps are not fitted with suction valves. Therefore, gravity feeding is not possible from the center tank.*

ENGINE FEED

Ident.: DSC-28-10-30-00001115.0002001 / 18 MAR 14
Applicable to: ALL



FUEL FEED SEQUENCE

Ident.: DSC-28-10-30-00021263.0001001 / 21 MAR 17
Applicable to: ALL

The tanks empty in the following sequence :

1. The ACT2 ◁ : Fuel transfers into the center tank.
2. The ACT1 ◁ : Fuel transfers into the center tank.
3. The center tank.
4. The inner tanks: Each inner tank empties down to 750 kg (1 650 lb).
5. The outer tanks: Fuel transfers into the inner tanks.

CENTER TANK FUEL TRANSFER

The center tank feeds fuel to the engines, when the center tank pumps are not stopped by the control logic described below. The inner tanks feed the engines when the center tank pumps are stopped.

CENTER TANK TRANSFER VALVE CONTROL LOGIC

Each center tank pump stops, until approximately 500 kg (1 100 lb) of the fuel in its associated inner tank fuel has been used (when the fuel level reaches the underfull sensors).
With the MODE SEL in the MAN position, the center tank pumps will run. In manual mode, the CTR TK PUMP pb-sw must be selected OFF, when the center tank is empty.

FUEL TRANSFER FROM OUTER TO INNER TANKS

The transfer valves automatically open, when the inner tank fuel reaches the low level (about 750 kg/1 650 lb), thus enabling the fuel to drain from the outer to inner tanks.
When open, the valves are latched open. They will automatically close at the next refueling operation.

Note: *1. Two level sensors are installed in each inner tank. Each sensor controls two transfer valves, one in each wing, ensuring simultaneous transfer to both wings.*
2. The 750 kg/1 650 lb value is based on a level aircraft attitude, with no acceleration. During steep descent or accelerations/decelerations, the transfer valves may open with more than 750 kg/1 650 lb of fuel in each inner tank, and the low level warning may be triggered.

IF THE AIRCRAFT HAS ONE ACT ⋘ : ACT TO CENTER TANK TRANSFER

ACT transfer automatically starts after takeoff at slats' retraction, if the center tank high-level sensor has been dry for 10 min, and the ACT is not empty.
Fuel transfers from the ACT to the center tank via pressurization of the tank, by closing the ACT vent valve and opening the air shutoff valve.
When the ACT is empty, the ACT transfer valve, the air shutoff valve and inlet valve close, and the ACT vent valve opens.

Note: *ACT transfer stops, if the center tank high level becomes wet, by closing the ACTs transfer valve. The transfer valve reopens when the center tank high-level sensor becomes dry for 10 min.*

Selecting the ACT pb-sw to FWD opens the ACT transfer valve, the ACT inlet valve, and starts the ACT transfer pump. It must be returned to AUTO, when the ACT is empty.
Center tank overflow is prevented, by returning the ACT pb-sw to AUTO, when the center tank is full.

IF THE AIRCRAFT HAS TWO ACTS ◁ : ACT 1 + 2 TO CENTER TANK TRANSFER

ACT transfer automatically starts after takeoff at slats' retraction, if the center tank high-level sensor has been dry for 10 min, and the ACT is not empty.
Fuel transfers from the ACT to the center tank via pressurization of the tank, by closing the ACT vent valve and opening the air shutoff valve.
ACT2 transfers first, via the ACT transfer valve and the ACT2 inlet valve.
When ACT2 is empty, the ACT2 inlet valve shuts, and the ACT1 inlet valve opens.
When ACT1 is empty, the ACT transfer valve and ACT1 inlet valve close.
When the aircraft is on ground after landing, the air shutoff valve closes and both ACT vent valves open, depressurizing the ACTs.

Note: *ACT transfer stop, if the center tank high level becomes wet, by closing the ACT transfer valve. The transfer valve reopens when the center tank high-level sensor becomes dry for 10 min.*

Selecting the ACT pb-sw to FWD opens the ACT transfer valve and starts the ACT transfer pump.
ACT2 empties first, then ACT1. It must be returned to AUTO, when the ACT is empty.
Center tank overflow is prevented, by returning the ACT pb-sw to AUTO, when the center tank is full.

APU FEED

Ident.: DSC-28-10-50-00001120.0001001 / 10 DEC 09
Applicable to: ALL

A special fuel pump supplies fuel for APU startup when fuel feed pressure is low (due to loss of tank pumps or loss of normal AC electrical supply). This pump normally runs off the AC ESS SHED, but runs off the AC STAT INV BUS if the AC ESS SHED fails.

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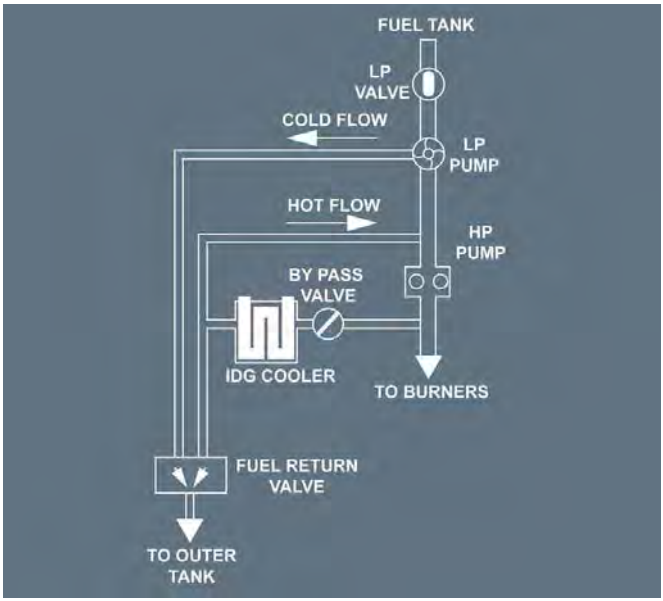
FUEL RECIRCULATION SYSTEM

Applicable to: ALL

Ident.: DSC-28-10-60-B-00020316.0001001 / 17 MAR 17

Illustration - For information only



Ident.: DSC-28-10-60-B-00020317.0004001 / 17 MAR 17

Refer to DSC-70-40 IDG Cooling System.

Some of the fuel supplied to each engine goes from the high-pressure fuel line in that engine, through the integrated drive generator (IDG) heat exchanger (where it absorbs heat), to the fuel return valve and back to the outer fuel tank.

This operation ensures the IDG cooling when the oil temperature is high or when at low engine power.

The FADEC controls the fuel return valve.

If the outer tank is already full, the fuel overflows to the inner tank through a spill pipe. On ground, the fuel recirculation is not inhibited if there is an overflow in the surge tanks (*Refer to DSC-70-40 IDG Cooling System*).

- **If the FUEL MODE SEL pb-sw is in AUTO mode:**

  If center tank is feeding, the wing tank will tend to overfill and the system automatically selects the CTR TK PUMP off when the inner tank is full. The wing tank pumps will feed until the engine

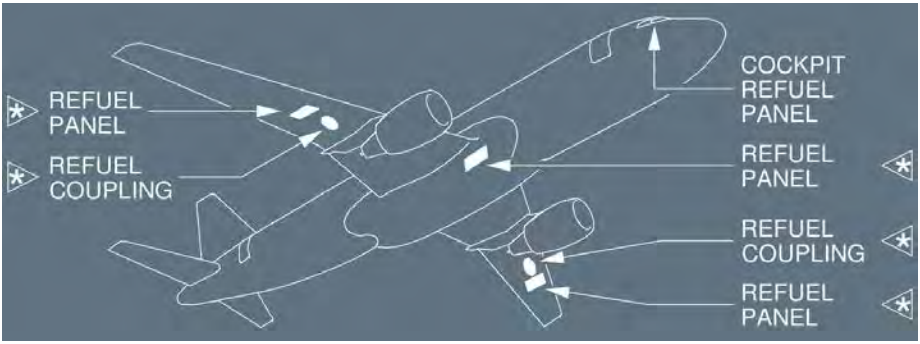
have used approximately 500 kg (1 100 lb) of fuel when the fuel level reaches the underfull sensors. The logic circuits then restart the center tank pumps.

■ **If the FUEL MODE SEL pb-sw is in MAN mode:**
If center tank is feeding, the wing tanks will tend to overfill but the system does not automatically select the CTR TK PUMPs OFF when the inner tank is full. Therefore, an overflow of the wing tanks can occur on ground if the CTR TK PUMPs are not switched OFF.

REFUELING - DEFUELING

Ident.: DSC-28-10-70-00021235.0002001 / 21 MAR 17
Applicable to: ALL

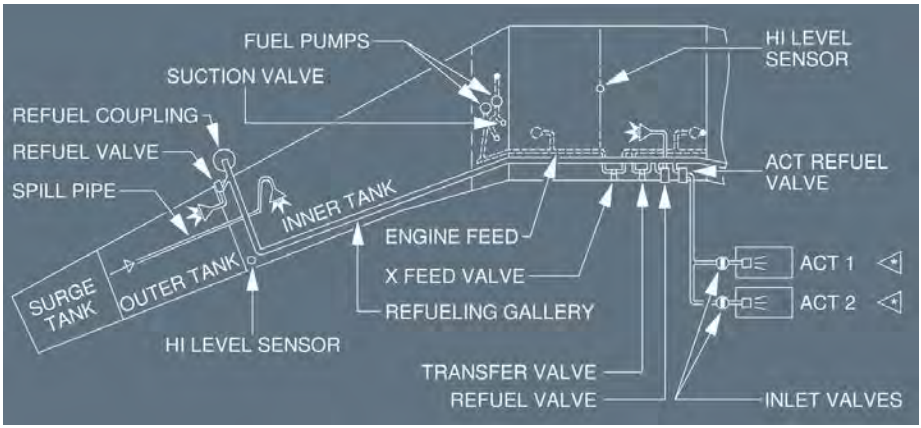
- During automatic refueling, fuel goes into the ACTs ◁ , the center tank and the outer cell of the wing tanks simultaneously. When the outer cell of the wing tank is full, fuel overflows into the inner cell. During manual refueling, fill the wing tanks first, then the center tank, then the ACTs ◁ .
- Electrical transients (caused by switching among the APU, the external and the engine electrical supply) during automatic refueling may stop the process. If the automatic refueling process is stopped, it is necessary to re-enter the Preselected Fuel Quantity.
- One (two) refueling point(s) is (are) installed under the wings, enabling the aircraft to be refueled from either the right or left (if installed) side.
- A refuel panel is located on the fuselage side beneath the right wing, or under the right or left wing adjacent to the refuel coupling.
- Another refuel panel is located on the cockpit overhead maintenance panel.
- A "READY FOR FUELING" green light is installed adjacent to the refuel coupling.



A gallery connects the refuel coupling to each tank's refuel valve.
Refueling is normally automatic, the required fuel load being set on the preselector.
Manual control is also available.
Automatic refueling starts with the outer tanks. If the selected fuel load exceeds the wing tank capacity, the center tank is simultaneously refueled.
When an outer tank is full, the fuel overflows into the inner tank through a spill pipe.
Refuel valves close automatically, when the tanks contain the preselected load, or when sensors detect a high fuel level.
The aircraft can be refueled, when only battery power is available.
The wing tanks can be refueled by gravity, through refueling points on top of the wings.

A transfer valve, between the engine feed system and the refueling gallery, allows :
- The tank pumps to transfer fuel from one tank to another
- Defueling through the refuel coupling.

Approximate refueling time at nominal pressure is:
- 17 min for wing tanks
- 20 min for all tanks (without ACT ⋘)
- 25 min for all tanks (with one ACT ⋘)
- 27 min for all tanks (with two ACTs ⋘).



FUEL QUANTITY INDICATION (FQI) SYSTEM

Ident.: DSC-28-10-80-00001123.0001001 / 10 DEC 09
Applicable to: ALL

The FQI is a computerized system that :
- transmits the actual total fuel mass, as well as the quantity and temperature of fuel in the tanks, to the ECAM.
- controls automatic refueling.

Two channels perform fuel computations : channel 2 activates automatically if channel 1 fails.

The FQI system has :
- an FQI computer.
- a set of capacitance probes in each tank to measure fuel level and temperature.
- one densitometer (cadensicon) sensor in each wing inner tank permitting the calculation of the fuel quantity.
- one Capacitance Index Compensator (CIC) in each inner tank giving the dielectric constant of the fuel in case of cadensicon failure.
- a quantity indicator for each tank installed on the refuel/defuel panel.
- a preselector on the refuel/defuel panel that shows the preselected and actual total fuel quantity.

FUEL LEVEL SENSING CONTROL UNIT (FLSCU)

Ident.: DSC-28-10-80-00001124.0001001 / 16 MAR 15
Applicable to: ALL

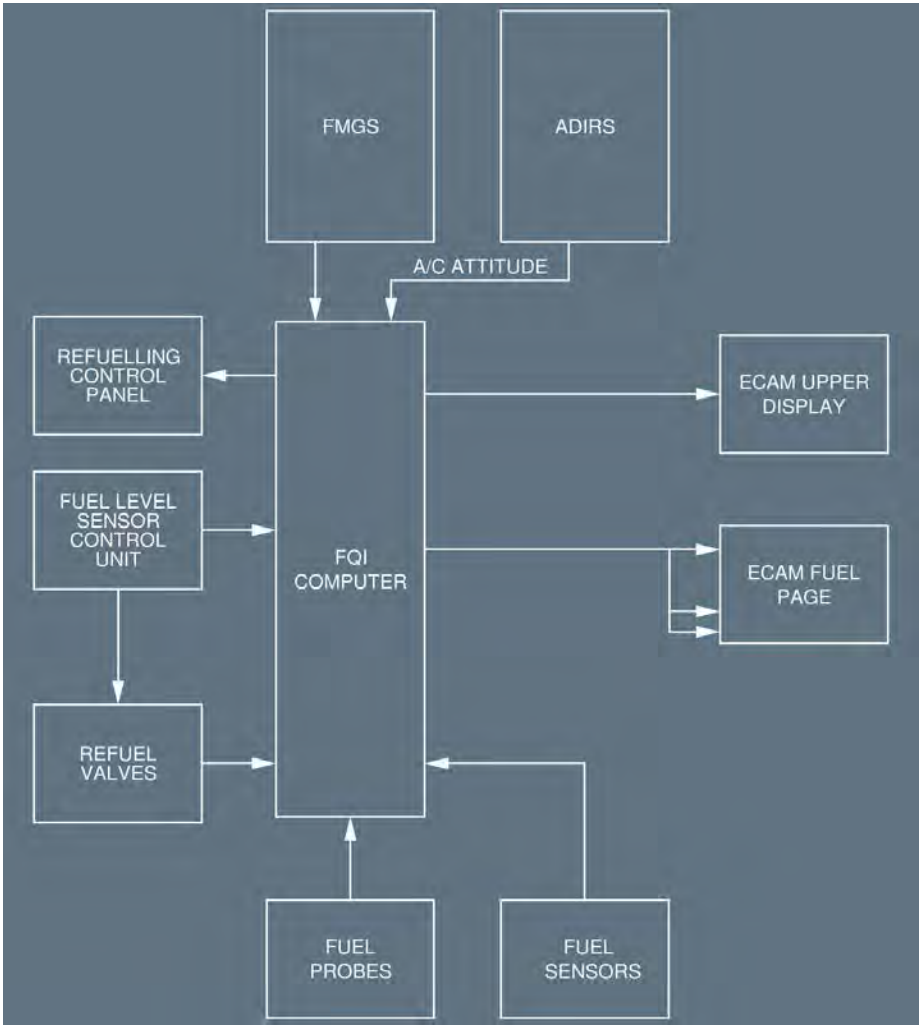
The fuel level system generates fuel-level and fuel-temperature signals in order to operate the appropriate switching functions for refueling and defueling and control the IDG cooling recirculation system and the center-tank-to-wing-tank fuel transfer system.

The FLSCU comprises :
- fuel level sensors in the tanks to sense high, low, and overflow levels.
- a fuel temperature sensor to control the IDG cooling recirculation.

When fuel quantity in one wing tank goes below 750 kg (1 650 lb), the low-level sensor triggers the LO LVL warning on ECAM. The LO LVL warning is totally independent from the displayed fuel quantity indication of the tank.

FUEL SYSTEM ARCHITECTURE

Ident.: DSC-28-10-80-00001125.0001001 / 22 MAY 12
Applicable to: ALL



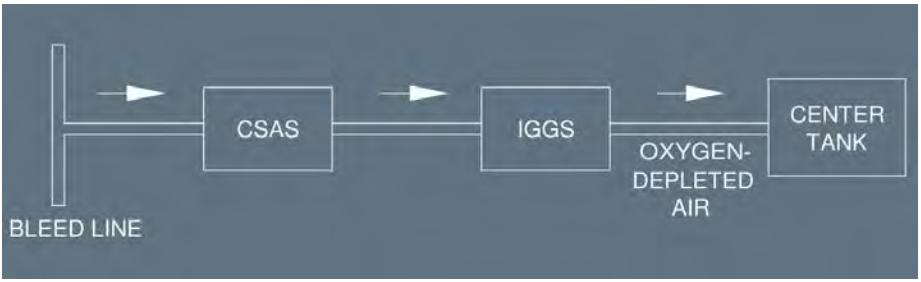
FUEL TANK INERTING SYSTEM

Ident.: DSC-28-10-90-00013692.0001001 / 18 MAR 11
Applicable to: MSN 3518, 4379-4547

The A318, A319, A320 and A321 aircraft are equipped with a Fuel Tank Inerting System.
The aim of this system is to reduce the flammability in the fuel tanks that have a high flammability exposure.
The fuel center tank is the only one that has a high flammability exposure. Therefore, the Fuel Tank Inerting System only needs to be installed for the center tank. All other tanks do not need Fuel Tank Inerting System installation.
To reduce the flammability in the center tank, the Fuel Tank Inerting System produces an oxygen-depleted air that goes in the center tank to replace the ambient air.

The system is installed in the belly fairing of the aircraft, and is composed by:
- A conditioned Service Air System (CSAS)
- An Inert Gas Generation System (IGGS).

The CSAS extracts and conditions some engine bleed air to adequate pressure and temperature. Then, the air goes through the IGGS where an Air Separation Module taps the nitrogen molecules. Therefore, an oxygen-depleted air is produced (with less than 12 % of oxygen) and replaces the ambient air of the center tank.



The Fuel Tank Inerting System does not require any flight crew action. It works independently as soon as the engines start and until they stop.

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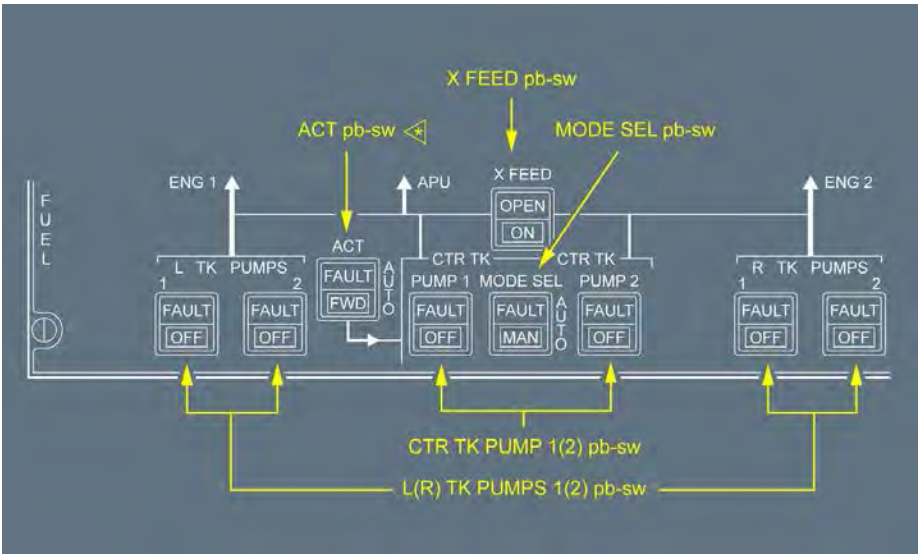
OVERHEAD PANEL

Applicable to: ALL

Ident.: DSC-28-20-G-00020183.0001001 / 17 MAR 17



Ident.: DSC-28-20-G-00020239.0001001 / 17 MAR 17

L(R) TK PUMPS 1(2) pb-sw

On	:	Pump is on (but only fuel feeds) when the delivery pressure of the center tank pumps drops below the threshold.
OFF	:	Pump is off, and the OFF button comes on white.
FAULT light	:	Amber light and ECAM caution come on, when the delivery pressure drops. It does not come on when OFF is selected.

Ident.: DSC-28-20-G-00020240.0001001 / 17 MAR 17

MODE SEL pb-sw

AUTO	:	Control of center tank pumps is automatic: - They run at engine start for 2 min, - Before or after the engine start sequence, the pumps run if the slats are retracted, - They stop automatically 5 min after center tank low level is reached.

MAN : Flight crew manually controls the center tank pumps with the center tank pumps' pushbutton.

FAULT light : Amber light comes on, and ECAM caution comes on when center tank has more than 250 kg (550 lb) of fuel and the left or right wing tank has less than 5 000 kg (11 000 lb).

Ident.: DSC-28-20-G-00020256.0001001 / 17 MAR 17

CTR TK PUMP 1(2) pb-sw

On : Pump runs, if MAN mode is selected on the MODE SEL pb-sw.
Pump is automatically controlled when AUTO mode is selected.

OFF : Pump is off and OFF button comes on white.

FAULT light : Amber light and associated ECAM caution come on, when the pump is in operation and the delivery pressure drops.

Ident.: DSC-28-20-G-00020257.0001001 / 17 MAR 17

X FEED pb-sw

ON : The valve opens, and the ON pushbutton comes on in white.

OFF : The valve closes, and the pushbutton does not come on.

OPEN light : This green light comes on, when the valve is fully open.

Ident.: DSC-28-20-G-00020258.0001001 / 17 MAR 17

ACT pb-sw ◁

AUTO : Control of the ACT transfer is automatic.
- The automatic forward transfer occurs, if:
  - The aircraft is in flight, and
  - The slats are retracted, and
  - At least one ACT low-level sensor is wet, and
  - The center tank high-level sensor has been dry for at least 10 min.
- The automatic forward transfer stops, as soon as one of the above conditions is not met.

FWD : The manual transfer to the center tank is initiated by opening:
- The ACT transfer valve,
- The ACT 1 or ACT 2 (if available) inlet valve.

The ACT transfer pump is then commanded on.

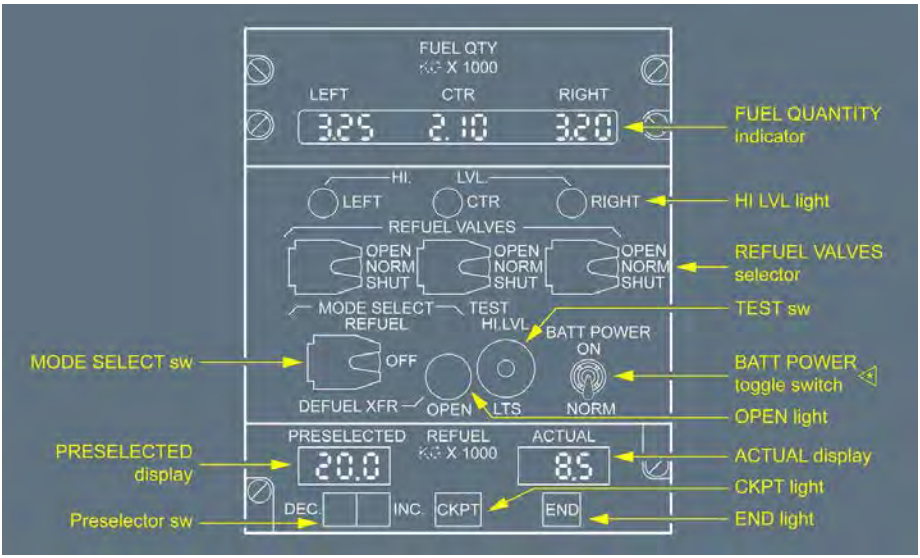
FAULT light : Amber light and associated ECAM caution come on, when:
- The center tank has less than 3 000 kg (6 614 lb) of fuel, and 1 ACT has more than 250 kg (550 lb) of fuel, and
- The ACT pb-sw is on AUTO.

Note: *When no ACT is installed, the pushbutton is inoperative.*

REFUELING CONTROL PANEL

Applicable to: ALL

Ident.: DSC-28-20-C-00020185.0001001 / 17 MAR 17



Ident.: DSC-28-20-C-00020265.0001001 / 21 MAR 17

FUEL QUANTITY INDICATOR

The number shows the quantity of fuel in each tank.
Units may either be in kg × 1 000 or lb × 1 000 depending on the aircraft configuration.

Ident.: DSC-28-20-C-00020266.0001001 / 21 MAR 17

HI LVL light

This blue light comes on, when the system detects a high fuel level.
The corresponding refuel valve closes automatically.

Ident.: DSC-28-20-C-00020267.0001001 / 21 MAR 17

REFUEL VALVES selector (GUARDED IN NORM)

NORM : Automatic refueling logic controls the refuel valves.

OPEN : Valves open when the MODE SELECT sw is set to the REFUEL or DEFUEL XFR position. Each refuel valve closes, when the system detects a high level in the associated tank.

SHUT : Valves close.

Ident.: DSC-28-20-C-00020268.0001001 / 17 MAR 17

MODE SELECT sw (GUARDED AT OFF)

OFF : Refuel system is de-energized. Refuel valves are closed.

REFUEL : Refuel valves operate in automatic or in manual mode depending on the position of REFUEL VALVES sw.

DEFUEL XFR : Refuel/Defuel transfer valve opens.

Refuel valve opens if the associated REFUEL VALVE sw is at OPEN.

Ident.: DSC-28-20-C-00020270.0001001 / 21 MAR 17

OPEN light

This amber light comes on when the defuel transfer valve is open.

Ident.: DSC-28-20-C-00020271.0001001 / 17 MAR 17

TEST sw

HI LVL : The HI LVL lights come on if high level sensors and associated circuits are serviceable.

Note: If tanks are full (HI LVL lights on) during this test, the HI LVL lights go out if high level sensors and associated circuits are serviceable.

LTS : Lights on panel and all 8's on FQI and preselector come on.

Ident.: DSC-28-20-C-00020272.0001001 / 21 MAR 17

PRESELECTED DISPLAY

This display shows the preselected total fuel quantity in kg (lb) × 1 000 (multiply by 1 000 to get actual amount).

Ident.: DSC-28-20-C-00020273.0001001 / 17 MAR 17

Preselector sw

Pressing the left or right side of the switch decreases or increases the preselected quantity.

Ident.: DSC-28-20-C-00020274.0001001 / 21 MAR 17

ACTUAL DISPLAY

This display shows the total fuel on board.

Ident.: DSC-28-20-C-00020275.0001001 / 21 MAR 17

END light

This green light comes on steady when automatic refueling is completed.
It flashes green if refueling is aborted.

Ident.: DSC-28-20-C-00020276.0002001 / 21 MAR 17

CKPT light

Indicates that cockpit refuel panel has priority.
Illuminates when electrical PWR pb-sw on cockpit refuel is pressed.

Ident.: DSC-28-20-C-00020277.0001001 / 21 MAR 17

BATT POWER TOGGLE SWITCH

ON : When the flight crew momentarily switches this to ON position and releases it, HOT BUS 1 supplies the FQI.
After completion of the FQI tests (about 40 s), the fuel quantity indications appear and refuel operation can be selected.

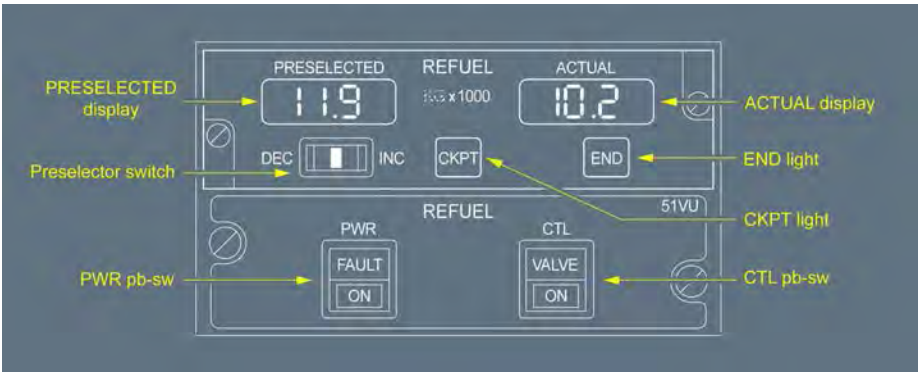
The electrical supply is automatically cut off:
- After 10 min, if no refuel operation is selected, or
- At the end of refueling.

NORM : The FQI is not supplied by batteries.

MAINTENANCE PANEL

Applicable to: ALL

Ident.: DSC-28-20-D-00020187.0007001 / 17 MAR 17



Ident.: DSC-28-20-D-00020286.0001001 / 21 MAR 17

PRESELECTED DISPLAY

This display shows the preselected total fuel quantity in KG (or in LB depending on aircraft configuration) × 1 000 (multiply by 1 000 to get actual amount).

Ident.: DSC-28-20-D-00020287.0001001 / 21 MAR 17

ACTUAL DISPLAY

This display shows the total fuel on board.

Ident.: DSC-28-20-D-00020288.0001001 / 17 MAR 17

Preselector sw

Pressing the left or the right side of the switch decreases or increases the preselected quantity.

Ident.: DSC-28-20-D-00020289.0001001 / 21 MAR 17

END light

This green light comes on steady when automatic refueling is achieved (associated with the green refuel light on wing extinguishing ◁).
It flashes green if refueling is aborted.

Ident.: DSC-28-20-D-00020290.0001001 / 17 MAR 17

PWR pb-sw

ON : - Refuel system is energized
- Cockpit refuel control/preselector panels takes priority (cockpit lights illuminate on cockpit and external refuel control panels)
- Automatic high level test
- REFUEL caption is displayed on ECAM.

OFF : - Refuel system is deenergized
- ECAM “REFUEL” caption is cleared
- Priority is cleared.

FAULT : This amber light comes on when auto high level test not satisfied.

Ident.: DSC-28-20-D-00020291.0001001 / 17 MAR 17

CTL pb-sw

ON : - Start of refuel, (associated with refuel green light illumination on wing ◁)
- Auto shut off occurs when the selected load is reached or in case of HI level detection
- VALVE light comes amber if REFUEL VALVE CTL switch are not at NORM position (on refueling control panel).

Off : Refuel stops. The selected load can be reset.

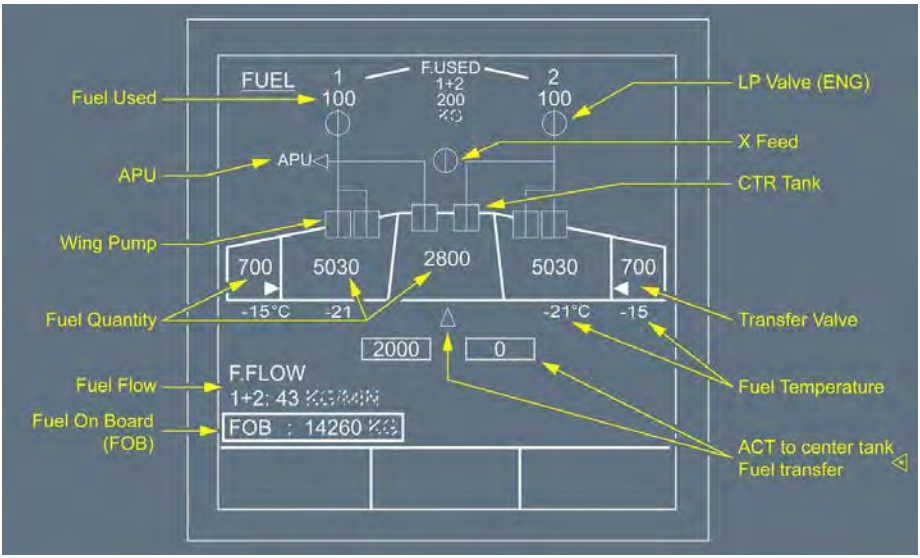
Ident.: DSC-28-20-D-00020294.0001001 / 21 MAR 17

CKPT light

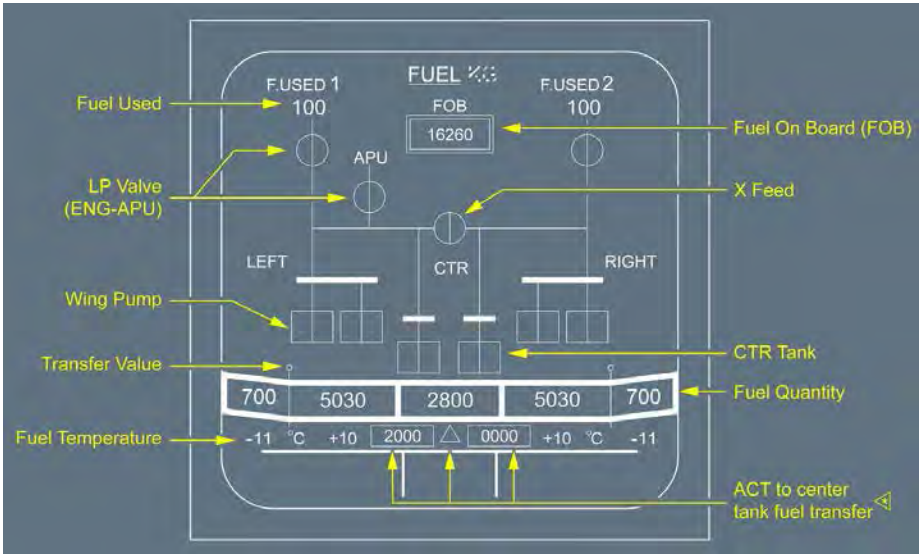
Comes on when PWR pb-sw switch is ON associated with the CKPT light on the external refuel control panel.

ECAM FUEL PAGE

Ident.: DSC-28-20-F-00020188.0004001 / 17 MAR 17
Applicable to: MSN 3408-4547



Ident.: DSC-28-20-F-00020188.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078



Ident.: DSC-28-20-F-00020213.0001001 / 17 MAR 17
Applicable to: ALL

WING PUMP INDICATIONS

Inline - Green	:	Pump pressure is normal (pump contactor on).
"LO" - Amber	:	Pump pressure is low (pump contactor on).
Crossline - Amber	:	Pump contactor is off.

Ident.: DSC-28-20-F-00020214.0002001 / 17 MAR 17
Applicable to: ALL

CTR TANKS PUMPS INDICATIONS

Inline - Green	:	Pump pressure is normal (pump contactor on).
"LO" - Amber	:	Pump pressure is low (pump contactor on).
Crossline - Green	:	Pump contactor is off, and auto shut-off is required.
Crossline - Amber	:	Pump contactor is off, and auto shut-off is not required.

Ident.: DSC-28-20-F-00020216.0002001 / 17 MAR 17
Applicable to: MSN 1882-2078

LP VALVE (ENG-APU) INDICATIONS

Inline - Green	:	The valve is open.
Inline - Amber	:	The valve is open, with the ENG (APU) MASTER switch OFF or FIRE pb out.
Crossline - Green	:	The APU valve is closed.
Crossline - Amber	:	The ENG valve is fully closed or APU valve is closed with master switch ON.
Transit - Amber	:	The valve is in transit.

Ident.: DSC-28-20-F-00020216.0001001 / 17 MAR 17
Applicable to: MSN 3408-4547

LP VALVE (ENG) INDICATIONS

Inline - Green	:	The valve is open.
Inline - Amber	:	The valve is open, with the ENG MASTER switch OFF.
Crossline - Amber	:	The ENG valve is fully closed.
Transit - Amber	:	The valve is in transit.

Ident.: DSC-28-20-F-00020217.0001001 / 17 MAR 17
Applicable to: ALL

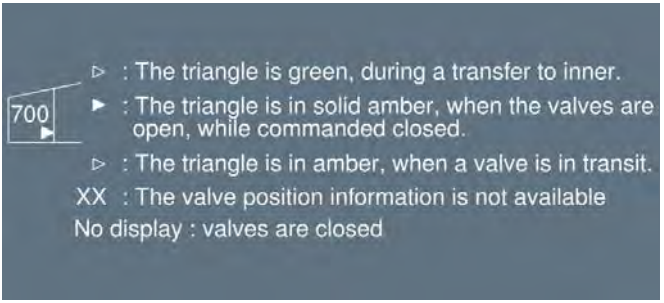
X FEED INDICATIONS

Inline - Green	:	The valve is open.
Inline - Amber	:	The valve is open, with X Feed pb off.
Crossline - Green	:	The valve is closed.
Crossline - Amber	:	The valve is closed with X feed pb ON.
Transit - Amber	:	The valve is in transit.

Ident.: DSC-28-20-F-00020218.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

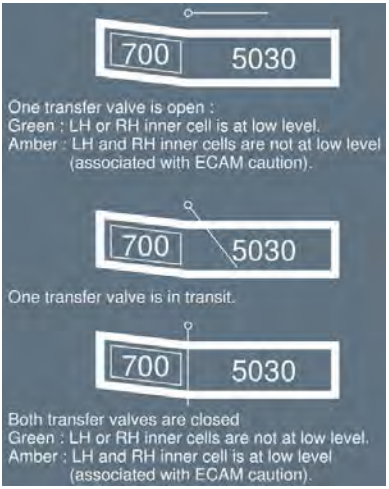
TRANSFER VALVE INDICATIONS

Outer to Inner Transfer



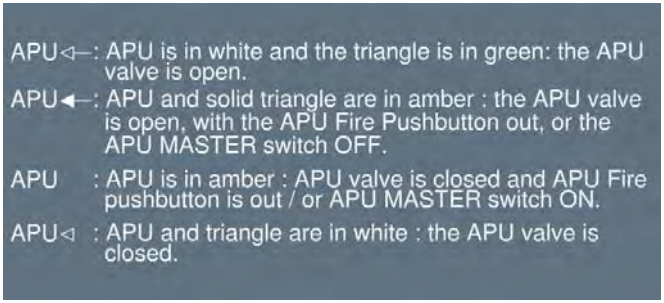
Ident.: DSC-28-20-F-00020218.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

TRANSFER VALVE INDICATIONS



Ident.: DSC-28-20-F-00020219.0001001 / 17 MAR 17
Applicable to: MSN 3408-4547

APU INDICATIONS



Ident.: DSC-28-20-F-00020220.0001001 / 17 MAR 17
Applicable to: ALL

FUEL TEMPERATURE INDICATION

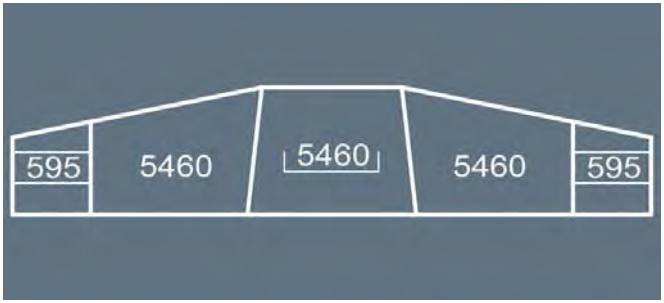
This appears when its associated temperature sensor is wet. It is normally in green.

An advisory only appears in phases 2 and 6, when the fuel temperature is:
- Above 45 °C for the inner cell, or 55 °C for the outer cell.
- Below -40 °C.

It becomes amber, and the ECAM displays a caution, if the temperature goes above the high limit or below the low limit.

Ident.: DSC-28-20-F-00020221.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

FUEL QUANTITY INDICATION



- It is normally in green.
- The units may either be in KG or LB, depending on the DMC pin program.
- Two dashes appear across the last two digits when the FQI is inaccurate (*Refer to DSC-28-20 Total Fuel Indication*).

Ident.: DSC-28-20-F-00020221.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

FUEL QUANTITY INDICATION

- It is normally in green.
- The units may either be in KG or LB, depending on the DMC pin program.
- Two dashes appear across the last two digits when the FQI is inaccurate (*Refer to DSC-28-20 Total Fuel Indication*).

Ident.: DSC-28-20-F-00020340.0001001 / 17 MAR 17
Applicable to: ALL

FUEL QUANTITY - BOXED INDICATIONS

- The outer indication is boxed amber, if both transfer valves fail to open when the inner is at low level.
- The center tank indication is boxed amber, if both center tank pumps are failed, or are switched OFF.

Ident.: DSC-28-20-F-00020341.0002001 / 17 MAR 17
Applicable to: MSN 3467

FUEL QUANTITY - OVERFLOW INDICATION

In the case of wing overflow, the associated inner tank quantity indication turns amber.

Ident.: DSC-28-20-F-00020345.0001001 / 17 MAR 17
Applicable to: ALL

FUEL QUANTITY - ADVISORY

An advisory appears in flight phases 2 and 6, when the difference between the fuel quantities in the two wings is greater than 1 500 kg (3 300 lb). The wing inner and outer tank indications pulse with the highest fuel level.

Ident.: DSC-28-20-F-00020346.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

FUEL ON BOARD (FOB) INDICATION

It is normally in green. It indicates the total of all tanks (Including the ACTs ◁)
Two dashes appear across the last two digits when the FQI is inaccurate (*Refer to DSC-28-20 Total Fuel Indication*).
Units may either be in KG or LB, depending on the DMC pin program.

The indication is boxed in amber, if:
- Center tank pumps fail, or are switched OFF.
- Both transfer valves fail to open, when the inner tank is at low level.
- Any ACT ◁ is not usable.

Ident.: DSC-28-20-F-00020346.0003001 / 17 MAR 17
Applicable to: MSN 3408-4547

FUEL ON BOARD (FOB) INDICATION

It is normally in green. It indicates the total of all tanks (Including the ACTs ◁).
Two dashes appear across the last two digits when the FQI is inaccurate (*Refer to DSC-28-20 Total Fuel Indication*).
Units may either be in KG or LB, depending on the DMC pin program.

The indication is half-boxed in amber, if:
- Center tank pumps fail, or are switched OFF.
- Both transfer valves fail to open, when the inner tank is at low level.
- Any ACT ◁ is not usable.

Ident.: DSC-28-20-F-00020347.0001001 / 17 MAR 17
Applicable to: ALL

FUEL USED INDICATION

- The engine identification number is in amber, when the engine is below idle. It is in white color, when it is at, or above, idle.
- The fuel used indication is green from flight phase 2, until electrical power is cut off at the end of the flight. It is automatically reset, when the engine is started on ground.
- Units may either be in KG or LB, depending on the DMC pin program.

Ident.: DSC-28-20-F-00020348.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

ACT TO CENTER TANK FUEL TRANSFER INDICATION

- It is normally in green.
- The ACT quantity is displayed in a grey box.

- This box becomes amber in case of a transfer fault.
- ACT 1 is indicated on the left and ACT 2 is indicated on the right.
- Units may either be in KG or LB, depending on the DMC pin program.
- A triangle indicates that the fuel transfer to the center tank has started:
  - △ : Green, when the automatic transfer begins.
  - ▲ : Fully green, when the manual transfer begins.

Ident.: DSC-28-20-F-00020348.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

ACT TO CENTER TANK FUEL TRANSFER INDICATION

It is normally in green.
A triangle indicates that the ACT fuel transfer to the center tank has started.
The ACT quantity is normally green. It shows the total fuel quantity of ACT(s) installed.
Units may either be in KG or LB, depending on the DMC pin program.
ACT1 is indicated on the left and ACT2 is indicated on the right.

Ident.: DSC-28-20-F-00020351.0001001 / 17 MAR 17
Applicable to: MSN 3408-4547

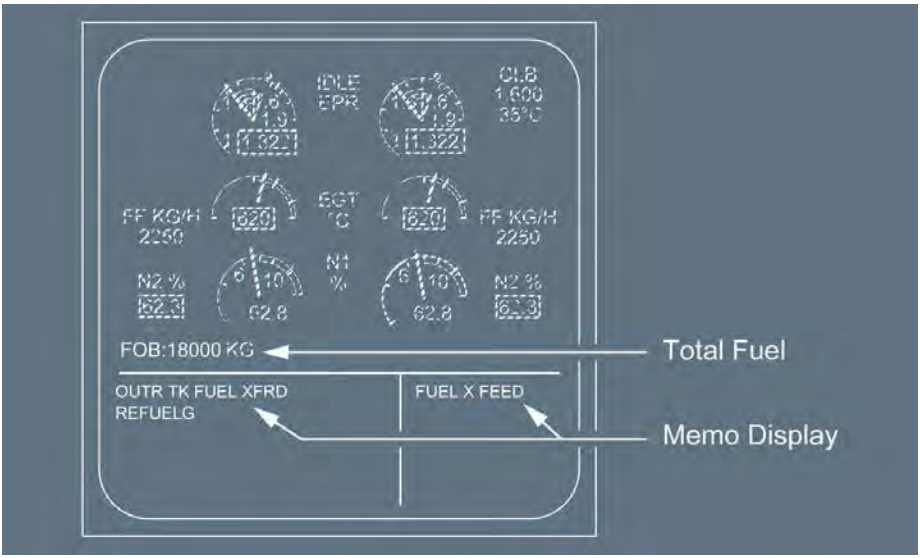
FUEL FLOW INDICATION

The Total Fuel Flow is displayed in KG/MIN or LB/MIN.
Units may either be in KG or LB, depending on the DMC pin program.

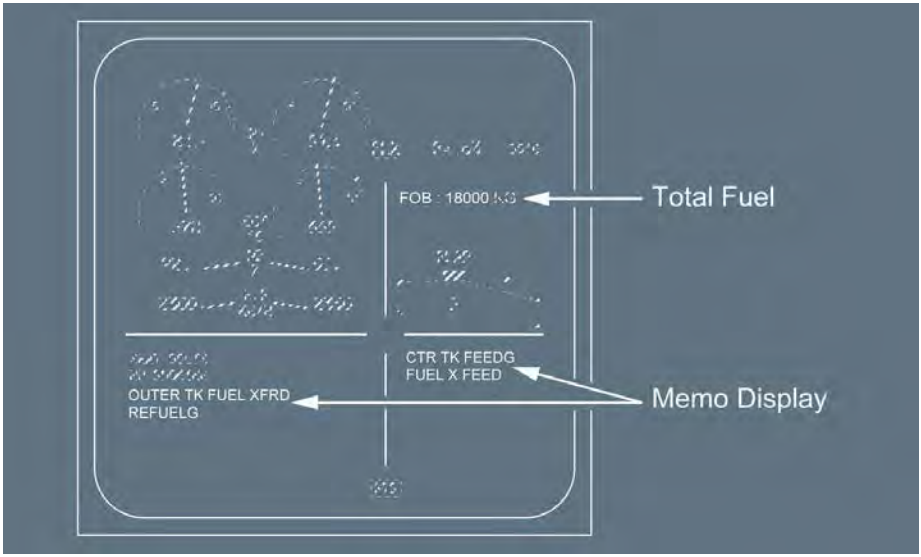
- It is normally in green.
- It is replaced by an amber XX if there is no valid data.

ECAM UPPER DISPLAY

Ident.: DSC-28-20-E-00020189.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547



Ident.: DSC-28-20-E-00020189.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078



Ident.: DSC-28-20-E-00020193.0001001 / 17 MAR 17
Applicable to: ALL

TOTAL FUEL INDICATION

An amber half box appears around FOB, when the displayed quantity is not all usable (intercell transfer valve failure or loss of center tank pumps).
Units may either be in KG or LB, depending on the DMC pin program.
If the FOB indication is displayed with two dashes across the two least significant digits, the FQI is in degraded mode. In this case, the ECAM FUEL page can be called on ECAM lower display to determine which tank is affected.

The loss of accuracy resulting from the loss of FQI normal mode is as follows :

Wing outer tank affected	:	+20 kg (+44 lb), –200 kg (–440 lb).
Wing inner tank affected	:	±110 kg (240 lb).
Center tank affected	:	±130 kg (290 lb).
All tanks affected	:	+390 kg (+860 lb), –750 kg (–1660 lb).

Ident.: DSC-28-20-E-00020194.0001001 / 17 MAR 17
Applicable to: ALL

MEMO DISPLAY

Memos are normally in green color, but they may be in amber color in abnormal situations.

MEMO DISPLAY

Applicable to: ALL

Ident.: DSC-28-20-A-00016777.0001001 / 21 MAR 16

CTR TK FEEDG : This memo appears in green, if at least one center tank pump is energized.

Ident.: DSC-28-20-A-00016778.0001001 / 21 MAR 16

FUEL X FEED : This memo appears in green, if the fuel X FEED pb-sw is ON, and the X FEED valve is not fully closed. It appears in amber in flight phases 3,4, or 5.

Ident.: DSC-28-20-A-00016776.0001001 / 21 MAR 16

OUTR TK FUEL XFRD : This memo appears in green, if at least one transfer valve is open in one wing tank.

Ident.: DSC-28-20-A-00016779.0001001 / 21 MAR 16

REFUELG : This memo appears in green, when :

- The door of the refuel control panel ◁ on the fuselage or on the wing is open, or
- The PWR pb-sw of the refuel control panel ◁ in the cockpit is ON.

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AIRCRAFT SYSTEMS

HYDRAULIC

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DSC-29-10 Description

DSC-29-10-10 General

DSC-29-10-20 Generation

DSC-29-10-30 Distribution

DSC-29-20 Controls and Indicators

Intentionally left blank

GENERAL

Ident.: DSC-29-10-10-00001133.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has three continuously operating hydraulic systems : blue, green, and yellow. Each system has its own hydraulic reservoir. Normal system operating pressure is 3 000 PSI (2 500 PSI when powered by the RAT). Hydraulic fluid cannot be transferred from one system to another.

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GREEN SYSTEM PUMP

Ident.: DSC-29-10-20-00001134.0001001 / 21 MAR 16
Applicable to: ALL

A pump driven by engine 1 pressurizes the green system.

BLUE SYSTEM PUMPS

Ident.: DSC-29-10-20-00001135.0001001 / 21 MAR 16
Applicable to: ALL

An electric pump pressurizes the blue system. A pump driven by a ram air turbine (RAT) pressurizes this system in an emergency.

YELLOW SYSTEM PUMPS

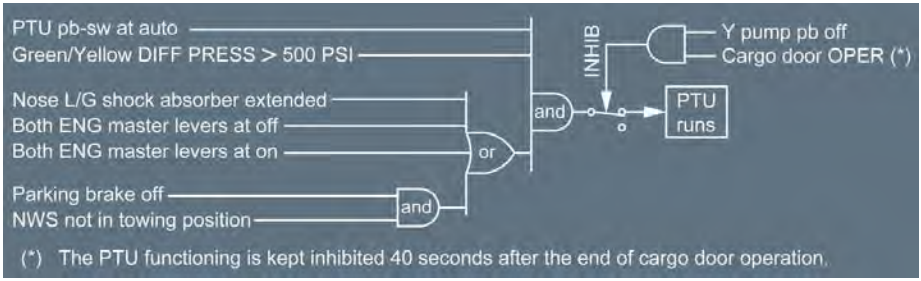
Ident.: DSC-29-10-20-00001136.0001001 / 21 MAR 16
Applicable to: ALL

A pump driven by engine 2 pressurizes the yellow system.
An electric pump can also pressurize the yellow system, which allows yellow hydraulics to be used on the ground when the engines are stopped.
Crew members can also use a hand pump to pressurize the yellow system in order to operate the cargo doors when no electrical power is available.

POWER TRANSFER UNIT (PTU)

Ident.: DSC-29-10-20-00001137.0001001 / 21 MAR 16
Applicable to: ALL

A bidirectional power transfer unit enables the yellow system to pressurize the green system and vice versa.
The power transfer unit comes into action automatically when the differential pressure between the green and the yellow systems is greater than 500 PSI.
The PTU therefore allows the green system to be pressurized on the ground when the engines are stopped.



RAM AIR TURBINE (RAT)

Ident.: DSC-29-10-20-00001138.0001001 / 21 MAR 16
Applicable to: ALL

A drop-out RAT coupled to a hydraulic pump allows the blue system to function if electrical power is lost or both engines fail. The RAT deploys automatically if AC BUS 1 and AC BUS 2 are both lost. It can be deployed manually from the overhead panel. It can be stowed only when the aircraft is on the ground.

SYSTEM ACCUMULATORS

Ident.: DSC-29-10-20-00001139.0001001 / 21 MAR 16
Applicable to: ALL

An accumulator in each system helps to maintain a constant pressure by covering transient demands during normal operation.

PRIORITY VALVES

Ident.: DSC-29-10-20-00001141.0001001 / 21 MAR 16
Applicable to: ALL

Priority valves cut off hydraulic power to heavy load users if hydraulic pressure in a system gets low.

FIRE SHUTOFF VALVES

Ident.: DSC-29-10-20-00001142.0001001 / 21 MAR 16
Applicable to: ALL

Each of the green and yellow systems has a fire shutoff valve in its line upstream of its engine-driven pump. The flight crew can close it by pushing the ENG 1(2) FIRE pushbutton.

LEAK MEASUREMENT VALVES

Ident.: DSC-29-10-20-00001143.0001001 / 21 MAR 16
Applicable to: ALL

Each system has a leak measurement valve upstream of the primary flight controls.
These valves, which measure the leakage in each circuit, are closed by operation of the LEAK MEASUREMENT VALVES pushbutton switch on the maintenance panel.

FILTERS

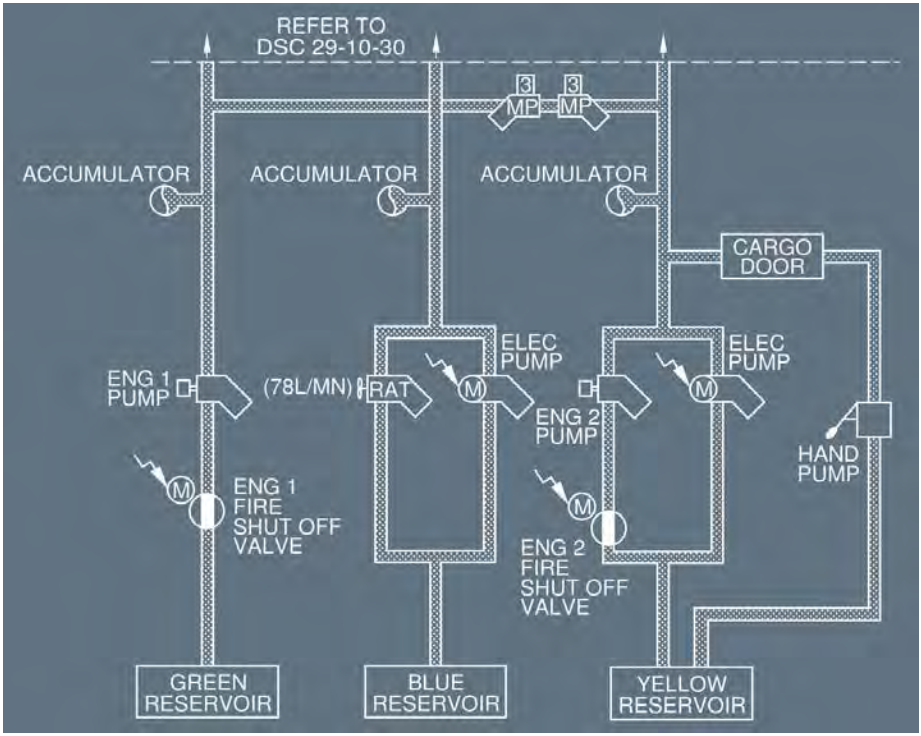
Ident.: DSC-29-10-20-00001144.0001001 / 21 MAR 16
Applicable to: ALL

L3 Filters clean the hydraulic fluid as follows :

- HP filters on each system and on the reservoir filling system and the normal braking system
- return line filters on each line
- case drain filters on engine pumps and the blue electric pump (which permit maintenance crew to monitor pump wear by inspecting the filters for the presence of metallic particles).

GENERATION

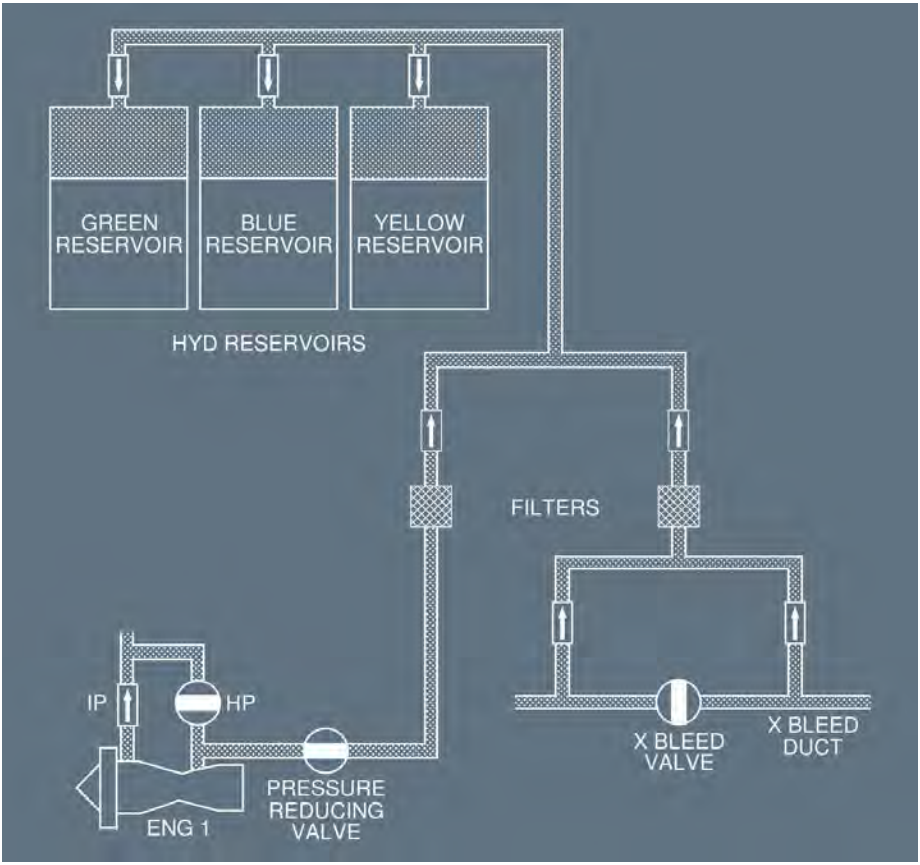
Ident.: DSC-29-10-20-00001145.0001001 / 08 FEB 13
Applicable to: ALL



RESERVOIR PRESSURIZATION

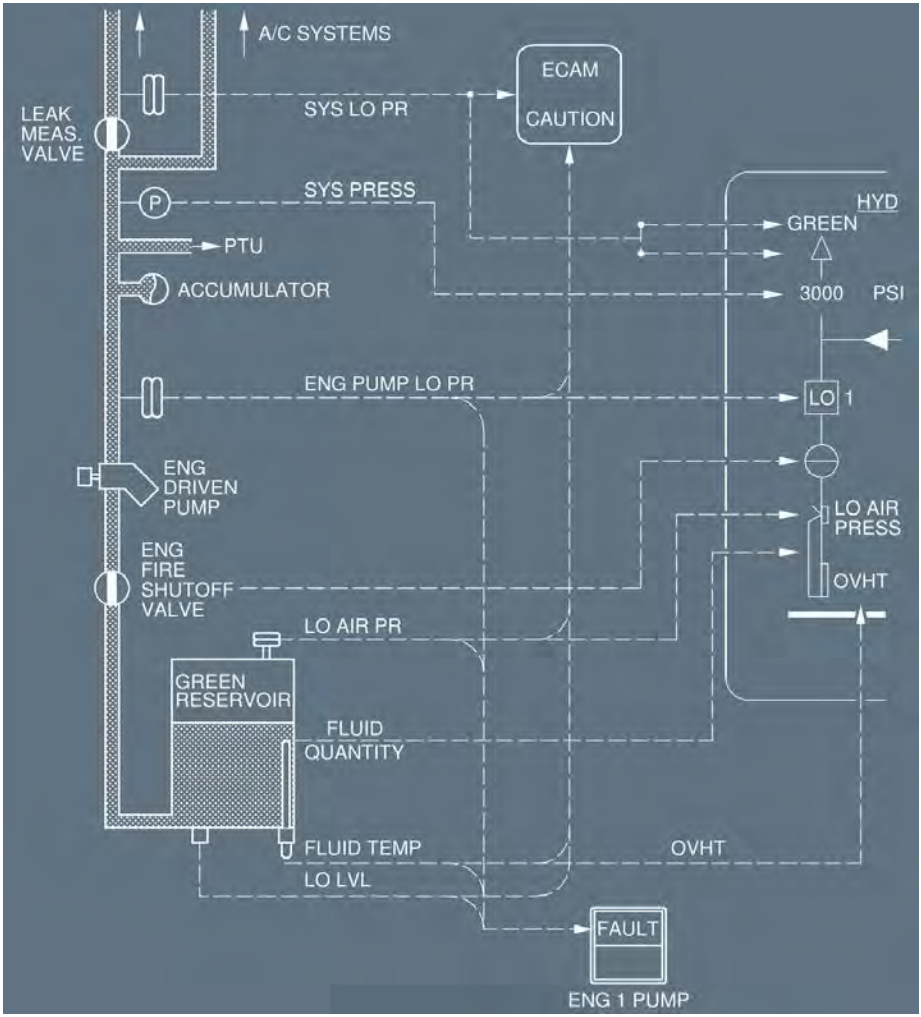
Ident.: DSC-29-10-20-00001146.0001001 / 08 FEB 13
Applicable to: ALL

Normally, HP bleed air from engine 1 pressurizes the hydraulic reservoirs automatically.
If the bleed air pressure is too low, the system takes bleed air pressure from the crossbleed duct.
The systems maintain a high enough pressure to prevent their pumps from cavitating.


GREEN RESERVOIR
BLUE RESERVOIR
YELLOW RESERVOIR
HYD RESERVOIRS
FILTERS
IP
HP
ENG 1
PRESSURE REDUCING VALVE
X BLEED VALVE
X BLEED DUCT

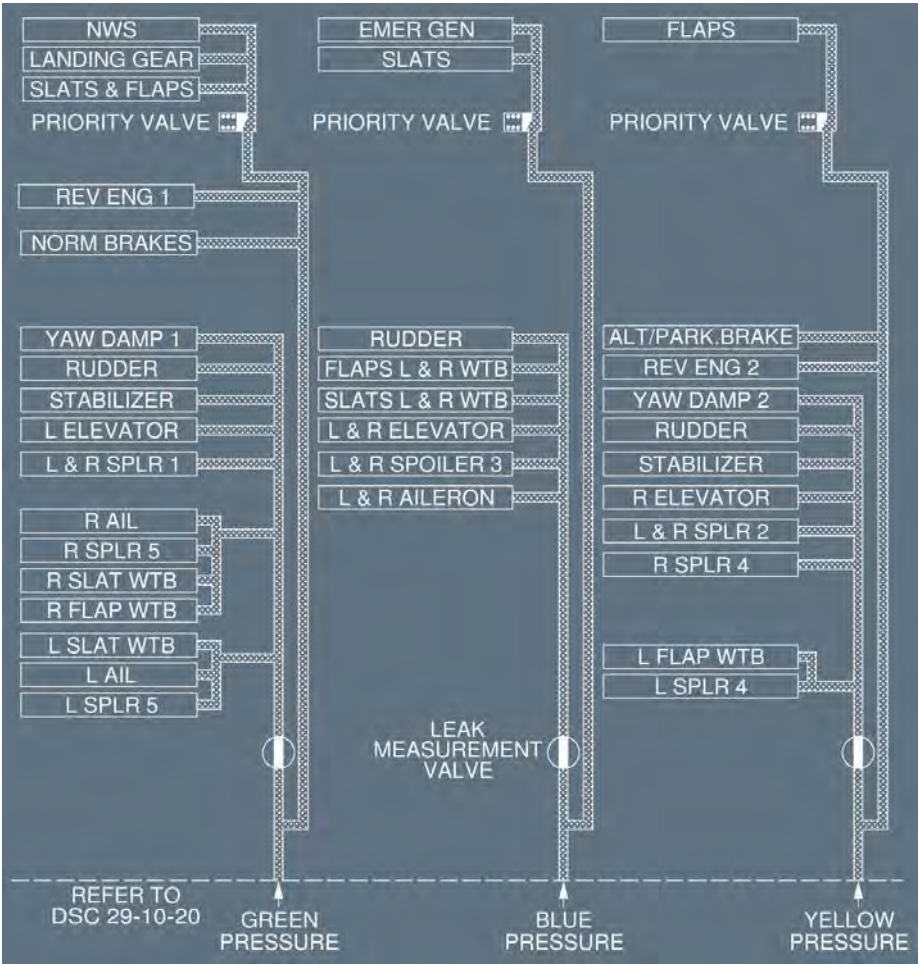
INDICATIONS

Ident.: DSC-29-10-20-00001147.0002001 / 09 OCT 12
Applicable to: ALL



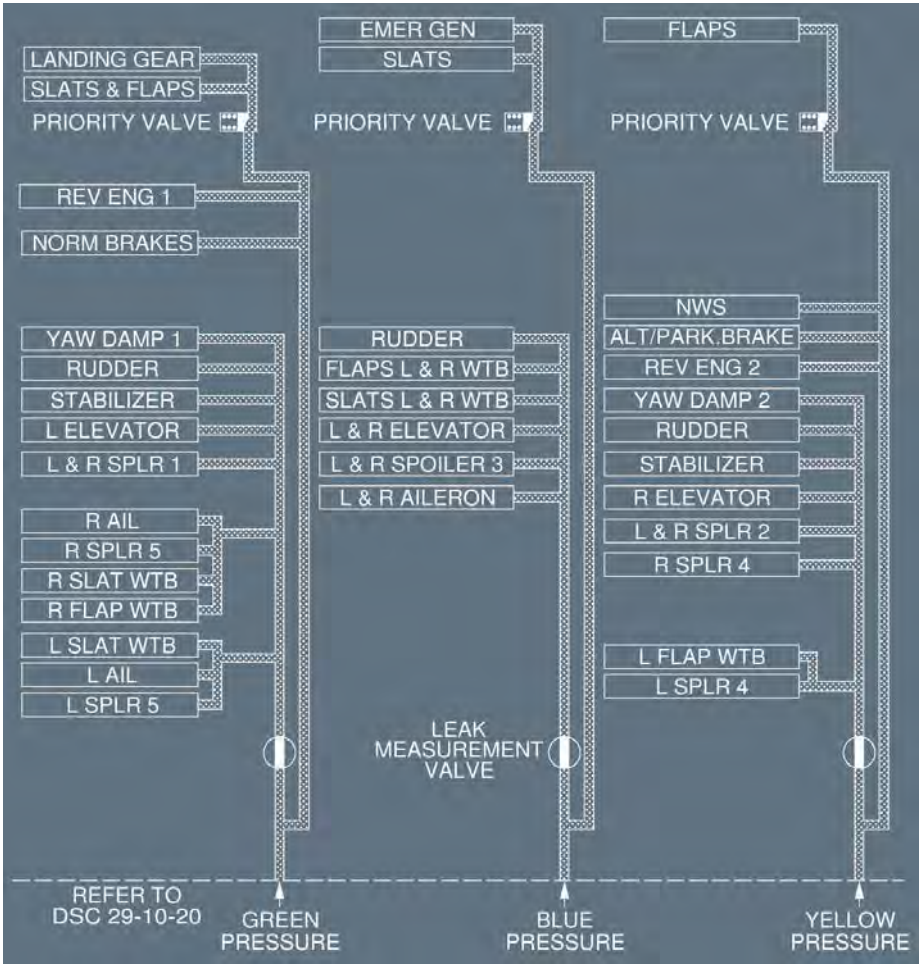
DISTRIBUTION

Ident.: DSC-29-10-30-00001148.0002001 / 08 FEB 13
Applicable to: MSN 1882-2078



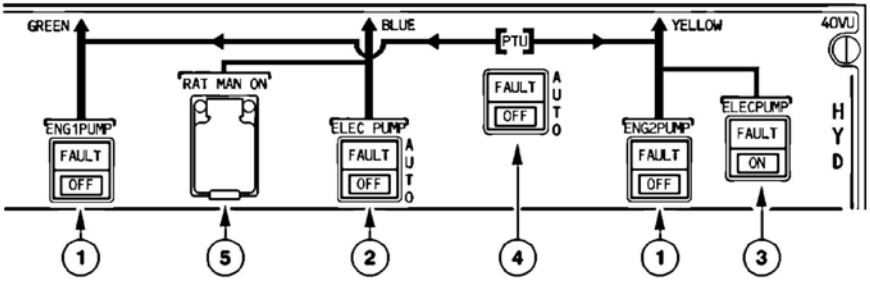
DISTRIBUTION

Ident.: DSC-29-10-30-00001148.0003001 / 08 FEB 13
Applicable to: MSN 3408-4547



OVERHEAD PANEL

Ident.: DSC-29-20-00001149.0001001 / 21 MAR 16
Applicable to: ALL



(1) ENG 1 (2) PUMP pb

On : The pump pressurizes the system when the engine is running.

OFF : The pump is depressurized. The generation of hydraulic power stops.

FAULT lt : This amber light comes on, and the ECAM caution appears, if :
- The reservoir level is low
- The reservoir overheats
- The reservoir air pressure is low
- The pump pressure is low (inhibited on the ground, when the engine is stopped).

This light goes out, when the crew selects OFF, except during an overheat. (The light stays on as long as the overheat lasts).

(2) BLUE ELEC PUMP pb (guarded)

AUTO : If AC power is available, the electric pump operates :
- In flight
- On the ground, if one engine is running or if the crew has pressed the BLUE PUMP OVRD pushbutton on the maintenance panel.

OFF : The pump is de-energized.

FAULT lt : This amber light comes on, and a caution appears on the ECAM, if :
- The reservoir level is low
- The reservoir overheats
- The air pressure in the reservoir is low
- The pump is delivering low pressure (inhibited on the ground, when the engines are stopped)
- The pump overheats.

The light goes out, when the crew selects OFF, except during an overheat. (The light stays on as long as the overheat lasts).

(3) YELLOW ELEC PUMP pb sw (springloaded)

ON : The electric pump is ON.
If the electrical power supply is removed, the pump will remain off when electrical power is applied again.

Off : The pump is off.
It comes on automatically when a crewman sets the lever of the cargo door manual selector valve to OPEN or CLOSE.
This inhibits the operation of other yellow system functions (except alternate braking and engine 2 reverse).

FAULT lt : This amber light, accompanied by an ECAM caution, comes on if :
- the reservoir level is low
- air pressure in the reservoir is low
- the reservoir overheats
- pump pressure is low
- the pump overheats.

The light goes out when the crew selects OFF, except during an overheat. (The light stays on as long as the overheat lasts).

(4) PTU pb sw

AUTO : The bidirectional power transfer unit is armed and both the yellow and the green electrohydraulic valves are open.
The power transfer unit runs automatically when the differential pressure between the green and yellow systems is more than 500 PSI.

Note: The PTU is inhibited during the first engine start and automatically tested during the second engine start.

OFF : Both the green and the yellow PTU electrohydraulic valves close. Power transfer stops.

FAULT lt : This amber light comes on, and a caution appears on the ECAM, if :
- the green or the yellow reservoir overheats
- the green or the yellow reservoir has low air pressure
- the green or the yellow reservoir has a low flluid level.

The light goes out when the crew selects OFF, except during an overheat. (The light stays on as long as the overheat lasts).

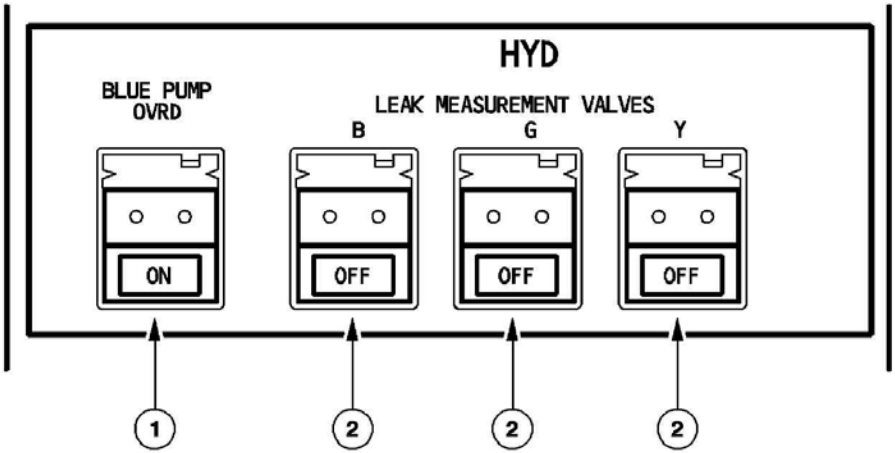
(5) RAT MAN ON pb

The flight crew may extend the RAT at any time by pressing the RAT MAN ON pushbutton.

Note: The RAT extends automatically if AC BUS 1 and AC BUS 2 are lost. (Refer to DSC-24-20 Overhead Panel (Cont'd)).

MAINTENANCE PANEL

Ident.: DSC-29-20-00001150.0001001 / 21 MAR 16
Applicable to: ALL



(1) BLUE PUMP OVRD pb sw (guarded)

ON : The blue electric pump is on if the ELEC PUMP pushbutton switch on the HYD panel is at AUTO.

Off : The blue electric pump is off.

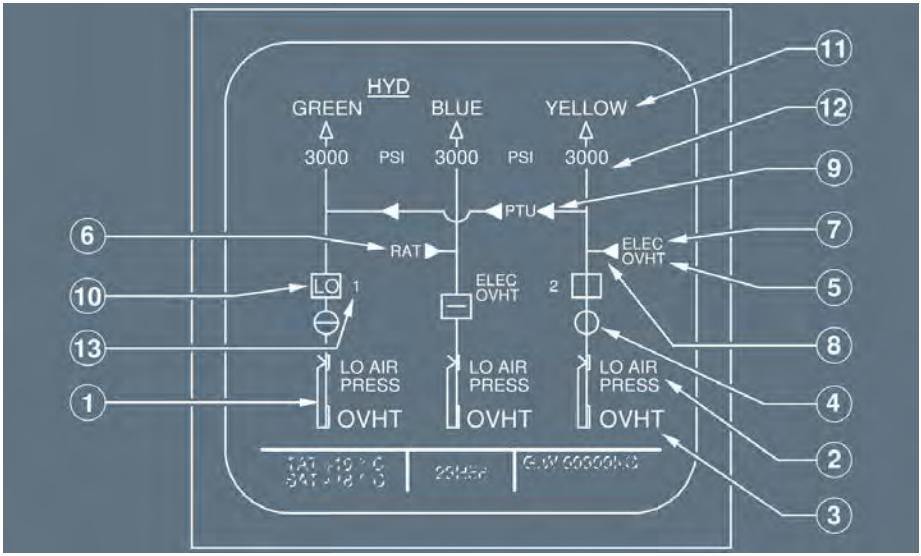
(2) LEAK MEASUREMENT VALVES pb sw (guarded)

OFF: The corresponding electrohydraulic valve closes and shuts off hydraulic supply to the primary flight controls.

On : The corresponding electrohydraulic valve opens to go back to normal hydraulic supply.

ECAM HYD PAGE

Ident.: DSC-29-20-00001151.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078



(1) Reservoir quantity
It is in green, unless the fluid level goes below the warning level, in which case it becomes amber.

(2) Reservoir LO AIR PRESS
This appears in amber, and a caution appears on ECAM, if the air pressure for the indicated reservoir drops below normal.

(3) Reservoir OVHT
This appears in amber, and a caution appears on ECAM, if the temperature of returning hydraulic fluid temperature at the inlet to its reservoir is above normal.

(4) FIRE VALVE

Cross line - Amber	:	The valve is fully closed.
In line - Green	:	The valve is not fully closed.

(5) OVHT
This appears in amber if the electric pump for that system (blue or yellow) overheats.

(6) RAT

RAT ▷ White	:	The RAT is stowed.
RAT Green	:	The RAT is not stowed.
RAT ▶ Amber	:	Pressure for stowing the RAT has been applied, or the RAT pump is not available.

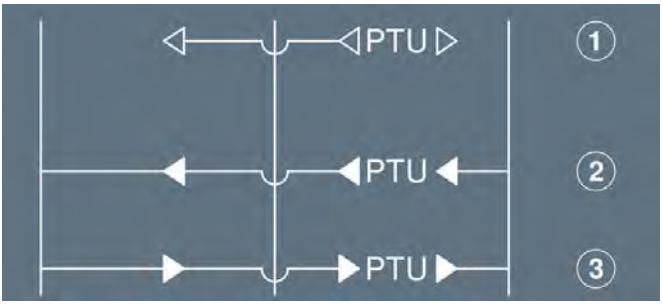
(7) ELEC
This legend, normally white, becomes amber if the associated power supply fails.

(8) YELLOW ELEC PUMP control

◁ White	:	The electric pump is off.
Green	:	The electric pump is ON.

◂ Amber : The electric pump is ON and the yellow system has low pressure.

(9) PTU control



(1)

Green : The power transfer unit (PTU) pushbutton switch is in AUTO and the PTU is not transferring pressure.

Amber : The PTU pb-sw is OFF.

(2)

Green : The PTU is supplying the green hydraulic system.

(3)

Green : The PTU is supplying the yellow hydraulic system.

(10) ENG PUMP control and low pressure indication

In line (Green) : The pushbutton switch for the designated PUMP is on and hydraulic pressure is normal.

Cross line (Amber) : The pushbutton switch for the designated PUMP is OFF.

"LO" (Amber) : The pushbutton switch for the designated PUMP is on and hydraulic pressure is low.

(11) System label

	pressure > 1 450 PSI	pressure < 1 450 PSI
YELLOW	white	amber
△	green	amber

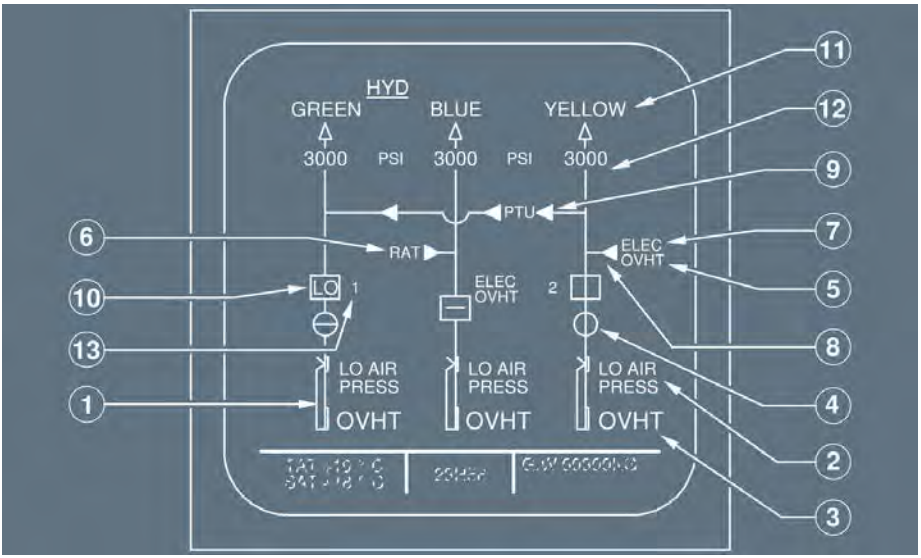
(12) System pressure

This legend, normally green, becomes amber when system pressure is below 1 450 PSI.

(13) PUMP
This legend, normally white, becomes amber when N2 is below idle.

ECAM HYD PAGE

Ident.: DSC-29-20-00001151.0002001 / 23 JUN 15
Applicable to: MSN 3408-4547



(1) Reservoir quantity
It is in green, unless the fluid level goes below the warning level, in which case it becomes amber.

(2) Reservoir LO AIR PRESS
This appears in amber, and a caution appears on ECAM, if the air pressure for the indicated reservoir drops below normal.

(3) Reservoir OVHT
This appears in amber, and a caution appears on ECAM, if the temperature of returning hydraulic fluid temperature at the inlet to its reservoir is above normal.

(4) FIRE VALVE

Cross line - Amber : The valve is fully closed.

In line - Green : The valve is not fully closed.

(5) OVHT
This appears in amber if the electric pump for that system (blue or yellow) overheats.

(6) RAT

RAT ▹ White : The RAT is stowed.

RAT Green : The RAT is not stowed.

RAT ▸ Amber : Pressure for stowing the RAT has been applied, or the RAT pump is not available.

(7) ELEC
This legend, normally white, becomes amber if the associated power supply fails.

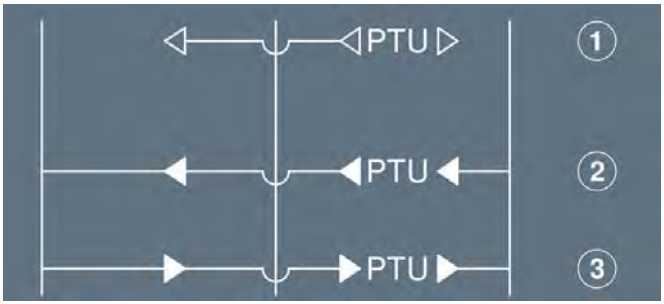
(8) YELLOW ELEC PUMP control

◃ White : The electric pump is off.

Green : The electric pump is ON.

◂ Amber : The electric pump is ON and the yellow system has low pressure.

(9) PTU control



(1)

Green : The power transfer unit (PTU) pushbutton switch is in AUTO and the PTU is not transferring pressure.

Amber : The PTU pb-sw is OFF.

(2)

Green : The PTU is supplying the green hydraulic system.

(3)

Green : The PTU is supplying the yellow hydraulic system.

(10) ENG PUMP control and low pressure indication

In line (Green) : The pushbutton switch for the designated PUMP is on and hydraulic pressure is normal.

Cross line (Amber) : The pushbutton switch for the designated PUMP is OFF.

"LO" (Amber) : The pushbutton switch for the designated PUMP is on and hydraulic pressure is low.

(11) System label

	pressure > 1 450 PSI	pressure < 1 450 PSI
YELLOW	white	amber
△	green	amber

(12) System pressure

This legend, normally green, becomes amber when system pressure is below 1 450 PSI.

(13) PUMP

This legend, normally white, becomes amber when N2 is below idle.

MEMO DISPLAY

Applicable to: ALL

Ident.: DSC-29-20-A-00016787.0001001 / 21 MAR 16

HYD PTU : This memo appears in green, when the power transfer unit is running.

Ident.: DSC-29-20-A-00016786.0001001 / 21 MAR 16

RAT OUT : This memo appears in green, if the Ram Air Turbine is not fully stowed. The color changes to amber during flight phases 1 and 2.

AIRCRAFT SYSTEMS

ICE AND RAIN PROTECTION

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Continued on the following page

Continued from the previous page

GENERAL

Ident.: DSC-30-10-10-00001154.0001001 / 16 MAR 11
Applicable to: ALL

The ice and rain protection system allows unrestricted operation of the aircraft in icing conditions and heavy rain.

ANTI-ICE

Ident.: DSC-30-10-10-00001155.0001001 / 29 MAR 12
Applicable to: ALL

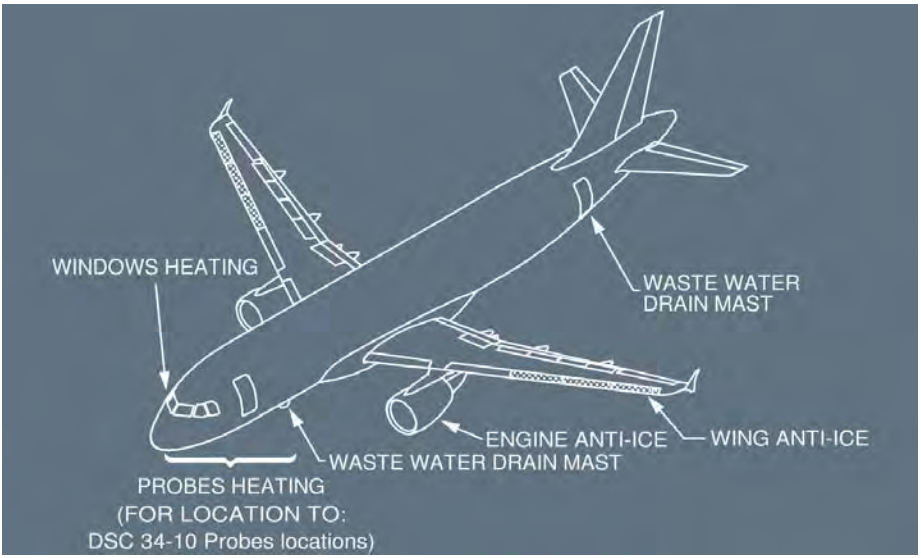
Either hot air or electrical heating protects critical areas of the aircraft as follows:

HOT AIR

- Three outboard leading-edge slats of each wing
- Engine air intakes.

ELECTRICAL HEATING

- Flight compartment windows
- Sensors, pitot probes and static ports
- Waste-water drain mast.



RAIN REMOVAL

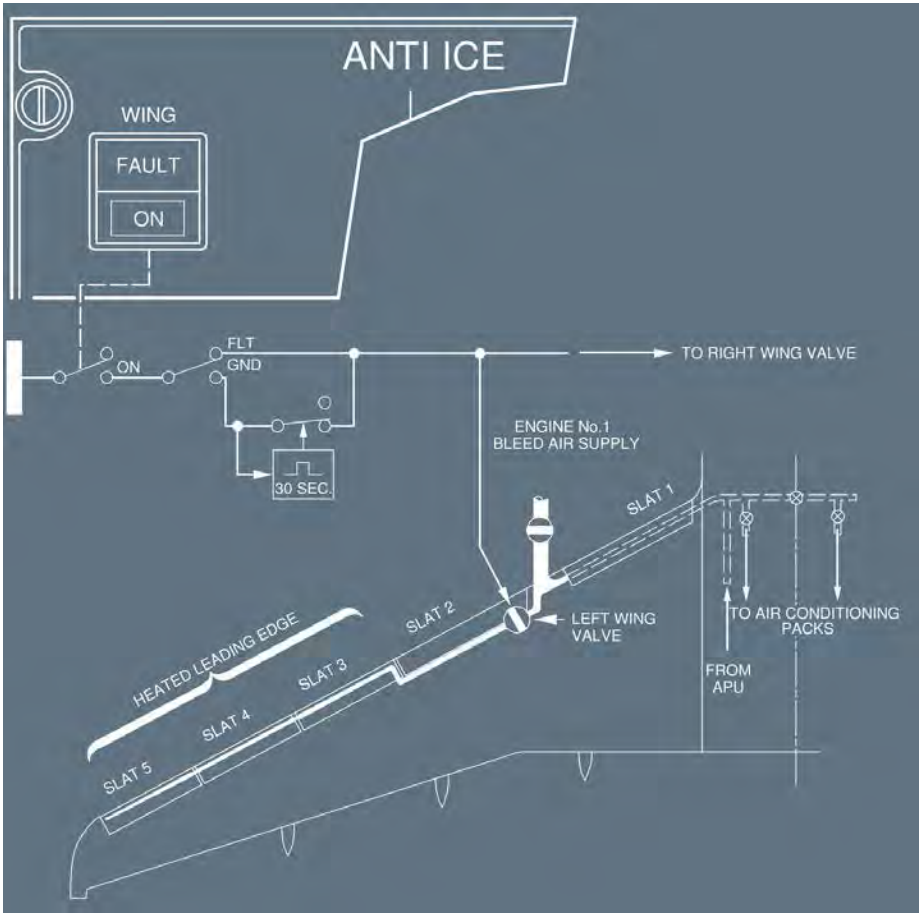
Ident.: DSC-30-10-10-00017416.0001001 / 21 MAR 16
Applicable to: ALL

Wipers and fluid rain repellent ◁ , remove rain from the front windshield panels.

DESCRIPTION

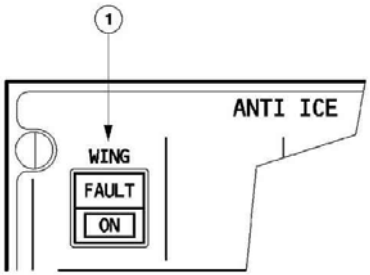
Ident.: DSC-30-20-10-00017417.0001001 / 21 MAR 16
Applicable to: ALL

In flight, hot air from the pneumatic system heats the three outboard slats (3-4-5) of each wing.
Air is supplied through one valve in each wing.
The WING pushbutton on the ANTI ICE panel controls the valves.
When the aircraft is on ground, the flight crew can initiate a 30 s test sequence by turning the system ON.
If the system detects a leak during normal operation, the affected side's wing anti-ice valve automatically closes (*Refer to DSC-36-10-50 Leak Detection*).
When wing anti-ice is selected, the N1 or EPR limit is automatically reduced, and the idle N1 or EPR is automatically increased.
If the electrical power supply fails, the valves close.


ANTI ICE
WING
FAULT
ON
ON
FLT
GND
30 SEC.
TO RIGHT WING VALVE
ENGINE No.1
BLEED AIR SUPPLY
SLAT 1
SLAT 2
SLAT 3
SLAT 4
SLAT 5
HEATED LEADING EDGE
LEFT WING
VALVE
TO AIR CONDITIONING
PACKS
FROM
APU

OVERHEAD PANEL

Ident.: DSC-30-20-20-00017418.0001001 / 21 MAR 16
Applicable to: ALL



(1) WING ANTI ICE pb sw
This switch controls the wing anti ice system on the left and right sides simultaneously.

Off : ON light goes off.
Wing anti-icing control valves close.

FAULT : Light comes on amber, and caution appears on ECAM, if:
- The position of the anti-icing control valve is not the required position, or
- Low pressure is detected.

Note: The amber FAULT light comes on briefly as the valves transit.

ON : Light comes on blue.
WING A. ICE appears on the ECAM MEMO page.
Wing anti ice control valves open if a pneumatic supply is available.
On the ground the wing anti-icing control valves open for 30 s only (test sequence).

ECAM BLEED PAGE

Ident.: DSC-30-20-20-00001159.0001001 / 21 MAR 16
Applicable to: ALL

Refer to DSC-36-20 ECAM Bleed Page

MEMO DISPLAY

Ident.: DSC-30-20-20-A-00016938.0001001 / 21 MAR 16
Applicable to: MSN 1882

ICE NOT DET : This memo appears in green, if ice is no longer detected after 190 s.

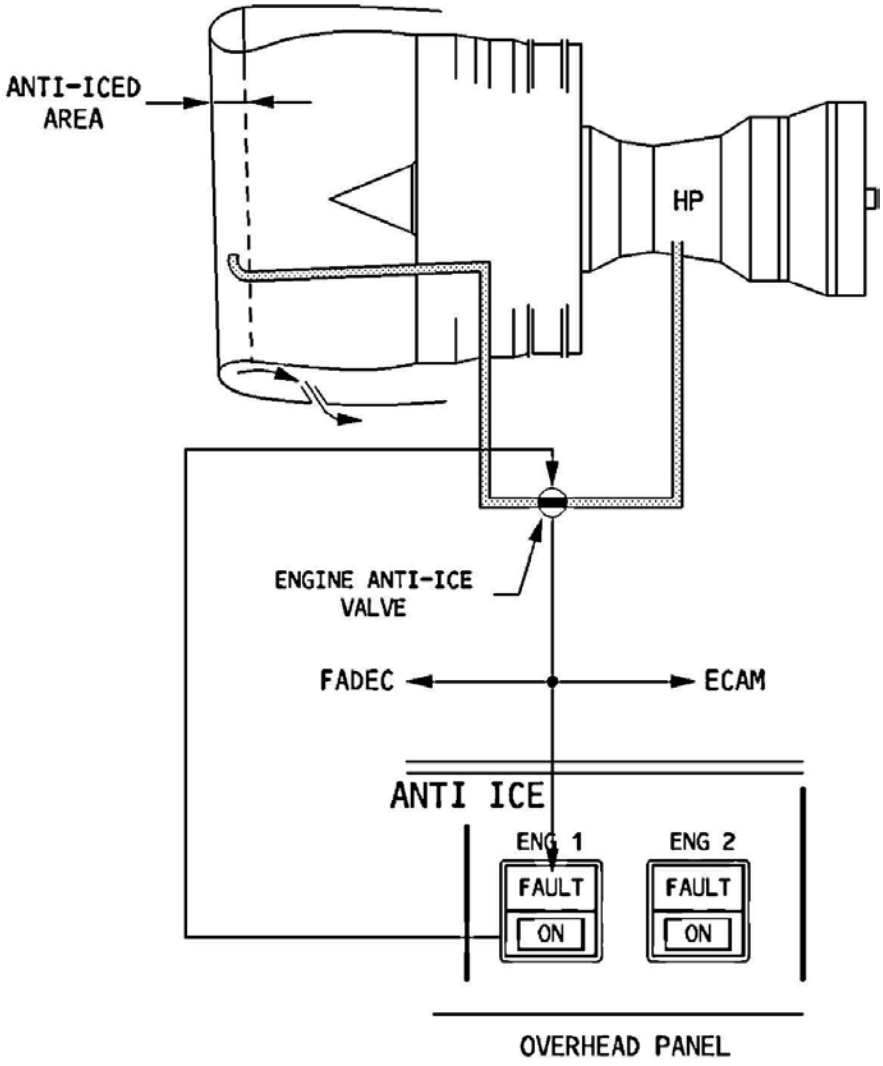
Ident.: DSC-30-20-20-A-00016939.0001001 / 21 MAR 16
Applicable to: ALL

WING A.ICE : This memo appears in green, if the WING ANTI ICE pb-sw is ON.

DESCRIPTION

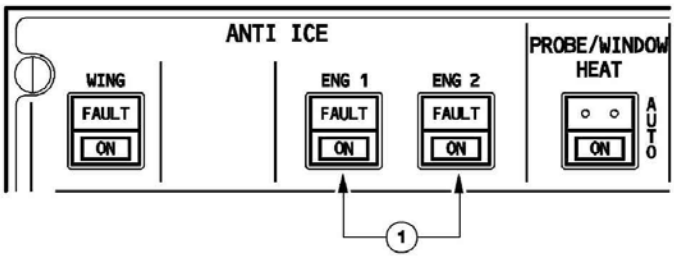
Ident.: DSC-30-30-10-00017422.0001001 / 21 MAR 16
Applicable to: ALL

An independent air bleed from the high pressure compressor protects each engine nacelle from ice.
Air is supplied through a two-position (open and closed) valve that the flight crew controls with two pushbuttons, one for each engine.
The valve automatically closes, if air is unavailable (engine not running).
When an engine anti-ice valve is open, the N1 or EPR limit is automatically reduced and, if necessary, the idle N1 or EPR is automatically increased for both engines in order to provide the required pressure.
If electrical power fails, the valves open.


ANTI-ICED
AREA
HP
ENGINE ANTI-ICE
VALVE
FADEC
ECAM
ANTI ICE
ENG 1
ENG 2
FAULT
ON
FAULT
ON
OVERHEAD PANEL

OVERHEAD PANEL

Ident.: DSC-30-30-20-00017425.0003001 / 21 MAR 16
Applicable to: ALL



(1) ENG 1 (2) ANTI ICE pb-sw

Off : ON light goes off.
Engine anti-ice valve closes.

FAULT : Light comes on amber, and caution message appears on ECAM, if the position of the anti-ice valve disagrees with the ENG 1 (2) pushbutton selection.

Note: The amber FAULT light comes on briefly as valve transits.

ON : Light comes on blue.
ECAM MEMO displays “ENG A. ICE”.
Engine anti-icing valve opens if bleed air is available from the engine.

MEMO DISPLAY

Ident.: DSC-30-30-20-A-00016945.0001001 / 21 MAR 16
Applicable to: ALL

ENG A.ICE : This memo appears in green, if one or both ENG ANTI ICE pb-sw are ON.

Ident.: DSC-30-30-20-A-00016949.0001001 / 21 MAR 16
Applicable to: MSN 1882

ICE NOT DET : This memo appears in green, if no ice has been detected 190 s after the flight crew has selected the ENG ANTI ICE pb-sw are ON.

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DESCRIPTION

Ident.: DSC-30-40-10-00017458.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft uses electrical heating for anti-icing each windshield and defogging the cockpit side windows.
Two independent Window Heat Computers (WHCs), one on each side, automatically regulate the system, protect it against overheating, and indicate faults.

Window heating comes on:
- automatically when at least one engine is running, or when the aircraft is in flight.
- manually, before engine start, when the flight crew switches ON the PROBE/WINDOW HEAT pushbutton switch.

Windshield heating operates at low power on the ground and at normal power in flight. The changeover is automatic.
Only one heating level exists for the windows.

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OVERHEAD PANEL

Ident.: DSC-30-40-20-00001165.0001001 / 21 MAR 16
Applicable to: ALL

Refer to DSC-30-50-20 Overhead Panel

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DESCRIPTION

Ident.: DSC-30-50-10-00017459.0001001 / 21 MAR 16
Applicable to: ALL

Electrical heating protects:
- Pitot probes
- Static ports
- Angle-Of-Attack (AOAs) probes
- Total Air Temperature (TAT) probes.

Three independent Probe Heat Computers (PHCs) automatically control and monitor:
- Captain probes
- F/O probes
- STBY probes.

They protect against overheating and indicate faults.

The probes are heated:
- Automatically when at least one engine is running, or when the aircraft is in flight.
- Manually, when the flight crew switches ON the PROBE/WINDOW HEAT pb.

On the ground, the TAT probes are not heated and pitot heating operates at a low level (the changeover to normal power in flight is automatic).

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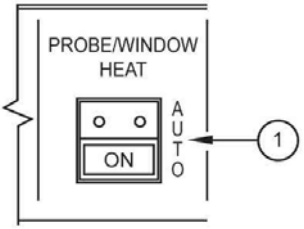
OVERHEAD PANEL

Ident.: DSC-30-50-20-00017460.0001001 / 21 MAR 16
Applicable to: ALL



(1) PROBE/WINDOW HEAT pb

AUTO : Probes/Windows are heated automatically :
- In flight, or
- On the ground (except TAT probes) provided one engine is running.

ON : Light comes on blue. Probes and windows are heated permanently.

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WIPERS

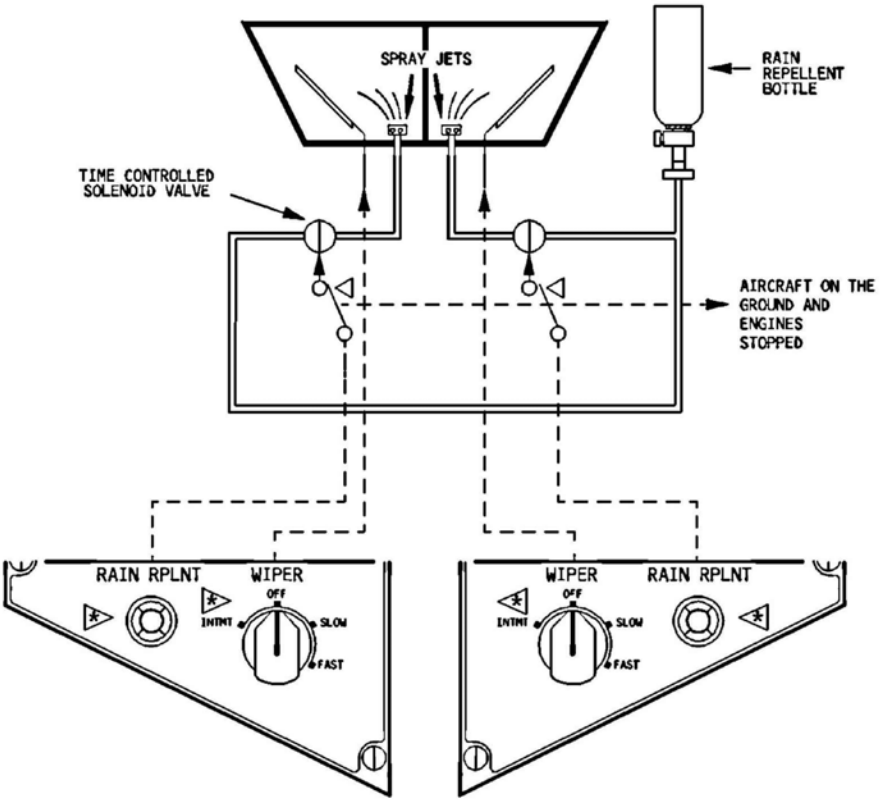
Ident.: DSC-30-60-10-00017461.0001001 / 21 MAR 16
Applicable to: ALL

Each front windshield has an electrical wiper with two speeds, and with an intermittent sweep function ◁ . A rotary selector controls each wiper.

RAIN REPELLENT ◁

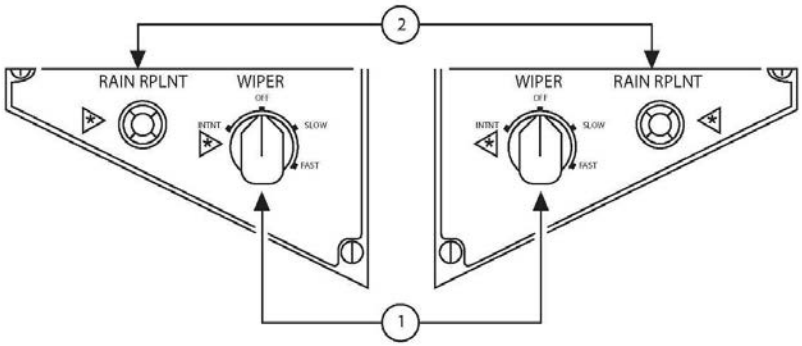
Ident.: DSC-30-60-10-00017462.0001001 / 01 JUN 17
Applicable to: ALL

In moderate to heavy rain, the flight crew can spray a rain repellent liquid on the windshield to improve visibility.
After about 30 s, the windows are covered with spray.
Separate pushbuttons control rain repellent application on each side of the windshield.


SPRAY JETS
RAIN REPELLENT BOTTLE
TIME CONTROLLED SOLENOID VALVE
AIRCRAFT ON THE GROUND AND ENGINES STOPPED
RAIN RPLNT
WIPER
OFF
INTMT
SLOW
FAST
WIPER
RAIN RPLNT
OFF
INTMT
SLOW
FAST

OVERHEAD PANEL

Ident.: DSC-30-60-20-00017466.0001001 / 21 MAR 16
Applicable to: ALL

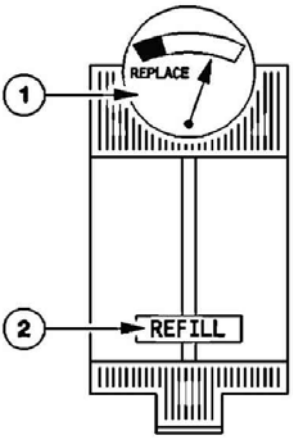


(1) WIPER rotary selector
Each rotary selector controls its wiper at low speed, high speed, or intermittent sweeping ⋖ .
When turned off, the wiper stops out of view.

(2) RAIN RPLNT pb-sw ⋖
Each of these buttons controls the application of rain repellent fluid to the corresponding side of the front windshield.
When the flight crew pushes the button, the timer applies a measured quantity of rain repellent to the windshield. To repeat the cycle, the flight crew must push the button again.
This function is inhibited when the aircraft is on the ground and the engines are stopped.

RAIN REPELLENT ◁ SYSTEM INDICATORS

Ident.: DSC-30-60-20-00017587.0001001 / 21 MAR 16
Applicable to: ALL



(1) Rain Repellent pressure indicator
This gauge shows the nitrogen pressure and therefore the remaining fluid in the rain repellent bottle. When the needle is in the yellow sector the bottle should be replaced.

(2) Rain Repellent low level indicator (depending on aircraft configuration)
When the REFILL float is in view the bottle should be replaced.

VISUAL ICE INDICATOR

Ident.: DSC-30-70-10-00017471.0001001 / 21 MAR 16
Applicable to: ALL

An external visual ice indicator is installed between the two windshields.
There can be also an external ice detector light ◁

ICE DETECTION SYSTEM

Ident.: DSC-30-70-10-00017472.0001001 / 21 MAR 16
Applicable to: MSN 1882

The ice detection system has two separate ice detector probes on the forward lower section of the fuselage.
The probes detect ice accretion. They also indicate, through the MEMO display, that icing conditions have disappeared. The system logic generates ECAM messages according to ice detector signals and the flight crew's selection of engine or wing anti-icing systems.
The ice detection system does not control the ENG or WING anti-icing systems.

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AIRCRAFT SYSTEMS

INDICATING/RECORDING SYSTEMS

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DSC-31-05 EIS General

Continued on the following page

Continued from the previous page

DSC-31-10 ECAM Description

DSC-31-15 Indications on E/WD

DSC-31-20 Indications on SD

DSC-31-25 ECAM Sequence

DSC-31-25-10 General

DSC-31-25-20 Example

Continued on the following page

Continued from the previous page

DSC-31-27 OEB Reminder

DSC-31-30 ECAM Controls

DSC-31-40 Indications on PFD

Continued on the following page

Continued from the previous page

INTRODUCTION

Ident.: DSC-31-05-10-00001182.0001001 / 21 MAR 16
Applicable to: ALL

The Electronic Instrument System (EIS) presents data on six identical Display Units (DUs):

- The Electronic Flight Instrument System (EFIS) displays mostly flight parameters and navigation data on the Primary Flight Displays (PFDs) and Navigation Displays (NDs).
- The Electronic Centralized Aircraft Monitor (ECAM) presents data on the Engine/Warning Display (E/WD) and System Display (SD) :
  - Primary engine indications, fuel quantity, flap and slat position
  - Warning and caution alerts, or memos
  - Synoptic diagrams of aircraft systems, and status messages
  - Permanent flight data

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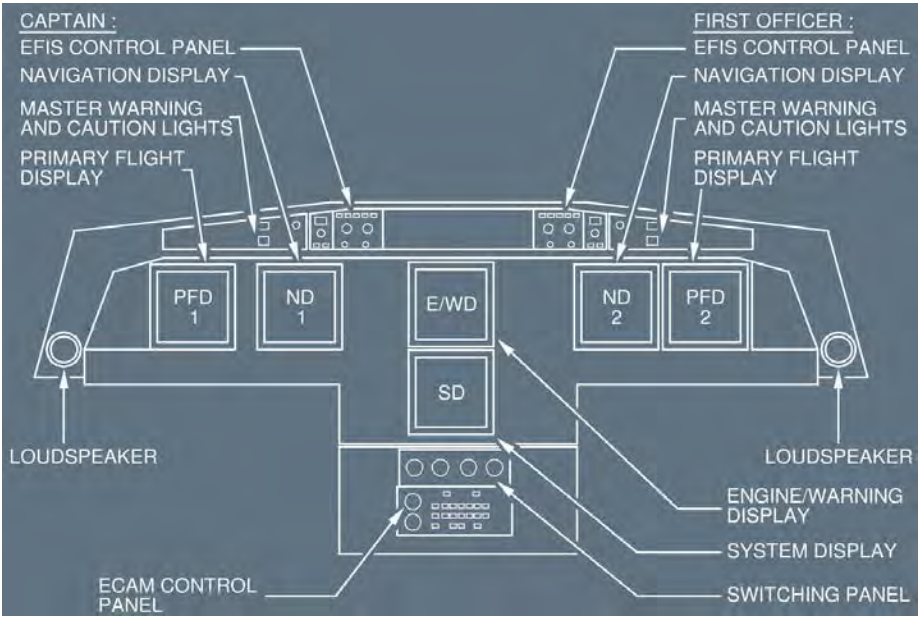
COCKPIT ARRANGEMENT

Ident.: DSC-31-05-20-00001183.0001001 / 09 OCT 12
Applicable to: ALL



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DISPLAY UNIT (DU)

Ident.: DSC-31-05-30-00001184.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The instrument panels have six identical units.
These DUs are full-color cathode ray tubes.

DISPLAY UNIT (DU)

Ident.: DSC-31-05-30-00001184.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

The instrument panels have six identical units.
These DUs are full-color Liquid Crystal Displays (LCD).

DISPLAY MANAGEMENT COMPUTER (DMC)

Ident.: DSC-31-05-30-00001185.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

Three identical Display Management Computers acquire and process all the signals received from sensors and other computers to generate the images to be displayed on the primary flight displays, navigation displays, engine/warning display, and system display.
Each DMC has two independent channels : An EFIS channel and an ECAM channel. Each DMC is able to simultaneously drive one PFD, one ND, and either one of the ECAMs in its engine warning or system status mode.

DISPLAY MANAGEMENT COMPUTER (DMC)

Ident.: DSC-31-05-30-00001185.0002001 / 20 DEC 10
Applicable to: MSN 3408-4547

Three identical Display Management Computers (DMCs) obtain data from the different sensors and computers, and send it to the display units. The display units then generate and display the applicable images. Each DMC has a single DMC channel, and can simultaneously supply one PFD, one ND and both ECAM display units (E/WD and SD).

SYSTEM DATA ACQUISITION CONCENTRATOR (SDAC)

Ident.: DSC-31-05-30-00001186.0001001 / 21 MAR 16
Applicable to: ALL

The two identical SDACs acquire data, then generate signals. Some of these signals go to the three DMCs, which use them to generate displays of system pages and engines parameters. Others go to the flight warning computers, which use them to generate ECAM messages and aural alerts.

FLIGHT WARNING COMPUTER (FWC)

Ident.: DSC-31-05-30-00001187.0001001 / 13 JAN 14
Applicable to: ALL

The two identical FWCs generate alert messages, memos, aural alerts, and synthetic voice messages. For this purpose they acquire data:
- Directly from aircraft sensors, or systems, to generate red warnings
- Through the SDACs to generate amber cautions.

The ECAM display units display the alert messages generated by the FWCs.

The FWCs also generate:
- Radio height callouts
- Decision height callouts
- Landing distance and landing speed increments.

ATTENTION - GETTERS

Ident.: DSC-31-05-30-00001188.0001001 / 21 MAR 16
Applicable to: ALL

The FWCs also drive the attention-getters. Each pilot has a set of these on the panel under the glareshield. They are :
- A master warning light, that flashes “MASTER WARN” in red, for red warnings.
- A master caution light, that illuminates “MASTER CAUT” in amber, for amber cautions.

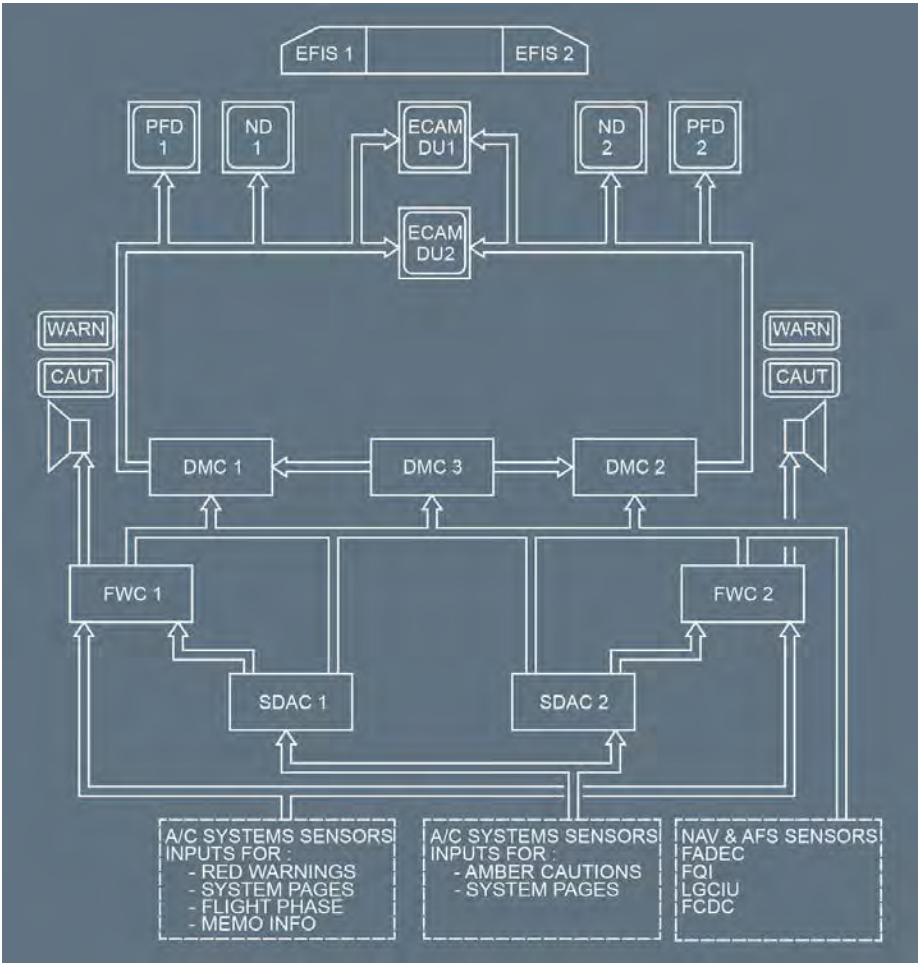
LOUDSPEAKER

Ident.: DSC-31-05-30-00001189.0001001 / 21 MAR 16
Applicable to: ALL

The communications loudspeakers announce aural alerts and voice messages, and do so even when they are turned off.

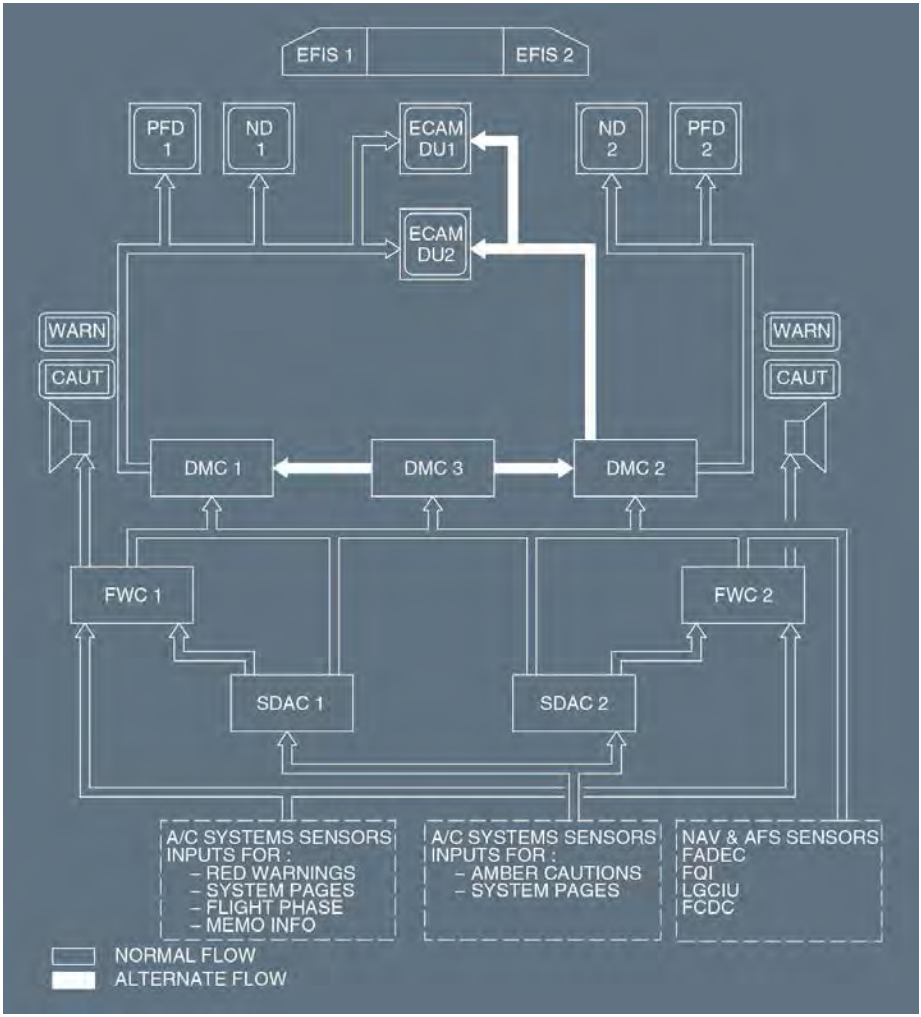
EIS BLOCK DIAGRAM

Ident.: DSC-31-05-30-00001190.0001001 / 06 JUL 17
Applicable to: MSN 1882-2078



EIS BLOCK DIAGRAM

Ident.: DSC-31-05-30-00001190.0002001 / 06 JUL 17
Applicable to: MSN 3408-4547



ECAM CONTROL PANEL (ECP)

Ident.: DSC-31-05-40-00001191.0001001 / 21 MAR 16
Applicable to: ALL

The ECAM Control Panel, located on the pedestal, includes :

- Such E/WD controls, as CLR, STS, and the brightness control knob.
- Such SD controls, as ENG, BLEED, PRESS..., system page selector, and the brightness control knob.

EIS DMC SWITCHING SELECTOR

Ident.: DSC-31-05-40-00001192.0001001 / 22 MAR 16
Applicable to: ALL

A switch near the center of the SWITCHING panel which is located just above the ECAM control panel, enables the flight crew to replace the Captain or First Officer's Display Management Computer (DMC 1, or DMC 2) by DMC 3.

ECAM/ND SWITCHING

Ident.: DSC-31-05-40-00001193.0001001 / 21 MAR 16
Applicable to: ALL

A switch on the right-hand side of the SWITCHING panel enables the flight crew to transfer the ECAM System Display to either the Captain or First Officer's Navigation Display.

EFIS SWITCHING

Ident.: DSC-31-05-40-00001194.0001001 / 21 MAR 16
Applicable to: ALL

A PFD/ND XFR pushbutton on each side console enables the pilot to swap displays to the respective onside DUs.

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RECONFIGURING THE DISPLAY MANAGEMENT COMPUTER (DMC)

Ident.: DSC-31-05-50-00001195.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

In normal operation, each DMC drives the following Display Units :
- DMC 1 drives the CAPT PFD, CAPT ND and the upper ECAM DUs.
- DMC 2 drives the F/O PFD and F/O ND, and the lower ECAM DU.
- DMC 3 is on standby.

If a DMC fails (corresponding DU shows a diagonal line), the flight crew can replace DMC 1 or 2 with DMC 3 by turning the EIS DMC switch on the SWITCHING panel to “CAPT 3” or “F/O 3”.

RECONFIGURING THE DISPLAY MANAGEMENT COMPUTER (DMC)

Ident.: DSC-31-05-50-00001195.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

In normal operation, each DMC drives the following Display Units :
- DMC 1 drives the CAPT PFD, CAPT ND and the ECAM DUs.
- DMC 2 drives the F/O PFD and F/O ND.
- DMC 3 is on standby, ready to drive any DU.

If DMC 1 or 2 fails (the “INVALID DATA” message is displayed on the DUs), the crew manually selects the DMC 3 source (“CAPT 3” or “F/O 3”).
If DMC 1 fails (or DMC 3, if “CAPT 3” was selected), DMC 2 automatically drives the ECAM.

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FAILURE OF UPPER ECAM DU (OR CTL/BRIGHTNESS KNOB TURNED TO OFF)

Ident.: DSC-31-05-60-00001196.0001001 / 21 MAR 16
Applicable to: ALL

If the upper ECAM display fails, or is switched off :

- The engine/warning page automatically replaces the system/status page on the lower ECAM DU.

The flight crew can display the system/status page by :

- Using the “ECAM/ND XFR“ switch, on the SWITCHING panel, to move it to a Navigation Display Unit (NDU), or
- Pushing and holding (for a maximum of 3 min) the related system page pushbutton, on the ECAM control panel, to temporarily display it on the lower ECAM DU (instead of the engine/warning page).

FAILURE OF LOWER ECAM DU (OR CTL/BRIGHTNESS KNOB TURNED TO OFF)

Ident.: DSC-31-05-60-00001197.0001001 / 21 MAR 16
Applicable to: ALL

If the lower ECAM display fails, or is switched off, the flight crew can display the system/status page by :

- Using the "ECAM/ND XFR" switch, on the SWITCHING panel, to display it on the NDU, or
- Pushing and holding (for a maximum of 3 min) the related system page pushbutton, on the ECAM control panel, to temporarily display it on the upper ECAM DU (instead of the engine/warning page).

FAILURE OF BOTH ECAM DUs

Ident.: DSC-31-05-60-00001198.0001001 / 21 MAR 16
Applicable to: ALL

If both ECAM displays fail, the flight crew may :

- Use the "ECAM/ND XFR", on the SWITCHING panel, to display the engine/warning page on a navigation display and, if needed,
- Push and hold (for a maximum of 3 min) the related system page pushbutton, on the ECAM control panel, to temporarily display the system/status page on an ND.

PFDU/NDU RECONFIGURATION

Ident.: DSC-31-05-60-00001199.0001001 / 21 MAR 16
Applicable to: ALL

If a PFDU fails, the system automatically transfers the PFD image to the NDU.

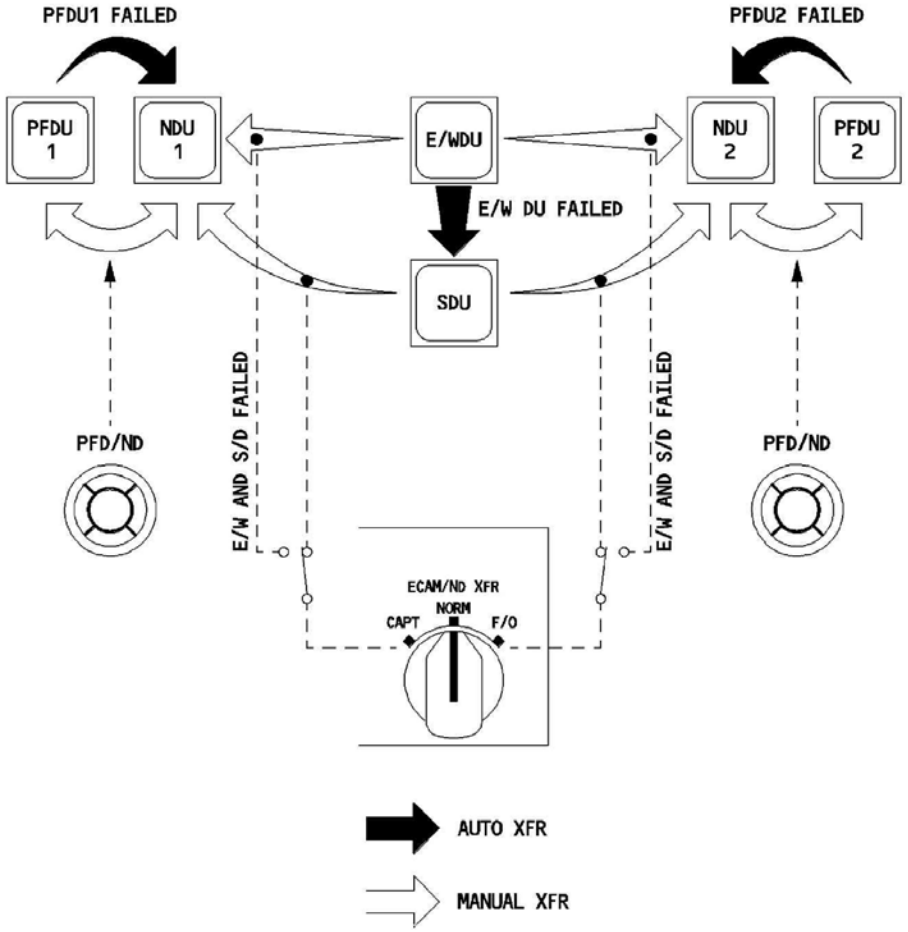
The pilot can also make this transfer manually by :

- turning the PFD ON-OFF/brightness control OFF, or
- pressing the PFD/ND/XFR pushbutton, which cross-changes the images between the PFDU and the NDU.

If an NDU fails, the pilot can use the PFD/ND/XFR pushbutton to transfer the ND image to the PFDU.

DU RECONFIGURATION

Ident.: DSC-31-05-60-00001200.0001001 / 21 MAR 16
Applicable to: ALL



GENERAL

Ident.: DSC-31-05-60-00012844.0001001 / 20 DEC 10
Applicable to: MSN 3408-4547

These messages are displayed on either the EFIS or the ECAM Display Unit (DU) depending on the current EFIS or ECAM configuration.

FAILURE OF A DU

Ident.: DSC-31-05-60-00012846.0001001 / 20 DEC 10
Applicable to: MSN 3408-4547

If a DU fails, the flight crew may find one of the following displays:
- A blank screen with an “F” letter in amber, or
- A distorted display, or
- A blank screen with the “INVALID DISPLAY UNIT” message in amber.

FEEDBACK MESSAGES

Ident.: DSC-31-05-60-00012847.0001001 / 20 DEC 10
Applicable to: MSN 3408-4547

The DU displays the following messages in amber when the Display Management Computer (DMC) detects a discrepancy between the parameters obtained by the DMC and the operational parameters displayed on the DU:
- ”CHECK CAPT PFD” (“CHECK F/O PFD”) if the discrepancy concerns the PFD parameters
- ”CHECK CAPT ND” (“CHECK F/O ND”) if the discrepancy concerns the ND parameters
- ”CHECK EWD” if the discrepancy concerns the E/WD parameters
- ”CHECK SD” if the discrepancy concerns the SD parameters.

In addition, if the aircraft is on ground, the “DU NOT MONITORED” message is displayed in amber when there is only one DMC, instead of two DMCs, that provides the affected DU with feedback information.
This message means that there is either a DMC test in progress or that there is an EIS failure.
In the case of an EIS failure, a maintenance action is necessary.

SIDE1/SIDE2 DISCREPANCY MESSAGES

Ident.: DSC-31-05-60-00012848.0001001 / 20 DEC 10
Applicable to: MSN 3408-4547

The DU displays the following messages along with a caution on the ECAM E/WD when there is a discrepancy between the parameters displayed on the Captain's EFIS and the First Officer's EFIS:

- Both PFDs display the message "CHECK ATT" if there is a discrepancy of at least 5 ° between the attitude values, pitch and/or roll
- Both PFDs display the message "CHECK ALT" if there is a discrepancy between the altitude values greater than 250 ft when the flight crew selects a QNH different from STD, or 500 ft when the flight crew selects a QNH STD
- Both PFDs and NDs display the message "CHECK HDG" if there is a discrepancy of at least 5 ° between the heading values.

Note: The message "CHECK HDG" flashes for a few seconds on the NDs, and then it remains steady. If the flight crew selects the PLAN mode on the NDs the message "CHECK HDG" does not appear.

DU RESET

Ident.: DSC-31-05-60-00012849.0001001 / 20 DEC 10
Applicable to: MSN 3408-4547

In the case of a DU reset, the message "SELF TEST IN PROGRESS" can be displayed in green and/or the message "WAITING FOR DATA" may be displayed in green during the EIS initialization.

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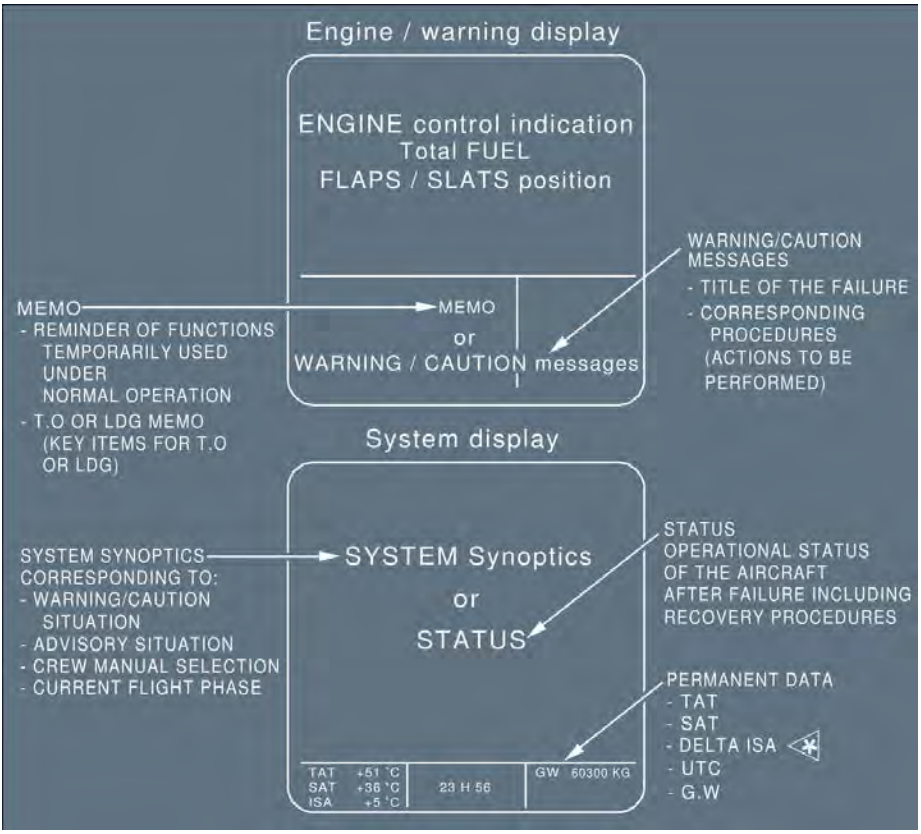
ECAM DU ARRANGEMENT

Ident.: DSC-31-10-00017519.0001001 / 21 MAR 16
Applicable to: ALL

The ECAM has two display units:

- One for the engine/warning display (E/WD).
- One for the system/status display (SD).



COLOR CODE

Ident.: DSC-31-10-00001202.0001001 / 21 MAR 16
Applicable to: ALL

The ECAM display uses a color code that indicates the importance of the failure or the indication.

- RED : The configuration or failure requires immediate action.
- AMBER : The flight crew should be aware of the configuration or failure, but need not take immediate action.
- GREEN : The item is operating normally.
- WHITE : These titles and remarks guide the flight crew, as they execute various procedures.
- BLUE : These are actions to be carried out, or limitations.
- MAGENTA : These are particular messages that apply to particular pieces of equipment or situations (inhibition messages, for example).

WARNING/CAUTION CLASSIFICATION

Ident.: DSC-31-10-00001203.0001001 / 21 MAR 16
Applicable to: ALL

	LEVEL	SIGNIFICATION	AURAL	VISUAL
FAILURE MODE	Level 3	Red warning : The configuration, or failure requires immediate action : - Aircraft in dangerous configuration, or limit flight conditions (eg: stall, o/speed) - System failure altering flight safety (eg : Eng fire, excess cab alt)	Continuous Repetitive Chime (CRC) or specific sound or synthetic voice	- MASTER WARN light red flashing or specific red light - Warning message (red) on E/WD - Automatic call of the relevant system page on the S/D (1).
	Level 2	Amber caution : The flight crew should be aware of the configuration or failure, but does not need to take any immediate action. However, time and situation permitting, these cautions should be considered without delay to prevent any further degradation of the affected system : - System failure without any direct consequence on the flight safety (eg: HYD G SYS LO PR)	Single Chime (SC)	- MASTER CAUT light amber steady - Caution message (amber) on E/WD - Automatic call of the relevant system page on the S/D (1).
	Level 1	Amber caution : Requires crew monitoring : - Failures leading to a loss of redundancy or system degradation (eg : FCDC fault)	NONE	- Caution message (amber) on E/WD generally without procedure.
INFORMATION	ADVISORY	System parameters monitoring	NONE	- Automatic call of the relevant system page on the S/D. The affected parameter pulses green.
	MEMO	Information : Recalls normal or automatic selection of functions which are temporarily used	NONE	- Green, Amber, or Magenta message on E/WD

(1) *except in some cases*

PRIORITY RULES

Ident.: DSC-31-10-00001204.0001001 / 17 MAR 17
Applicable to: ALL

There are three priority levels for warnings and cautions :
- A level 3 warning has priority over a level 2 caution which has priority over a level 1 caution.
The FWC observes these priorities.

INFORMATION PROVIDED WHEN NEEDED

One of the main advantages of the ECAM is that it displays applicable information to the flight crew, on an "as needed" basis. The following outlines the ECAM's operating modes:

- **Normal Mode**:
  Automatically displays systems and memos, in accordance with the flight phase.
- **Failure Mode**:
  Automatically displays the appropriate emergency/abnormal procedures, in addition to their associated system synoptic.
- **Advisory Mode**:
  Automatically displays the appropriate system synoptic, associated with a drifting parameter.
- **Manual Mode**:
  Enables the flight crew to manually select any system synoptic via the ECAM Control Panel (ECP).

Most warnings and cautions are inhibited during critical phases of flight (T/O INHIBIT – LDG INHIBIT), because most system failures will not affect the aircraft's ability to continue a takeoff or landing.

TYPES OF FAILURES

Ident.: DSC-31-10-00001205.0001001 / 21 MAR 16
Applicable to: ALL

Independent	:	a failure that affects an isolated system or item of equipment without degrading the performance of others in the aircraft.
Primary	:	a failure of a system or an item of equipment that costs the aircraft the use of other systems or items of equipment.
Secondary	:	the loss of a system or an item of equipment resulting from a primary failure.

AUDIO INDICATORS

Applicable to: MSN 1882

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015446.0001001 / 22 JUL 16			
CONTINUOUS REPETITIVE CHIME	RED WARNINGS	PERMANENT	Press MASTER WARN lt
Ident.: DSC-31-10-A-00015447.0001001 / 22 JUL 16			
SINGLE CHIME	AMBER CAUTION	0.5 s	
Ident.: DSC-31-10-A-00015448.0001001 / 04 FEB 14			
CAVALRY CHARGE	A/P DISCONNECTION BY TAKE OVER pb	1.5 s	Second push on TAKE OVER pb
	A/P DISCONNECTION DUE TO FAILURE	PERMANENT	Press MASTER WARN lt or TAKE OVER pb
Ident.: DSC-31-10-A-00015449.0001001 / 22 JUL 16			
TRIPLE CLICK	LANDING CAPABILITY CHANGE	0.5 s (3 pulses)	
Ident.: DSC-31-10-A-00015450.0001001 / 04 FEB 14			
CRICKET + "STALL" message (synthetic voice)	STALL	PERMANENT	NIL
Ident.: DSC-31-10-A-00015451.0001001 / 23 JUN 15			
BUZZER	CABIN CALL	3 s	NIL
	EMER CABIN CALL	3 s REPEATED 3 TIMES	NIL
	MECH CALL	As long as outside pb pressed	Press MASTER CAUT pb
Ident.: DSC-31-10-A-00015452.0001001 / 23 JUN 15			
CONTINUOUS BUZZER	SELCAL CALL	PERMANENT	Press RESET key on ACP or press MASTER CAUT pb

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015453.0002001 / 06 APR 17			
"WINDSHEAR" (synthetic voice)	WINDSHEAR	REPEATED 3 TIMES	NIL
"GO AROUND WINDSHEAR AHEAD" (synthetic voice)	Windshear ahead detected during the landing phase	PERMANENT	NIL
"WINDSHEAR AHEAD" (twice) (synthetic voice)	Windshear ahead detected during the takeoff phase	PERMANENT	NIL
"MONITOR RADAR DISPLAY" (synthetic voice)	Windshear ahead detected caution message	PERMANENT	NIL
Ident.: DSC-31-10-A-00015454.0001001 / 04 FEB 14			
C CHORD	ALTITUDE ALERT (*Refer to DSC-31-40 Altitude Alert*)	1.5 s or PERMANENT	new ALTITUDE selection or press MASTER WARN pb
Ident.: DSC-31-10-A-00015455.0001001 / 21 MAR 16			
AUTO CALL OUT (synthetic voice)	HEIGHT ANNOUNCEMENT BELOW 2 500 ft (*Refer to DSC-34-NAV-40-10 Automatic Callout*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015456.0001001 / 21 MAR 17			
GROUND PROXIMITY WARNING (synthetic voice)	(*Refer to DSC-34-SURV-40-10 Overview*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015457.0001001 / 04 FEB 14			
"PRIORITY LEFT" "PRIORITY RIGHT" (synthetic voice)	A/P TAKE OVER pb	1 s	NIL
Ident.: DSC-31-10-A-00015458.0001001 / 04 FEB 14			
"RETARD" (synthetic voice)	Thrust levers not in IDLE or REVERSE position for landing	ONE TIME at 20 ft (10 ft in autoland with A/THR ON), Then PERMANENT	All Thrust levers are set to IDLE or REVERSE

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015459.0001001 / 04 FEB 14			
"RETARD-RETARD" (synthetic voice)	At least one Thrust Lever above IDLE after touchdown	Above 40 kt, PERMANENT	All Thrust levers are set to IDLE or REVERSE
Ident.: DSC-31-10-A-00015460.0001001 / 04 FEB 14			
TCAS (synthetic voice)	(*Refer to DSC-34-SURV-60-20 Aural Messages*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015461.0001001 / 04 FEB 14			
″SPEED, SPEED, SPEED″ (Synthetic voice)	Current thrust is not sufficient to recover a positive flight through pitch control	Every 5 s until thrust is increased	THRUST LEVER(s)
Ident.: DSC-31-10-A-00015463.0001001 / 04 FEB 14			
"DUAL INPUT" (synthetic voice)	Both sidesticks are moved simultaneously	Every 5 s	One sidestick deactivated

(a) *The pilot can cancel any audio indicator, by pressing:*
- *The EMER CANC pb on the ECAM control panel, or*
- *The MASTER WARN pushbutton, except for OVERSPEED or L/G NOT DOWN warnings.*

AUDIO INDICATORS

Applicable to: MSN 2078, 3467-3518

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION [(a)]
Ident.: DSC-31-10-A-00015446.0001001 / 22 JUL 16			
CONTINUOUS REPETITIVE CHIME	RED WARNINGS	PERMANENT	Press MASTER WARN lt
Ident.: DSC-31-10-A-00015447.0001001 / 22 JUL 16			
SINGLE CHIME	AMBER CAUTION	0.5 s	
Ident.: DSC-31-10-A-00015448.0001001 / 04 FEB 14			
CAVALRY CHARGE	A/P DISCONNECTION BY TAKE OVER pb	1.5 s	Second push on TAKE OVER pb
	A/P DISCONNECTION DUE TO FAILURE	PERMANENT	Press MASTER WARN lt or TAKE OVER pb
Ident.: DSC-31-10-A-00015449.0006001 / 22 JUL 16			
TRIPLE CLICK	Landing capability downgrade or some cases of mode reversion	0.5 s (3 pulses)	
Ident.: DSC-31-10-A-00015450.0001001 / 04 FEB 14			
CRICKET + "STALL" message (synthetic voice)	STALL	PERMANENT	NIL
Ident.: DSC-31-10-A-00015451.0001001 / 23 JUN 15			
BUZZER	CABIN CALL	3 s	NIL
	EMER CABIN CALL	3 s REPEATED 3 TIMES	NIL
	MECH CALL	As long as outside pb pressed	Press MASTER CAUT pb
Ident.: DSC-31-10-A-00015452.0001001 / 23 JUN 15			
CONTINUOUS BUZZER	SELCAL CALL	PERMANENT	Press RESET key on ACP or press MASTER CAUT pb

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AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015453.0002001 / 06 APR 17			
"WINDSHEAR" (synthetic voice)	WINDSHEAR	REPEATED 3 TIMES	NIL
"GO AROUND WINDSHEAR AHEAD" (synthetic voice)	Windshear ahead detected during the landing phase	PERMANENT	NIL
"WINDSHEAR AHEAD" (twice) (synthetic voice)	Windshear ahead detected during the takeoff phase	PERMANENT	NIL
"MONITOR RADAR DISPLAY" (synthetic voice)	Windshear ahead detected caution message	PERMANENT	NIL
Ident.: DSC-31-10-A-00015454.0001001 / 04 FEB 14			
C CHORD	ALTITUDE ALERT (*Refer to DSC-31-40 Altitude Alert*)	1.5 s or PERMANENT	new ALTITUDE selection or press MASTER WARN pb
Ident.: DSC-31-10-A-00015455.0001001 / 21 MAR 16			
AUTO CALL OUT (synthetic voice)	HEIGHT ANNOUNCEMENT BELOW 2 500 ft (*Refer to DSC-34-NAV-40-10 Automatic Callout*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015456.0001001 / 21 MAR 17			
GROUND PROXIMITY WARNING (synthetic voice)	(*Refer to DSC-34-SURV-40-10 Overview*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015457.0001001 / 04 FEB 14			
"PRIORITY LEFT" "PRIORITY RIGHT" (synthetic voice)	A/P TAKE OVER pb	1 s	NIL
Ident.: DSC-31-10-A-00015458.0001001 / 04 FEB 14			
"RETARD" (synthetic voice)	Thrust levers not in IDLE or REVERSE position for landing	ONE TIME at 20 ft (10 ft in autoland with A/THR ON), Then PERMANENT	All Thrust levers are set to IDLE or REVERSE

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015459.0001001 / 04 FEB 14			
"RETARD-RETARD" (synthetic voice)	At least one Thrust Lever above IDLE after touchdown	Above 40 kt, PERMANENT	All Thrust levers are set to IDLE or REVERSE
Ident.: DSC-31-10-A-00015460.0001001 / 04 FEB 14			
TCAS (synthetic voice)	(*Refer to DSC-34-SURV-60-20 Aural Messages*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015461.0001001 / 04 FEB 14			
″SPEED, SPEED, SPEED″ (Synthetic voice)	Current thrust is not sufficient to recover a positive flight through pitch control	Every 5 s until thrust is increased	THRUST LEVER(s)
Ident.: DSC-31-10-A-00015463.0001001 / 04 FEB 14			
"DUAL INPUT" (synthetic voice)	Both sidesticks are moved simultaneously	Every 5 s	One sidestick deactivated
Ident.: DSC-31-10-A-00015466.0001001 / 04 FEB 14			
"STOP RUDDER INPUT" (synthetic voice)	Inappropriate rudder pedal inputs detected in cruise at high speed.	Message repeated at least TWO TIMES	NIL

(a) *The pilot can cancel any audio indicator, by pressing:*
- *The EMER CANC pb on the ECAM control panel, or*
- *The MASTER WARN pushbutton, except for OVERSPEED or L/G NOT DOWN warnings.*

AUDIO INDICATORS

Applicable to: MSN 3408

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015446.0001001 / 22 JUL 16			
CONTINUOUS REPETITIVE CHIME	RED WARNINGS	PERMANENT	Press MASTER WARN lt
Ident.: DSC-31-10-A-00015447.0001001 / 22 JUL 16			
SINGLE CHIME	AMBER CAUTION	0.5 s	
Ident.: DSC-31-10-A-00015448.0001001 / 04 FEB 14			
CAVALRY CHARGE	A/P DISCONNECTION BY TAKE OVER pb	1.5 s	Second push on TAKE OVER pb
	A/P DISCONNECTION DUE TO FAILURE	PERMANENT	Press MASTER WARN lt or TAKE OVER pb
Ident.: DSC-31-10-A-00015449.0006001 / 22 JUL 16			
TRIPLE CLICK	Landing capability downgrade or some cases of mode reversion	0.5 s (3 pulses)	
Ident.: DSC-31-10-A-00015450.0001001 / 04 FEB 14			
CRICKET + "STALL" message (synthetic voice)	STALL	PERMANENT	NIL
Ident.: DSC-31-10-A-00015451.0001001 / 23 JUN 15			
BUZZER	CABIN CALL	3 s	NIL
	EMER CABIN CALL	3 s REPEATED 3 TIMES	NIL
	MECH CALL	As long as outside pb pressed	Press MASTER CAUT pb
Ident.: DSC-31-10-A-00015452.0001001 / 23 JUN 15			
CONTINUOUS BUZZER	SELCAL CALL	PERMANENT	Press RESET key on ACP or press MASTER CAUT pb

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AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015453.0002001 / 06 APR 17			
"WINDSHEAR" (synthetic voice)	WINDSHEAR	REPEATED 3 TIMES	NIL
"GO AROUND WINDSHEAR AHEAD" (synthetic voice)	Windshear ahead detected during the landing phase	PERMANENT	NIL
"WINDSHEAR AHEAD" (twice) (synthetic voice)	Windshear ahead detected during the takeoff phase	PERMANENT	NIL
"MONITOR RADAR DISPLAY" (synthetic voice)	Windshear ahead detected caution message	PERMANENT	NIL
Ident.: DSC-31-10-A-00015454.0001001 / 04 FEB 14			
C CHORD	ALTITUDE ALERT (*Refer to DSC-31-40 Altitude Alert*)	1.5 s or PERMANENT	new ALTITUDE selection or press MASTER WARN pb
Ident.: DSC-31-10-A-00015455.0001001 / 21 MAR 16			
AUTO CALL OUT (synthetic voice)	HEIGHT ANNOUNCEMENT BELOW 2 500 ft (*Refer to DSC-34-NAV-40-10 Automatic Callout*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015456.0001001 / 21 MAR 17			
GROUND PROXIMITY WARNING (synthetic voice)	(*Refer to DSC-34-SURV-40-10 Overview*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015457.0001001 / 04 FEB 14			
“PRIORITY LEFT” ”PRIORITY RIGHT“ (synthetic voice)	A/P TAKE OVER pb	1 s	NIL
Ident.: DSC-31-10-A-00015458.0001001 / 04 FEB 14			
“RETARD" (synthetic voice)	Thrust levers not in IDLE or REVERSE position for landing	ONE TIME at 20 ft (10 ft in autoland with A/THR ON), Then PERMANENT	All Thrust levers are set to IDLE or REVERSE

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015459.0001001 / 04 FEB 14			
"RETARD-RETARD" (synthetic voice)	At least one Thrust Lever above IDLE after touchdown	Above 40 kt, PERMANENT	All Thrust levers are set to IDLE or REVERSE
Ident.: DSC-31-10-A-00015460.0001001 / 04 FEB 14			
TCAS (synthetic voice)	(*Refer to DSC-34-SURV-60-20 Aural Messages*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015461.0001001 / 04 FEB 14			
″SPEED, SPEED, SPEED″ (Synthetic voice)	Current thrust is not sufficient to recover a positive flight through pitch control	Every 5 s until thrust is increased	THRUST LEVER(s)
Ident.: DSC-31-10-A-00015463.0001001 / 04 FEB 14			
"DUAL INPUT" (synthetic voice)	Both sidesticks are moved simultaneously	Every 5 s	One sidestick deactivated

(a) *The pilot can cancel any audio indicator, by pressing:*
- *The EMER CANC pb on the ECAM control panel, or*
- *The MASTER WARN pushbutton, except for OVERSPEED or L/G NOT DOWN warnings.*

AUDIO INDICATORS

Applicable to: MSN 4100

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015446.0001001 / 22 JUL 16			
CONTINUOUS REPETITIVE CHIME	RED WARNINGS	PERMANENT	Press MASTER WARN lt
Ident.: DSC-31-10-A-00015447.0001001 / 22 JUL 16			
SINGLE CHIME	AMBER CAUTION	0.5 s	
Ident.: DSC-31-10-A-00015448.0001001 / 04 FEB 14			
CAVALRY CHARGE	A/P DISCONNECTION BY TAKE OVER pb	1.5 s	Second push on TAKE OVER pb
	A/P DISCONNECTION DUE TO FAILURE	PERMANENT	Press MASTER WARN lt or TAKE OVER pb
Ident.: DSC-31-10-A-00015449.0006001 / 22 JUL 16			
TRIPLE CLICK	Landing capability downgrade or some cases of mode reversion	0.5 s (3 pulses)	
Ident.: DSC-31-10-A-00015450.0001001 / 04 FEB 14			
CRICKET + "STALL" message (synthetic voice)	STALL	PERMANENT	NIL
Ident.: DSC-31-10-A-00015451.0001001 / 23 JUN 15			
BUZZER	CABIN CALL	3 s	NIL
	EMER CABIN CALL	3 s REPEATED 3 TIMES	NIL
	MECH CALL	As long as outside pb pressed	Press MASTER CAUT pb
Ident.: DSC-31-10-A-00015452.0001001 / 23 JUN 15			
CONTINUOUS BUZZER	SELCAL CALL	PERMANENT	Press RESET key on ACP or press MASTER CAUT pb

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015453.0002001 / 06 APR 17			
"WINDSHEAR" (synthetic voice)	WINDSHEAR	REPEATED 3 TIMES	NIL
"GO AROUND WINDSHEAR AHEAD" (synthetic voice)	Windshear ahead detected during the landing phase	PERMANENT	NIL
"WINDSHEAR AHEAD" (twice) (synthetic voice)	Windshear ahead detected during the takeoff phase	PERMANENT	NIL
"MONITOR RADAR DISPLAY" (synthetic voice)	Windshear ahead detected caution message	PERMANENT	NIL
Ident.: DSC-31-10-A-00015454.0001001 / 04 FEB 14			
C CHORD	ALTITUDE ALERT (*Refer to DSC-31-40 Altitude Alert*)	1.5 s or PERMANENT	new ALTITUDE selection or press MASTER WARN pb
Ident.: DSC-31-10-A-00015455.0001001 / 21 MAR 16			
AUTO CALL OUT (synthetic voice)	HEIGHT ANNOUNCEMENT BELOW 2 500 ft (*Refer to DSC-34-NAV-40-10 Automatic Callout*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015456.0001001 / 21 MAR 17			
GROUND PROXIMITY WARNING (synthetic voice)	(*Refer to DSC-34-SURV-40-10 Overview*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015457.0001001 / 04 FEB 14			
"PRIORITY LEFT" "PRIORITY RIGHT" (synthetic voice)	A/P TAKE OVER pb	1 s	NIL
Ident.: DSC-31-10-A-00015458.0001001 / 04 FEB 14			
"RETARD" (synthetic voice)	Thrust levers not in IDLE or REVERSE position for landing	ONE TIME at 20 ft (10 ft in autoland with A/THR ON), Then PERMANENT	All Thrust levers are set to IDLE or REVERSE

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION [(a)]
Ident.: DSC-31-10-A-00015459.0001001 / 04 FEB 14			
"RETARD-RETARD" (synthetic voice)	At least one Thrust Lever above IDLE after touchdown	Above 40 kt, PERMANENT	All Thrust levers are set to IDLE or REVERSE
Ident.: DSC-31-10-A-00015460.0001001 / 04 FEB 14			
TCAS (synthetic voice)	(*Refer to DSC-34-SURV-60-20 Aural Messages*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015461.0001001 / 04 FEB 14			
″SPEED, SPEED, SPEED″ (Synthetic voice)	Current thrust is not sufficient to recover a positive flight through pitch control	Every 5 s until thrust is increased	THRUST LEVER(s)
Ident.: DSC-31-10-A-00015463.0001001 / 04 FEB 14			
"DUAL INPUT" (synthetic voice)	Both sidesticks are moved simultaneously	Every 5 s	One sidestick deactivated
Ident.: DSC-31-10-A-00015465.0001001 / 04 FEB 14			
"PITCH, PITCH" (synthetic voice)	The aircraft pitch attitude is becoming excessive during flare and landing.	one time	NIL
Ident.: DSC-31-10-A-00015466.0001001 / 04 FEB 14			
"STOP RUDDER INPUT" (synthetic voice)	Inappropriate rudder pedal inputs detected in cruise at high speed.	Message repeated at least TWO TIMES	NIL

[(a)] The pilot can cancel any audio indicator, by pressing:
- *The EMER CANC pb on the ECAM control panel, or*
- *The MASTER WARN pushbutton, except for OVERSPEED or L/G NOT DOWN warnings.*

AUDIO INDICATORS

Applicable to: MSN 4379-4547

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015446.0001001 / 22 JUL 16			
CONTINUOUS REPETITIVE CHIME	RED WARNINGS	PERMANENT	Press MASTER WARN lt
Ident.: DSC-31-10-A-00015447.0001001 / 22 JUL 16			
SINGLE CHIME	AMBER CAUTION	0.5 s	
Ident.: DSC-31-10-A-00015448.0001001 / 04 FEB 14			
CAVALRY CHARGE	A/P DISCONNECTION BY TAKE OVER pb	1.5 s	Second push on TAKE OVER pb
	A/P DISCONNECTION DUE TO FAILURE	PERMANENT	Press MASTER WARN lt or TAKE OVER pb
Ident.: DSC-31-10-A-00015449.0006001 / 22 JUL 16			
TRIPLE CLICK	Landing capability downgrade or some cases of mode reversion	0.5 s (3 pulses)	
Ident.: DSC-31-10-A-00015450.0001001 / 04 FEB 14			
CRICKET + "STALL" message (synthetic voice)	STALL	PERMANENT	NIL
Ident.: DSC-31-10-A-00015451.0001001 / 23 JUN 15			
BUZZER	CABIN CALL	3 s	NIL
	EMER CABIN CALL	3 s REPEATED 3 TIMES	NIL
	MECH CALL	As long as outside pb pressed	Press MASTER CAUT pb
Ident.: DSC-31-10-A-00015452.0001001 / 23 JUN 15			
CONTINUOUS BUZZER	SELCAL CALL	PERMANENT	Press RESET key on ACP or press MASTER CAUT pb

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015453.0002001 / 06 APR 17			
"WINDSHEAR" (synthetic voice)	WINDSHEAR	REPEATED 3 TIMES	NIL
"GO AROUND WINDSHEAR AHEAD" (synthetic voice)	Windshear ahead detected during the landing phase	PERMANENT	NIL
"WINDSHEAR AHEAD" (twice) (synthetic voice)	Windshear ahead detected during the takeoff phase	PERMANENT	NIL
"MONITOR RADAR DISPLAY" (synthetic voice)	Windshear ahead detected caution message	PERMANENT	NIL
Ident.: DSC-31-10-A-00015454.0001001 / 04 FEB 14			
C CHORD	ALTITUDE ALERT (*Refer to DSC-31-40 Altitude Alert*)	1.5 s or PERMANENT	new ALTITUDE selection or press MASTER WARN pb
Ident.: DSC-31-10-A-00015455.0001001 / 21 MAR 16			
AUTO CALL OUT (synthetic voice)	HEIGHT ANNOUNCEMENT BELOW 2 500 ft (*Refer to DSC-34-NAV-40-10 Automatic Callout*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015456.0001001 / 21 MAR 17			
GROUND PROXIMITY WARNING (synthetic voice)	(*Refer to DSC-34-SURV-40-10 Overview*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015457.0001001 / 04 FEB 14			
“PRIORITY LEFT” ”PRIORITY RIGHT“ (synthetic voice)	A/P TAKE OVER pb	1 s	NIL
Ident.: DSC-31-10-A-00015458.0001001 / 04 FEB 14			
“RETARD" (synthetic voice)	Thrust levers not in IDLE or REVERSE position for landing	ONE TIME at 20 ft (10 ft in autoland with A/THR ON), Then PERMANENT	All Thrust levers are set to IDLE or REVERSE

Continued on the following page

Continued from the previous page

AUDIO INDICATORS	MEANING	DURATION	AUDIO INDICATOR CANCELLATION (a)
Ident.: DSC-31-10-A-00015459.0001001 / 04 FEB 14			
"RETARD-RETARD" (synthetic voice)	At least one Thrust Lever above IDLE after touchdown	Above 40 kt, PERMANENT	All Thrust levers are set to IDLE or REVERSE
Ident.: DSC-31-10-A-00015460.0001001 / 04 FEB 14			
TCAS (synthetic voice)	(*Refer to DSC-34-SURV-60-20 Aural Messages*)	PERMANENT	NIL
Ident.: DSC-31-10-A-00015461.0001001 / 04 FEB 14			
″SPEED, SPEED, SPEED″ (Synthetic voice)	Current thrust is not sufficient to recover a positive flight through pitch control	Every 5 s until thrust is increased	THRUST LEVER(s)
Ident.: DSC-31-10-A-00015463.0001001 / 04 FEB 14			
"DUAL INPUT" (synthetic voice)	Both sidesticks are moved simultaneously	Every 5 s	One sidestick deactivated
Ident.: DSC-31-10-A-00015465.0001001 / 04 FEB 14			
"PITCH, PITCH" (synthetic voice)	The aircraft pitch attitude is becoming excessive during flare and landing.	one time	NIL

(a) *The pilot can cancel any audio indicator, by pressing:*
- *The EMER CANC pb on the ECAM control panel, or*
- *The MASTER WARN pushbutton, except for OVERSPEED or L/G NOT DOWN warnings.*

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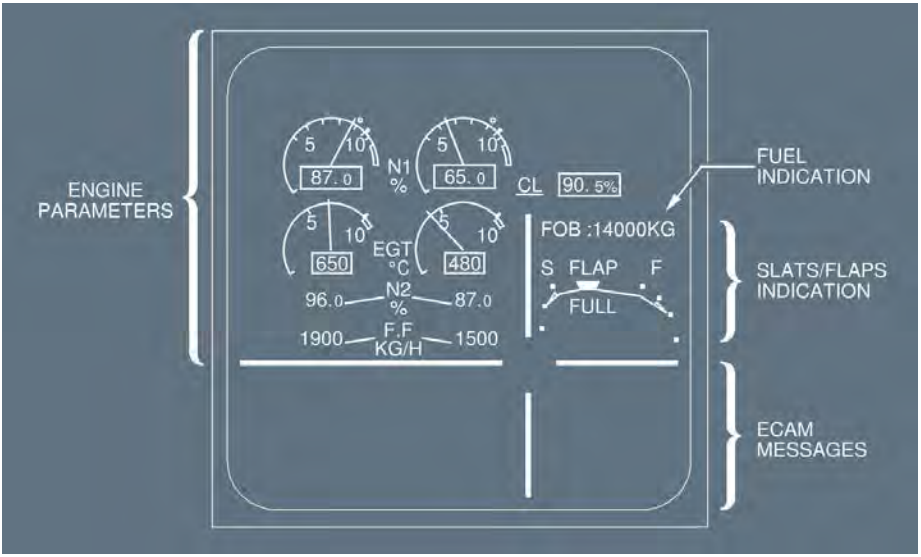
GENERAL

Ident.: DSC-31-15-00001207.0001001 / 21 MAR 17
Applicable to: MSN 1882-2078

The Engine Warning Display (E/WD) appears on the ECAM's upper Display Unit (DU).

- The upper part of this DU displays :
  - Engine parameters (*Refer to DSC-70-90-40 Engine Warning Display*)
  - Fuel On Board (FOB) (*Refer to DSC-28-20 ECAM Upper Display*)
  - Slats/Flaps' position (*Refer to DSC-27-20-30 ECAM F/CTL Page*)
- The lower part of this DU displays messages generated by the FWC :
  - Warning and caution messages, when a failure occurs.
  - Memos, when there is no failure.



The lower part, dedicated to ECAM messages, is divided into two sections of several lines each.

Bottom left : - Primary or independent warnings and cautions, or
- Memo information.

Bottom right : - Title of the system affected by a primary or independent warning or caution, in case of overflow on the bottom left part, or
- Secondary failure, or
- Memo, or
- Special lines (such as “AP OFF”, “LAND ASAP”).

As soon as the FWC detects a failure, and if there is no flight phase inhibition active, the E/WD displays the title of the failure and actions to be taken.
The action line automatically clears, when the flight crew has performed the required action.

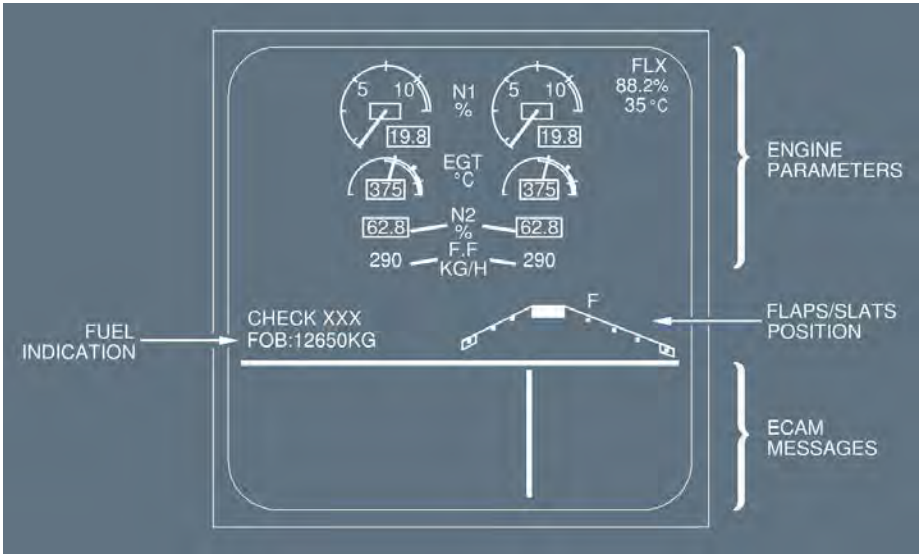
Note: *Certain actions lines will not disappear after being done.*

GENERAL

Ident.: DSC-31-15-00001207.0003001 / 21 MAR 17
Applicable to: MSN 3408-4547

The Engine Warning Display (E/WD) appears on the ECAM's upper Display Unit (DU).

- The upper part of this DU displays:
  - Engine parameters (*Refer to DSC-70-90-40 Engine Warning Display*)
  - Feedback messages (*Refer to DSC-31-05-60 Feedback Messages*)
  - Fuel On Board (FOB) (*Refer to DSC-28-20 ECAM Upper Display*)
  - Slats/Flaps' position (*Refer to DSC-27-20-30 ECAM F/CTL Page*)
- The lower part of this DU displays messages generated by the FWC:
  - Warning and caution messages, when a failure occurs
  - Memos when there is no failure.



The lower part of the DU, dedicated to ECAM messages, is divided into two sections that have several lines each.

Bottom left : - Primary or independent warnings and cautions, or
- Memo information.

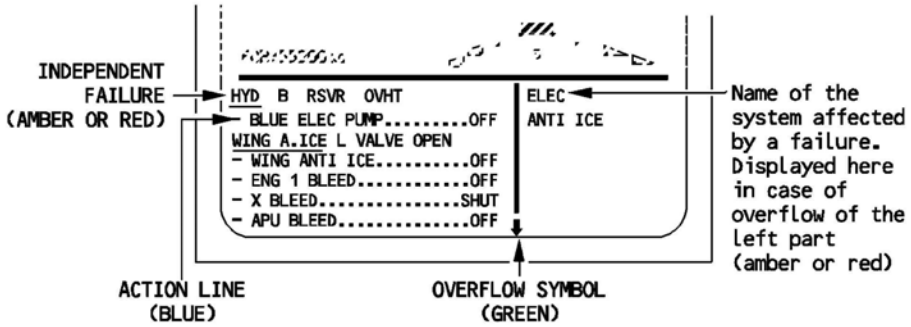
Bottom right : - Title of the system affected by a primary or independent warning or caution, in the case of overflow on the bottom left part, or
- Secondary failure, or
- Memo, or
- Special lines (such as “AP OFF”, “LAND ASAP”).

As soon as the FWC detects a failure, and if there is no flight phase inhibition active, the E/WD displays the title of the failure and actions that the flight crew must perform.
The action line automatically clears, when the flight crew has performed the necessary action.

Note: Some action lines do not disappear from the E/WD even after the flight crew performs the necessary action.

INDEPENDENT FAILURE

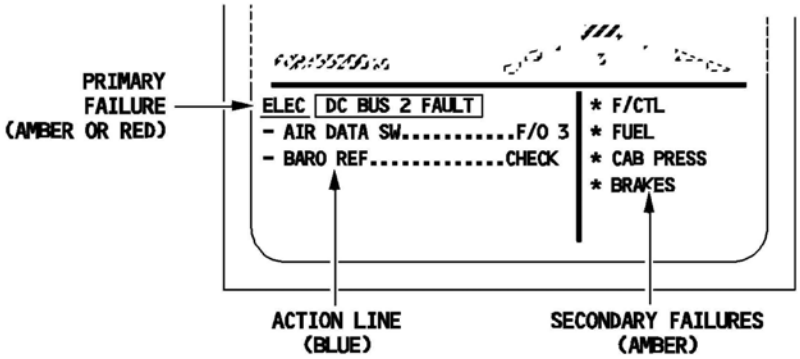
Ident.: DSC-31-15-00001208.0001001 / 03 FEB 11
Applicable to: ALL



If there are too many ECAM messages for the amount of space available in the lower part of the E/WD, a green arrow appears at the bottom of the display, pointing down to show that the information has overflowed off the screen. The pilot can scroll down to view additional messages by pushing the CLR pushbutton on the ECAM control panel (on the pedestal, just below the lower ECAM DU).

PRIMARY AND SECONDARY FAILURE

Ident.: DSC-31-15-00001209.0001001 / 03 FEB 11
Applicable to: ALL



The ECAM DU displays a primary failure as a boxed title.
It identifies a secondary failure by putting a star in front of the title of the affected system.

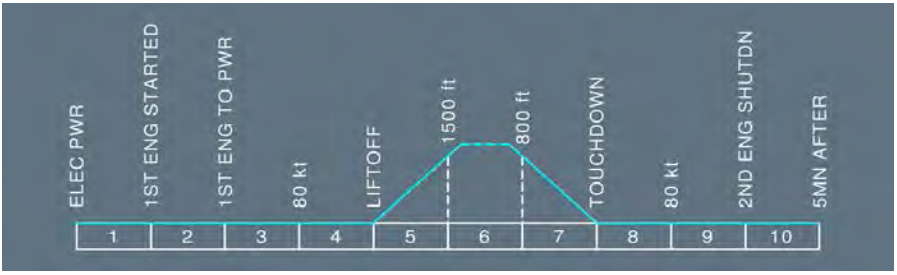
Note: *The DU displays the overflow symbol, if primary or secondary failures overflow. In case of ELEC EMER CONFIG, the secondary failures are inhibited.*

FLIGHT PHASES

Ident.: DSC-31-15-00001210.0001001 / 21 MAR 16
Applicable to: ALL

GENERAL

The FWC divides its functions according to these ten flight phases :



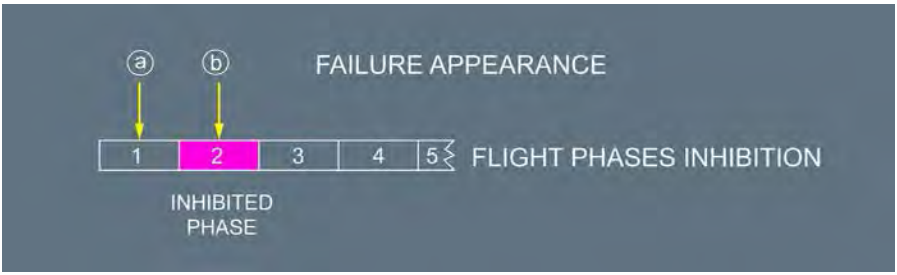
To improve its operational efficacy, the computer inhibits some warnings and cautions for certain flight phases. It does so to avoid alerting the pilots unnecessarily at times when they have high

workloads, such as during takeoff or landing. In these two phases, the DU displays magenta memos : “T.O. INHIBIT” (flight phases 3, 4, and 5), and “LDG INHIBIT” (flight phases 7 and 8).

Note: These flight phases are different from and independent of the ones that the FMGC uses.

FLIGHT PHASE INHIBITION

Two cases are possible (for instance) :



Effect on E/WD :

(a) The failure occurs during phase 1. The E/WD displays the warning immediately and continues to display it as long as the failure is present, even in phase 2.

(b) The failure occurs during phase 2. The E/WD displays the warning only when the aircraft has entered phase 3, where it is not inhibited. Then the warning remains displayed as long as the failure is present.

MEMOS

Applicable to: ALL

Ident.: DSC-31-15-A-00001211.0001001 / 21 MAR 16

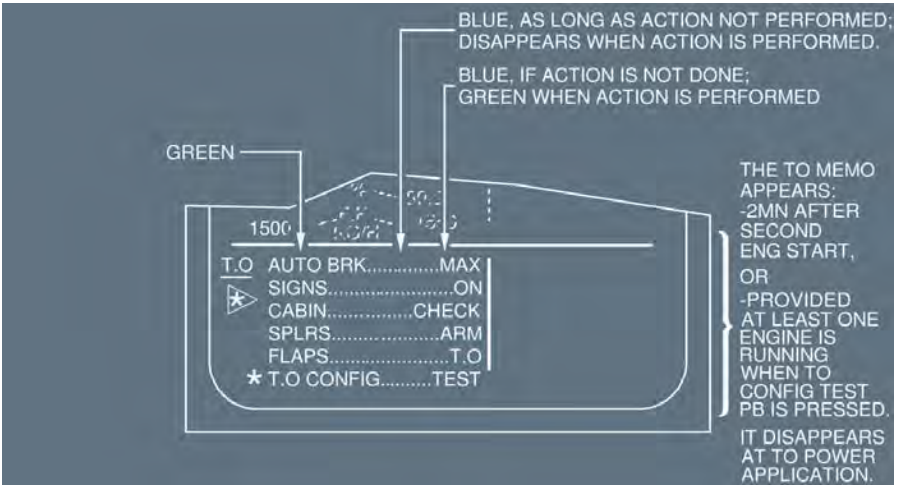
DISPLAY

Memos appear in the lower part of the E/WD. They are normally in green, but may be amber in abnormal situations.
Memos list functions or systems that are temporarily used in normal operations.

Ident.: DSC-31-15-A-00001212.0002001 / 22 APR 16

TO AND LDG MEMOS

During the takeoff and landing phases, the right side of the memo area displays specific TO INHIBIT or LDG INHIBIT (magenta) memos.
Takeoff and landing memos are displayed, as follows, during the related flight phases:



(*) This line disappears when the test is completed. It is replaced by "TO CONFIG NORMAL", if aircraft configuration is correct.
The test is requested again, if the configuration becomes abnormal.

(*) "CONF 3" is displayed in alternate or direct law, or if the GPWS LDG FLAP 3 pushbutton is ON.

Note: *After a go-around, if the aircraft does not climb above 2 200 ft RA, the landing memo appears only below 800 ft RA during the subsequent approach.*

CONFIGURATION WARNINGS

Ident.: DSC-31-15-00001214.0015001 / 16 MAR 11
Applicable to: ALL

The following warnings and cautions appear in the lower part of the E/WD if the aircraft is not in takeoff configuration when the flight crew presses the TO CONFIG pushbutton on the ECAM control panel or applies takeoff power.

<table>
<tr><th>WARNINGS/CAUTIONS</th><th>TO CONFIG TEST</th><th>TO POWER</th></tr>
<tr><td>CONFIG RUD TRIM NOT IN TO RANGE (R)</td><td rowspan="12">TRIGGERED</td><td rowspan="8">TRIGGERED</td></tr>
<tr><td>CONFIG PITCH TRIM NOT IN TO RANGE (R)</td></tr>
<tr><td>CONFIG FLAPS NOT IN TO CONFIG (R)</td></tr>
<tr><td>CONFIG SPD BRK NOT RETRACTED (R)</td></tr>
<tr><td>CONFIG SLATS NOT IN TO CONFIG (R)</td></tr>
<tr><td>CONFIG L SIDESTICK FAULT (R)</td></tr>
<tr><td>CONFIG R SIDESTICK FAULT (R)</td></tr>
<tr><td>DOOR (A)</td></tr>
<tr><td>FWS OEB/FWC DISCREPANCY (A)</td><td rowspan="5">NOT TRIGGERED</td></tr>
<tr><td>BRAKES HOT (A)</td></tr>
<tr><td>FUEL R(L) TK PUMP 1+2 LO PR (A)</td></tr>
<tr><td>HYD G(Y) ENG 1(2) PUMP LO PR (A)</td></tr>
<tr><td>HYD G(Y)(B) SYS LO PR (A)</td></tr>
<tr><td>ELEC IDG 1(2) DISCONNECTED (A)</td><td rowspan="3">TRIGGERED if the two GENs are inop.</td></tr>
<tr><td>ELEC GEN 1(2) FAULT (A)</td></tr>
<tr><td>ELEC GEN 1(2) OFF (A)</td></tr>
<tr><td>CONFIG PARK BRK ON (R)</td><td rowspan="2">NOT TRIGGERED</td><td rowspan="2">TRIGGERED</td></tr>
<tr><td>ENG THR LEVERS NOT SET (A)</td></tr>
</table>

(R) Red warning

(A) Amber caution

Intentionally left blank

GENERAL

Ident.: DSC-31-20-00001215.0001001 / 21 MAR 16
Applicable to: ALL

The system/status display (SD) uses the lower ECAM DU to display :
- pages showing synoptic diagrams of the aircraft systems, or
- the status page.

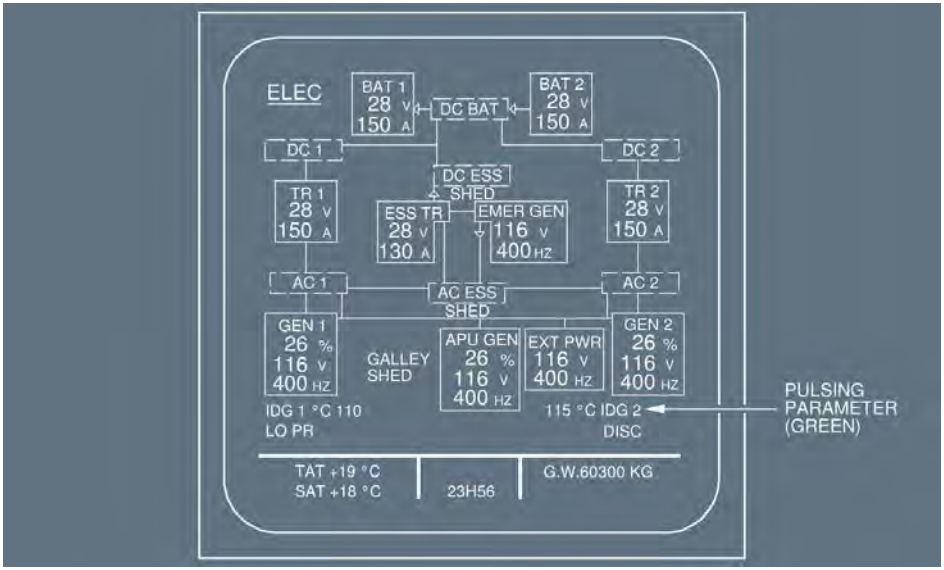
SYSTEM PAGES

Ident.: DSC-31-20-00001216.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The lower ECAM DU can display 12 system pages (For description see relevant FCOM chapter):
- ENGINE (secondary engine parameters)
- BLEED (air bleed)
- CAB PRESS (cabin pressurization)
- ELEC (electric power)
- HYD (hydraulic)
- FUEL (fuel)
- APU (auxiliary power unit)
- COND (air conditioning)
- DOOR/OXY (doors/oxygen)
- WHEEL (landing gear, braking, ground spoilers, etc.)
- F/CTL (flight controls)
- CRUISE (cruise)

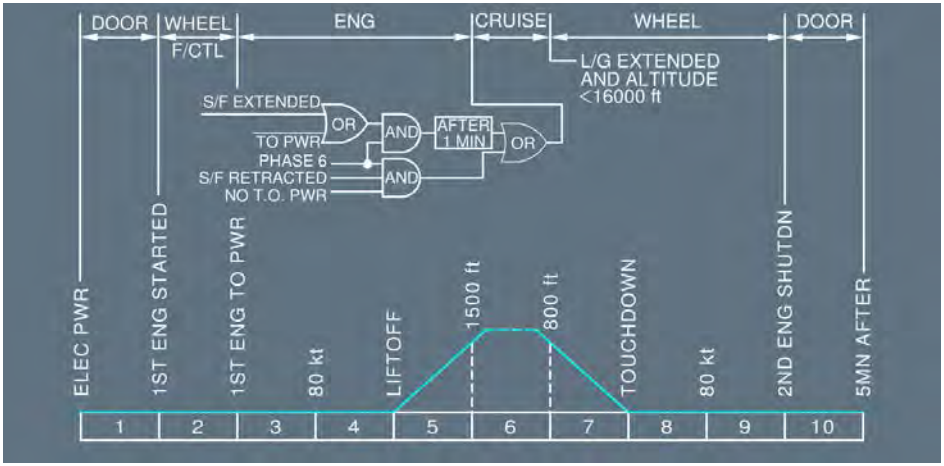
The pilot may manually call up a system page for display on the lower ECAM DU, or the system may automatically display a page.
- Manual:
  - The pilot can, at any time, use the pushbutton on the ECAM's control panel to call up and display any system page, except the CRUISE page.
  - The corresponding pushbutton on the ECAM control panel lights up.
  - A failure-related or advisory display automatically replaces a page the pilot has manually called up.
- Automatic, related to a failure:
  - The relevant system page automatically appears, as soon as any fault or malfunction triggers a caution or warning message.

- Automatic, advisory:
  - The relevant system page automatically appears, when a parameter drifts out of its normal range.
  - The value (shown in green) pulses, as long as it is outside its limits.
  - The advisory mode is inhibited in some flight phases.



Note: *If an advisory is triggered, when the ECAM is in the single-display configuration, an advisory message appears on the upper part of the E/WD, and the associated key on the ECAM control panel flashes to identify the appropriate system page.*

- Automatic, flight phase mode
  - If no other mode is engaged, the SD displays the system page related to the present flight phase, as shown in the following diagram.



- Phase 2 : The F/CTL page replaces the WHEEL page for 20 s when either pilot moves his sidestick (more than 3 ° in pitch or roll) or when the rudder pedal deflection is more than 22 °.
- The APU page appears when the APU MASTER switch is ON. It disappears when APU RPM has been above 95 % for 10 s, or when the APU MASTER switch is switched OFF.
- The ENGINE page appears at the beginning of start sequence or when a pilot selects “CRANK”. It disappears 10 s after the end of the start sequence, when the ENG MODE sel is set to NORM.

For a description of the ENGINE and AIR indications that appear when the SD is displaying the CRUISE page, see the relevant FCOM chapter.

SYSTEM PAGES

Ident.: DSC-31-20-00001216.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

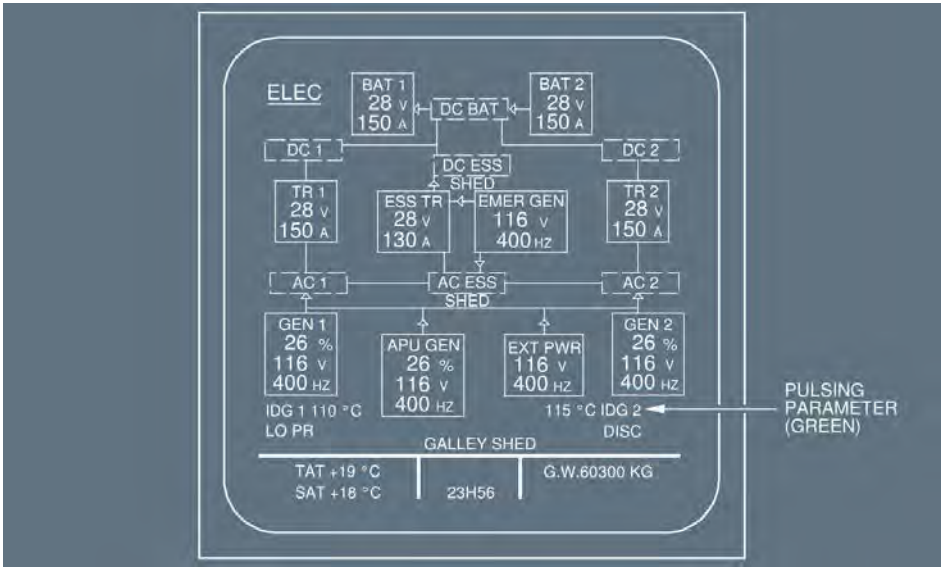
The lower ECAM DU can display 12 system pages (For description see relevant FCOM chapter):

- ENGINE (secondary engine parameters)
- BLEED (air bleed)
- CAB PRESS (cabin pressurization)
- ELEC (electric power)
- HYD (hydraulic)
- FUEL (fuel)
- APU (auxiliary power unit)
- COND (air conditioning)
- DOOR/OXY (doors/oxygen)
- WHEEL (landing gear, braking, ground spoilers, etc.)
- F/CTL (flight controls)
- CRUISE (cruise)

The pilot may manually call up a system page for display on the lower ECAM DU, or the system may automatically display a page.

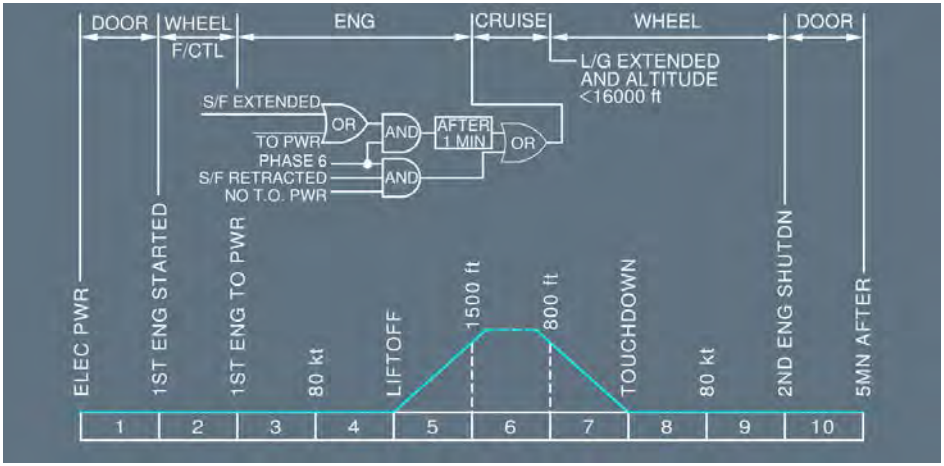
- Manual:
  - The pilot can, at any time, use the pushbutton on the ECAM's control panel to call up and display any system page, except the CRUISE page.
  - The corresponding pushbutton on the ECAM control panel lights up.
  - A failure-related or advisory display automatically replaces a page the pilot has manually called up.
- Automatic, related to a failure:
  - The relevant system page automatically appears, as soon as any fault or malfunction triggers a caution or warning message.

- Automatic, advisory:
  - The relevant system page automatically appears, when a parameter drifts out of its normal range.
  - The value (shown in green) pulses, as long as it is outside its limits.
  - The advisory mode is inhibited in some flight phases.



Note: *If an advisory is triggered, when the ECAM is in the single-display configuration, an advisory message appears on the upper part of the E/WD, and the associated key on the ECAM control panel flashes to identify the appropriate system page.*

- Automatic, flight phase mode
  - If no other mode is engaged, the SD displays the system page related to the present flight phase, as shown in the following diagram.



- Phase 2 : The F/CTL page replaces the WHEEL page for 20 s when either pilot moves his sidestick (more than 3 ° in pitch or roll) or when the rudder pedal deflection is more than 22 °.
- The APU page appears when the APU MASTER switch is ON. It disappears when APU RPM has been above 95 % for 10 s, or when the APU MASTER switch is switched OFF.
- The ENGINE page appears at the beginning of start sequence or when a pilot selects “CRANK”. It disappears 10 s after the end of the start sequence, when the ENG MODE sel is set to NORM.

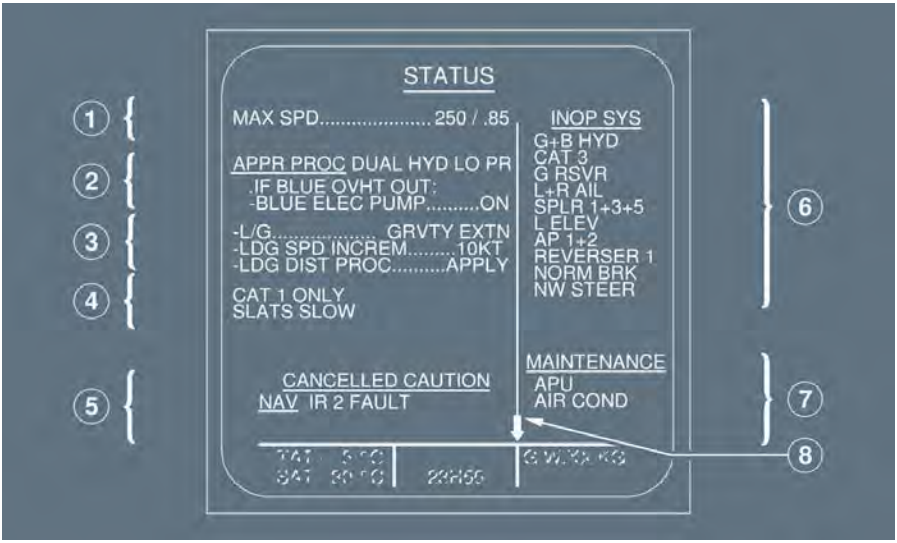
For a description of the ENGINE and AIR indications that appear when the SD is displaying the CRUISE page, see the relevant FCOM chapter.

STATUS PAGE

Ident.: DSC-31-20-00001217.0001001 / 12 APR 16
Applicable to: ALL

PURPOSE

The STATUS page provides an operational summary of the state of the aircraft. As illustrated in the following image, this operational summary includes all of the following:



(1) Limitations (speed, flight level): Blue

(2) Approach procedures: White (Red) (Amber)

(3) Procedures (corrections to apply for landing): Blue

(4) Information: Green

(5) Cancelled caution: White

(6) Inoperative system: Amber

(7) Maintenance status: White

(8) The arrow appears if the data on the STATUS page overflows the left or right area of the page.

The flight crew can press the CLR pb, in order to scroll the display to view the overflow.

Note: *The titles of the different parts of the display appear in white and underlined.*

STATUS PAGE DISPLAY

The STATUS page appears when the flight crew presses the STS pb on the ECAM Control Panel (ECP).

The STATUS page automatically appears in abnormal operations if one of the following applies:
- The STATUS page is not empty, and the flight crew clears the last alert on the E/WD, or
- The STATUS page is not empty, and the flight crew selects the CONF1 for approach.

BLANK LINES

Each block that is described above (limitation block (1), approach procedure block (2), etc.) is separated by a blank line.
Therefore, a condition that is included in a limitation block (1) and the associated action line that is included in the procedure block (3) are separated by a blank line.
Example: Illustration with the ECAM alert ENG 1(2) SHUTDOWN.

In this example, the action line “LDG DIST PROC … APPLY” applies only in the case of severe ice accretion.

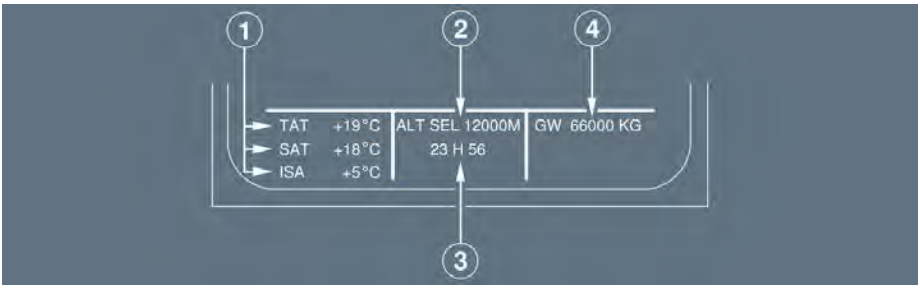
STS REMINDER

The STS reminder appears on the E/WD if both the following conditions apply:
- The STATUS page is not empty: The STATUS page displays message other than “CANCELLED CAUTION” or MAINTENANCE status.
- There is a MAINTENANCE status at engines shutdown.

The MAINTENANCE status can appear only when the aircraft is on the ground, before engine start or after engine shutdown.

PERMANENT DATA

Ident.: DSC-31-20-00017520.0011001 / 25 JUL 16
Applicable to: MSN 3408-4547



(1) Temperature

The screen displays the Total Air Temperature (TAT) and Static Air Temperature (SAT) in green.

The difference between the SAT and the International Standard Atmosphere temperature (ISA) temperature (Delta ISA ◁) is displayed in green, in standard altitude mode and when the SAT is valid.

(2) G LOAL - ALT SEL

The screen displays one of the following items:

- Load factor (G LOAD) in amber, when the value is above 1.4 g or below 0.7 g for more than 2 s. The G LOAD amber indication remains displayed 5 s after the excessive load occurrence. The display of the load factor is inhibited during flight phases 1, 2, 3, 9 and 10.
- Altitude in green selected via the Flight Control Unit (FCU), if the flight crew selects metric units, and provided the load factor is not displayed.
- "CHECK CAPT (F/O) PFD", "CHECK CAPT (F/O) ND" or "CHECK SD" all in amber (*Refer to DSC-31-05-20 Cockpit Arrangement*).

Note: The display of the feedback messages takes priority over the load factor indication.

(3) UTC

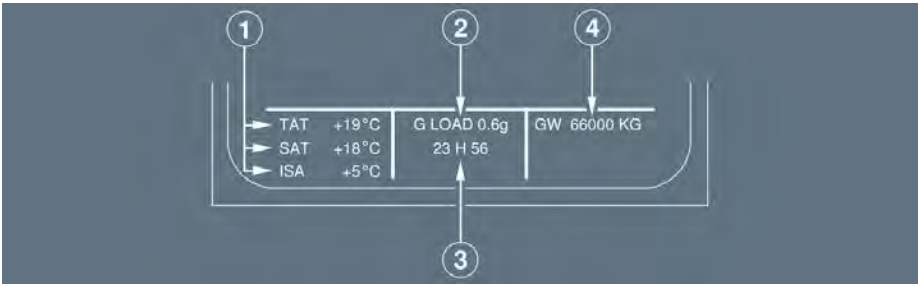
The screen displays the Universal Time Coordinated (UTC), synchronized with the cockpit clock, in green.

(4) GW

The screen displays the Gross Weight (GW) in green, as soon as the flight crew starts the first engine. The last two digits are dashed, if accuracy is degraded. On ground, blue dashes are displayed instead of the indication, if no computed data is available.

PERMANENT DATA

Ident.: DSC-31-20-00017520.0014001 / 25 JUL 16
Applicable to: MSN 1882-2078



(1) Temperature

The screen displays the Total Air Temperature (TAT) and Static Air Temperature (SAT) in green.

The difference between the SAT and the International Standard Atmosphere (ISA) temperature (Delta ISA ◁)is displayed in green, in standard altitude mode and when the SAT is valid.

(2) G LOAD

The screen displays the load factor (G LOAD) in amber, when the value is above 1.4 g or below 0.7 g for more than 2 s. The G LOAD amber indication remains displayed 5 s after the excessive load occurrence. The display of the load factor is inhibited during flight phases 1, 2 and 3.

(3) UTC

The screen displays the Universal Time Coordinated (UTC), synchronized with the cockpit clock, in green.

(4) GW

The screen displays the Gross Weight (GW) in green, as soon as the flight crew starts the first engine. The last two digits are dashed, if accuracy is degraded. On ground, blue dashes are displayed instead of the indication, if no computed data is available.

AMBER CROSSES "XX" ON THE SD

Ident.: DSC-31-20-00013602.0001001 / 18 MAR 11
Applicable to: ALL

If a parameter value on any SD page is not available for display, amber crosses "XX" appear instead of the value.

AMBER DASHES ON THE SD

Ident.: DSC-31-20-00015526.0001001 / 01 APR 14
Applicable to: ALL

If the accuracy of a parameter value on any SD page is degraded, amber dashes are displayed over the last digits.

Intentionally left blank

GENERAL

Ident.: DSC-31-25-10-00001219.0001001 / 22 MAR 16
Applicable to: ALL

If ECAM detects a failure :
- The E/WD displays warning or caution messages.
- The master warning or master caution lights light up (except in the case of a level 1 caution).
- The system sounds an aural signal (except in the case of a level 1 caution).
- The system display (SD) shows the system page for the affected system.
- The CLR pushbutton on the ECAM control panel lights up.

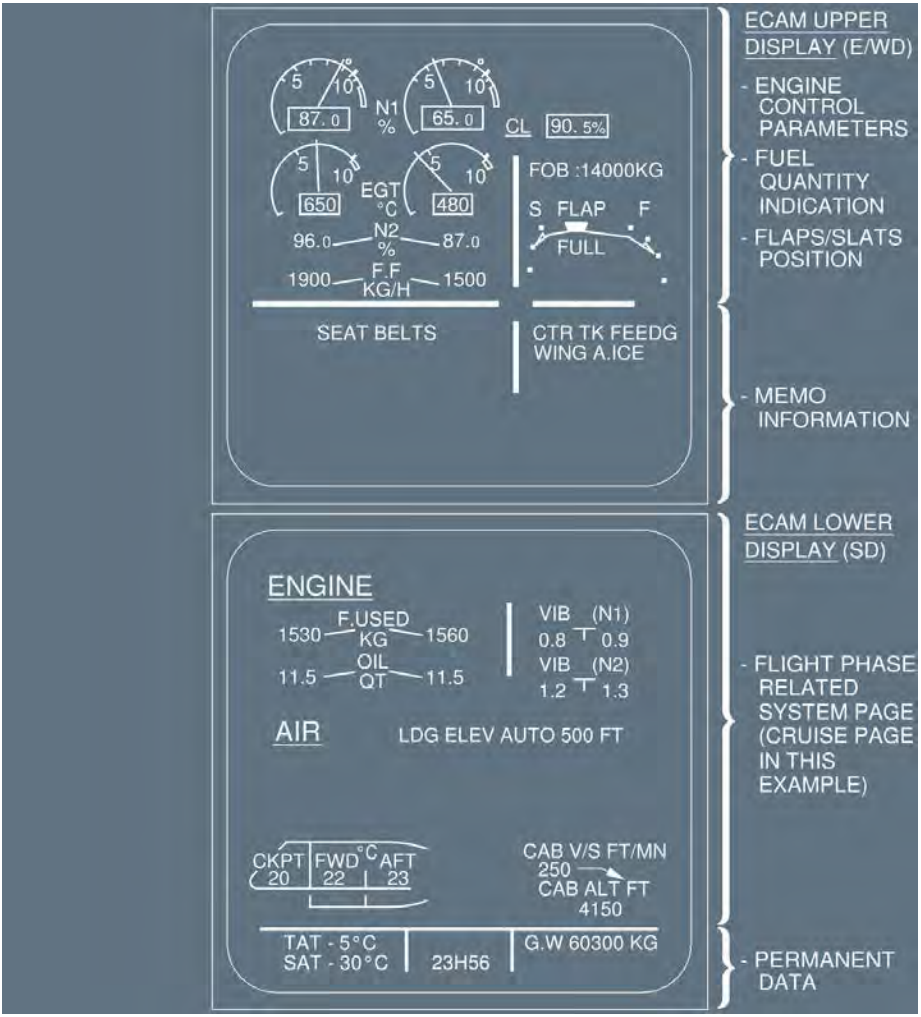
In addition, a local warning light controlled directly by the affected system can light up.

After completing remedial procedures, the flight crew must push the CLR pushbutton repeatedly until the displays return to their normal configurations :
- MEMO messages on the E/WD
- The system page related to the present flight phase on the SD.
- The CLR light on the ECAM control panel turned off.

Intentionally left blank

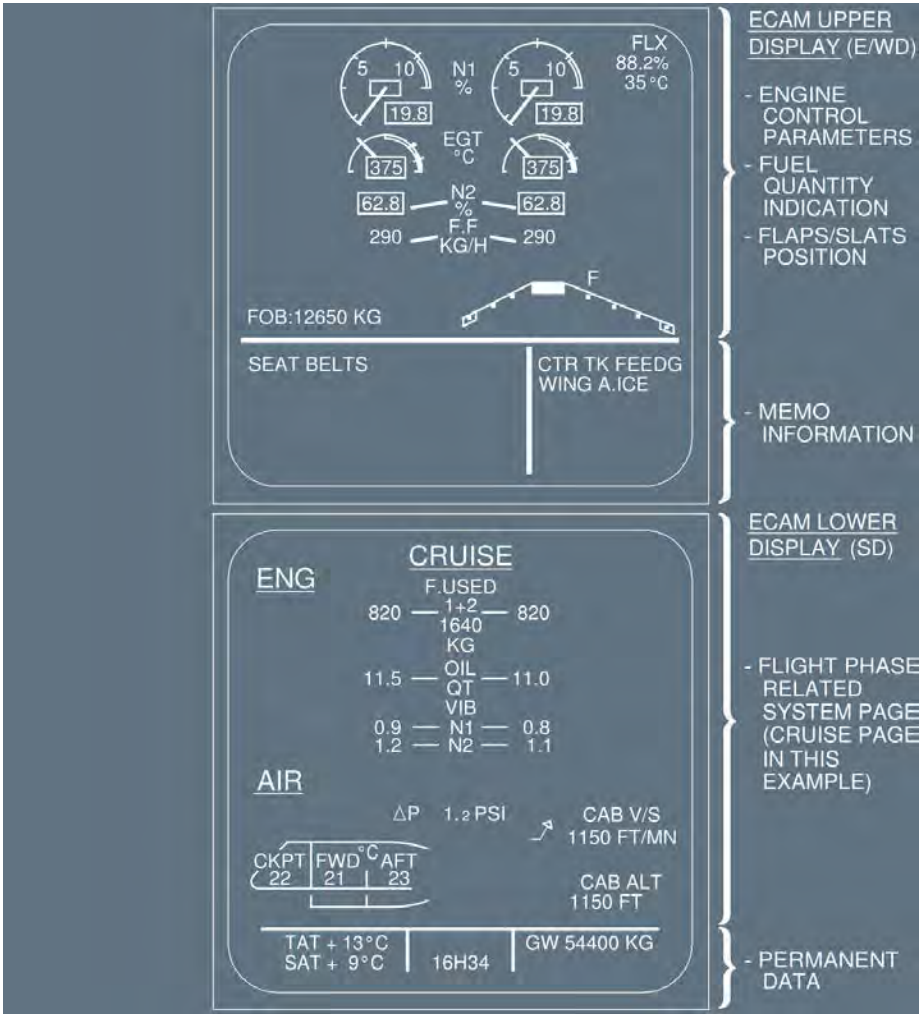
1 - THE ECAM DETECTS NO FAILURE

Ident.: DSC-31-25-20-00001220.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078



1 - THE ECAM DETECTS NO FAILURE

Ident.: DSC-31-25-20-00001220.0004001 / 09 OCT 12
Applicable to: MSN 3408-4547



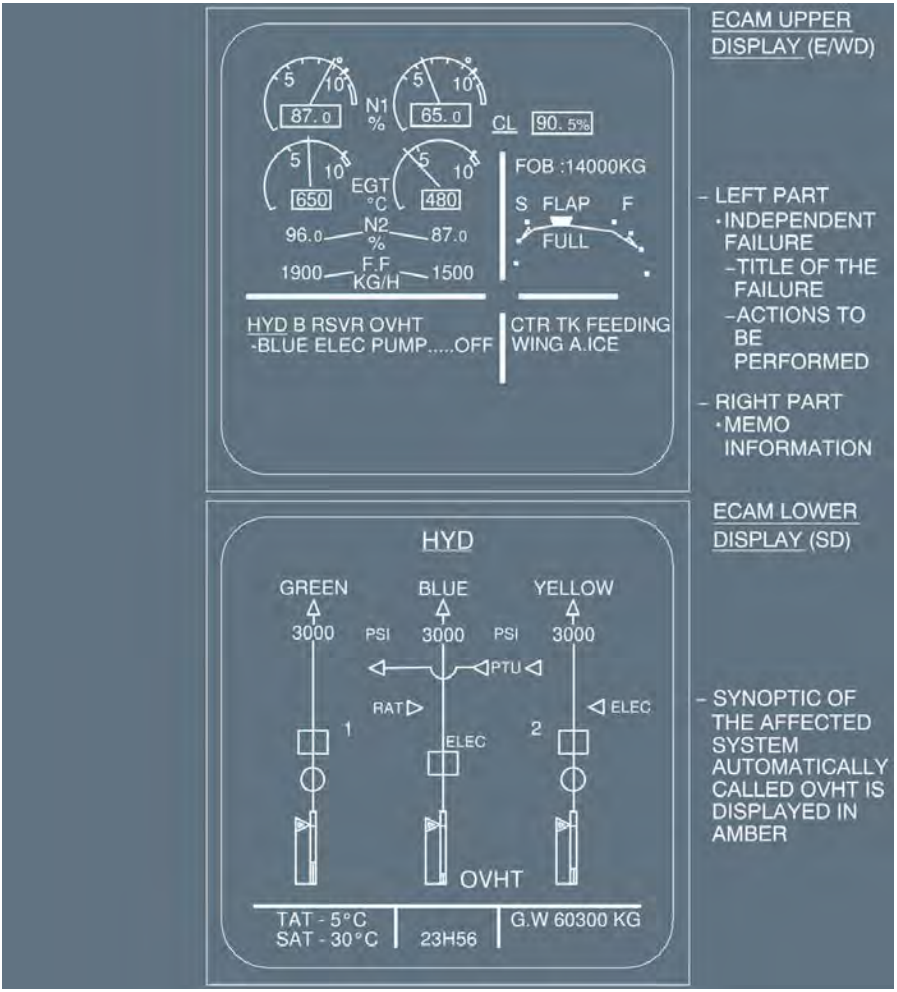
2 - THE ECAM DETECTS A FAILURE

Ident.: DSC-31-25-20-00001221.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

For example, a hydraulic reservoir is overheat.

COCKPIT INDICATIONS

- A single chime sounds
- Both MASTER CAUTION lights come on, and stay on
- A FAULT light, on the overhead HYD panel, comes on
- The memo space on the E/WD displays the “HYD B RSVR OVHT” message, and the “BLUE ELEC PUMP . . . . . OFF” instruction
- The lower ECAM display (SD) automatically calls up the hydraulic system's diagram, and displays “OVHT” in amber next to the blue system
- The ECAM's CLR pushbutton lights up.



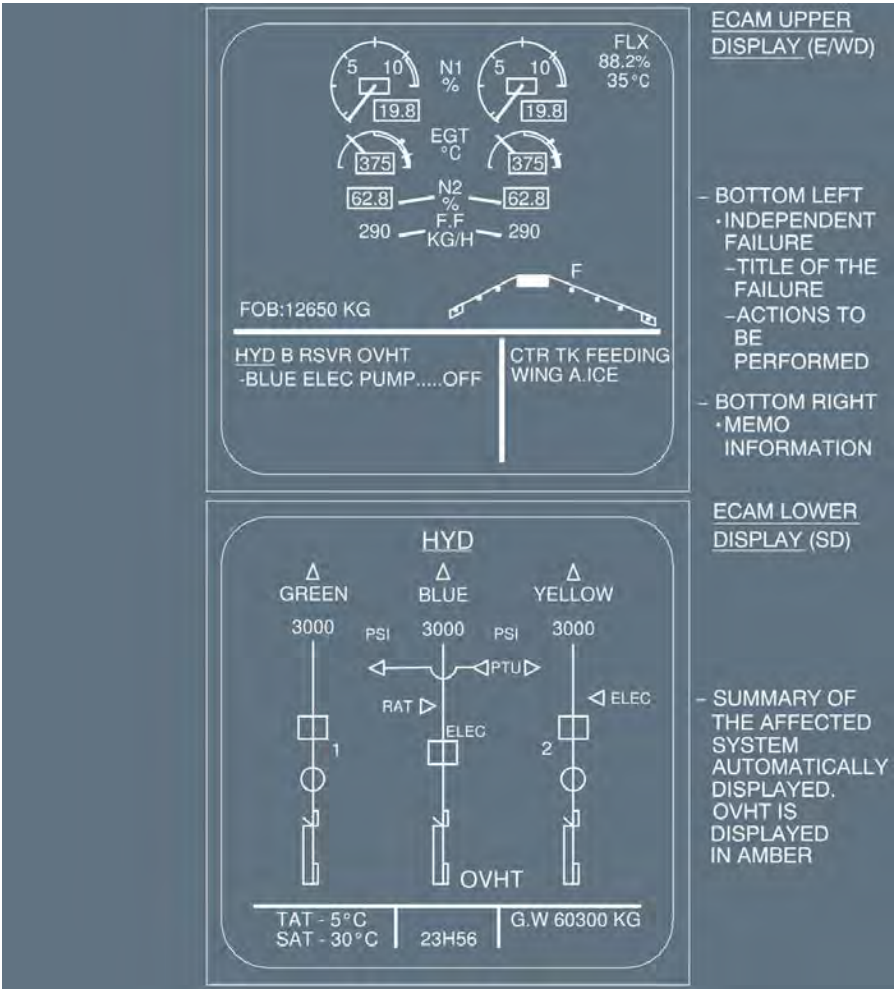
2 - THE ECAM DETECTS A FAILURE

Ident.: DSC-31-25-20-00001221.0004001 / 09 OCT 12
Applicable to: MSN 3408-4547

For example, a hydraulic reservoir is overheat.

COCKPIT INDICATIONS

- A single chime sounds
- Both MASTER CAUTION lights come on, and stay on
- A FAULT light, on the overhead HYD panel, comes on
- The memo space on the E/WD displays the “HYD B RSVR OVHT” message, and the “BLUE ELEC PUMP . . . . . OFF” instruction
- The lower ECAM display (SD) automatically calls up the hydraulic system's diagram, and displays “OVHT” in amber next to the blue system
- The ECAM's CLR pushbutton lights up.



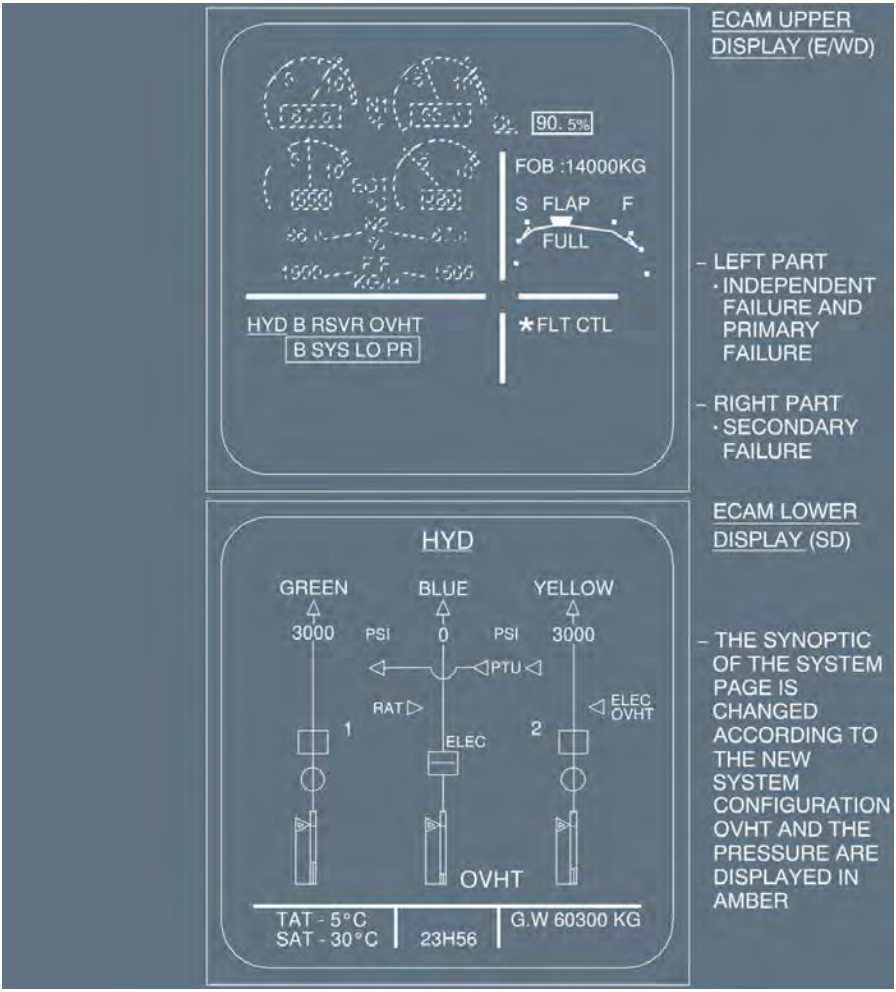
3 - THE FLIGHT CREW FOLLOWS THE INSTRUCTION DISPLAYED ON THE E/WD

Ident.: DSC-31-25-20-00001222.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

The flight crew switches off the BLUE ELEC PUMP pushbutton, depressurizing the blue hydraulic circuit.

COCKPIT INDICATIONS

- A single chime sounds.
- Both MASTER CAUTION lights stay on.
- A FAULT/OFF light, on the overhead panel, comes on.
- The second part of the message on the E/WD changes to “B SYS LO PR”.
- The SD's system diagram shows an amber zero for the pressure in the blue system, along with the amber “OVHT”.
- The right side of the memo area indicates a secondary failure in the flight control system.
- The ECAM control panel's CLR pushbutton remains on.



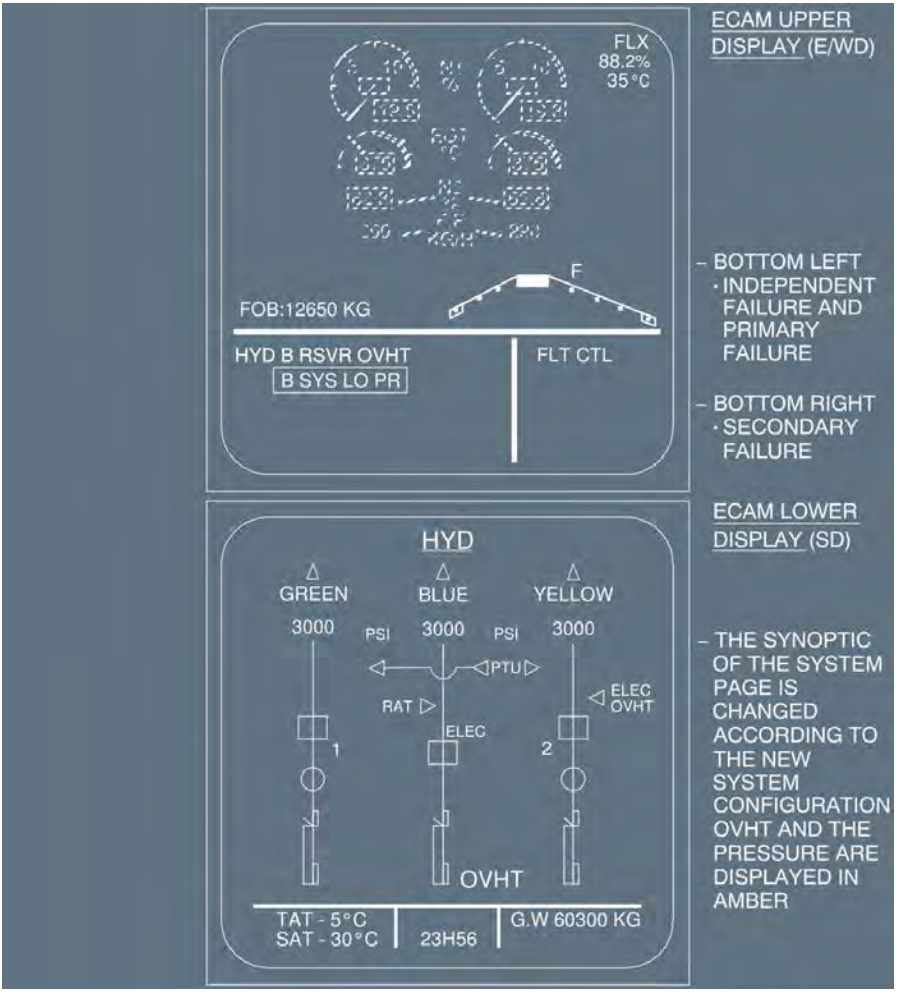
3 - THE FLIGHT CREW FOLLOWS THE INSTRUCTION DISPLAYED ON THE E/WD

Ident.: DSC-31-25-20-00001222.0002001 / 09 OCT 12
Applicable to: MSN 3408-4547

The flight crew switches off the BLUE ELEC PUMP pushbutton, depressurizing the blue hydraulic circuit.

COCKPIT INDICATIONS

- A single chime sounds.
- Both MASTER CAUTION lights stay on.
- A FAULT/OFF light, on the overhead panel, comes on.
- The second part of the message on the E/WD changes to “B SYS LO PR”.
- The SD's system diagram shows an amber zero for the pressure in the blue system, along with the amber “OVHT”.
- The right side of the memo area indicates a secondary failure in the flight control system.
- The ECAM control panel's CLR pushbutton remains on.



ECAM UPPER DISPLAY (E/WD)

- BOTTOM LEFT
  - INDEPENDENT FAILURE AND PRIMARY FAILURE
- BOTTOM RIGHT
  - SECONDARY FAILURE

ECAM LOWER DISPLAY (SD)

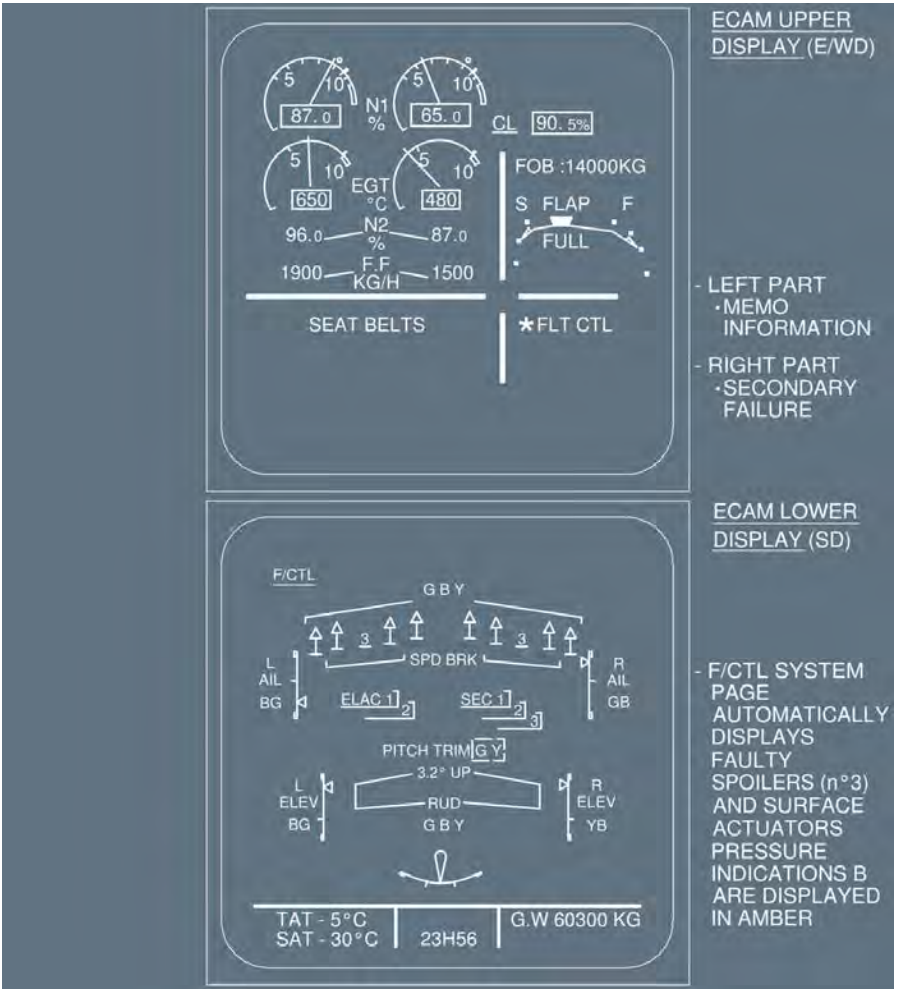
- THE SYNOPTIC OF THE SYSTEM PAGE IS CHANGED ACCORDING TO THE NEW SYSTEM CONFIGURATION OVHT AND THE PRESSURE ARE DISPLAYED IN AMBER

4 - ONE OF THE PILOTS PUSHES THE CLR PUSHBUTTON ON THE ECP

Ident.: DSC-31-25-20-00001223.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

COCKPIT INDICATIONS

- The CLR pushbutton stays on.
- The FAULT/OFF light stays on.
- Hydraulic system messages disappear from the E/WD, and the right side of the memo area indicates a secondary failure in the flight control system.
- The SD automatically calls up the flight control system page, with surface actuator indications (associated with the blue hydraulic system) shown in amber.

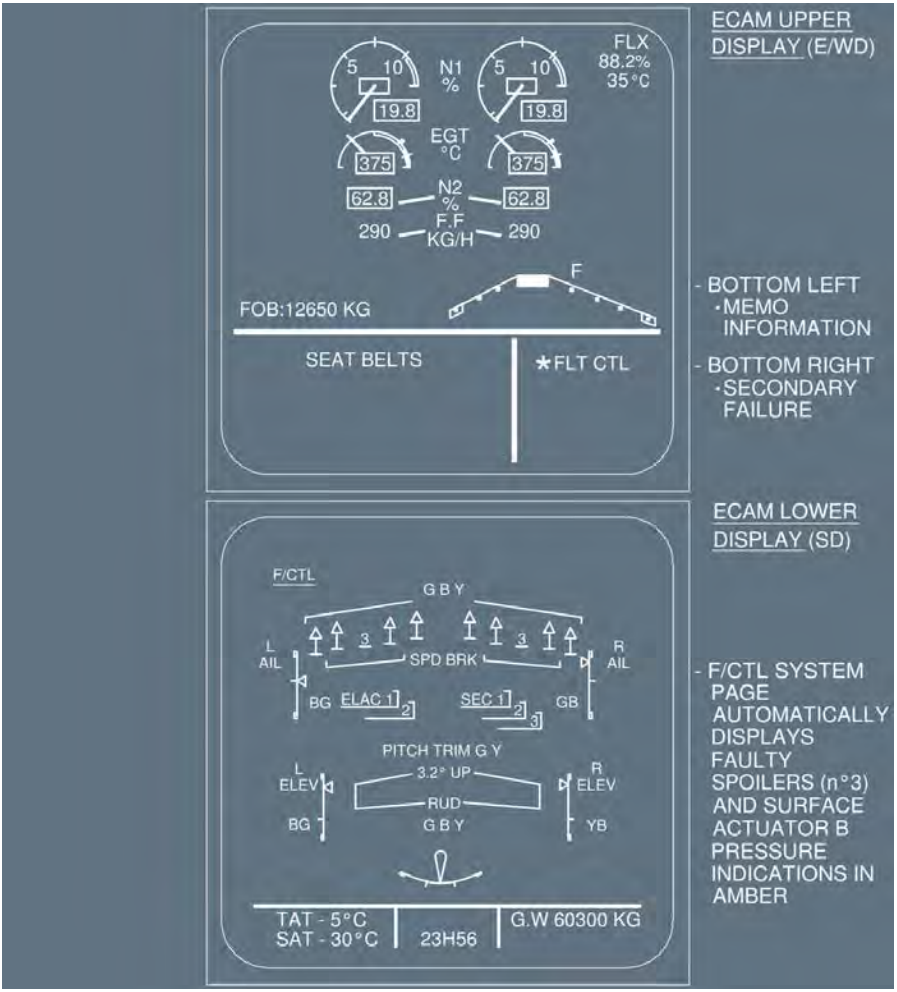

ECAM UPPER DISPLAY (E/WD)
N1 %
87.0
65.0
CL
90.5%
EGT °C
650
480
FOB :14000KG
S FLAP F
FULL
96.0
N2 %
87.0
1900
F.F KG/H
1500
SEAT BELTS
*FLT CTL
- LEFT PART
·MEMO INFORMATION
- RIGHT PART
·SECONDARY FAILURE
ECAM LOWER DISPLAY (SD)
F/CTL
G B Y
SPD BRK
L AIL BG
R AIL GB
ELAC 1 2
SEC 1 2 3
PITCH TRIM G Y
3.2° UP
L ELEV BG
RUD
G B Y
R ELEV YB
TAT - 5°C
SAT - 30°C
23H56
G.W 60300 KG
- F/CTL SYSTEM PAGE AUTOMATICALLY DISPLAYS FAULTY SPOILERS (n°3) AND SURFACE ACTUATORS PRESSURE INDICATIONS B ARE DISPLAYED IN AMBER

4 - ONE OF THE PILOTS PUSHES THE CLR PUSHBUTTON ON THE ECP

Ident.: DSC-31-25-20-00001223.0003001 / 09 OCT 12
Applicable to: MSN 3408-4547

COCKPIT INDICATIONS

- The CLR pushbutton stays on.
- The FAULT/OFF light stays on.
- Hydraulic system messages disappear from the E/WD, and the right side of the memo area indicates a secondary failure in the flight control system.
- The SD automatically calls up the flight control system page, with surface actuator indications (associated with the blue hydraulic system) shown in amber.

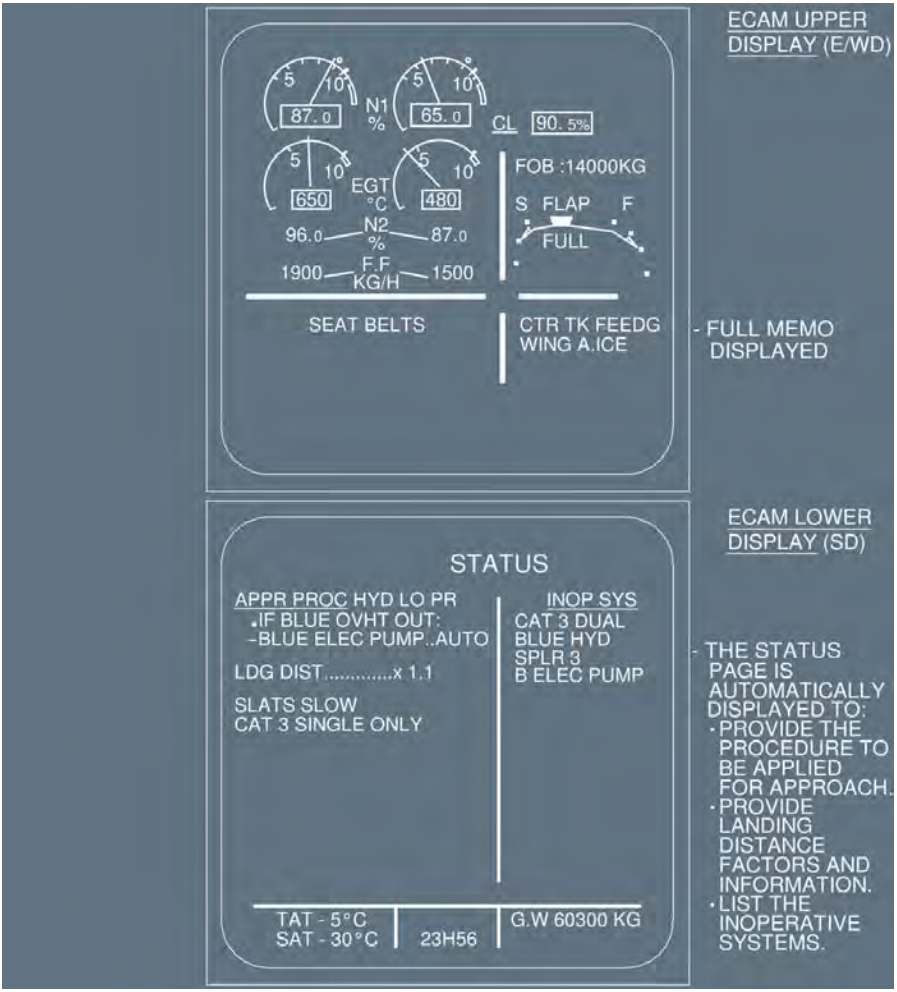

ECAM UPPER DISPLAY (E/WD)
FLX
88.2%
35 °C
N1
%
19.8
19.8
EGT
°C
375
375
N2
%
62.8
62.8
F.F
KG/H
290
290
F
FOB:12650 KG
SEAT BELTS
*FLT CTL
- BOTTOM LEFT
·MEMO
INFORMATION
- BOTTOM RIGHT
·SECONDARY
FAILURE
ECAM LOWER DISPLAY (SD)
F/CTL
G B Y
L AIL
R AIL
SPD BRK
BG
ELAC 1
SEC 1
GB
PITCH TRIM G Y
L ELEV
R ELEV
3.2° UP
RUD
BG
G B Y
YB
TAT - 5°C
SAT - 30°C
23H56
G.W 60300 KG
- F/CTL SYSTEM PAGE AUTOMATICALLY DISPLAYS FAULTY SPOILERS (n°3) AND SURFACE ACTUATOR B PRESSURE INDICATIONS IN AMBER

5 - ONE OF THE PILOTS PUSHES THE CLR PUSHBUTTON A SECOND TIME

Ident.: DSC-31-25-20-00001224.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

COCKPIT INDICATIONS

- The ECP's CLR and STS pushbuttons light up.
- The FAULT/OFF lights stay on.
- The E/WD's memo area returns to normal.
- The STATUS page automatically appears on the SD, displaying the procedures for completing the flight with a faulty blue system.

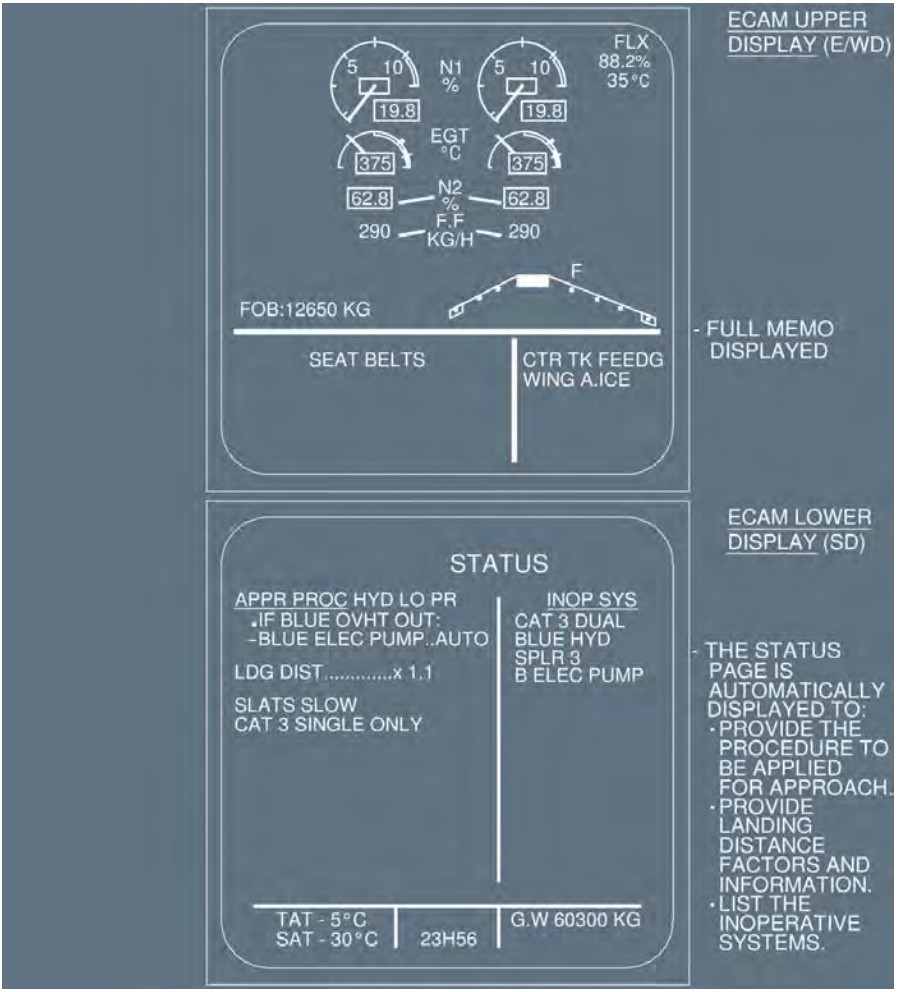

ECAM UPPER DISPLAY (E/WD)
N1 %
87.0
65.0
CL
90.5%
EGT °C
650
480
FOB :14000KG
S FLAP F
FULL
96.0
N2 %
87.0
1900
F.F KG/H
1500
SEAT BELTS
CTR TK FEEDG
WING A.ICE
- FULL MEMO DISPLAYED
ECAM LOWER DISPLAY (SD)
STATUS
APPR PROC HYD LO PR
.IF BLUE OVHT OUT:
-BLUE ELEC PUMP..AUTO
LDG DIST.....x 1.1
SLATS SLOW
CAT 3 SINGLE ONLY
INOP SYS
CAT 3 DUAL
BLUE HYD
SPLR 3
B ELEC PUMP
TAT - 5°C
SAT - 30°C
23H56
G.W 60300 KG
- THE STATUS PAGE IS AUTOMATICALLY DISPLAYED TO:
· PROVIDE THE PROCEDURE TO BE APPLIED FOR APPROACH.
· PROVIDE LANDING DISTANCE FACTORS AND INFORMATION.
· LIST THE INOPERATIVE SYSTEMS.

5 - ONE OF THE PILOTS PUSHES THE CLR PUSHBUTTON A SECOND TIME

Ident.: DSC-31-25-20-00001224.0003001 / 09 OCT 12
Applicable to: MSN 3408-4547

COCKPIT INDICATIONS

- The ECP's CLR and STS pushbuttons light up.
- The FAULT/OFF lights stay on.
- The E/WD's memo area returns to normal.
- The STATUS page automatically appears on the SD, displaying the procedures for completing the flight with a faulty blue system.

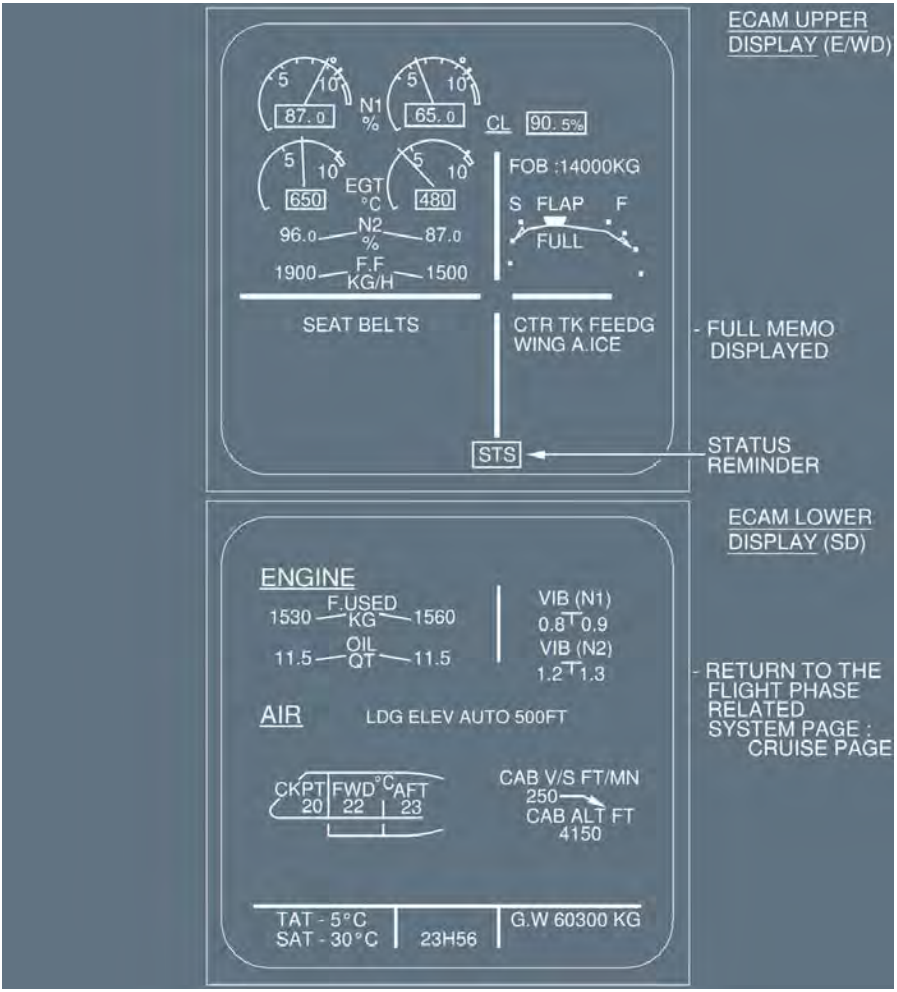

ECAM UPPER DISPLAY (E/WD)
FLX
88.2%
35 °C
N1
%
5 10
19.8
19.8
EGT
°C
375
375
N2
%
62.8
62.8
F.F
KG/H
290
290
F
FOB:12650 KG
SEAT BELTS
CTR TK FEEDG
WING A.ICE
- FULL MEMO DISPLAYED
ECAM LOWER DISPLAY (SD)
STATUS
APPR PROC HYD LO PR
.IF BLUE OVHT OUT:
-BLUE ELEC PUMP..AUTO
LDG DIST.....x 1.1
SLATS SLOW
CAT 3 SINGLE ONLY
INOP SYS
CAT 3 DUAL
BLUE HYD
SPLR 3
B ELEC PUMP
TAT - 5°C
SAT - 30°C
23H56
G.W 60300 KG
- THE STATUS PAGE IS AUTOMATICALLY DISPLAYED TO:
· PROVIDE THE PROCEDURE TO BE APPLIED FOR APPROACH.
· PROVIDE LANDING DISTANCE FACTORS AND INFORMATION.
· LIST THE INOPERATIVE SYSTEMS.

6 - ONE OF THE PILOTS PUSHES THE CLR PUSHBUTTON A THIRD TIME

Ident.: DSC-31-25-20-00001225.0001001 / 09 OCT 12
Applicable to: MSN 1882-2078

COCKPIT INDICATIONS

- The CLR pushbutton light goes off.
- The FAULT/OFF lights stay on.
- A status reminder appears at the bottom of the E/WD.
- The SD automatically displays the system page corresponding to the flight phase.

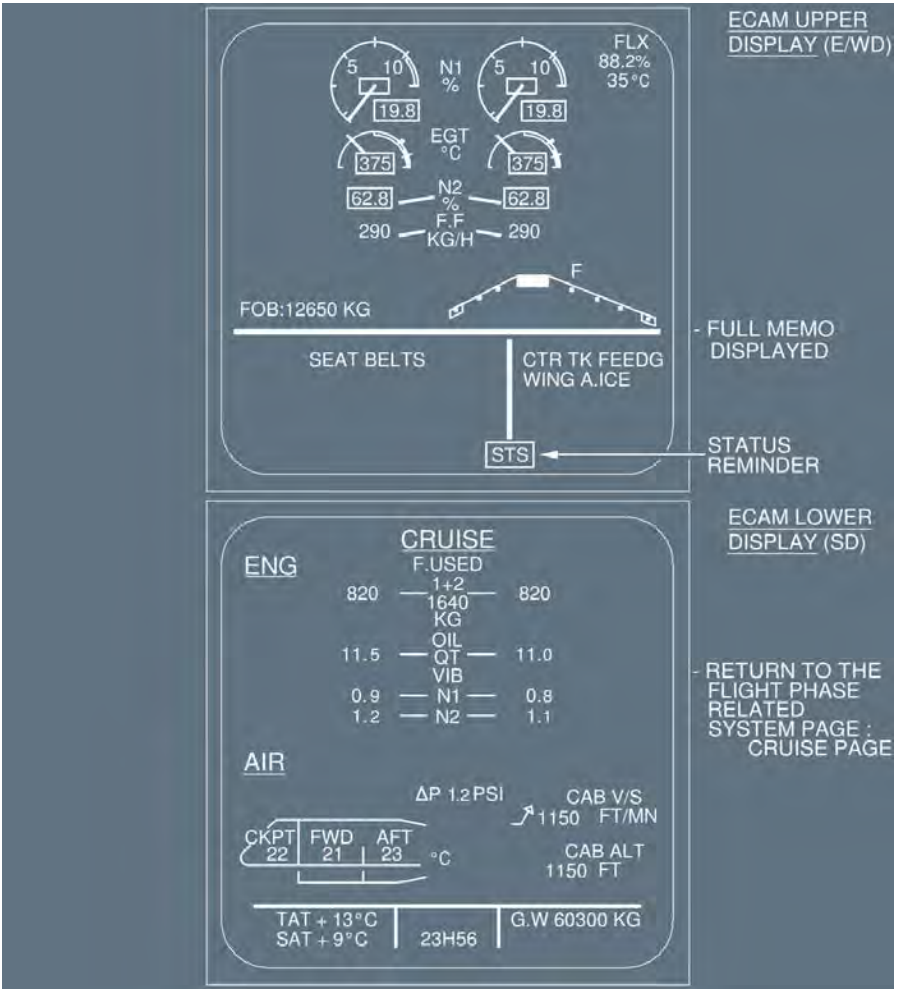

ECAM UPPER DISPLAY (E/WD)
N1 %
87.0
65.0
CL
90.5%
EGT °C
650
480
FOB :14000KG
S FLAP F
FULL
96.0
N2 %
87.0
1900
F.F KG/H
1500
SEAT BELTS
CTR TK FEEDG
WING A.ICE
- FULL MEMO DISPLAYED
STS
STATUS REMINDER
ECAM LOWER DISPLAY (SD)
ENGINE
F.USED KG
1530
1560
OIL QT
11.5
11.5
VIB (N1)
0.8 0.9
VIB (N2)
1.2 1.3
AIR
LDG ELEV AUTO 500FT
CKPT 20
FWD °C 22
AFT 23
CAB V/S FT/MN
250
CAB ALT FT
4150
TAT - 5°C
SAT - 30°C
23H56
G.W 60300 KG
- RETURN TO THE FLIGHT PHASE RELATED SYSTEM PAGE : CRUISE PAGE

6 - ONE OF THE PILOTS PUSHES THE CLR PUSHBUTTON A THIRD TIME

Ident.: DSC-31-25-20-00001225.0003001 / 09 OCT 12
Applicable to: MSN 3408-4547

COCKPIT INDICATIONS

- The CLR pushbutton light goes off.
- The FAULT/OFF lights stay on.
- A status reminder appears at the bottom of the E/WD.
- The SD automatically displays the system page corresponding to the flight phase.


ECAM UPPER DISPLAY (E/WD)
FLX
88.2%
35 °C
N1
%
5 10
19.8
19.8
EGT
°C
375
375
N2
%
62.8
62.8
F.F
KG/H
290
290
F
FOB:12650 KG
SEAT BELTS
CTR TK FEEDG
WING A.ICE
STS
- FULL MEMO DISPLAYED
STATUS REMINDER
ECAM LOWER DISPLAY (SD)
CRUISE
ENG
F.USED
820
1+2
1640
KG
820
OIL
QT
11.5
11.0
VIB
N1
0.9
0.8
N2
1.2
1.1
- RETURN TO THE FLIGHT PHASE RELATED SYSTEM PAGE : CRUISE PAGE
AIR
ΔP 1.2 PSI
CAB V/S
1150 FT/MN
CKPT
22
FWD
21
AFT
23
°C
CAB ALT
1150 FT
TAT + 13°C
SAT + 9°C
23H56
G.W 60300 KG

GENERAL

Ident.: DSC-31-27-00001226.0001001 / 21 MAR 16
Applicable to: ALL

The OEB reminder function provides operational help to the crew by enabling them to clearly identify (on the ECAM) all procedures and status messages affected by an OEB.
When a situation leading to a warning/caution occurs, a message informs the crew in real time that an OEB exists for the displayed warning and/or status and, consequently, that the procedure and/or status presented on the ECAM is not applicable.
Then the crew must refer to the QRH where the correct information is provided.

DESCRIPTION

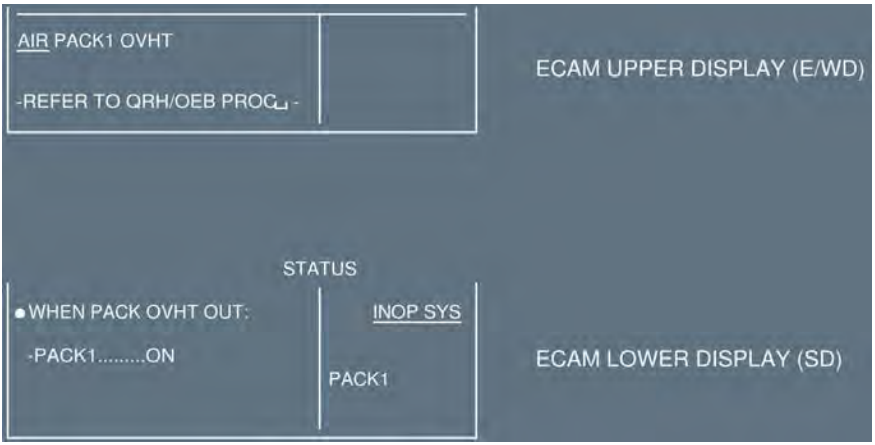
Ident.: DSC-31-27-00001227.0003001 / 22 MAY 12
Applicable to: ALL

The OEB reminder flag may apply to the:
- ECAM procedure only,
- ECAM procedure and corresponding status messages,
- Status message only.

PROCEDURE ONLY AFFECTED

- The ECAM warning title remains unaltered,
- All corresponding actions are suppressed and replaced by the “REFER TO QRH/OEB PROC” message,
- The related status messages on the ECAM system display remains unaltered.

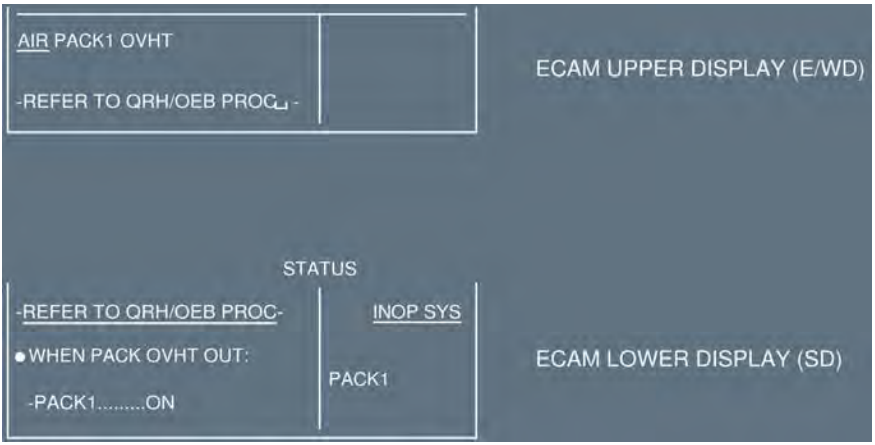
COCKPIT INDICATION



PROCEDURE AND STATUS AFFECTED

- The ECAM warning title remains unaltered,
- All corresponding actions are suppressed and replaced by the “REFER TO QRH/OEB PROC” message,
- The related status messages on the ECAM system display remains unchanged, except for the additional “REFER TO QRH/OEB PROC” title.

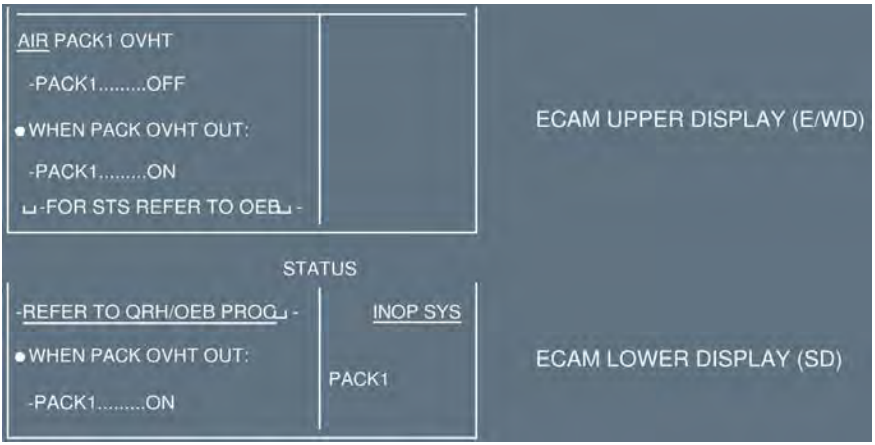
COCKPIT INDICATION



STATUS MESSAGE ONLY AFFECTED

- The ECAM warning title remains unaltered,
- The corresponding procedure remains unchanged, except for the additional “FOR STS REFER TO OEB" line.
- The related status messages on the ECAM system display remains unchanged, except for the additional " REFER TO QRH/OEB PROC" title.

COCKPIT INDICATION



OEB DATABASE

Ident.: DSC-31-27-00001228.0001001 / 21 MAR 16
Applicable to: ALL

The OEB database lists the warnings and cautions affected by an OEB.

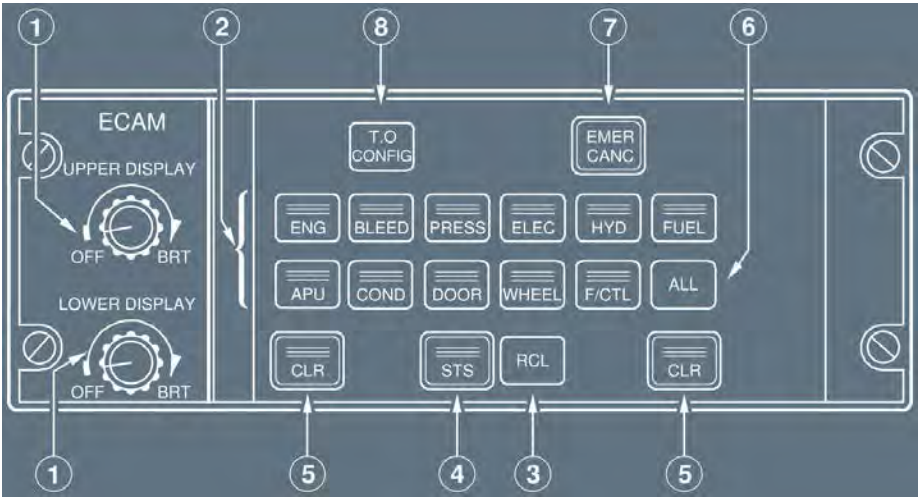
The OEB database can be :

- Loaded manually on the aircraft via the MCDU, and stored in both FWCs.
- Crossloaded from one FWC to the other FWC.
- Updated by entering a code via the MCDU.
- Checked via the MCDU.

Note: *The code provided on the OEB is designed to ensure that the OEB database is not updated before the OEB is available.*

ECAM CONTROL PANEL

Ident.: DSC-31-30-00001229.0002001 / 26 JUL 17
Applicable to: MSN 3408-4547



(1) OFF / BRT knobs

Used to turn the ECAM DUs on and off, and to control their brightness (automatic adjustment of brightness for ambient light conditions is superimposed on this manual control).

Note: When the pilot turns the UPPER DISPLAY knob to OFF, the engine/warning (E/W) display appears on the lower display unit (automatic transfer).

(2) System page pushbuttons

- Call up the corresponding system pages on the SD
- Light up, when pushed for manual selection, or when an advisory is detected
- Call up the aircraft system page corresponding to the present flight phase or the current warning when pushed a second time.

When only one ECAM display is on, the pilot can display a system page for up to 3 min by pushing and holding the system page pushbutton.

- If an advisory condition arises, the relevant system page is not automatically displayed, but the pushbutton light pulses
- If an ECAM warning is triggered, the relevant system page is not automatically displayed, and the system page pushbutton does not light up.

(3) RCL pb

- When pressed, the E/WD displays all alerts previously cleared via the CLR pb that are still active.
- When pressed for more than 3 s, the E/WD displays:
  - All alerts previously cleared via the CLR pb that are still active
  - All alerts previously cancelled via the EMER CANC pb.

Note: 1. If there is no alert to recall, the "NORMAL" message appears for 3 s on the E/WD.
2. This action on the RCL pb also suppresses the flight phase inhibition function until the next flight phase. As a consequence, all new alerts that should normally be inhibited will be displayed.

(4) STS pb

The pilot pushes this pushbutton to display the STATUS page on the lower SD. The pushbutton remains lit, as long as the SD displays the STS page. If the system has no status messages, the status page displays "NORMAL" for 3 s.
The pilot can clear the STATUS page by pushing the CLR pb, or by pushing the STS pb a second time.

When only one ECAM display is on :

- It displays the STATUS page only when the pilot pushes the STATUS pushbutton and holds it. He can display the next STATUS page, if any, by releasing the pushbutton and pushing it again (before 2 s have elapsed). The new page then appears after a short delay.
- The pilot can keep the STS pb pressed to display the STATUS page for a maximum of 3 min, after which the ECAM automatically displays the engine/warning page.

(5) CLR pb

This pushbutton remains lit as long as the E/WD is displaying a warning or caution message, or a status message on the SD.
If it is lit, pressing it changes the ECAM display.

(6) ALL pb

When this pushbutton is pressed and held down, the SD successively displays all the system pages at 3 s intervals.
If the ECAM control panel fails, the pilot can use this pushbutton to page through the system pages until he comes to the one he wants to look at. He then releases the pushbutton to select that page.

(7) EMER CANC pb

This pushbutton affects the following :

- Warnings :
  - Cancels (stops) an aural warning for as long as the failure condition continues
  - Extinguishes the MASTER WARNINGS lights
  - Does not affect the ECAM message display.
- Cautions :
  - Cancels any present caution (single chime, MASTER CAUTION lights, ECAM message) for the rest of the flight.

The flight crew can press the RCL pb for more than 3 s in order to restore all the alerts previously canceled via the EMER CANC pb.
All the alerts previously canceled via the EMER CANC pb automatically reappear on the E/WD in flight phase 1 or 2, immediately after the alignment of IRs 1 and 2.

Note: This pushbutton should only be used to suppress spurious MASTER CAUTIONS.

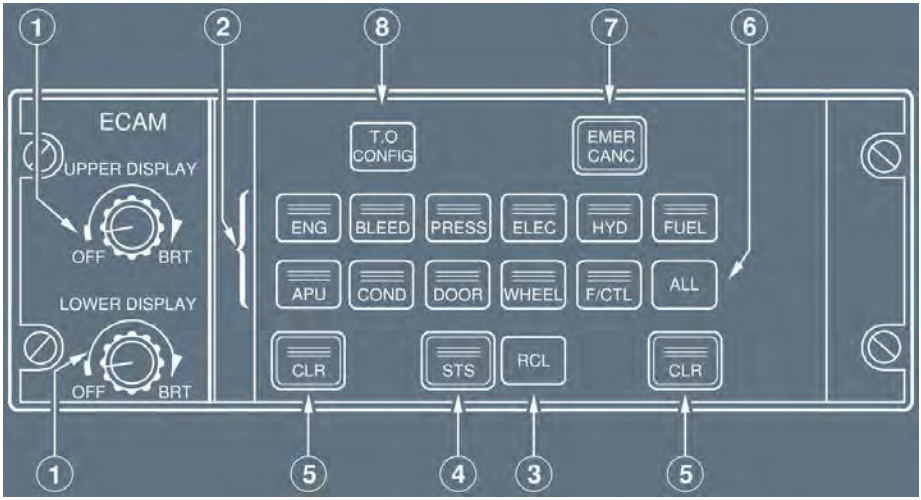
(8) T.O CONFIG pb

This pushbutton simulates the application of takeoff power. This is a test that triggers a warning, if the aircraft is not in takeoff configuration. (*Refer to DSC-31-15 Configuration Warnings*).
If the configuration is correct, the E/WD displays the “TO CONFIG NORMAL” message in the TO MEMO section.

Note: If the ECAM control panel fails, the CLR, RCL, STS, EMER CANC, and ALL pushbuttons remain operative, because their contacts are directly wired to the flight warning and display management computers.

ECAM CONTROL PANEL

Ident.: DSC-31-30-00001229.0001001 / 26 JUL 17
Applicable to: MSN 1882-2078



(1) OFF / BRT knobs

Used to turn the ECAM DUs on and off, and to control their brightness (automatic adjustment of brightness for ambient light conditions is superimposed on this manual control).

Note: When the pilot turns the UPPER DISPLAY knob to OFF, the engine/warning (E/W) display appears on the lower display unit (automatic transfer).

(2) System page pushbuttons

- Call up the corresponding system pages on the SD
- Light up, when pushed for manual selection, or when an advisory is detected
- Call up the aircraft system page corresponding to the present flight phase or the current warning when pushed a second time.

When only one ECAM display is on, the pilot can display a system page for up to 3 min by pushing and holding the system page pushbutton.

- If an advisory condition arises, the relevant system page is not automatically displayed, but the pushbutton light pulses
- If an ECAM warning is triggered, the relevant system page is not automatically displayed, and the system page pushbutton does not light up.

(3) RCL pb

- When pressed, the E/WD displays all alerts previously cleared via the CLR pb that are still active.
- When pressed for more than 3 s, the E/WD displays:
  - All alerts previously cleared via the CLR pb that are still active
  - All alerts previously cancelled via the EMER CANC pb.

Note: 1. If there is no alert to recall, the "NORMAL" message appears for 3 s on the E/WD.
2. This action on the RCL pb also suppresses the flight phase inhibition function until the next flight phase. As a consequence, all new alerts that should normally be inhibited will be displayed.

(4) STS pb

The pilot pushes this pushbutton to display the STATUS page on the lower SD. The pushbutton remains lit, as long as the SD displays the STS page. If the system has no status messages, the status page displays "NORMAL" for 3 s.
The pilot can clear the STATUS page by pushing the CLR pb, or by pushing the STS pb a second time.

When only one ECAM display is on :

- It displays the STATUS page only when the pilot pushes the STATUS pushbutton and holds it. He can display the next STATUS page, if any, by releasing the pushbutton and pushing it again (before 2 s have elapsed). The new page then appears after a short delay.
- The pilot can keep the STS pb pressed to display the STATUS page for a maximum of 3 min, after which the ECAM automatically displays the engine/warning page.

(5) CLR pb

This pushbutton remains lit as long as the E/WD is displaying a warning or caution message, or a status message on the SD.
If it is lit, pressing it changes the ECAM display.

(6) ALL pb

When this pushbutton is pressed and held down, the SD successively displays all the system pages at one-second intervals.
If the ECAM control panel fails, the pilot can use this pushbutton to page through the system pages until he comes to the one he wants to look at. He then releases the pushbutton to select that page.

(7) EMER CANC pb

This pushbutton affects the following :

- Warnings :
  - Cancels (stops) an aural warning for as long as the failure condition continues
  - Extinguishes the MASTER WARNINGS lights
  - Does not affect the ECAM message display.
- Cautions :
  - Cancels any present caution (single chime, MASTER CAUTION lights, ECAM message) for the rest of the flight.

The flight crew can press the RCL pb for more than 3 s in order to restore all the alerts previously canceled via the EMER CANC pb.
All the alerts previously canceled via the EMER CANC pb automatically reappear on the E/WD in flight phase 1 or 2, immediately after the alignment of IRs 1 and 2.

Note: This pushbutton should only be used to suppress spurious MASTER CAUTIONS.

(8) T.O CONFIG pb

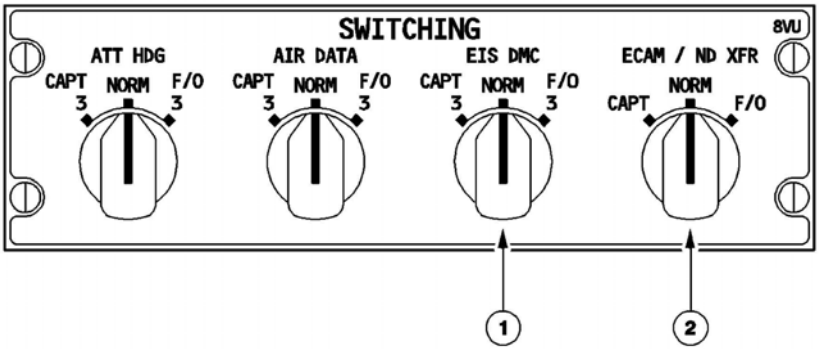
This pushbutton simulates the application of takeoff power. This is a test that triggers a warning, if the aircraft is not in takeoff configuration. (*Refer to DSC-31-15 Configuration Warnings*).
If the configuration is correct, the E/WD displays the “TO CONFIG NORMAL” message in the TO MEMO section.

Note: If the ECAM control panel fails, the CLR, RCL, STS, EMER CANC, and ALL pushbuttons remain operative, because their contacts are directly wired to the flight warning and display management computers.

SWITCHING PANEL

Ident.: DSC-31-30-00001230.0001001 / 17 MAR 11
Applicable to: MSN 1882-2078

ON PEDESTAL



(1) EIS DMC rotsel

NORM : DMC 1 drives the CAPT's PFD, the CAPT's ND, and the upper ECAM DU. DMC 2 drives the F/O's PFD and the F/O's ND, .and the lower ECAM DU

CAPT 3 : DMC 3 replaces DMC 1.

F/O 3 : DMC 3 replaces DMC 2.

Note: If a DMC fails, each of its associated DUs displays a diagonal line.

(2) ECAM/ND XFR rostel

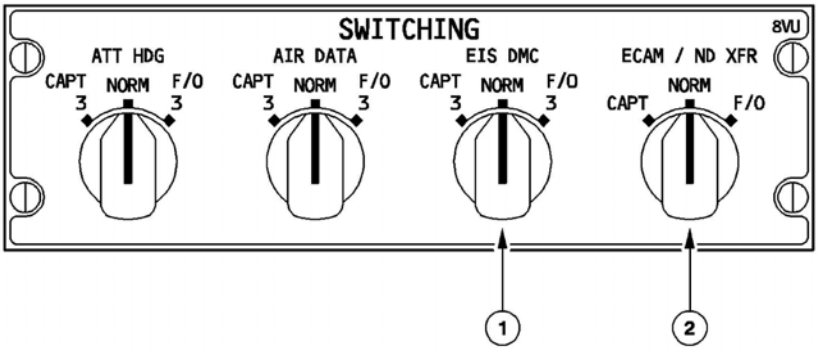
Transfers the system/status display to either the Captain's or the First Officer's ND.

Note: If both ECAM DUs (E/WD and SD) fail, the flight crew can use this switch to transfer the E/WD display to either navigation display.

SWITCHING PANEL

Ident.: DSC-31-30-00001230.0002001 / 17 MAR 11
Applicable to: MSN 3408-4547

ON PEDESTAL



(1) EIS DMC rotary selector

NORM : DMC 1 supplies the CAPT's PFD, the CAPT's ND, and the ECAM's DUs.
DMC 2 supplies the F/O's PFD and the F/O's ND.

CAPT 3 : DMC 3 replaces DMC 1.

F/O 3 : DMC 3 replaces DMC 2.

Note: If a DMC fails, each of its associated DUs displays an "INVALID DATA" message.

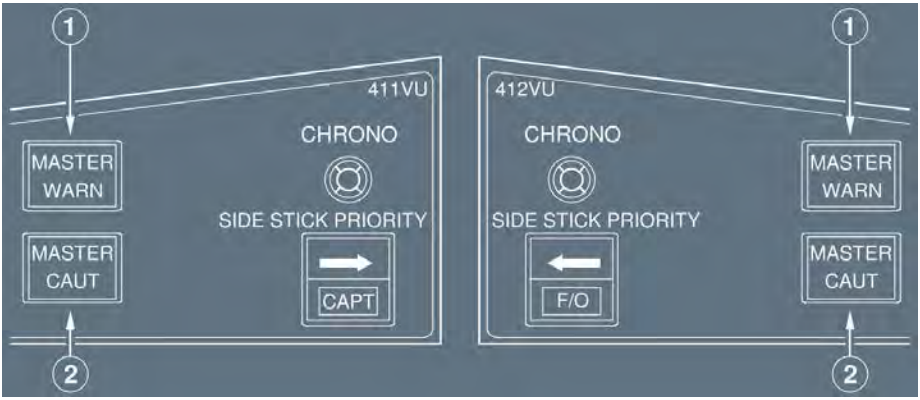
(2) ECAM/ND XFR rotary selector

Transfers the system/status display to either the Captain's or the First Officer's ND.
The "ECAM ON ND" message is displayed on the lower ECAM display.

Note: If both ECAM DUs (E/WD and SD) fail, the flight crew may use this switch to transfer the E/WD display to either navigation display. In this case, the "ECAM ON ND" message is not displayed.

ATTENTION GETTERS

Ident.: DSC-31-30-00001231.0001001 / 09 OCT 12
Applicable to: ALL



(1) MASTER WARN lights

- Flash red for level 3 warning
- Accompanied by an aural warning (continuous repetitive chime, specific sounds or synthetic voice).

(2) MASTER CAUT lights

- Light up steady amber for a level 2 caution
- Accompanied by a single chime.

These lights go out when :
- One pilot presses the light (except for some red warnings, such as the overspeed and stall warnings)
- The warning/caution situation is over
- The pilot presses the CLR pb on the ECAM control panel (except for some red warnings, such as the overspeed and stall warnings).
- The pilot presses the EMER CANC pb on the ECAM control panel.

The aural warnings cease when :
- One pilot presses the MASTER WARN light (except for some red warnings, such as the overspeed and stall warnings)
- The warning situation is over
- The pilot presses the EMER CANC pb on the ECAM control panel.

MEMO DISPLAY

Ident.: DSC-31-30-00018053.0001001 / 21 MAR 16
Applicable to: ALL

SWITCHING PNL : This memo appears in green, when:

1. PFD/ND XFR pb is pressed and ECAM/ND XFR rotary selector is selected at CAPT or F/O side simultaneously, or
2. ATT HDG rotary selector is selected at CAPT or F/O side, or
3. AIR DATA rotary selector is selected at CAPT or F/O side, or
4. EIS DMC rotary selector is selected at CAPT or F/O side.

GENERAL

Ident.: DSC-31-40-00017531.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The Primary Flight Display (PFD) provides the following information to the flight crew:
- Attitude and guidance
- Airspeed
- Altitude (BARO and radio) and vertical speed
- Heading and track
- FMGS modes (Flight Mode Annunciator)
- Vertical and lateral deviations
- Radio navigation information (ILS, MLS ◁✠ , DME).

The FWC monitors main parameters such as attitude, heading, and altitude. For more information, *Refer to DSC-31-40 Flags and Messages Displayed on PFD*.

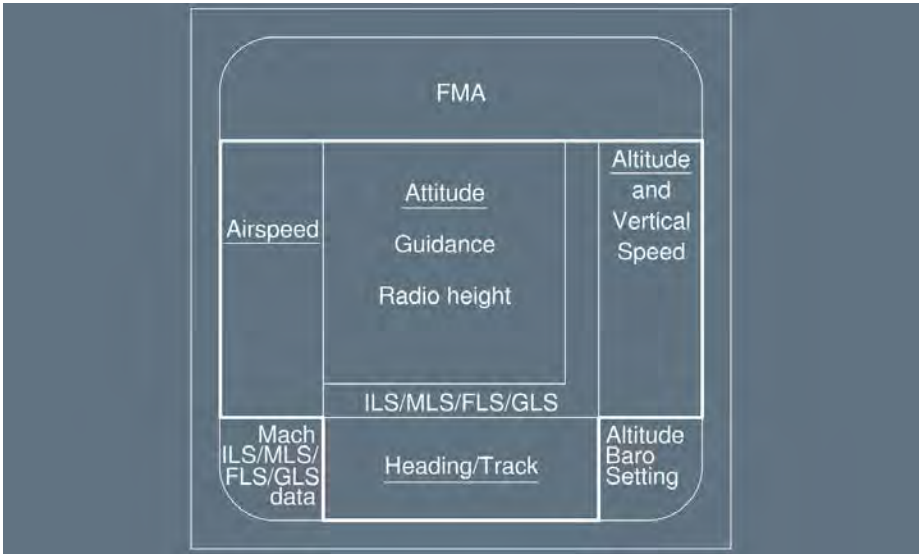
Note: A grey background appears on the speed, the heading vertical speed, and the altitude speed scales of the PFD. If the Primary Flight Display (PFD) Unit temperature exceeds a defined threshold, the grey background disappears, in order to limit power consumption and prevent a DU overheat. Any additional increase in temperature will lead to a complete cut off of the power supply to this display unit.

GENERAL

Ident.: DSC-31-40-00017531.0003001 / 21 MAR 16
Applicable to: MSN 3408, 3518-4547

The Primary Flight Display (PFD) provides the following information to the flight crew:

- Attitude and guidance
- Airspeed
- Altitude (BARO and radio) and vertical speed
- Heading and track
- FMGS modes (Flight Mode Annunciator)
- Vertical and lateral deviations
- Radio navigation information (ILS, MLS ◁✱ , FLS ◁✱ , GLS ◁✱ , DME).



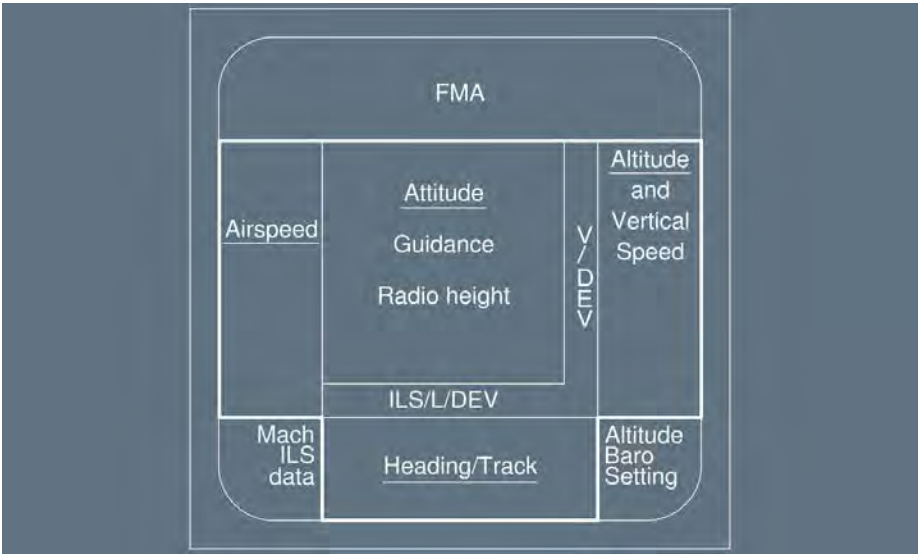
The FWC monitors main parameters such as attitude, heading, and altitude. For more information, *Refer to DSC-31-40 Flags and Messages Displayed on PFD*.

GENERAL

Ident.: DSC-31-40-00017531.0005001 / 21 MAR 16
Applicable to: MSN 3467

The Primary Flight Display (PFD) provides the following information to the flight crew:

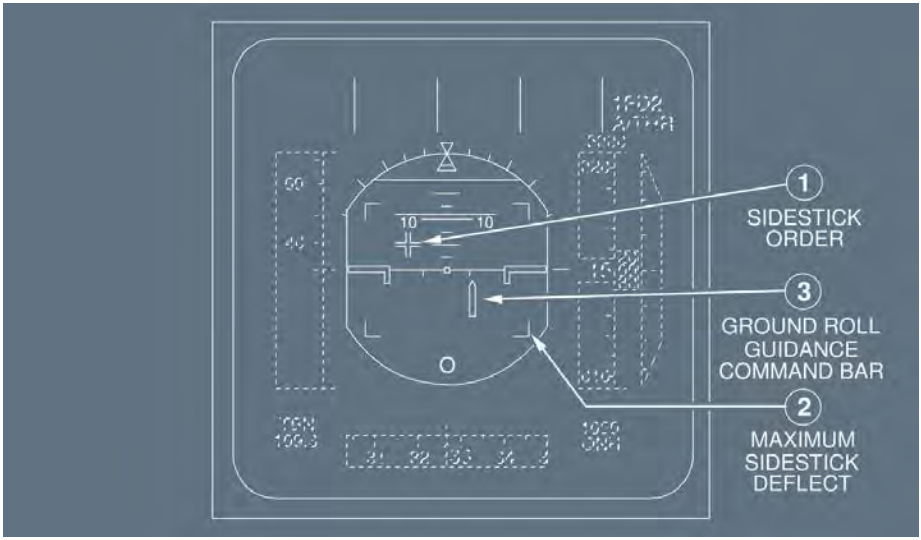
- Attitude and guidance
- Airspeed
- Altitude (BARO and radio) and vertical speed
- Heading and track
- FMGS modes (Flight Mode Annunciator)
- Vertical and lateral deviations
- Radio navigation information (ILS, DME).



The FWC monitors main parameters such as attitude, heading, and altitude. For more information, *Refer to DSC-31-40 Flags and Messages Displayed on PFD*.

SPECIFIC GROUND INDICATIONS

Ident.: DSC-31-40-00001233.0001001 / 13 JAN 14
Applicable to: ALL



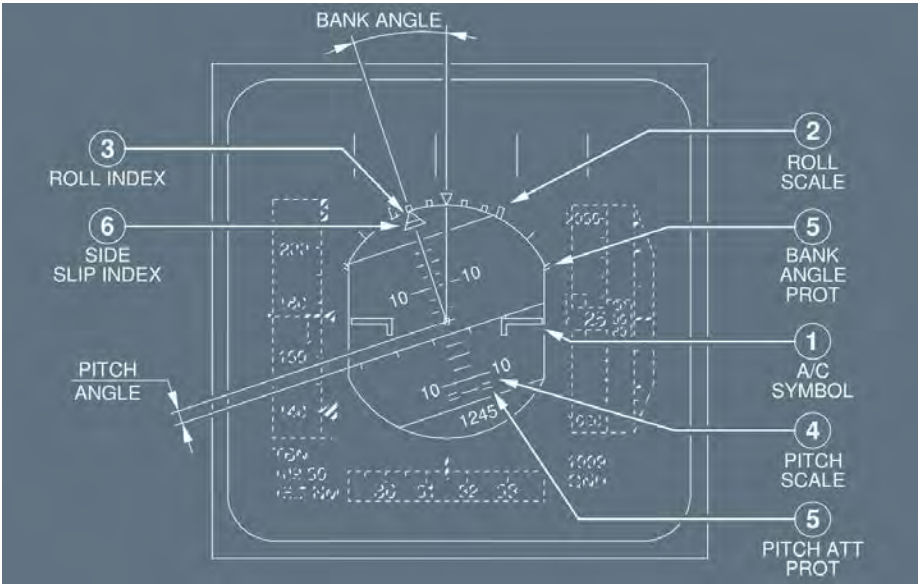
(1) Sidestick order indication
This symbol is in white, and appears as soon as one engine is started.
It indicates the total of the Captain's and First Officer's sidestick orders (shown here as left wing down, pitch up).

(2) Max Sidestick Deflection
This symbol is in white, and appears as soon as one engine is started.

(3) Ground Roll Guidance Command Bar
This symbol is in green, and appears when the aircraft is on ground, or below 30 ft radio height, provided that a localizer signal is available. It indicates the Flight Director yaw orders, to maintain the aircraft on the runway centerline.

ATTITUDE DATA

Ident.: DSC-31-40-00001234.0001001 / 09 OCT 12
Applicable to: MSN 1882



(1) Fixed Aircraft Symbol
This symbol is in black, and outlined in yellow. The yellow outline is dimmed if the flight crew selects TRK-FPA, unless the FMA is in TOGA or FLX mode.

(2) Roll Scale
This scale is in white, and has markers at 0, 10, 20, 30, and 45 ° of bank.

(3) Roll Index (yellow)
This pointer indicates the bank angle. When the bank angle exceeds 45 °, all the PFD symbols, except those for attitude, speed, heading, altitude, and vertical speed, disappear. The display returns to normal when the bank angle decreases below 40 °.

(4) Pitch Scale (white)
This scale has markers every 10 ° between 80 ° nose up and 80 ° nose down (every 2.5 ° between 10 ° nose down and 30 ° nose up). When pitch angle exceeds 25 ° nose up or 13 ° nose down, all the PFD displays except attitude, speed, speed trend, heading, altitude, and vertical speed disappear. Beyond 30 °, large red arrowheads indicate that the attitude has

become excessive and show the direction to move the nose in order to reduce it. The display returns to normal when pitch angle becomes less than 22 ° nose up or 10 ° nose down.

(5) Flight Control Protection Symbols

The display shows these symbols (=) in green:
- On the roll scale to mark the bank angle protection availability.
- On the pitch scale at 15 ° nose down or 30 ° nose up to mark the pitch limits.

An amber x replaces these symbols if the corresponding protection is lost.
(*Refer to DSC-27-20-10-20 Protections - General*)

(6) Sideslip Index (yellow)

This trapezoidal index moves beneath the roll index. On ground it represents the lateral acceleration of the aircraft: In flight it shows sideslip (as computed by the FAC). One centimeter of displacement indicates 0.2 g. The sideslip index is against its stop at 0.3 g.

In case of engine failure at takeoff or go around, the sideslip index changes from yellow to blue.

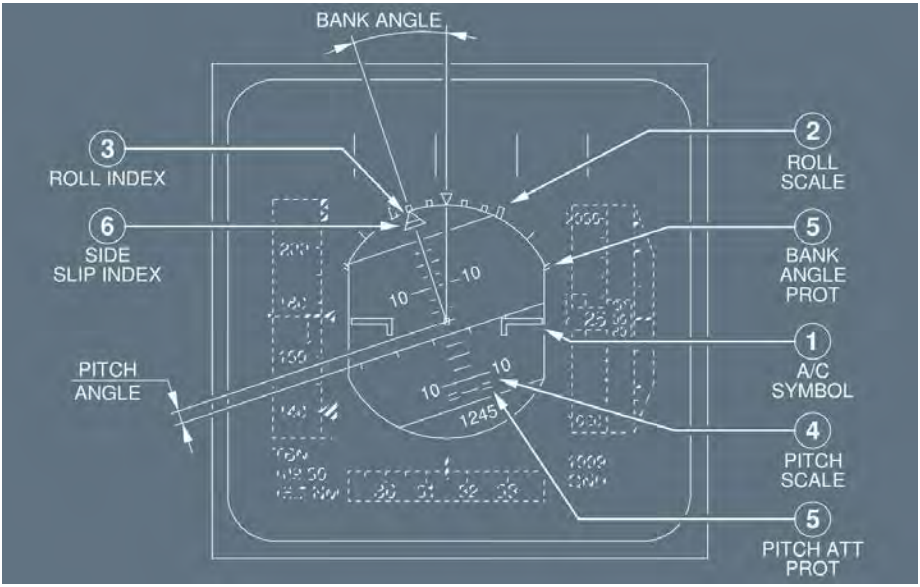
Note: *The sideslip target is blue, if :*
- *CONF 1, 2, or 3 is selected, and*
- *Any ENG N1 > 80 %, and*
- *The difference between the ENG N1's exceeds 35 %.*

In this case, the sideslip index is called β target.

When this index is centered with the roll index, the sideslip equals the sideslip target for optimum aircraft performance.

ATTITUDE DATA

Ident.: DSC-31-40-00001234.0003001 / 09 OCT 12
Applicable to: MSN 2078-4547



(1) Fixed Aircraft Symbol
This symbol is in black, and outlined in yellow. The yellow outline is dimmed if the crew selects TRK-FPA, unless the FMA is in the TOGA or FLX mode.

(2) Roll Scale
This scale is in white, and has markers at 0, 10, 20, 30, and 45 ° of bank.

(3) Roll Index (yellow)
This pointer indicates the bank angle. When the bank angle exceeds 45 °, all the PFD symbols, except those for attitude, speed, heading, altitude, and vertical speed, disappear. The display returns to normal when the bank angle decreases below 40 °.

(4) Pitch Scale (white)
This scale has markers every 10 ° between 80 ° nose up and 80 ° nose down (every 2.5 ° between 10 ° nose down and 30 ° nose up). When pitch angle exceeds 25 ° nose up or 13 ° nose down, all the PFD displays except attitude, speed, speed trend, heading, altitude, and vertical speed disappear. Beyond 30 °, large red arrowheads indicate that the attitude has

become excessive and show the direction to move the nose in order to reduce it. The display returns to normal when pitch angle becomes less than 22 ° nose up or 10 ° nose down.

(5) Flight Control Protection Symbols

The display shows these symbols (=) in green:
- On the roll scale to mark the bank angle protection availability.
- On the pitch scale at 15 ° nose down or 30 ° nose up to mark the pitch limits.

An amber x replaces these symbols if the corresponding protection is lost.
(*Refer to DSC-27-20-10-20 Protections - General*)

(6) Sideslip Index (yellow)

This trapezoidal index moves beneath the roll index. On ground, it represents the lateral acceleration of the aircraft. In flight, it shows sideslip (as computed by the FAC). One centimeter of displacement indicates 0.2 g. The sideslip index is against its stop at 0.3 g.

In case of engine failure at takeoff or go around, the sideslip index changes from yellow to blue.

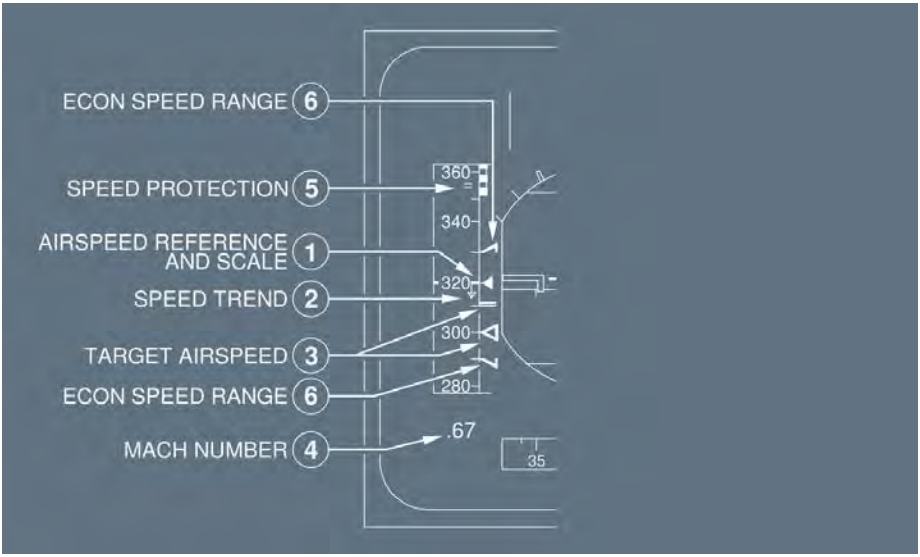
Note: The sideslip target is blue, if:
- *CONF 1, 2, or 3 is selected, and*
- *Any ENG N1 > 80 %or one Thrust Lever > MCT (≥ FLX if FLX or DERATED TO), and*
- *The difference between the ENG N1's exceeds 35 %.*

In this case, the sideslip index is called β target.

When this index is centered with the roll index, the sideslip equals the sideslip target for optimum aircraft performance.

AIRSPEED

Ident.: DSC-31-40-00001235.0002001 / 21 MAR 17
Applicable to: MSN 1882-2078



(1) Actual Airspeed Reference Line and Scale
A white scale on a grey background moves in front of a fixed yellow reference line next to a yellow triangle to show airspeed. The minimum airspeed indication is 30 kt.

(2) Speed Trend (yellow)
This pointer starts at the speed symbol. The tip shows the speed the aircraft will reach in 10 s if its acceleration remains constant. The pointer appears only when it is greater than 2 kt and disappears when it is less than 1 kt.
It also disappears, if the FACs fail.

(3) Target Airspeed (magenta or blue)
This symbol gives the target airspeed or the airspeed corresponding to the target Mach number.
The target airspeed is the airspeed computed by FMGC in managed speed mode (magenta) or entered manually on the FCU for selected speed mode (blue). The target speed is a magenta double bar (=) when associated with the ECON speed range.
Otherwise it is a triangle (magenta or blue).

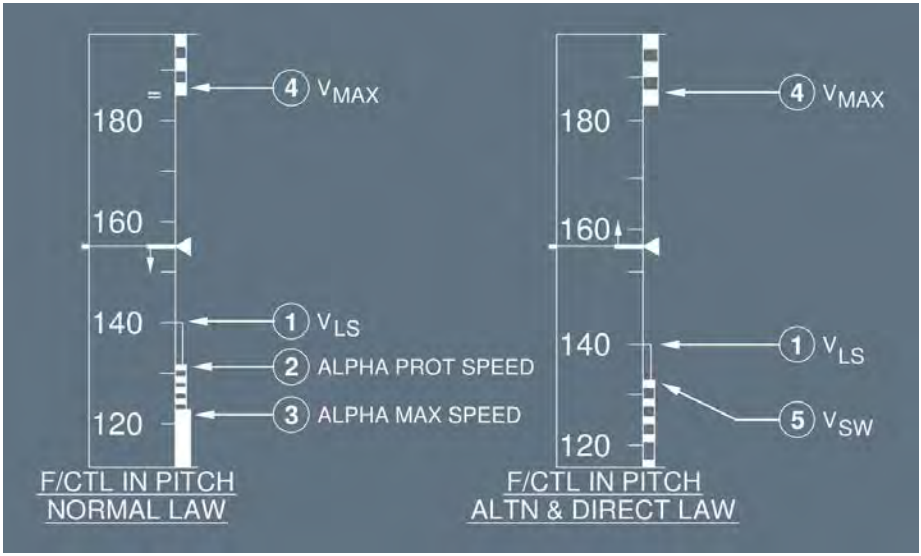
When the target speed is off the speed scale, its value is displayed as numbers below or above the speed scale.

(4) Mach Number (green)
This is displayed when it is greater than 0.5.

(5) Speed Protection (green)
This symbol indicates the speed (VMO +6 kt or MMO +0.01) at which overspeed protection becomes active (*Refer to DSC-27-20-10-20 Protections - General*).

(6) ECON Speed Range (magenta)

In descent mode with the ECON/AUTO SPD mode active, these two half triangles replace the selected speed symbol. It shows the upper and lower limits calculated by the FMGC:
- The upper speed is target speed +20 kt, limited to VMAX or VMO -3 kt or MMO -0.006, whichever is lowest.
  If a speed limit or a speed constraint applies, the upper margin is limited to ECON SPD +5 kt
- The lower speed margin is the target speed -20 kt, limited to green dot, F, S, or VLS, whichever is higher.



(1) Minimum Selectable Speed (VLS)
The top of the amber strip along the speed scale indicates this speed. It represents the lowest selectable speed providing an appropriate margin to the stall speed. (*Refer to DSC-27-20-10-20 Protections - High Speed Protection*)
VLS information is inhibited from touchdown until 10 s after liftoff.

(2) Alpha Protection Speed
The top of a black and amber strip along the speed scale indicates this speed.
It represents the speed corresponding to the angle of attack at which alpha protection becomes active (*Refer to DSC-27-20-10-20 Protections - General*).
It is displayed when in pitch normal law.

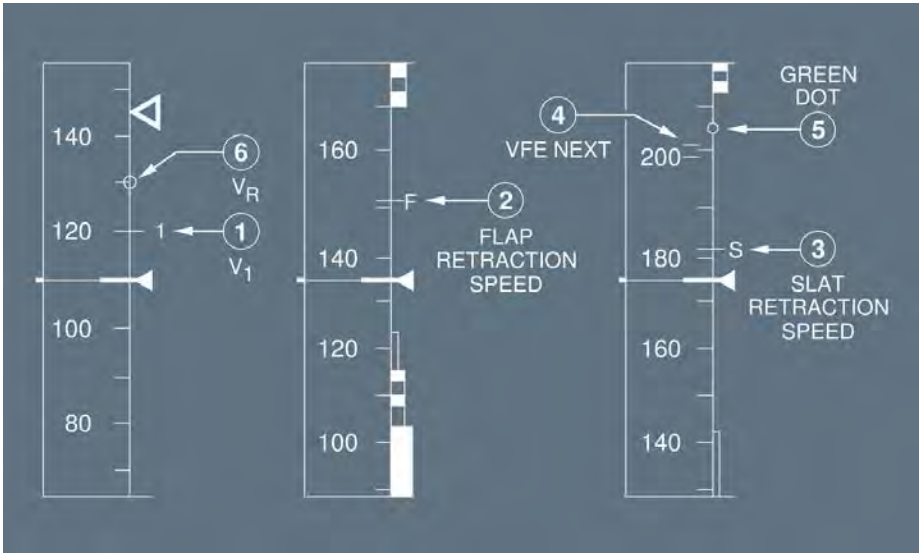
(3) Alpha MAX Speed
The top of a red strip along the speed scale indicates this speed. It represents the speed corresponding to the maximum angle of attack that the aircraft can attain in pitch normal law (*Refer to DSC-27-20-10-20 Protections - General*).
It is displayed when in pitch normal law.

(4) VMAX
The lower end of a red and black strip along the speed scale defines this speed.

It is the lowest of the following:
- VMO or the speed corresponding to MMO
- VLE
- VFE

(*Refer to DSC-27-20-10-20 Protections - High Speed Protection*)

(5) Stall Warning Speed (VSW)
The top of a red and black strip along the speed scale defines this speed.
It is the speed corresponding to the stall warning. (*Refer to DSC-27-20-10-20 Protections - General*).
VSW information is inhibited from touchdown until 5 s after liftoff.
It is displayed when operating in pitch alternate or pitch direct law.



(1) Decision Speed (V1)
This is a blue symbol (numeral one) that the crew manually inserts via the MCDU. When it is off the scale, the upper part of the scale shows it in numbers.
It disappears after liftoff (*Refer to DSC-22_10-50-50 Other Speeds*).

(2) Minimum Flap Retraction Speed
This is a green symbol (letter F).
It appears when the flap selector is in position 3 or 2. (*Refer to DSC-27-20-10-20 Protections - High Speed Protection*).

(3) Minimum Slat Retraction Speed
This is a green symbol (letter S).
It appears when the flap selector is in position 1. (*Refer to DSC-27-20-10-20 Protections - High Speed Protection*).

(4) VFE NEXT
The VFE next symbol is an amber equal sign showing the VFE corresponding to the next flap lever position.
It appears when the aircraft altitude is below 15 000 ft or 20 000 ft, depending upon the FAC standard (*Refer to DSC-22_10-50-30 Limit Speeds*).

(5) Green Dot (Engine-out operating speed in clean configuration)
This green dot appears, when the aircraft is flying in the clean configuration.

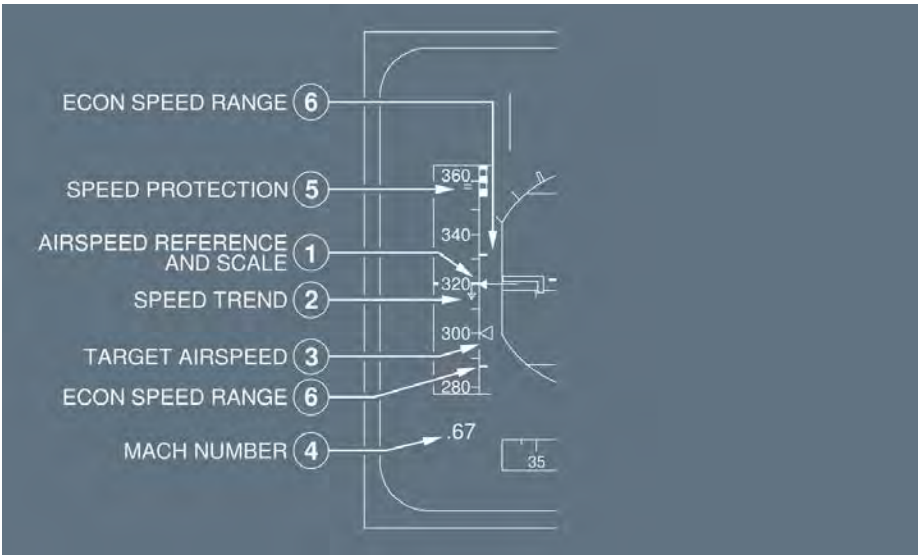
It shows the speed corresponding to the best lift-to-drag ratio.

(6) Rotation speed: (VR)
VR is entered on the PERF takeoff page of the MCDU, and is indicated by a cyan circle. This cyan circle is visible during takeoff.

Note: V2 is represented by the target speed index during takeoff.
V2 is manually inserted by the crew via the MCDU.

AIRSPEED

Ident.: DSC-31-40-00001235.0004001 / 21 MAR 17
Applicable to: MSN 3408-4547



(1) Actual Airspeed Reference Line and Scale
A white scale, on a grey background, moves in front of a fixed yellow reference line (next to a yellow triangle) to indicate airspeed. The minimum airspeed indication is 30 kt.

(2) Speed Trend (yellow)
This pointer starts at the speed symbol. The tip indicates the speed the aircraft will reach in 10 s, if its acceleration remains constant. The pointer only appears, when it is greater than 2 kt, and disappears when it is less than 1 kt.
It also disappears, if the FACs fail.

(3) Target Airspeed (magenta or blue)

This symbol gives the target airspeed, or the airspeed corresponding to the target Mach number.

The target airspeed is the airspeed computed by FMGC in managed speed mode (magenta), or the airspeed manually entered on the FCU in selected speed mode (blue). The target speed is indicated by a magenta or blue triangle.

When the target speed is off the speed scale, its value is displayed as numbers, either above or below the speed scale.

(4) Mach Number (green)

It is displayed, when it is greater than0.5.

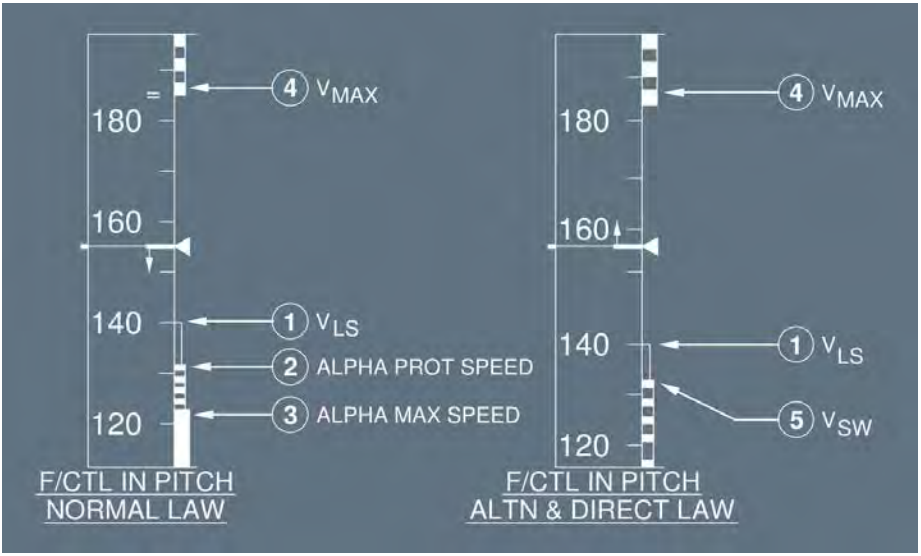
(5) Speed Protection (green)

This symbol indicates the speed (VMO +6 kt or MMO +0.01) at which overspeed protection becomes active (*Refer to DSC-27-20-10-20 Protections - General*).

(6) ECON Speed Range (magenta)

In descent mode with the ECON/AUTO SPD mode active, these two thick lines replace the selected speed symbol. It shows the upper and lower limits, calculated by the FMGC.

- The upper speed is target speed +20 kt, limited to VMAX or VMO -3 kt or MMO -0.006, whichever is lowest.
  If a speed limit or a speed constraint applies, the upper margin is limited to ECON SPD +5 kt.
- The lower speed margin is the target speed -20 kt, limited to green dot, F, S, or VLS, whichever is higher.



(1) Minimum Selectable Speed (VLS)
The top of the amber strip along the speed scale indicates this speed. It represents the lowest selectable speed providing an appropriate margin to the stall speed. (*Refer to DSC-27-20-10-20 Protections - High Speed Protection*)
VLS information is inhibited from touchdown until 10 s after liftoff.

(2) Alpha Protection Speed
The top of a black and amber strip along the speed scale indicates this speed.
It represents the speed corresponding to the angle of attack at which alpha protection becomes active (*Refer to DSC-27-20-10-20 Protections - General*).
It is displayed when in pitch normal law.

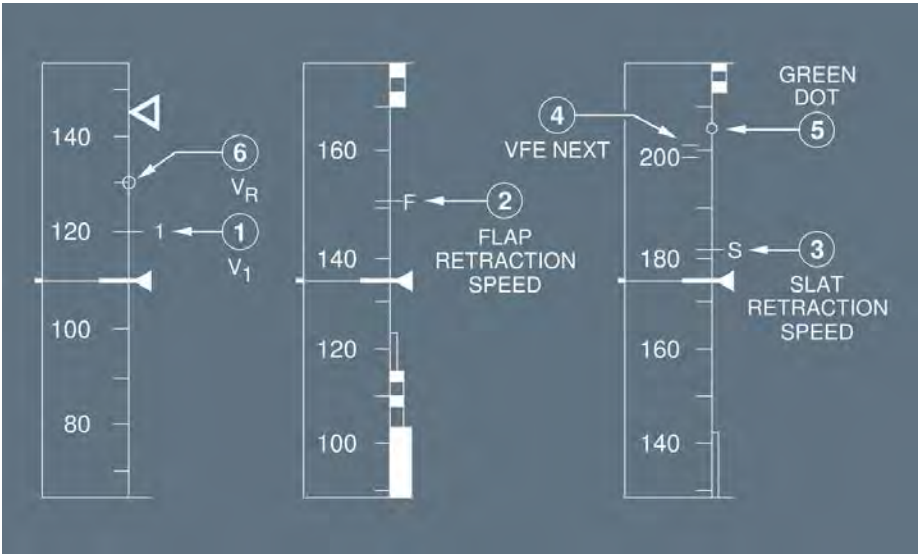
(3) Alpha MAX Speed
The top of a red strip along the speed scale indicates this speed. It represents the speed corresponding to the maximum angle of attack that the aircraft can attain in pitch normal law (*Refer to DSC-27-20-10-20 Protections - General*).
It is displayed when in pitch normal law.

(4) VMAX
The lower end of a red and black strip along the speed scale defines this speed.

It is the lowest of the following:
- VMO or the speed corresponding to MMO
- VLE
- VFE

(*Refer to DSC-27-20-10-20 Protections - High Speed Protection*)

(5) Stall Warning Speed (VSW)
The top of a red and black strip along the speed scale defines this speed.
It is the speed corresponding to the stall warning. (*Refer to DSC-27-20-10-20 Protections - General*).
VSW information is inhibited from touchdown until 5 s after liftoff.
It is displayed when operating in pitch alternate or pitch direct law.



(1) Decision Speed (V1)
This is a blue symbol (numeral one) that the crew manually inserts via the MCDU. When it is off the scale, the upper part of the scale shows it in numbers.
It disappears after liftoff (*Refer to DSC-22_10-50-50 Other Speeds*).

(2) Minimum Flap Retraction Speed
This is a green symbol (letter F).
It appears when the flap selector is in position 3 or 2. (*Refer to DSC-27-20-10-20 Protections - High Speed Protection*).

(3) Minimum Slat Retraction Speed
This is a green symbol (letter S).
It appears when the flap selector is in position 1. (*Refer to DSC-27-20-10-20 Protections - High Speed Protection*).

(4) VFE NEXT
The VFE next symbol is an amber equal sign showing the VFE corresponding to the next flap lever position.
It appears when the aircraft altitude is below 15 000 ft or 20 000 ft, depending upon the FAC standard (*Refer to DSC-22_10-50-30 Limit Speeds*).

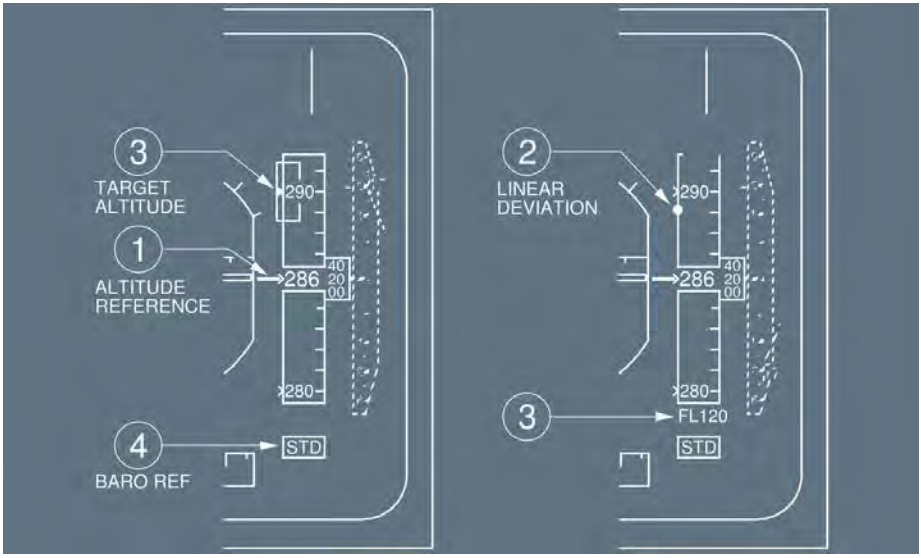
(5) Green Dot (Engine-out operating speed in clean configuration)
This green dot appears, when the aircraft is flying in the clean configuration.
It shows the speed corresponding to the best lift-to-drag ratio.

(6) Rotation speed: (VR)
VR is entered on the PERF takeoff page of the MCDU, and is indicated by a cyan circle.
This cyan circle is visible during takeoff.

Note: V2 is represented by the target speed index during takeoff.
V2 is manually inserted by the crew via the MCDU.

ALTITUDE

Ident.: DSC-31-40-00001237.0049001 / 29 OCT 13
Applicable to: MSN 3467, 4379-4547



(1) Altitude Indication

This appears both as a white moving scale, and as a green digital readout on a grey background. Small white marks are positioned on the scale against the round values (e.g. 280, 290...). “NEG” appears in the window in white for negative values. The altitude window changes from yellow to amber, if the aircraft deviates from the FCU-selected altitude or flight level.

On any approach for which an minimum is entered in the FMGC, the altitude numbers change from green to amber, when the aircraft goes below the minimum.

(2) Linear Deviation (green filled circle)

This symbol appears next to the altitude corresponding to the theoretical vertical profile computed by the FMGC. It is displayed from the top of descent down to the MAP altitude. The flight crew can read the linear deviation directly from the altitude scale. The range is ±500 ft. When the linear deviation value exceeds ±500 ft, the symbol stays at the range limit but changes to a half filled circle and the PROG page displays the exact value.

(3) Target Altitude or Selected Flight Level Symbol (blue)
This symbol shows the FCU selected altitude (if QNH BARO reference is selected) or the selected flight level (if STD BARO reference is selected.)
When the FMGC operates in the vertical managed mode, this symbol is magenta if it represents a flight plan altitude constraint that the FMGC will follow. If the target altitude or flight level is on the scale, the symbol is displayed and the numerical value appears inside the symbol.
If it is off the scale, the symbol is not displayed, and the numerical value appears above or underneath the scale.

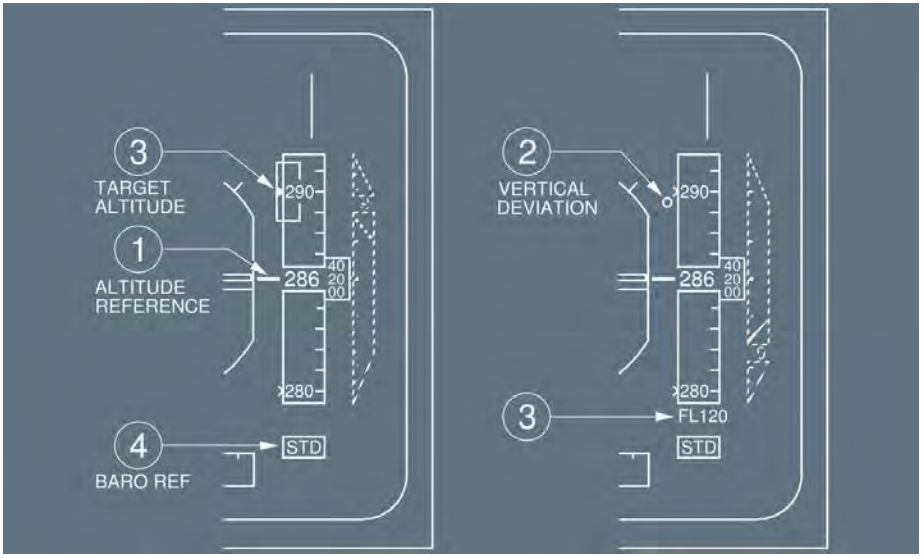
(4) Barometric Reference
The display shows “STD” or it shows “QNH” and the numerical setting in hectoPascals or inches of mercury.
It pulses when the selection made by the flight crew is not correct (STD not selected above transition altitude in climb or STD still selected in approach below transition level).

APPROACH MINIMUM INDICATION

Approach minimum is displayed on the altitude scale by an amber indication.

ALTITUDE

Ident.: DSC-31-40-00001237.0003001 / 27 JUN 12
Applicable to: MSN 1882-2078



(1) Altitude Indication

This appears both as a white moving scale, and as a green digital readout on a grey background. Small white marks are positioned on the scale against the round values (e.g. 280, 290...). “NEG” appears in the window in white for negative values. The altitude window changes from yellow to amber, if the aircraft deviates from the FCU-selected altitude or flight level.

On any approach for which an MDA (MDH) is entered in the FMGS, the altitude numbers change from green to amber, when the aircraft goes below the MDA (MDH).

(2) Vertical Deviation (magenta)

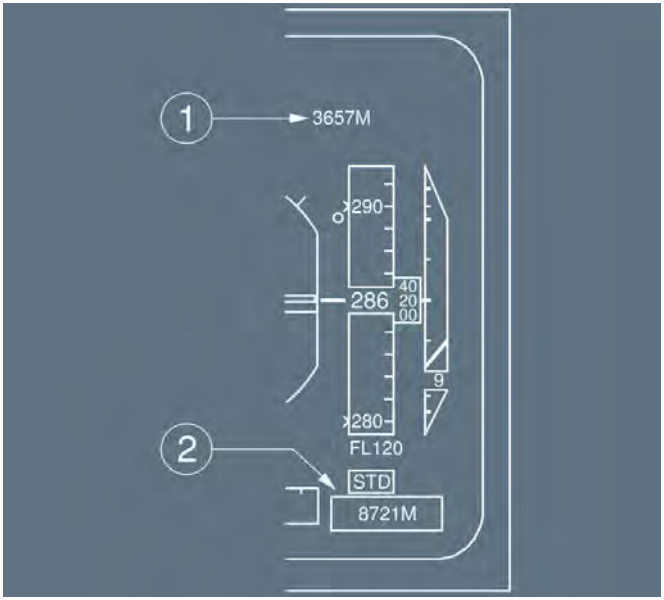
This symbol appears next to the altitude corresponding to the theoretical vertical profile computed by the FMGC. It is displayed from the top of descent down to the MAP altitude. The pilot can read the VDEV directly from the altitude scale. The range is ±500 ft. When the VDEV value exceeds ±500 ft, the symbol stays at the range limit and the PROG page displays the exact value.

(3) Target Altitude or Selected Flight Level Symbol (blue)
This symbol shows the FCU selected altitude (if QNH BARO reference is selected) or the selected flight level (if STD BARO reference is selected.)
When the FMGC operates in the vertical managed mode, this symbol is magenta if it represents a flight plan altitude constraint that the FMGC will follow. If the target altitude or flight level is on the scale, the symbol is displayed and the numerical value appears inside the symbol.
If it is off the scale, the symbol is not displayed, and the numerical value appears above or underneath the scale.

(4) Barometric Reference
The display shows "STD" or it shows "QNH" and the numerical setting in hectoPascals or inches of mercury.
It pulses when the selection made by the pilot is not correct (STD not selected above transition altitude in climb or STD still selected in approach below transition level).

METRIC ALTITUDE INDICATION

If metric reference is selected on the FCU two additional symbols are displayed on PFD.

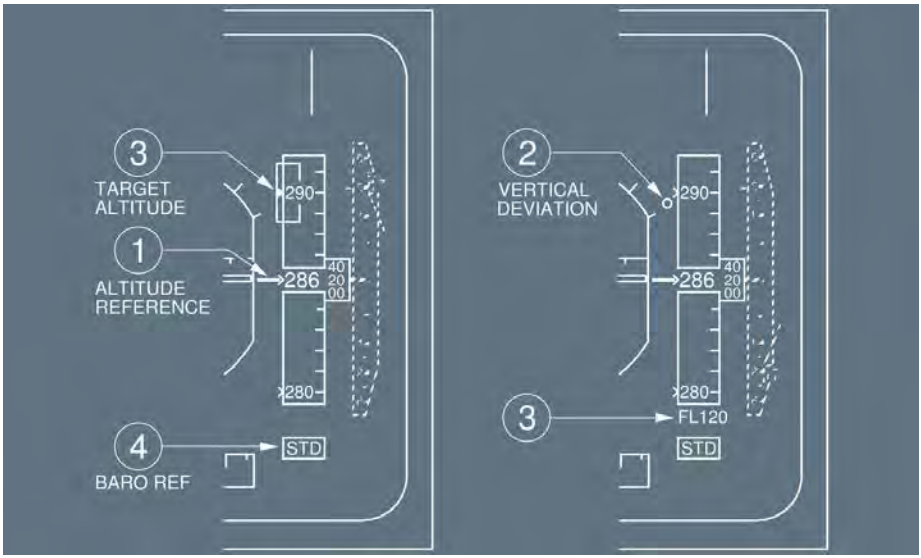


(1) Target altitude or selected flight level (magenta or blue)
The display shows the selected altitude value in meters.

(2) Altitude indication (green)
The display shows the actual aircraft altitude value in meters.

ALTITUDE

Ident.: DSC-31-40-00001237.0023001 / 29 OCT 13
Applicable to: MSN 3408, 3518-4100



(1) Altitude Indication
This appears both as a white moving scale, and as a green digital readout on a grey background. Small white marks are positioned on the scale against the round values (e.g. 280, 290...). “NEG” appears in the window in white for negative values. The altitude window changes from yellow to amber, if the aircraft deviates from the FCU-selected altitude or flight level.
On any approach for which an minimum is entered in the FMGS, the altitude numbers change from green to amber, when the aircraft goes below the minimum.

(2) Vertical Deviation (magenta)
This symbol appears next to the altitude corresponding to the theoretical vertical profile computed by the FMGC. It is displayed from the top of descent down to the MAP altitude. The pilot can read the VDEV directly from the altitude scale. The range is ±500 ft. When the VDEV value exceeds ±500 ft, the symbol stays at the range limit and the PROG page displays the exact value.

(3) Target Altitude or Selected Flight Level Symbol (blue)
This symbol shows the FCU selected altitude (if QNH BARO reference is selected) or the selected flight level (if STD BARO reference is selected.)
When the FMGC operates in the vertical managed mode, this symbol is magenta if it represents a flight plan altitude constraint that the FMGC will follow. If the target altitude or flight level is on the scale, the symbol is displayed and the numerical value appears inside the symbol.
If it is off the scale, the symbol is not displayed, and the numerical value appears above or underneath the scale.

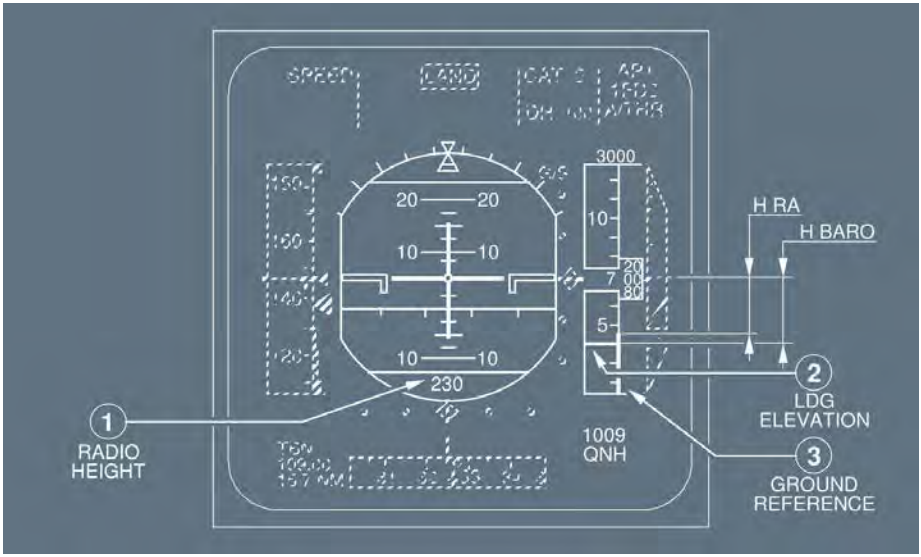
(4) Barometric Reference
The display shows “STD” or it shows “QNH” and the numerical setting in hectoPascals or inches of mercury.
It pulses when the selection made by the pilot is not correct (STD not selected above transition altitude in climb or STD still selected in approach below transition level).

APPROACH MINIMUM INDICATION

Approach minimum is displayed on the altitude scale by an amber indication.

ALTITUDE (CONT'D)

Ident.: DSC-31-40-00006121.0001001 / 13 JAN 14
Applicable to: MSN 1882-2078



(1) Radio Height

This quantity appears when it is less than 2 500 ft.

- If a DH has been entered, the radio height appears:
  - In green, when DH +100 ft < RA < 2 500 ft
  - In amber, when RA < DH +100 ft

  If "NO" is entered as the DH on the MCDU APPROACH page, 0 ft becomes a default value. When the aircraft reaches the decision height selected on the MCDU, DH letters flash amber for 3 s, then remain amber above the radio height indication.
- If no DH has been entered, or if both FMGCs fail, the radio height appears:
  - In green, when 400 ft < RA < 2 500 ft
  - In amber, when RA ≤ 400 ft

The radio height indication changes every 10 ft down to 50 ft, then every 5 ft down to 10 ft, then every foot.

(2) Landing Elevation (blue)

The horizontal bar on the altitude scale shows the landing elevation at the flight-planned destination.

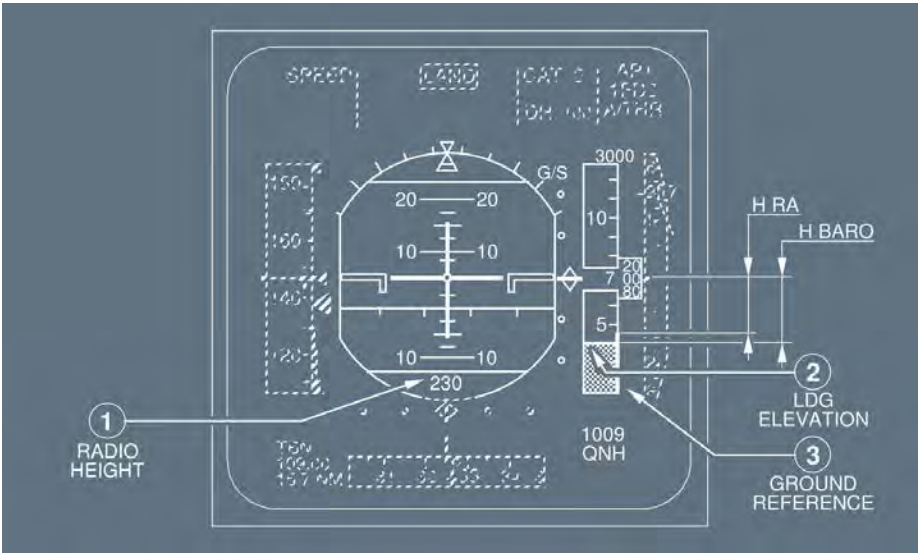
It is displayed:
- during flight phases 7 and 8 and
- if the QNH reference mode is selected.

(3) Ground reference

A red ribbon on the right of the altitude scale represents the field elevation. This ribbon, which is driven by the radio altimeter signal, is displayed below 570 ft.
It moves up, as does the lower line of the attitude sphere, with the altitude scale as the aircraft descends. When the aircraft has touched down, the top of this ribbon is at the middle of the altitude window.

ALTITUDE (CONT'D)

Ident.: DSC-31-40-00006121.0002001 / 13 JAN 14
Applicable to: MSN 3408-4547



(1) Radio Height

A value appears, when the aircraft is lower than 2 500 ft.

- If a DH has been entered, the radio height appears:
  - In green, when DH +100 ft < RA < 2 500 ft
  - In amber, when RA < DH +100 ft

  If "NO" is entered as the DH on the MCDU APPROACH page, 0 ft becomes a default value.
  When the aircraft reaches the decision height selected on the MCDU, DH letters flash amber for 9 s, then remain amber above the radio height indication.
- If no DH has been entered, or if both FMGCs fail, the radio height appears:
  - In green, when 400 ft < RA < 2 500 ft
  - In amber, when RA ≤ 400 ft

The radio height indication changes every 10 ft down to 50 ft, then every 5 ft down to 10 ft, then every foot.

(2) Landing Elevation (brown)

The top of the brown surface on the altitude scale represents the landing elevation at the flight-planned destination.

It is displayed:

- during flight phases 7 and 8 and
- if the STD reference mode is not selected.

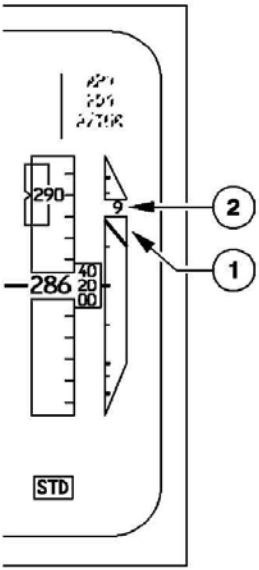
(3) Ground reference

A red ribbon on the right of the altitude scale represents the field elevation. This ribbon, which is driven by the radio altimeter signal, is displayed below 570 ft.
It moves up, as does the lower line of the attitude sphere, with the altitude scale as the aircraft descends. When the aircraft has touched down, the top of this ribbon is at the middle of the altitude window.

VERTICAL SPEED

Ident.: DSC-31-40-00001239.0001001 / 21 MAR 17
Applicable to: MSN 1882-2078

The displayed vertical speed information is normally based on both inertial and barometric data. If inertial data is not available, it is automatically replaced by barometric information.
In this case, the window around the numerical value becomes amber.



(1) Analog pointer
This pointer, which is normally in green, points to a white vertical speed scale, displayed on a grey background and graduated at intervals of 500 ft/min.
If the V/S is greater than 6 000 ft/min, the pointer stays at the end of the scale.

(2) Digital indication
This number, normally in green, is the vertical speed in hundreds of feet per minute.
It disappears, if the vertical speed is less than 200 ft/min.

The analog pointer and the digital indication become amber, if:
- V/S is greater than 6 000 ft/min, (climb or descent)
- V/S is greater than 2 000 ft/min, during descent when 1 000 ft < RA < 2 500 ft, or
- V/S is greater than 1 200 ft/min, during descent and RA < 1 000 ft.

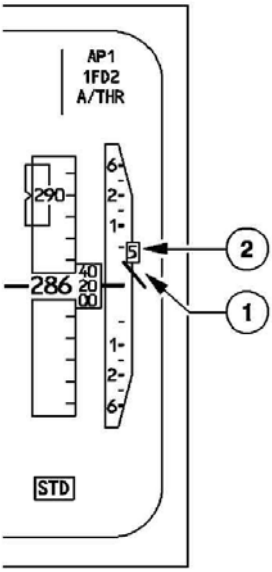
Note: *For TCAS, Refer to DSC-34-SURV-60-20 TCAS Messages.*

VERTICAL SPEED

Ident.: DSC-31-40-00001239.0002001 / 21 MAR 17
Applicable to: MSN 3408-4547

The displayed vertical speed information is normally based on both inertial and barometric data. If inertial data is not available, it is automatically replaced by barometric information.

In this case, the window around the numerical value becomes amber.



(1) Analog pointer
This pointer, which is normally in green, points to a white vertical speed scale, displayed on a grey background and graduated at intervals of 500 ft/min.
If the V/S is greater than 6 000 ft/min, the pointer stays at the end of the scale.

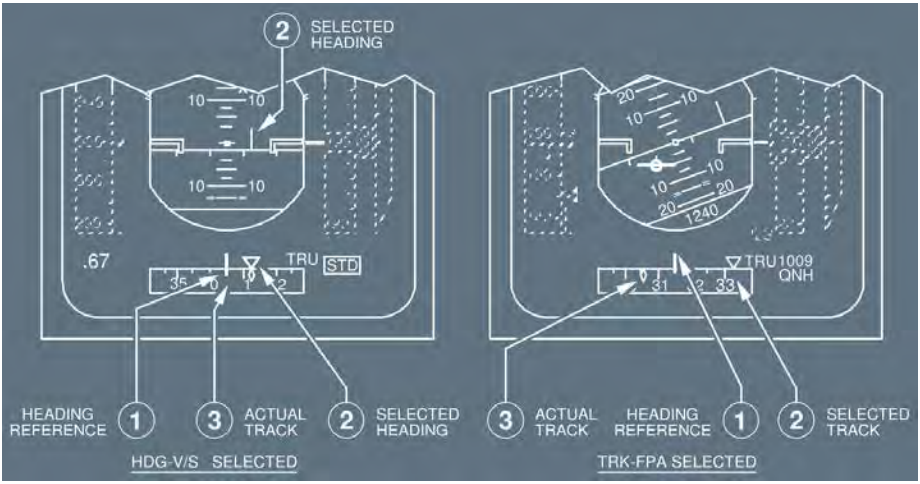
(2) Digital indication
This number, normally in green, is the vertical speed in hundreds of feet per minute.
It disappears, if the vertical speed is less than 200 ft/min.

The analog pointer and the digital indication become amber, if:
- V/S is greater than 6 000 ft/min, (climb or descent)
- V/S is greater than 2 000 ft/min, during descent when 1 000 ft < RA < 2 500 ft, or
- V/S is greater than 1 200 ft/min, during descent and RA < 1 000 ft.

Note: *For TCAS, Refer to DSC-34-SURV-60-20 TCAS Messages.*

HEADING

Ident.: DSC-31-40-00001240.0001001 / 22 MAY 12
Applicable to: MSN 1882-2078



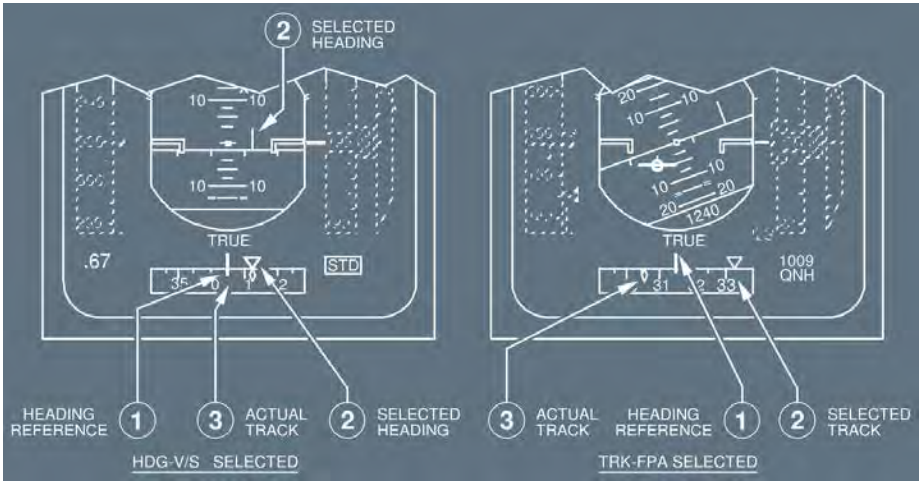
(1) Heading Reference Line and Scale
A white scale on a grey background moves in front of a fixed yellow reference line to indicate the actual magnetic heading.
"TRU" appears, when the display indicates the true heading, rather than the magnetic heading (latitude above 73 ° North or below 60 ° South).

(2) Selected Heading or Track Index (blue)
The pointer indicates the heading or track displayed on the FCU HDG-TRK window.
The index is replaced by digits on the right or left side of the scale, when the selected value is off the scale.
If the FD pushbutton is OFF, a second heading/track symbol appears on the horizon line, and markers are displayed every 10 °.

(3) Actual Track Symbol
This symbol is a small green diamond.

HEADING

Ident.: DSC-31-40-00001240.0002001 / 07 MAY 13
Applicable to: MSN 3408-4547



(1) Heading Reference Line and Scale
A white scale on a grey background moves in front of a fixed yellow reference line to indicate the actual magnetic heading.
"TRUE" appears, when the display indicates the true heading, rather than the magnetic heading (latitude above 73 ° North or below 60 ° South).

(2) Selected Heading or Track Index (blue)
This pointer is in blue, and indicates the heading or track displayed on the FCU HDG-TRK window.
The index is replaced by digits on the right or left side of the scale, when the selected value is off the scale.
If the FD pushbutton is OFF, a second heading/track symbol appears on the horizon line, and markers are displayed every 10 °.

(3) Actual Track Symbol
This symbol is a small green diamond.

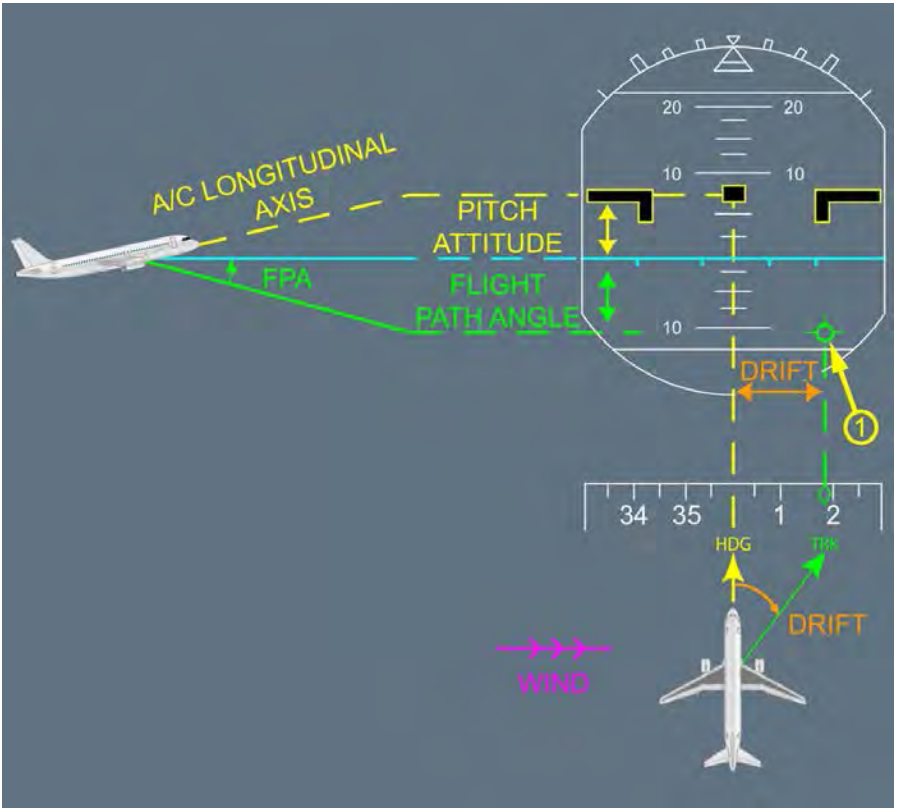
FLIGHT PATH VECTOR

Ident.: DSC-31-40-00001241.0001001 / 17 MAR 17
Applicable to: ALL

The Flight Path Vector (FPV) is the flight reference with the TRK and FPA as basic guidance parameters. When the TRK/FPA is selected on the FCU, the FPV appears on the PFD.

INFORMATION PRESENTATION

The FPV appears on the PFD as a symbol, known as the "bird". The bird indicates the track and flight patch angle in relation to the ground.
The track is indicated on the PFD by a green diamond on the compass, in addition to the lateral movement of the bird in relation to the fixed aircraft symbol. On the ND, the track is indicated by a green diamond on the compass scale. The difference in angle between track and heading indicates the drift.
The flight path angle is indicated on the PFD by the vertical movement of the bird in relation to the pitch scale.
With the flight directors (FD) ON, the Flight Path Director (FPD) replaces the HDG-VS Flight Director (FD). With both FD pb set to OFF, the blue track index appears on the PFD horizon.



(1) Flight Path Vector (FPV)
This symbol appears, when the pilot selects TRK/FPA on the FCU.

The flight path vector represents the lateral and vertical trajectory of the aircraft with respect to the ground.
- On the lateral scale, it indicates the aircraft's track.
- On the vertical scale, it indicates the aircraft's flight path angle.

Example : The aircraft flies a track of 009 ° (heading 360 °, wind from west) and descends with a flight path angle of minus 7.5 °.

USE OF FPV

The bird is the flying reference that should be used when flying a stabilized segment of trajectory, e.g.: non-precision approach when the FLS function ◁ is not used or visual circuit.

In dynamic manoeuvres, the bird is directly affected by the aircraft inertia and has a delayed reaction. As a result, the bird should not be used as a flight reference in dynamic manoeuvres. *Refer to FCTM/AS-BIRD Introduction* for more information.

GUIDANCE

Ident.: DSC-31-40-00001242.0001001 / 13 JAN 14
Applicable to: ALL

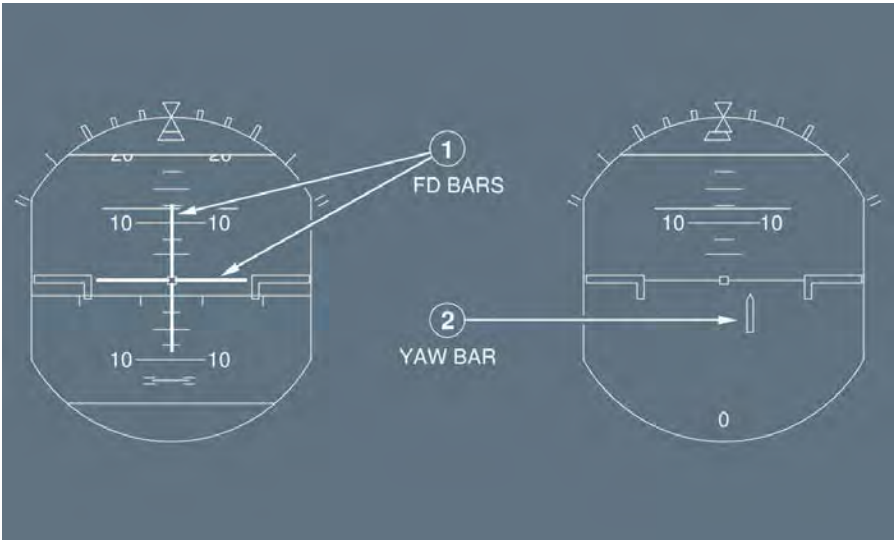
Two completely different flight director modes are available, each with its own characteristic symbols. The symbol displayed corresponds to the basic operating reference the pilot has selected – either HDG V/S or TRK FPA.
In normal operation, PFD1 displays FD1 orders.
If FD1 fails, PFD1 automatically displays FD2 orders on PFD1, the FD2 indication in the right column of the FMA flashes for a few seconds.
This is also applicable to FD2 orders, that are displayed on PFD2.

IF THE CREW HAS SELECTED HDG V/S TO BE THE BASIC REFERENCE:

The PFD displays FD bars in green. They automatically move out of view at touchdown in ROLL OUT mode.

They flash for 10 s, and then remain steady, if the following occur:
- A reversion to the HDG V/S basic mode (manual or automatic), or
- The selected flight level is changed, when ALT CAPTURE mode is engaged, or
- The loss of LOC or G/S in LAND mode or loss of LAND mode, or
- At the first AP or FD engagement.

The PFD displays a yaw bar in green below 30 ft radio height, if a localizer signal is available:
- During takeoff (in RWY mode)
- Upon landing (in FLARE and ROLL OUT mode).

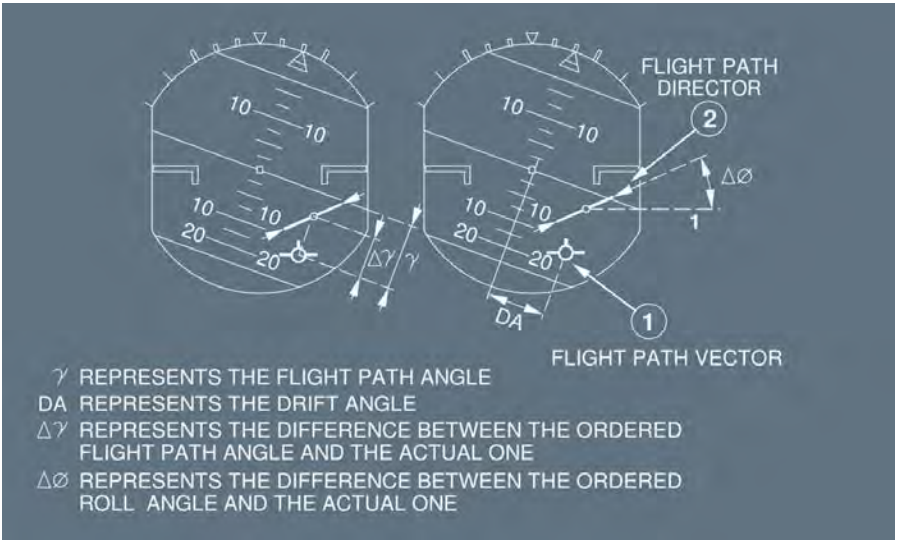


(1) FD Crossed Bars (green)

(2) Yaw Bar (green)

THE CREW HAS SELECTED TRK FPA AS THE BASIC REFERENCE:

An inertial flight path vector defines the aircraft's horizontal and vertical track, taking wind effect into account.
An associated flight path director symbol guides the flight crew onto the vertical and horizontal flight path targets.



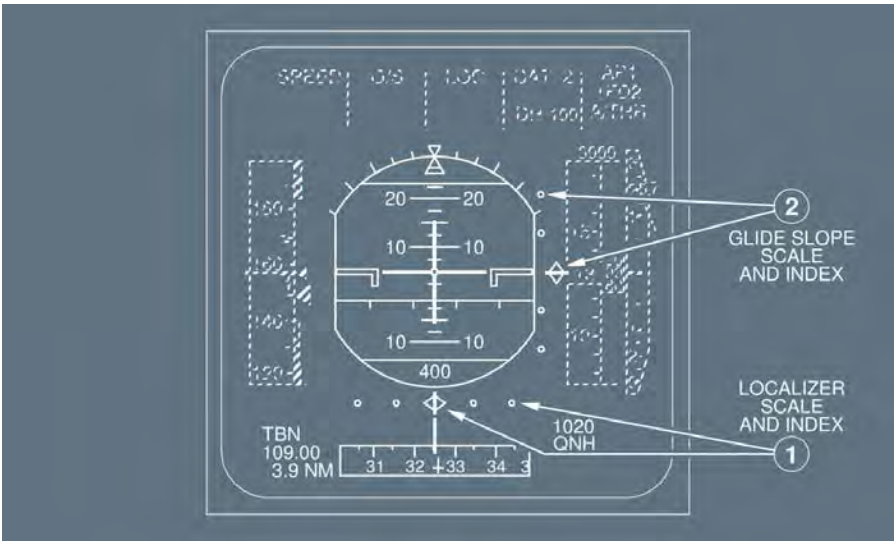
(1) Flight Path Vector (green)

(2) Flight Path Director (green)

TRAJECTORY DEVIATION

Ident.: DSC-31-40-A-00017532.0001001 / 21 MAR 16
Applicable to: ALL

ILS/GLS ◁ /MLS ◁ APPROACH



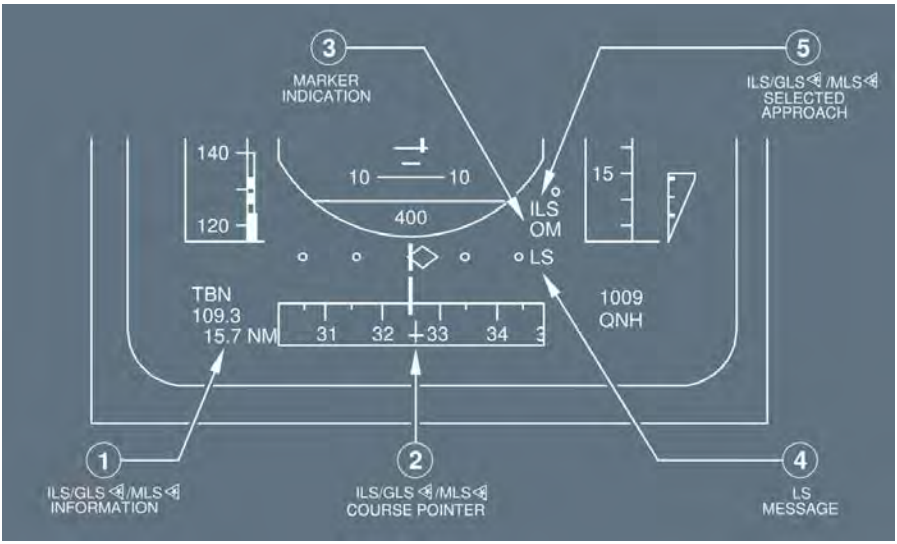
(1) Localizer Deviation Scale and Index

(2) Glide slope Deviation Scale and Index
Deviation scales appear as soon as the flight crew presses an LS/ILS pb on the EFIS control panel. Deviation indexes appear when the glide slope and localizer signals of the ILS/GLS ◁ (or the elevation and azimuth signals of the MLS ◁) are valid, if deviation scales are displayed.
When a deviation index is out of the displayed range, only half a symbol appears at the end of the scale.
The LOC scale flashes and continues to flash if the deviation exceeds 1/4 dot for two seconds while the aircraft is between 15 ft and 1 000 ft, and CAT2 or CAT3 capability displayed on the FMA, and either LOC, LAND, or FLARE is engaged. The glideslope scale flashes and continues to flash if the deviation exceeds one dot for two seconds (above 100 ft RA).
“LOC” and the glideslope scale half index symbols flash, and continue to flash, when the deviation exceeds two dots for two seconds.

One dot represents a deviation of ± 0.8 ° on the localizer scale, and ± 0.4 ° on the glideslope scale.

Ident.: DSC-31-40-A-00017533.0004001 / 21 MAR 16
Applicable to: MSN 3408-4547

ILS/GLS ⋖ /MLS ⋖ APPROACH (CONT'D)



(1) ILS/GLS ⋖ /MLS ⋖ information (magenta)

The following information appears on the PFD, when the crew has selected an ILS frequency/GLS channel/MLS channel and course, and pressed the LS pb:
- ILS/GLS/MLS identification, as decoded by the ILS/GLS/MLS receiver;
- ILS frequency/GLS channel/MLS channel;
- For ILS/MLS: DME distance, if the ILS/MLS has a DME. For GLS: distance to runway threshold computed by the MMR.

(2) ILS/GLS ⋖ /MLS ⋖ course Pointer (magenta)

This pointer appears on the PFD, when the crew has selected an ILS frequency/GLS channel/MLS channel and course, and pressed the LS pb.
It is a dagger-shaped symbol on the heading scale.
The ILS/GLS/MLS course pointer is replaced by digits on the right or left hand of the heading scale (in a white box) when the ILS/GLS/MLS course value is outside the displayed portion of the heading scale.

(3) Marker Indications

OM appears in blue, when the aircraft flies over the outer marker.
MM appears in amber, when it flies over the middle marker.
IM appears in white, when it flies over an airways marker beacon or the ILS/GLS ◁ inner marker.

(4) LS Message

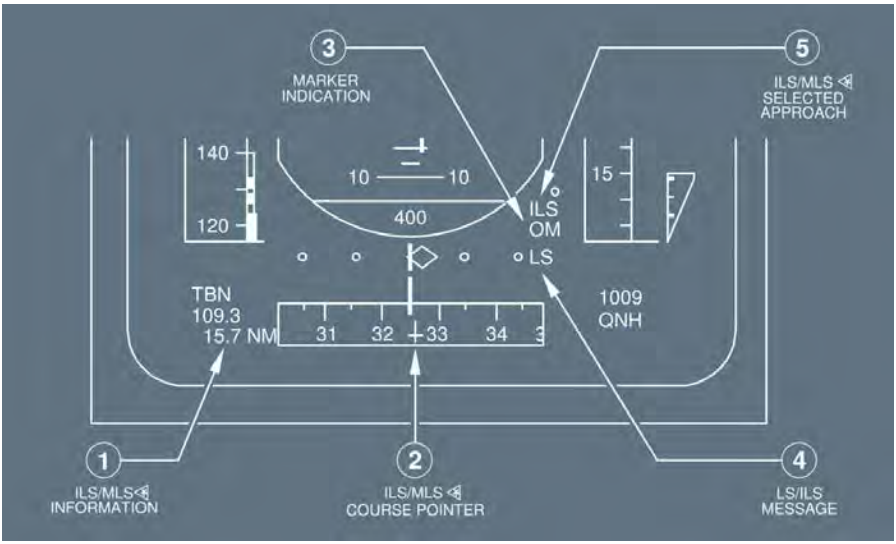
This flashes amber, when the APPR mode is armed, but the LS pb has not been selected.

(5) Selected approach

The ILS/GLS/MLS indication is displayed in magenta according to the approach selected by the crew.

Ident.: DSC-31-40-A-00017533.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

ILS/MLS ◁ APPROACH (CONT'D)



(1) ILS/MLS ◁ information (magenta)

The following information appears on the PFD, when the crew has selected an ILS frequency/MLS channel and course, and pressed the LS pb:
- ILS/MLS identification, as decoded by the ILS/MLS receiver;
- ILS frequency/MLS channel;
- DME distance, if the ILS/MLS has a DME

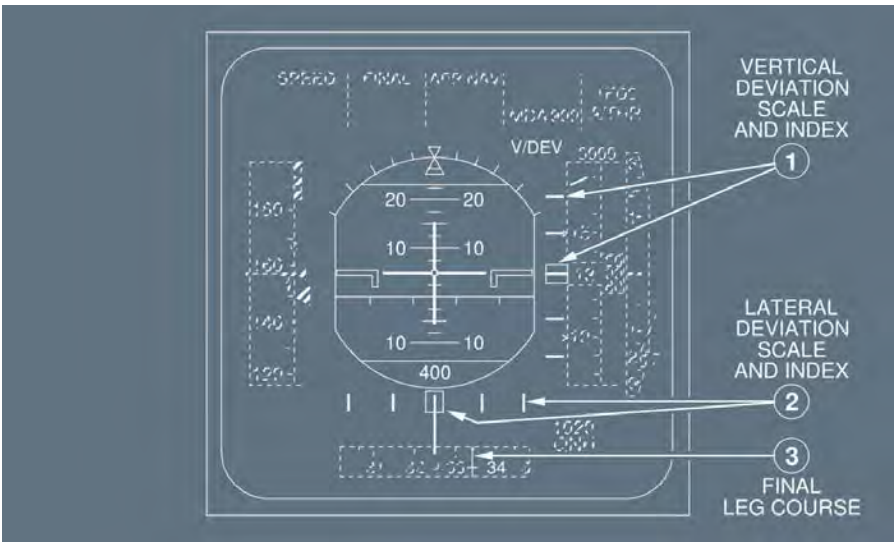
(2) ILS/MLS ◁ course Pointer (magenta)
This pointer appears on the PFD, when the crew has selected an ILS frequency/MLS channel and course, and pressed the LS pb.
It is a dagger-shaped symbol on the heading scale.
The ILS/MLS course pointer is replaced by digits on the right or left hand of the heading scale (in a white box) when the ILS/MLS course value is outside the displayed portion of the heading scale.

(3) Marker Indications
OM appears in blue, when the aircraft flies over the outer marker.
MM appears in amber, when it flies over the middle marker.
AWY appears in white, when it flies over an airways marker beacon or the ILS/MLS inner marker.

(4) LS/ILS Message
This flashes amber, when the APPR mode is armed, but the LS pb has not been selected.

(5) Selected approach
The ILS or MLS ◁ indication is displayed in magenta according to the approach selected by the crew.

RNP-RNAV NON PRECISION APPROACH



(1) Vertical Deviation Scale and Index

The vertical deviation is displayed if:
1. A non precision approach is entered in the Flight Plan
2. LS pb is not pressed
3. FINAL descent mode is armed or engaged
4. Approach phase is active or aircraft is in the FMS approach area (5 NM to the first approach waypoint).

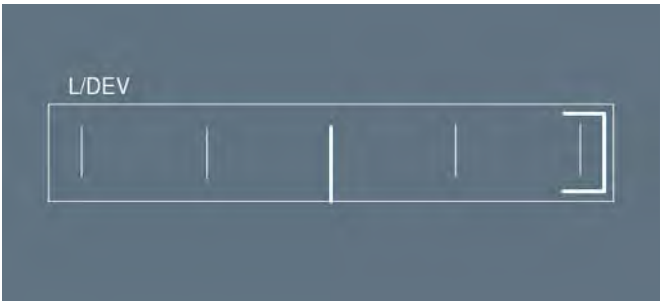
Each vertical deviation scale graduation represents 100 ft, the range being ± 200 ft. Vertical deviation index is displayed until MDA has been reached or MAP or RWY has sequenced.

(2) Lateral Deviation Scale and Index
The lateral deviation is displayed if:

1. LS pb is not pressed
2. GPS primary is installed
3. RNP is equal or less than 0.3
4. LDEV suits to RNP AR operations.

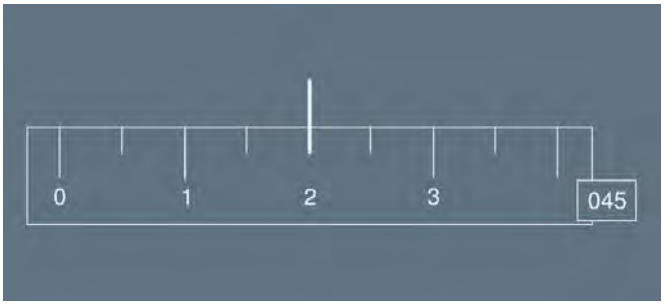
Each lateral deviation scale graduation represents 0.1 NM, the range being + or – 0.2 NM on each side. An index represents the lateral deviation, when the value is less than 0.2 NM. When out of range, the index is replaced by a half index at the scale limit.

Note: *The lateral deviation scale and index can also be displayed on takeoff and missed approach if the same conditions as above are met.*



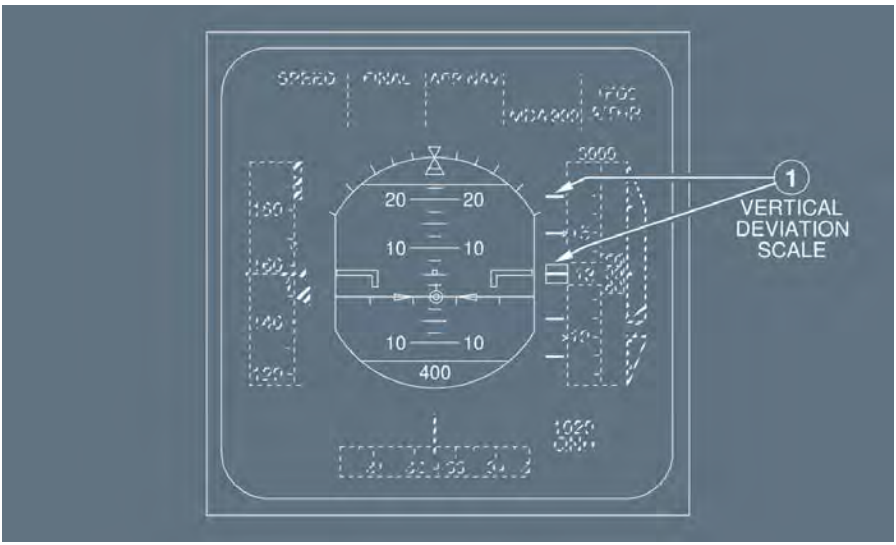
(3) FINAL Leg Course

The inbound course of the last approach leg is displayed on the heading scale in magenta. When outside the range, the symbol is replaced by a digital value in magenta, and located at the limit of the heading area.



Note: *If the LS pb is pressed, glide and LOC deviation has priority over vertical and lateral deviation information. As long as VDEV and L/DEV display conditions are met, and the LS pb is selected, an amber VDEV and L/DEV message flashes above the glide scale.*

NON PRECISION APPROACH

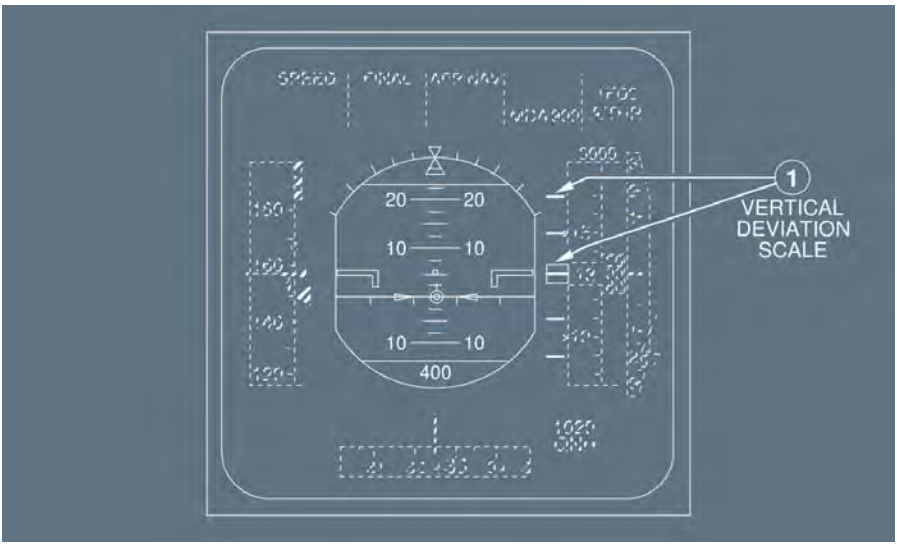


(1) Vertical Deviation Scale and Index

These symbols appear when in the approach phase and, when either FINAL is armed/engaged or a non-LS approach has been entered. They are displayed in the approach or go-around phase, until the MDA has been reached, or the MAP or the runway has been sequenced. They give the vertical deviation from the trajectory defined by the FMGC. Each index scale graduation represents 100 ft. The range is ± 200 ft.

Note: *If the LS pb is pressed, glide deviation has priority over vertical deviation information. As long as VDEV display conditions are met, and the LS pb is selected, an amber VDEV message flashes above the glide scale.*

NON PRECISION APPROACH



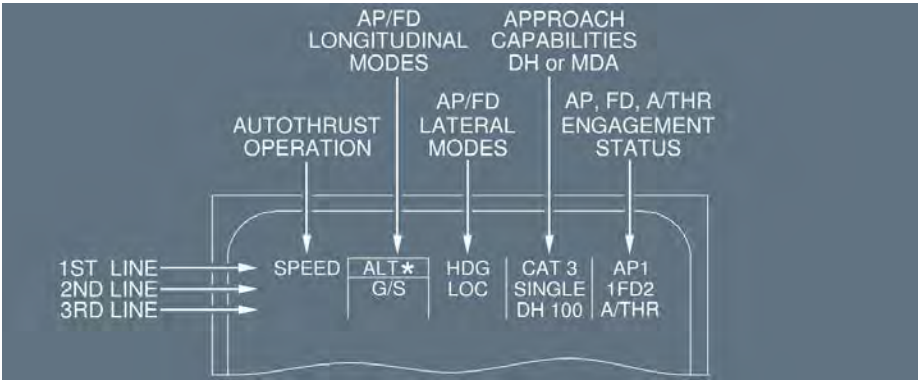
(1) Vertical Deviation Scale and Index

These symbols appear when in the approach phase and, when either FINAL is armed/engaged or a non-LS approach has been entered. They are displayed in the approach or go-around phase, until the MDA has been reached, or the MAP or the runway has been sequenced. They give the vertical deviation from the trajectory defined by the FMGC. Each index scale graduation represents 100 ft. The range is ± 200 ft.

Note: If the LS pb is pressed, glide deviation has priority over vertical deviation information. As long as VDEV display conditions are met, and the LS pb is selected, an amber VDEV message flashes above the glide scale.

FLIGHT MODE ANNUNCIATOR

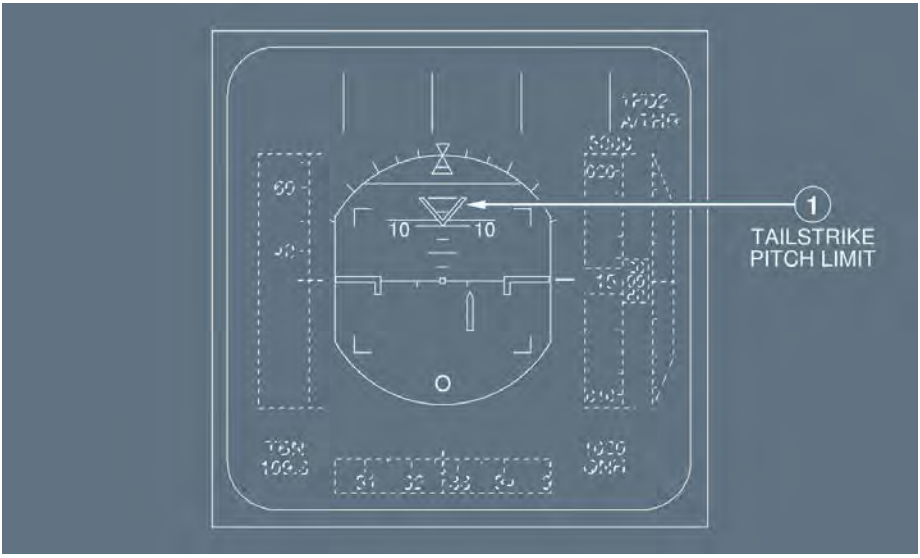
Ident.: DSC-31-40-00001246.0002001 / 09 OCT 12
Applicable to: ALL



For a detailed discussion of legends and messages that may appear during FMGS operations, see FLIGHT GUIDANCE chapter (*Refer to DSC-22_30-100 Flight Mode Annunciator (FMA) - General*).

TAILSTRIKE PITCH LIMIT INDICATOR

Ident.: DSC-31-40-00017534.0003001 / 21 MAR 16
Applicable to: ALL

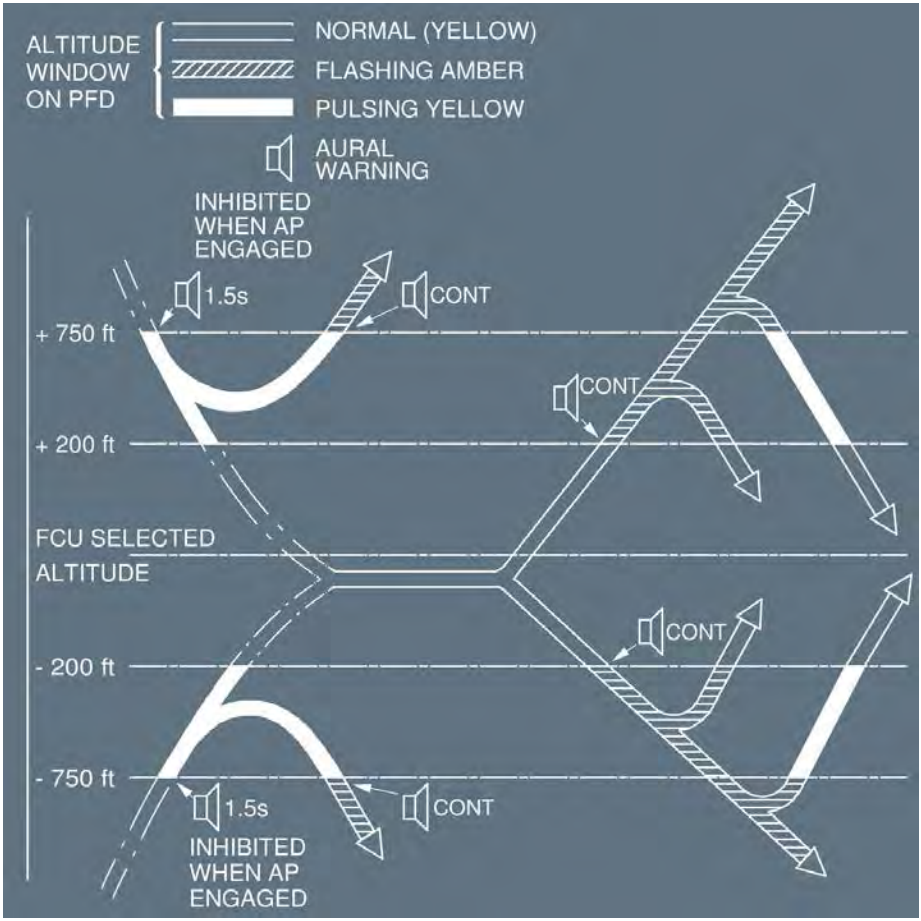


(1) Tailstrike Pitch Limit
The pitch limit indicates the maximum pitch attitude to avoid the tailstrike risk at landing. The indication is a fixed value corresponding to the main landing gear compressed. The indication appears at 400 ft radio height. The indication disappears, when there is no longer a risk of tailstrike.

ALTITUDE ALERT

Ident.: DSC-31-40-00001247.0002001 / 22 MAY 12
Applicable to: ALL

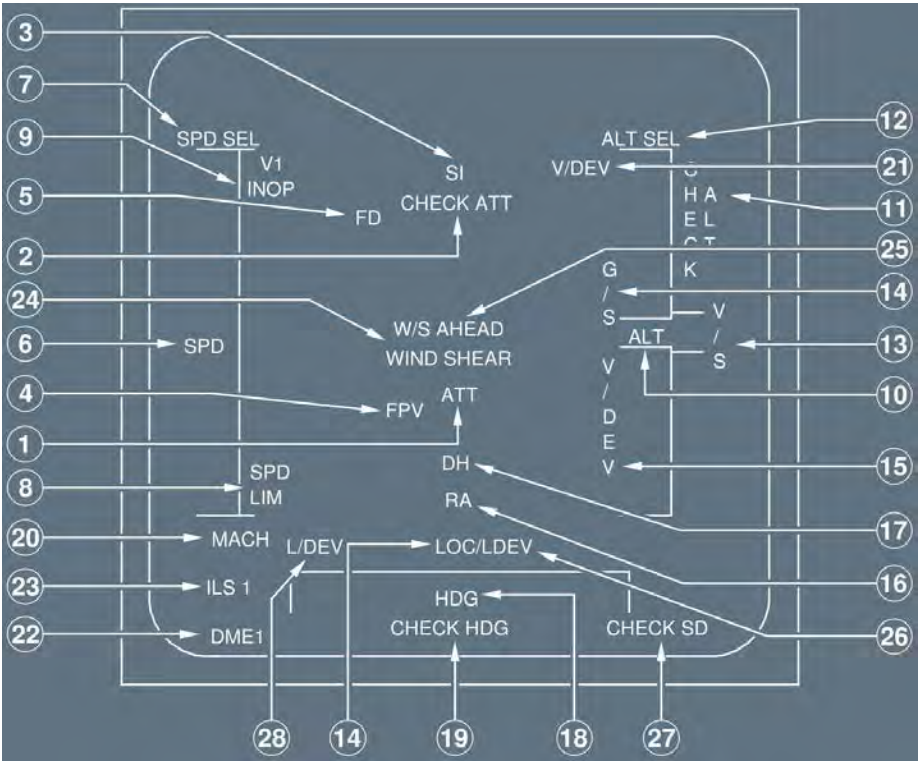
The FWC generates an altitude warning (C chord sound and PFD's altitude window pulses in yellow or flashes in amber), when the aircraft approaches a preselected altitude or flight level, or when it deviates from its selected altitude or flight level.
This warning results from a comparison between the altitude (ADIRS) and the preselected altitude displayed on FCU.



- Selecting a new altitude, or pushing the ECAM's EMER CANC pushbutton, or pressing either MASTER WARN pushbutton, cancels the continuous C chord.
- Selecting a new altitude stops the flashing of the altitude window.
- The altitude alert is inhibited:
  - When the slats are out, with the landing gear is selected down, or
  - In approach after the aircraft captures the glideslope, or
  - When the landing gear is locked down.

FLAGS AND MESSAGES DISPLAYED ON PFD

Ident.: DSC-31-40-00001248.0090001 / 21 MAR 17
Applicable to: MSN 3467



(1) ATT flag (red)
If the PFD loses all attitude data, its entire sphere is cleared to display the ATT flag.

(2) CHECK ATT, CHECK CAPT (F/O) PFD, CHECK EWD, DU NOT MONITORED (amber)
For CHECK ATT, *Refer to DSC-31-05-60 Side1/Side2 Discrepancy Messages*
For more information, *Refer to DSC-31-05-10 Introduction*

(3) SI flag (red)
If the sideslip information is lost or any reverse is deployed in flight, the index disappears and a red SI flag appears.

(4) FPV flag (red)
In the TRK FPA mode, when the drift angle or flight path angle is not valid, an FPV flag appears.

(5) FD flag (red)
If both FMGCs fail, or if both FDs are disengaged and the FD pb is on and the attitude is valid, a red FD flag appears.

(6) SPD flag (red)
If the speed information fails, a SPD flag replaces the speed scale.

(7) SPD SEL flag (red)
If the selected speed information fails, a SPD SEL flag appears.

(8) SPD LIM flag (red)
This flag appears when both FACs are inoperative, or in case of SFCC dual flap/slat channel failure.
In this case, the following PFD information is lost : VLS, S, F, Green Dot, Vtrend, Vmax, VFE next, VSW.

(9) V1 INOP flag (red)
When the V1 signal is not valid, a V1 INOP flag replaces the digital value.

(10) ALT flag (red)
If the altitude information fails, the ALT flag replaces the altitude scale.

(11) CHECK ALT flag (amber)
For more information, *Refer to DSC-31-05-60 Side1/Side2 Discrepancy Messages*

(12) ALT SEL flag (red)
If the selected altitude information fails, an ALT SEL flag appears.

(13) V/S flag (red)
If the vertical speed information fails, the V/S flag replaces the vertical speed scale.

(14) LOC and G/S flags (red)
If the localizer or glideslope receiver fails, a LOC or G/S flag appears on the deviation scale.

(15) VDEV flag (red)
If the vertical deviation information fails, and the LS pb is not pressed, a VDEV flag replaces the VDEV scale.

(16) RA flag (red)
If both radio altimeters fail, this flag appears in place of the radio height indication.

(17) DH flag (amber)
A DH flag appears, when the aircraft reaches the selected DH.

(18) HDG flag (red)
If the heading information fails, the HDG flag replaces the heading scale.

(19) CHECK HDG flag (amber)
For more information, *Refer to DSC-31-05-60 Side1/Side2 Discrepancy Messages*

(20) MACH flag (red)
This flag appears, if the Mach data fails.

(21) VDEV (amber)
At the top of the glide scale, this message flashes when either the FINAL mode is armed/engaged and the LS pb is selected.

(22) DME 1 flag (red)
When the DME distance is not valid, a DME1 (on PFD1) or DME2 (on PFD2) flag replaces the DME distance indication.

(23) ILS1 flag (red)
If an ILS frequency fails, or if either the LOC or G/S signals fail, an ILS1 (on PFD1) or ILS2 (on PFD2) flag replaces the ILS frequency indication.

(24) WINDSHEAR warning (red)
This message is displayed, when windshear is detected (reactive windshear warning) by the FAC.
Refer to DSC-22_40-40 Windshear Detection Function

(25) W/S AHEAD
This message is displayed, when the predictive windshear system has detected windshear ahead of the aircraft.
The message is in amber or red, depending on the alert level.
Refer to DSC-34-SURV-30-20 Windshear Alerts Inhibition

(26) L/DEV flag (red)
When the crosstrack error is not valid, a L/DEV flag is displayed in red instead of the lateral deviation scale.

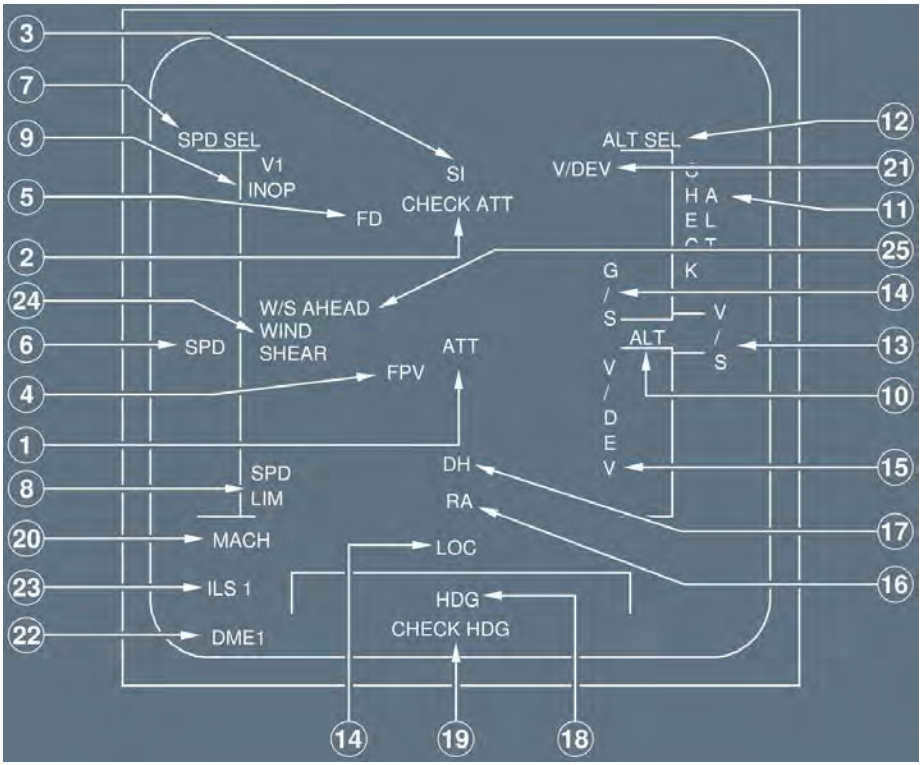
(27) CHECK SD, CHECK CAPT (F/O) ND (amber)
For more information, *Refer to DSC-31-05-10 Introduction*

(28) L/DEV (amber)
At the top left of the LOC scale, this message flashes when the FINAL mode is armed/engaged, and the LS pb is selected.

Note: *1. All flags, except, V1 INOP which is steady, flash for 9 s, then remain steady.*
2. For information on the TCAS flag, Refer to DSC-34-SURV-60-20 PFD Indications.

FLAGS AND MESSAGES DISPLAYED ON PFD

Ident.: DSC-31-40-00001248.0009001 / 21 MAR 17
Applicable to: MSN 1882-2078



(1) ATT flag (red)
If the PFD loses all attitude data, its entire sphere is cleared to display the ATT flag.

(2) CHECK ATT (amber)
"CHECK ATT" appears, when there is a disagreement (of a least 5 °) between the attitude information displayed by the two PFDs. The CHECK ATT flag appears on both PFDs, and a caution appears on the ECAM.

(3) SI flag (red)
If the sideslip information is lost or any reverse is deployed in flight, the index disappears and a red SI flag appears.

(4) FPV flag (red)
In the TRK FPA mode, when the drift angle or flight path angle is not valid, an FPV flag appears.

(5) FD flag (red)
If both FMGCs fail, or if both FDs are disengaged and the FD pushbutton is on and the attitude is valid, a red FD flag appears.

(6) SPD flag (red)
If the speed information fails, a SPD flag replaces the speed scale.

(7) SPD SEL flag (red)
If the selected speed information fails, a SPD SEL flag appears.

(8) SPD LIM flag (red)
This flag appears when both FACs are inoperative, or in case of SFCC dual flap/slat channel failure.
In this case, the following PFD information is lost : VLS, S, F, Green Dot, Vtrend, VMAX, VFE next, VSW.

(9) V1 INOP flag (red)
When the V1 signal is not valid, a V1 INOP flag replaces the digital value.

(10) ALT flag (red)
If the altitude information fails, the ALT flag replaces the altitude scale.

(11) CHECK ALT flag (amber)
The CHECK ALT flag appears, as does an ECAM caution, if the disagree between the two PFD altitude indications is greater than 250 ft when QNH is selected, or 500 ft when STD is selected.
The caution and the flag disappear, when the Pilot's and the Co-pilot's barometer references disagree.

(12) ALT SEL flag (red)
If the selected altitude information fails, an ALT SEL flag appears.

(13) V/S flag (red)
If the vertical speed information fails, the V/S flag replaces the vertical speed scale.

(14) LOC and G/S flags (red)
If the localizer or glideslope receiver fails, a LOC or G/S flag appears on the deviation scale.

(15) VDEV flag (red)
If the vertical deviation information fails, and the LS pb is not pressed, a VDEV flag replaces the VDEV scale.

(16) RA flag (red)
If both radio altimeters fail, this flag appears in place of the radio height indication.

(17) DH flag (amber)
A DH flag appears, when the aircraft reaches the selected DH.

(18) HDG flag (red)
If the heading information fails, the HDG flag replaces the heading scale.

(19) CHECK HDG flag (amber)
The CHECK HDG flag appears, as does an ECAM caution, if there is a discrepancy (5 °) between pilots's, and copilot's heading indications.

(20) MACH flag (red)
This flag appears, if the Mach data fails.

(21) VDEV (amber)
At the top of the glide scale, this message flashes in approach phase and, when either the FINAL mode is armed/engaged, or a non-LS approach has been selected, and the LS pushbutton is selected.

(22) DME 1 flag (red)
When the DME distance is not valid, a DME1 (on PFD1) or DME2 (on PFD2) flag replaces the DME distance indication.

(23) ILS1 flag (red)
If an ILS frequency fails, or if either the LOC or G/S signals fail, an ILS1 (on PFD1) or ILS2 (on PFD2) flag replaces the ILS frequency indication.

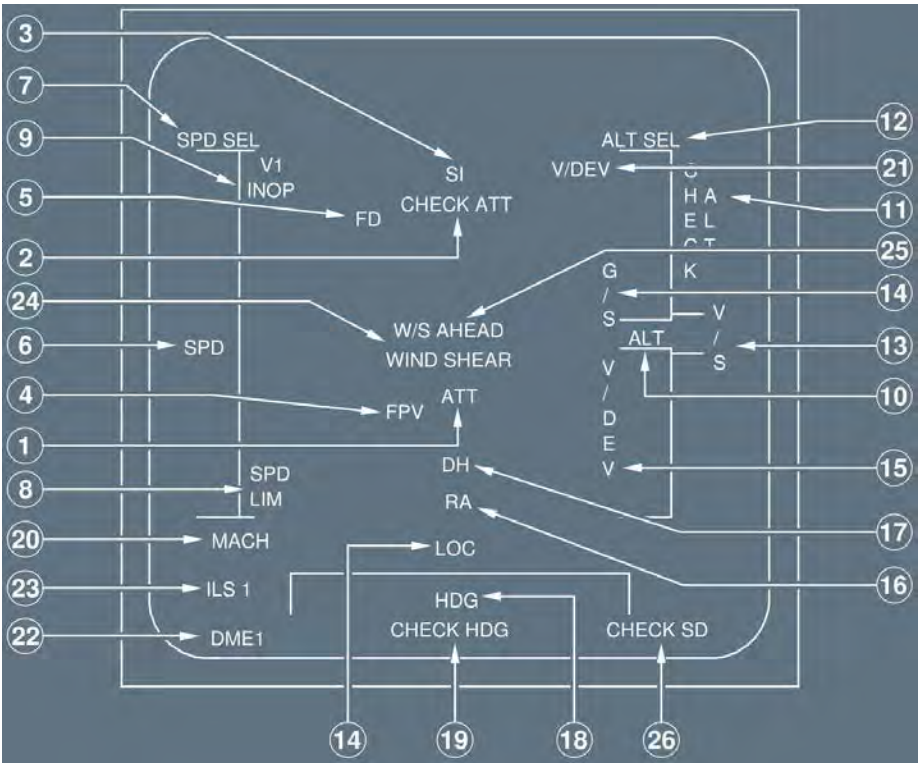
(24) WINDSHEAR warning (red)
This message is displayed, when windshear is detected (reactive windshear warning) by the FAC.
Refer to DSC-22_40-40 Windshear Detection Function

(25) W/S AHEAD
This message is displayed, when the predictive windshear system has detected windshear ahead of the aircraft.
The message is in amber or red, depending on the alert level.
Refer to DSC-34-SURV-30-20 Windshear Alerts Inhibition

Note: *1. All flags, except SI, V1 INOP and DME 1 which are steady, flash for 9 s, then remain steady.*
The DH flag flashes for 3 s, then remains steady.
2. For information on the TCAS flag, Refer to DSC-34-SURV-60-10 TCAS Modes.

FLAGS AND MESSAGES DISPLAYED ON PFD

Ident.: DSC-31-40-00001248.0012001 / 21 MAR 17
Applicable to: MSN 3408, 3518-4547



(1) ATT flag (red)
If the PFD loses all attitude data, its entire sphere is cleared to display the ATT flag.

(2) CHECK ATT, CHECK CAPT (F/O) PFD, CHECK EWD, DU NOT MONITORED (amber)
For CHECK ATT, *Refer to DSC-31-05-60 Side1/Side2 Discrepancy Messages*
For more information, *Refer to DSC-31-05-10 Introduction*

(3) SI flag (red)
If the sideslip information is lost or any reverse is deployed in flight, the index disappears and a red SI flag appears.

(4) FPV flag (red)
In the TRK FPA mode, when the drift angle or flight path angle is not valid, an FPV flag appears.

(5) FD flag (red)
If both FMGCs fail, or if both FDs are disengaged and the FD pushbutton is on and the attitude is valid, a red FD flag appears.

(6) SPD flag (red)
If the speed information fails, a SPD flag replaces the speed scale.

(7) SPD SEL flag (red)
If the selected speed information fails, a SPD SEL flag appears.

(8) SPD LIM flag (red)
This flag appears when both FACs are inoperative, or in case of SFCC dual flap/slat channel failure.
In this case, the following PFD information is lost : VLS, S, F, Green Dot, Vtrend, Vmax, VFE next, VSW.

(9) V1 INOP flag (red)
When the V1 signal is not valid, a V1 INOP flag replaces the digital value.

(10) ALT flag (red)
If the altitude information fails, the ALT flag replaces the altitude scale.

(11) CHECK ALT flag (amber)
For more information, *Refer to DSC-31-05-60 Side1/Side2 Discrepancy Messages*

(12) ALT SEL flag (red)
If the selected altitude information fails, an ALT SEL flag appears.

(13) V/S flag (red)
If the vertical speed information fails, the V/S flag replaces the vertical speed scale.

(14) LOC and G/S flags (red)
If the localizer or glideslope receiver fails, a LOC or G/S flag appears on the deviation scale.

(15) VDEV flag (red)
If the vertical deviation information fails, and the LS pb is not pressed, a VDEV flag replaces the VDEV scale.

(16) RA flag (red)
If both radio altimeters fail, this flag appears in place of the radio height indication.

(17) DH flag (amber)
A DH flag appears, when the aircraft reaches the selected DH.

(18) HDG flag (red)
If the heading information fails, the HDG flag replaces the heading scale.

(19) CHECK HDG flag (amber)
For more information, *Refer to DSC-31-05-60 Side1/Side2 Discrepancy Messages*

(20) MACH flag (red)
This flag appears, if the Mach data fails.

(21) VDEV (amber)
At the top of the glide scale, this message flashes in approach phase and, when either the FINAL mode is armed/engaged, or a non-LS approach has been selected, and the LS pushbutton is selected.

(22) DME 1 flag (red)
When the DME distance is not valid, a DME1 (on PFD1) or DME2 (on PFD2) flag replaces the DME distance indication.

(23) ILS1 flag (red)
If an ILS frequency fails, or if either the LOC or G/S signals fail, an ILS1 (on PFD1) or ILS2 (on PFD2) flag replaces the ILS frequency indication.

(24) WINDSHEAR warning (red)
This message is displayed, when windshear is detected (reactive windshear warning) by the FAC.
Refer to DSC-22_40-40 Windshear Detection Function

(25) W/S AHEAD
This message is displayed, when the predictive windshear system has detected windshear ahead of the aircraft.
The message is in amber or red, depending on the alert level.
Refer to DSC-34-SURV-30-20 Windshear Alerts Inhibition

Note: 1. All flags, except, V1 INOP which is steady, flash for 9 s, then remain steady.
2. For information on the TCAS flag, Refer to DSC-34-SURV-60-20 PFD Indications.

(26) CHECK SD, CHECK CAPT (F/O) ND (amber)
For more information, *Refer to DSC-31-05-10 Introduction*.

BACKUP SPEED/ALTITUDE SCALE

Applicable to: MSN 4487-4547

Ident.: DSC-31-40-B-00019127.0001001 / 16 MAY 17

GENERAL

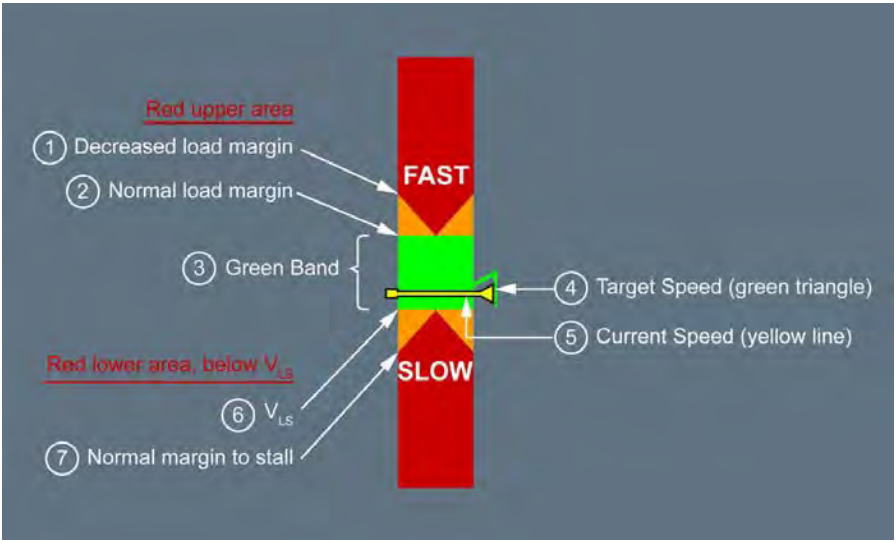
The BackUp Speed Scale (BUSS) enables to fly the aircraft when airspeed indications are unreliable.

When the BUSS is activated:
- The BUSS replaces the normal speed,
- The GPS altitude replaces the barometric altitude scales.

The BUSS is displayed on both PFDs when the flight crew turn off all ADRs.
The activation of this BUSS is not reversible.
The BUSS information is based on the angle of attack (AOA), and depends on the slat/flap configuration.

Ident.: DSC-31-40-B-00019128.0001001 / 21 MAR 16

BACKUP SPEED SCALE



(1) Red FAST area
This area indicates the excessive speed range while decreasing the margin to the maximum structural speed.

(2) Amber FAST area
This area indicates the excessive speed range while keeping an appropriate margin to the maximum structural speed.

(3) Green area
The green area indicates the safe speed range.

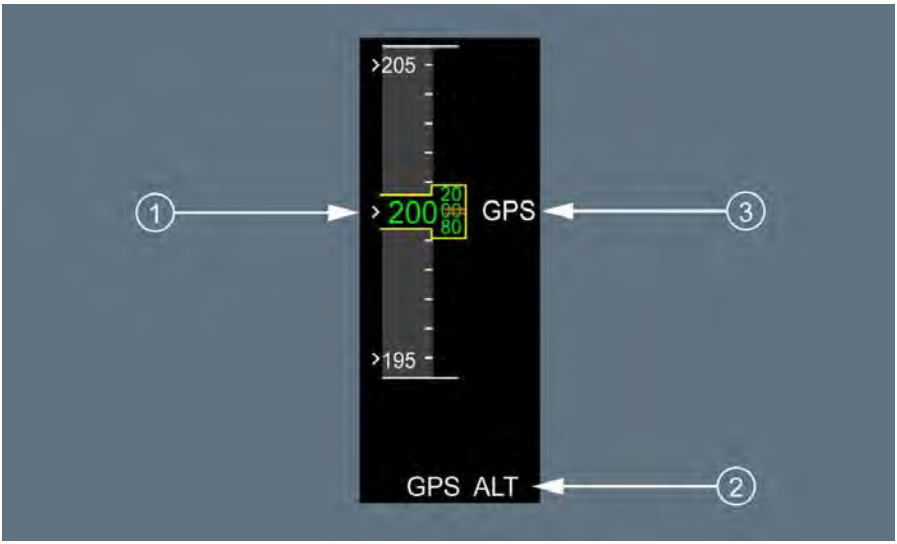
(4) Target speed (green triangle)
This symbol indicates the optimum target speed.
During the approach, it indicates the target speed for the approach.

(5) Actual speed reference (yellow line)
This line indicates the current speed of the aircraft.

(6) Amber SLOW area
This area indicates the too low speed range while keeping an appropriate margin to the stall speed.

(7) Red SLOW area
This area indicates the too low speed range while reducing the margin to the stall speed.

BACKUP ALTITUDE SCALE



(1) Current GPS altitude
Two amber dashes cover the last two digits.

(2) GPS ALT flag
This flag indicates that the barometric altitude is replaced by the GPS altitude.

(3) GPS flag (displayed depending of the aircraft configuration)
This flag indicates that the barometric altitude is replaced by the GPS altitude.

Note: *The vertical speed indication is no longer displayed.*

GENERAL

Ident.: DSC-31-45-00001249.0002001 / 24 FEB 11
Applicable to: MSN 1882-2078

There are five different displays (five modes to display navigation information):
- ROSE LS
- ROSE VOR
- ROSE NAV
- ARC
- PLAN

The Navigation Display (ND) can provide a weather radar image in all modes, except PLAN.

Note: *In case avionics ventilation is not sufficient (e.g. due to a blower and extract fan failure), and the Navigation Display (ND) Unit temperature exceeds a defined threshold, the ND will not display the weather radar image, in order to limit power consumption and prevent a DU overheat. Any additional increase in temperature will lead to a complete cut off of the power supply to this display unit.*

GENERAL

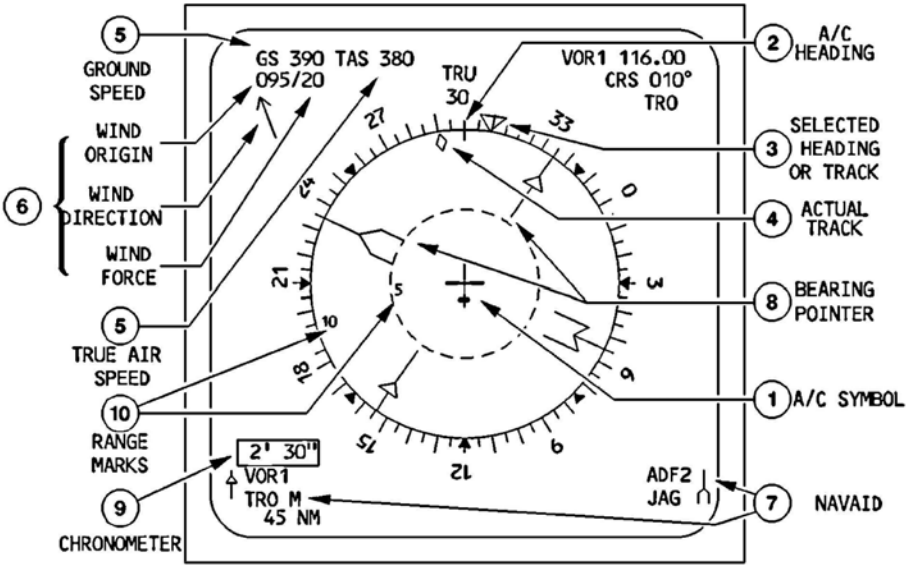
Ident.: DSC-31-45-00001249.0003001 / 21 MAR 16
Applicable to: MSN 3408-4547

There are five different displays (five modes to display navigation information) :
- ROSE LS
- ROSE VOR
- ROSE NAV
- ARC
- PLAN

The Navigation Display (ND) can provide a weather radar image in all modes, except PLAN.

ROSE MODES

Ident.: DSC-31-45-00001250.0001001 / 19 MAY 14
Applicable to: MSN 1882-2078



(1) Aircraft symbol (yellow)
Fixed and centered in the display, this symbol points to the yellow lubber line.

(2) Aircraft heading
The fixed yellow lubber line points to the aircraft magnetic heading on the moving white compass rose. Small white triangles are fixed at 45 ° intervals on the circumference of the compass rose.
"TRU" appears at the top of the compass rose, when it is displaying true heading instead of magnetic heading (latitude above 73 ° North or 60 ° South).

(3) Selected heading or track (blue)
This pointer shows the heading or track indicated on the FCU's HDG TRK counter.

(4) Actual aircraft track (green)
This symbol is a small green diamond.

(5) Ground speed and true air speed (green)
ADIRS furnishes these speeds.

(6) Wind direction and speed

ADIRS provides the wind direction and speed. The digital direction reflects the true north reference, and the analog direction (indicated by the green arrow) reflects the magnetic north reference. The green arrow only appears, if the wind speed is above two knots.
If the display does not receive either wind speed or direction, dashes replace the numbers on the display.

(7) NAVAIDs

When the ADF-OFF-VOR selector switch on either the pilot's or copilot's EFIS control panel is set to ADF or VOR, the onside ND displays the following characteristics of the corresponding NAVAID in white for VOR or in green for ADF (left side for receiver 1 and right side for receiver 2):

- Type of NAVAID (ADF or VOR)
- Shape and color of the associated bearing pointer (if the bearing pointer is in view).
- NAVAID identification (or frequency by default)
- DME distance if a DME is collocated with the selected VOR. ADF and DME distance are never displayed at the same time.
- Mode of tuning
  - M for a NAVAID tuned manually by the pilot through the MCDU (underlined and dimmed),
  - R for a NAVAID tuned from an RMP (Radio Management Panel) (underlined and dimmed),
  - Nothing for a NAVAID tuned automatically by the FMGC.

If reception fails, the ND stops displaying the associated data (except for the identification or frequency).

(8) Bearing pointer (green for ADF, white for VOR)

This pointer appears when bearing data is available.
If the aircraft is not receiving the beacon or if a receiver fails, the associated bearing pointer disappears.

(9) Chronometer Indication (white)

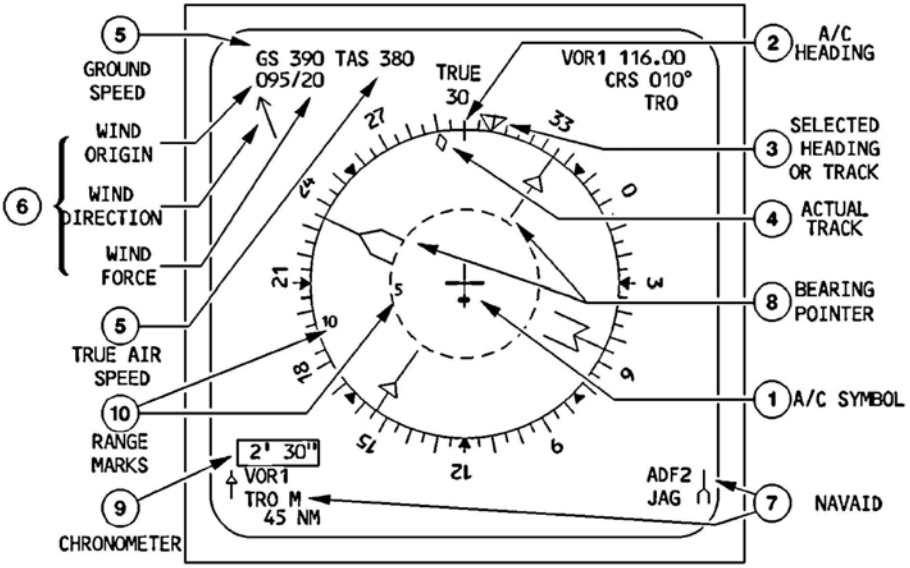
These numbers appear when the onside chronometer is started.
They display the elapsed time.
The indication is in minutes and seconds from 0 to 59 min 59 s, and in hours and minutes from 1 h to 99 h 59 min (Seconds are not displayed beyond 59 min 59 s.).

(10) Range marks

The range scale value selected on the EFIS control panel (10 to 320 NM) governs the scale of the ND.

ROSE MODES

Ident.: DSC-31-45-00001250.0002001 / 19 MAY 14
Applicable to: MSN 3408-4547



(1) Aircraft symbol (yellow)
Fixed and centered in the display, this symbol points to the yellow lubber line.

(2) Aircraft heading
The fixed yellow lubber line points to the aircraft magnetic heading on the moving white compass rose. Small white triangles are fixed at 45 ° intervals on the circumference of the compass rose.
"TRUE" appears at the top of the compass rose, when it is displaying true heading instead of magnetic heading (latitude above 73 ° North or 60 ° South).

(3) Selected heading or track (blue)
This pointer shows the heading or track indicated on the FCU's HDG TRK counter.

(4) Actual aircraft track (green)
This symbol is a small green diamond.

(5) Ground speed and true air speed (green)
ADIRS furnishes these speeds.

(6) Wind direction and speed

ADIRS provides the wind direction and speed. The digital direction and the analog direction (indicated by the green arrow) both reflect the true north reference. The green arrow only appears, if the wind speed is above two knots.

If the display does not receive either wind speed or direction, dashes replace the numbers on the display.

(7) NAVAIDs

When the ADF-OFF-VOR selector switch on either the pilot's or copilot's EFIS control panel is set to ADF or VOR, the onside ND displays the following characteristics of the corresponding NAVAID in white for VOR or in green for ADF (left side for receiver 1 and right side for receiver 2):

- Type of NAVAID (ADF or VOR)
- Shape and color of the associated bearing pointer (if the bearing pointer is in view).
- NAVAID identification (or frequency by default)
- DME distance if a DME is collocated with the selected VOR. ADF and DME distance are never displayed at the same time.
- Mode of tuning
  - M for a NAVAID tuned manually by the pilot through the MCDU (underlined and dimmed),
  - R for a NAVAID tuned from an RMP (Radio Management Panel) (underlined and dimmed),
  - Nothing for a NAVAID tuned automatically by the FMGC.

If reception fails, the ND stops displaying the associated data (except for the identification or frequency).

(8) Bearing pointer (green for ADF, white for VOR)

This pointer appears when bearing data is available.

If the aircraft is not receiving the beacon or if a receiver fails, the associated bearing pointer disappears.

(9) Chronometer Indication (white)

These numbers appear when the onside chronometer is started.

They display the elapsed time.

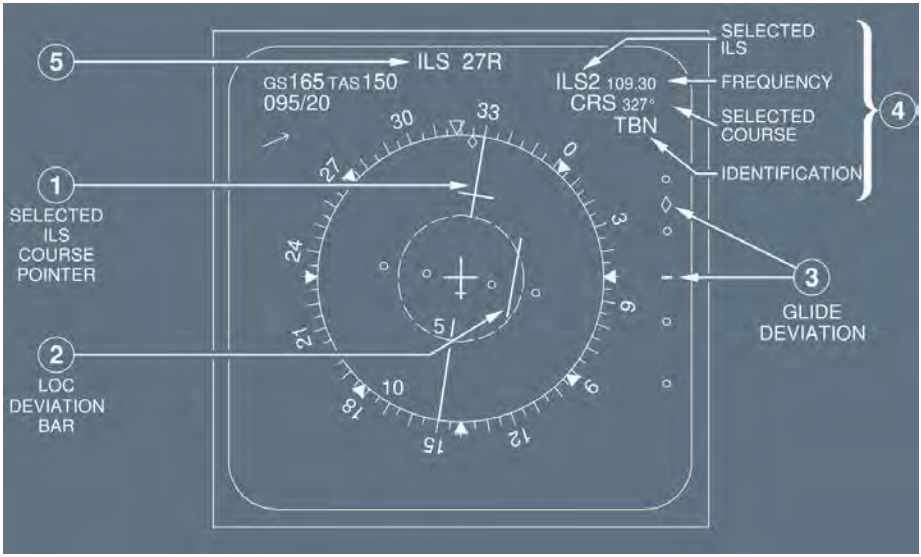
The indication is in minutes and seconds from 0 to 59 min 59 s, and in hours and minutes from 1 h to 99 h 59 min (Seconds are not displayed beyond 59 min 59 s).

(10) Range marks

The range scale value selected on the EFIS control panel (10 to 320 NM) governs the scale of the ND.

ROSE LS MODE

Ident.: DSC-31-45-00009584.0065001 / 24 NOV 15
Applicable to: ALL



(1) ILS Course Pointer (Magenta)
This symbol points at the selected ILS course.
The ILS is either selected by the FMGC (autotuned or manually) or manually selected by the flight crew via the RMP backup mode. If no course has been entered, the default value is 360 °.

(2) Localizer Deviation Bar (Magenta)
This bar moves laterally with respect to the course pointer. Its scale has two white dots on each side of the zero deviation. Each dot corresponds to a deviation of approximately ±0.8 °.
If the lateral deviation exceeds 1/4 dot (0.2 °) above 15 ft RA, both the bar and the scale flash.

(3) Glide Deviation (Magenta)
This diamond moves on a vertical scale that has two white dots on each side of the yellow reference line. Each dot corresponds to a deviation of approximately ±0.4 °.
If the deviation exceeds one dot above 100 ft RA, both the scale and the diamond flash.

(4) Selected ILS Information
This area displays the ILS frequency (magenta), selected course (magenta), and identification (magenta).

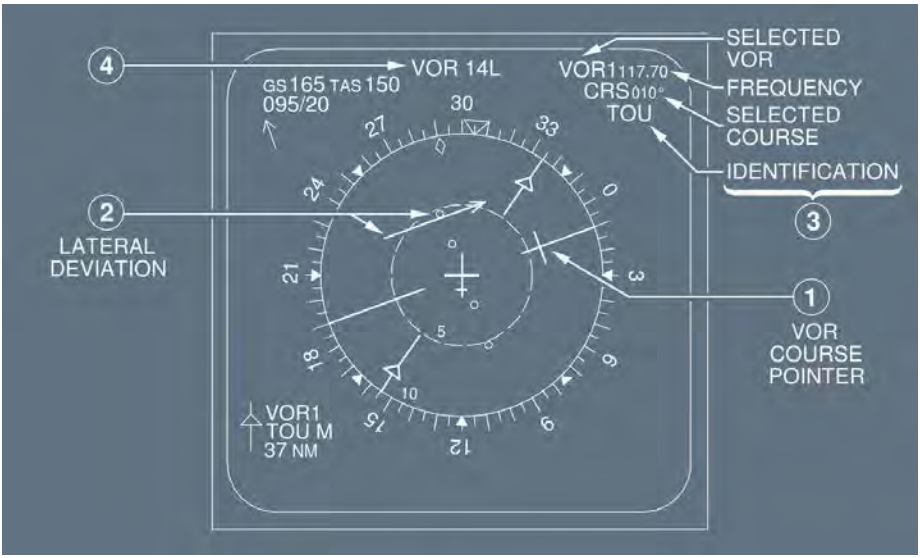
(5) ILS Message (Green)

This message indicates the full runway name of the selected approach. This message appears:
- The flight crew selects an ILS approach on the MCDU, and
- The FMS flight phase is DES, APP or GA, or the FMS phase is CRZ and the along track distance to destination is less than 250 NM.

Note: ILS 1 information appears on PFD 1 and ND 2.
ILS 2 information appears on PFD 2 and ND 1.

ROSE VOR MODE

Ident.: DSC-31-45-00001252.0029001 / 05 NOV 15
Applicable to: ALL



(1) VOR Course Pointer (Cyan)
This symbol points at the selected VOR course.
The VOR course is either automatically selected by the FMGC or manually selected by the flight crew via the MCDU pages or the RMP backup mode.

(2) Lateral Deviation Bar (Cyan)
This bar indicates the VOR deviation on a lateral scale.
Each dot corresponds to 5 ° of lateral deviation. When the lateral deviation exceeds 10 °, the bar remains displayed on the outer dot.

The arrow on the bar provides the TO/FROM indication.

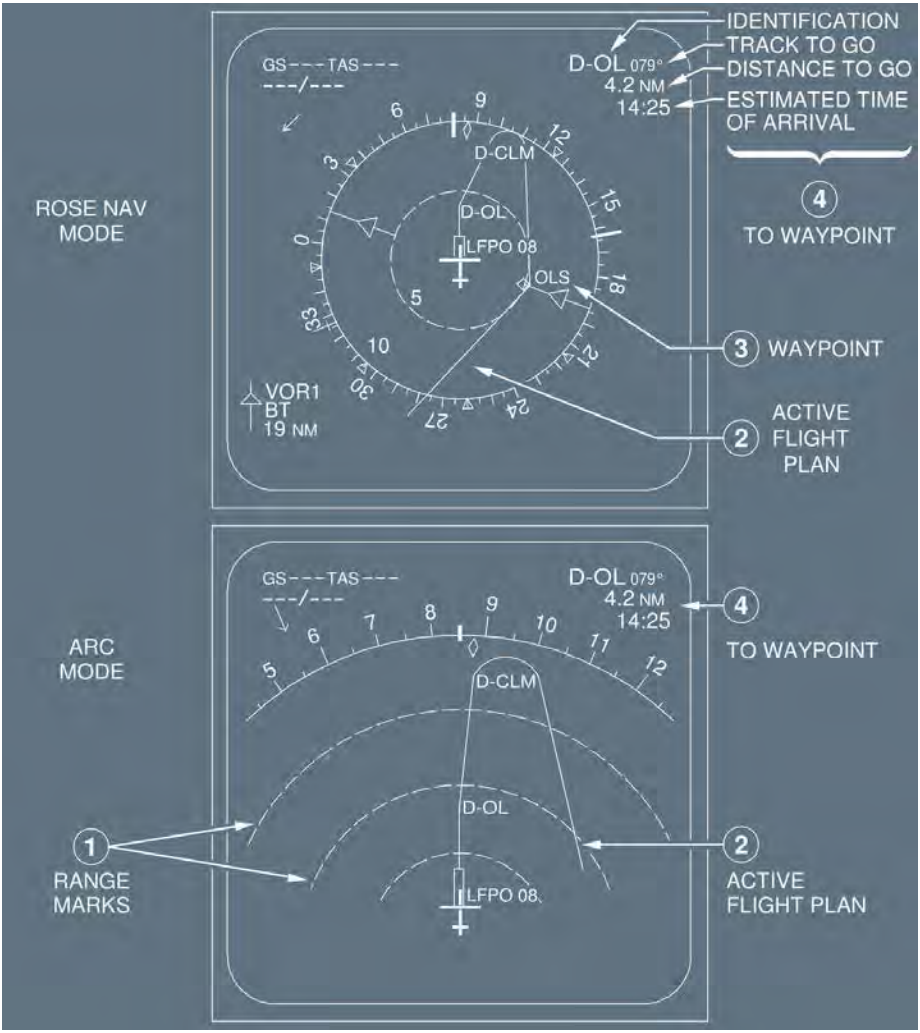
(3) VOR Information (White and cyan)
This area displays the frequency and identification (if decoded by the receiver) of the selected VOR in white, the selected course in cyan, and the tuning mode in white.

(4) VOR or GPS Message (Green)
VOR 14L appears when the flight crew selects a VOR approach on the MCDU.
GPS 14L appears when the flight crew selects a GPS approach.

ROSE NAV MODE/ARC MODE

Ident.: DSC-31-45-00001253.0017001 / 08 FEB 13
Applicable to: MSN 1882-3408, 3518-4547

ROSE NAV and ARC modes give the pilot the same information, but ARC mode limits it to the forward 90 ° sector.


IDENTIFICATION
TRACK TO GO
DISTANCE TO GO
ESTIMATED TIME OF ARRIVAL
GS---TAS---
---/---
D-OL 079°
4.2 NM
14:25
D-CLM
D-OL
LFPO 08
OLS
ROSE NAV MODE
4 TO WAYPOINT
3 WAYPOINT
VOR1
BT
19 NM
2 ACTIVE FLIGHT PLAN
ARC MODE
1 RANGE MARKS
2 ACTIVE FLIGHT PLAN

(1) Range Marks and Values

The values displayed on the ND are:

In ROSE NAV mode	1/4 of the selected range for the inner circle.
	1/2 of the selected range for the heading scale circle.
In ARC mode	1/4 of the selected range for the first inner arc.
	1/2 of the selected range for the second inner arc.
	3/4 of the selected range for the third inner arc.

(2) Flight Plan

The crew can use the MCDU to select various types of flight plan:

- The active flight plan (the flight plan the aircraft is actually following when the NAV mode is engaged) is represented by a continuous green line. The ND shows only the part of the flight plan that is ahead of the aircraft, as well as the waypoints that are still to be overflown and the waypoint from which the aircraft is coming.
  The ND does not show a SID or a STAR, except for the last waypoint of the SID and the first waypoint of the STAR, when the selected range is 160 or 320 NM.
  If the primary flight plan is not active, it is represented by a dotted green line.
- A continuous blue line portrays the missed approach procedure, and a dashed blue line portrays the flight plan to the alternate.

  The missed approach and the alternate flight plan are displayed when:
  - In ARC or ROSE NAV mode, a missed approach waypoint or an alternate flight plan waypoint is displayed on the onside MCDU.
  - In PLAN mode a missed approach or alternate waypoint is displayed in the 2L field of the onside MCDU.
- The secondary flight plan is represented by a continuous white line. The ND continues to display the active flight plan
- Temporary flight plan
  The revised portion of the flight plan is represented by a dotted yellow line
- Flight plan capture
  When the aircraft is off the primary flight plan and is flying toward it in HDG mode with the NAV mode armed, the ND shows the new active flight plan as a continuous green line if the FMGC has computed the intercept path.
  The part of the flight plan before the interception point shows as a dotted green line.

(3) Waypoint

The ND can display various kinds of waypoints:

Flight plan waypoints

The ND displays these as green diamonds (white, for TO waypoints). When the flight crew selects the WPT option on his EFIS control panel, all waypoints other than flight plan waypoints are displayed in magenta.

Pseudo waypoint

Point of the flight path where the aircraft is predicted to reach a selected altitude or speed.

Pseudo waypoint	Definition
	Level symbol (top of climb or level-off position), when the aircraft reaches: - The FCU-selected altitude (blue arrow), or - The constrained altitude, if it is more restrictive than the FCU altitude and if appropriate modes are engaged (magenta) - It does not appear when the aircraft is within 100 ft above, or below, the selected altitude.
	Top of descent symbol, or continue descent symbol: - White, if DES is not armed - Blue, if DES is armed.

Continued on the following page

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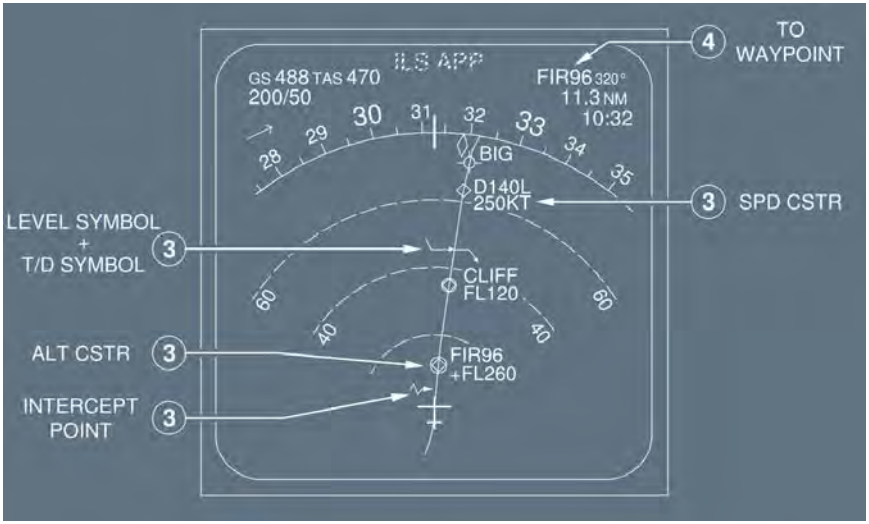
Pseudo waypoint	Definition
	Start of CLIMB symbol: - White, if CLB is not armed - Blue, if CLB is armed.
	Intercept point symbol: - White, if only the NAV mode is engaged - Blue, if DES mode is engaged - Indicates the point at which the aircraft is predicted to intercept the descent path, if there is any vertical deviation while the aircraft is in DES mode.
	Speed change symbol (magenta): Indicates the point at which the aircraft will start an automatic acceleration or deceleration from the current speed to a new computed speed for SPD LIM, SPD CSTR, or HOLDING SPD.
	Decelerate point symbol: - Indicates the point at which the aircraft is predicted to decelerate for approach (and thus switch to the approach phase) - Magenta, if in managed speed and NAV or approach mode is engaged - White, if in selected speed or HDG/TRK mode - Automatic decelerations only occur when displayed in magenta.
	ALT CSTR symbol set around the constrained waypoint: - Magenta, when the ALT CSTR is predicted to be met - Amber, when the ALT CSTR is predicted to be missed - White, when the ALT CSTR is not taken into account by the FMGS, and NAV mode is engaged.
	Energy circle symbol (green arc) centered on the aircraft position and oriented to the current track line. Represents the Required Distance to Land. Only displayed if the lateral guidance mode is heading or track, and the current FMS flight phase is in cruise, descent or approach, and the aircraft is within 180 NM of the destination.

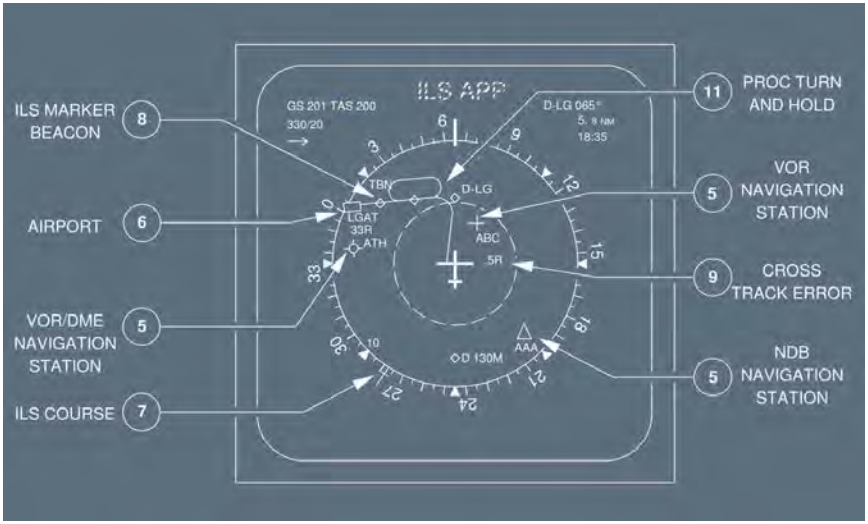


(4) TO waypoint

This is the next waypoint to be overflown.

This area of the screen also shows:

- Waypoint identification (white)
- Track to go (green)
- Distance to go (green)
- Estimated time of arrival (green), assuming the aircraft will fly directly from its present position to the TO waypoint at the current ground speed.



(5) NAVAIDs

The display uses specific symbols for NAVAIDs:


DME or TACAN


VOR


VOR/DME


NDB

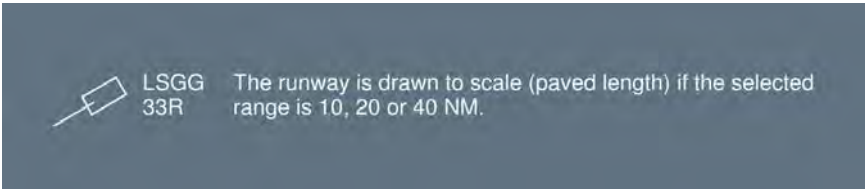
The symbol appears:

- In green if the NAVAID is a current waypoint of the flight plan
- In white if it is the TO waypoint
- In blue when the NAVAID is tuned for display either automatically by the FMGC or manually through the MCDU
- In magenta when the NAVAID is not part of the flight plan and is called for display as an option (corresponding option pushbutton pressed on the FCU EFIS control panel).

(6) Airport

Airport included in the flight plan:

- If the runway is not specified, the airport is represented by a star and the identification is displayed in white.
  Example: * LSGG
- If the runway is specified, it is represented by an oriented runway symbol in white.



Optional airport information
The airports that are not displayed as part of the flight plan may be called for display (ARPT pb on the EFIS control panel).
They are represented by a star and the identification in magenta.

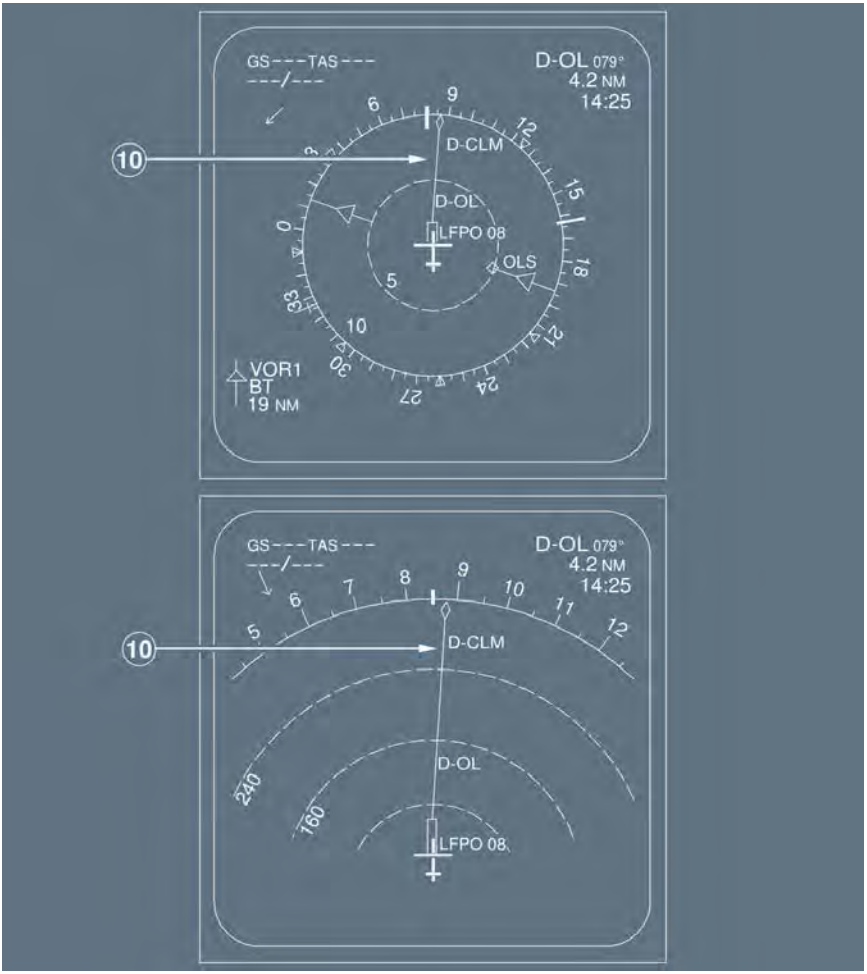
(7) ILS Course (Magenta)
When the pilot pushes the LS pb-sw on the EFIS control panel, and if an ILS station has been selected, the display shows an ILS course symbol.

(8) ILS Marker Beacons
The screen shows these as waypoints (diamonds).

When the aircraft overflies a marker beacon, the corresponding symbol flashes:
Blue for the outer marker.
Amber for the middle marker.
White for the inner marker.

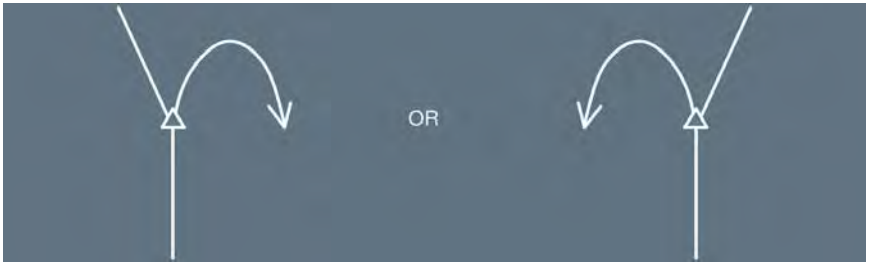
(9) Cross Track Error
This is the aircraft's lateral deviation from the active leg of the flight plan (related to the great circle route). It is indicated in nautical miles (NM), with the letter R (right) or L (left), according to the position of the aircraft with respect to the flight plan.

(10) Track Line
This line appears in green only in the ROSE NAV or ARC mode when HDG or TRK has been selected on the FCU.



(11) Procedure turns and holding patterns

These only appear when they are part of the flight plan. For the 160 and 320 NM range scales, each one is represented by a white arrow that originates at the associated fix and indicates the direction of the turn.

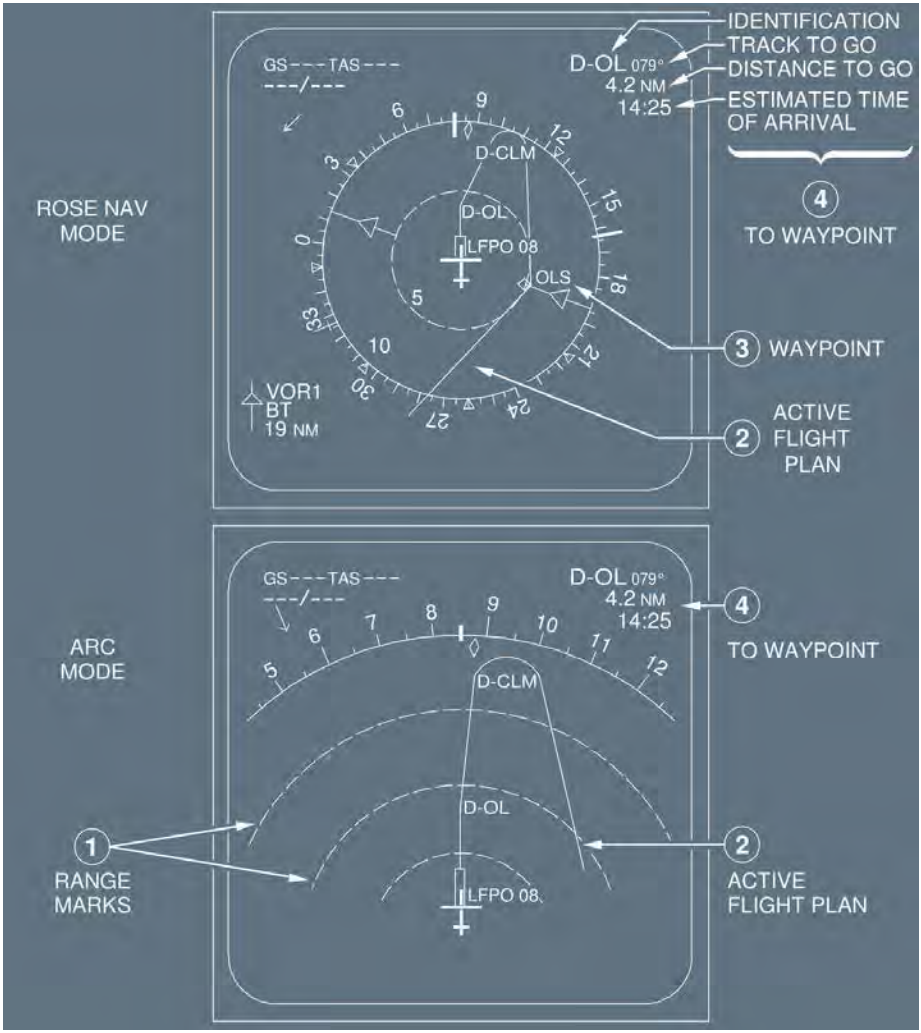


For shorter range scales, and if the procedure turn or the holding pattern is in the next or the active leg, the display shows the full circuit or pattern.

ROSE NAV MODE/ARC MODE

Ident.: DSC-31-45-00001253.0067001 / 13 MAY 14
Applicable to: MSN 3467

ROSE NAV and ARC modes give the pilot the same information, but ARC mode limits it to the forward 90 ° sector.


IDENTIFICATION
TRACK TO GO
DISTANCE TO GO
ESTIMATED TIME OF ARRIVAL
GS---TAS---
---/---
D-OL 079°
4.2 NM
14:25
ROSE NAV MODE
D-CLM
D-OL
LFPO 08
OLS
4 TO WAYPOINT
3 WAYPOINT
2 ACTIVE FLIGHT PLAN
VOR1
BT
19 NM
ARC MODE
1 RANGE MARKS
2 ACTIVE FLIGHT PLAN

(1) Range Marks and Values

The values displayed on the ND are:

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	1/2 of the selected range for the heading scale circle.
In ARC mode	1/4 of the selected range for the first inner arc.
	1/2 of the selected range for the second inner arc.
	3/4 of the selected range for the third inner arc.

(2) Flight Plan

The crew can use the MCDU to select various types of flight plan:

- The active flight plan (the flight plan the aircraft is actually following when the NAV mode is engaged) is represented by a continuous green line. The ND shows only the part of the flight plan that is ahead of the aircraft, as well as the waypoints that are still to be overflown and the waypoint from which the aircraft is coming.
  The ND does not show a SID or a STAR, except for the last waypoint of the SID and the first waypoint of the STAR, when the selected range is 160 or 320 NM.
  If the primary flight plan is not active, it is represented by a dotted green line.
- A continuous blue line portrays the missed approach procedure, and a dashed blue line portrays the flight plan to the alternate.

  The missed approach and the alternate flight plan are displayed when:
  - In ARC or ROSE NAV mode, a missed approach waypoint or an alternate flight plan waypoint is displayed on the onside MCDU.
  - In PLAN mode a missed approach or alternate waypoint is displayed in the 2L field of the onside MCDU.
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  The revised portion of the flight plan is represented by a dotted yellow line
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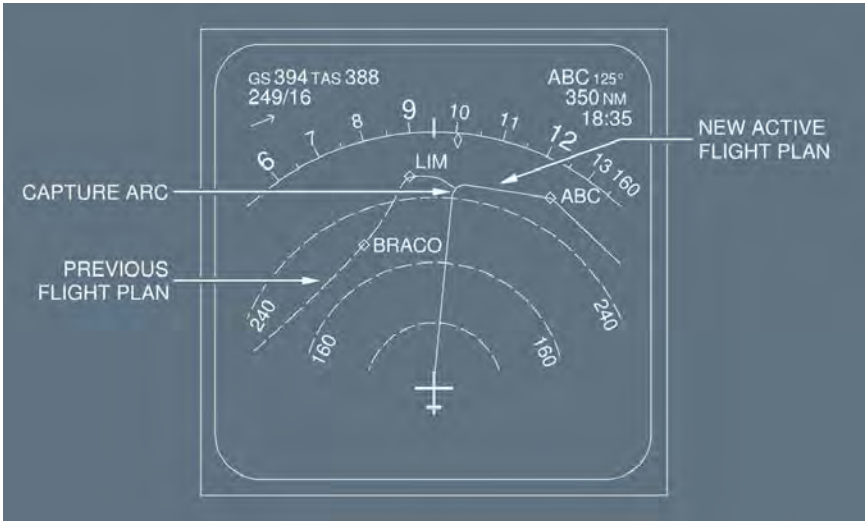
  The part of the flight plan before the interception point shows as a dotted green line.



(3) Waypoint

The ND can display various kinds of waypoints:

Flight plan waypoints

The ND displays these as green diamonds (white, for TO waypoints). When the flight crew selects the WPT option on his EFIS control panel, all waypoints other than flight plan waypoints are displayed in magenta.

Pseudo waypoint

Point of the flight path where the aircraft is predicted to reach a selected altitude or speed.

Pseudo waypoint	Definition
	Level symbol (top of climb or level-off position), when the aircraft reaches: - The FCU-selected altitude (blue arrow), or - The constrained altitude, if it is more restrictive than the FCU altitude and if appropriate modes are engaged (magenta) - It does not appear when the aircraft is within 100 ft above, or below, the selected altitude.
	Top of descent symbol, or continue descent symbol: - White, if DES is not armed - Blue, if DES is armed.

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Pseudo waypoint	Definition
	Start of CLIMB symbol: - White, if CLB is not armed - Blue, if CLB is armed.
	Intercept point symbol: - White, if only the NAV mode is engaged - Blue, if DES mode is engaged - Indicates the point at which the aircraft is predicted to intercept the descent path, if there is any vertical deviation while the aircraft is in DES mode.
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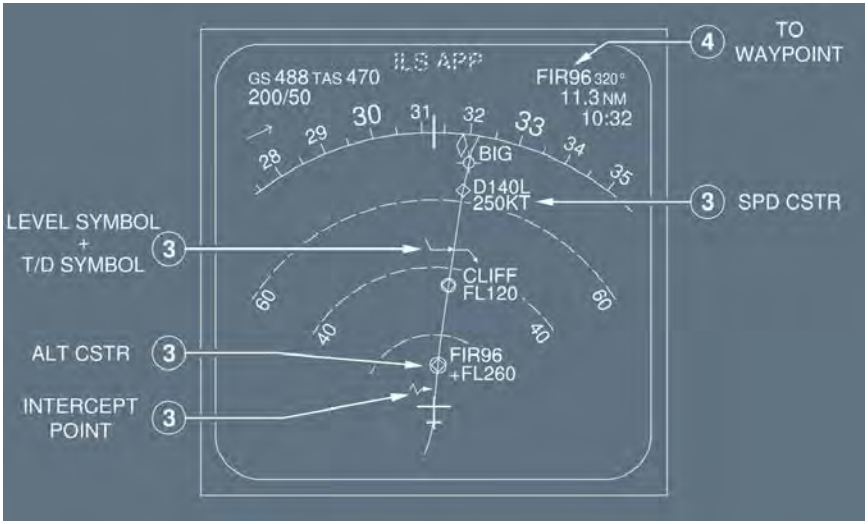
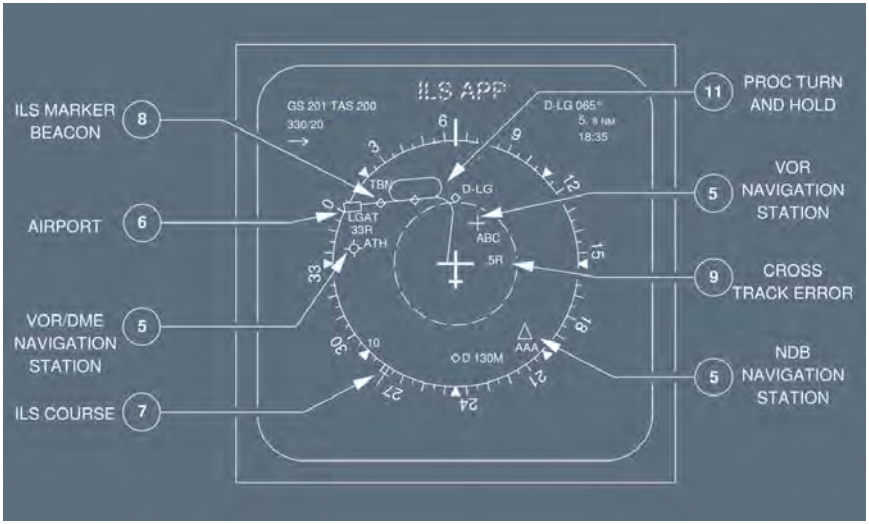
	ALT CSTR symbol set around the constrained waypoint: - Magenta, when the ALT CSTR is predicted to be met - Amber, when the ALT CSTR is predicted to be missed - White, when the ALT CSTR is not taken into account by the FMGS, and NAV mode is engaged.
	Energy circle symbol (green arc) centered on the aircraft position and oriented to the current track line. Represents the Required Distance to Land. Only displayed if the lateral guidance mode is heading or track, and the current FMS flight phase is in cruise, descent or approach, and the aircraft is within 180 NM of the destination.



(4) TO waypoint
This is the next waypoint to be overflown.

This area of the screen also shows:
- Waypoint identification (white)
- Track to go (green)
- Distance to go (green)
- Estimated time of arrival (green), assuming the aircraft will fly directly from its present position to the TO waypoint at the current ground speed.



(5) NAVAIDs

The display uses specific symbols for NAVAIDs:


DME or TACAN


VOR


VOR/DME


NDB

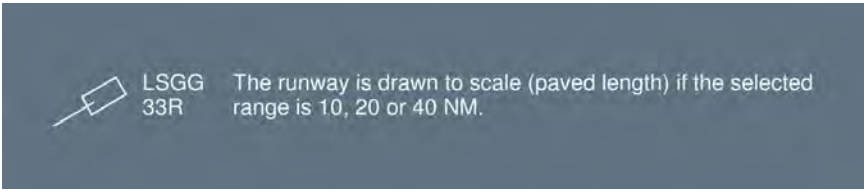
The symbol appears:

- In green if the NAVAID is a current waypoint of the flight plan
- In white if it is the TO waypoint
- In blue when the NAVAID is tuned for display either automatically by the FMGC or manually through the MCDU
- In magenta when the NAVAID is not part of the flight plan and is called for display as an option (corresponding option pushbutton pressed on the FCU EFIS control panel).

(6) Airport

Airport included in the flight plan:

- If the runway is not specified, the airport is represented by a star and the identification is displayed in white.
  Example: * LSGG
- If the runway is specified, it is represented by an oriented runway symbol in white.



Optional airport information

The airports that are not displayed as part of the flight plan may be called for display (ARPT pb on the EFIS control panel).
They are represented by a star and the identification in magenta.

(7) ILS Course (Magenta)

When the pilot pushes the LS pb-sw on the EFIS control panel, and if an ILS station has been selected, the display shows an ILS course symbol.

(8) ILS Marker Beacons

The screen shows these as waypoints (diamonds).

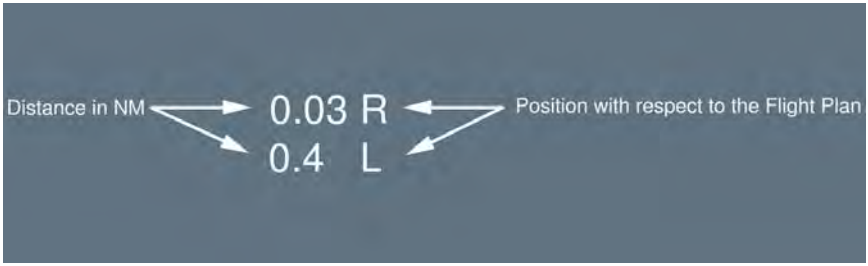
When the aircraft overflies a marker beacon, the corresponding symbol flashes:
Blue for the outer marker.
Amber for the middle marker.
White for the inner marker.

(9) Cross Track Error

This is the aircraft's lateral deviation from the active leg of the flight plan (related to the great circle route). It is indicated in nautical miles (NM), with the letter R (right) or L (left), according to the position of the aircraft with respect to the flight plan.

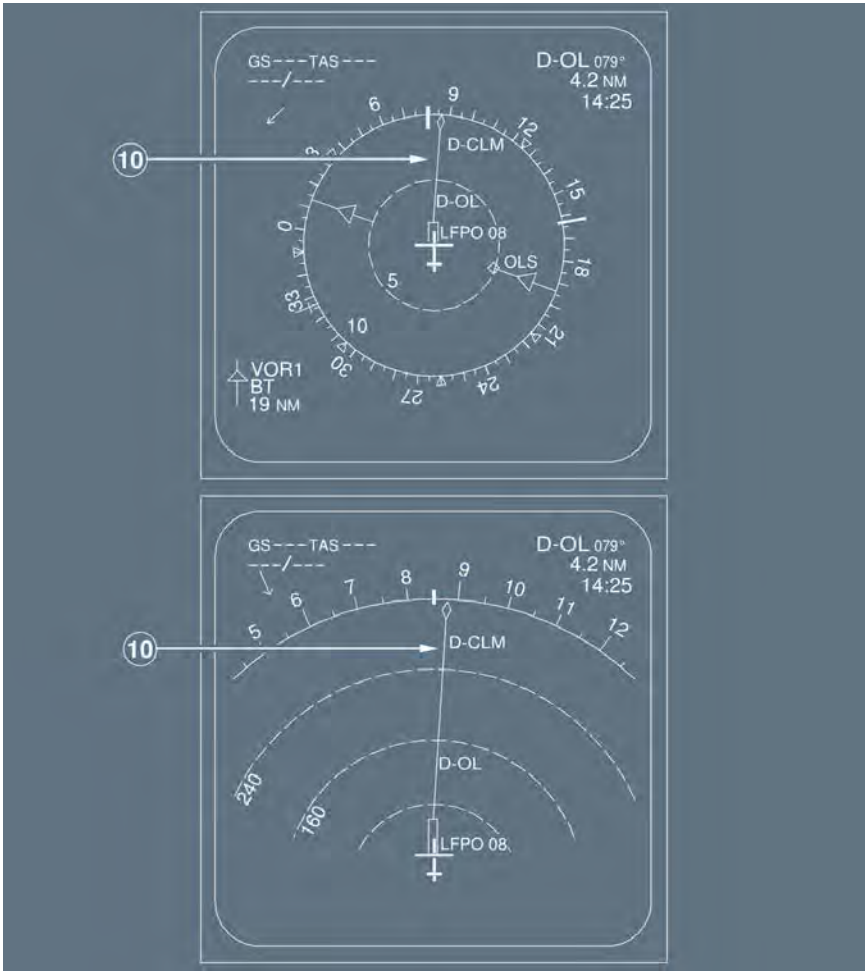
Conditions of display

1. The cross-track error is displayed with a precision of one digit (0.1 NM), when the cross-track error is strictly greater than 0.29 NM
2. The cross-track error is displayed with a precision of 2 digits (0.01 NM), from 0.02 NM to 0.29 NM and when the aircraft current altitude is less than the transition altitude or the transition level.
3. When displayed, the cross-track error is removed when it is becomes less than 0.01 NM



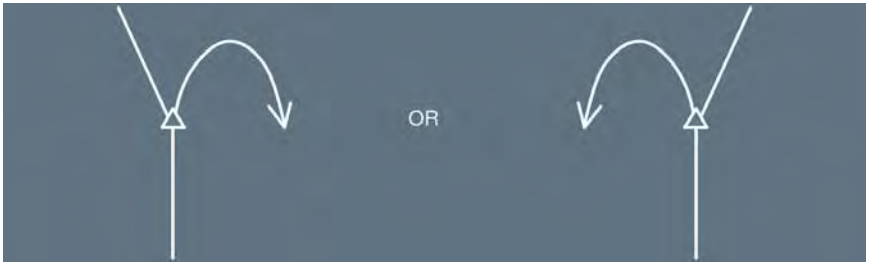
(10) Track Line

This line appears in green only in the ROSE NAV or ARC mode when HDG or TRK has been selected on the FCU.



(11) Procedure turns and holding patterns

These only appear when they are part of the flight plan. For the 160 and 320 NM range scales, each one is represented by a white arrow that originates at the associated fix and indicates the direction of the turn.

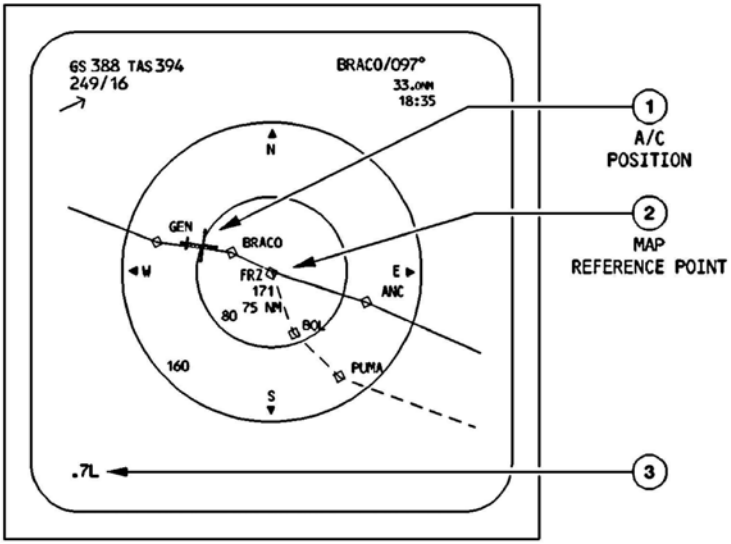


For shorter range scales, and if the procedure turn or the holding pattern is in the next or the active leg, the display shows the full circuit or pattern.

PLAN MODE

Ident.: DSC-31-45-00001254.0002001 / 24 FEB 11
Applicable to: ALL

This mode statically displays the flight plan legs on a map oriented to true north. The map is centered on a map reference point, that the pilot selects by scrolling to it on his MCDU.
The map reference point is the waypoint displayed on the second line of the MCDU's F-PLN page. It can either be the active waypoint (next waypoint to be overflown), or any other waypoint of the flight plan.
The pilot can scroll through the overall flight plan, and display it in PLAN mode.
The pilot chooses the scale of the map with the range selector (the diameter of the outer circle corresponds to the selected range).
Data on NAVAIDs and on their characteristics and associated bearing pointers are not available in this mode.



(1) Aircraft Position and True Track
The orientation of the yellow aircraft symbol always indicates the true track of the aircraft. Its position represents the aircraft position given by the FMGS.

(2) Map Reference Point
If the CSTR option is not selected, the track and distance from the map reference point to the next F-PLN waypoint is displayed in magenta.

(3) Cross Track Error
Refer to DSC-31-45 ROSE NAV Mode/ARC Mode.

WEATHER RADAR INDICATIONS

Ident.: DSC-31-45-00015503.0001001 / 21 MAR 17
Applicable to: ALL

Refer to DSC-34-SURV-30-30 Weather Radar indication on ND.

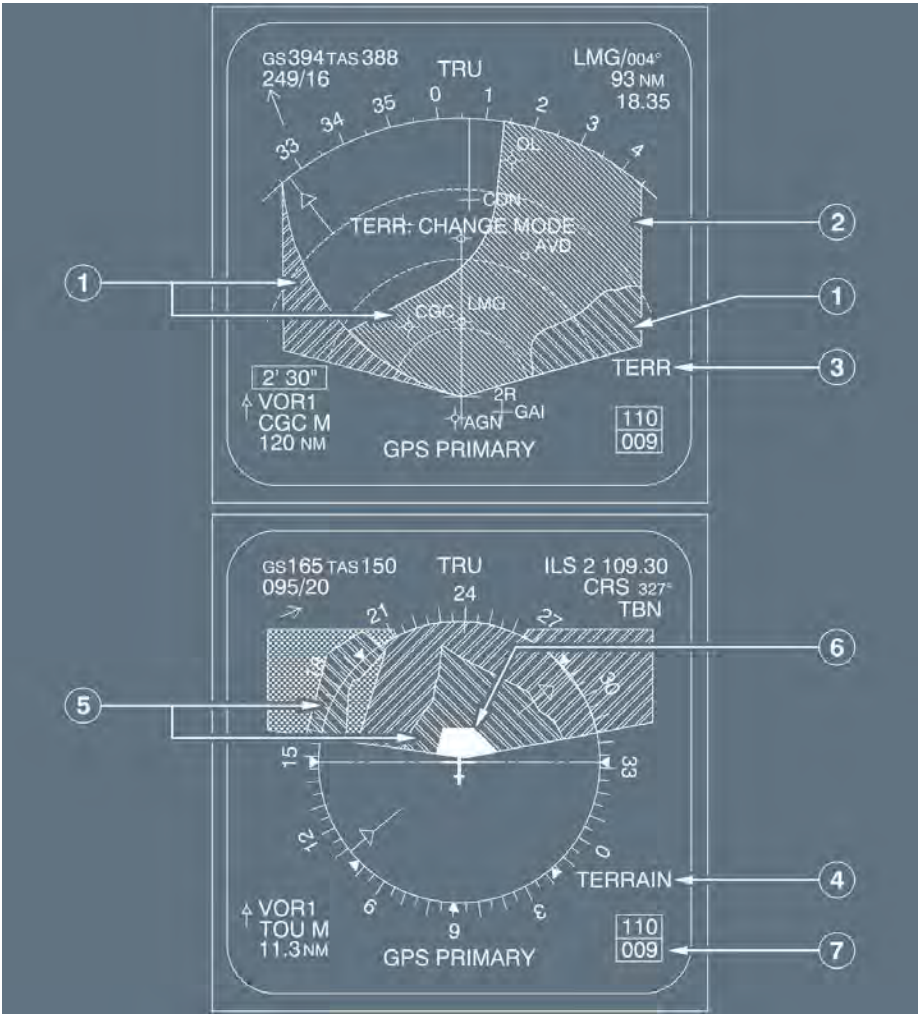
PWS INDICATIONS

Ident.: DSC-31-45-00015504.0001001 / 21 MAR 17
Applicable to: ALL

Refer to DSC-34-SURV-30-30 PWS (if installed) indication on PFD and ND

EGPWS

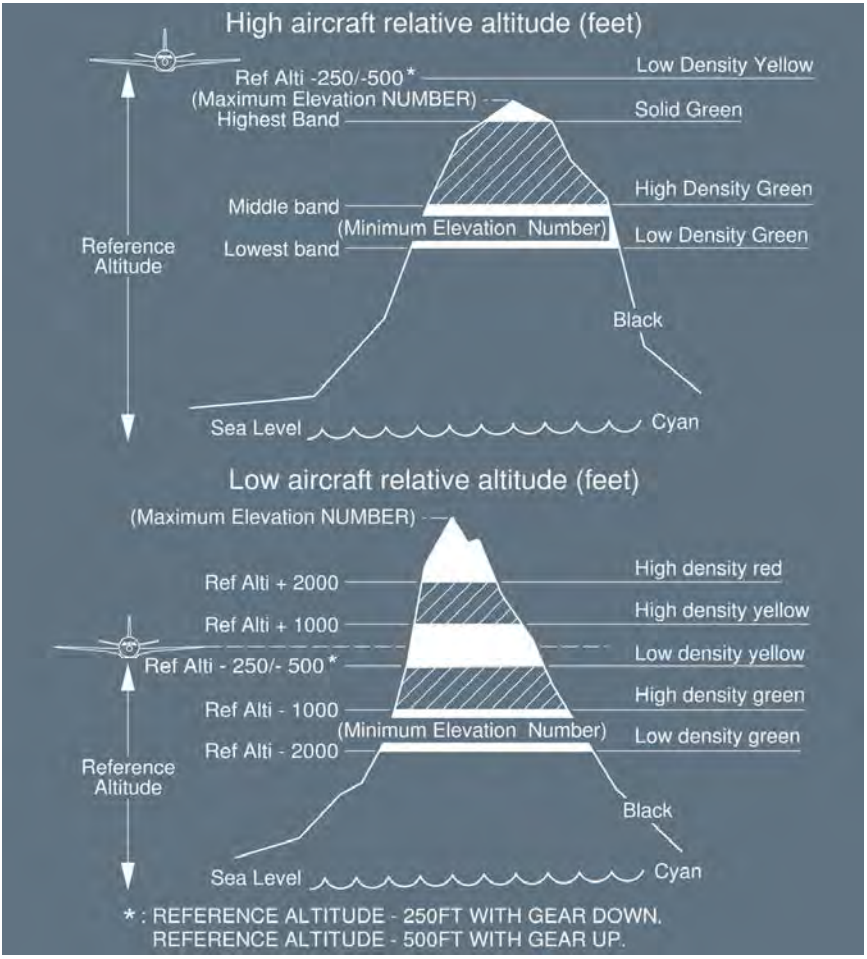
Ident.: DSC-31-45-00009586.0056001 / 08 AUG 13
Applicable to: MSN 3467



(1) EGPWS terrain picture

The ND displays the EGPWS terrain picture, when the TERR ON ND switch is selected ON, and the ND is not in PLAN mode. The terrain picture replaces the weather radar image. Terrain data is displayed independently of the aircraft relative altitude.

The terrain appears in different colors and densities, in accordance with its relative height:



Note: - *Areas without available terrain data in the EGPWS database appear in magenta*
- *The reference altitude is computed based on the current aircraft altitude or, if descending more than 1 000 ft/min, the altitude expected in 30 s*
- *In case of flight above the maximum elevation number, the relief between the minimum and maximum displayed elevations is displayed by using three different green levels.*

(2) Center Part Messages

- The "TERR CHANGE MODE" indication is displayed in red (or amber), in the case of a Terrain Awareness Display (TAD) warning (or caution) alert, if the current selected display mode is PLAN
- The "TERR REDUCE RANGE" indication is displayed in red (or amber), in the case of a Terrain Awareness Display (TAD) warning (or caution) alert, if the selected range is 160 NM or 320 NM.

(3) TERR indication

To differentiate between the terrain and the weather display, the weather radar TILT is replaced by a blue TERR, and the terrain display sweeps from the center outward to both ND sides.

(4) Warning and caution messages

TERRAIN or OBST (amber) : For a caution.

TERRAIN or OBST (red) : For a warning.

When triggered, these messages flash for 9 s, then remain steady until the caution or warning alert condition disappears.

TERR RNG (red) : For a RANGE error warning.

TERR TST (amber) : Appears during the EGPWS test, when the terrain pattern is displayed, and there is no failure.

(5) Terrain or obstacle caution alert

Generated when a conflict exists between the terrain caution envelope, ahead of the aircraft, and database-stored terrain/obstacles. The conflict area is shown in solid yellow.

(6) Terrain or obstacle warning alert

Generated when a conflict exists between the terrain warning envelope, ahead of the aircraft, and terrain/obstacles data stored in the database. The conflict area is shown in solid red.

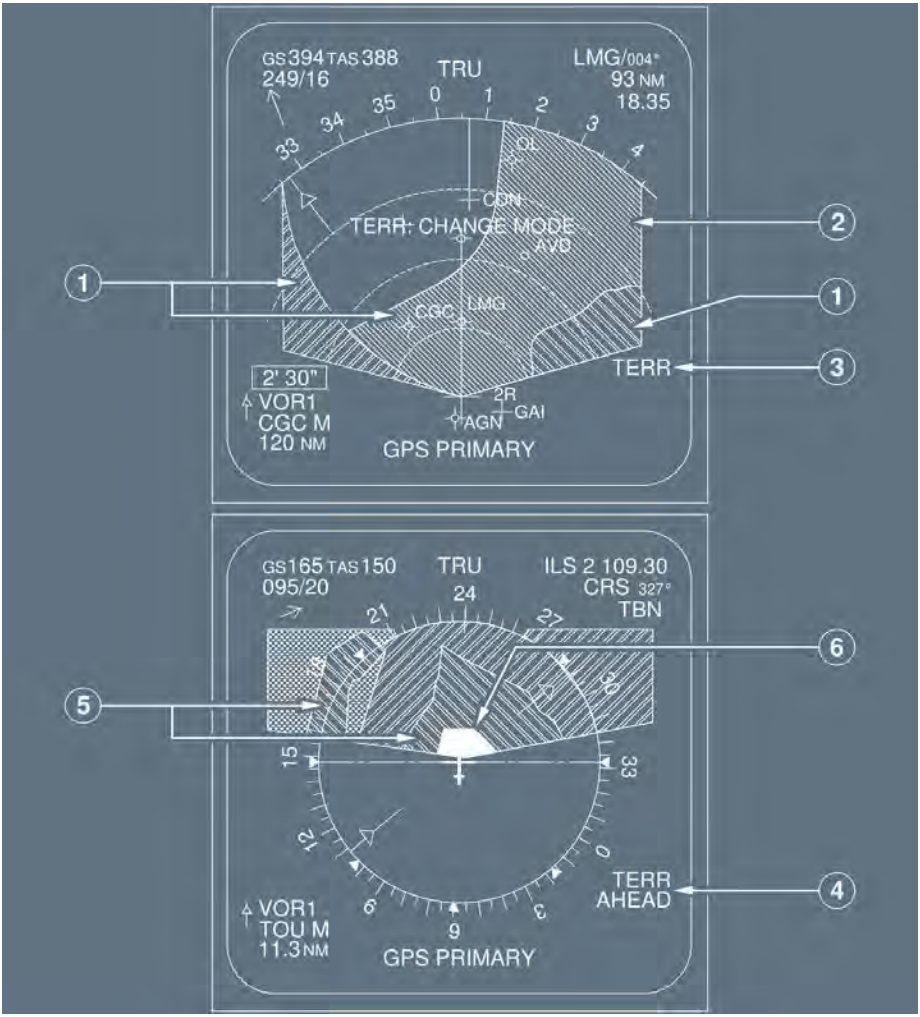
Note: *When an alert is generated (either caution or warning) and TERR ON ND is not selected, the terrain is automatically displayed and the TERR ON ND's pushbutton ON light comes on.*

(7) Lowest and highest elevations

Minimum and maximum elevations encountered ahead of the aircraft, within the selected ND range. The color code of the elevation figures is the same as for the EGPWS terrain picture.

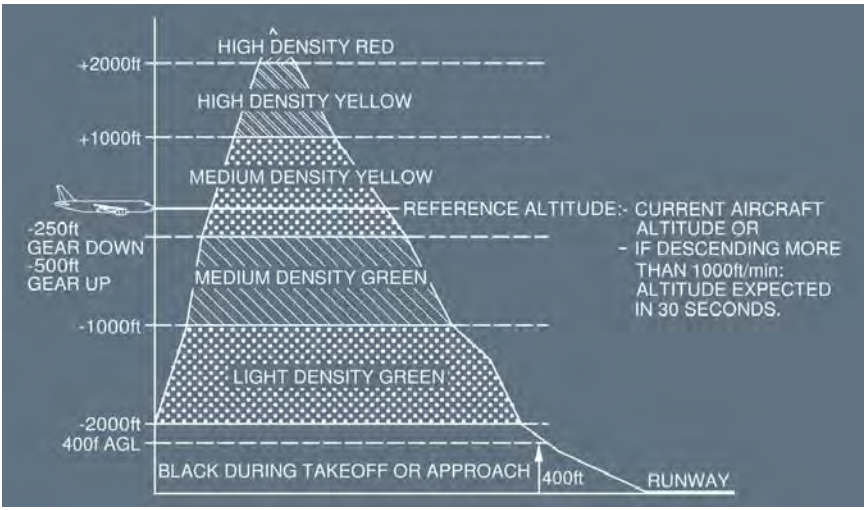
EGPWS

Ident.: DSC-31-45-00009586.0001001 / 22 MAY 12
Applicable to: MSN 1882-2078



(1) EGPWS terrain picture

The ND displays the EGPWS terrain picture, when the TERR ON ND switch is selected ON, and the ND is not in PLAN mode. The terrain picture replaces the weather radar image.
The terrain appears in different colors and densities, in accordance with its relative height:



Note: Areas without available terrain data in the EGPWS database appear in magenta.

(2) Center Part Messages

- The “TERR CHANGE MODE” indication is displayed in red (or amber), in the case of a Terrain Awareness Display (TAD) warning (or caution) alert, if the current selected display mode is PLAN
- The “TERR REDUCE RANGE” indication is displayed in red (or amber), in the case of a Terrain Awareness Display (TAD) warning (or caution) alert, if the selected range is 160 NM or 320 NM.

(3) TERR indication

To differentiate between the terrain and the weather display, the weather radar TILT is replaced by a blue TERR, and the terrain display sweeps from the center outward to both ND sides.

(4) Warning and caution messages

TERR AHEAD (amber) : For a caution.

TERR AHEAD (red) : For a warning.

When triggered, these messages flash for 9 s, then remain steady until the caution or warning alert condition disappears.

TERR RNG (red) : For a RANGE error warning.

TERR TST (amber) : Appears during the EGPWS test, when the terrain pattern is displayed, and there is no failure.

(5) Terrain caution alert

Generated when a conflict exists between the terrain caution envelope, ahead of the aircraft, and the terrain data stored in the database. The conflict area is shown in solid yellow.

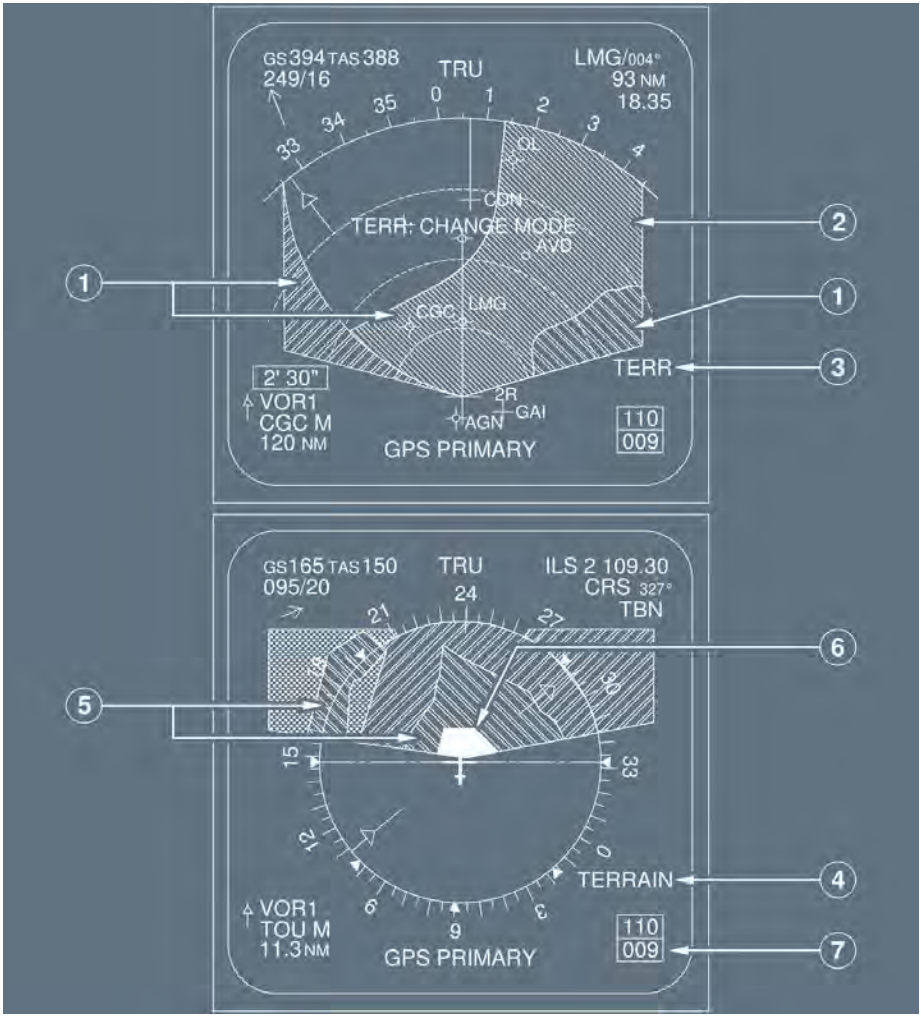
(6) Terrain warning alert

Generated when a conflict exists between the terrain warning envelope, ahead of the aircraft, and the terrain data stored in the database. The conflict area is shown in solid red.

Note: When an alert is generated (either caution or warning) and TERR ON ND is not selected, the terrain is automatically displayed and the TERR ON ND's pushbutton ON light comes on.

EGPWS

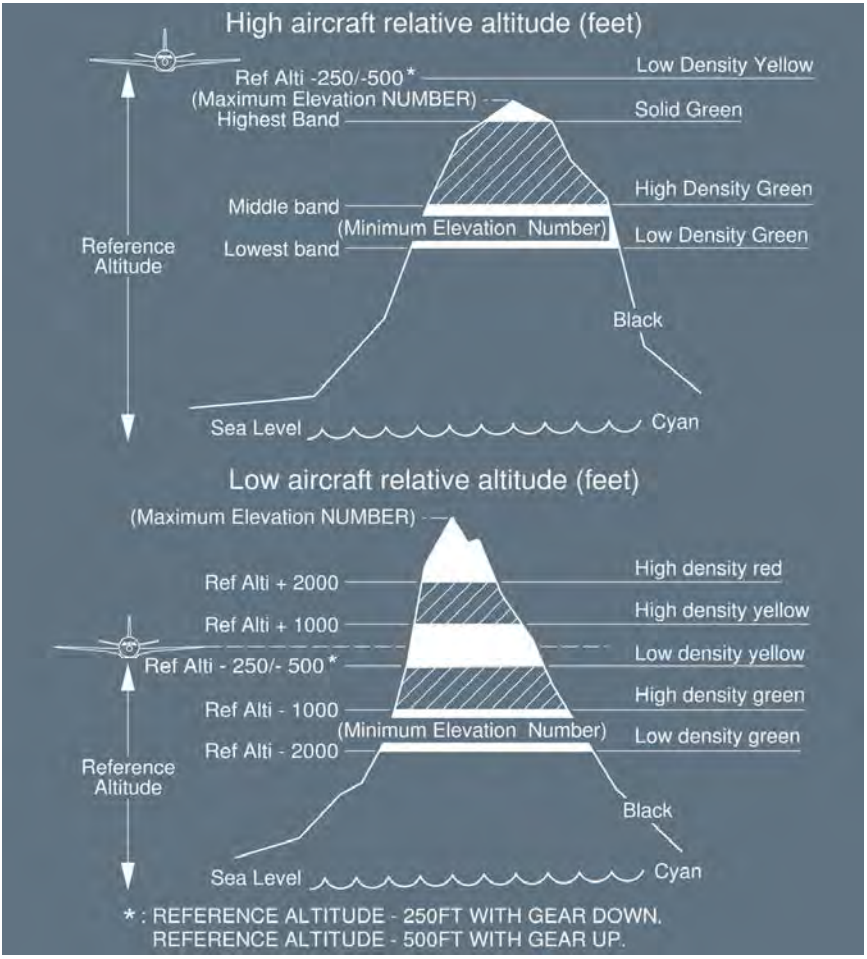
Ident.: DSC-31-45-00009586.0013001 / 08 AUG 13
Applicable to: MSN 3408, 3518-4547



(1) EGPWS terrain picture

The ND displays the EGPWS terrain picture, when the TERR ON ND switch is selected ON, and the ND is not in PLAN mode. The terrain picture replaces the weather radar image. Terrain data is displayed independently of the aircraft relative altitude.

The terrain appears in different colors and densities, in accordance with its relative height:



Note: - *Areas without available terrain data in the EGPWS database appear in magenta*
- *The reference altitude is computed based on the current aircraft altitude or, if descending more than 1 000 ft/min, the altitude expected in 30 s*
- *In case of flight above the maximum elevation number, the relief between the minimum and maximum displayed elevations is displayed by using three different green levels.*

(2) Center Part Messages

- The "TERR CHANGE MODE" indication is displayed in red (or amber), in the case of a Terrain Awareness Display (TAD) warning (or caution) alert, if the current selected display mode is PLAN
- The "TERR REDUCE RANGE" indication is displayed in red (or amber), in the case of a Terrain Awareness Display (TAD) warning (or caution) alert, if the selected range is 160 NM or 320 NM.

(3) TERR indication

To differentiate between the terrain and the weather display, the weather radar TILT is replaced by a blue TERR, and the terrain display sweeps from the center outward to both ND sides.

(4) Warning and caution messages

TERRAIN or OBST (amber) : For a caution.

TERRAIN or OBST (red) : For a warning.

When triggered, these messages flash for 9 s, then remain steady until the caution or warning alert condition disappears.

TERR RNG (red) : For a RANGE error warning.

TERR TST (amber) : Appears during the EGPWS test, when the terrain pattern is displayed, and there is no failure.

(5) Terrain or obstacle caution alert

Generated when a conflict exists between the terrain caution envelope, ahead of the aircraft, and database-stored terrain/obstacles. The conflict area is shown in solid yellow.

(6) Terrain or obstacle warning alert

Generated when a conflict exists between the terrain warning envelope, ahead of the aircraft, and terrain/obstacles data stored in the database. The conflict area is shown in solid red.

Note: *When an alert is generated (either caution or warning) and TERR ON ND is not selected, the terrain is automatically displayed and the TERR ON ND's pushbutton ON light comes on.*

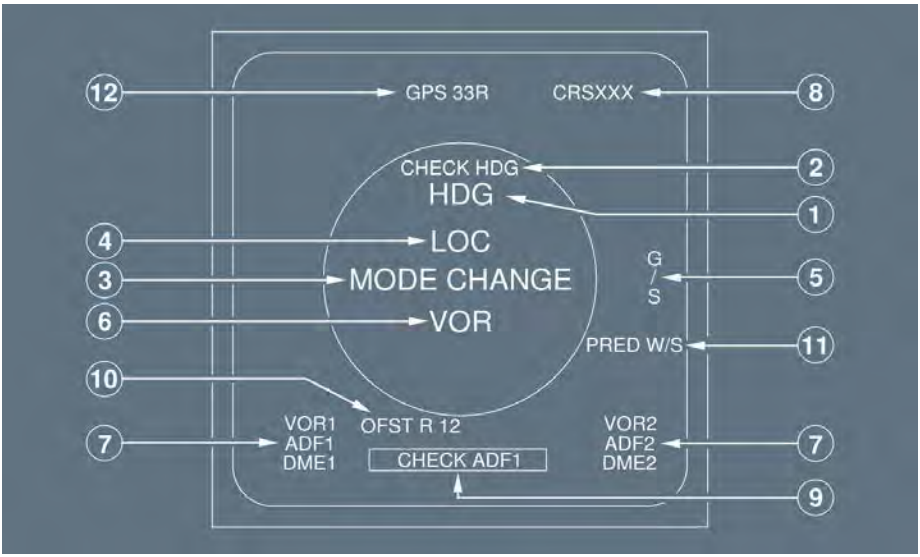
(7) Lowest and highest elevations

Minimum and maximum elevations encountered ahead of the aircraft, within the selected ND range. The color code of the elevation figures is the same as for the EGPWS terrain picture.

Note: The elevations shown on the ND correspond to the terrain included in the selected ND range, ahead of the aircraft. In ARC mode, the elevations are linked with the terrain displayed on the ND. In ROSE mode, the elevations may not represent the lowest and highest terrain currently displayed on the ND.

FLAGS AND MESSAGES DISPLAYED ON ND

Ident.: DSC-31-45-00001256.0349001 / 21 MAR 17
Applicable to: MSN 1882-2078



(1) HDG Flag (red)

If the heading data fails, the rose, arc and associated symbols disappear.
A HDG flag flashes for 9 s, then remains steady in the upper part of the ND.

(2) CHECK HDG Flag (amber)

When the flight warning computer detects a disagree (5 °) between sides 1 and 2, a CHECK HDG flag appears on both NDs, and a caution appears on the ECAM.

(3) Center Part Messages

- The screen displays a MODE CHANGE message in green if there is a discrepancy between the selected mode on the EFIS control panel and the mode sent from the onside FMGC, or while the DMC is preparing a new page for display
- The screen displays a RANGE CHANGE message in green if there is a discrepancy between the range selected on the EFIS control panel and the range sent from the onside FMGC. A MODE CHANGE message has priority over a RANGE CHANGE message
- The screen displays a MAP NOT AVAIL message in red for several reasons:
  - The MODE CHANGE or RANGE CHANGE message has been displayed more than 6 s, or
  - The FMGC has failed, or
  - The FMGC has delivered an invalid aircraft position.
- The screen displays a W/S SET RNG 10 NM message if a predictive windshear alert is triggered and the range is above 10 NM.
  The message is displayed in the color corresponding to the windshear alert: red for a warning, amber for a caution
- The screen displays a W/S CHANGE MODE message if a predictive windshear alert is triggered and the ND is not in ARC or ROSE mode. The message appears in red for a warning, or amber for a caution.

(4) LOC Flag (red)
If LOC data fails, this flag flashes for 9 s, then remains steady.

(5) G/S Flag (red)
If G/S data fails, this flag flashes for 9 s, then remains steady.

(6) VOR Flag (red)
In ROSE VOR mode, when the VOR bearing is not valid, this flag flashes for 9 s, then remains steady.

(7) VOR 1(2) or ADF 1(2) or DME 1(2) Flag (red)
If a navigation receiver fails, the appropriate one of these flags flashes for 9 s, then remains steady.

(8) VOR Course Flag
If the VOR course fails, a red CRSXXX flag appears.
If there is non-computed data (NCD), a blue CRS - - - flag appears.

(9) Other messages

MAP PARTLY DISPLAYED (amber)	:	In case of incomplete data transmission between the FMGC (priority criteria) and the DMC, or if the DMC cannot draw the complete MAP. This message is also displayed when a very long leg exists in the flight plan. A leg is considered as "very long" when the starting point (or endpoint) is located at more than 45 ° from the aircraft location (45 ° of longitude or latitude). This DMC limitation results from a compromise between accurate drawing precision and maximum leg length that can be displayed.
NAV ACCUR UPGRAD, or (white) NAV ACCUR DOWNGRAD (amber)	:	Signals a change in navigation accuracy.
SPECIFIC VOR/D UNAVAIL (amber)	:	If the NAVAID, that is tuned for the selected approach or departure, is not available.
SET OFFSIDE RNG/MODE (amber)	:	Displayed on ND 1(2), in case of an FMGC 1(2) failure when the two ND ranges or modes selected on the EFIS control panels are different.
GPS PRIMARY (white, boxed white)	:	This message appears when GPS PRIMARY mode is available, or has been recovered. The pilot can clear this message by pressing the CLR key on the MCDU.
GPS PRIMARY LOST (amber, boxed white)	:	This message appears when GPS PRIMARY is not available, and not clearable by pilot action.
↓ (green)	:	Overflow arrow, displayed when more than one of the following messages are present at the same time: - NAV ACCUR DOWNGRAD (inhibited when the navigation mode is IRS/GPS) - NAV ACCUR UPGRAD (inhibited when the navigation mode is IRS/GPS) - SPECIF VOR-D UNAVAIL - MAP PARTLY DISPLAYED - SET OFFSIDE RNG/MODE - GPS PRIMARY - GPS PRIMARY LOST.

Note: *For information about the TCAS messages:* *Refer to DSC-34-SURV-60-20 TCAS Messages.*

(10) OFST R(L) XX message (yellow)
The screen displays this message, when a temporary or an offset flight plan is entered.
The offset value is given in NM.

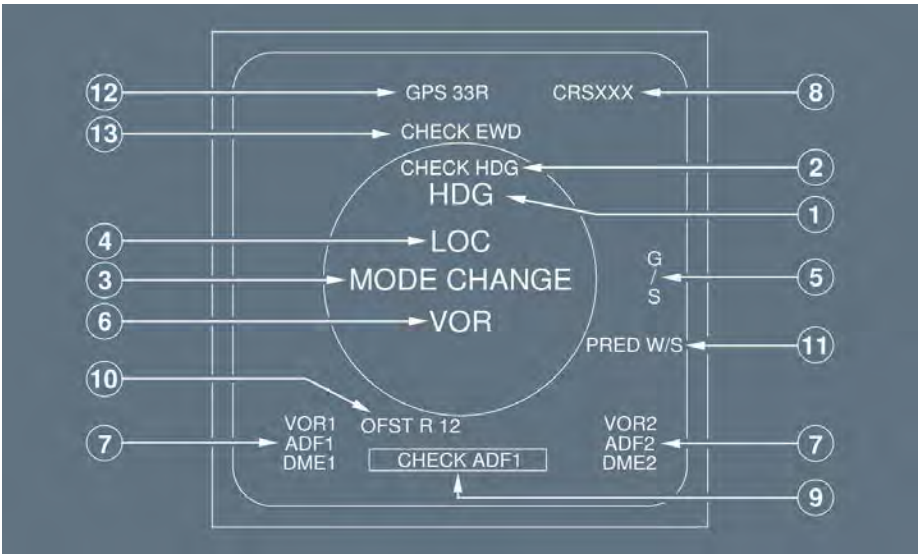
Note: *For information about the TCAS messages:* *Refer to DSC-34-SURV-60-20 TCAS Messages.*

(11) PRED W/S flag (amber)
The WINDSHEAR sw on the weather radar panel is set to AUTO, and a Predictive Windshear System fault is detected. This message appears on ground, or when flaps and slats are extended.
It is associated with a single chime. The radar image remains available, provided that the fault does not affect the radar mode.

(12) GPS message (green)
This message shows the full runway name of the selected approach. It is displayed, when a GPS approach has been selected.

FLAGS AND MESSAGES DISPLAYED ON ND

Ident.: DSC-31-45-00001256.0425001 / 21 MAR 17
Applicable to: MSN 3408-4547



(1) HDG Flag (red)
If the heading data fails, the rose, arc and associated symbols disappear.
A HDG flag flashes for 9 s, then remains steady in the upper part of the ND.

(2) CHECK HDG Flag (amber)
For more information: *Refer to DSC-31-05-60 Side1/Side2 Discrepancy Messages*

(3) Center Part Messages

- The screen displays a MODE CHANGE message in green if there is a discrepancy between the selected mode on the EFIS control panel and the mode sent from the onside FMGC, or while the DMC is preparing a new page for display
- The screen displays a RANGE CHANGE message in green if there is a discrepancy between the range selected on the EFIS control panel and the range sent from the onside FMGC. A MODE CHANGE message has priority over a RANGE CHANGE message
- The screen displays a MAP NOT AVAIL message in red for several reasons:
  - The MODE CHANGE or RANGE CHANGE message has been displayed more than 6 s, or
  - The FMGC has failed, or
  - The FMGC has delivered an invalid aircraft position.
- The screen displays a W/S SET RNG 10 NM message if a predictive windshear alert is triggered and the range is above 10 NM.
  The message is displayed in the color corresponding to the windshear alert: red for a warning, amber for a caution
- The screen displays a W/S CHANGE MODE message if a predictive windshear alert is triggered and the ND is not in ARC or ROSE mode. The message appears in red for a warning, or amber for a caution.

(4) LOC Flag (red)
If LOC data fails, this flag flashes for 9 s, then remains steady.

(5) G/S Flag (red)
If G/S data fails, this flag flashes for 9 s, then remains steady.

(6) VOR Flag (red)
In ROSE VOR mode, when the VOR bearing is not valid, this flag flashes for 9 s, then remains steady.

(7) VOR 1(2) or ADF 1(2) or DME 1(2) Flag (red)
If a navigation receiver fails, the appropriate one of these flags flashes for 9 s, then remains steady.

(8) VOR Course Flag
If the VOR course fails, a red CRSXXX flag appears.

If there is non-computed data (NCD), a blue CRS - - - flag appears.

(9) Other messages

MAP PARTLY DISPLAYED (amber)	:	In case of incomplete data transmission between the FMGC (priority criteria) and the DMC, or if the DMC cannot draw the complete MAP. This message is also displayed when a very long leg exists in the flight plan. A leg is considered as “very long” when the starting point (or endpoint) is located at more than 45 ° from the aircraft location (45 ° of longitude or latitude). This DMC limitation results from a compromise between accurate drawing precision and maximum leg length that can be displayed.
NAV ACCUR UPGRAD, or (white) NAV ACCUR DOWNGRAD (amber)	:	Signals a change in navigation accuracy.
SPECIFIC VOR/D UNAVAIL (amber)	:	If the NAVAID, that is tuned for the selected approach or departure, is not available.
BACK-UP NAV (amber)	:	If the MCDU back-up navigation mode is activated (*Refer to DSC-22_10-40-10 MCDU - MCDU Interface*)
SET OFFSIDE RNG/MODE (amber)	:	Displayed on ND 1(2), in case of an FMGC 1(2) failure when the two ND ranges or modes selected on the EFIS control panels are different.
OFFSIDE FM CONTROL (amber)	:	If the offside FM supplies the onside ND.
GPS PRIMARY (white, boxed white)	:	This message appears when GPS PRIMARY mode is available, or has been recovered. The pilot can clear this message by pressing the CLR key on the MCDU.
GPS PRIMARY LOST (amber, boxed white)	:	This message appears when GPS PRIMARY is not available, and not clearable by pilot action.

↓ (green) : Overflow arrow, displayed when more than one of the following messages are present at the same time:
- NAV ACCUR DOWNGRAD
- NAV ACCUR UPGRAD
- SPECIF VOR-D UNAVAIL
- MAP PARTLY DISPLAYED
- SET OFFSIDE RNG/MODE
- GPS PRIMARY
- GPS PRIMARY LOST

Note: *For information about the TCAS messages:* *Refer to DSC-34-SURV-60-20 TCAS Messages.*

(10) OFST R(L) XX message (yellow)
The screen displays this message, when a temporary or an offset flight plan is entered. The offset value is given in NM.

Note: *For information about the TCAS messages:* *Refer to DSC-34-SURV-60-20 TCAS Messages.*

(11) PRED W/S flag (amber)
The WINDSHEAR sw on the weather radar panel is set to AUTO, and a Predictive Windshear System fault is detected. This message appears on ground, or when flaps and slats are extended.
It is associated with a single chime. The radar image remains available, provided that the fault does not affect the radar mode.

(12) GPS message (green)
This message shows the full runway name of the selected approach. It is displayed, when the flight crew selects a GPS approach.

(13) CHECK EWD, CHECK CAPT (F/O) PFD, CHECK SD, CHECK CAPT (F/O) ND (amber)
For more information: *Refer to DSC-31-05-60 Feedback Messages*

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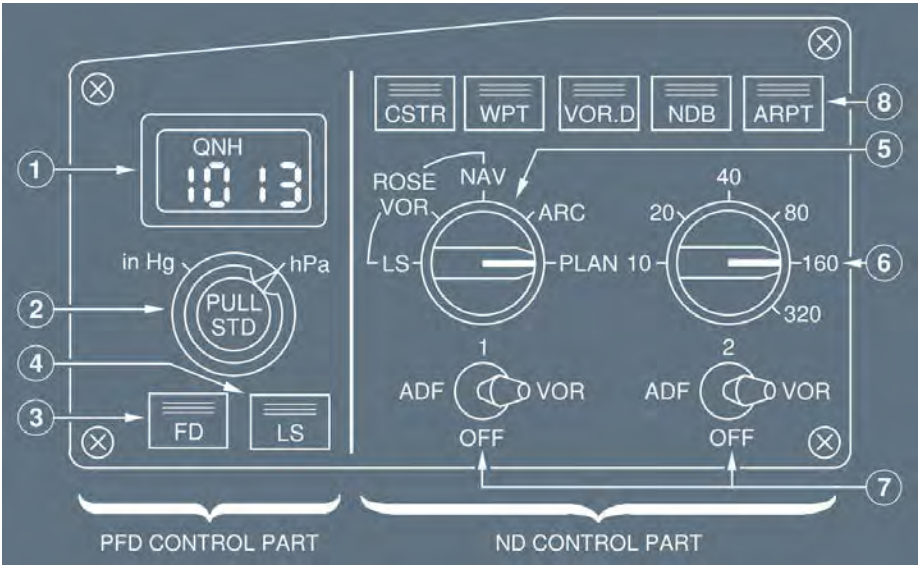
EFIS CONTROL PANEL

Ident.: DSC-31-50-00001257.0003001 / 09 OCT 12
Applicable to: ALL



(1) Barometer Reference Display Window

Range : 745 hPa to 1 100 hPa.

(2) Barometer Reference Selector

a. Outer ring : For selection of the units for the barometer reference-either hectoPascals or inches of mercury.

Note: The unit selected does not appear on the PFD.

b. Inner knob : For selection of the reference value displayed in the barometer reference display window and on the PFD below the altitude scale.

At FCU initialization, the window displays 1 013 or 29.92, depending on the unit selected.

- Pulling the knob selects the standard BARO reference setting. The PFD then displays "STD." (Rotating the knob has no effect.)
- Pushing the knob from the STD position makes the last selected QNH BARO setting available.

(3) FD pb
Pushing this button removes the FD bars from the associated PFD (or removes the flight path director symbol if the TRK FPA reference is selected).
The pushbutton light goes out.
Pushing it again restores the FD bars (or the FPD symbol) and the green pushbutton light comes on.

(4) LS pb
Pushing this button displays the localizer and glide slope scales on the PFD.
Deviation symbols appear if there is a valid ILS signal.
The green pushbutton light comes on.

(5) Mode Select Switch
This switch selects a navigation display for the onside ND.

(6) Range Select Switch
This switch selects a range scale for the onside ND.

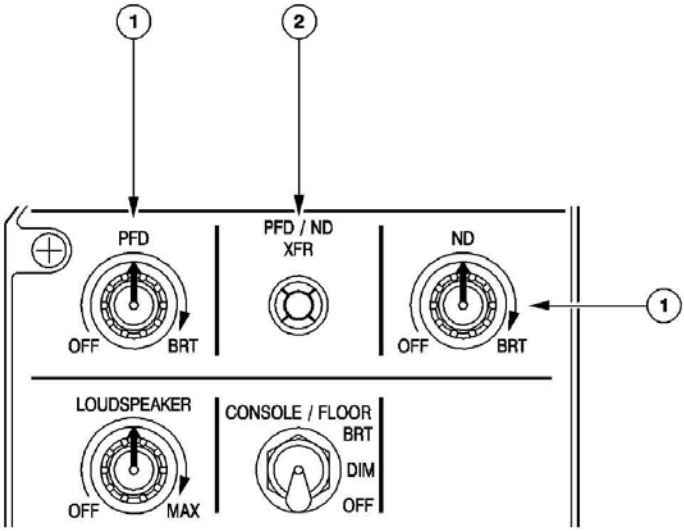
Note: If the mode or the range data fails, the default selection is the ROSE NAV mode and 80 NM range.

(7) ADF-VOR Select Switches
These switches select ADF or VOR bearing pointers and DME distance on the onside ND, as well as the corresponding NAVAID data characteristics in any mode except PLAN mode.

(8) Optional Data Display Pushbutton
Pushing this button displays optional data in addition to the data permanently displayed in PLAN, ARC, or ROSE NAV modes. The green pushbutton light comes on.
Only one option can be activated at a time.

OTHER EFIS CONTROLS

Ident.: DSC-31-50-00001258.0002001 / 15 FEB 11
Applicable to: ALL



(1) OFF/BRT knobs

- These knobs turn the PFD and ND display units on and off, and control their brightness.
- The display brightness adjusts automatically for changing light conditions, and is also adjusted manually.

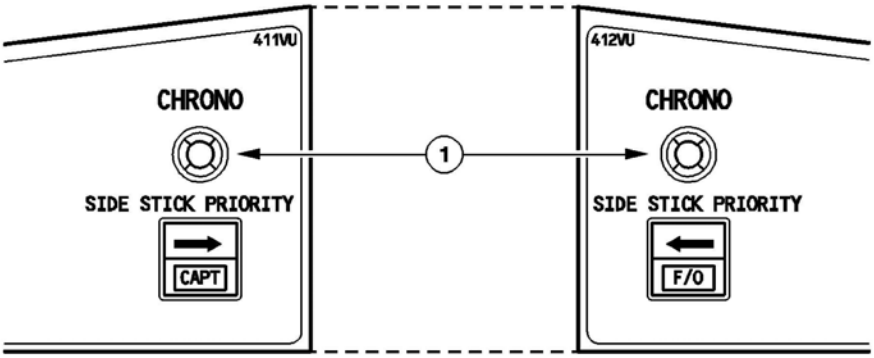
PFD Brightness Control Knob
Rotating this knob all the way counterclockwise switches off the PFD. In this case, the PFD image is automatically displayed on the NDU, but the pilot may recover the ND by means of the PFD-ND XFR pushbutton .
ND Brightness Control Knob
The outer knob controls the brightness of both the weather radar image and EGPWS terrain display.
The inner knob controls the general brightness of the ND symbols.
Rotating this knob all the way counterclockwise switches off the NDU.

(2) PFD/ND Pushbutton
Pushing this button interchanges the PFD and the ND.

If the PFDU fails, the PFD automatically transfers to the NDU.

CHRONOMETER

Ident.: DSC-31-50-00001259.0001001 / 15 FEB 11
Applicable to: ALL



(1) CHRONO Pushbutton
Pushing this button displays chronometer time on the onside ND.
Pushing it again freezes the displayed value.
Pushing it a third time resets the chronometer, and the chronometer time disappears from the display.

GENERAL

Ident.: DSC-31-55-10-00001260.0002001 / 21 MAR 16
Applicable to: ALL

A fully independent clock is on the right side of the control panel.
It sends time to the centralized fault data interface unit, the flight data interface unit, and the flight management and guidance computer.
The clock has two electrical supplies, one of which is a direct connection to the aircraft battery hot bus.

The clock performs four functions :
- It displays “UTC” (GMT) time in hours, minutes and seconds on the center counter.
- It displays elapsed time (ET) (from engine startup) in hours and minutes on the lower counter.
- It drives the chronometer (CHR), which measures a time interval (from the pushing of the CHRONO button) in minutes and seconds.
- It can replace the UTC with the date.

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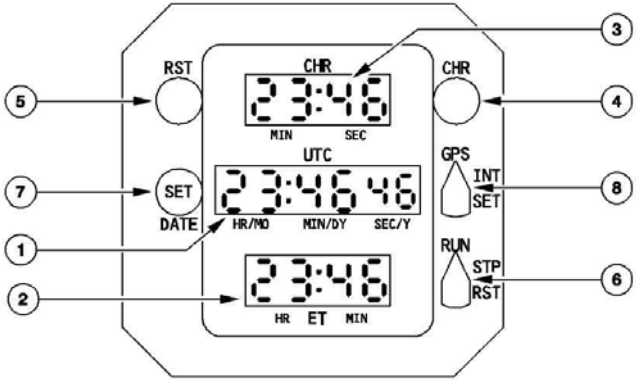
GENERAL

Ident.: DSC-31-55-20-00001261.0003001 / 16 MAR 11
Applicable to: ALL



(1) UTC (GMT) counter
This counter displays the present time in 24 h format from 0 to 23 h 59 min 59 s.

(2) Elapsed Time (ET)
This counter registers the elapsed time up to 99 h and 59 min.

(3) Chrono (CHR) counter
This Counter registers elapsed time from 0 to 99 min 59 s. It is controlled by the CHR pushbutton.

(4) CHR pushbutton

First push : starts the CHR counter

Second push : stops the CHR counter, keeps the display at its last indication.

(5) Reset (RST) pushbutton
When pressed, the CHR counter restarts from 0 if the chrono is running.

(6) ET selector

"RUN" : the ET counter starts

"STP" : the ET counter stops counting

spring loaded "RST" : the ET counter is blanked. The selector returns to its STP position when the selector is released.

Note: A cumulative elapsed time can be realized by alternatively setting this switch in "RUN" and "STP" position.

(7) DATE/SET pushbutton

First push : sets the clock to date mode. The UTC time display is replaced by the date (day month year).

Second push : sets the clock to time mode. The date display disappears.

Note: in order to select the date mode, the UTC selector must be set on "GPS" or "INT" position.

(8) UTC selector

"GPS" : Time (or date, if selected) is displayed, and this data is synchronized on GPS information.

Note:
- *If the signal between the GPS and the clock is not detected, dashes are displayed. Only the "INT" and "SET" positions are then available.*
- *If the signal is detected, but GPS data is invalid, the clock automatically runs on its internal time.*
- *The clock will automatically resynchronize on the GPS information, as soon as the GPS data becomes available.*

"INT" : Internal time (or date, if selected) is displayed.

Note:
- *The clock's internal time is initialized with the latest valid GPS information.*
- *If there is no valid GPS information at power up, the internal time will be 00:00:00, until the clock is initialized.*

"SET" : Allows the internal time and date to be initialized.

OPERATION IN INTERNAL MODE

Ident.: DSC-31-55-20-00007126.0001001 / 21 MAR 17
Applicable to: ALL

DATE INITIALIZATION

Set the UTC selector on "SET". The minute digits flash, and the seconds' digits are blank.
To increase data, turn the DATE/SET button clockwise.

To decrease data, turn the DATE/SET button counterclockwise.

- First, push on DATE/SET : To set the hour.
- Second, push on DATE/SET : To set the year.
- Third, push on DATE/SET : To set the month.
- Fourth, push on DATE/SET : To set the day.

Switch the UTC selector to the "INT" position, and the clock starts with the seconds' digits at 00.

Note: This process must be completed in less than one minute. Otherwise, it will be necessary to reset the CFDS in order to synchronize the lower ECAM time display with the cockpit clock display. Resetting the CFDS is a maintenance operation.

PRECAUTION IN CASE OF ATC DATALINK COMMUNICATION

If the clock is set to internal (INT) mode and the flight crew manually sets the time and date, the clock does not comply with the time precision required for ATC datalink communication (+/-1 s UTC). This may lead to the rejection of messages, or to the acceptance of obsolete messages:

- The CPDLC function will send CPDLC messages with an erroneous date/time
- The CPDLC function will accept obsolete uplink messages and may reject uplink messages with a correct date/time
- The uplink messages for oceanic and departure clearance will be displayed in the Datalink Control and Display Unit (DCDU) with an erroneous time
- The ADS-C function will continue to operate, but in a degraded mode.

To comply with the time precision requirement for ATC datalink communication, the flight crew must either:

- Use the clock in GPS mode, or
- Use the clock in INT mode and synchronize the clock with the GPS at least one time per day. This synchronization ensures that the UTC time drift is below +/- 1 s UTC.

GPS SYNCHRONIZATION IN INTERNAL MODE

When the clock is set to INT mode, the UTC time is only based on the internal clock and is not synchronized with the GPS. To reset the drift that results from the UTC internal time, the flight crew must perform the following actions:

- Set the UTC selector of the clock to the GPS mode and keep this setting during at least 10 seconds
- Then reset the UTC selector of the clock to INT mode.

These actions result in a resynchronization of the internal clock with the GPS.

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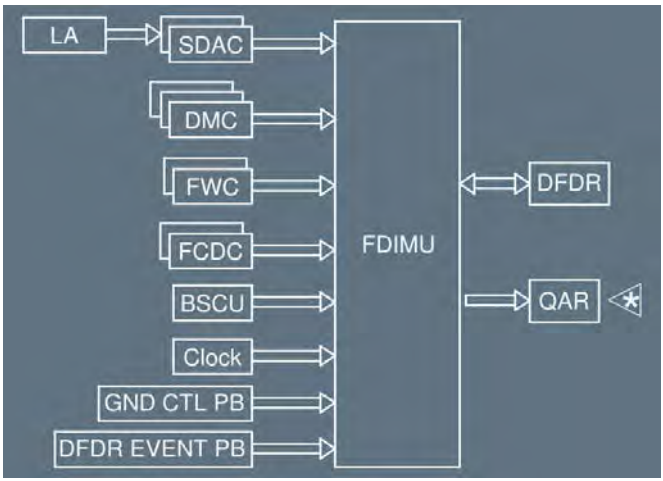
DESCRIPTION

Ident.: DSC-31-60-10-00001262.0002001 / 09 OCT 12
Applicable to: ALL

The Flight Data Recording System, which records the mandatory parameters, consists of the following components:
- A Flight Data Interface and Management Unit (FDIMU)
- A Digital Flight Data Recorder (DFDR)
- A three-axis Linear Accelerometer (LA)

The FDIMU collects and processes parameters from the SDACs, DMCs, FWCs, FCDCs, BSCU, the DFDR event pushbutton, the GND CTL pushbutton and the Clock.
It stores the mandatory flight parameters in the DFDR.
The DFDR can store the last 25 h data, at least. It stores this data on a fireproof and shockproof device. An underwater locator beacon is attached to the DFDR.
The linear accelerometer measures the acceleration of the aircraft along each of the three axes.
The QAR is an operational recorder that stores the same data as the DFDR. However the QAR is more accessible for the maintenance crew.



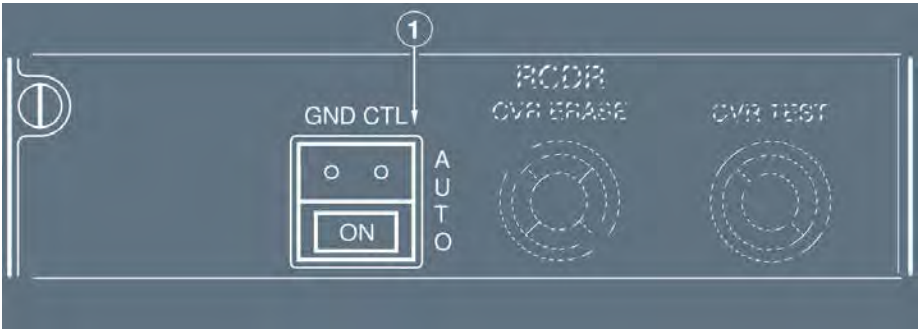
The recording system is automatically active:
- On the ground, during the first five minutes after the aircraft electric network is energized.
- On the ground, after the first engine start.
- In flight (whether the engines are running or not).

On the ground, the recording system stops automatically five minutes after the second engine shuts down.

On the ground, the crew can start the recording system manually by pressing the GND CTL pushbutton.

OVERHEAD PANEL

Ident.: DSC-31-60-20-00001263.0001001 / 09 OCT 12
Applicable to: ALL



(1) GND CTL pushbutton (springloaded)

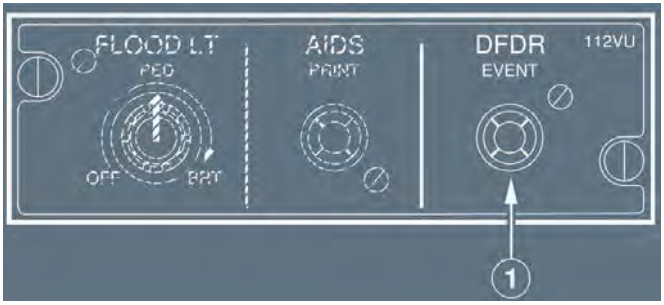
ON : The Cockpit Voice Recorder (CVR) and the Flight Data Recorders are active. The ON light is on.

AUTO : The Cockpit Voice Recorder (CVR) and the Flight Data Recorders are active, according to the logic.

The system automatically switches from ON to AUTO at the first engine start, and also in case of an electrical transient.

PEDESTAL

Ident.: DSC-31-60-20-00001264.0001001 / 22 MAY 12
Applicable to: ALL



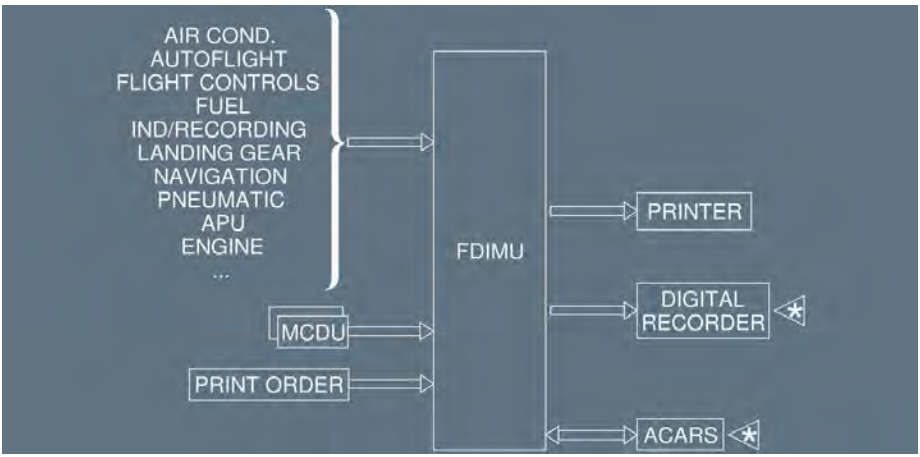
(1) DFDR EVENT pushbutton

Pressing this button (briefly) sets an event mark on the Flight Data records.

DESCRIPTION

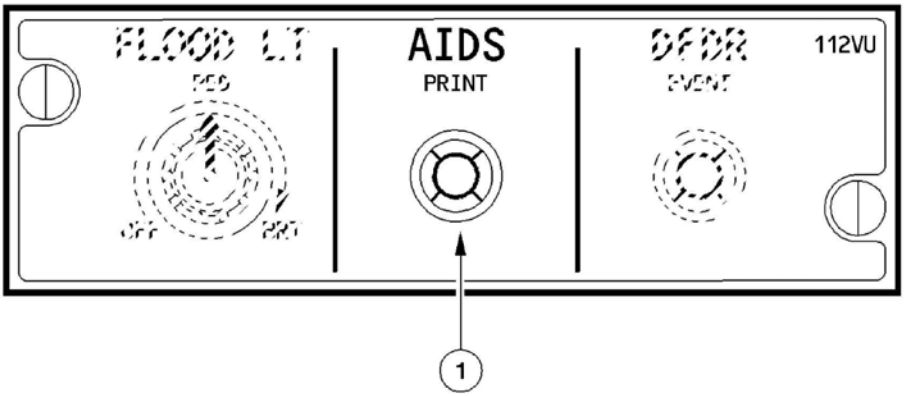
Ident.: DSC-31-60-30-00005369.0002001 / 09 OCT 12
Applicable to: ALL

The AIDS is used to monitor various aircraft system parameters in order to make maintenance easier and to allow formulating operational recommendations.
The AIDS can generate system reports. The Airbus Standard Reports are preprogrammed reports available at aircraft delivery. The operator can create its own reports.
The AIDS uses the Flight Data Interface and Management Unit (FDIMU) to acquire the relevant aircraft system parameters. The FDIMU is connected to the rest of the AIDS as shown below.
The system may be programmed using the MCDUs. The crew can select any report to be displayed on the MCDUs.
The Printer prints the flight phase programmed reports or any report selected on the MCDU.
This printing may be automatic or in response to the AIDS PRINT pushbutton.
The AIDS may send automatic reports via ACARS .
An optional Digital Recorder may be installed to extend the recording capacity.



CONTROLS ON PEDESTAL

Ident.: DSC-31-60-30-00005370.0001001 / 20 DEC 10
Applicable to: ALL



(1) AIDS PRINT pushbutton
Pushing this pushbutton causes the immediate printing of a specific report, depending on the flight phase. The crew may then use the MCDU to select another report for immediate printing.

AIRCRAFT SYSTEMS

LANDING GEAR

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DSC-32-10 Gears and Doors

DSC-32-10-10 Description

DSC-32-10-20 Landing Gear System/Interface

DSC-32-10-30 Interactions between Landing Gear and Aircraft Systems

DSC-32-10-40 Controls and Indicators

DSC-32-20 Nose Wheel Steering

DSC-32-20-10 Description

DSC-32-20-20 Controls and Indicators

Continued on the following page

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DSC-32-30 Brakes and Antiskid

DSC-32-30-10 Description

DSC-32-30-20 Controls and Indicators

GENERAL

Ident.: DSC-32-10-10-00018598.0001001 / 21 MAR 16
Applicable to: ALL

The landing gear consists of :
- Two main landing gears that retract inboard
- One nose landing gear that retracts forward.

Doors enclose the landing gear bays. Gear and doors are electrically controlled and hydraulically operated.
The doors, which are fitted to the landing gear struts, are operated mechanically by the gear and close at the end of gear retraction.
All gear doors open while the gear is retracting or extending.
Two Landing Gear Control and Interface Units (LGCIUs) control the extension and retraction of the gear and the operation of the doors. They also supply information about the landing gear to ECAM for display, and send signals indicating whether the aircraft is in flight or on the ground to other aircraft systems.
A hand crank on the center pedestal allows the flight crew to extend the landing gear if the aircraft loses hydraulic systems or electrical power.

MAIN LANDING GEAR (MLG)

Ident.: DSC-32-10-10-00018599.0001001 / 21 MAR 16
Applicable to: ALL

Each main gear has twin wheels and an oleopneumatic shock absorber.
Each main wheel has an antiskid brake.

NOSE LANDING GEAR (NLG)

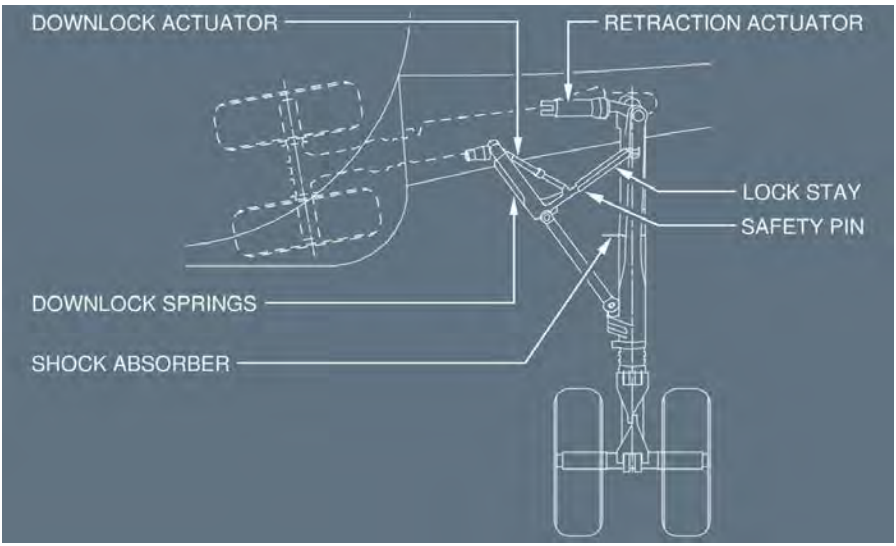
Ident.: DSC-32-10-10-00018600.0001001 / 21 MAR 16
Applicable to: ALL

The two-wheeled nose gear has an oleopneumatic shock strut and a nose wheel steering system.

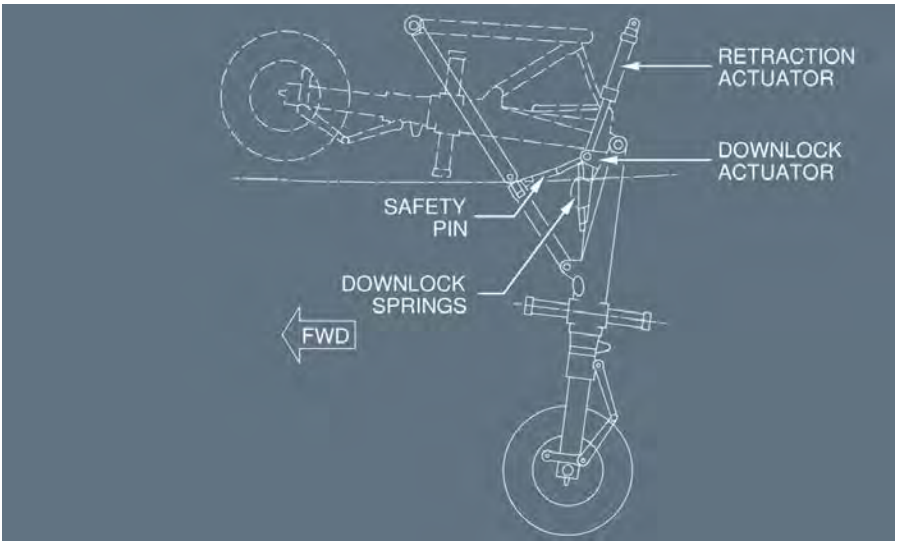
LANDING GEAR EXTENSION AND RETRACTION EQUIPMENT

Ident.: DSC-32-10-10-00018601.0001001 / 21 MAR 16
Applicable to: ALL

MAIN LANDING GEAR



NOSE LANDING GEAR



LANDING GEARS AND DOORS OPERATION

Applicable to: ALL

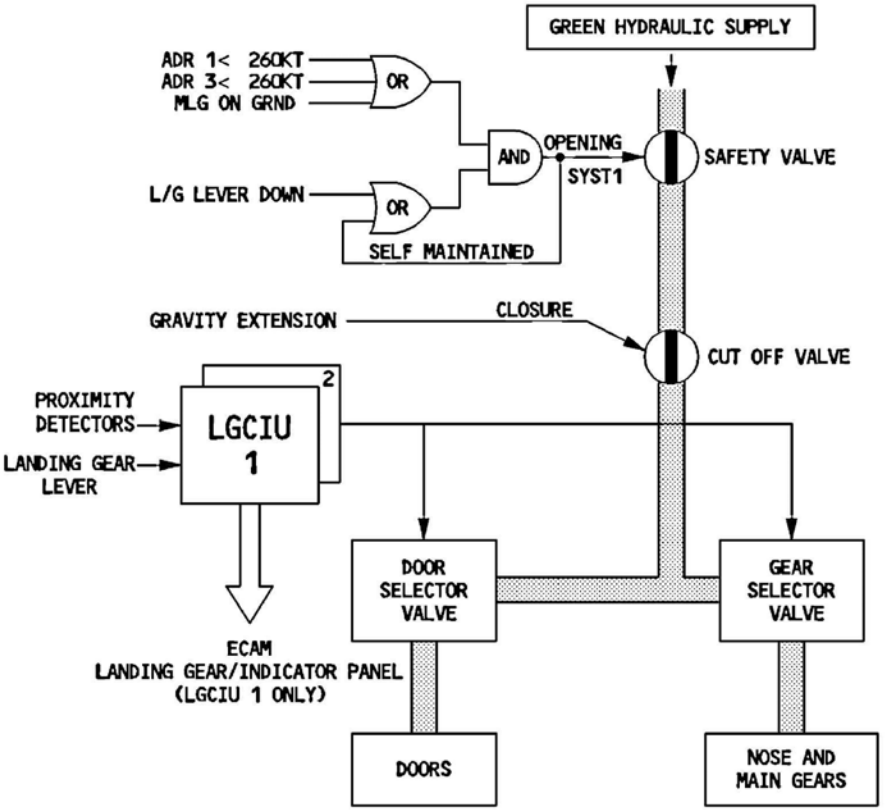
Ident.: DSC-32-10-10-A-00018602.0001001 / 21 MAR 16

NORMAL OPERATION

The flight crew normally operates the landing gear by means of the lever on the center instrument panel.

The LGCIUs control the sequencing of gear and doors electrically. One LGCIU controls one complete gear cycle, then switches over automatically to the other LGCIU at the completion of the retraction cycle. It also switches over in case of failure.

The green hydraulic system actuates all gear and doors. When the aircraft is flying faster than 260 kt, a safety valve automatically cuts off hydraulic supply to the landing gear system. Below 260 kt, the hydraulic supply remains cut off as long as the landing gear lever is up.



Ident.: DSC-32-10-10-A-00018603.0001001 / 21 MAR 16

LANDING GEAR GRAVITY EXTENSION

If the normal system fails to extend the landing gear hydraulically, the flight crew can use a crank to extend it mechanically.

When a crew member turns the crank, it :

- Isolates the landing gear hydraulics from the green hydraulic system
- Unlocks the landing gear doors and the main and nose main gear
- Allows gravity to drop the gear into the extended position.

Locking springs help the crew to crank the main gear into the locked condition, and aerodynamic forces assist in the locking of the nose gear.

The gear doors remain open.
The flight crew can reset the emergency extension system in flight after using it for training (if green hydraulic pressure is available).

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LANDING GEAR CONTROL INTERFACE UNIT (LGCIU)

Applicable to: ALL

Ident.: DSC-32-10-20-A-00018604.0001001 / 21 MAR 16

GENERAL

The LGCIUs receive position information from the landing gear, cargo door, and landing flap systems.

Ident.: DSC-32-10-20-A-00018605.0001001 / 21 MAR 16

LANDING GEAR INFORMATION

The LGCIUs receive landing gear position information from proximity detectors when:
- The landing gears are locked down or up, or
- The shock absorbers are compressed or extended, or
- The landing gear doors are open, or closed, or
- The bogie are aligned or not.

The LGCIUs send the landing gear position data to other aircraft systems.
In case of a LGCIU failure, the landing gear is controlled by the remaining healthy LGCIU.

Ident.: DSC-32-10-20-A-00018606.0001001 / 21 MAR 16

CARGO DOORS INFORMATION

Sensors send to the LGCIUs the position of the following components :
- Manuel selector valves
- Locking shaft
- Locking handle
- Safety shaft
- Door sills ◁ .

The LGCIUs detect electrical failures only in certain proximity switches in the cargo door system :
- Locking shaft
- Locking handle
- Safety shaft.

When an LGCIU makes such a detection, it indicates the NON LOCKED condition for that component.

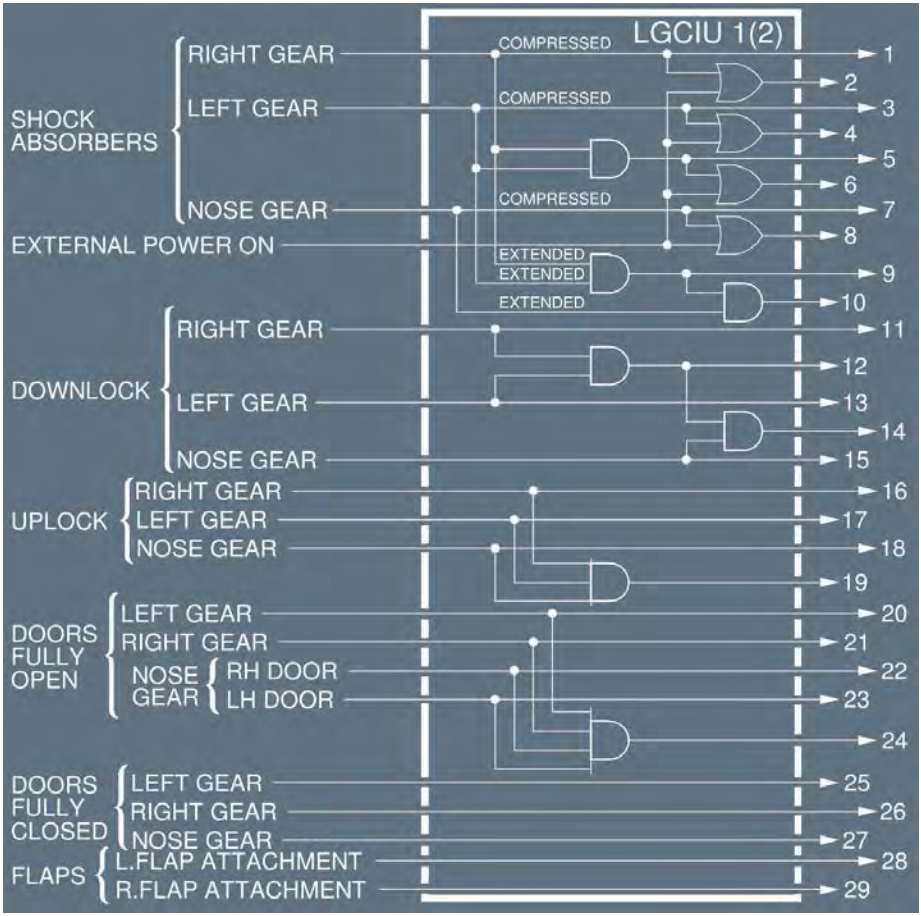
Ident.: DSC-32-10-20-A-00018607.0001001 / 21 MAR 16

LANDING FLAPS INFORMATION

The LGCIUs process the signals from four flap disconnect proximity switches, then send them to the Slat/Flap Control Computers (SFCCs).
The LGCIUs do not monitor failures in the SFCC system.

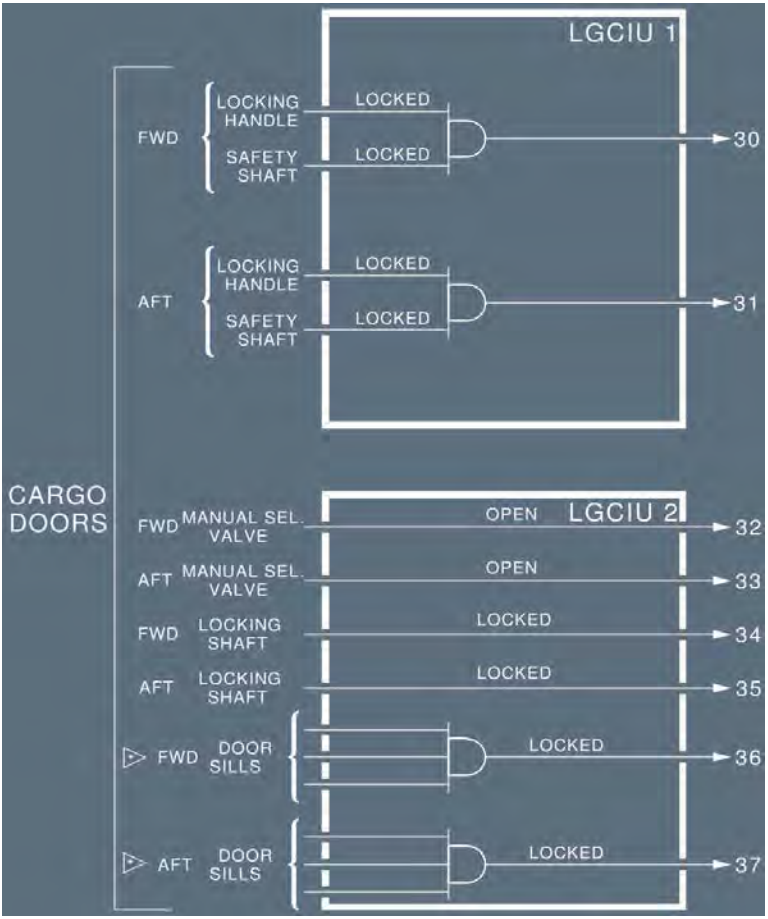
PROXIMITY DETECTOR OUTPUT SIGNALS

Ident.: DSC-32-10-20-00001278.0001001 / 22 MAY 12
Applicable to: ALL



PROXIMITY DETECTOR OUTPUT SIGNALS (CONT'D)

Ident.: DSC-32-10-20-00001279.0001001 / 21 MAR 16
Applicable to: ALL



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GENERAL

Ident.: DSC-32-10-30-00001285.0001001 / 10 DEC 09
Applicable to: ALL

The following tables present the operational effects of the proximity detectors on aircraft systems.
How to read the tables :

SYSTEM	LGCIU 1	LGCIU 2	A/C IN FLT	A/C ON GROUND
SERVICE INTERPHONE	**6**	**6**	.....	.....
SFCC 1(2)	**5**	(**5**)	.....	.....

The above lines mean that the service interphone receives the output n° 6 from both LGCIUs, while SFCC 1 receive the output 5 from LGCIU 1 and SFCC 2 the output 5 from LGCIU 2.
The two additional columns give the system functioning when the aircraft is in flight and on the ground.

PROXIMITY DETECTORS ON SHOCK ABSORBERS

Ident.: DSC-32-10-30-00018608.0001001 / 06 SEP 16
Applicable to: MSN 1882-2078

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
GENERAL	STROBE lts		**5**	On when AUTO selected	Off when AUTO selected
	LOGO lts		**5**	Off when flaps retracted	On
	AIRSTAIRS	**3**	**1**	Control inhibited(1)	Control not inhibited(2)
	CARGO DOOR(5)		**5**	Normal control not available	Normal control available
	WATER FILLING		**5**	Preselect water servicing inhibited	Preselect water servicing available

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
AIR COND	AVNCS COOLING	**5**	**5**	• Skin temp. < 35 °C : The system is in closed conf.(1) • Skin temp. > 35 °C : The system is in intermediate conf.(1)	• Skin temp. < 5 °C : The system is in closed conf.(2) • Skin temp. > 5 °C : The system is in open conf.(2)
	GRND COOLING ❄	**1** **3**	**1** **3**	Inhibited(1)	Not inhibited(2)
	FWD CARGO VENT		**5**	Extract fan stopped when ΔP > 1 PSI	Extract fan on
	CAB PRESS	**5**	**5**	Climb mode active(4)	- Prepressurization active before TO (3) - Depressurization active after LDG (3)
	PACK 1(2) TEMP CONTROL		**3** **(1)**	Pack air inlet flaps opened.	Pack air inlet flap fully closed at TO and LDG
APU	APU AUTO SHUTDOWN	**5**		In case of oil low press, automatic shutdown is delayed by 15.5 s	In case of oil low press, the automatic shutdown is delayed by: • 15.5 s if the oil temp < -4 °C • 0.05 s if oil temp > -4 °C
	APU SPEED CONTROL			Speed is controlled at 100 %	Speed is controlled at 99 % (100 % for ENG start or when ambient temp is below -18 °C or above 35 °C)

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
COMMUNICATIONS	SERVICE INTERPHONE	**6**	**6**	Inhibited(6)	Available(7)
	PUBLIC ADDRESS	**1** **3**	**1** **3**	P.A. increased level(6)	P.A. low level(7)
	ADIRU and AVIONICS ground warning	**1** **3**	**1** **3**	External horn and light inhibited(6)	External horn and light not inhibited(7)
	FLT INTERPHONE	**9**		Communication with ground mechanic inhibited	Communication with ground mechanic available
	COCKPIT CALL LIGHT	**9**		Inhibited	Not inhibited
	ACARS (ACARS MU or ATSU)	**7**		Available	Available
	CVR	**1** **3** **7**	**1** **3**	Runs(6)	Runs : (7) - During the first 5 min following energization - With at least one engine running Stops : (7) 5 min after second engine shutdown
	CVR		**5**	• ERASE function inhibited • No low frequency signal in the loudspeakers if test performed	• ERASE function not inhibited • Low frequency signal in the loudspeakers if test performed
ELEC	DC generation	**5**		APU start on batteries only, is delayed by 45 s	No APU start delay when on batteries only
	GALLEY supply		**5**	Main galley not supplied when APU GEN only is supplying	Main galley supplied when APU GEN only is supplying
EIS	EIS	**5**		Display test inhibited when ANN LT TEST is selected	Display test not inhibited
FIRE	APU	**5**		No APU fire automatic extinguishing	Automatic extinguishing not inhibited

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
FLT CTL	SFCC 1(2)	**5**	**(5)**	• For SFCC 1(2): Slats alpha/speed lock function active • For SFCC(2): No flaps movement inhibition if the cargo door is opened	• For SFCC 1(2): Slats alpha/speed lock function active if speed > 60 kt • For SFCC (2): Flaps movement inhibition if cargo door is opened
FLT INST	• DFDR • QAR ✻	**1** **3** **7**	**1** **3**	Runs[6]	Runs: [7] • During the first 5 min following energization • With one engine running Stops: [7] 5 min after second engine shut down
FUEL	FQI	**5**		FQI uses flight attitude correction due to wing bending	FQI uses ground attitude correction

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
HYD	BLUE and GREEN pumps	**1** **3**		Blue or green pump "FAULT" light not inhibited when related pump is stopped(6)	Blue or green pump "FAULT" light inhibited when related pump is stopped(7)
	BLUE pump	**7**		Runs when electrical power is available	Runs when at least one engine is running
	BLUE and YELLOW pumps		**1** **3**	Blue or yellow pump "FAULT" light not inhibited when related pump is stopped(6)	Blue or yellow pump "FAULT" light inhibited when related pump is stopped(8)
	PTU		**7**	PTU runs if green/yellow diff. press > 500 PSI	PTU runs if green/yellow diff. press > 500 PSI and • Both MASTER LEVERS are at OFF or • Both MASTER LEVERS are at ON or • Nose wheel steering is not in towing position with parking brake released. PTU is inhibited during the use of the cargo door hand pump and for 40 s after its use.
ICE RAIN PROT	CAPT, (F/O), ((STBY)) probes and CAPT, (F/O) windows heating	**4,** **(2)** **((8))**	**4,** **(2)** **((8))**	• CAPT, (F/O), ((STBY)) pitots and CAPT, (F/O) windows : high heating level applied • All other probes and windows are heated(6)	• With engines stopped: no heating(8) • With at least one engine running: CAPT, (F/O), ((STBY)) pitots and CAPT, (F/O) windows are heated at low level(8)
	WING ANTI ICE	**3**	**1**	Wing anti ice valves open when the WING ANTI ICE pb is at ON(6)	Wing anti ice valves open for 30 s when the WING ANTI ICE pb is at ON(8)
	RAIN REPELLENT	**1** **3**	**1** **3**	Not inhibited(6)	Inhibited if engines are stopped(7)
	DRAIN MAST(10)		**9**	High heating level is applied	Low heating level is applied

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
LANDING GEAR	L/G SAFETY VALVE	**6**		Safety valve closes if aircraft speed > 260 kt	Safety valve opened
	L/G control	**10**	**10**	Retraction not inhibited(9)	Retraction inhibited(9)
	TIRE PRESS		**5**	"TYRE LO PRESS" warning threshold set to its flight level	"TYRE LO PRESS" warning threshold set to its ground level
NAVIGATION	STAND BY ALTI	**5**		VIBRATION function active	VIBRATION function inhibited
	ATC 1(2)	**3**	**(1)**	ATC 1(2) available in AUTO mode	ATC 1(2) inhibited in AUTO mode
	ADIRU 1(10)	**7**		No external horn when ADIRU supplied from batteries only	External horn not inhibited

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
POWER PLANT	FADEC 1(2)	**1 3 8**	**(1) (3) (8)**	On ENG 1(2): (6) • Reverse inhibited • No automatic start abort • FADEC always supplied • FLEX not available • If installed, BUMP not selectable	On ENG 1(2): (8) • Reverse available • Automatic start abort available • 5 min after eng-shut down FADEC 1(2) no more supplied • FLEX available • If installed, BUMP selectable
		1 3 8	**(1) (3) (8)**	Modulated idle and approach idle are available(6)	Modulated idle only available(7)

(1) *When either LGCIU indicates flight.*

(2) *When both LGCIU indicate ground.*

(3) *When either LGCIU indicates ground.*

(4) *When both LGCIU indicate flight.*

(5) *Valid from MSN 44.*

(6) *When either output indicates flight.*

(7) *When all outputs indicate ground.*

(8) *When both outputs indicate ground.*

(9) *One valid output is sufficient.*

(10) *Valid from MSN 22.*

PROXIMITY DETECTORS ON SHOCK ABSORBERS

Ident.: DSC-32-10-30-00018608.0003001 / 06 SEP 16
Applicable to: MSN 3408-4547

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
GENERAL	STROBE lts		**5**	On when AUTO selected	Off when AUTO selected
	LOGO lts		**5**	Off when flaps retracted	On
	AIRSTAIRS ◁	**3**	**1**	Control inhibited(1)	Control not inhibited(2)
	CARGO DOOR(5)		**5**	Normal control not available	Normal control available
	WATER FILLING		**5**	Preselect water servicing inhibited	Preselect water servicing available
AIR COND	AVNCS COOLING	**5**	**5**	• Skin temp. < 35 °C : The system is in closed conf.(1) • Skin temp. > 35 °C : The system is in intermediate conf. (1)	• Skin temp. < 5 °C : The system is in closed conf.(2) • Skin temp. > 5 °C : The system is in open conf.(2)
	GRND COOLING ◁	**1** **3**	**1** **3**	Inhibited(1)	Not inhibited(2)
	FWD CARGO VENT		**5**	Extract fan stopped when ΔP > 1 PSI	Extract fan on
	CAB PRESS	**5**	**5**	Climb mode active(4)	- Prepressurization active before TO (3) - Depressurization active after LDG (3)
	PACK 1(2) TEMP CONTROL		**3** **(1)**	Pack air inlet flaps opened	Pack air inlet flap fully closed at TO and LDG
APU	APU AUTO SHUTDOWN	**5**		In case of oil low press, automatic shutdown is delayed by 15.5 s	- In case of oil low press, the automatic shutdown is delayed by : • 15.5 s if the oil temp < -4 °C • 0.05 s if oil temp > -4 °C

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
COMMUNICATIONS	SERVICE INTERPHONE	**6**	**6**	Inhibited(6)	Available(7)
	PUBLIC ADDRESS	**1** **3**	**1** **3**	P.A. increased level(6)	P.A. low level(7)
	ADIRU and AVIONICS ground warning	**1** **3**	**1** **3**	External horn and light inhibited(6)	External horn and light not inhibited(7)
	FLT INTERPHONE	**9**		Communication with ground mechanic inhibited	Communication with ground mechanic available
	COCKPIT CALL LIGHT	**9**		Inhibited	Not inhibited
	ACARS (ACARS MU or ATSU)	**7**		Available	Available
	CVR	**1** **3** **7**	**1** **3**	Runs(6)	Runs: (7) - during the first 5 min following energization - with one engine running Stops: (7) 5 min after second engine shutdown
	CVR		**5**	• ERASE function inhibited • No low frequency signal in the loudspeakers if test performed	• ERASE function not inhibited • Low frequency signal in the loudspeakers if test performed
ELEC	DC generation	**5**		APU start on batteries only, is delayed by 45 s	No APU start delay when on batteries only
	GALLEY supply		**5**	Main galley not supplied when APU GEN only is supplying	Main galley supplied when APU GEN only is supplying
EIS	EIS	**5**		Display test inhibited when ANN LT TEST is selected	Display test not inhibited
FIRE	APU	**5**		No APU fire automatic extinguishing	Automatic extinguishing not inhibited

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
FLT CTL	SFCC 1(2)	**5**	**(5)**	• For SFCC 1(2): Slats alpha/speed lock function active • For SFCC(2): No flaps movement inhibition if the cargo door is opened	• For SFCC 1(2): Slats alpha/speed lock function active if speed > 60 kt • For SFCC (2): Flaps movement inhibition if cargo door is opened
FLT INST	• DFDR • QAR	**1** **3** **7**	**1** **3**	Runs(6)	Runs: (7) • During the first 5 min following energization • With one engine running Stops: (7) 5 min after second engine shut down
FUEL	FQI	**5**		FQI uses flight attitude correction due to wing bending	FQI uses ground attitude correction
HYD	BLUE and GREEN pumps	**1** **3**		Blue or green pump "FAULT" light not inhibited when related pump is stopped(6)	Blue or green pump "FAULT" light inhibited when related pump is stopped(7)
	BLUE pump	**7**		Runs when electrical power is available	Runs when at least one engine is running
	BLUE and YELLOW pumps		**1** **3**	Blue or yellow pump "FAULT" light not inhibited when related pump is stopped(6)	Blue or yellow pump "FAULT" light inhibited when related pump is stopped(8)
	PTU		**7**	PTU runs if green/yellow diff. press > 500 PSI	PTU runs if green/yellow diff. press > 500 PSI and • both MASTER LEVERS are at OFF or • Both MASTER LEVERS are at ON or • Nose wheel steering is not in towing position with parking brake released. PTU is inhibited during the use of the cargo door hand pump and for 40 s after its use.

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
ICE RAIN PROT	CAPT, (F/O), ((STBY)) probes and CAPT, (F/O) windows heating	**4, (2) ((8))**	**4, (2) ((8))**	• CAPT, (F/O), ((STBY)) pitots and CAPT, (F/O) windows : high heating level applied • All other probes and windows are heated(6)	• With engines stopped: no heating(8) • With at least one engine running: • CAPT, (F/O), ((STBY)) pitots and CAPT, (F/O) windows are heated at low level(8)
	WING ANTI ICE	**3**	**1**	Wing anti ice valves open when the WING ANTI ICE pb is at ON(6)	Wing anti ice valves open for 30 s when the WING ANTI ICE pb is at ON(8)
	RAIN REPELLENT	**1** **3**	**1** **3**	Not inhibited(6)	Inhibited if engines are stopped(7)
	DRAIN MAST(10)		**9**	High heating level is applied	Low heating level is applied
LANDING GEAR	L/G SAFETY VALVE	**6**		Safety valve closes if aircraft speed > 260 kt	Safety valve opened
	L/G control	**10**	**10**	Retraction not inhibited(9)	Retraction inhibited(9)
	TIRE PRESS		**5**	"TYRE LO PRESS" warning threshold set to its flight level	"TYRE LO PRESS" warning threshold set to its ground level
NAVIGATION	STAND BY ALTI	**5**		VIBRATION function active	VIBRATION function inhibited
	ATC 1(2)	**3**	**(1)**	ATC 1(2) available in AUTO mode	ATC 1(2) inhibited in AUTO mode
	ADIRU 1(10)	**7**		No external horn when ADIRU supplied from batteries only	External horn not inhibited

Continued on the following page

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	A/C IN FLT	A/C ON GRND
POWER PLANT	FADEC 1(2)	**1** **3** **8**	**(1)** **(3)** **(8)**	On ENG 1(2): (6) • Reverse inhibited • No automatic start abort • FADEC always supplied • FLEX not available • If installed, BUMP not selectable	On ENG 1(2): (8) • Reverse available • Automatic start abort available • 5 min after eng-shut down FADEC 1(2) no more supplied • FLEX available • If installed, BUMP selectable
		1 **3** **8**	**(1)** **(3)** **(8)**	Modulated idle and approach idle are available(6)	Modulated idle only available (7)

(1) *When either LGCIU indicates flight.*

(2) *When both LGCIU indicate ground.*

(3) *When either LGCIU indicates ground.*

(4) *When both LGCIU indicate flight.*

(5) *Valid from MSN 44.*

(6) *When either output indicates flight.*

(7) *When all outputs indicate ground.*

(8) *When both outputs indicate ground.*

(9) *One valid output is sufficient.*

(10) *Valid from MSN 22.*

PROXIMITY DETECTORS ON UPLOCKS

Ident.: DSC-32-10-30-00018610.0002001 / 21 MAR 16
Applicable to: ALL

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	L/G UPLOCKED	L/G NOT UPLOCKED
LANDING GEAR	L/G control	**19**	**19**	If UP selected :(1) L/G doors will close	If UP selected :(1) L/G doors will not close
	ECAM WHEEL page	**16** **17** **18**	**16** **17** **18**	If UP selected :(2) L/G uplocked indications	If UP selected :(2) L/G in transit indications
	L/G indicator panel	**16** **17** **18**		If UP selected :(2) no indication	If UP selected :(2) "UNLK" red indications

(1) *One valid output is sufficient.*

(2) *When all outputs indicate the same position.*

PROXIMITY DETECTORS ON DOORS

Ident.: DSC-32-10-30-00018611.0001001 / 21 MAR 16
Applicable to: ALL

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	DOORS FULLY OPENED	DOORS CLOSED
LANDING GEAR	L/G control	**24**	**24**	L/G extension or retraction possible (1)	L/G extension or retraction inhibited (1)
	ECAM WHEEL page	**20** **21** **22** **23**	**20** **21** **22** **23**	Doors fully opened indication	Doors closed indication

(1) *One valid output is sufficient.*

PROXIMITY DETECTORS ON DOWNLOCKS

Ident.: DSC-32-10-30-00018613.0001001 / 21 MAR 16
Applicable to: ALL

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	L/G DOWNLOCKED	L/G NOT DOWNLOCKED
GEN	TAXI/T.O lights		**15**	Lights not inhibited	Lights inhibited
COMM	SIGNS	**12**	**12**	"NO SMOKING" (1)and "EXIT" signs on when AUTO selected(2)	"NO SMOKING" (1)and EXIT" signs inhibited when AUTO selected(3)

Continued on the following page

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	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	L/G DOWNLOCKED	L/G NOT DOWNLOCKED
FLT INST	WBS ◁✻	**15**	**15**	Active *(4)*	Inhibited *(5)*
FMGS	FAC 1(2)	**12**	**12**	VLE indication displayed on PFD 1(2)	No VLE indication
LANDING GEAR	L/G control	**14**	**14**	If DOWN selected : *(6)* L/G doors will close	If DOWN selected : *(6)* L/G doors will not close
	ECAM WHEEL page	**11** **13** **15**	**11** **13** **15**	If DOWN selected : *(7)* L/G down indications	If DOWN selected : *(7)* L/G in transit indications
	L/G INDIC panel	**11** **13** **15**		If DOWN selected :*(7)* L/G down indications	If DOWN selected : *(7)* L/G in transit indications
	BRAKING STEERING	**15**	**15**	BSCU test operative*(2)*	BSCU test inhibited*(3)*
	BRAKE COOLING FANS ◁✻		**13**	Cooling available when ON selected	Cooling inhibited when ON selected
NAV	GPWS	**13**		"TOO LOW-FLAPS" or "TOO LOW TERRAIN" warning operative	"TOO LOW-GEAR" or "TOO LOW TERRAIN" warning operative

(1) For cabin not configured for non smoking flight

(2) When either output indicates DOWNLOCK.

(3) When both outputs indicate NOT DOWNLOCK.

(4) When both outputs indicate DOWNLOCK.

(5) When either output indicates NOT DOWNLOCK.

(6) One valid output is sufficient.

(7) When all outputs indicate the same position.

PROXIMITY DETECTORS ON CARGO DOORS

Ident.: DSC-32-10-30-00018614.0001001 / 21 MAR 16
Applicable to: ALL

LOCKING HANDLE OR SHAFT, DOOR SILLS

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	LOCKED	UNLOCKED
CRG DOORS	ECAM DOOR PAGE	**30 (31)**		Forward (aft) door symbol appears green	Forward (aft) door symbol appears amber, associated with "CARGO" amber
	CARGO DOOR OPERATION		**34 (35)**	Forward (aft) door normal opening inhibition	Forward (aft) door normal opening possible
			36 (37)	Forward (aft) door normal operation possible	Forward (aft) door normal operation inhibited

MANUAL SELECTOR VALVE

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	CLOSE	OPEN
CRG DOORS	CARGO DOOR OPERATION		**32 (33)**	Forward (aft) door normal opening inhibition	Forward (aft) door normal opening possible

PROXIMITY DETECTORS ON FLAPS ATTACHMENTS

Ident.: DSC-32-10-30-00001291.0001001 / 22 MAR 16
Applicable to: ALL

	SYSTEM	LGCIU 1 OUTPUT	LGCIU 2 OUTPUT	FLAP ATTACHMENT	FLAP ATTACHMENT FAILURE
FLT CTL	SFCC	**28 (29)**	**28 (29)**	L(R) FLAPS normal operation (1)	"FLAPS LOCKED" warning (2)

(1) *When at least one SFCC detects normal operation*

(2) *When both SFCCs detect attachment failure*

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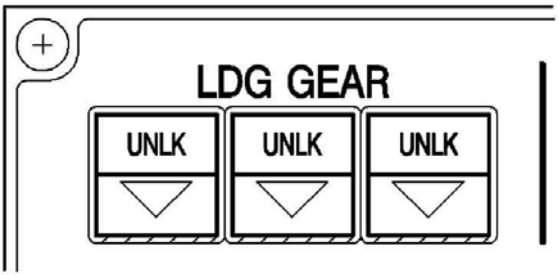
LANDING GEAR INDICATOR PANEL

Ident.: DSC-32-10-40-00018615.0001001 / 21 MAR 16
Applicable to: ALL



This panel is connected to LGCIU1, which receives signals from proximity detectors.

▽ light: comes on green if the gear is locked down.

UNLK light: comes on red if the gear is not locked in the selected position.

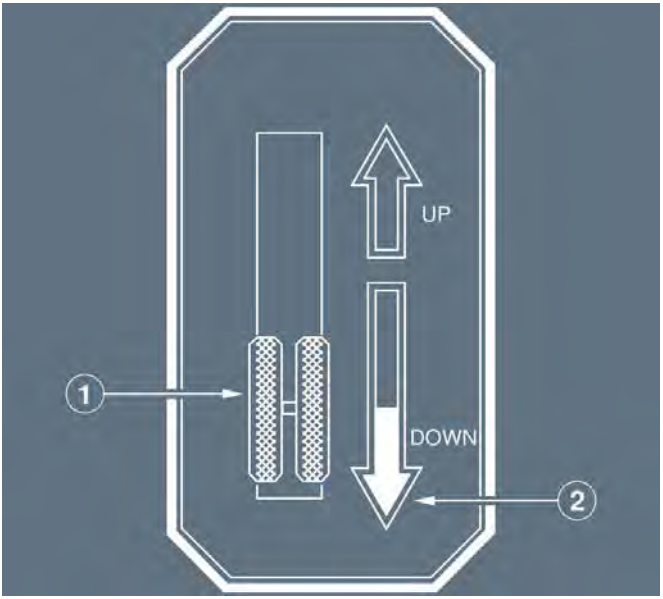
Note: This panel is connected to the LGCIU1 only, therefore, the lights on the LDG GEAR indicator panel come on as long as the LGCIU1 is electrically supplied.
If one UNLK indication remains on, the landing gear position can be confirmed using the WHEEL SD page (information from LGCIU 1 & 2). Only one green triangle on each landing gear is sufficient to confirm that the landing gear is downlocked.

LANDING GEAR SELECTOR LEVER

Ident.: DSC-32-10-40-00018616.0001001 / 20 MAY 16
Applicable to: ALL

A two-position selector lever sends electrical signals to the two LGCIUs. These control the green hydraulic supply to the landing gear system by means of selector valves.
The flight crew must always move the L/G lever in one continuous movement (i.e. with no stop between both positions).

When the flight crew selects UP or DOWN (and if the airspeed is below 260 kt):
- All landing gear doors open
- Each landing gear moves to the selected position
- All landing gear doors close.



(1) L/G LEVER

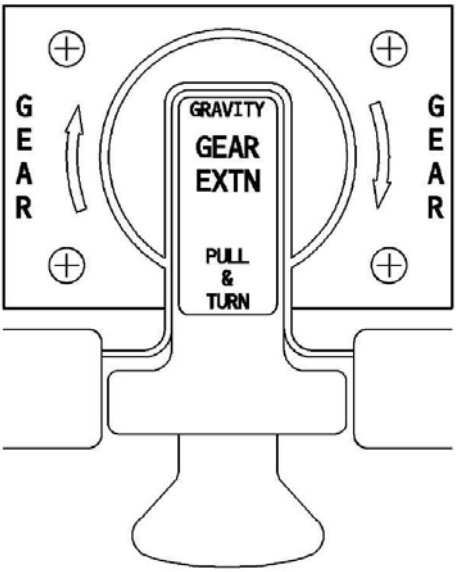
UP : This position selects landing gear retraction.
While the landing gear doors are opening, the normal brake system brakes the wheels of the main landing gear automatically.
A brake band in the nose landing gear well brakes the nose landing gear wheels as the doors close (for aircraft equipped with nose landing gear rubbing strips).

DOWN : This position selects landing gear extension.
An interlock mechanism prevents anyone from accidentally retracting the gear while the aircraft is on the ground. It does so by locking the lever in DOWN position when the shock absorber on either main gear is compressed (aircraft on ground) or the nose wheel steering is not centered.
The landing gear hydraulic system remains pressurized as long as the landing gear is extended (if green hydraulic pressure is available).

(2) RED ARROW
This red arrow lights up if the landing gear is not locked down when the aircraft is in the landing configuration, and a red warning appears on ECAM.

LANDING GEAR GRAVITY EXTENSION

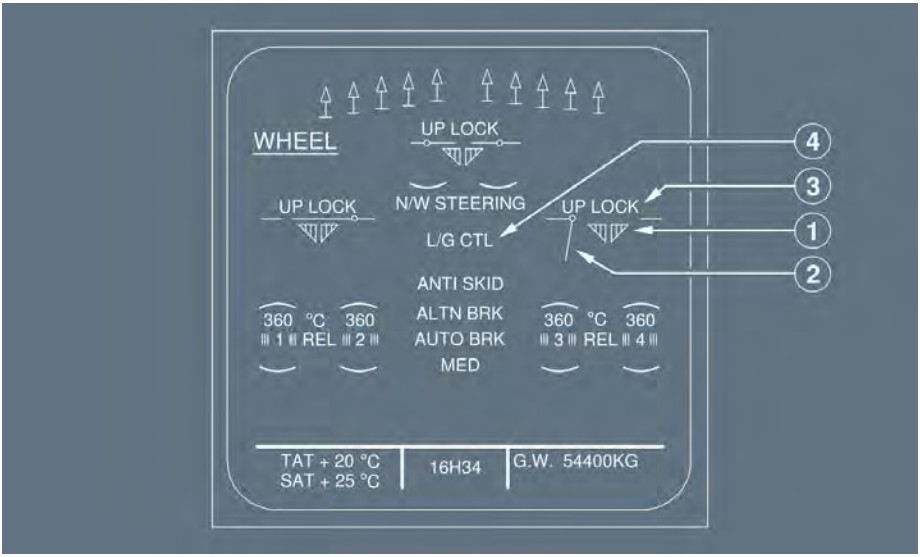
Ident.: DSC-32-10-40-00018617.0001001 / 21 MAR 16
Applicable to: ALL



To put the landing gear down by gravity, the flight crew must pull the gear crank out, then turn it clockwise for 3 turns.
When the flight crew operates the crank handle, the cutout valve shuts off hydraulic pressure to the landing gear system and depressurizes it.

WHEEL SD PAGE

Ident.: DSC-32-10-40-00018618.0007001 / 21 MAR 16
Applicable to: MSN 3467, 4379-4547



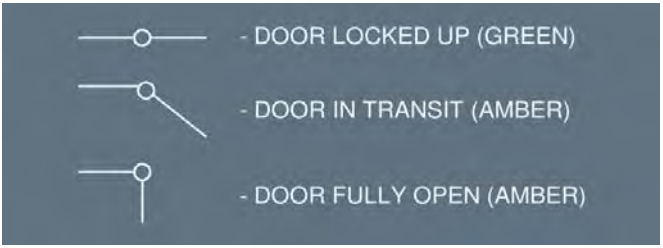
(1) Landing gear position indication

The landing gear positions are indicated by 2 triangles for each gear. The indications are as follow:

- Green triangle indicates that one LGCIU detects a landing gear downlocked
- Red triangle indicates that one LGCIU detects a landing gear in transit
- No triangle indicates that one LGCIU detects a landing gear uplocked
- Amber crosses will replace the right triangle to indicate that LGCIU 1 or LGCIU 2 has failed.

Note: Only one green triangle on each landing gear strut is sufficient to confirm that the landing gear is downlocked.

(2) Landing gear door position indication

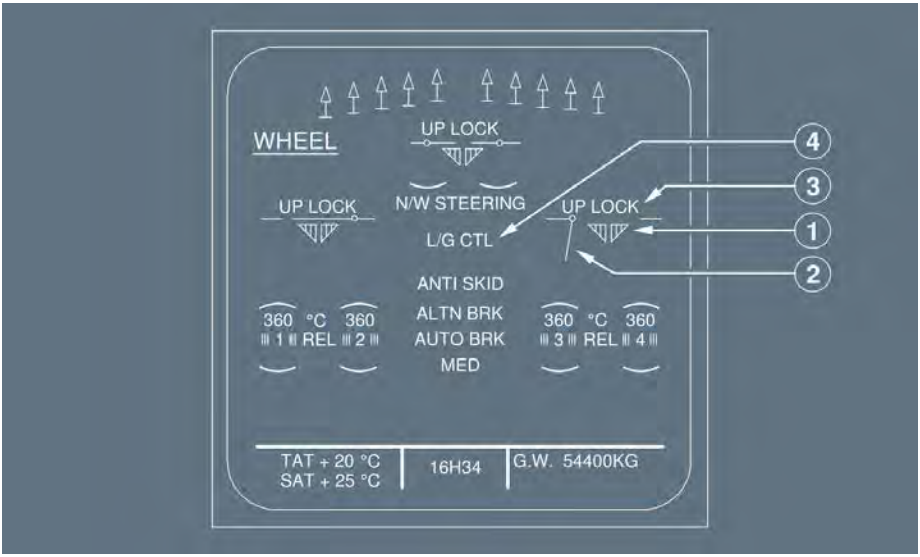


(3) UP LOCK
This legend appears amber along with a caution on the ECAM if the landing gear uplock is engaged when the landing gear is down locked.

(4) L/G CTL
This legend appears amber along with an ECAM caution if the landing gear lever and the landing gear position do not agree. This legend only appears when the landing gear is moving to the selected position.

WHEEL SD PAGE

Ident.: DSC-32-10-40-00018618.0004001 / 21 MAR 16
Applicable to: MSN 3408, 3518-4100



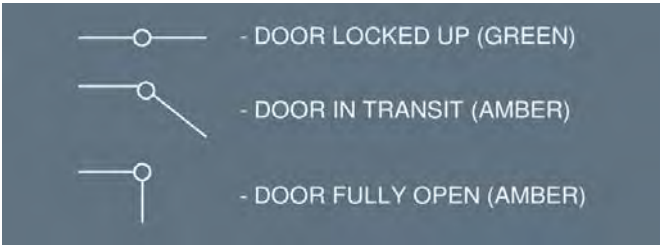
(1) Landing gear position indication

The landing gear positions are indicated by 2 triangles for each gear:

- Green triangle indicates that one LGCIU detects a landing gear downlocked
- Red triangle indicates that one LGCIU detects a landing gear in transit
- No triangle indicates that one LGCIU detects a landing gear uplocked
- Amber crosses on one triangle indicate that LGCIU1 or LGCIU2 is failed.

Note: Only one green triangle on each landing gear strut is sufficient to confirm that the landing gear is downlocked.

(2) Landing gear door position indication



(3) UP LOCK

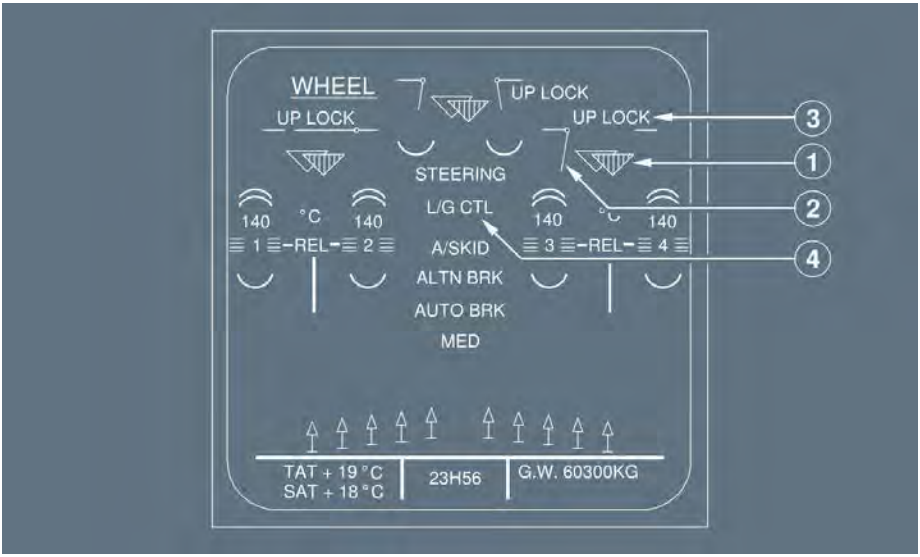
This legend appears amber along with a caution on the ECAM if the landing gear uplock is engaged when the landing gear is down locked.

(4) L/G CTL

This legend appears amber along with an ECAM caution if the landing gear lever and the landing gear position do not agree. This legend only appears when the landing gear is moving to the selected position.

WHEEL SD PAGE

Ident.: DSC-32-10-40-00018618.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



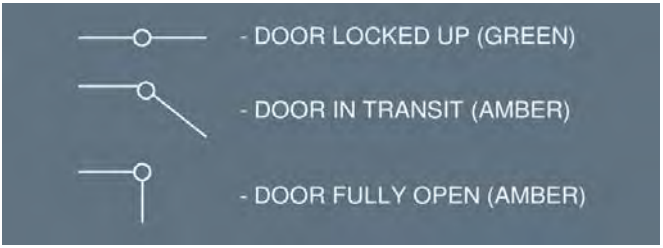
(1) Landing gear position indication

The landing gear positions are indicated by 2 triangles for each gear. The indications are as follow:

- Green triangle indicates that one LGCIU detects a landing gear downlocked
- Red triangle indicates that one LGCIU detects a landing gear in transit
- No triangle indicates that one LGCIU detects a landing gear uplocked
- Amber crosses indicate that one LGCIU is failed.

Note: Only one green triangle on each landing gear strut is sufficient to confirm that the landing gear is downlocked.

(2) Landing gear door position indication



(3) UP LOCK
This legend appears amber along with a caution on the ECAM if the landing gear uplock is engaged when the landing gear is down locked.

(4) L/G CTL
This legend appears amber along with an ECAM caution if the landing gear lever and the landing gear position do not agree. This legend only appears when the landing gear is moving to the selected position.

MEMO DISPLAY

Ident.: DSC-32-10-40-00018778.0001001 / 22 MAR 16
Applicable to: ALL

FLT L/G DOWN : This memo appears in green if the aircraft is operated in ferry flight conditions with landing gear down.

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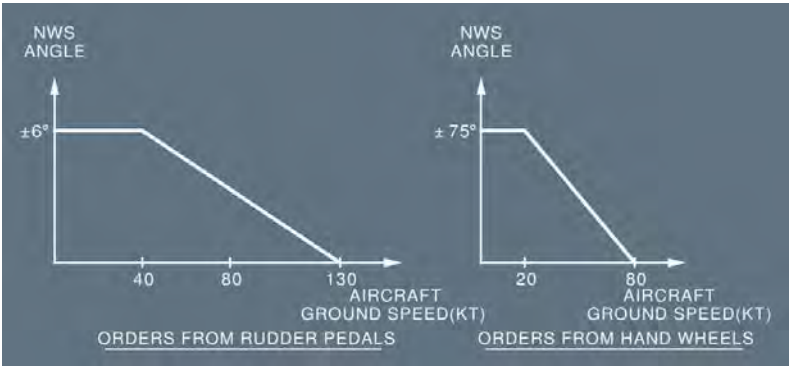
DESCRIPTION

Ident.: DSC-32-20-10-00018619.0007001 / 21 MAR 16
Applicable to: MSN 3408-4547

A hydraulic actuating cylinder steers the nose wheel. The yellow hydraulic system supplies pressure to the cylinder, and electric signals from the Brake and Steering Control Unit (BSCU) control it.

The BSCU receives orders from:
- Captain's, and the First Officer's steering hand wheels (orders added algebraically), or
- Rudder pedals, or
- Autopilot.

The BSCU transforms these orders into nose wheel steering angle. That angle has the following limits, which depend on ground speed and the origin of the orders.



The steering system receives actuating hydraulic pressure when:
- A/SKID & N/W STRG switch is ON
- Towing control lever is in normal position
- At least one engine is running
- Aircraft is on ground.

The handwheel can turn the nosewheel up to 75 ° in either direction. A lever, on the towing electrical box (on nose landing gear), enables ground crew to deactivate the steering system for towing. Then the wheel can be turned 95 ° in either direction.
To prevent rudder pedal orders, or autopilot orders, from going to the BSCU, the pilots can use the pushbutton on either steering handwheel.
00000An internal cam mechanism returns the nose wheel to the centered position after takeoff.

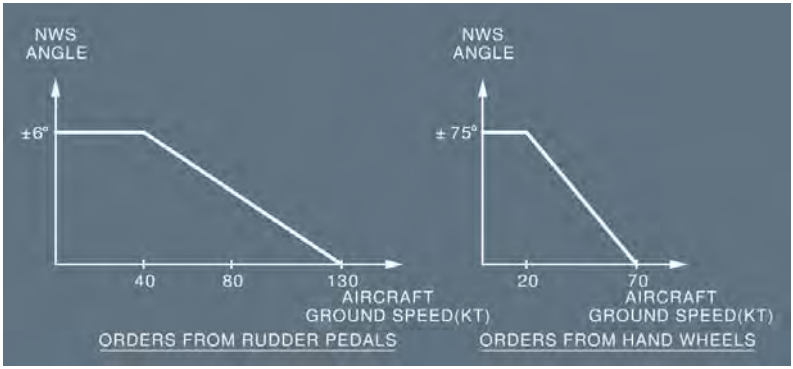
DESCRIPTION

Ident.: DSC-32-20-10-00018619.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

A hydraulic actuating cylinder steers the nose wheel. The green hydraulic system supplies pressure to the cylinder, and electric signals from the Brake and Steering Control Unit (BSCU) control it.

The BSCU receives orders from:
- Captain's, and the First Officer's steering hand wheels (orders added algebraically), or
- Rudder pedals, or
- Autopilot.

The BSCU transforms these orders into nose wheel steering angle. That angle has the following limits, which depend on ground speed and the origin of the orders.



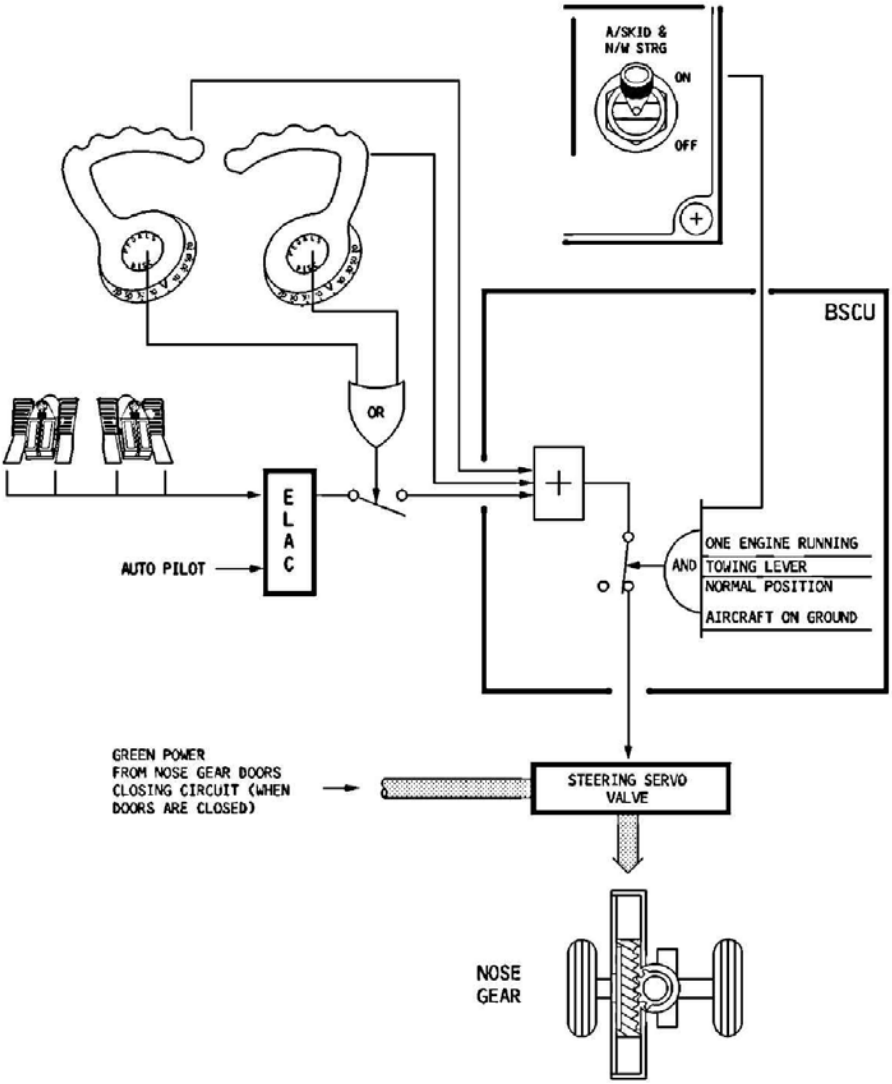
The steering system receives actuating hydraulic pressure when:
- A/SKID & N/W STRG switch is ON
- Towing control lever is in normal position
- At least one engine is running
- Aircraft is on ground.

The nose landing gear doors must be closed in order for the green hydraulic system to apply pressure to the actuating cylinder.
The handwheel can turn the nose wheel up to 75 ° in either direction. A lever on the towing electrical box (on nose landing gear) allows ground crew to deactivate the steering system for towing. This then allows the wheel to be turned 95 ° in either direction.
The pilots can use a pushbutton on either steering handwheel to prevent rudder pedal orders or autopilot orders from going to the BSCU.
An internal cam mechanism returns the nose wheel to the centered position after takeoff.

ARCHITECTURE

Ident.: DSC-32-20-10-00001298.0001001 / 21 MAR 16

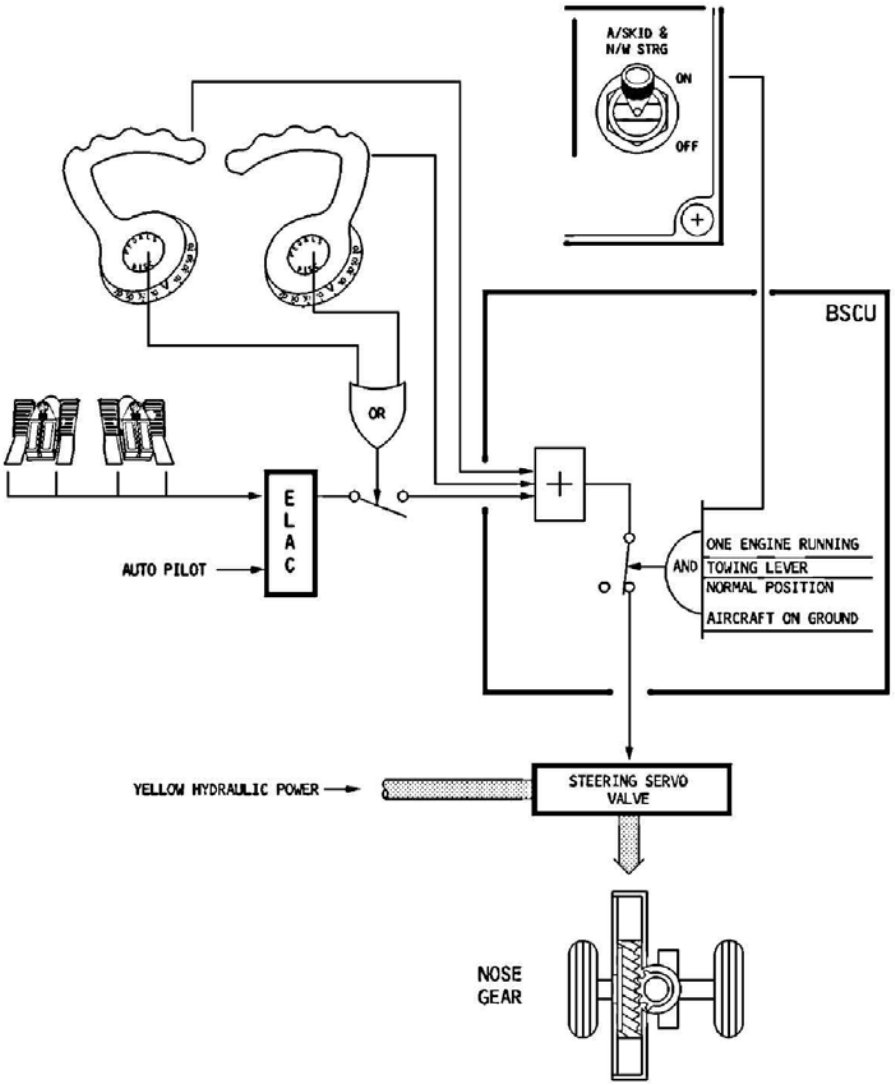
Applicable to: MSN 1882-2078



ARCHITECTURE

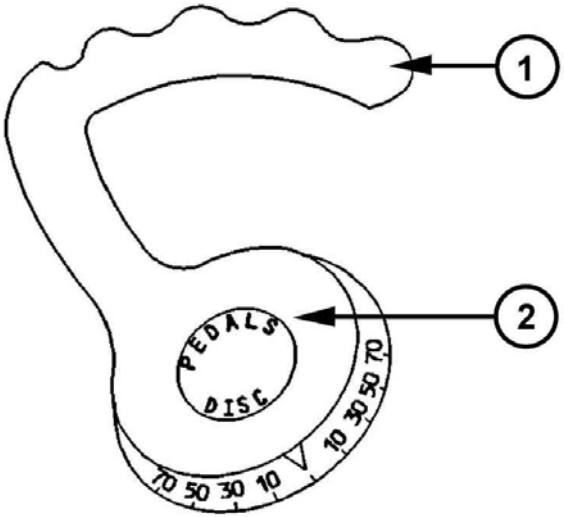
Ident.: DSC-32-20-10-00001298.0002001 / 21 MAR 16

Applicable to: MSN 3408-4547



SIDE CONSOLES

Ident.: DSC-32-20-20-00018620.0001001 / 21 MAR 16
Applicable to: ALL



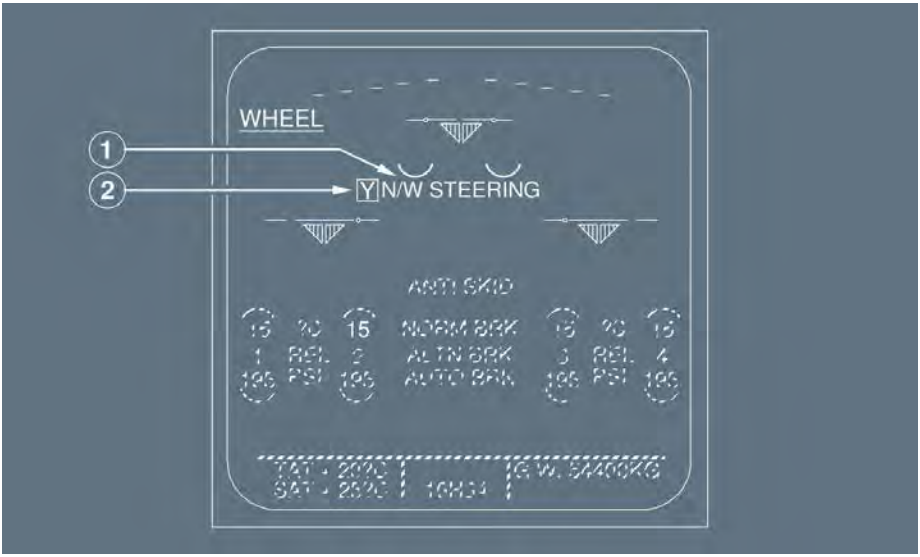
(1) Steering handwheels
The steering handwheels, which are interconnected, can steer the nose wheel up to 75 ° in either direction.

Note: The steering system centers the nose wheel automatically after liftoff.

(2) Rudder PEDALS DISC pb
Pressing this button on either handwheel removes control of nose wheel steering from the rudder pedals until the button is released.

WHEEL SD PAGE

Ident.: DSC-32-20-20-00018622.0004001 / 21 MAR 16
Applicable to: MSN 3408-4547



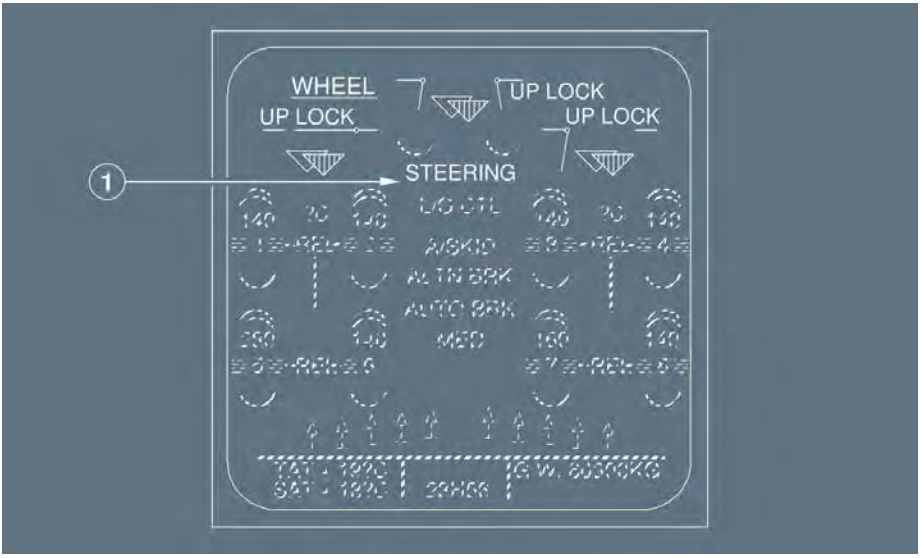
(1) N/W STEERING indication
It appears in amber, when nosewheel steering is lost, due to failure of the nosewheel steering system, or of both BSCU channels, or in case of a yellow hydraulic system low pressure, or if the A/SKID & N/W STRG switch is OFF.

(2) N/W STEERING hydraulic supply indication:

Only when the N/W STEERING indication is displayed, Y is displayed:
- In green when the yellow hydraulic system is not failed, or
- In amber when the yellow hydraulic system low pressure.

WHEEL SD PAGE

Ident.: DSC-32-20-20-00018622.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) STEERING indication
It appears along with an ECAM caution if either the nose wheel steering or the anti-skid feature fails.

MEMO DISPLAY

Ident.: DSC-32-20-20-00016853.0001001 / 10 AUG 15
Applicable to: ALL

NW STRG DISC : This memo appears in green, when the nose wheel steering selector is in the towing position.

NW STRG DISC : This memo appears in amber, if one engine is running.

Intentionally left blank

GENERAL

Ident.: DSC-32-30-10-00018623.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

The main wheels are equipped with carbon multidisc brakes, which can be actuated by either of two independent brake systems.
The normal system uses green hydraulic pressure, whereas the alternate system uses the yellow hydraulic system backed up by the hydraulic accumulator.
An anti-skid and autobrake system is also provided.
Braking commands come from either the brake pedals (pilot action), or the autobrake system (deceleration rate selected by the crew).
In normal operation, a dual channel Brake and Steering Control Unit (BSCU) controls normal braking and antiskid.

Depending on the failure, braking may revert to:
- Alternate braking with antiskid. This braking mode is controlled by the Alternate Braking Control Unit (ABCU), and the antiskid is controlled by the BSCU
- Alternate braking without antiskid. This braking mode is fully-controlled by the ABCU
- Alternate braking without antiskid on accumulator. This braking mode is fully-controlled by the ABCU.

All the normal and alternate braking components are fully-monitored. Any detected failure is signaled to the crew via ECAM warnings.

The BSCU performs the following secondary functions:
- Checks the residual pressure in the brakes
- Monitors the brake temperature
- Provides discrete wheel speed information to other aircraft systems.

A changeover between the two BSCU channels takes place at each DOWN landing gear lever selection, or in case one channel fails.
The main gear wheels are fitted with fusible plugs which protect against tire burst, in the event of overheat.
Main gear wheels are also equipped with brake cooling fans ◁ , which permit a high speed cooling of brakes.

GENERAL

Ident.: DSC-32-30-10-00018623.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The main wheels are equipped with carbon multidisc brakes, which can be actuated by either of two independent brake systems.

The normal system uses green hydraulic pressure, whereas the alternate system uses the yellow hydraulic system backed up by the hydraulic accumulator.
An anti-skid and autobrake system is also provided.
Braking commands come from either the brake pedals (pilot action), or the autobrake system (deceleration rate selected by the crew).
Two units on each main gear monitor the temperature of the brakes.
All braking functions (normal and alternate braking control, anti-skid control, autobraking, brake temperature indication) are controlled by a two-channel Brake and Steering Control Unit (BSCU).
The main gear wheels are fitted with fusible plugs which protect against tire burst, in the event of overheat.
Main gear wheels are also equipped with brake cooling fans ◁ , which permit a high speed cooling of brakes.

ANTI-SKID SYSTEM

Ident.: DSC-32-30-10-00018624.0001001 / 21 MAR 16
Applicable to: ALL

The antiskid system provides maximum braking efficiency by maintaining the wheels at the limit of an impending skid.
At skid onset, brake release orders are sent to the normal and alternate servovalves, as well as to the ECAM system which displays the released brakes.
Without using autobrake, full braking performance is achieved only with brake pedals at full deflection.
The antiskid system is deactivated below 20 kt (ground speed).
An ON/OFF switch activates, or deactivates, the antiskid and nosewheel steering systems.

PRINCIPLE

The speed of each main gear wheel (given by a tachometer) is compared to the aircraft speed (reference speed). When the speed of a wheel decreases below approximately 0.87 times (depending on conditions) reference speed, brake release orders are given to maintain the wheel slip at that value (best braking efficiency).
In normal operation, the reference speed is determined by the BSCU from the horizontal acceleration of ADIRU 1, or ADIRU 2, or ADIRU 3.
In case all ADIRUs fail, reference speed equals the maximum of either main landing gear wheel speeds.

AUTO BRAKE

Applicable to: ALL

Ident.: DSC-32-30-10-A-00018625.0001001 / 21 MAR 16

GENERAL

The purposes of the autobrake system are the following:
- Reduce the braking distance in case of an aborted takeoff
- Establish and maintain a selected deceleration rate during landing, thereby improving passenger comfort and reducing crew workload.

Ident.: DSC-32-30-10-A-00018626.0002001 / 21 MAR 16

SYSTEM ARMING

The crew may arm the system by pressing the LO, MED, or MAX pushbutton provided all the following arming conditions are met :
- Green pressure available
- Anti-skid electrically-powered
- No failure in the braking system
- At least one ADIRU is available.

Note: *1. Auto brake may be armed with the parking brake on.*
2. MAX autobrake mode cannot be armed in flight.

Ident.: DSC-32-30-10-A-00018627.0002001 / 21 MAR 16

SYSTEM ACTIVATION

Automatic braking is activated when:
- The command for ground spoilers extension is detected (*Refer to DSC-27-10-20 Speed Brakes and Ground Spoilers - Speed Brake Control*), for LO and MED mode, or
- The command for ground spoilers extension is detected, and the aircraft speed is above 40 kt, for MAX mode.

Therefore, if the aircraft makes an acceleration stop and begins to decelerate when its speed is under 72 kt, the automatic braking will not activate because the ground spoilers will not extend. For autobrake to activate, at least two SEC's must be operative.

Ident.: DSC-32-30-10-A-00018628.0001001 / 21 MAR 16

SYSTEM DEACTIVATION

The system deactivates when:
- The system disarmed (*Refer to DSC-32-30-10 Auto Brake - System Disarming*), or
- The ground spoilers retract. In this case it remains armed.

Ident.: DSC-32-30-10-A-00018629.0002001 / 21 MAR 16

The system disarms when:
- Flight crew presses the pushbutton switch, or
- One or more arming conditions is lost, or
- After take-off/touch and go, or
- Flight crew applies enough deflection to at least one brake pedal when autobrake is active in MAX, MED or LO mode.

BRAKING MODES

Ident.: DSC-32-30-10-B-00018630.0001001 / 21 MAR 16
Applicable to: ALL

GENERAL

There are four modes of operation:
- Normal braking
- Alternate braking with antiskid
- Alternate braking without antiskid
- Parking brake.

Ident.: DSC-32-30-10-B-00018631.0001001 / 21 MAR 16
Applicable to: ALL

NORMAL BRAKING

Normal braking is operative when:
- Green hydraulic pressure is available
- A/SKID & N/W STRG switch is ON.

During normal braking, antiskid is operative and autobrake is available.

Braking is electrically-controlled through the BSCU from:
- Pilot's pedals, or
- Automatically activates when:
  - On ground by the autobrake system, or
  - In flight when the landing gear lever is up.

The antiskid system is controlled by the BSCU via the normal servo valves.
There is no brake pressure indication in the cockpit.

Ident.: DSC-32-30-10-B-00018632.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

ALTERNATE BRAKING WITH ANTI-SKID

Autobrake is inoperative.

Braking uses this mode when green hydraulic pressure is insufficient, and :
- Yellow hydraulic pressure is available
- A/SKID & N/W STRG switch is ON
- Parking brake is not ON.

Braking inputs are made by the brake pedals and sent to the ABCU. Then, taking into account the brake pedal input, the ABCU:
- Energizes the alternate brake selector valve to pressurize the yellow hydraulic circuit
- Electrically controls the Alternate Servo Valve to obtain the correct pressure for the related brakes.

Antiskid is controlled by the BSCU.
A triple indicator on the center instrument panel indicates the pressure delivered to the left and right brakes, as well as the accumulator pressure.

Note: *Initial pedal force or displacement produces more braking action in alternate mode than in normal mode.*

Ident.: DSC-32-30-10-B-00018632.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

ALTERNATE BRAKING WITH ANTI-SKID

Autobrake is inoperative.

Braking uses this mode when green hydraulic pressure is insufficient, and :
- Yellow hydraulic pressure is available
- A/SKID & N/W STRG switch is ON
- Parking brake is not ON.

An automatic hydraulic selector changes from the green to the yellow system.
The pedals brake through the auxiliary low-pressure hydraulic distribution line acting on the dual valves. The BSCU controls the anti-skid system via the alternate servo valves.
A triple indicator on the center instrument panel indicates the pressure delivered to the left and right brakes, as well as the accumulator pressure.

Note: *Initial pedal force or displacement produces more braking action in alternate mode than in normal mode.*

Ident.: DSC-32-30-10-B-00018633.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

ALTERNATE BRAKING WITHOUT ANTI-SKID

Autobrake and antiskid are inoperative.

The antiskid system is either deactivated:
- Electrically (A/SKID & N/W STRG sw OFF, or power supply failure, or BSCU failure), or
- Hydraulically (Y + G system low pressure, the brakes are supplied by the brake accumulator only).

Depending on the brake pedals' demand, the ABCU controls the alternate brake selector and the alternate servovalves.
Brake pressure and accumulator pressure are indicated on a triple indicator, located on the center instrument panel. To avoid wheel locking and limit the risk of tire burst, brake pressure is automatically limited to 1 000 PSI.
The accumulator can supply at least 7 full brake applications.

Note: *Initial pedal force or displacement produces more braking action in alternate mode than in normal mode.*

Ident.: DSC-32-30-10-B-00018633.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

ALTERNATE BRAKING WITHOUT ANTI-SKID

The anti-skid system can be deactivated:
- Electrically (A/SKID & N/W STRG sw OFF, or power failure or BSCU failure), or
- Hydraulically (low pressure in both green and yellow systems, brakes being supplied by the brake accumulator only).

The pilot controls the braking with the pedals (acting on the dual valves).
Alternate servo valves are fully open.
Brake pressure and accumulator pressure are indicated on a triple indicator, located on the center instrument panel. The pilot must modulate brake pressure at, or below, 1 000 PSI in order to avoid wheel locking.
The accumulator can supply at least 7 full brake applications.

Note: *Initial pedal force or displacement produces more braking action in alternate mode than in normal mode.*

Ident.: DSC-32-30-10-B-00018634.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

PARKING BRAKE

Brakes are supplied by the yellow hydraulic system, or by accumulator pressure via the parking brake control valve, which opens allowing full pressure application on the main gear wheel brakes.
The accumulator maintains the parking pressure for at least 12 h.
If the parking brake is activated and no yellow hydraulic or accumulator brake pressure is available, then the normal braking system can be applied via the brake pedals.
Yellow accumulators can be pressurized by pressing the yellow electrical pump switch.

A triple indicator on the center instrument panel indicates the pressure delivered to the left and right brakes, as well as the accumulator pressure.

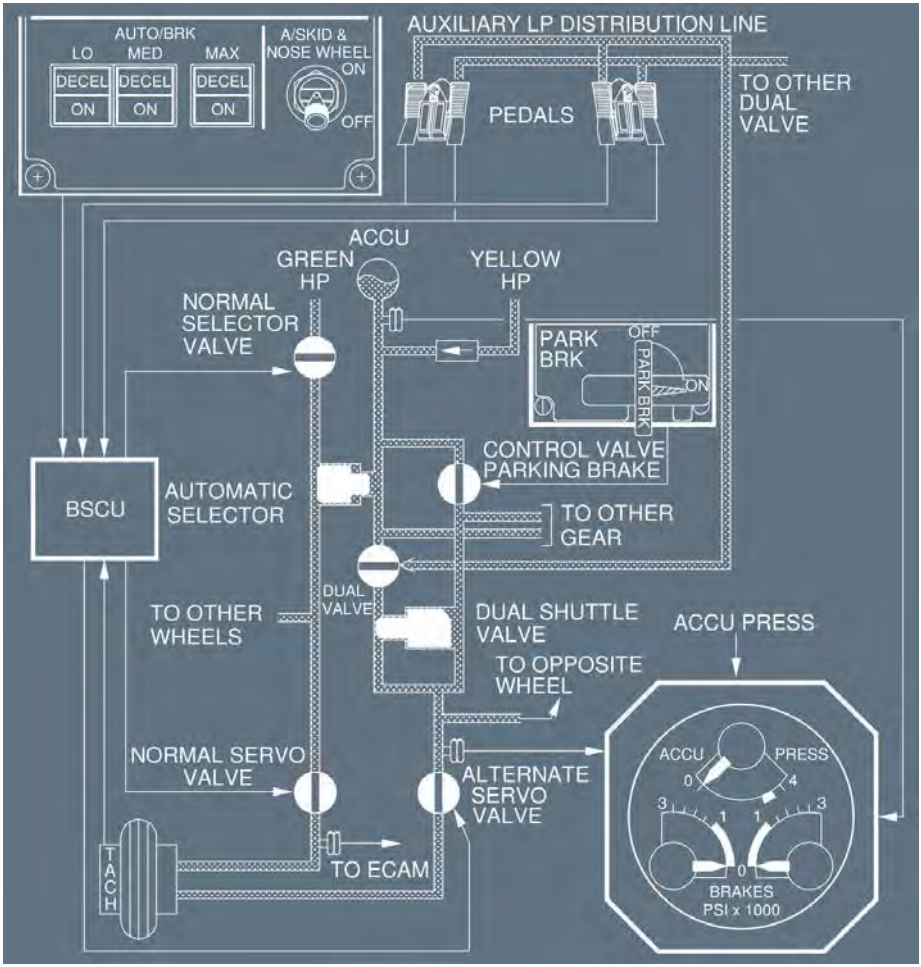
Ident.: DSC-32-30-10-B-00018634.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

PARKING BRAKE

Brakes are supplied by the yellow hydraulic system, or by accumulator via the dual shuttle valves.
Alternate servo valves open allowing full pressure application.
The accumulator maintains the parking pressure for at least 12 h.
If the parking brake is activated and no yellow hydraulic or accumulator brake pressure is available, then the normal braking system can be applied via the brake pedals.
Yellow accumulators can be pressurized by pressing the yellow electrical pump switch.
A triple indicator on the center instrument panel indicates the pressure delivered to the left and right brakes, as well as the accumulator pressure.

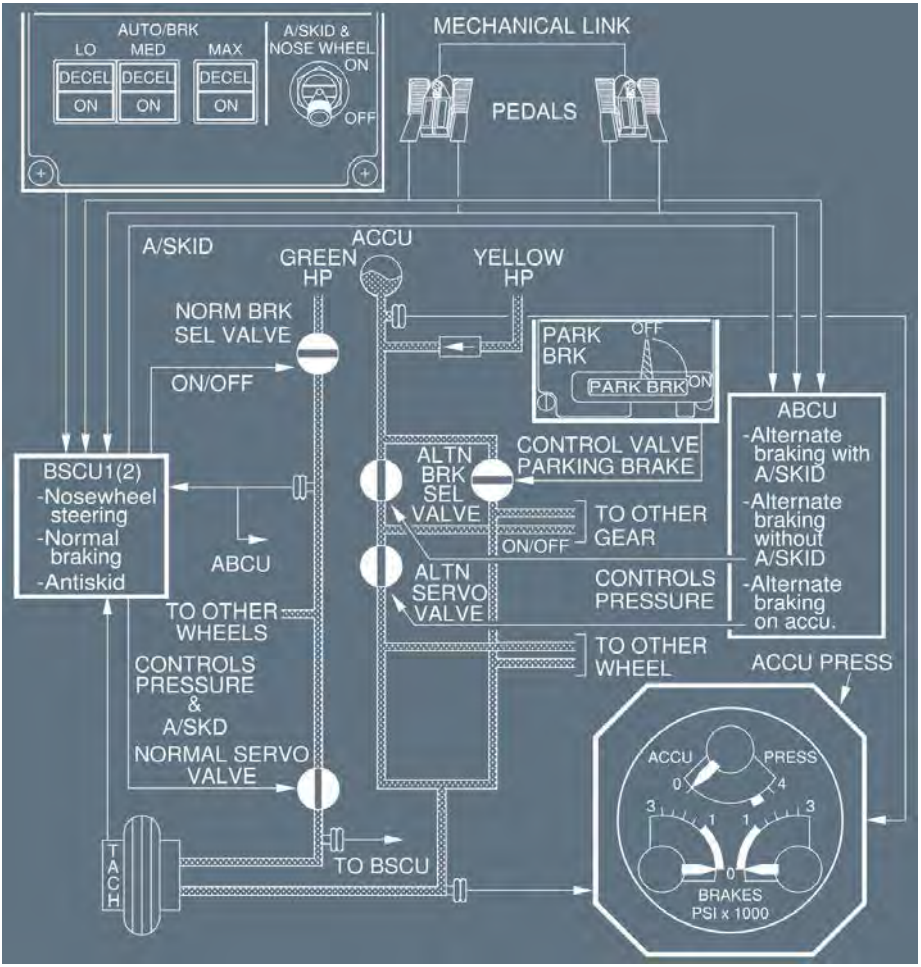
BRAKING SCHEMATIC

Ident.: DSC-32-30-10-00001316.0004001 / 09 OCT 12
Applicable to: MSN 1882-2078



BRAKING SCHEMATIC

Ident.: DSC-32-30-10-00001316.0003001 / 09 OCT 12
Applicable to: MSN 3408-4547



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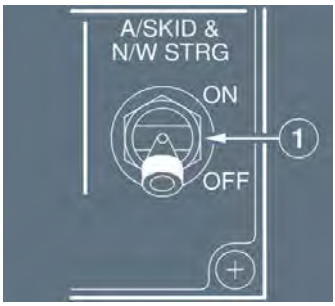
CENTER INSTRUMENT PANEL

Ident.: DSC-32-30-20-00018635.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



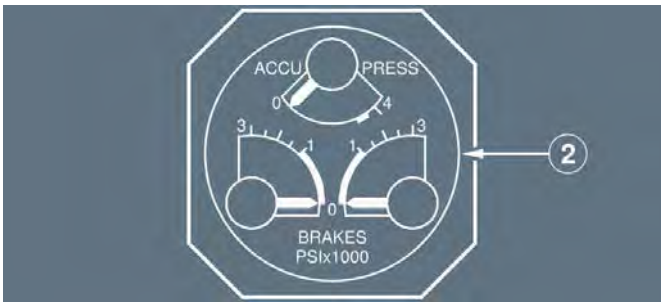
(1) A/SKID & N/W STRG sw

ON : If green hydraulic pressure is available, then antiskid is available.

If green hydraulic pressure is lost, then:
- Yellow hydraulic pressure automatically takes over to supply the brakes
- Antiskid and nosewheel steering remain available
- Triple indicator shows yellow system brake pressure.

OFF : The yellow hydraulic system supplies pressure to the brakes.

- Antiskid is deactivated. The pilot must refer to the triple indicator to limit brake pressure and avoid locking a wheel
- Nosewheel steering is lost
- Differential braking remains available through the pedals
- Triple indicator displays yellow system brake pressure.



(2) BRAKES and ACCU PRESS indicator

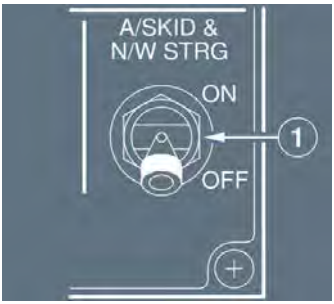
Brake pressure is only indicated when the yellow hydraulic system controls the brake pressure, This is when the:
- Alternate braking system is activated, or
- Parking brake is applied.

ACCU PRESS : Indicates the pressure in the yellow brake accumulator.

BRAKES : Indicates the yellow pressure delivered to the left and right brakes, as measured upstream of the alternate servovalves.

CENTER INSTRUMENT PANEL

Ident.: DSC-32-30-20-00018635.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



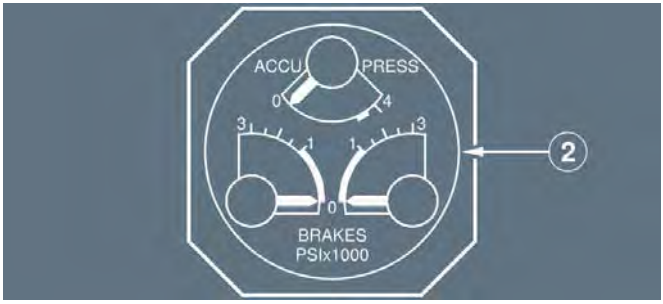
(1) A/SKID & N/W STRG sw

ON : If green hydraulic pressure is available:
- Antiskid is available
- Nosewheel steering is available.

If green hydraulic pressure is lost, then:
- Yellow hydraulic pressure automatically takes over to supply the brakes
- Antiskid remains available
- Nosewheel steering is lost
- Triple indicator displays yellow system brake pressure.

OFF : The yellow hydraulic system supplies pressure to the brakes.

- Antiskid is deactivated. The pilot must refer to the triple indicator to limit brake pressure and avoid locking a wheel
- Nosewheel steering is lost
- Differential braking remains available through the pedals
- Triple indicator displays yellow system brake pressure.



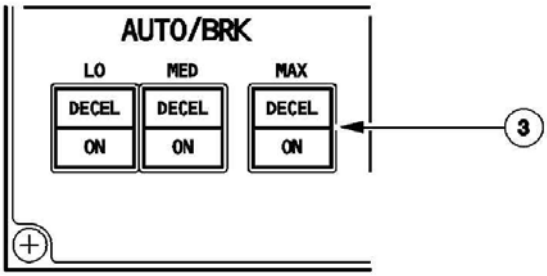
(2) BRAKES and ACCU PRESS indicator

ACCU PRESS : Indicates the pressure in the yellow brake accumulator.

BRAKES : Indicates the yellow pressure delivered to the left and right brakes, as measured upstream of the alternate servovalves.

AUTO BRK PANEL

Ident.: DSC-32-30-20-00018636.0002001 / 21 MAR 16
Applicable to: ALL



(3) AUTO/BRK panel

The springloaded MAX, MED, and LO pushbutton switches arm the appropriate deceleration rate. The usage for each mode are as follow:

- MAX mode is normally selected for takeoff.
  In the case of an aborted takeoff, maximum pressure goes to the brakes, as soon as the system generates the ground spoiler deployment order
- MED or LO mode is normally selected for landing:
  - MED mode sends progressive pressure to the brakes 2 s after the ground spoilers deploy in order to decelerate the aircraft at 3 m/s² (9.8 ft/s²)
  - LO mode sends progressive pressure to the brakes 4 s after the ground spoilers deploy, in order to decelerate the aircraft at 1.7 m/s² (5.6 ft/s²).

The lighting on the pushbutton switches are as follow:

ON light : comes on blue to indicate positive arming

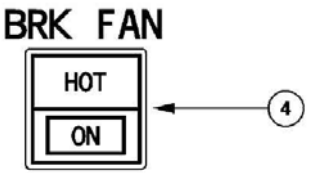
DECEL light : comes on green when the actual deceleration is 80 % of the selected rate

Note: On slippery runways, the predetermined deceleration may not be reached, due to antiskid operation. In this case, the DECEL light will not come on. This does not mean that autobrake is not working.

Off : The corresponding autobrake mode is not armed

BRAKE FAN ⋖

Ident.: DSC-32-30-20-00018637.0001001 / 21 MAR 16
Applicable to: ALL



(4) BRK FAN pb-sw ⋖

ON light : The brake fans run if the lefthand main landing gear is down and locked

Off : The brake fans stop

HOT light : This amber light comes on when the brakes get too hot (A caution appears on ECAM, also)

PEDESTAL

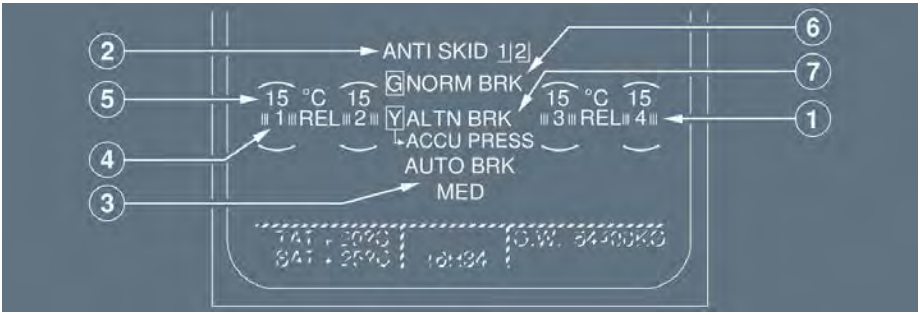
Ident.: DSC-32-30-20-00018638.0001001 / 21 MAR 16
Applicable to: ALL

(1) PARKING BRK handle
Flight crew pulls this handle, then turns it clockwise, to apply the parking brake.
The ECAM memo page displays “PARK BRK”.

CAUTION	If the pointer is not at ON, the parking brake is not on.

WHEEL SD PAGE

Ident.: DSC-32-30-20-00018639.0008001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) Release indicators

It appears in amber in case of brake released fault.

(2) ANTI SKID indication

(A) ANTISKID label

It appears in amber, a long with an ECAM caution, in case of a total BSCU failure, or when the A/SKID & N/W STRG sw is OFF, or if the BSCU detects an ANTI-SKID failure, or in case of normal braking and yellow hydraulic system low pressure.
It appears in green in case of autobrake, normal braking, or alternate braking failure, and antiskid is still available.

(B) BSCU channel indication

When ANTISKID label is displayed, the number of the failed system(s) is (are) displayed in amber, if any.

(3) AUTO BRK

This legend appears:
- In green when auto brake is armed, or
- Flashing green for 10 s after autobrake disengagement, or
- In amber, along with an ECAM caution, to indicate a system failure.

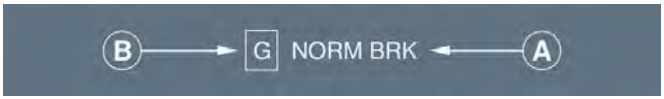
MED, LO, or MAX appears underneath in green to show which rate has been selected.

(4) Wheel number
This white number identifies individual wheels of the main landing gear.

(5) Brake temperature

- Temperature normally appears in green.
- Green arc appears on the hottest wheel when one brake temperature exceeds 100 °C.
- Green arc becomes amber, and an ECAM caution appears, when the corresponding brake temperature exceeds 300 °C.

(6) NORM BRK indication



(A) NORM BRK label
This indication appears in green when autobrake or alternate braking is failed, and normal braking is still available.
The legend appears in amber when normal braking is failed due to total BSCU failure, or to the loss of the green hydraulic pressure, or to the loss of antiskid.

(B) NORM BRK hydraulic supply indication
G is displayed when the NORM BRK label is displayed. It is green when green hydraulic pressure is available and amber, in case of green hydraulic low pressure.

(7)

(A) ALTN BRK label
This indication appears in green, if the braking system is in alternate mode and not failed, or in case autobrake or normal braking is failed and alternate braking is still available.
This indication appears in amber when alternate braking is failed.

(B) ALTN BRK hydraulic supply indication
Y is displayed when the ALTN BRK label is displayed. It is green when yellow hydraulic pressure is available and amber, in case of yellow hydraulic low pressure.

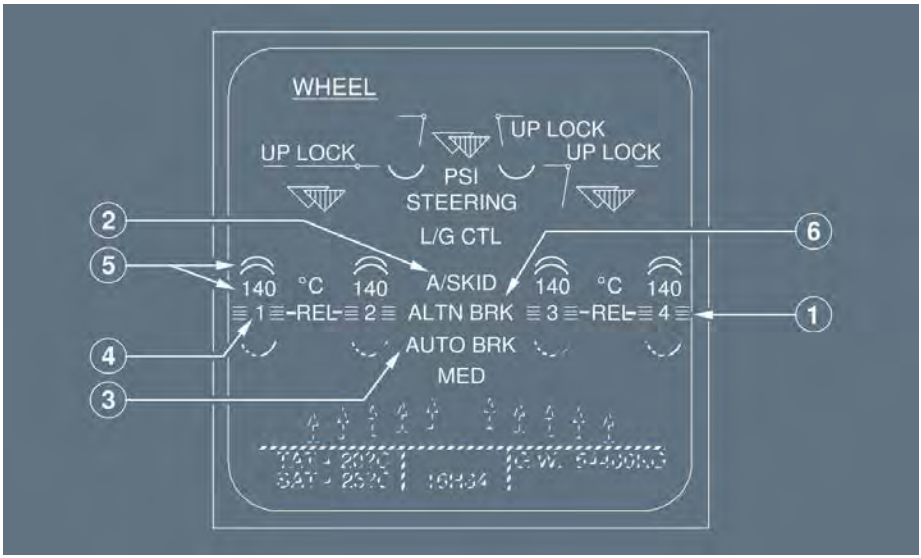
(C) ACCU indications

(*) Appears in green, when the ALTN BRK label is displayed, and the yellow hydraulic pressure is available.
Appears in amber, with no arrow, when the yellow hydraulic system and the accumulator are in low pressure.

(**) Appears in green when the alternate braking is pressurized by the yellow accumulator.

WHEEL SD PAGE

Ident.: DSC-32-30-20-00018639.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) Release indicators

These green lines appear temporarily after the landing gear has been lowered to indicate that the anti-skid function is ready.
They reappear after touchdown, along with REL (blue), when the anti-skid is active.

(2) A/SKID

This legend appears in amber, along with an ECAM caution, in case of total BSCU failure, or when the A/SKID & N/W STRG sw is OFF, or if the BSCU detects an ANTI-SKID failure.

(3) AUTO BRK

This legend appears:
- In green when auto brake is armed, or
- Flashing green for 10 s after autobrake disengagement, or
- In amber, along with an ECAM caution, to indicate a system failure.

MED, LO, or MAX appears underneath in green to show which rate has been selected.

(4) Wheel number

This white number identifies individual wheels of the main landing gear.

(5) Brake temperature

- Temperature normally appears in green.
- Green arc appears on the hottest wheel when one brake temperature exceeds 100 °C.
- Green arc becomes amber, and an ECAM caution appears, when the corresponding brake temperature exceeds 300 °C.

(6) ALTN BRK

This legend appears in green if the braking system is in alternate mode.

MEMO DISPLAY

Applicable to: ALL

Ident.: DSC-32-30-20-A-00016854.0001001 / 22 MAR 16

AUTO BRK LO/MED/MAX : This memo appears in green, depending on the selection of the AUTO BRK pb.

Ident.: DSC-32-30-20-A-00016855.0001001 / 22 MAR 16

AUTO BRK OFF : This memo appears in green if the auto brake is failed.

Ident.: DSC-32-30-20-A-00016856.0001001 / 22 MAR 16

BRK FAN : This memo appears in green if the BRK FAN pb is ON.

Ident.: DSC-32-30-20-A-00016857.0001001 / 22 MAR 16

PARK BRK : This memo appears in green, if the parking brake is ON, during flight phases 1, 2, 9 and 10.

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AIRCRAFT SYSTEMS

LIGHTS

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GENERAL

Ident.: DSC-33-10-10-00017615.0001001 / 21 MAR 16
Applicable to: ALL

The instrument panel has both integral instrument lighting and flood lighting.
The brightness of all panel lighting is adjustable.
Spot lights and flood lights provide lighting for all work surfaces and the side consoles.
Two dimmable dome lights provide lighting for the overall cockpit. When the batteries are supplying electrical power, only the right-hand dome light is on line.

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DESCRIPTION

Ident.: DSC-33-10-20-00017616.0001001 / 21 MAR 16
Applicable to: ALL

INTEGRATED LIGHTING FOR INSTRUMENTS AND PANELS

All instruments and panels in the cockpit (other than display units) have integral lighting.
The flight crew can adjust the brightness of all integral lighting.

ANNUNCIATOR LIGHTS

The ANN LT sw on the overhead panel controls the brightness of all the annunciator lights in the cockpit.
The ANN LT sw sets the brightness of all annunciator lights at the same level.
The flight crew can test the annunciator lights with the following procedure: Set the ANN LT sw to the TEST position, and check to see that all the annunciator lights come on.

DOME LIGHTS

Two dome lights provide the cockpit with shadow-free lighting.

MAP HOLDER LIGHTING ⋖

Each flight crewmember has a map holder that can be lighted.

CONSOLE AND BRIEFCASE LIGHTING

Each flight crewmember has lighting for briefcase stowage, the side console, and the floor.

CENTER INSTRUMENT PANEL

Lights under the glareshield provide lighting for the center instrument panel.

STANDBY COMPASS

The standby compass has integral lighting.

READING LIGHTS

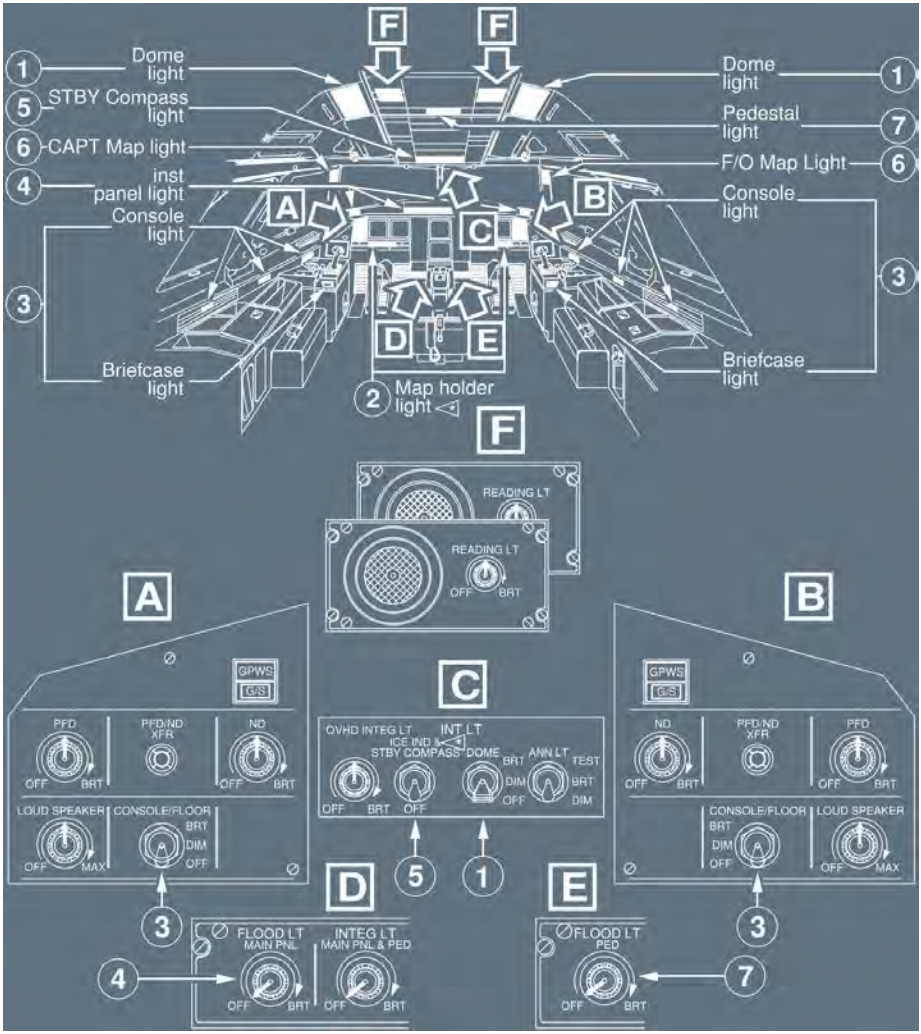
Each flight crewmember has a reading light.

PEDESTAL LIGHTING

A flood light in the middle of the overhead panel provides lighting for the center pedestal.

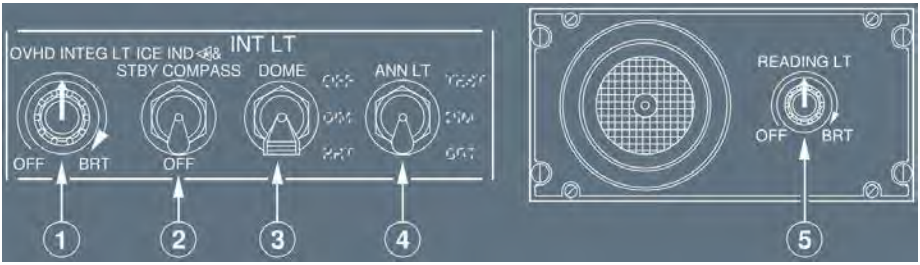
SCHEMATIC

Ident.: DSC-33-10-20-00001336.0002001 / 05 FEB 14
Applicable to: ALL



OVERHEAD PANEL

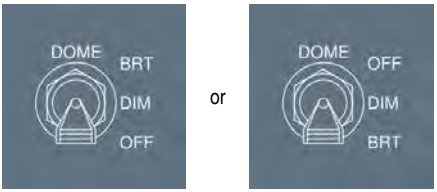
Ident.: DSC-33-10-30-00017617.0001001 / 21 MAR 16
Applicable to: ALL



(1) OVHD INTEG LT knob
This knob turns the overhead panel's integral lighting on and off, and adjusts its brightness.

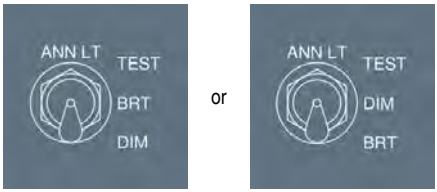
(2) ICE IND & STBY COMPASS sw
This switch turns the standby compass light and the external ice detector light on and off.

(3) DOME sw
The DOME sw controls both dome lights.
The DOME sw can have one of the two following configurations:



BRT : Both dome lights are on and bright.
DIM : Both dome lights are on and dim.
OFF : Both dome lights are off.

(4) ANN LT sw
The ANN LT sw controls all the flight deck annunciator lights.
The ANN LT sw can have one of the two following configurations:



TEST : All flight deck annunciator lights turn On.
The figure '8' is displayed on all Liquid Crystal Display (LCD) of the FCU.

DIM : Reduces the brightness of all flight deck annunciator lights.

BRT : All flight deck annunciator lights operate normally.

Note: When the ANN LT sw is set to TEST, do not reconfigure the DU (ECAM/ND transfer) or the DMC (DMC switching).

(5) READING LT knob
The reading light on each side of the overhead panel has its own control knob that turns it on and off and adjusts its brightness.

MAINTENANCE PANEL

Ident.: DSC-33-10-30-00001338.0001001 / 22 MAY 12
Applicable to: ALL

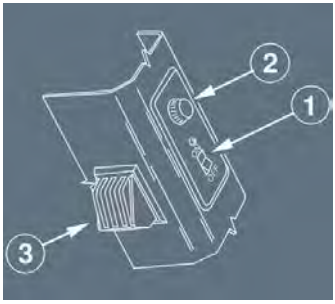
(1) AVIONICS COMPT LT pushbutton switch

AUTO : avionic compartment lighting is automatically controlled by door opening.

ON : avionic compartment lighting is on.

LATERAL WINDOW

Ident.: DSC-33-10-30-00001339.0002001 / 05 FEB 14
Applicable to: ALL



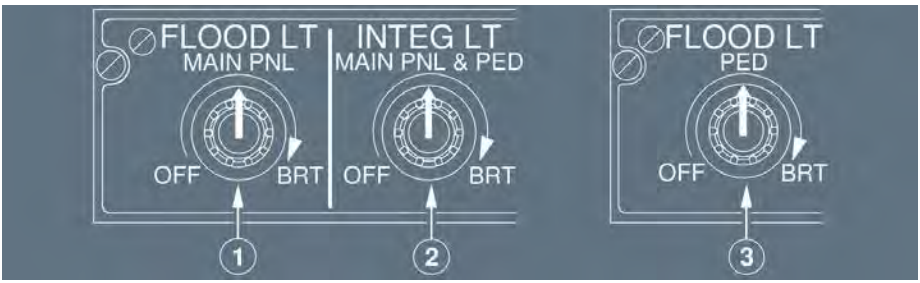
(1) Map light sw (Captain and F/O)

(2) Brightness adjustment knob

(3) Light

PEDESTAL

Ident.: DSC-33-10-30-00017619.0001001 / 21 MAR 16
Applicable to: ALL



(1) FLOOD LT MAIN PNL knob
Turns on or off, and adjusts the brightness of the main instrument panel.

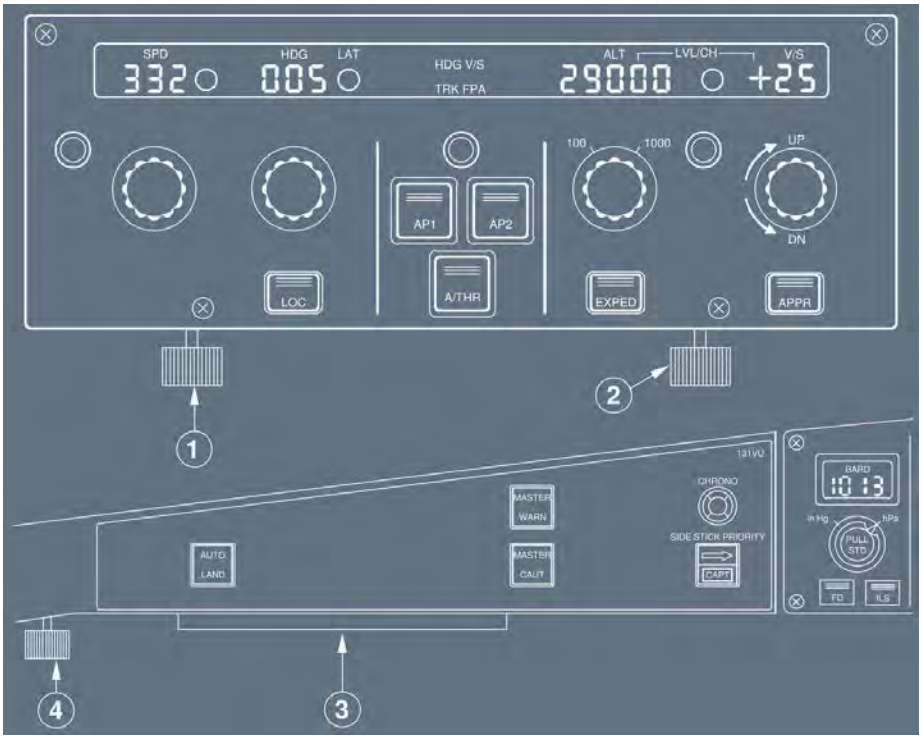
(2) INTEG LT MAIN PNL & PED knob
Turns on or off, and adjusts the brightness of the integral lights of:

- The main instrument panel
- The center pedestal.

(3) FLOOD LT PED knob
Turns on or off, and adjusts the brightness of the pedestal lights.

GLARESHIELD

Ident.: DSC-33-10-30-00001341.0002001 / 21 JAN 14
Applicable to: ALL



(1) This knob adjusts the brightness of the integral lighting on the glareshield.

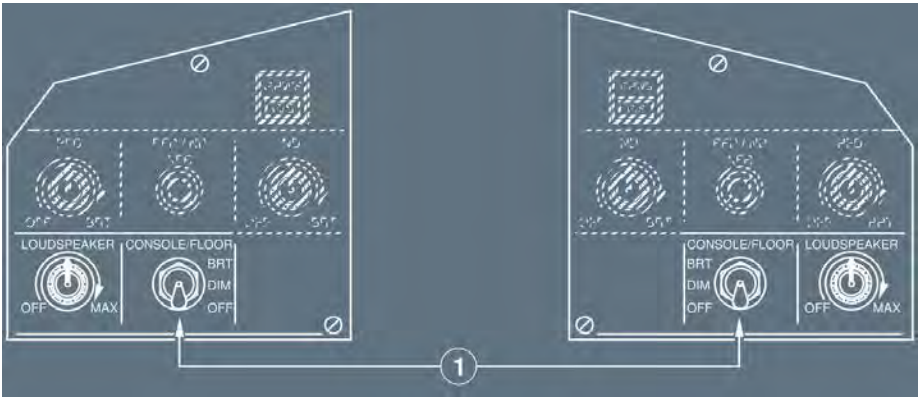
(2) This knob adjusts the brightness of the FCU displays.

(3) This lighting ◁ illuminates the sliding table and map holder.

(4) This knob ◁ adjusts the brightness of the sliding table and map holder lighting.

MAIN INST PANEL

Ident.: DSC-33-10-30-00017620.0001001 / 21 MAR 16
Applicable to: ALL



(1) CONSOLE/FLOOR sw
Each switch controls the lights of the side console and of the briefcase on each side of the cockpit. In addition, each switch controls the lighting of the floor around each flight crew member's seat. The lights can either be bright, dim, or off.

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GENERAL

Ident.: DSC-33-20-10-00017621.0001001 / 21 MAR 16
Applicable to: ALL

Exterior lighting includes the following lights:

- The navigation lights
- The landing lights
- The runway turn off lights
- The TO and TAXI lights
- The logo lights ◁
- The anticollision lights
- The wing and engine scan lights.

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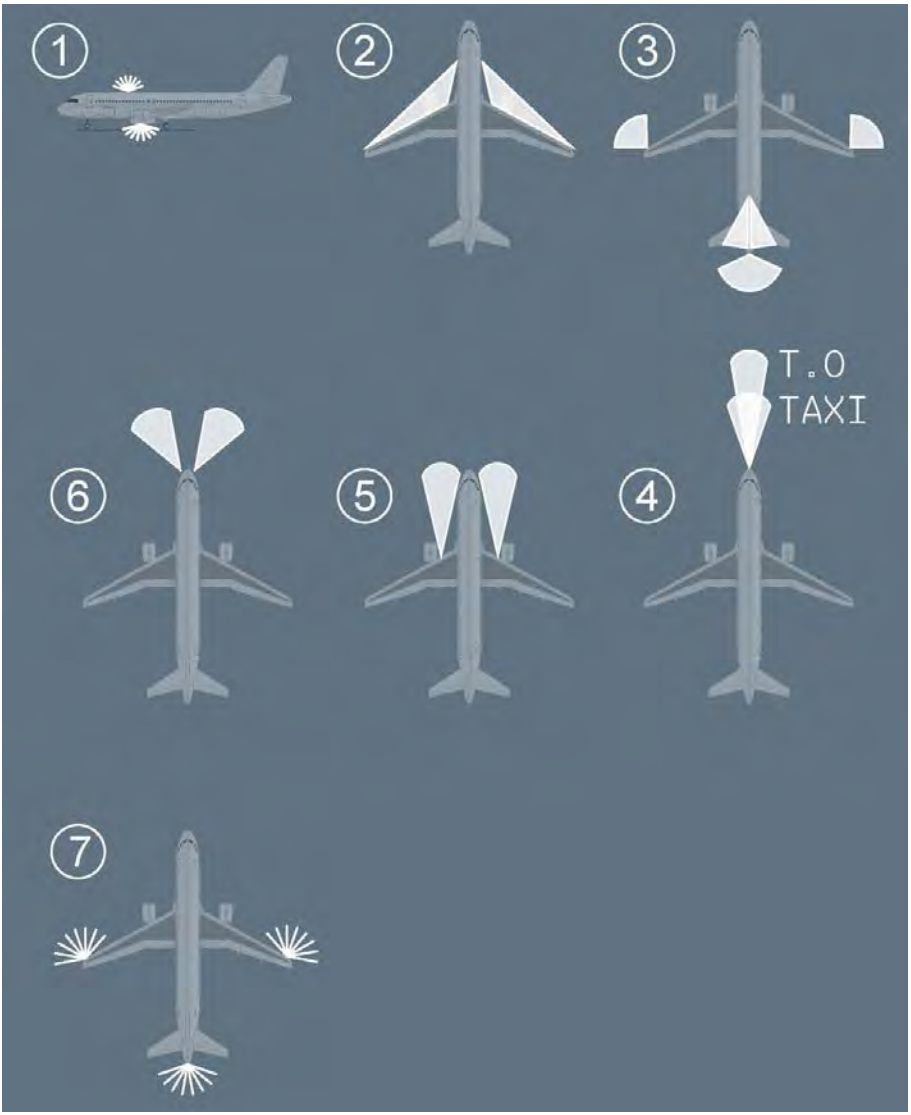
SCHEMATIC

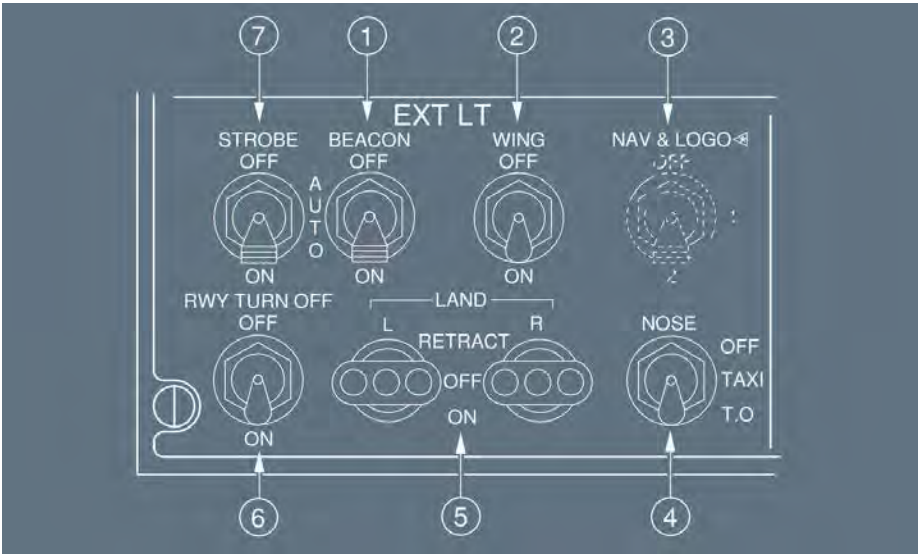
Ident.: DSC-33-20-20-00017622.0001001 / 21 MAR 16

Applicable to: ALL



OVERHEAD PANEL

Ident.: DSC-33-20-20-00017623.0004001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) BEACON sw
This switch turns on and off the two flashing red lights, one on top and one on the bottom of the fuselage.

(2) WING sw
This switch turns on and off two beam lights on each side of the fuselage. These lights provide lighting on the wing leading edge and on the engine air intake to detect ice accretion.

(3) NAV & LOGO ◁ sw
There are single navigation light, or dual navigation lights ◁ on each wing and in the APU tail cone.
A blue light ◁ below each navigation light allows to monitor the navigation light wear (LED technology). When the NAV & LOGO ◁ sw is ON, this light ◁ flashes in blue if the navigation light replacement should be planned.
There are logo lights ◁ in the upper surface of each horizontal stabilizer. These light provide lighting for the company logo on the vertical stabilizer provided the main landing gears are compressed, or depending on the aircraft configuration, when flaps are extended (at least 15 ° on some aircraft) or slats are extended.

The NAV & LOGO ◁ sw can have one of the following configuration:

ON : Turns on the NAV and the LOGO lights ◁ .
OFF : The NAV and the LOGO lights ◁ are off.

or

2 : Turns on NAV 2 and the LOGO lights ◁ .
1 : Turns on NAV 1 and the LOGO lights ◁ .
OFF : The NAV and the LOGO lights ◁ are off.

(4) NOSE sw
This switch turns the taxi and takeoff lights on and off.

TO : Turns on both taxi and takeoff lights.
TAXI : Turns on only taxi light.
OFF : Taxi and takeoff lights off.

Note: These two lights, attached to the nose gear strut, go off automatically when landing gear is retracted.

(5) L and R LAND sel
These selectors control the landing lights.

ON : Extends the (left or right) landing lights which come on automatically when fully extended.
OFF : Shuts off the landing lights which remain extended.
RETRACT : Shuts off and retracts the landing lights.

(6) RWY TURN OFF sw
This switch turns the runway turn-off lights on and off.

Note: These lights go off automatically when landing gear is retracted.

(7) STROBE sw
This switch turns on and off the three synchronized strobe lights, one on each wing and one below the tail cone.

A blue light ◁ below each strobe light allows to monitor the strobe light wear (LED technology). When STROBE sw is OFF or BEACON sw is ON, this light ◁ flashes in blue if the strobe light replacement should be planned.

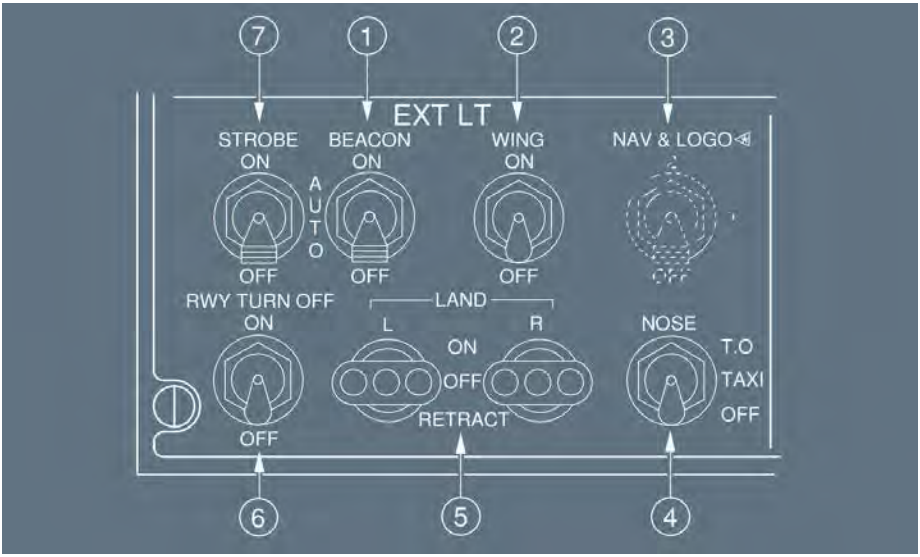
ON : The strobe lights flash white.

AUTO : The strobe lights come on automatically when the main landing gear is not compressed.

OFF : The strobe lights are off.

OVERHEAD PANEL

Ident.: DSC-33-20-20-00017623.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) BEACON sw

This switch turns on and off the two flashing red lights, one on top and one on the bottom of the fuselage.

(2) WING sw

This switch turns on and off two beam lights on each side of the fuselage. These lights provide lighting on the wing leading edge and on the engine air intake to detect ice accretion.

(3) NAV & LOGO ◁ sw

There are single navigation light, or dual navigation lights ◁ on each wing and in the APU tail cone.

A blue light ◁ below each navigation light allows to monitor the navigation light wear (LED technology). When NAV & LOGO ◁ sw is ON, this light ◁ flashes in blue if the navigation light replacement should be planned.

There are logo lights ◁ in the upper surface of each horizontal stabilizer. These lights provide lighting for the company logo on the vertical stabilizer provided the main landing gear is compressed, or depending on the aircraft configuration, when flaps are extended (at least 15 ° on some aircraft) or slats are extended.

The NAV & LOGO ◁ sw can have one of the following configuration:

ON : Turns on the NAV and the LOGO lights ◁ .
OFF : The NAV and the LOGO lights ◁ are off.

or

2 : Turns on NAV 2 and the LOGO lights ◁ .
1 : Turns on NAV 1 and the LOGO lights ◁ .
OFF : The NAV and the LOGO lights ◁ are off.

(4) NOSE sw

This switch turns the taxi and takeoff lights on and off.

TO : Turns on both taxi and takeoff lights.

TAXI : Turns on only taxi light.

OFF : Taxi and takeoff lights off.

Note: These two lights, attached to the nose gear strut, go off automatically when landing gear is retracted.

(5) L and R LAND sel

These selectors control the landing lights.

ON : Extends the (left or right) landing lights which come on automatically when fully extended.

OFF : Shuts off the landing lights which remain extended.

RETRACT : Shuts off and retracts the landing lights.

(6) RWY TURN OFF sw

This switch turns the runway turn-off lights on and off.

Note: These lights go off automatically when landing gear is retracted.

(7) STROBE sw

This switch turns on and off the three synchronized strobe lights, one on each wing and one below the tail cone.

A blue light ◁ below each strobe light allows to monitor the strobe light wear (LED technology). When STROBE sw is OFF or BEACON sw is ON, this light ◁ flashes in blue if the strobe light replacement should be planned.

ON : The strobe lights flash white.

AUTO : The strobe lights come on automatically when the main landing gear is not compressed.

OFF : The strobe lights are off.

MEMO DISPLAY

Applicable to: ALL

Ident.: DSC-33-20-20-M-00016785.0001001 / 21 MAR 16

LDG LT : The message is displayed in green, if one landing light is extended.

Ident.: DSC-33-20-20-M-00016784.0001001 / 21 MAR 16

STROBE LT OFF : The message is displayed in green, if the STROBE sw is OFF in flight.

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GENERAL

Ident.: DSC-33-30-10-00017632.0024001 / 21 MAR 16
Applicable to: MSN 3408-4547

The emergency lighting system consists of the following:
- Proximity emergency escape path marking systems (escape path and exit markers)
- Overhead emergency lights
- EXIT signs
- Lavatory auxiliary lights
- Overwing escape route ◁✻ lighting
- Escape slide lighting.

When in operation:
- The proximity emergency escape path marking system is powered by internal batteries for at least 12 min.
- The DC SHED ESS BUS supplies the cabin emergency lighting.
- If DC SHED ESS BUS fails, batteries inside the light provides power to cabin emergency lighting.
- In nominal case, the DC SHED ESS BUS charges these internal batteries if:
  - The EMER LT sw is not at ON
  - The EMER pb on the Purser's panel is not pressed
  - The DC BUS 1 is supplied
  - Depending on the CIDS/CAM programming, when:
    - The NO SMOKING sw ◁✻ , or
    - The NO PORTABLE ELEC DEVICE sw ◁✻ , or
    - The EXIT sw ◁✻ is set to OFF or AUTO when the landing gear is retracted.

Lavatory auxiliary lights are always on. They are supplied by 28 V DC ESS BUS.
The escape slides have an integral lighting system. The escape slide lights and overwing escape route ◁✻ lights come on automatically when the slide is armed and the door or emergency exit is open. They are supplied by internal batteries.

GENERAL

Ident.: DSC-33-30-10-00017632.0002001 / 21 MAR 16
Applicable to: MSN 1882-2078

The emergency lighting system consists of the following:
- Proximity emergency escape path marking systems (escape path and exit markers)
- Overhead emergency lights
- EXIT signs
- Lavatory auxiliary lights

- Overwing escape route ◁ lighting
- Escape slide lighting.

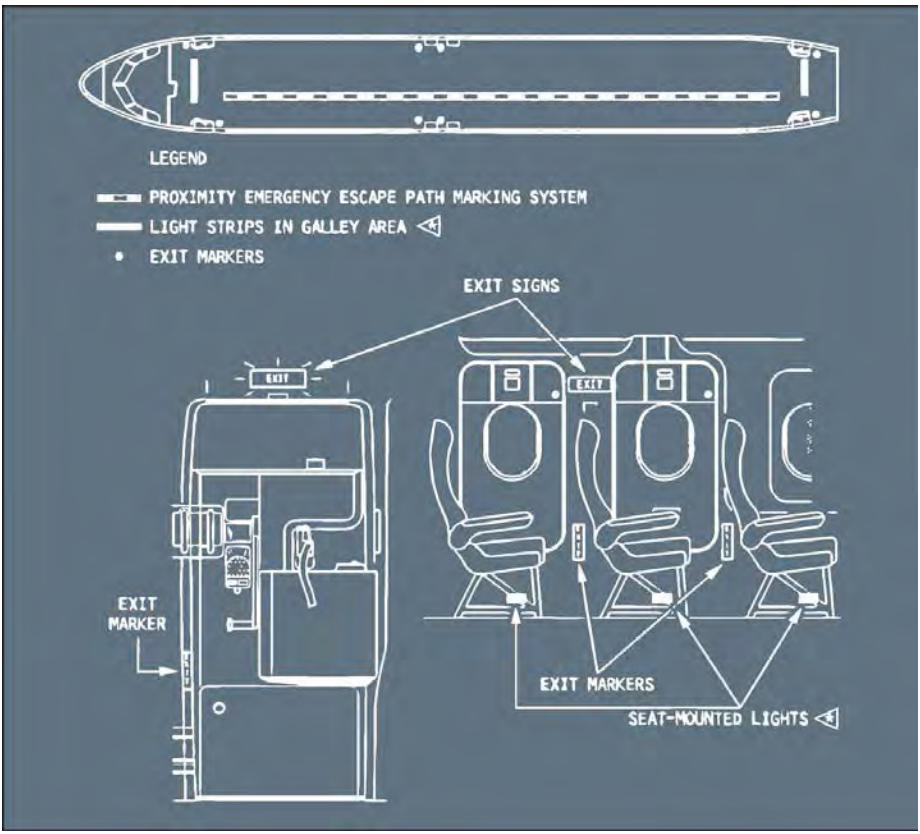
The floor proximity emergency escape path marking is a self-luminescent system.

When in operation:
- The exit markers of the proximity emergency escape path marking system are powered by internal batteries for at least 12 min.
- The DC SHED ESS BUS supplies the cabin emergency lighting.
- If DC SHED ESS BUS fails, batteries inside the light provides power to cabin emergency lighting.
- In nominal case, the DC SHED ESS BUS charges these internal batteries if:
  - The EMER LT sw is not at ON
  - The EMER pb on the Purser's panel is not pressed
  - The DC BUS 1 is supplied
  - Depending on the CIDS/CAM programming, when:
    - The NO SMOKING sw ◁ , or
    - The NO PORTABLE ELEC DEVICE sw ◁ , or
    - The EXIT sw ◁ is set to OFF or AUTO when the landing gear is retracted.

Lavatory auxiliary lights are always on. They are supplied by 28 V DC ESS BUS.
The escape slides have an integral lighting system. The escape slide lights and overwing escape route ◁ lights come on automatically, when the slide is armed and the door or emergency exit is open. They are supplied by internal batteries.

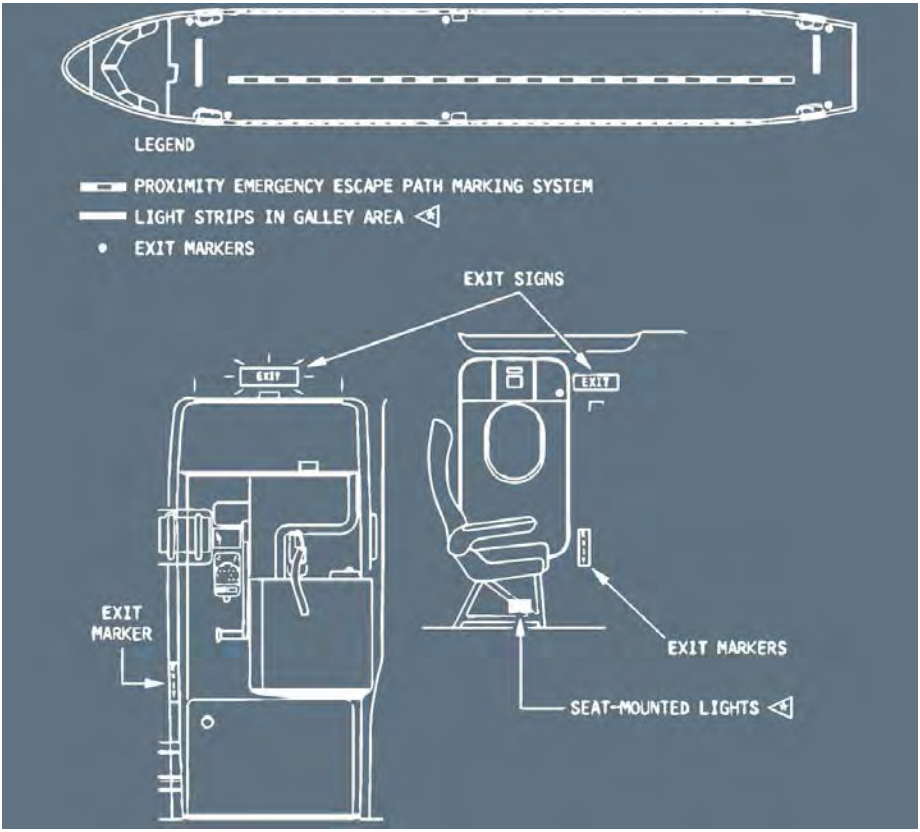
PROXIMITY EMERGENCY ESCAPE PATH MARKING SYSTEM/EXIT SIGNS

Ident.: DSC-33-30-10-00017646.0013001 / 21 MAR 16
Applicable to: MSN 3408, 4100-4547



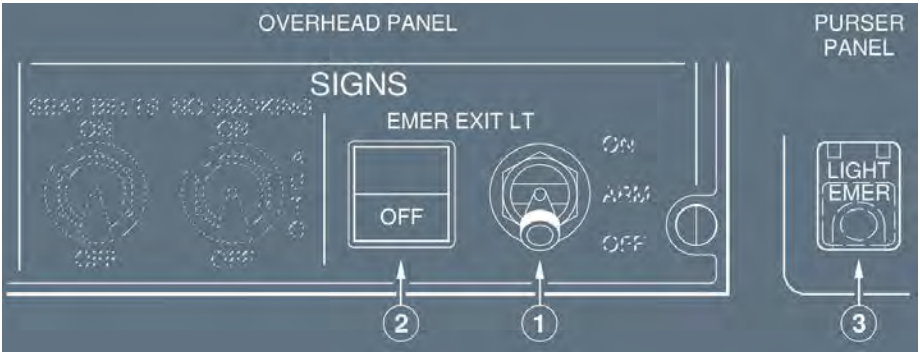
PROXIMITY EMERGENCY ESCAPE PATH MARKING SYSTEM/EXIT SIGNS

Ident.: DSC-33-30-10-00017646.0012001 / 21 MAR 16
Applicable to: MSN 1882-2078, 3467-3518

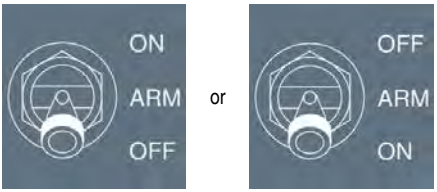


CONTROLS AND INDICATORS

Ident.: DSC-33-30-20-00017708.0003001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) EMER EXIT LT sw
The EMER EXIT LT sw can have one of the following configuration:



ON : Overhead emergency lights, EXIT signs and proximity marking system come on.
OFF : Above lights are off.

ARM : - The proximity emergency escape path marking system comes on when the normal aircraft electrical power or DC SHED ESS BUS is lost
- The overhead emergency lights come on if:
  - Normal aircraft electrical power system fails or
  - DC SHED ESS BUS fails or
  - AC BUS 1 fails.
- Exit signs come on if:
  - Normal aircraft electrical power system fails or
  - DC SHED ESS BUS fails or

Note: The LIGHT EMER pb on the Purser's panel can turn on the emergency lighting regardless of the position of the EMER EXIT LT sw.

(2) EMER EXIT LT-OFF lt

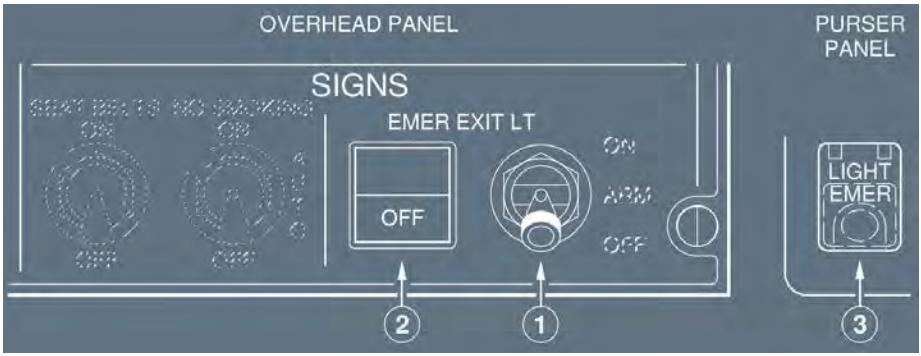
OFF : The amber EMER EXIT LT-OFF lt comes on when the EMER EXIT LT sw is set to OFF.

(3) LIGHT EMER pb

When pressed, this button performs the same function as the EMER EXIT LT sw when it is set to ON.

CONTROLS AND INDICATORS

Ident.: DSC-33-30-20-00017708.0027001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) EMER EXIT LT sw

The EMER EXIT LT sw can have one of the following configuration:

or

ON : Overhead emergency lights, EXIT signs and proximity marking system come on.

OFF : Above lights are off.

ARM :
- Exit markers come on when the normal aircraft electrical power or DC SHED ESS BUS is lost.
- The overhead emergency lights come on if:
  - Normal aircraft electrical power system fails or
  - DC SHED ESS BUS fails or
  - AC BUS 1 fails.
- Exit signs come on if:
  - Normal aircraft electrical power system fails or
  - DC SHED ESS BUS fails or

Note: The LIGHT EMER pb on the Purser's panel can turn on the emergency lighting regardless of the position of the EMER EXIT LT sw.

(2) EMER EXIT LT-OFF lt

OFF : The amber EMER EXIT LT-OFF lt comes on when the EMER EXIT LT sw is set to OFF.

(3) LIGHT EMER pb

When pressed, this button performs the same function as the EMER EXIT LT sw when it is set to ON.

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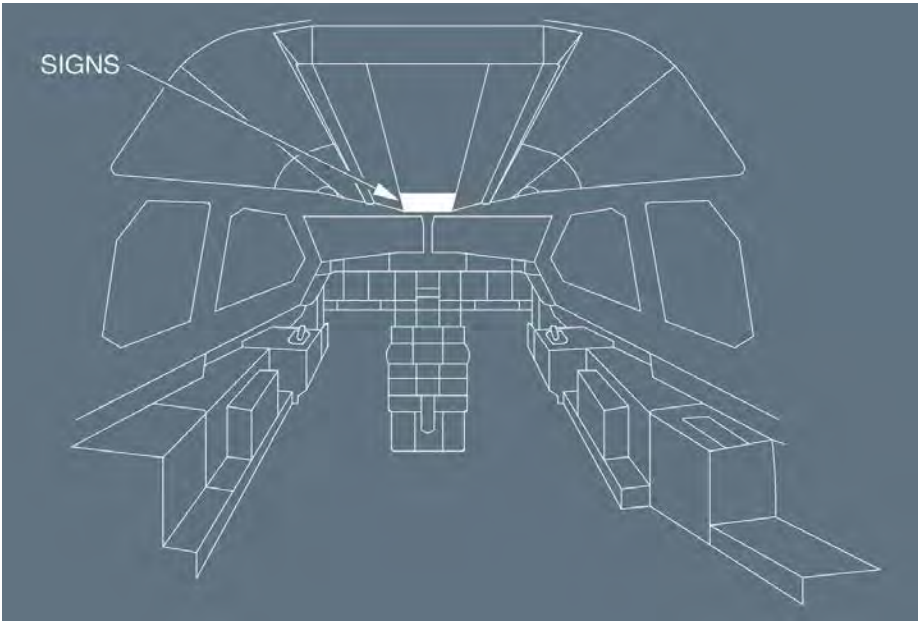
OVERHEAD PANEL

Ident.: DSC-33-40-10-00017709.0001001 / 21 MAR 16
Applicable to: ALL



The switches described below are installed on the SIGNS panel on the overhead panel.

The cabin signs consist of the following:
- A SEAT BELTS sw, and
- A NO SMOKING sw ◁✻ , or
- An EXIT sw ◁✻ , or
- A NO PORTABLE ELEC DEVICE sw ◁✻ .

The SEAT BELTS sw activates the FASTEN SEAT BELT and RETURN TO YOUR SEAT signs.
The NO SMOKING sw ◁✻ or EXIT sw ◁✻ activate the EXIT and NO SMOKING signs.
The NO PORTABLE ELEC DEVICE sw ◁✻ activates the EXIT and NO MOBILE signs.
A low tone chime sounds (depending on CIDS/CAM programming) each time a sign goes on or off.
Each switch has 3 positions:

ON : Signs are on in the cabin

AUTO : ◁✻ Signs are on in the cabin when either landing gear is extended or flaps/slats are extended (position 1, 2, 3, or FULL)

OFF : Signs are off in the cabin

Example of switches layout:

Note: *1. If the cabin altitude goes above 11 300 ft (± 350 ft), the cabin lights (depending on CIDS/CAM programming) and all the cabin signs, except the NO PORTABLE ELEC DEVICE signs come on regardless of switches position.*

2. For NON SMOKER , the NO SMOKING signs are always on.

MEMO DISPLAY

Ident.: DSC-33-40-10-00016783.0001001 / 21 MAR 16
Applicable to: ALL

When the corresponding signs are on, the ECAM displays in green the SEAT BELTS message, the NO SMOKING message or the NO PED, depending on aircraft customization.

AIRCRAFT SYSTEMS

NAVIGATION

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Continued on the following page

Continued from the previous page

GENERAL

Ident.: DSC-34-NAV-10-10-00018524.0001001 / 21 MAR 16
Applicable to: ALL

The Air Data and Inertial Reference System (ADIRS) supplies temperature, anemometric, barometric and inertial parameters to the EFIS system (PFD and ND) and to other user systems (FMGC, FADEC, ELAC, SEC, FAC, FWC, SFCC, ATC, GPWS, CFDIU, CPC).

The system includes:

- Three identical ADIRUs (Air Data and Inertial Reference Units).

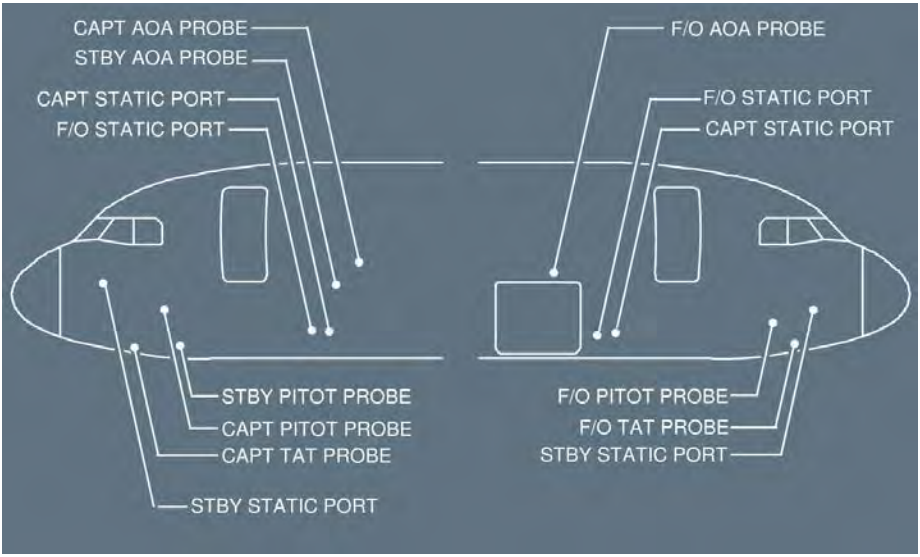
  Each ADIRU is divided in two parts, either of which can work separately in case of failure in the other:
  - The ADR part (Air Data Reference) which supplies barometric altitude, airspeed, Mach, angle of attack, temperature and overspeed warnings.
  - The IR part (Inertial Reference) which supplies attitude, flight path vector, track, heading, accelerations, angular rates, ground speed and aircraft position.

- One ADIRS control panel on the overhead panel for selection of modes (NAV, ATT, OFF) and indications of failures.
- Four types of sensors:
  - Pitot probes (3)
  - Static pressure probes (STAT) (6)
  - Angle of attack sensors (AOA) (3)
  - Total air temperature probes (TAT) (2)

  These sensors are electrically heated to prevent from icing up.
- Eight ADMs (Air Data Modules) which convert pneumatic data from PITOT and STAT probes into numerical data for the ADIRUs.
- A switching facility for selecting ADR3 or IR3 for instrument displays in case of ADIRU1 or 2 failure.

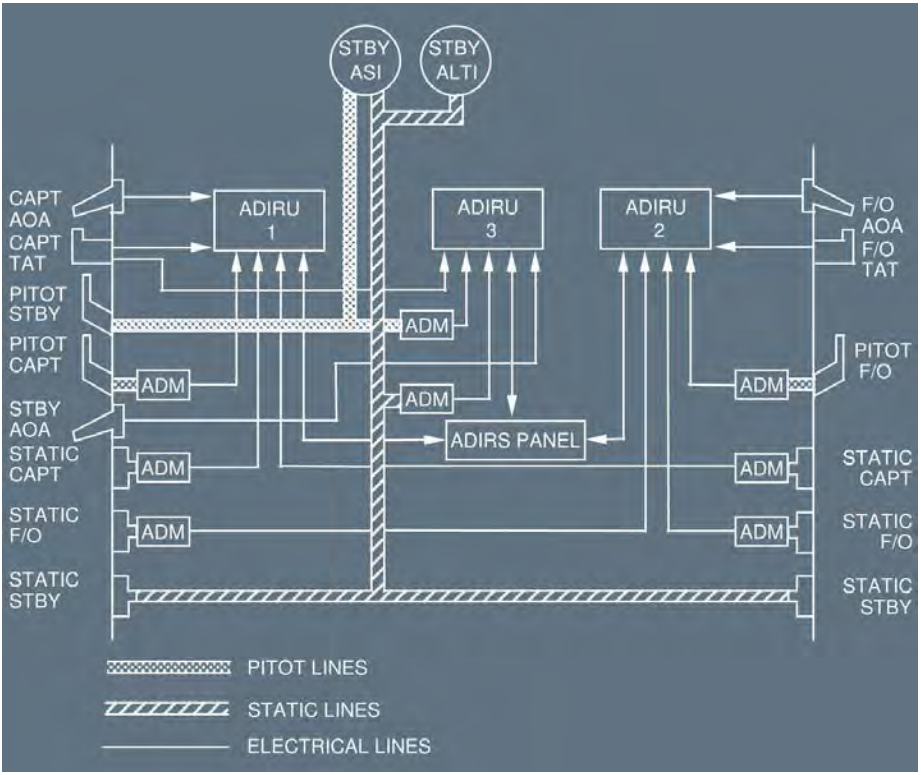
PROBES LOCATION

Ident.: DSC-34-NAV-10-10-00018525.0001001 / 21 MAR 16
Applicable to: ALL



PROBES SCHEMATIC

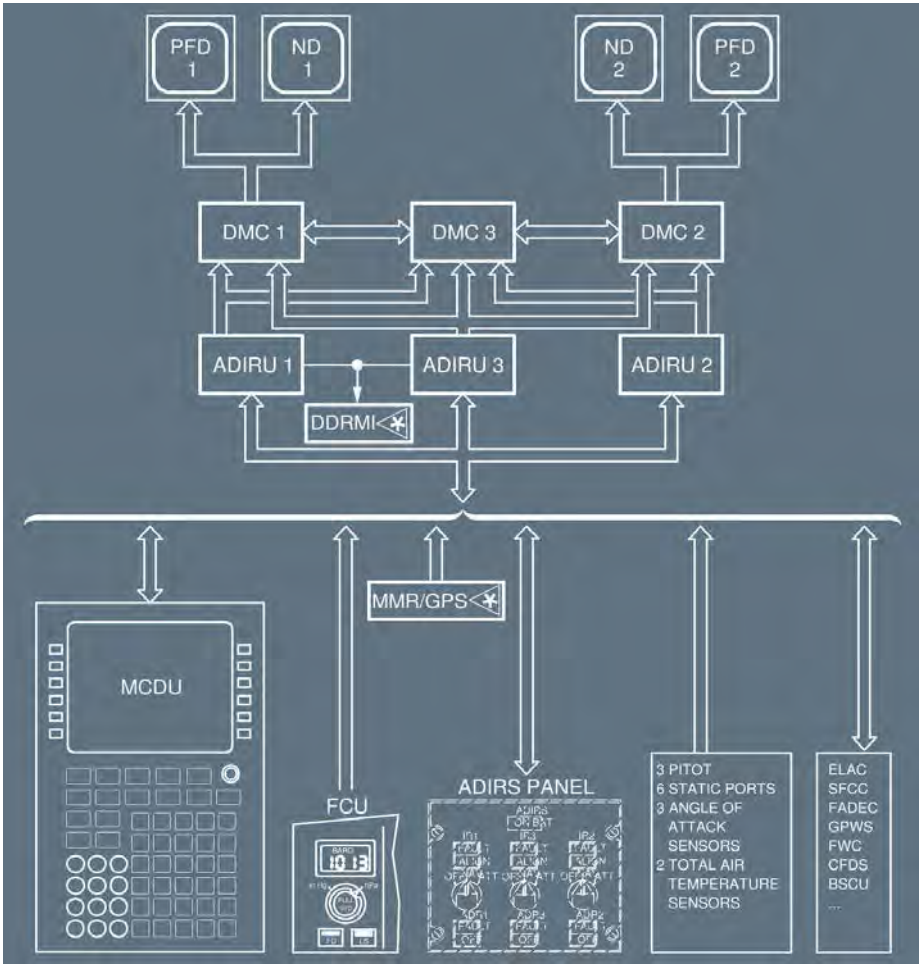
Ident.: DSC-34-NAV-10-10-00018526.0001001 / 21 MAR 16
Applicable to: ALL



Note: *ADIRU (1) is supplied by CAPT probes,*
ADIRU (2) is supplied by F/O probes,
ADIRU (3) is supplied by STBY probes and CAPT TAT.

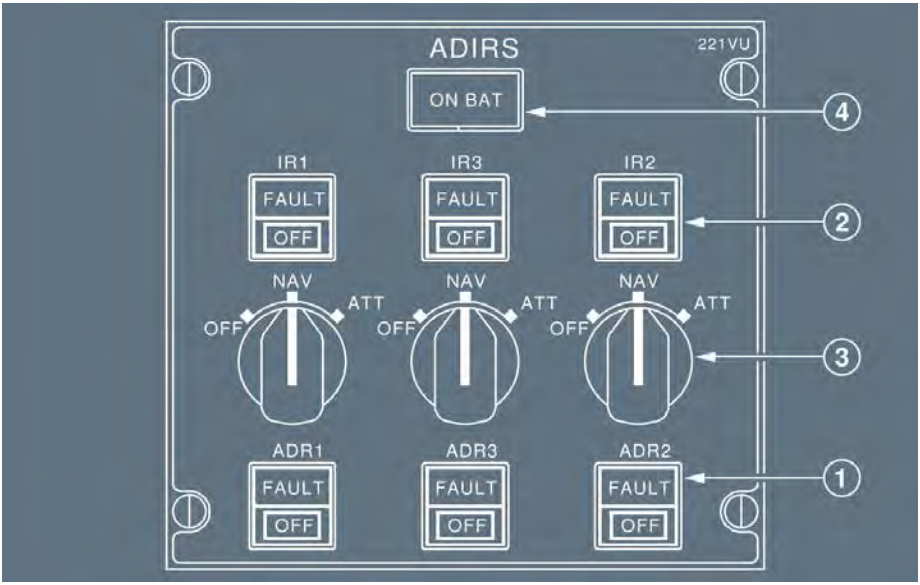
ADIRS SCHEMATIC

Ident.: DSC-34-NAV-10-10-00018527.0001001 / 21 MAR 16
Applicable to: ALL



OVERHEAD PANEL

Ident.: DSC-34-NAV-10-20-00018528.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) ADR 1(2)(3) pb sw

OFF light : Air data output disconnected.

FAULT light : This amber light comes on with an ECAM caution if a fault is detected in the air data reference part.

(2) IR 1(2)(3) pb sw

OFF light : Inertial data output disconnected.

FAULT light : This amber light comes on with an ECAM caution when a fault affects the respective IR.

- Steady : the respective IR is lost.
- Flashing : the attitude and heading information may be recovered in ATT mode.

(3) IR 1(2)(3) mode rotary sel

OFF : The ADIRU is not energized.
ADR and IR data are not available.

NAV : Normal mode of operation.
Supplies full inertial data to aircraft systems.

ATT : IR mode supplying only attitude and heading information if the system loses its ability to navigate.
The heading must be entered through the MCDU and has to be reset frequently (about every 10 min).

(4) ON BAT light

The ON BAT light comes on in amber when the aircraft battery supplies at least one IRS. The ON BAT light also comes on for a few seconds at the beginning of a complete IRS alignment. The light does not come on in the case of a fast alignment.

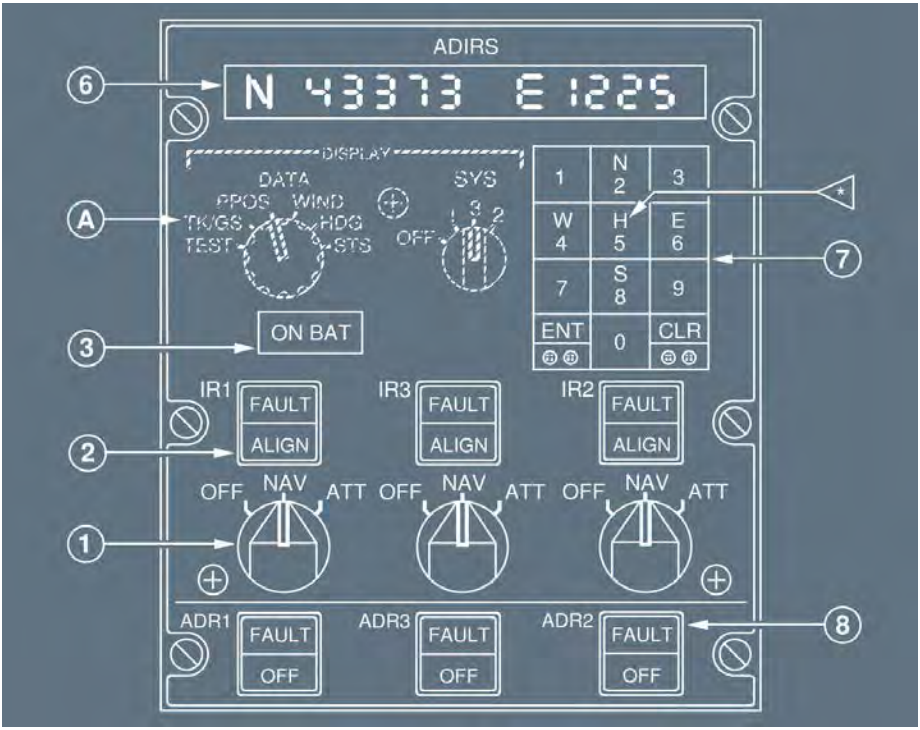
Note: When the aircraft is on ground and if at least one ADIRU is supplied by aircraft batteries:
- *An external horn sounds*
- *The ADIRU and AVNCS light comes on amber on the EXTERNAL POWER panel.*

OVERHEAD PANEL

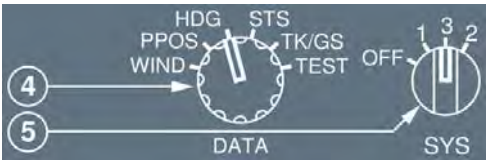
Ident.: DSC-34-NAV-10-20-00018528.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The ADIRS CDU on the overhead panel provides the controls and indicators to permit:
- Selection of power supplies to the ADR and IRS systems
- Selection and display of navigation data
- Status and fault indication of IRS or ADRs.
- Manual initialization of IRS

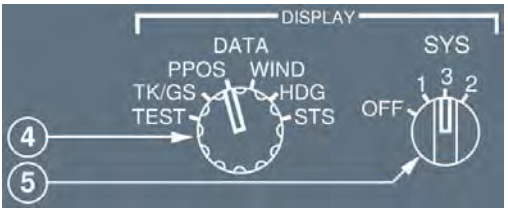
Note: IRS are normally initialized with the FMGC, but IRS may be initialized with the ADIRS CDU as a backup.



(A) Depending of aircraft configuration,



or



(1) IR 1(2)(3) Mode rotary sel

OFF : The ADIRU is not energized.
ADR and IR data are not available.

NAV : Normal mode of operation.
Supplies full inertial data to aircraft systems.

ATT : IR mode supplying only attitude and heading information, if the system loses its ability to navigate.

The heading must be entered using:
- The CDU keyboard, or
- The MCDU (if the entry field is available).

The heading has to be reset frequently (about every 10 min).

(2) IR 1(2)(3) lt

FAULT light : This amber light comes on with an ECAM caution when a fault affects the respective IR.
- Steady : The respective IR is lost.
- Flashing : The attitude and heading information may be recovered in ATT mode.

ALIGN light :
- Steady : The respective IR is operating normally in align mode.
- Flashing : IR alignment fault, or no present position entry after 10 min, or difference between position at shutdown and entered position exceeds 1 ° of latitude or longitude.
- Extinguished: Alignment has been completed.

(3) ON BAT lt

The ON BAT light comes on in amber when the aircraft battery supplies at least one IRS. The ON BAT light also comes on for a few seconds at the beginning of a complete IRS alignment.

Note: When the aircraft is on ground and if at least one ADIRU is supplied by aircraft batteries:
- *An external horn sounds*
- *The ADIRU and AVNCS light comes on amber on the EXTERNAL POWER panel.*

(4) DATA selector knob

This knob selects the information to be displayed in the ADIRS display window.

TEST The ENT and CLR buttons on the keyboard come on, and the display shows all 8's.

TK/GS The display shows true track and ground speed.

PPOS The display shows present latitude and longitude

WIND The display shows true wind direction and speed.

HDG The display shows true heading and the minutes remaining until alignment is completed.

STS The display shows an action code.

(5) SYS selector knob

OFF : The CDU display is not energized. ADIRS are still energized if the associated IR mode rotary selectors are not at OFF.

1.2.3 : System selected for data display.

(6) Display

The display presents the data selected by the DATA selector.
A keyboard entry overrides the selected display.

(7) Keyboard

The flight crew can use the keyboard to enter the present position, or the heading in ATT mode, into the selected system.

Letter keys : Used to enter N, S, E, or W for position, or entering H ◁ for heading (ATT mode).

Number keys : Used to enter the present position (or the present magnetic heading in ATT mode).

CLR key : The integral cue light comes on after an entry operation, if the data has an unreasonable value.
Pressing this key clears the data display, that has been keyed in but not yet entered.

ENT Key : The integral cue light comes on when a crew member has keyed in a number for N, S, W, E or H ◁ .
Pressing the key enters data into the ADIRS.

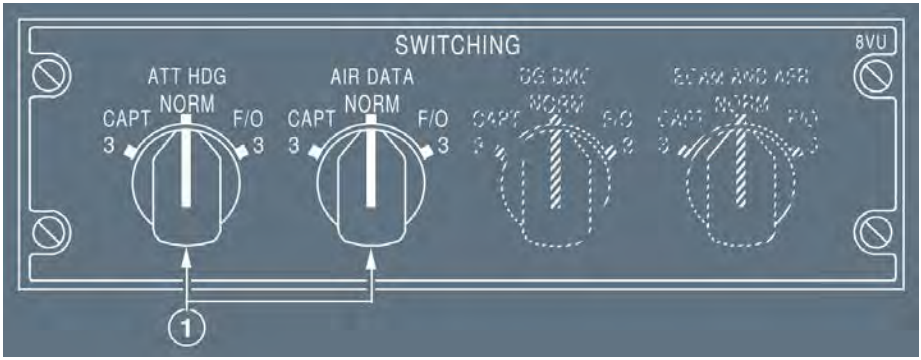
(8) ADR 1(2)(3) pb (momentary action)

OFF light Air data output disconnected.

FAULT light This amber light comes on with an ECAM caution, if a fault is detected in the air data reference part.

PEDESTAL

Ident.: DSC-34-NAV-10-20-00018529.0001001 / 21 MAR 16
Applicable to: ALL



(1) ATT HDG and AIR DATA sel

NORM : ADIRU1 supplies data to PFD1, ND1, DDRMI and VOR/DME. ADIRU 2 supplies data to PFD 2, and ND2.

CAPT 3 : ADR3 or IR3 replaces ADR1 or IR1.

F/O 3 : ADR 3 or IR3 replaces ADR 2 or IR2.

MEMO DISPLAY

Ident.: DSC-34-NAV-10-20-A-00017043.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

IR IN ATT ALIGN : This memo appears in green during the IR alignment in Attitude mode.

Ident.: DSC-34-NAV-10-20-A-00017042.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

IRS IN ALIGN : This memo appears in green if one of the 3 IRS is still in alignment and both engines are stopped.

IRS IN ALIGN : This memo appears in amber if one of the 3 IRS is still in alignment and one engine is running.

Ident.: DSC-34-NAV-10-20-A-00017041.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

IRS IN ALIGN X MN : This memo appears in green, if both engines are stopped. The memo "IRS IN ALIGN X MN" appears during flight phase 1 or 2, if:

- At least one active IRS is in ALIGN submode
- The remaining time until NAV mode is obtained in X minutes (1 < X < 10).

IRS IN ALIGN X MN : This memo appears in amber, if one engine is running. The memo "IRS IN ALIGN X MN" appears during flight phase 1 or 2, if:

- At least one active IRS is in ALIGN submode
- The remaining time until NAV mode is obtained in X minutes (1 < X<10).

Ident.: DSC-34-NAV-10-20-A-00017041.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

The memo "IRS IN ALIGN X MN" appears during IRS alignment in flight phase 1 or 2. X MN indicates the number of remaining minutes (1 < X < 10), until NAV mode is reached.
Before any engine is started:

IRS IN ALIGN X MN : This memo appears in green when at least one active IRS is being aligned.

IRS IN ALIGN X MN : This memo pulses in green, if the alignment of one IRS is faulty.

When one engine is started:

IRS IN ALIGN X MN : This memo appears in amber during IRS alignment. If the alignment of one IRS is faulty, this memo is replaced by the “IR NOT ALIGNED” ECAM caution.

MAXIMUM DIFFERENCES BETWEEN SPEED/MACH INDICATIONS

Ident.: DSC-34-NAV-10-20-00021130.0002001 / 17 MAR 17
Applicable to: ALL

FL	SPEED	SPEED/MACH COMPARISON BETWEEN					
		ADR1 and ADR2 (on PFD)		ADR3 and ADR1, or ADR3 and ADR2		Standby Airspeed Indicator and any ADR 1, or 2, or 3	
		kt	Mach	kt	Mach	kt	Mach on ISIS (1)
GND CHECK	-	6 kt	M 0.008	6 kt	M 0.008	6 kt	-
FL 50	250 kt	4 kt	M 0.005	4 kt	M 0.007	7 kt	-
FL 100	250 kt	4 kt	M 0.005	5 kt	M 0.008	8 kt	M 0.032

Continued on the following page

Continued from the previous page

FL	SPEED	SPEED/MACH COMPARISON BETWEEN					
		ADR1 and ADR2 (on PFD)		ADR3 and ADR1, or ADR3 and ADR2		Standby Airspeed Indicator and any ADR 1, or 2, or 3	
		kt	Mach	kt	Mach	kt	Mach on ISIS ◁ (1)
FL 200	300 kt	3 kt	M 0.007	5 kt	M 0.011	9 kt	M 0.033
FL 300	M 0.78	3 kt	M 0.010	5 kt	M 0.014	9 kt	M 0.025
FL 390	M 0.78	3 kt	M 0.010	4 kt	M 0.014	8 kt	M 0.025

(1) *Mach values lower than M 0.50 in climb, and M 0.45 in descent, are not displayed on ISIS ◁.*

DESCRIPTION

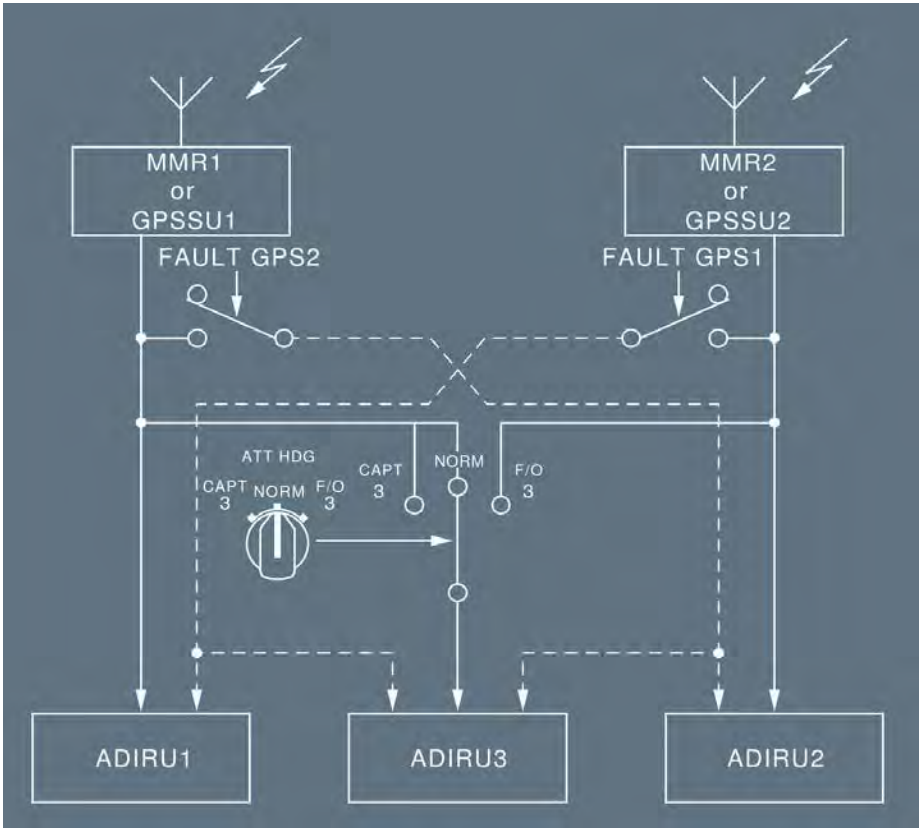
Ident.: DSC-34-NAV-15-10-00018530.0001001 / 21 MAR 16
Applicable to: ALL

The Global Positioning System (GPS) is a satellite-based radio navigation aid.
Worldwide, 24 satellites broadcast accurate navigation data that the aircraft use for precise determination of its position.

The aircraft has two independent GPS receivers. Depending of the aircraft configuration, each receiver consists:

- Of a GPS Sensor Unit (GPSSU), or
- Is integrated in the Multi Mode Receiver (MMR). The GPS1 receiver in MMR1, and the GPS2 receiver in MMR2.

The GPSSU or the MMR processes the received data, and transfers them to the ADIRUs. Then each ADIRU performs the GP-IRS hybrid position calculation. FMGCs use this hybrid position.


MMR1
or
GPSSU1
MMR2
or
GPSSU2
FAULT GPS2
FAULT GPS1
ATT HDG
CAPT
3
NORM
F/O
3
CAPT
3
NORM
F/O
3
ADIRU1
ADIRU3
ADIRU2

OPERATIONS

GPS information are available on the FMS – GPS Monitor Page. *Refer to DSC-22_20-50-10 Pages descriptions*.

- During normal operations
  The GPS receiver 1 supplies the ADIRU 1 and the ADIRU 3, and the GPS receiver 2 supplies the ADIRU 2.
- In case of failure of one GPS receiver
  All ADIRUs use the operative GPS receiver.
- In case of failure of ADIRUs
  - If the ADIRU 1 fails, ADIRU 3 is supplied by the GPS receiver 1, and ADIRU 2 is supplied by the GPS receiver 2.
  - If the ADIRU 2 fails, the ATT HDG selector has to be set to F/O 3 in order to maintain Side 1 and Side 2 segregation. In this case, the ADIRU 3 will be supplied with GPS receiver 2.
  - If two ADIRUs fail, the remaining ADIRU is supplied by its own side GPS receiver.

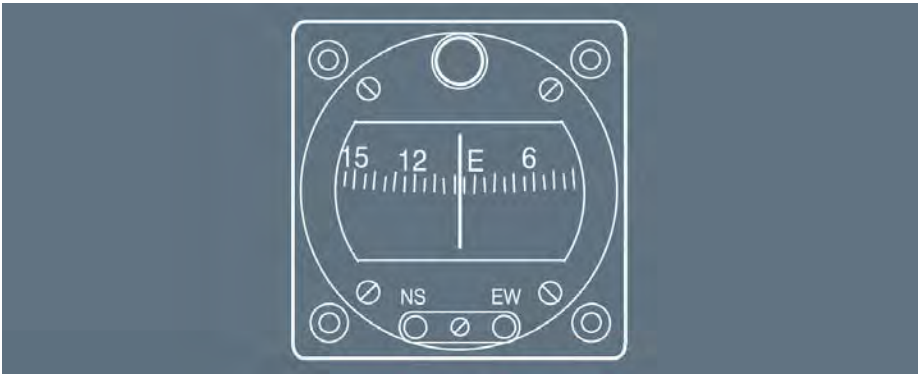
Intentionally left blank

COMPASS

Ident.: DSC-34-NAV-20-00001367.0001001 / 19 DEC 12
Applicable to: ALL

There is a compass located on top of the windshield center post.
The deviation card is located above the compass.

Note: Because of the location of the APU power on contactor in the cockpit, the APU start sequence may disturb the compass reading.

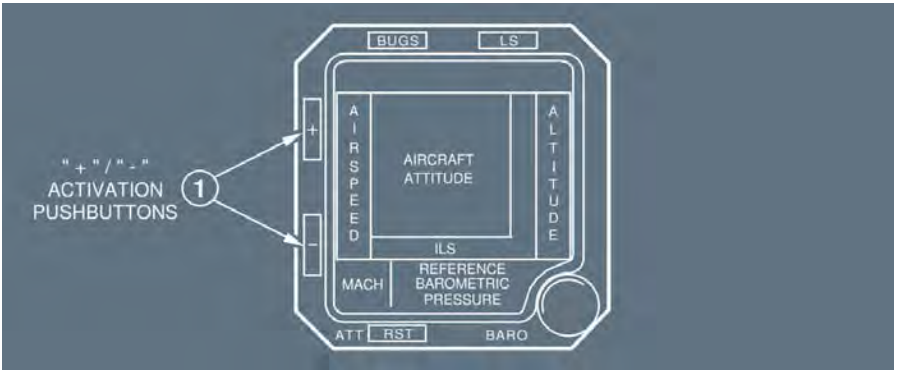


DESCRIPTION OF THE ISIS

Ident.: DSC-34-NAV-20-00018543.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

GENERAL

The ISIS system displays the following information:
- Attitude
- Airspeed and mach
- Altitude
- Barometric pressure
- LS function
- Bugs

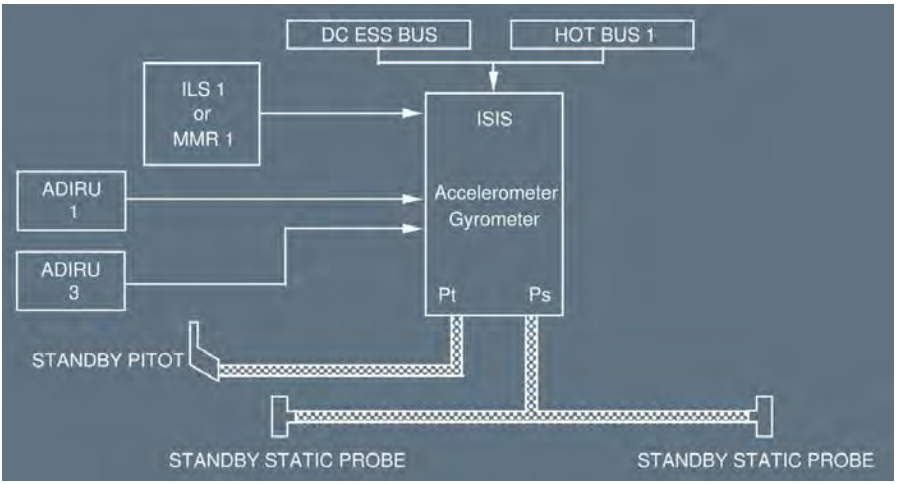


(1) "+"/ "-" activation pushbuttons

Two pushbuttons labelled "+" and "–" are used to adjust the level of brightness.
The brightness of the screen automatically adjusts after power-up tests.
This is because of the photosensitive cell located on the surface of the ISIS system display.
The "+" and "–" pushbuttons then allow this initial brightness to be manually adjusted and changed.

Note: The system must be reset after 350 h of continuous electrical supply using the « ATT RST » pushbutton.

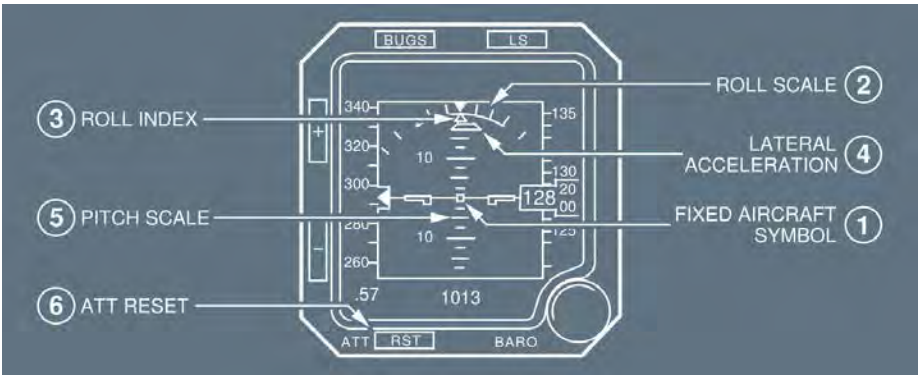
ARCHITECTURE



ATTITUDE

Ident.: DSC-34-NAV-20-00018575.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

Note: When leveling the wings after performing a small turn of a small bank angle, the displayed roll attitude may temporarily be incorrect by a few degrees.



(1) Fixed aircraft symbol
The fixed aircraft symbol is in black, and outlined in yellow.
Depending of the aircraft configuration, the center of the fixed aircraft symbol is a point (like on the illustration above) or “V-bars”.

(2) Roll scale
The roll scale is in white.
The markers are at 0 (small yellow triangle), 10, 20, 30, 45, 60 ° of bank.

(3) Roll index
The roll index is in black, and outlined in white. It indicates the bank angle.

(4) Lateral acceleration index
The trapezoidal index moves beneath the roll index. It represents the aircraft’s lateral acceleration.

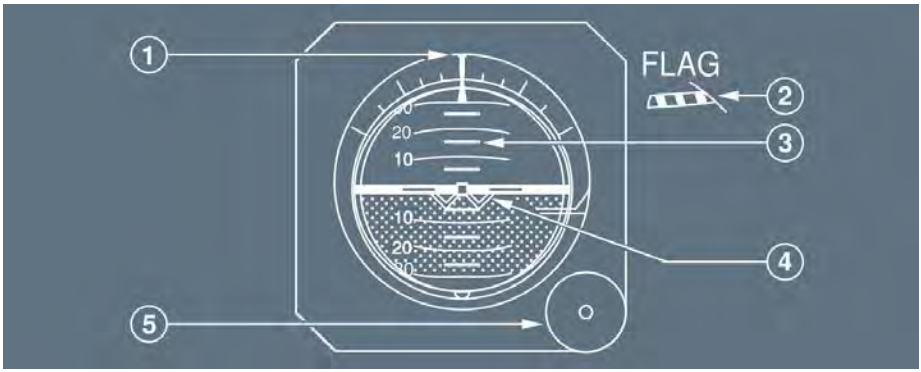
(5) Pitch scale
The pitch scale is in white. The scale shows markers every 2.5 ° between 30 ° nose up and 30 ° nose down. Beyond 30 °, large red arrowheads (V-shaped) indicate that the attitude has become excessive, and show the direction to follow in order to reduce it. The minimum pitch scale displayed is -17.5 ° +15 ° at 0 ° pitch.

(6) ATT RST
The attitude indication can be reset by pressing this pushbutton for at least 2 s. The aircraft must be level during this procedure. During the reset time (approximately 10 s), the “ATT 10 s” message is displayed on the screen. This pushbutton is also used to realign the system, if excessive aircraft movement is detected during the alignment phase.

ATTITUDE

Ident.: DSC-34-NAV-20-00018575.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

Note: When leveling the wings, after performing a small turn of a small bank angle, the displayed roll attitude may temporarily be incorrect by a few degrees.



(1) Roll scale
The roll scale indicates the bank angle. It has bank angle graduations up to 60 °. There is no rotation limit.

(2) Flag
The flag appears if the instrument fails or if power supply fails.

(3) Pitch scale
The pitch scale indicates the pitch attitude. It can show pitch angle up to ± 85 °.

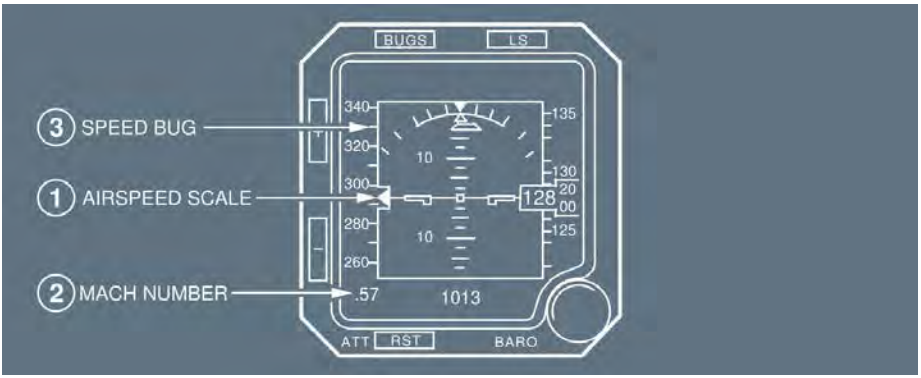
(4) Aircraft reference
Fixed symbol.

(5) Caging knob
The flight crew pulls it out to reinitialize the gyro, and to level and center the horizon. (The airplane should be level during this procedure).

Note: *After low-rate turns, the standby horizon may not give accurate indications. To correct this behavior, use the caging knob when the aircraft is level.*

AIRSPEED

Ident.: DSC-34-NAV-20-00018576.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



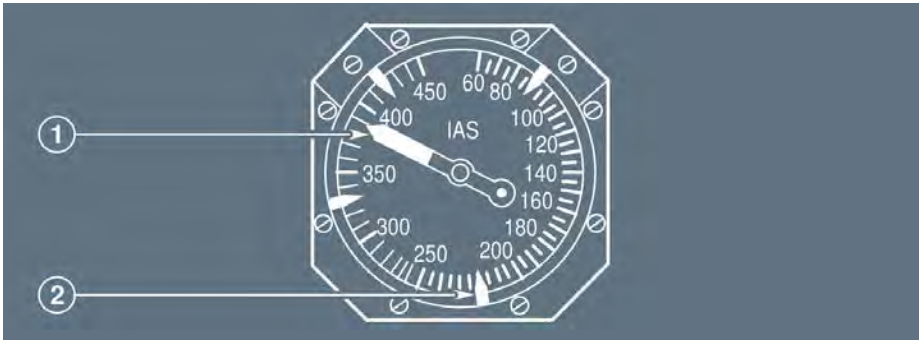
(1) Airspeed scale
A white scale moves in front of a yellow triangle indicating the airspeed. The scale ranges from 5 to 250 kt, with a mark every 5 kt, and from 250 to 520 kt, with a mark every 10 kt.

(2) Mach Number
The Mach number is displayed in green it goes greater than 0.5. And it disappears only when it goes below 0.45.

(3) Speed bug
When a speed bug is entered via the BUGS function, the corresponding speed mark is indicated by a cyan dash.

AIRSPEED

Ident.: DSC-34-NAV-20-00018576.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

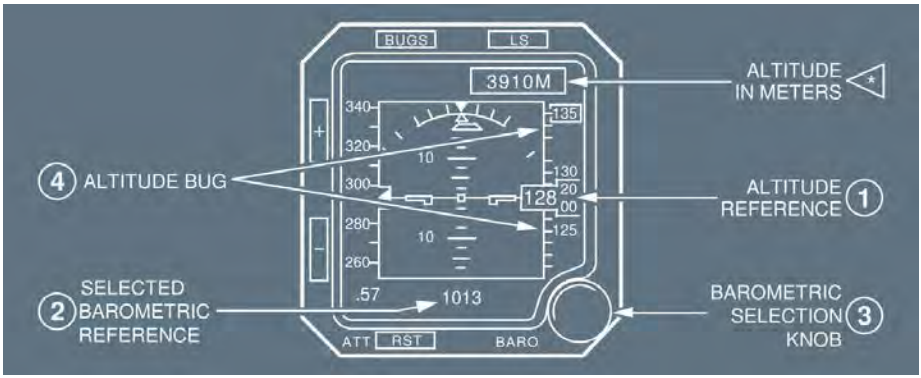


(1) Airspeed pointer

(2) Airspeed bugs (4)
For marking airspeed references.

ALTIMETER

Ident.: DSC-34-NAV-20-00018577.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) Altitude indication
The altitude indication is given as a white moving scale, and a green digital readout on a gray background.

The altitude scale ranges from -2 000 to 50 000 ft every 100 ft, with altitude digital indications every 500 ft.
For negative altitudes, "NEG" appears in the window in white.
The altitude box changes to cyan, when it also corresponds to a bug value.
Depending of the aircraft configuration, the altitude in meters is displayed above the altitude scale.

(2) Barometric reference
The barometric reference pressure is displayed in cyan.

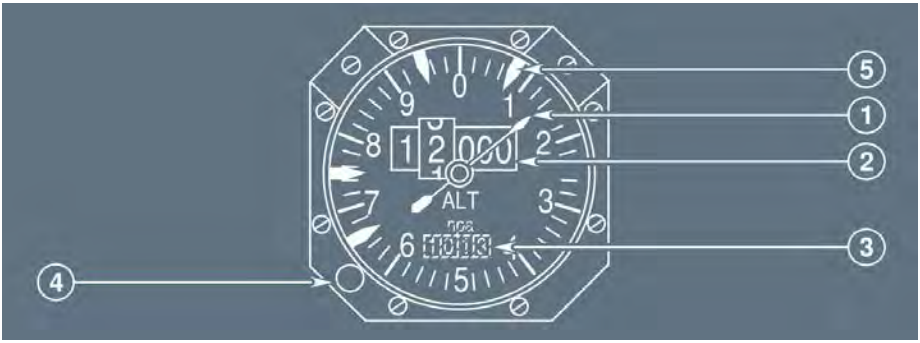
The displayed barometric reference is:
- The standard barometric reference "STD", or
- Depending of the aircraft configuration, the barometric pressure is "hPa" or "hPa/ inHg".

(3) Barometric selection knob
This knob enables the selection of a barometric pressure, setting a variation of 10 hPa per knob rotation.
The standard barometric pressure can be selected by pressing the barometric knob. “STD” is then displayed, in place of the pressure value.
Pressing the knob again will display the selected barometric pressure.

(4) Altitude bug
When an altitude bug is entered through the bugs function, the corresponding altitude mark is indicated by a cyan dash, or by a cyan box when the dash covers the digital indication on the scale.

ALTIMETER

Ident.: DSC-34-NAV-20-00018577.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078



(1) Altitude pointer

(2) Altitude counter
Depending of the aircraft configuration, the unit is "feet" or "meter".

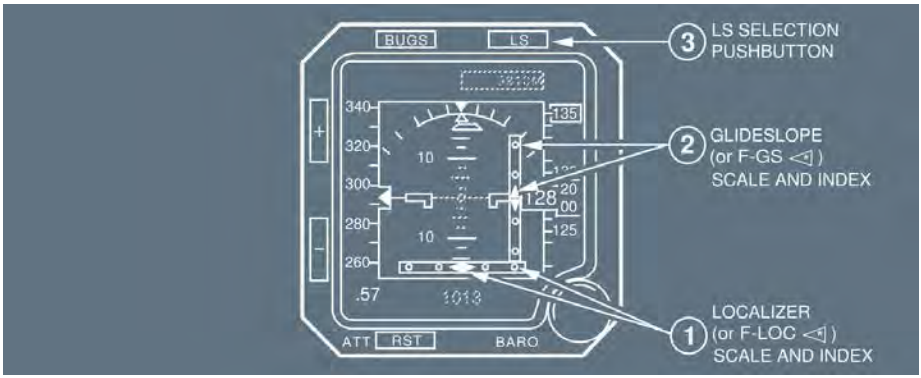
(3) Altimeter setting
Depending of the aircraft configuration, the unit is "hPa" or "inHg".

(4) Altimeter setting knob

(5) Altitude bugs (4)
For marking of altitude references.

LANDING SYSTEM FUNCTION

Ident.: DSC-34-NAV-20-00001377.0005001 / 22 JUL 14
Applicable to: MSN 3408-4547



(1) Localizer / scale and index

(2) Glideslope / scale and index
When the LS pb is pressed, the deviation scales are displayed.
When deviation scales are displayed and the LS deviations are valid, the indexes appear.

The LS deviations that are displayed correspond to the LS approach:
- Selected on the MCDU, or
- Tuned on the RMP.

Note: The LS approach corresponds to either ILS approach, or MLS ◁ approach, or GLS ◁ approach, or non precision approach using FLS ◁.

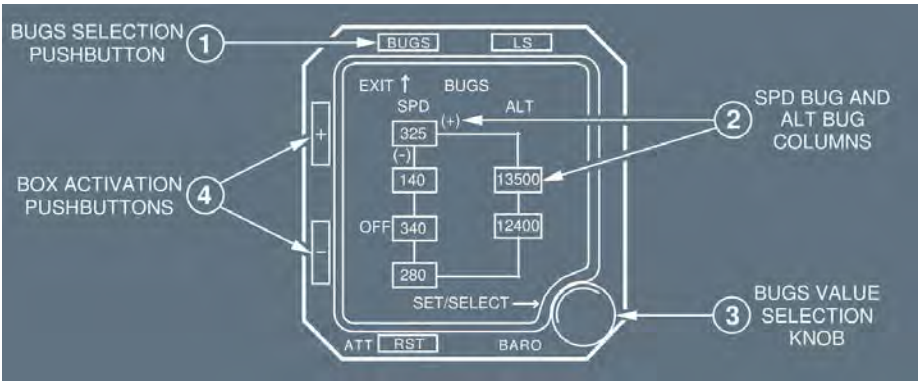
(3) LS selection pushbutton

Pressing the LS pb will display the LS scales. Pressing the LS pb again will remove the LS scales.

CAUTION	Do not use the ISIS LS for takeoff using the localizer of the opposite runway, or for a back-course localizer approach. The LOC deviations are given in the wrong sense.

BUGS FUNCTION

Ident.: DSC-34-NAV-20-00018578.0001001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) BUGS function selection pushbutton

Pressing the BUGS pushbutton will activate the BUGS function and display the bug values to be selected.

(2) SPD BUG and ALT BUG columns

The SPD BUG column gives four speed values (in knots) that can be selected by the crew.
The ALT BUG column gives two altitude values (feet) to be selected by the crew.

(3) BUGS value selection knob

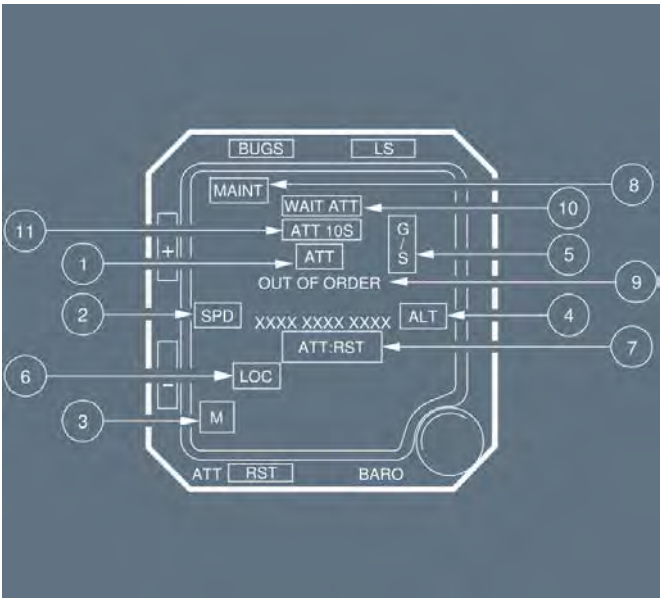
It allows the bug value to be set by rotating the BARO knob. This value cannot be lower than 30 kt for a speed bug, or a negative value for an altitude bug.
Pressing the BARO setting knob, once a bug value box is activated, will deselect the bug value. The “OFF” label comes on close to the activated box.
The entered values are memorized by the system, when exiting the screen, by pressing the BUGS pushbutton (1), or after 15 s without any pilot action.

(4) "+"/"-" box activation buttons
Access from one box to another is obtained by pressing the "+" or "–" pushbutton.
When a bug value is entered, access to the next box is obtained by pressing the "–" pushbutton. The box becomes active and flashes.
The "+" pushbutton can be used to return to a previous box.

Note: Use of the ISIS bugs function is not recommended because, in the event that both PFDs are lost in flight, when the ISIS bugs were previously set for takeoff, then for the approach, the bugs would remain at the takeoff characteristic speed settings.

FLAGS

Ident.: DSC-34-NAV-20-00018580.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) ATT flag (red)
When attitude data is lost, the red ATT flag appears.

(2) SPD flag (red)
When airspeed data is lost, the red SPD flag appears.

(3) M flag (red)
When mach number is lost, the red M flag appears.

(4) ALT flag (red)
When altitude data is lost, the red ALT flag appears.

(5) G/S flag (red)
When glideslope information is lost, the red G/S flag appears.

(6) LOC flag (red)
When localizer data is lost, the red LOC flag appears.

(7) ATT: RST (yellow)

The "ATT: RST" flag appears:
- When excessive aircraft movement is detected during the alignment phase, or
- After 350 h of continuous electrical supply, or
- When the "WAIT ATT" flag is displayed during more than 10 s.

In both cases, press the ATT RST pb to reset/realign and recover the attitude indication.

(8) MAINT flag (white)
Maintenance required. This "MAINT flag" does not affect ISIS operation.
Displayed only on ground phase (speed < 60 kt).

(9) OUT OF ORDER (white)
When an internal failure of the ISIS indicator occurs, the "OUT OF ORDER" message appears, accompanied by a fault code.

(10) WAIT ATT flag (yellow)

If the ISIS looses attitude data, its entire sphere is cleared to display the: "WAIT ATT" flag.
- If the "WAIT ATT" flag is displayed during less than 10 s, a normal operation is recovered.
- If attitude data are lost for more than 10 s, the "WAIT ATT" flag is then replaced by the "ATT: RST" flag.

(11) ATT 10 s flag (yellow)
This count down flag appears, when the flight crew press the ATT RST pb, in order to indicate that the attitude reset function is in progress.

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GENERAL

Ident.: DSC-34-NAV-30-10-00018581.0001001 / 21 MAR 16
Applicable to: ALL

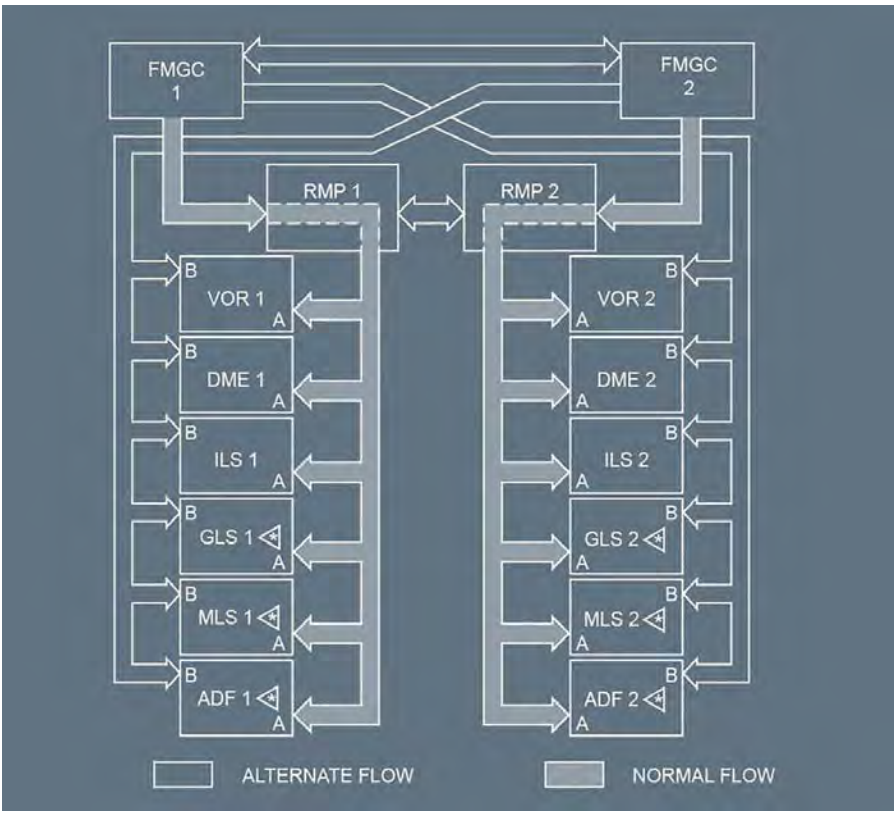
Three modes of tuning are available.

1. **Automatic Tuning**
   This is the basic means for tuning navaids.
   In normal operation, the FMGC tunes navaids automatically, with each FMGC controlling its own receivers.
   If one FMGC fails, the remaining FMGC controls both sides receivers.
2. **Manual Tuning**
   The flight crew can use the MCDU to override the automatic tuning of navaids by FMGC in order to select a specific navaid for visual display.
   This does not affect the automatic function of the FMGC.
   Any entry on one MCDU is sent to both FMGC in dual mode, or the remaining FMGC in single mode.
3. **Back Up Tuning**
   If both FMGCs fail, the flight crew can use the RMPs (Radio Management Panels 1 and 2) on the pedestal for back up tuning.
   The CAPT RMP controls VOR1 and ADF 1 ◁.
   The F/O RMP controls VOR2 and ADF 2 ◁.
   Either RMP controls ILS/GLS ◁ / MLS ◁, provided “STBY NAV” is selected on RMP1 and RMP2. RMP3 ◁ is not used for navaids tuning.

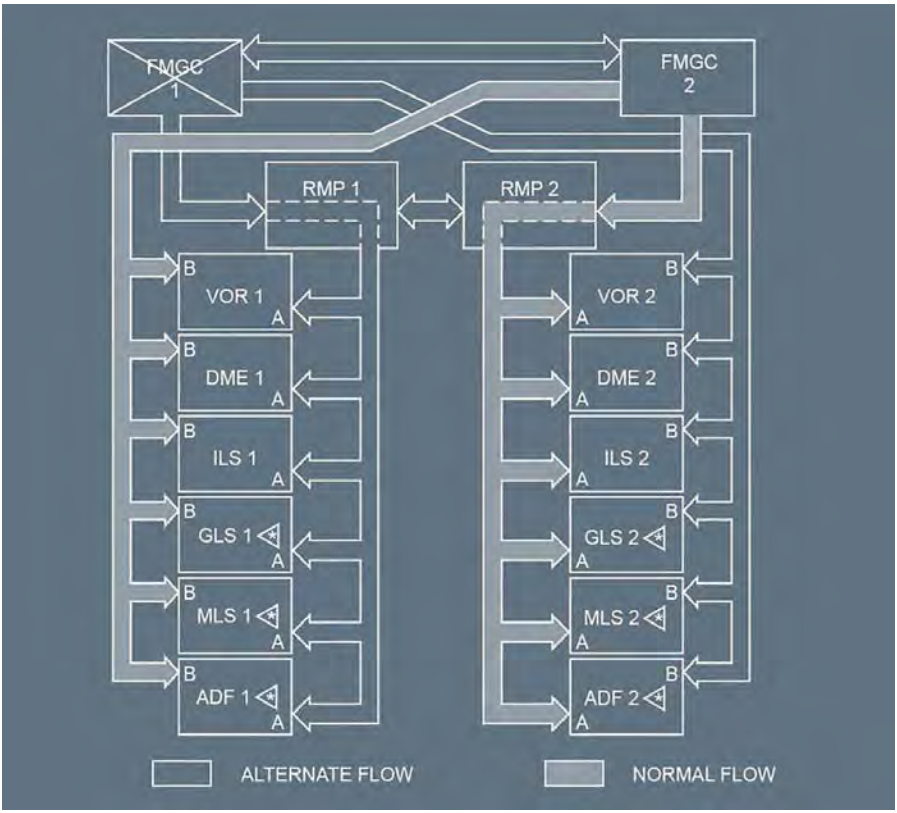
ARCHITECTURE

Ident.: DSC-34-NAV-30-10-00018582.0001001 / 21 MAR 16
Applicable to: ALL

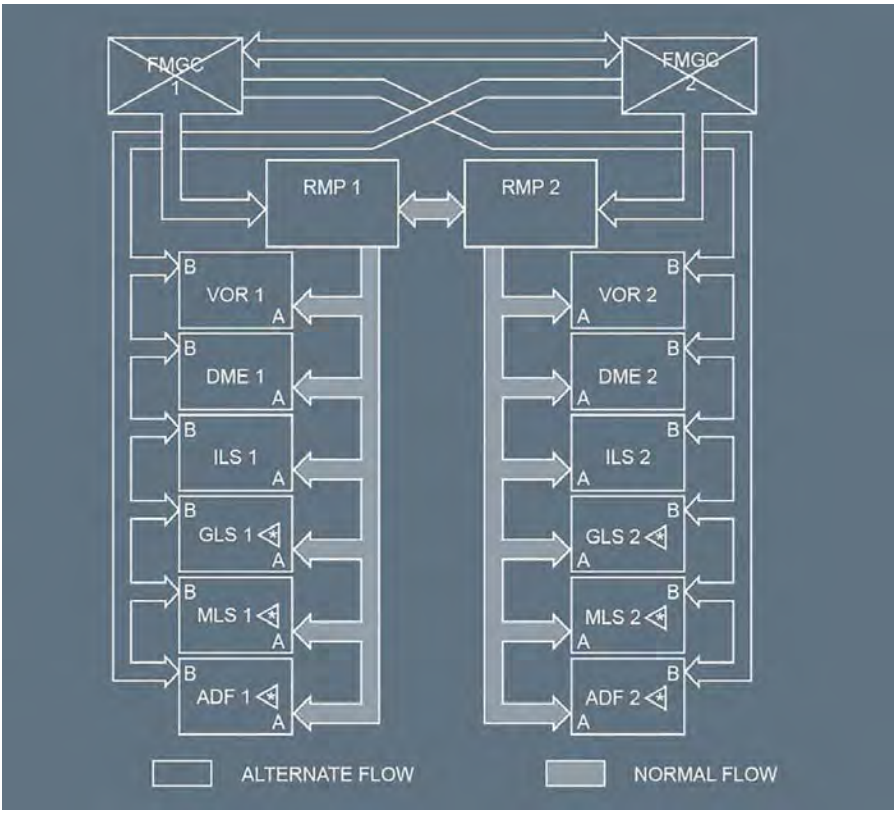
NORMAL OPERATION



FMGC 1 FAILURE



BACK UP TUNING



VOR

Ident.: DSC-34-NAV-30-20-00018657.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has two VOR receivers.

- The Navigation Displays (NDs) display VOR1 and VOR2 information, in accordance with the position of the ADF ◁ /VOR selectors on the EFIS control panel (*Refer to DSC-31-45 ROSE Modes*).
- The DDRMI ◁ also displays VOR1 and VOR2 bearings, if the heading signal is valid.

ILS/GLS ◁ /MLS ◁

Ident.: DSC-34-NAV-30-20-00018658.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has two ILS/GLS ◁ /MLS ◁ receivers.

Note: *When the aircraft is equipped with MMRs, ILS and GLS ◁ and MLS ◁ receivers are in the MMRs (ILS1/GLS1 ◁ /MLS1 ◁ in the MMR1 and the ILS2/GLS2 ◁ /MLS2 ◁ in the MMR2)*

- PFD1 and ND2 display ILS1/GLS1 ◁ /MLS1 ◁ information.
- PFD2 and ND1 display ILS2/GLS2 ◁ /MLS2 ◁ information.
- The PFD display the ILS/GLS ◁ /MLS ◁ information if the flight crew press the LS pb or ILS pb (depending of the aircraft configuration) on the EFIS control panel (*Refer to DSC-31-50 EFIS Control Panel*).
- The NDs display the ILS/GLS ◁ /MLS ◁ information if the flight crew selects the ROSE LS mode or the ROSE ILS mode (depending of the aircraft configuration) on the EFIS control panel (*Refer to DSC-31-50 EFIS Control Panel*).

ADF ◁

Ident.: DSC-34-NAV-30-20-00018659.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft may be fitted with 1 ADF ◁ or 2 ADF ◁ .
The NDs display ADF ◁ information, depending on the position of the ADF/VOR selectors on the EFIS control panel (*Refer to DSC-31-45 ROSE Modes*).
The DDRMI ◁ also displays ADF 1 ◁ and ADF 2 ◁ bearings, depending on the position of the ADF/VOR selector on the DDRMI ◁ .

DME

Ident.: DSC-34-NAV-30-20-00018660.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has two DMEs.
The frequency that is automatically set on the DME corresponds to the frequency/channel that is set on the VOR, or ILS, or GLS ◁, or MLS ◁.
The NDs and the DDRMI ◁ can display DME information associated with VOR.
The PFDs can display DME information associated with ILS/GLS ◁ /MLS ◁ (*Refer to DSC-31-40 Trajectory Deviation - ILS Approach*).

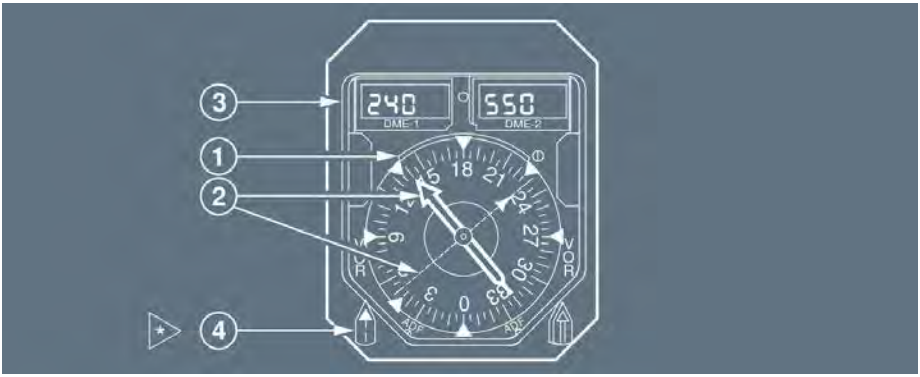
MARKER BEACON

Ident.: DSC-34-NAV-30-20-00001389.0001001 / 21 MAR 16
Applicable to: ALL

One marker beacon system is included in VOR receiver 1.
The PFD displays the outer, middle, and inner marker signals (*Refer to DSC-31-40 Trajectory Deviation - ILS Approach*).

DIGITAL DISTANCE AND RADIO MAGNETIC INDICATOR ◁ (DDRMI)

Ident.: DSC-34-NAV-30-30-00018583.0001001 / 21 MAR 16
Applicable to: ALL



(1) Compass card
ADIRU1 normally supplies the signal that positions the compass card.
ADIRU3 supplies this signal when selected by the ATT HDG SWITCHING selector.

(2) Bearings pointers
Indicate the magnetic bearing to the station received by VOR1 or ADF 1 ◁ (dashed pointer) and VOR2 or ADF 2 ◁ (double pointer).

Note: Depending on the quality of the VOR beacon's signal, and mainly at distances greater than 25 NM from the station, the processing of the signal, on aircraft equipped with COLLINS or BENDIX VOR may lead to bearing pointer oscillations.

(3) DME1(2) counters
Indicates distance in nautical miles to/from DME station.

The counters indicate distances:
- in NM when the station is at more than 20 NM
- 1/10th of NM when the station is at less than 20 NM.

When the station is at less than 1 NM, 0 is shown.
The DME1 and DME2 display are blanked or dashed when a fault is detected or data invalid.

(4) VOR/ADF selector ◁

- VOR1 or ADF 1 ◁ on the dashed pointer.
- VOR2 or ADF 2 ◁ on the double pointer (if ADF2 is not installed, then ADF1 may be selected).

The DDRMI ◁ has also VOR/ADF flags and HDG flags when the associated information is not available.

The indicators display these flags if:
- The VOR or ADF receiver fails (associated to the VOR/ADF flag only)
- The DDRMI ◁ has an internal failure
- The heading signal from ADIRS is not valid
- The power supply fails.

As long as the VOR/ADF flag is shown, and depending of the aircraft configuration, the associated bearing pointer remains:
- At the last valid position, or
- Into the horizontal line.

RADIO MANAGEMENT PANEL (RMP)

Ident.: DSC-34-NAV-30-30-00018584.0001001 / 21 MAR 16
Applicable to: ALL

(1) ON/OFF sw
This switch controls the power supply to the panel.

(2) NAV key (transparent switchguard)

- Pressing this key engages the radio navigation backup mode. It takes control of the VOR, ILS, GLS ◁ , MLS ◁ and ADF ◁ receivers away from the FMGC and gives it to the RMP.
- The green monitor light comes on.
- Pressing the NAV key a second time returns control of the navigation radios to the FMGC.

Note:
- *The flight crew must select this backup tuning mode on both RMP1 and RMP2 if both FMGCs or both MCDUs fail. In the emergency electrical configuration, only RMP1 receives power*
- *Pressing the NAV key on RMP3 ◁ has no effect*
- *In the NAV backup mode, the flight crew can select radio communication systems as it would in the normal mode.*
  Setting one RMP to NAV backup mode removes navaids tuning from both FMGCs.
- *When the flight crew uses an RMP to tune an ILS/DME or GLS ◁ /DME or MLS ◁ /DME, the PFDs do not display the DME distance.*

(3) STBY NAV keys
When the NAV key is on and the flight crew presses one of these STBY NAV keys, the ACTIVE window displays the frequency/channel to which that receiver is tuned. The green monitor light on the selected key comes on, and the one on the previously selected STBY NAV or COM key goes out.

(4) Frequency/channel selector knob
Two concentric knobs allow the flight crew to preselect frequencies/channels for communication radios and stand-by navigation systems and select courses for VOR, ILS, GLS ◁ and MLS ◁ .
The desired frequency, channel or course is set in the STBY/CRS window.
The outer and the inner knobs set a frequency/channel: the outer knob controls the most significant digits, the inner knob controls the least significant digits. A rate multiplier speeds up the tuning when the knob is rotated quickly.
The inner knob only sets a course.

(5) Transfer key
The flight crew presses this key to interchange ACTIVE and STBY frequencies/channels. This action tunes the selected receiver to the new ACTIVE frequency/channel.

(6) STBY/CRS window

The flight crew can make the displayed frequency /channel by rotating the tuning knob.
The frequency/channel displayed in the window becomes the active frequency/channel when the flight crew presses the Transfer Key.
If this window displays a course, then the ACTIVE window displays the associated frequency/channel.

Note: If the STBY/CRS window is displaying a course, then pressing the transfer key displays the active frequency/channel in both windows.

(7) ACTIVE window

This window displays the frequency/channel of the selected navaid, which is identified by a green monitor light on the selection key.

(8) LOAD FUNCTION

The flight crew can load the VHF frequency from the CPDLC CONTACT/MONITOR messages to the STBY/CRS window.

(9) BFO key

If the ADF is selected, rressing this key activates the BFO (Beat Frequency Oscillator).
For most ADF, with BFO activated, the audio identification is heard. However there are some ADF where the BFO must be deactivated in order to hear the audio identification.

GENERAL

Ident.: DSC-34-NAV-40-10-00018585.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has two radio altimeters (RA).
CAPT PFD displays the RA1 height, and the F/Os PFD displays the RA2 height.
If one RA fails, both PFDs display the height from the remaining RA.
For indication on the PFD, *Refer to DSC-31-40 Altitude (CONT'D)*.

AUTOMATIC CALLOUT

Ident.: DSC-34-NAV-40-10-00018656.0001001 / 21 MAR 16
Applicable to: ALL

GENERAL

The FWC generates a synthetic voice for radio height announcement below 2 500 ft. These announcements come through the cockpit loudspeakers, even if the speakers are turned off.

PREDETERMINED CALL OUT

The altitude call out uses the following predetermined threshold:

Height (feet)	Call out
2 500	TWO THOUSAND FIVE HUNDRED OR TWENTY FIVE HUNDRED
2 000	TWO THOUSAND
1 000	ONE THOUSAND
500	FIVE HUNDRED
400	FOUR HUNDRED
300	THREE HUNDRED
200	TWO HUNDRED
115	STANDBY (1)
100	ONE HUNDRED
90	STANDBY (1)
65	FLARE (1)
50	FIFTY
40	FORTY
30	THIRTY
20	TWENTY
10	TEN
5	FIVE
DH (or MDA/MDH) + 100	HUNDRED ABOVE
DH (or MDA/MDH)	MINIMUM

(1) *These callouts are triggered only if the Steep Approach and Landing function is active. In this case, the "ONE HUNDRED" callout is inhibited.*

Note: The reference altitude for callouts is the radio height for precision approaches (DH), and baro altitude (MDA/MDH) for non precision approaches.

Pin programming enables Operators to select the required callouts. If the aircraft remains at a height that is in the detection zone for a height callout, the corresponding message is repeated at regular intervals.

INTERMEDIATE CALL OUT

If time between two consecutive predetermined call outs exceeds a certain threshold, the present height is repeated at regular intervals.

The threshold is:
- 11 s above 50 ft
- 4 s below 50 ft

The repeating interval is 4 s.

RETARD ANNOUNCEMENT

The loudspeaker announces RETARD at:

- 20 ft, or
- at 10 ft if autothrust is active and one autopilot is in LAND mode.

AIRCRAFT SYSTEMS

SURVEILLANCE

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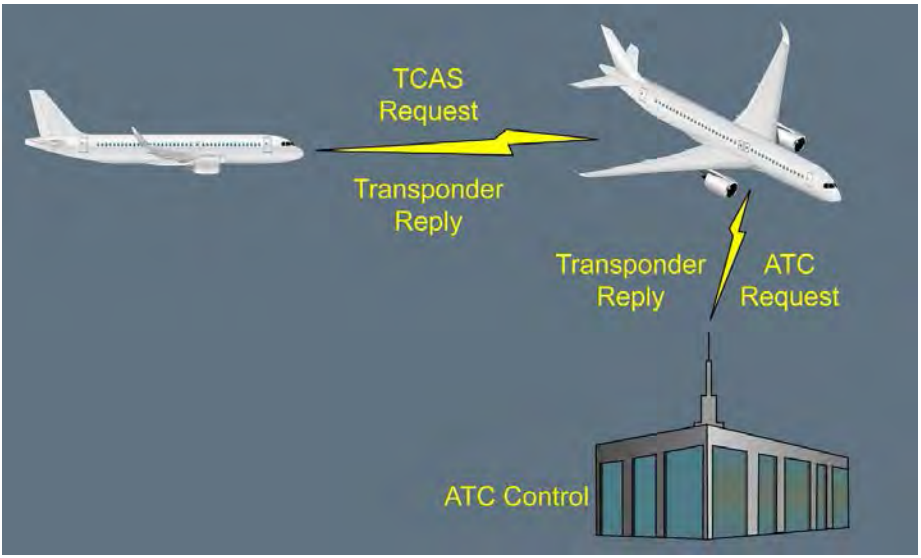
PRINCIPLE

Ident.: DSC-34-SURV-10-10-00020602.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

The aircraft has two ATC transponders (XPDR) which are controlled by a control panel (ATC/TCAS) on the center pedestal.
Only the selected XPDR operates.

The XPDR automatically responds to requests:
- From the ATC, to ensure effective air traffic surveillance
- From other aircraft that have a TCAS, to ensure that traffic alerts are triggered.

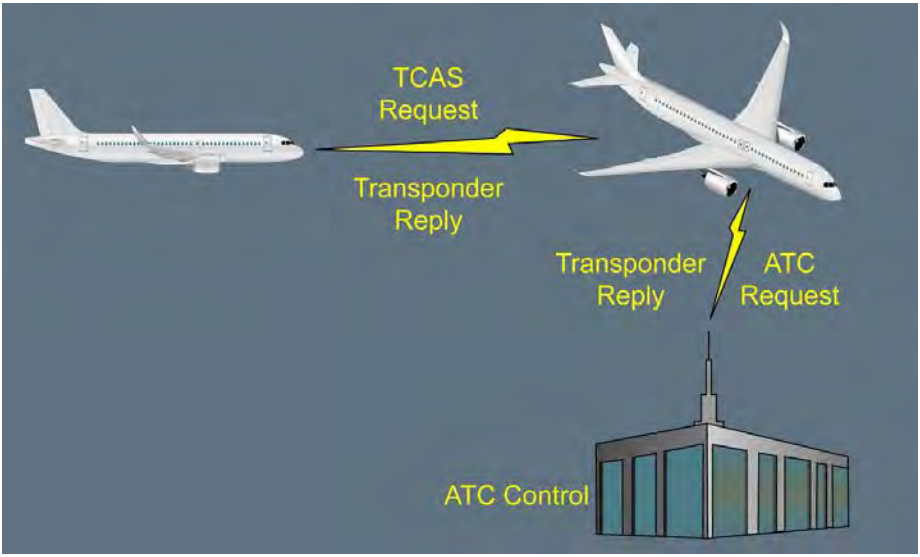


PRINCIPLE

Ident.: DSC-34-SURV-10-10-00020602.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547

The aircraft has two ATC transponders (XPDR) which are controlled by a control panel (ATC/TCAS) on the center pedestal.
Only the selected XPDR operates.

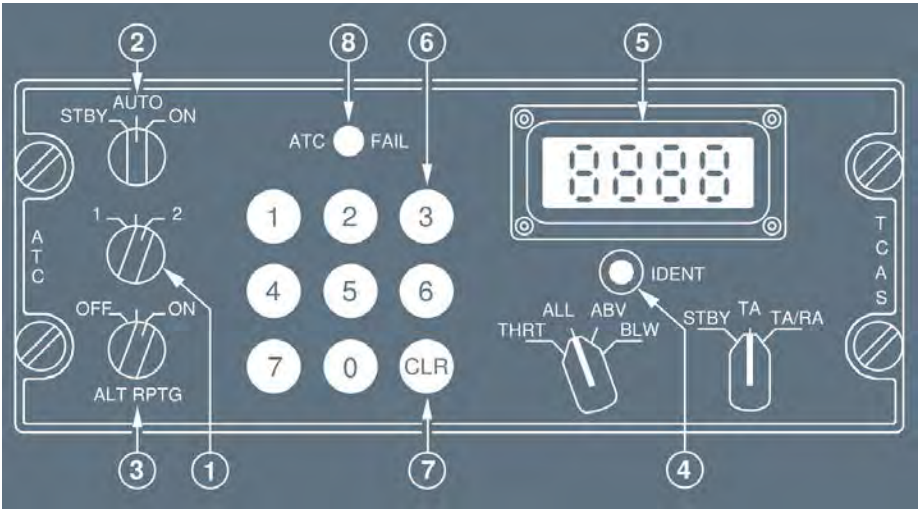
The XPDR automatically responds to requests:
- From the ATC, to ensure effective air traffic surveillance
- From other aircraft that have a TCAS, to ensure that traffic alerts are triggered.



The XPDR is capable of elementary surveillance (ELS) and enhanced surveillance (EHS). It transmits the following data to the ATC center:
- The aircraft 24 bit address, the aircraft altitude, the flight number, the RA report
- The indicated airspeed, the Mach number, and the barometric vertical speed that are all supplied by the ADRs
- The magnetic heading, the roll angle, the ground speed, the track angle, the track angle rate, and the inertial vertical speed, that are all supplied by the IRs
- The selected altitude and barometric reference settings supplied by the FCUs.

CONTROL PANELS

Ident.: DSC-34-SURV-10-20-00020607.0009001 / 17 MAR 17
Applicable to: MSN 1882-2078



(1) XPDR Selector
This switch selects XPDR 1 or 2.

(2) Mode Selector

STBY	:	Both XPDR are electrically supplied but do not operate.
ON	:	Selected XPDR operates.
AUTO	:	In flight : Selected XPDR operates.
AUTO	:	On ground : Selected XPDR only operates in mode S (Selective aircraft interrogation mode).

(3) ALT RPTG Switch

ON	:	The XPDR sends barometric standard altitude data.
OFF	:	No altitude data transmission. If the TCAS is installed, the upper ECAM displays "TCAS STBY" in green.

(4) IDNT Switch
The flight crew presses this button to send the aircraft identification signal.

(5) Code Display
The window displays the selected code.

(6) Keypad
The flight crew uses the keypad to set the code assigned by ATC.

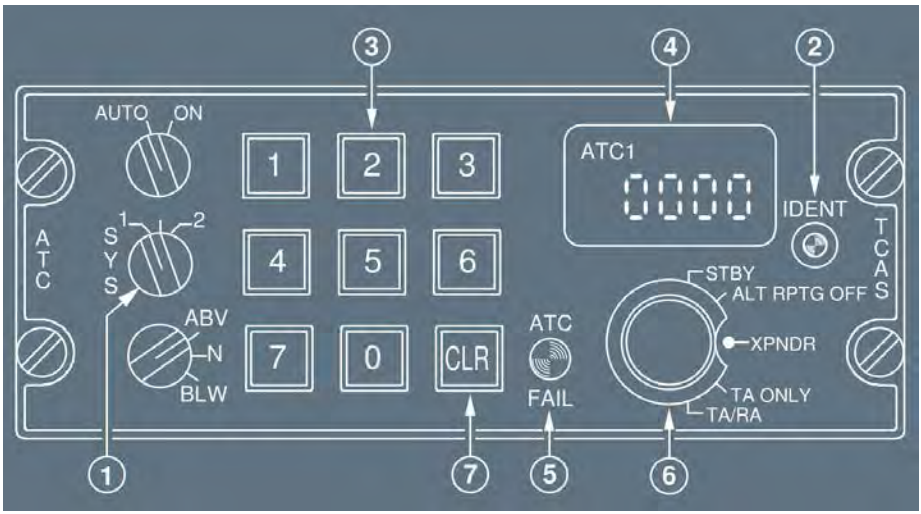
(7) CLR Key
The flight crew uses this key to clear the code display.

Note: As long as the four figures of the new code are not entirely written, the previous code remains.

(8) ATC FAIL Light
This light comes on if the selected XPDR fails.

CONTROL PANELS

Ident.: DSC-34-SURV-10-20-00020607.0012001 / 17 MAR 17
Applicable to: MSN 3408-4547



(1) XPDR Selector
Selects XPDR 1 or 2.

(2) IDENT Switch
The flight crew presses this button to send the aircraft identification signal.

(3) Keypad
The flight crew uses these key to set the code assigned by ATC.

(4) Code Display
The window displays the selected code.

(5) ATC FAIL Light
This light comes on if the selected XPDR fails.

(6) Mode Selector

STBY	:	Both XPDR and TCAS are electrically-supplied, but are on standby.
ALT RPTG OFF	:	No altitude data is transmitted.
XPNDR	:	In flight : Selected XPDR operates in all modes. Baro altitude data is transmitted. ATC 1 uses ADR 1 or ADR 3. ATC 2 uses ADR 2 or ADR 3. The TCAS is on standby.
XPNDR	:	On ground : Selected XPDR only operates in mode S (Selective aircraft interrogation mode).
TA-RA/TA	:	*Refer to DSC-34-SURV-60-20 ATC/TCAS Panel.*

(7) CLR Key
The flight crew uses this key to clear the code display.

Note: As long as the four figures of the new code are not entirely written, the previous code remains.

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DESCRIPTION

Ident.: DSC-34-SURV-30-10-00014867.0001001 / 21 MAR 17
Applicable to: MSN 1882-2078

The aircraft is fitted with one (or two ◁) weather radar system(s) with a Predictive WindShear (PWS ◁) function.
If two weather radar systems are installed, only one system is active at a time. The flight crew can display weather data on the CAPT and/or F/O NDs in either ARC or ROSE mode.
The flight crew can adjust the brightness of the weather image on the ND thanks the outer knob of the ND Brightness Control knob (*Refer to DSC-31-50 Other EFIS Controls*).

Note: *A low brightness setting of the weather display may reduce the visibility of weather data, and therefore reduce crew awareness of the weather situation.*

The flight crew can adjust manually the antenna tilt settings, and can adjust gain either automatically or manually using knobs located on the radar control panel.

DESCRIPTION

Ident.: DSC-34-SURV-30-10-00014867.0002001 / 22 MAR 17
Applicable to: MSN 3408-4547

The aircraft is fitted with one or two ◁ Multiscan weather radar systems with a Predictive WindShear (PWS ◁) function and a weather hazard prediction function ◁ .
The flight crew can display weather data on the CAPT and/or F/O NDs in either ARC or ROSE mode.
The flight crew can adjust the brightness of the weather image on the ND thanks the outer knob of the ND Brightness Control knob (*Refer to DSC-31-50 Other EFIS Controls*).

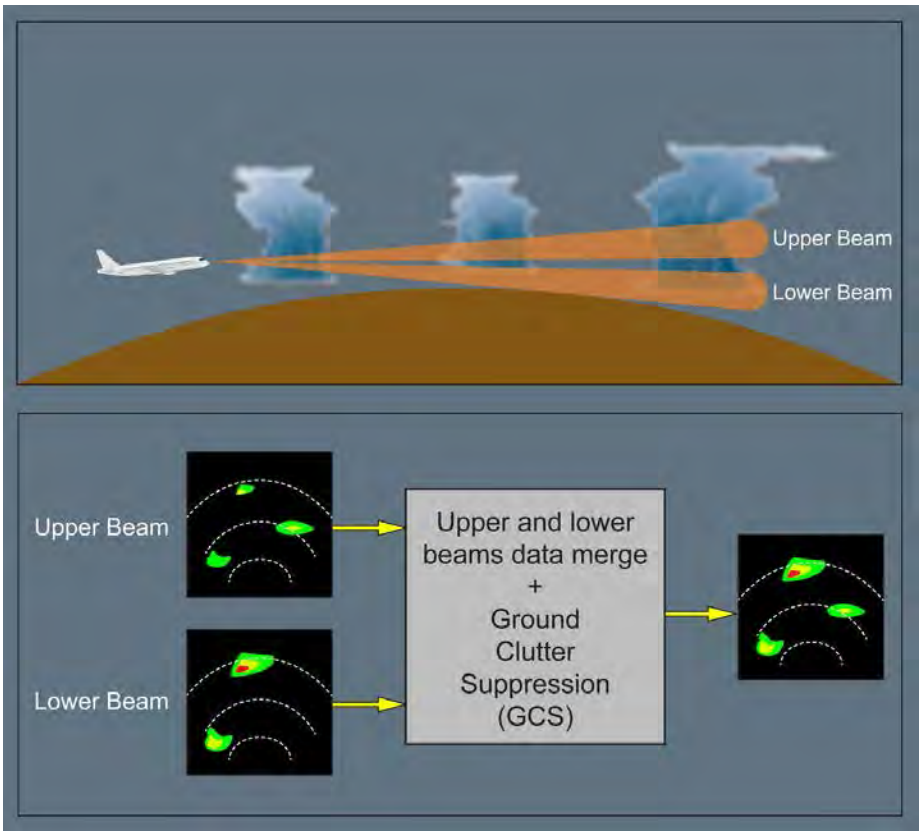
Note: *A low brightness setting of the weather display may reduce the visibility of weather data, and therefore reduce crew awareness of the weather situation.*

The flight crew can use the radar in the following modes:
- Multiscan Automatic mode: MULTISCAN sw set to AUTO (recommended), or
- Manual mode: MULTISCAN sw set to MAN.

When in Multiscan Automatic mode:
- The radar alternatively scans at two antenna tilt settings. The weather radar image that is displayed is the result of the stored and combined information from each beam.
- When the gain selector is set to the Calibrated position (CAL), the radar automatically adjusts the gain based on various parameters (aircraft altitude, geographical area, season, time of the day) to obtain the best weather display.

- To prevent unnecessary clutter display, the “Quiet and Dark cockpit” philosophy removes the weather that:
  - is not on the aircraft flight path
  - is not a threat to the aircraft (post convective cell).
- The Ground Clutter Suppression (GCS) function removes the ground returns from the ND.

Multiscan Principle



When in Manual mode:

- The flight crew can adjust manually the antenna tilt settings, and can adjust gain either automatically or manually using knobs located on the radar control panel
- The GCS function is not available
- When the gain selector is set to CAL, there is no automatic gain adjustment based on altitude, geographical area, season and time of the day.

As a consequence, when the flight crew switches from the Multiscan Automatic mode with CAL gain to the Manual mode with CAL gain, the weather displayed on the ND may be significantly different.

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GENERAL

Ident.: DSC-34-SURV-30-20-00020942.0004001 / 17 MAR 17
Applicable to: MSN 3408-4547

The weather radar has a Predictive WindShear system (PWS) that operates when the PWS switch is in the AUTO position , and the aircraft radio height is below 2 300 ft, and

- Weather radar is ON (Radar sw on position 1 or 2), or
- Weather radar is OFF, and
  - At least one engine is running, and
  - Aircraft ground speed is greater than 30 kt, or
  - Aircraft longitudinal acceleration is above a given threshold during at least 0.5 s.

Note: *If two weather radars are installed, when the selected weather radar fails, the flight crew can recover the PWS function by selecting the operative system on the Radar sw of the radar control panel.*

The system scans the airspace for windshear within a range of 5 NM ahead of the aircraft. When the system detects windshear, a windshear symbol appears on the ND (*Refer to DSC-34-SURV-30-30 PWS (if installed) indication on PFD and ND*).
Predictive windshear warnings and cautions are associated to an aural alert and to a red (warning) or amber (caution) "W/S AHEAD" message on the PFD, whereas windshear advisories are only displayed on the ND (*Refer to DSC-34-SURV-30-30 PWS (if installed) indication on PFD and ND*) without message on the PFD.

Alert Level	Aural Warning	PFD	ND (*Refer to DSC-34-SURV-30-30 PWS (if installed) indication on PFD and ND*)
Warning (Approach)	«GO AROUND WINDSHEAR AHEAD»	W/S AHEAD (red)	Windshear icon
Warning (Takeoff)	«WINDSHEAR AHEAD» (twice)	W/S AHEAD (red)	Windshear icon
Caution	«MONITOR RADAR DISPLAY»	W/S AHEAD (amber)	Windshear icon
Advisory	Nil	Nil	Windshear icon

GENERAL

Ident.: DSC-34-SURV-30-20-00020942.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

The weather radars have a Predictive Windshear System (PWS) that operates when:

- The PWS switch is in the AUTO position (Even if the weather radar is OFF), and
- The aircraft is below 2 300 ft AGL, and

- The ATC is switched to the ON, or AUTO, or XPDR, or XPNDR, position (depending on the ATC panel), and
- Either engine is running.

Note: *When two weather radars are installed, if the selected weather radar fails, the PWS function is recovered by selecting the non-failed weather radar on the control panel.*

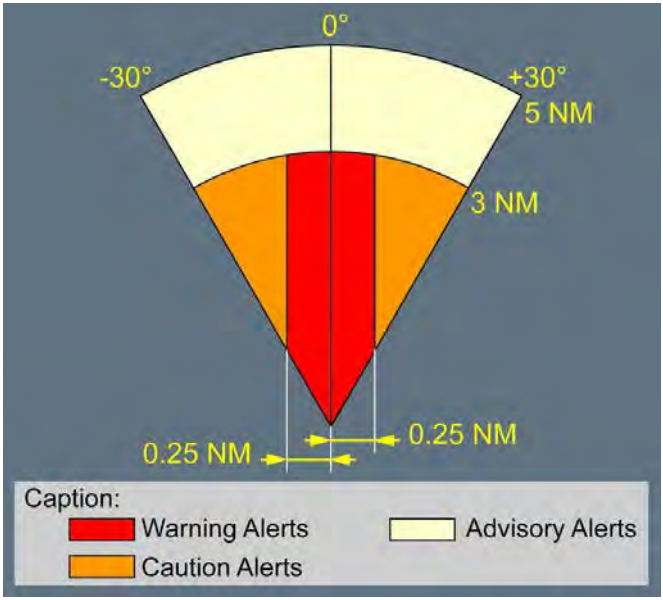
The system scans the airspace, within a range of 5 NM ahead of the aircraft, for windshears. When the system detects windshear, depending on the range selected on the ND, a warning, caution, or advisory message appears on the ND. Predictive windshear warnings and cautions are associated with an aural warning.
Predictive windshear warnings and cautions are associated to an aural alert and to a red (warning) or amber (caution) "W/S AHEAD" message on the PFD, whereas windshear advisories are only displayed on the ND (*Refer to DSC-34-SURV-30-30 PWS (if installed) indication on PFD and ND*) without message on the PFD.

Alert Level	Aural Warning	PFD	ND (*Refer to DSC-34-SURV-30-30 PWS (if installed) indication on PFD and ND*)
Warning (Approach)	«GO AROUND WINDSHEAR AHEAD»	W/S AHEAD (red)	Windshear icon
Warning (Takeoff)	«WINDSHEAR AHEAD» (twice)	W/S AHEAD (red)	Windshear icon
Caution	«MONITOR RADAR DISPLAY»	W/S AHEAD (amber)	Windshear icon
Advisory	Nil	Nil	Windshear icon

WINDSHEAR ALERTS DURING TAKEOFF ROLL, UP TO 100 KNOTS

Ident.: DSC-34-SURV-30-20-00020944.0001001 / 17 MAR 17
Applicable to: ALL

Windshear Alerts During Takeoff Roll, Up to 100 knots



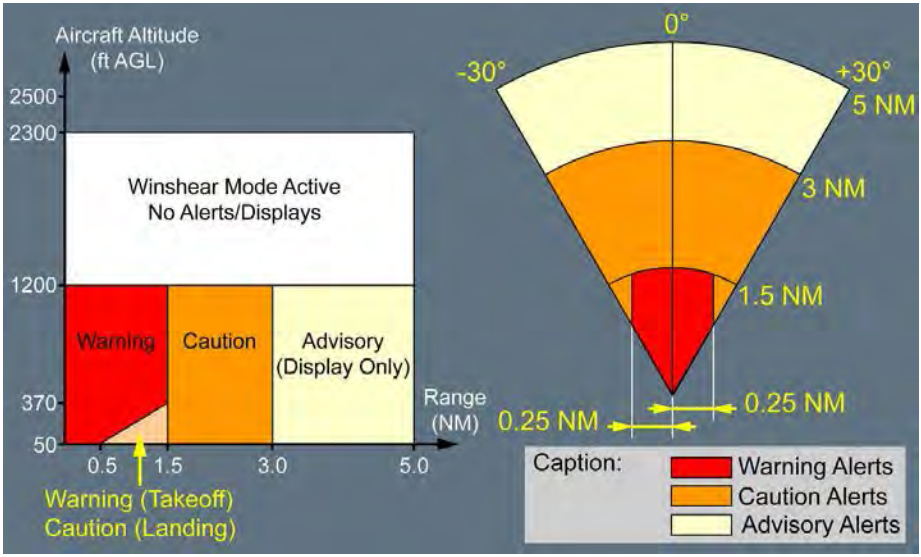
During the takeoff roll, up to 100 kt, both warnings and cautions are available within a range of 3 NM.

Note: *This is also applicable during taxi when weather radar is set to ON.*

WINDSHEAR ALERTS ABOVE 50 FEET

Ident.: DSC-34-SURV-30-20-00006422.0001001 / 12 APR 16
Applicable to: ALL

Windshear Alerts Above 50 feet



During final approach, the visual and aural warning alerts are downgraded to caution alerts between 370 ft AGL and 50 ft AGL, and range between 1.5 NM and 0.5 NM.

WINDSHEAR ALERTS INHIBITION

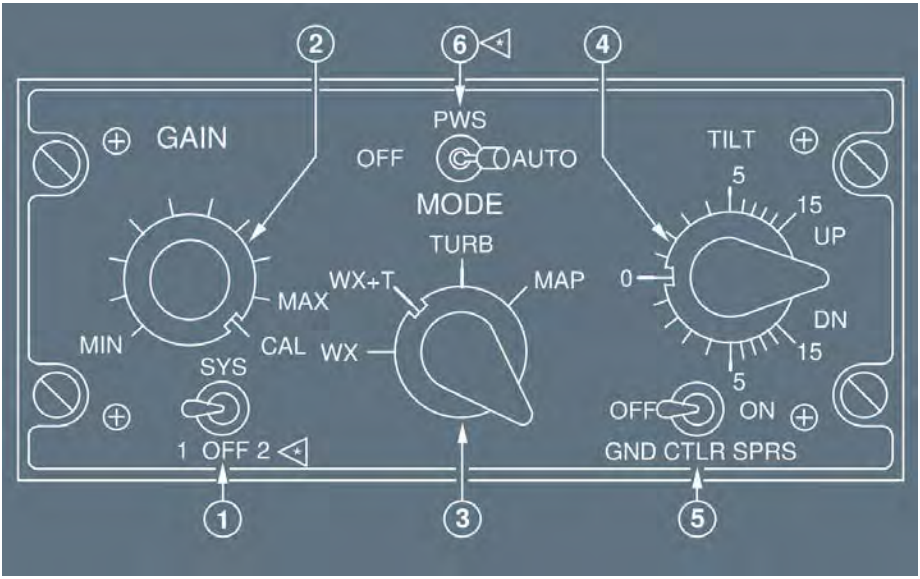
Ident.: DSC-34-SURV-30-20-00006426.0002001 / 20 JUL 15
Applicable to: ALL

At takeoff, alerts are inhibited above 100 kt and up to 50 ft.
During landing, alerts are inhibited below 50 ft.

The aural alerts of the Predictive WindShear system (PWS):
- Have priority over TCAS, GPWS, and other FWC aural warnings
- Are inhibited by reactive windshear detection and aural messages of stall warnings.

CONTROL PANEL

Ident.: DSC-34-SURV-30-30-00001402.0010001 / 21 MAR 17
Applicable to: MSN 1882-2078



(1) Radar sw

Note: *If only one radar is installed on the aircraft, either:*
- *a "INOP" or "DEACT" sticker replaces the "2", or*
- *a "ON/OFF" Radar sw replaces the "1/OFF/2" Radar sw.*

This switch sets:
- the radar to ON or OFF (if only one radar is installed on the aircraft), or
- one radar to ON or turns off both radars (if two radars are installed on the aircraft).

Note: *If only one radar is installed on the aircraft, no weather image is displayed on the Navigation Dislplay (ND) when the "1/OFF/2" Radar sw is set to "2".*

(2) GAIN knob

This knob adjusts the sensitivity of the radar.
"CAL" is the normal position; it adjusts the gain to a calibrated setting.

(3) Display mode selector

WX : Weather mode :
Colors indicate the intensity of precipitation (black for the lowest intensity, green, amber and red indicate progressively higher intensity).

WX+T : Weather and Turbulence mode :
The ND indicates precipitation and turbulence areas. Turbulence areas are displayed in magenta (within 40 NM).

TURB : Turbulence mode :
The ND only displays turbulence areas in magenta (within 40 NM).

MAP : Map mode :
The radar operates in ground mapping mode: black indicates water, green indicates the ground, and amber indicates cities and mountains.

(4) TILT knob

This knob adjusts antenna tilt above and below the horizon.
Zero indicates the horizon reference, as provided by the ADIRS.

(5) GND CLTR SPRS sw

ON : Suppresses the ground echo on the screen.

OFF : Normal use of the radar.

(6) PWS sw

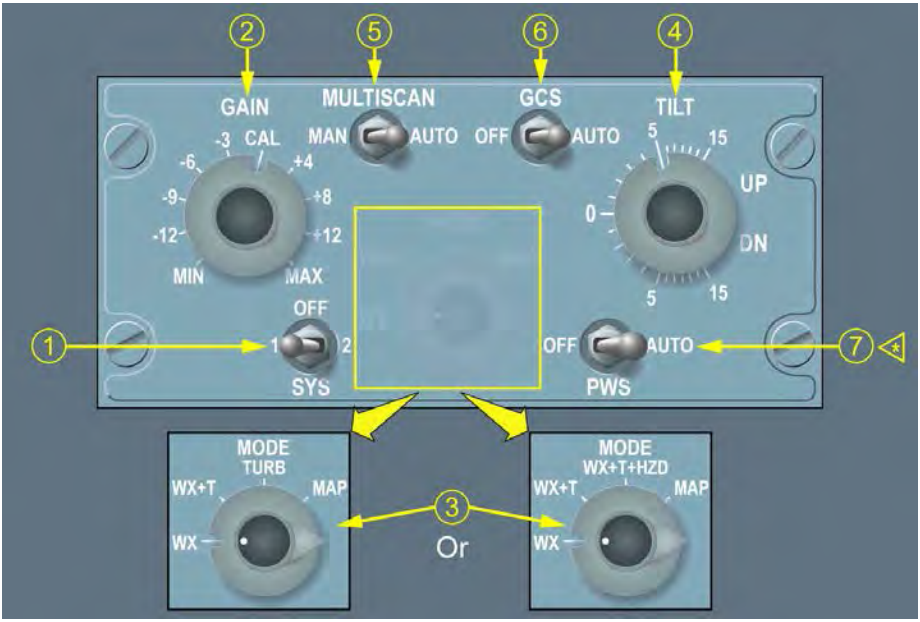
Note: If the PWS function is not installed on the aircraft, a "INOP" sticker can replace the PWS sw.

AUTO : Activates the Predictive WindShear function in accordance with activation conditions (*Refer to DSC-34-SURV-30-20 Windshear Alerts Above 50 feet*).

OFF : Turns off the predictive windshear function.

CONTROL PANEL

Ident.: DSC-34-SURV-30-30-00001402.0002001 / 21 MAR 17
Applicable to: MSN 3408-4547



(1) Radar sw

This switch sets one radar to ON or turns both radars to OFF.

Note: *If only one radar is installed on the aircraft, either:*
- *a "INOP" or "DEACT" sticker replaces the "2", or*
- *a "ON/OFF" Radar sw replaces the "1/OFF/2" Radar sw.*

Note: *If only one radar is installed on the aircraft, no weather image is displayed on the Navigation Display (ND) when the "1/OFF/2" SYS sw is set to "2".*

(2) GAIN knob

This knob adjusts the sensitivity of the radar.

CAL is the normal position of the knob :

- When in Multiscan Automatic mode and gain set to CAL, the radar automatically adjusts the gain according to various parameters (aircraft altitude, geographical area, season, time of the day) to obtain the best weather display
- When in Manual mode and gain set to CAL, the radar adjusts the gain to a calibrated setting.

(3) Display mode selector

WX : Weather mode :
Colors indicate the intensity of precipitation (black for the lowest intensity, green, amber and red indicate progressively higher intensity).

WX+T : Weather and Turbulence mode :
The ND indicates precipitation and turbulence areas. Turbulence areas are displayed in magenta (within 40 NM).

TURB : Turbulence mode :
The ND only displays turbulence areas in magenta (within 40 NM).

WX+T+HZD: Weather, Turbulence and Hazard mode (recommended position) :
The ND indicates precipitation, turbulence areas in magenta (within 40 NM) and hazard prediction risk areas (*Refer to DSC-34-SURV-30-30 Weather Hazard Prediction Function Indication on ND*).
Hazard prediction function is only available when the MULTISCAN sw is set to AUTO.

Note: When MULTISCAN sw is set to MAN, WX+T+HZD mode is equivalent to WX+T mode.

MAP : Map mode :
The radar operates in ground mapping mode: black indicates water, green indicates the ground, and amber indicates cities and mountains.

(4) TILT knob
This knob adjusts the antenna tilt when MULTISCAN sw is set to MAN.
Zero indicates the horizon reference provided by the IRS.

(5) MULTISCAN sw

AUTO : Activates Multiscan mode
Multiscan controls the tilt automatically and combines two scans done at different tilt angles to optimize weather detection and minimize ground clutter.

MAN : When set to MAN, the crew can manually adjust the tilt by using the TILT knob.

(6) GCS sw
The Ground Clutter Suppression (GCS) switch is spring-loaded to the AUTO position.

AUTO : - If MULTISCAN sw is set to AUTO, the radar is in normal use. Ground clutter is not displayed on the screen
- If MUTLISCAN sw is set to MAN, the GCS sw has no utility. Ground clutter is displayed on the screen.

OFF : Ground clutter is displayed on the screen.

(7) PWS sw

AUTO : Activates the Predictive WindShear function in accordance with activation conditions (*Refer to DSC-34-SURV-30-20 Windshear Alerts Above 50 feet*).

OFF : The Predictive WindShear function is off.

WEATHER RADAR INDICATION ON ND

Ident.: DSC-34-SURV-30-30-00001255.0001001 / 28 FEB 14
Applicable to: MSN 1882-2078

(1) Weather Radar Picture

- When the radar is operating, and when the ND is not in PLAN mode, the ND displays the weather radar picture.
- The echoes appear in different colors, depending on the precipitation rates (black, green, yellow, red or magenta).
- The selected ND range will determine how often the image is refreshed.

(2) Tilt Angle and Gain Mode

- The value of the tilt angle is in degrees, and quarters of a degree. It appears in blue in the lower right-hand corner of the screen. This angle is the angle between the horizon and the radar beam axis.
- "MAN" appears in white, when the manual gain mode is selected.

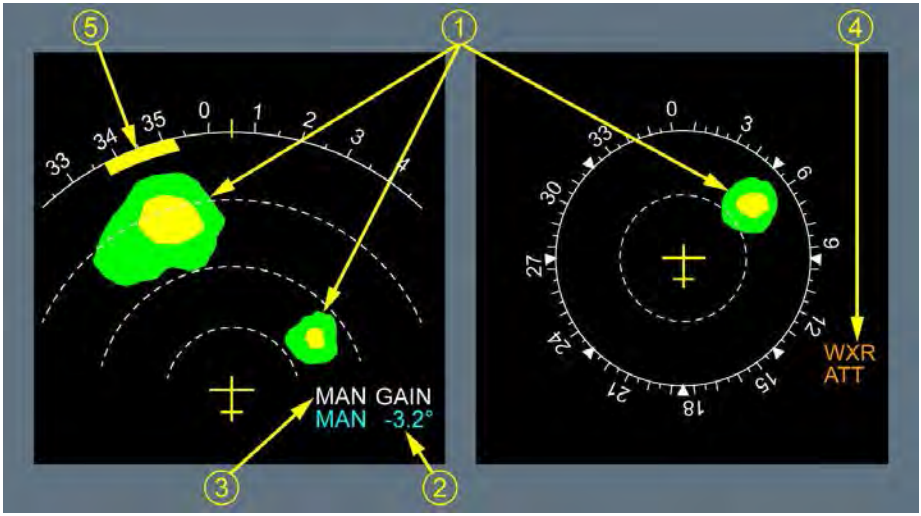
(3) Failure Messages

The ND lists the detected failures.
If the message is in "red", the ND does not display a radar image.
If the message is in "amber", the image is not affected.

WXR RT (red)	:	Radar transceiver failure.
WXR ANT (red)	:	Radar antenna failure.
WXR CTL (red)	:	Radar control unit failure.
WXR RNG (red)	:	Range error.
WXR WEAK (amber)	:	Calibration failure.
WXR ATT (amber)	:	Attitude control failure.
WXR STAB (amber)	:	Antenna stabilization failure.

WEATHER RADAR INDICATION ON ND

Ident.: DSC-34-SURV-30-30-00001255.0007001 / 21 MAR 16
Applicable to: MSN 3408-4547



(1) Weather Radar Picture

- When the radar is operating, and when the ND is not in PLAN mode, the ND displays the weather radar picture.
- The weather echoes appear in different colors, depending on the precipitation rates (black, green, yellow, red or magenta for turbulence).
- The selected ND range will determine how often the image is refreshed.

(2) Tilt Angle

- The multiscan function of the weather radar alternatively scans at low and high beam, and automatically sets the tilt of these beams to optimize the weather radar detection. The displayed weather radar picture is the result of the storing and merging of the information from each beam.
- The tilt angle is the angle between the horizon and the radar beam axis. The value of the tilt angle is in degrees, and quarters of a degree. It appears in the lower right corner of the screen:
  - In green, when the MULTISCAN sw is set to AUTO. This value represents the average of the lower and the upper beam tilts.
  - In blue, next to the blue “MAN” indication, when the flight crew sets the MULTISCAN sw to MAN.
  - When the multiscan function is lost, the tilt value is dashed and the “NO AUTO TILT” message appears in amber on the ND, until the flight crew sets the MULTISCAN sw to MAN.

(3) Gain Mode

- ”MAN GAIN” appears in white, when the flight crew selects the manual gain mode.

(4) Failure Messages

The ND lists the detected failures.
If the message is in “red”, the ND does not display a radar image.
If the message is in “amber”, the image is not affected.

NO WXR (red)	:	Radar System failure.
WXR RT (red)	:	Radar transceiver failure.
WXR ANT (red)	:	Radar antenna failure.
WXR CTL (red)	:	Radar control unit failure.
WXR RNG (red)	:	Range error.
WXR WEAK (amber)	:	Calibration failure.
WXR ATT (amber)	:	Attitude control failure.

WXR STAB (amber)	:	Antenna stabilization failure.
PRED W/S (amber)	:	PWS ⩤ function failure.
NO AUTO TILT (amber)	:	Automatic tilt adjustment failure.
WXR TEST (amber)	:	Radar System test.

(5) PAC alert

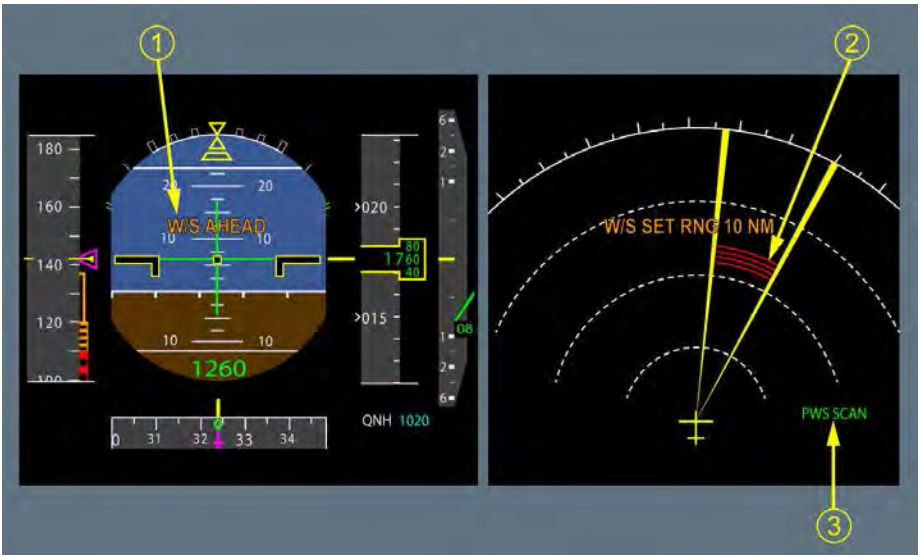
When the flight crew sets the display mode selector to WX or WX+T, or WX+T+HZD ⩤ and sets the gain to CAL, and when the aircraft is within 80 NM of a storm cell, the Path Attenuation Compensation (PAC) alert is available.

The PAC alert displays a yellow arc on the outermost scale of the ND, when an intervening rainfall creates an attenuated area behind a storm cell (also called a radar shadow or attenuation effect).

Note: The PAC alert is only available when the MULTISCAN sw is in the AUTO position.

PWS ⩤ INDICATION ON PFD AND ND

Ident.: DSC-34-SURV-30-30-00020941.0002001 / 17 MAR 17
Applicable to: MSN 3408-4547



(1) W/S AHEAD message on the PFD

This message is displayed, when the Predictive WindShear system detects windshear ahead of the aircraft.

The message is in amber or red, depending on the level of the alert. *Refer to DSC-34-SURV-30-20 General*.

(2) Predictive WindShear area indication

A red and black symbol and two yellow radial lines indicate the predicted windshear area. Windshear indication is available in ARC and ROSE ND modes.

When the radar detects a windshear event and the ND range is set above 10 NM, a W/S SET RNG 10 NM (Windshear, set range to 10 NM) message appears. This message requests the flight crew to adjust the range on the corresponding ND.

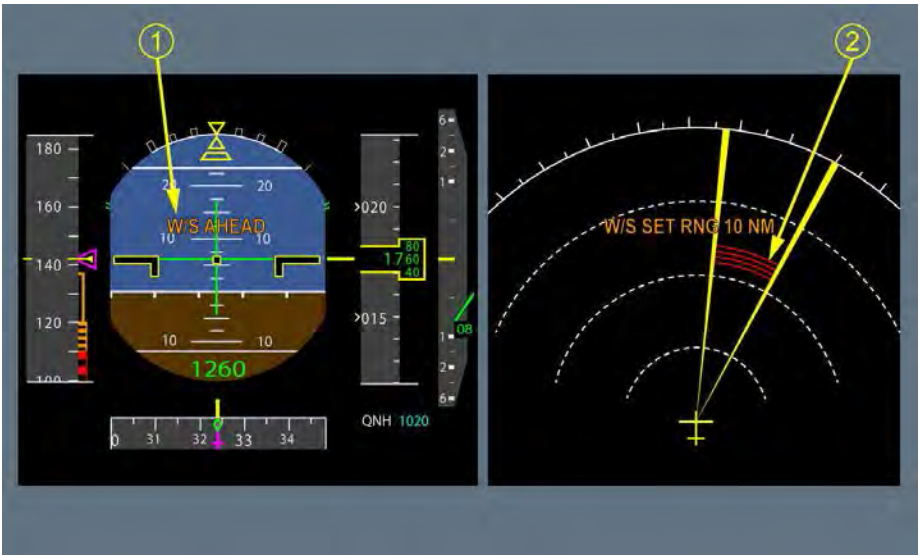
Depending on the windshear alert level, ND indication may be associated with an aural message and a PFD message. *Refer to DSC-34-SURV-30-20 General*.

(3) PWS SCAN message on the ND

If only the PWS detection is active, the ND displays a PWS SCAN message when the PWS is active. In this mode, when the radar detects a windshear event, a windshear symbol and the weather returns appear automatically on the ND.

PWS ◁ INDICATION ON PFD AND ND

Ident.: DSC-34-SURV-30-30-00020941.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078



(1) W/S AHEAD message on the PFD

This message is displayed, when the Predictive WindShear system detects windshear ahead of the aircraft.

The message is in amber or red, depending on the level of the alert. *Refer to DSC-34-SURV-30-20 General*.

(2) Predictive WindShear area indication

A red and black symbol and two yellow radial lines indicate the predicted windshear area.

Windshear indication is available in ARC and ROSE ND modes.

When the radar detects a windshear event and the ND range is set above 10 NM, a W/S SET RNG 10 NM (Windshear, set range to 10 NM) message appears. This message requests the flight crew to adjust the range on the corresponding ND.

Depending on the windshear alert level, ND indication may be associated with an aural message and a PFD message. *Refer to DSC-34-SURV-30-20 General*.

MEMO DISPLAY

Ident.: DSC-34-SURV-30-30-00017051.0001001 / 21 MAR 16
Applicable to: ALL

The "PRED W/S OFF" message appears when windshear is set to OFF on the weather radar panel.

PRED W/S OFF : This memo appears in green during flight phases 2 and 6.

PRED W/S OFF : This memo appears in amber when:

- The aircraft is in flight phases 3, 4, 5, 7, 8, and 9.
- The T.O. CONFIG pb is pressed during flight phase 2.

OVERVIEW

Ident.: DSC-34-SURV-40-10-00021292.0001001 / 17 MAR 17
Applicable to: ALL

The purpose of the Ground Proximity Warning System (GPWS) is to warn the flight crew of potentially hazardous situations, such as a collision with terrain. It detects terrain collision threats and triggers applicable aural and visual indications.

The GPWS includes:
- Five basic modes active up to radio height of 2 500 ft.
  - Excessive rate of descent (Mode 1)
  - Excessive terrain closure rate (Mode 2)
  - Altitude loss after takeoff or go-around (Mode 3)
  - Terrain clearance not sufficient, if not in landing configuration (Mode 4)
  - Excessive descent below the glide slope (Mode 5).
- A predictive GPWS ◁ function, based on a GPWS database, to display terrain information. It can be provided:
  - By Honeywell through Enhanced GPWS (EGPWS)
  - By ACSS as Ground Collision Avoidance System (GCAS), through T2CAS or T3CAS.

  The predictive GPWS is composed of:
  - Mandatory functions such as the Forward Looking Terrain Alerting function
  - Optional functions such as the obstacle database.

  Note: The terrain data are displayed on the ND and the brightness is controlled via the weather radar brightness control knob. If the weather radar brightness was set to low (due to bad weather) and a terrain alert occurs, then the brightness of the terrain display will also be low.

PRINCIPLE

Ident.: DSC-34-SURV-40-10-00021293.0001001 / 17 MAR 17
Applicable to: ALL

The GPWS computes the geometric altitude of the aircraft by using:
- Pressure altitude
- Radio altitude
- Temperature
- Barometric references

- GPS altitude for predictive GPWS ◁
- Data from the GPWS database for predictive GPWS ◁ .

MODE 1 : EXCESSIVE RATE OF DESCENT

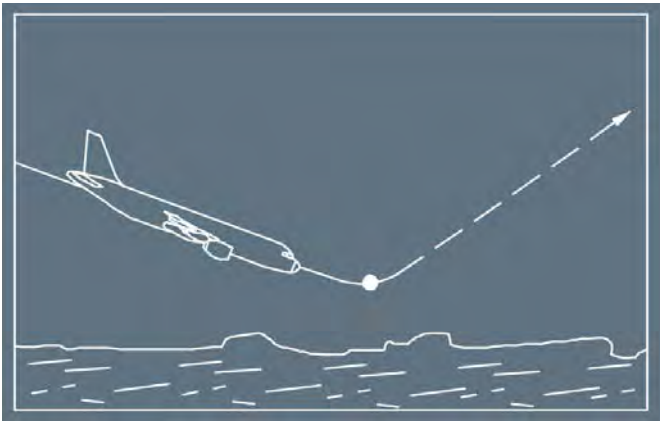
Ident.: DSC-34-SURV-40-20-00015115.0001001 / 13 JAN 14
Applicable to: MSN 1882-2078

Mode 1 triggers aural and visual alerts about excessive rates of descent, based on the radio height, and the rate of descent of the aircraft.
Mode 1 is active for all phases of the flight.

	CAUTION	WARNING
AURAL ALERT	"SINK RATE, SINK RATE"	"PULL UP" (repeated as long as MODE 1 is triggered)
VISUAL ALERT	GPWS The GPWS red lights come on	GPWS The GPWS red lights come on

MODE 1 : EXCESSIVE RATE OF DESCENT

Ident.: DSC-34-SURV-40-20-00015115.0004001 / 13 JAN 14
Applicable to: MSN 3408-4547

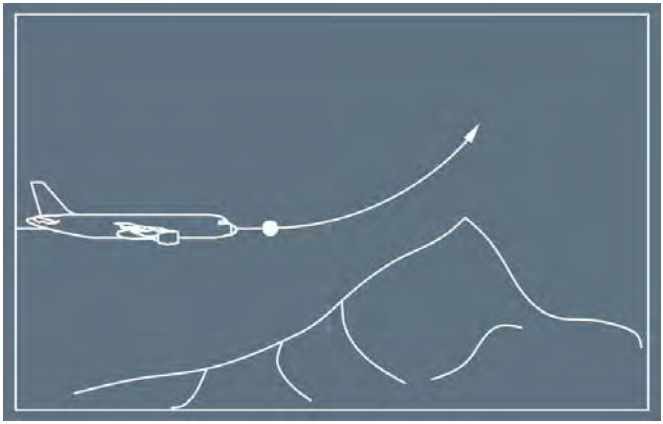


Mode 1 triggers aural and visual alerts about excessive rates of descent, based on the radio height, and the rate of descent of the aircraft.
Mode 1 is active for all phases of the flight.

	CAUTION	WARNING
AURAL ALERT	"SINK RATE, SINK RATE"	"PULL UP" (repeated as long as MODE 1 is triggered)
VISUAL ALERT	 The GPWS amber lights come on	 The PULL UP red lights come on

MODE 2 : EXCESSIVE TERRAIN CLOSURE RATE

Ident.: DSC-34-SURV-40-20-00015116.0001001 / 23 JUN 15
Applicable to: MSN 1882-2078



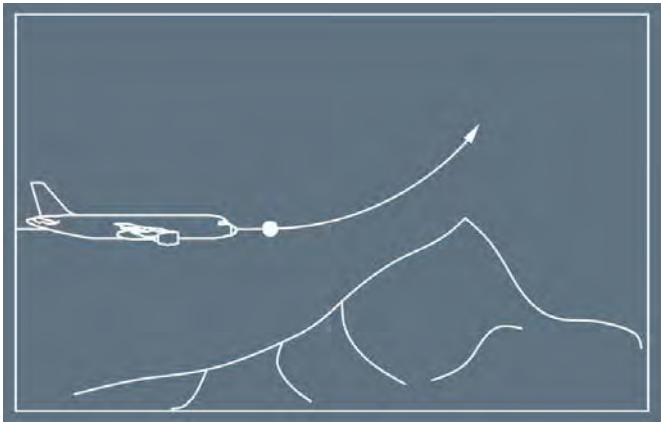
Mode 2 triggers two types of aural and visual alerts, based on the landing gear/flaps configuration of the aircraft, the radio height, and the RA rate of change.
There are two types of Mode 2 alerts, Mode 2A (active during climb, cruise, and initial approach), and Mode 2B (active during approach and 60 s after takeoff).

CONFIGURATION	Flaps not in Landing Position + Landing Gear Up (Mode 2A) Flaps Down + Landing Gear Up (Mode 2B)		
	CAUTION	WARNING	
AURAL ALERT	"TERRAIN, TERRAIN"	"PULL UP" (repeated as long as MODE 2 is triggered in the warning conditions)	"TERRAIN" (repeated as long as MODE 2 is triggered after leaving the warning conditions)
VISUAL ALERT	GPWS The GPWS red lights come on	GPWS The GPWS red lights come on	GPWS The GPWS red lights come on

CONFIGURATION	Flaps Down + Landing Gear Down (Mode 2B)
AURAL ALERT	**CAUTION** "TERRAIN" (repeated as long as MODE 2 is triggered)
VISUAL ALERT	 The GPWS red lights come on

MODE 2 : EXCESSIVE TERRAIN CLOSURE RATE

Ident.: DSC-34-SURV-40-20-00015116.0004001 / 03 AUG 17
Applicable to: MSN 3408-4547



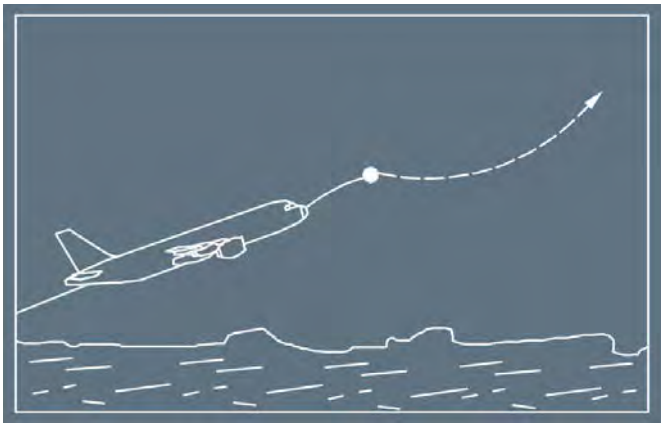
Mode 2 triggers aural and visual alerts, based on the landing gear/flaps configuration of the aircraft, the radio height, and the RA rate of change.
There are two types of Mode 2 alerts, Mode 2A (active during climb, cruise, and initial approach), and Mode 2B (active during approach and 60 s after takeoff).

CONFIGURATION	Flaps not in Landing Position + Landing Gear Up (Mode 2A) Flaps in landing position + Landing Gear Up (Mode 2B)		
	CAUTION	WARNING	
AURAL ALERT	"TERRAIN, TERRAIN"	"PULL UP" (repeated as long as MODE 2 is triggered in the warning conditions)	"TERRAIN" (repeated as long as MODE 2 is triggered after leaving the warning conditions)
VISUAL ALERT	 The GPWS amber lights come on	 The PULL UP red lights come on	 The PULL UP red lights stay on

CONFIGURATION	Flaps in landing position + Landing Gear Down (Mode 2B)
	CAUTION
AURAL ALERT	"TERRAIN" (repeated as long as MODE 2 is triggered)
VISUAL ALERT	 The GPWS amber lights come on

MODE 3 : ALTITUDE LOSS AFTER TAKEOFF

Ident.: DSC-34-SURV-40-20-00015117.0004001 / 19 SEP 13
Applicable to: MSN 3408-4547

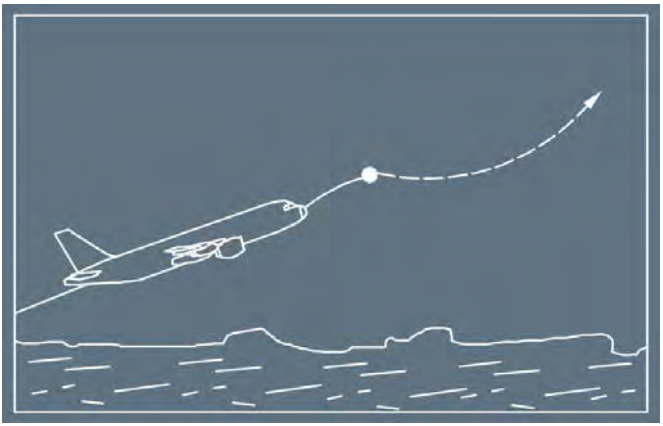


Mode 3 triggers aural and visual alerts when the altitude significantly decreases after takeoff, and go-arounds with landing gear or flaps not in landing configuration.

	CAUTION
AURAL ALERT	"DON'T SINK, DON'T SINK" (repeated as long as MODE 3 is triggered)
VISUAL ALERT	GPWS — The GPWS amber lights come on

MODE 3 : ALTITUDE LOSS AFTER TAKEOFF

Ident.: DSC-34-SURV-40-20-00015117.0001001 / 19 SEP 13
Applicable to: MSN 1882-2078

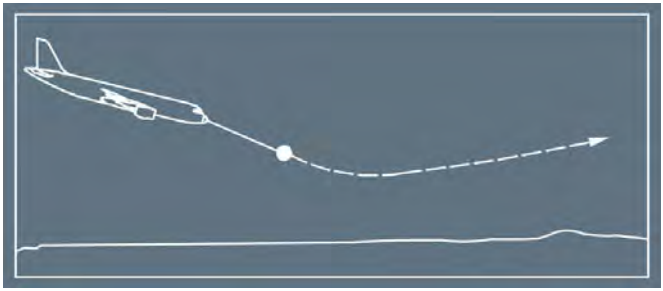


Mode 3 triggers aural and visual alerts when the altitude significantly decreases after takeoff, and go-arounds with landing gear or flaps not in landing configuration.

	CAUTION
AURAL ALERT	"DON'T SINK, DON'T SINK" (repeated as long as MODE 3 is triggered)
VISUAL ALERT	GPWS — The GPWS red lights come on

MODE 4 : UNSAFE TERRAIN CLEARANCE WHEN NOT IN LANDING CONFIGURATION

Ident.: DSC-34-SURV-40-20-00015118.0003001 / 13 JAN 14
Applicable to: MSN 1882

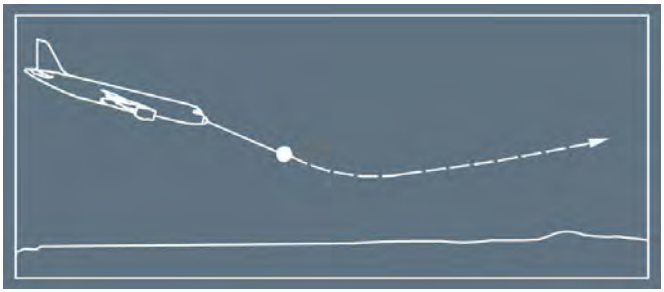


There are three types of Mode 4 alerts, Mode 4A and Mode 4B (both active during cruise and approach), and Mode 4C (active during takeoff).
Mode 4A and Mode 4B trigger aural and visual alerts when terrain clearance is not sufficient based on the phase of flight, the configuration of the landing gear and the flaps, and the speed. Mode 4C triggers aural and visual alerts based on the minimum terrain clearance and the radio height of the aircraft.

CONFIGURATION	Landing gear Up (Mode 4A)		Flaps not in landing position + Landing gear down (Mode 4B)		Flaps not in landing position OR Landing Gear Up (Mode 4C)
AURAL ALERT	CAUTION				
	"TOO LOW TERRAIN"	"TOO LOW GEAR"	"TOO LOW TERRAIN"	"TOO LOW FLAPS"	"TOO LOW TERRAIN"
VISUAL ALERT			The GPWS red lights come on		

MODE 4 : UNSAFE TERRAIN CLEARANCE WHEN NOT IN LANDING CONFIGURATION

Ident.: DSC-34-SURV-40-20-00015118.0005001 / 13 JAN 14
Applicable to: MSN 2078-4547

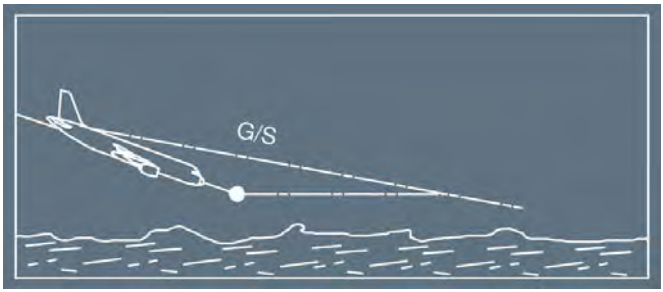


There are three types of Mode 4 alerts, Mode 4A and Mode 4B (both active during cruise and approach), and Mode 4C (active during takeoff*).
Mode 4A and Mode 4B trigger aural and visual alerts when terrain clearance is not sufficient based on the phase of flight, the configuration of the landing gear and the flaps, and the speed. Mode 4C triggers aural and visual alerts based on the minimum terrain clearance and the radio height of the aircraft. *(Only EGPWS not T2CAS)

CONFIGURATION	Landing gear Up (Mode 4A)		Flaps not in landing position + Landing gear down (Mode 4B)		Flaps not in landing position OR Landing Gear Up (Mode 4C)
AURAL ALERT	CAUTION				
	"TOO LOW TERRAIN"	"TOO LOW GEAR"	"TOO LOW TERRAIN"	"TOO LOW FLAPS"	"TOO LOW TERRAIN"
VISUAL ALERT	GPWS	The GPWS amber lights come on			

MODE 5 : DESCENT BELOW GLIDESLOPE

Ident.: DSC-34-SURV-40-20-00015119.0004001 / 19 SEP 13
Applicable to: MSN 3408-4547

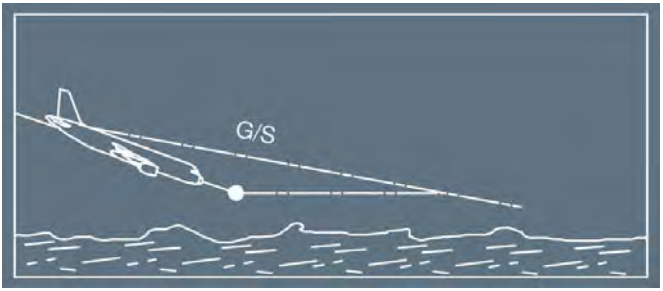


Mode 5 triggers aural and visual alerts, when the aircraft descends below the glide slope.

	CAUTION
AURAL ALERT	"GLIDESLOPE" (repeated as long as MODE 5 is triggered)
VISUAL ALERT	GPWS The GPWS amber lights come on

MODE 5 : DESCENT BELOW GLIDESLOPE

Ident.: DSC-34-SURV-40-20-00015119.0001001 / 19 SEP 13
Applicable to: MSN 1882-2078



Mode 5 triggers aural and visual alerts, when the aircraft descends below the glide slope.

	CAUTION
AURAL ALERT	"GLIDESLOPE" (repeated as long as MODE 5 is triggered)
VISUAL ALERT	 The G/S amber lights come on

TERRAIN AWARENESS AND DISPLAY

Ident.: DSC-34-SURV-40-35-00001417.0002001 / 17 MAR 11
Applicable to: MSN 1882-2078

The Terrain Awareness and Display (TAD) function computes a caution and a warning envelope in front of the aircraft, which varies according to aircraft altitude, nearest runway altitude, distance to the nearest runway threshold, ground speed, and turn rate. When the boundary of these envelopes conflicts with the terrain, memorized in the database, the system generates the relevant alert:

Alert Level	Aural Warning	ND (*Refer to DSC-31-45 Flags and Messages Displayed on ND*)	Local Warning
Warning	**TERRAIN AHEAD, PULL UP**	- Automatic terrain display See * - Solid red areas - TERR AHEAD (red)	The pb light comes on, on each pilot's instrument panel.
Caution	**TERRAIN AHEAD**	- Automatic terrain display pop up See * - Solid yellow areas - TERR AHEAD (amber)	

* When the TERR pb-sw ON, ND is selected ON, and ARC or ROSE mode is selected, the terrain is displayed on the ND. The terrain is displayed in various densities of green, yellow, red, or magenta, depending on the threat. (*Refer to DSC-31-45 Flags and Messages Displayed on ND*). If an alert is generated (caution or warning) when TERR pb-sw ON ND is not selected, the terrain will be automatically displayed and the ON light of the TERR pb-sw ON ND will come on.

Note:
1. *When TERR pb-sw ON ND is selected, the weather radar image is not displayed*
2. *The relative height of the aircraft is computed using the Captain's BARO setting. Thus, the Terrain Awareness Display (TAD) does not protect against BARO setting errors.*
3. *The TAD and Terrain Clearance Floor (TCF) functions operate using the FMS 1 position. Thus, the system does not protect against FMS 1 position error.*

If the crew identifies that navigation accuracy is low, it must set the enhanced modes to off, via the TERR pb-sw. The 5 GPWS modes remain active.

TERRAIN AWARENESS AND DISPLAY

Ident.: DSC-34-SURV-40-35-00001417.0114001 / 29 JUN 16
Applicable to: MSN 3408-4547

The Terrain Awareness and Display (TAD) function computes a caution and a warning envelope in front of the aircraft, depending on the aircraft altitude, the nearest runway altitude, the distance to the nearest runway threshold, the ground speed, and the turn rate. When the boundary of these

envelopes conflicts with the terrain, or with an obstacle memorized in the database, the system generates the relevant alert:

Alert Level	Aural Warning	ND (*Refer to DSC-31-45 Flags and Messages Displayed on ND*)	Local Warning
Warning	**TERRAIN TERRAIN PULL UP**	- Automatic terrain display See * - Solid red areas - TERRAIN (red)	On each pilot's instrument panel, The pushbutton light comes on.
	OBSTACLE OBSTACLE, PULL UP	- Automatic terrain display See * - Solid red areas - OBST (red)	
Caution	**CAUTION TERRAIN**	- Automatic terrain displaySee * - Solid yellow areas - TERRAIN (amber)	
	CAUTION OBSTACLE	- Automatic terrain display See * - Solid yellow areas - OBST (amber)	

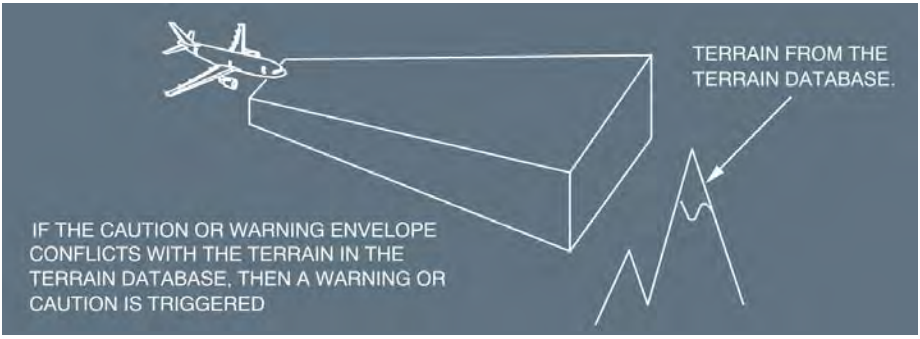
* When the TERR pb-sw ON ND is set to ON, and ARC or ROSE mode is selected, the ND displays the terrain and the obstacles memorized in the database, depending on the aircraft's position. The terrain is displayed in various densities of green, yellow, red, or magenta, depending on the threat (*Refer to DSC-31-45 Flags and Messages Displayed on ND*). If an alert is generated (caution or warning), and TERR pb-sw ON ND is not selected, the terrain and the obstacles are automatically displayed, and the ON light of the TERR pb-sw ON ND comes on.

Note:
1. *When TERR pb-sw ON ND is selected, the weather radar image is not displayed.*
2. *The Geometric Altitude function can protect against certain BARO setting errors, provided the components used to compute the Geometric Altitude are valid and accurate enough.*
3. *The TAD and Terrain Clearance Floor (TCF) functions operate using the pure lateral GPS position and, the FMS1 position as backup.*

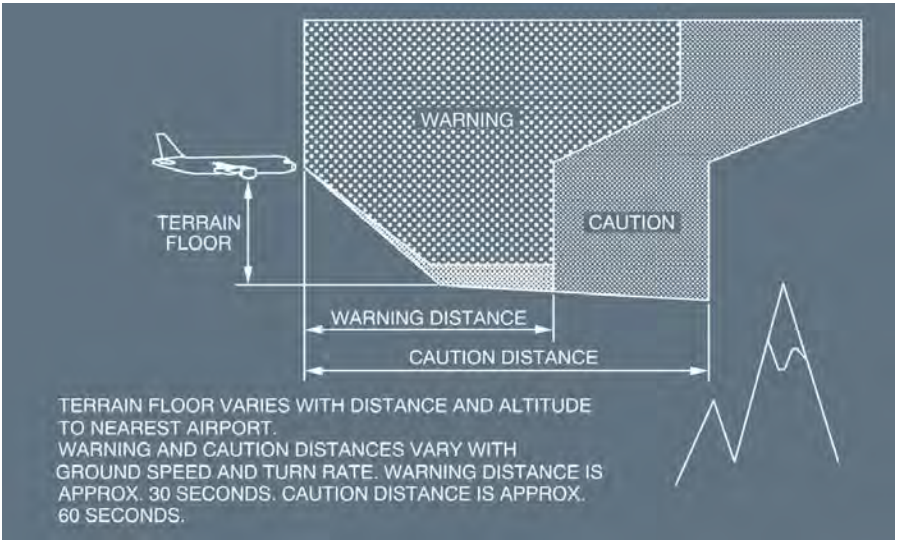
If the crew identifies that navigation accuracy is low, it must set the enhanced modes to off, via the TERR pb-sw. The 5 GPWS modes remain active.

TERRAIN CAUTION AND WARNING ENVELOPE

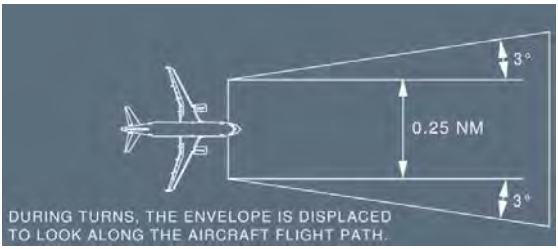
Ident.: DSC-34-SURV-40-35-00006161.0002001 / 19 DEC 12
Applicable to: ALL



VERTICAL ENVELOPE



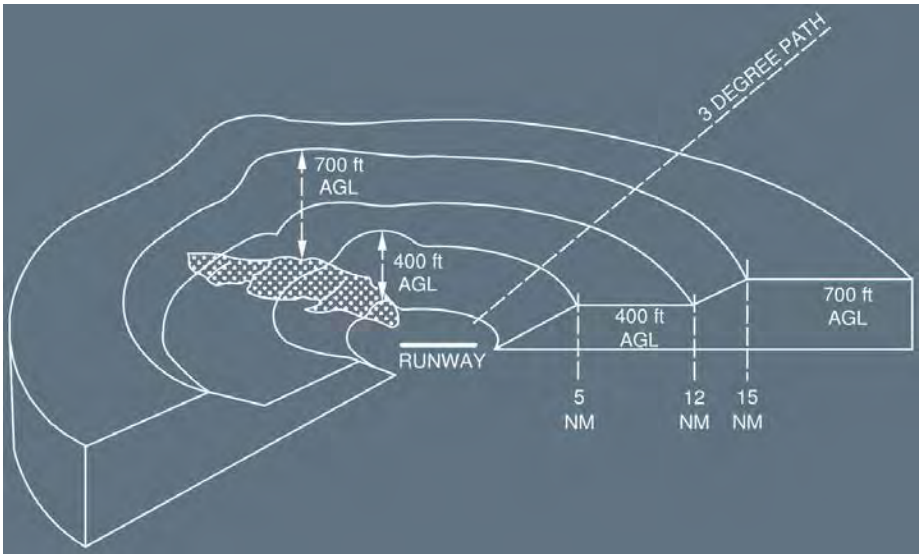
HORIZONTAL ENVELOPE



TERRAIN CLEARANCE FLOOR

Ident.: DSC-34-SURV-40-35-00006162.0002001 / 03 JUN 14
Applicable to: ALL

A terrain clearance floor envelope is stored in the database for each runway for which terrain data exist. The Terrain Clearance Floor (TCF) function warns of a premature descent below this floor, regardless of aircraft configuration.

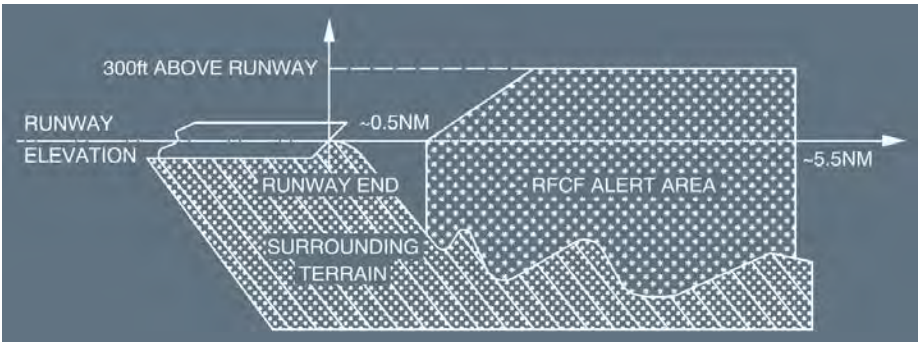


If the airplane descends below this floor, a TOO LOW TERRAIN aural warning is announciated, and the pushbutton light comes on, on the glareshield.

RUNWAY FIELD CLEARANCE FLOOR

Ident.: DSC-34-SURV-40-35-00006163.0002001 / 19 DEC 12
Applicable to: MSN 3408-4547

The Runway Field Clearance Floor (RFCF) provides an additional envelope protection, for runways that are significantly higher than the surrounding terrain. It is contained in a circle within the 5.5 NM of the runway threshold and it is based on the geometric altitude and the runway elevation.



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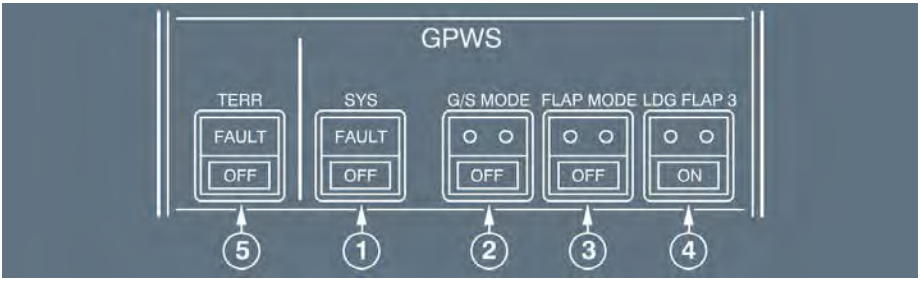
OVERHEAD PANEL

Ident.: DSC-34-SURV-40-40-00001418.0002001 / 21 MAR 17
Applicable to: MSN 1882-3408, 3518-4547



(1) SYS pushbutton

OFF : All basic GPWS alerts (Mode 1 to 5) are inhibited.

FAULT light : This amber light comes on, along with an ECAM caution, if the basic GPWS mode 1 to 5 malfunction.

Note: If ILS 1 fails, only mode 5 is inhibited. Consequently, the FAULT light does not come on and the GPWS FAULT warning is not triggered.

(2) G / S MODE pushbutton

OFF : Glideslope mode (mode 5) is inhibited.

(3) FLAP MODE pusbutton

OFF : Flap mode (“TOO LOW FLAPS” mode 4) is inhibited.
(To avoid nuisance warning in case of landing with flaps setting reduced).

(4) LDG FLAP 3 pushbutton

ON : Flap mode is inhibited when FLAPS CONF 3 is selected (to avoid nuisance warning in case of landing in CONF 3).
In this case, LDG MEMO displays "FLAPS ... 3" instead of “CONF ... FULL”.

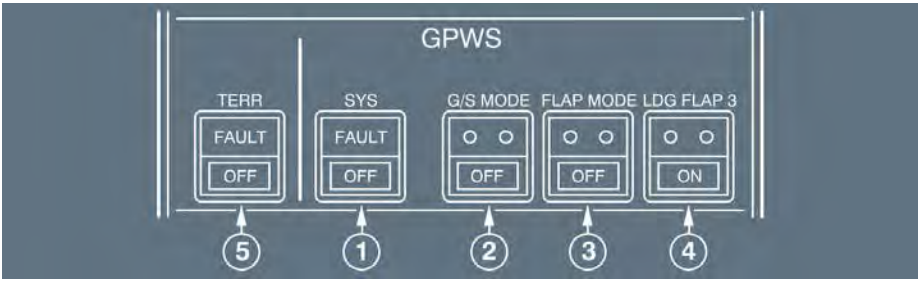
(5) TERR pushbutton

OFF : Inhibits the Terrain Awareness Display (TAD) and Terrain Clearance Floor (TCF) modes, and does not affect the basic GPWS mode 1 to 5. If OFF is selected the ECAM caution NAV GPWS TERR DET FAULT is displayed.

FAULT light : This amber light comes on, along with an ECAM caution, if the TAD or TCF mode fails. The terrain is not shown on the ND. The basic GPWS mode 1 to mode 5 are still operative if the SYS pushbutton OFF or FAULT lights are not illuminated.

OVERHEAD PANEL

Ident.: DSC-34-SURV-40-40-00001418.0008001 / 29 JUL 13
Applicable to: MSN 3467



(1) SYS pushbutton

OFF : All basic GPWS alerts (Mode 1 to 5) are inhibited.

FAULT light : This amber light comes on, along with an ECAM caution, if the basic GPWS mode 1 to 5 malfunction.

Note: If ILS 1 fails, only mode 5 is inhibited. Consequently, the FAULT light does not come on and the GPWS FAULT warning is not triggered.

(2) G / S MODE pushbutton

OFF : Glideslope mode (mode 5) is inhibited.

(3) FLAP MODE pusbutton

OFF : Flap mode (“TOO LOW FLAPS” mode 4) is inhibited.
(To avoid nuisance warning in case of landing with flaps setting reduced).

(4) LDG FLAP 3 pushbutton

ON : Flap mode is inhibited when FLAPS CONF 3 is selected (to avoid nuisance warning in case of landing in CONF 3).
In this case, LDG MEMO displays "FLAPS ... 3" instead of “CONF ... FULL”.

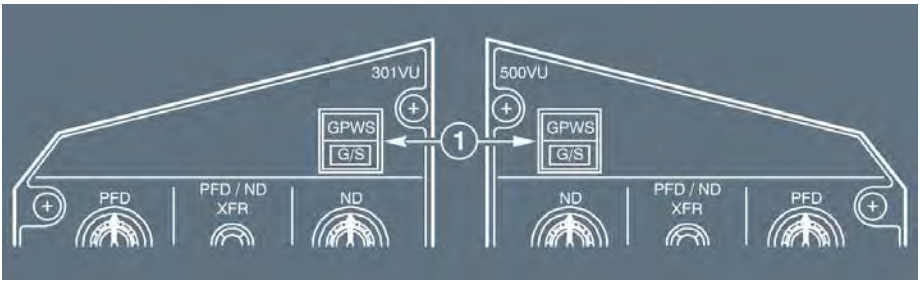
(5) TERR pushbutton

OFF : Inhibits the Terrain Awareness Display (TAD) and Terrain Clearance Floor (TCF) modes, and does not affect the basic GPWS mode 1 to 5. If OFF is selected the ECAM caution NAV GPWS TERR DET FAULT is displayed. Also inhibits the ROW/ROP function.

FAULT light : This amber light comes on, along with an ECAM caution, if the TAD or TCF mode fails. The terrain is not shown on the ND. The basic GPWS mode 1 to mode 5 are still operative if the SYS pushbutton OFF or FAULT lights are not illuminated.

INSTRUMENT PANELS

Ident.: DSC-34-SURV-40-40-00001419.0003001 / 19 DEC 12
Applicable to: ALL



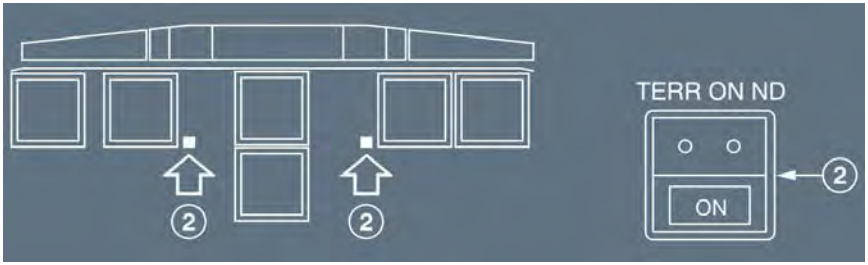
(1) GPWS – G/S pushbutton

GPWS : This red light comes on when any mode from 1 to 4, or any TAD or TCF alert is activated. A specific voice alert accompanies it.

G/S : Comes on amber when Mode 5 is activated. It is accompanied by the aural "GLIDE SLOPE" warning.

Note: *1. If the flight crew presses this button briefly when a glide slope warning is on, the G/S light goes out and the "GLIDE SLOPE" aural warning (soft or loud) stops.*

2. On ground, the GPWS can be tested by pressing this pushbutton. If the pushbutton is pressed briefly, some of the aural warnings sound and pushbutton captions, related to the GPWS, come on. If the pushbutton is pressed continuously, then all the aural warnings sound.



(2) TERR ON ND pushbutton

These pushbuttons are located on either side of the ECAM. Each pushbutton controls the onside terrain display.

ON : The terrain is displayed on the ND if the:
- TERR pb-sw is selected ON, and
- TERR FAULT light is not on.

The ON light comes on.

OFF : The terrain data is not displayed on the ND.

Note:
- *If the Terrain Awareness Display (TAD) mode generates a caution or a warning, while the TERR ON ND is not switched ON, the terrain is automatically displayed on the NDs (see EGPWS specific caution and warning due to TAD mode) and the ON light of the TERR ON ND pushbutton come on.*
- *To differenciate between the terrain and the weather display, the terrain display sweeps from the center outward to both sides of the ND.*

MEMO DISPLAY

Ident.: DSC-34-SURV-40-40-A-00017057.0001001 / 21 MAR 16
Applicable to: ALL

GPWS FLAP 3 : This memo appears in green when GPWS LDG FLAP 3 pb-sw is ON.

Ident.: DSC-34-SURV-40-40-A-00017058.0001001 / 21 MAR 16
Applicable to: ALL

GPWS FLAP MODE OFF : This memo appears in green when GPWS FLAP MODE pb-sw is OFF.

Ident.: DSC-34-SURV-40-40-A-00017060.0004001 / 21 MAR 16
Applicable to: ALL

The TERR OFF memo appears when the TERR pb-sw is OFF.

TERR OFF : This memo appears in green when:

- The aircraft is in flight phase 2, before the Take Off Configuration test is launched.
- The aircraft is in flight phase 6.

TERR OFF : This memo appears in amber when:

- The aircraft is in flight phase 2, after the Take Off Configuration test.
- The aircraft is in flight phases 3, 4, 5, 7, 8 and 9.

Ident.: DSC-34-SURV-40-40-A-00017059.0007001 / 21 MAR 16
Applicable to: MSN 3408-4547

TERR STBY : Airborne TERR STBY memo appears in green when the aircraft position accuracy (computed by the EGPWS) is not sufficient to allow the enhanced TCF and TAD modes to operate. These modes are not available until the TERR STBY memo disappears. If selected, the terrain data display on ND is automatically deselected when the TERR STBY memo is triggered.

Ident.: DSC-34-SURV-40-40-A-00017059.0003001 / 21 MAR 16
Applicable to: MSN 1882-2078

TERR STBY : Airborne TERR STBY memo appears in green when the aircraft position accuracy (provided by the FMS) is not sufficient to allow the enhanced TCF and TAD modes to operate. These modes are not available until the TERR STBY memo disappears. If selected, the terrain data display on ND is automatically deselected when the TERR STBY memo is triggered.

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GENERAL

Ident.: DSC-34-SURV-50-10-00015123.0001001 / 08 NOV 13
Applicable to: MSN 3467

The Runway Overrun Prevention System (ROPS) is designed to alert the flight crew in the case of potential runway overrun situation for dry and wet runway. The ROPS is composed of two functions:

- The Runway Overrun Warning (ROW) function. It automatically arms at 500 ft AGL and works until start of braking,
- The Runway Overrun Protection (ROP) function. It works from start of braking until the aircraft stops.

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DESCRIPTION

Ident.: DSC-34-SURV-50-20-00015124.0001001 / 17 MAR 17
Applicable to: MSN 3467

The ROW/ROP functions compute in real time the landing distances dry and wet for current conditions, and compare them with the Landing Distance Available (LDA) of the landing runway. To detect the landing runway, the ROW/ROP functions use the TAWS Runway database and the actual aircraft position and track. During final approach:

- The detection starts from 2 000 ft, then
- The ROW function arms at 500 ft.

L2 The landing runway detection is continuously updated several times per second, including below 500 ft when the ROW function is armed.

L1 The computation is made in real time, the ROW and ROP functions consider:
- All landing weight and CG ranges (including overweight landing),
- Both landing configurations (CONF 3 and CONF FULL),
- Published Landing Distance Available (LDA),
- Autopilot engaged or not,
- All wind conditions,
- Dry and wet runway state,
- No failure affecting landing performance,
- 15 % safety margin.

If a risk of overrun is detected (computed landing distances are greater than the LDA) the ROW/ROP trigger:
- Visual alert messages displayed on the PFDs,
- Aural alert messages provided through loudspeakers.

ROW FUNCTION

The ROW function enhances flight crew awareness on actual approach stabilization and capacity to land on available landing distance.

ROW ARMING

During the approach, the ROW function detects the landing runway according to the aircraft actual position, and the TAWS Runway database.
At 500 ft AGL, the ROW function automatically arms, and starts computing the landing distances dry and wet for current aircraft and environmental conditions.

The ROW function computes the landing distance assuming:
- Maximum manual braking,
- Idle reverser thrust for the computation for dry runway,
- Maximum reverser thrust for the computation for wet runway.

ROW ACTIVATION

Below 400 ft, if the computed wet landing distance is greater than the LDA:
- "IF WET: RWY TOO SHORT" message is displayed in amber on both PFDs. This message flashes 9 s and then remains steady. This message is not associated to an aural alert.

Below 400 ft, if the computed dry landing distance is greater than the LDA:

- "RWY TOO SHORT" message is displayed in red on both PFDs. This message flashes 9 s and then remains steady. In addition, when reaching 200 ft , a repetitive aural alert "RUNWAY TOO SHORT" triggers.

If the overrun situation is no longer detected, alerts are no longer triggered.

ROP FUNCTION

The ROP function enhances flight crew awareness on actual deceleration and capacity to stop before the runway end.

ROP ACTIVATION

When on ground, ROP function computes braking distance for current aircraft and runway conditions. If current braking performance is not sufficient to stop on LDA, it triggers visual and aural alerts.

As soon as an overrun situation is detected "MAX BRAKING" and "MAX REVERSE" messages are displayed in red on both PFDs. They flash 9 s and then remain steady.

At the same time “BRAKE, MAX BRAKING, MAX BRAKING” aural alert is triggered and remains as long as no full pedals braking is detected.
“SET MAX REVERSE” aural alert is also triggered and remains as long as no full reverse thrust is set.

Note: The aural alert “BRAKE, MAX BRAKING, MAX BRAKING” has priority on “SET MAX REVERSE”.

“KEEP MAX REVERSE” aural alert is triggered, below 80 kt , if the overrun situation is still detected with maximum braking and maximum reverse thrust.
If the overrun situation is no longer detected, alerts are no longer triggered.

ROP INHIBITION

The ROP function is inhibited when the ground speed goes below 20 kt.

OPERATING PROCEDURES

For operating procedure related to ROW/ROP *Refer to FCTM/AS-ROWROP General*.

CONTROLS AND INDICATORS

Ident.: DSC-34-SURV-50-30-00015132.0001001 / 29 JUL 13
Applicable to: MSN 3467

For ROW/ROP control *Refer to DSC-34-SURV-40-40 Overhead Panel*.

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OVERVIEW

Ident.: DSC-34-SURV-60-10-00020407.0001001 / 21 MAR 17
Applicable to: ALL

The Traffic alert and Collision Avoidance System (TCAS):

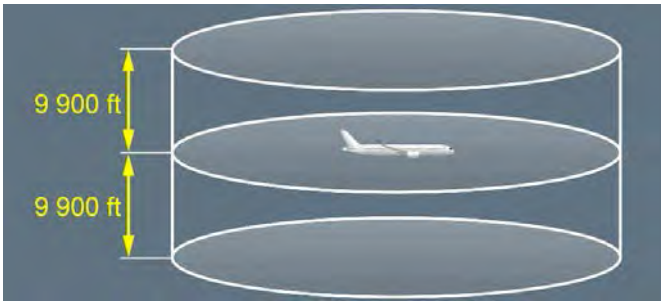
- Detects and displays surrounding aircraft that have a transponder
- Calculates and display possible collision threats
- Triggers vertical speed orders, in order to avoid collisions.

PRINCIPLE

Ident.: DSC-34-SURV-60-10-00020408.0001001 / 21 MAR 17
Applicable to: ALL

The TCAS detection capability is limited to intruders flying within a maximum range of 30 NM on either sides and approximately 30 NM to 80 NM longitudinally (depending on aircraft configuration and external conditions), and within a maximum altitude range of 9 900 ft above and below the aircraft.

TCAS Range

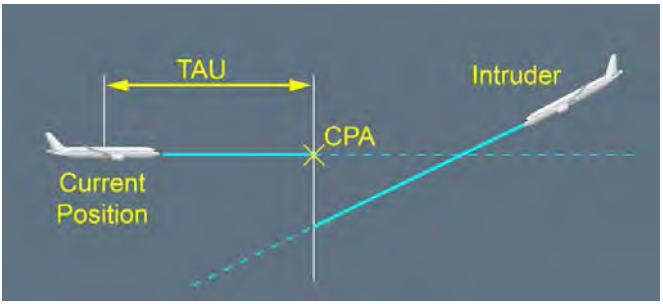


The TCAS obtains data transmitted by the transponders of nearby aircraft, and uses this data to evaluate possible collision threats.

The TCAS determines:
- The bearing of intruders, in relation to the bearing of the aircraft.
- The distance between the aircraft and intruders, and the rate of separation or closure.
- The relative altitude of intruders, if intruders have a Mode-C or Mode-S transponder.

The TCAS then calculates the intruder trajectory, the Closest Point of Approach (CPA), and the estimated time (TAU) before reaching the CPA.
The TAU is the ratio between the distance that separates both aircraft, and the sum of their speed.

TAU Definition



If the TCAS detects that the trajectory of an intruder may be a collision threat, it triggers:
- Audio and visual indicators
- Vertical speed orders, to ensure a sufficient trajectory separation and a minimal vertical speed variation considering all intruders.

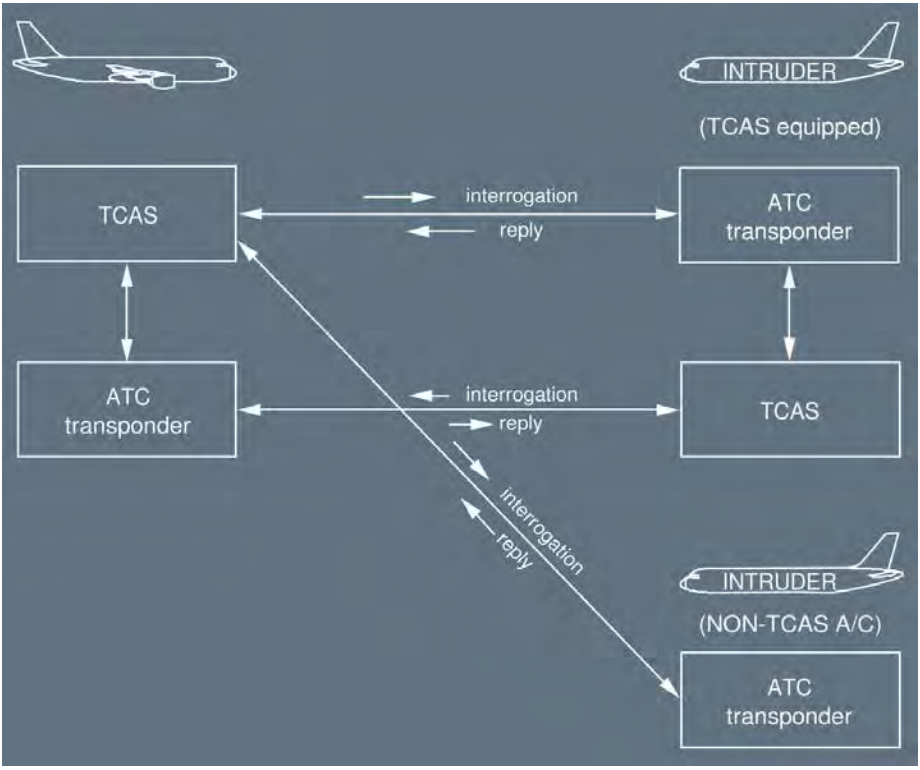
MAIN COMPONENTS

Ident.: DSC-34-SURV-60-10-00020409.0001001 / 21 MAR 17
Applicable to: ALL

The system includes:
- A single channel TCAS computer
- Two TCAS antennas
- Two mode S ATC transponders, one active the other in standby

  These transponders allow:
  - Interface between the ATC/TCAS control panel and the TCAS computer
  - Communication between the aircraft and intruders equipped with a TCAS system.

- An ATC/TCAS control panel.



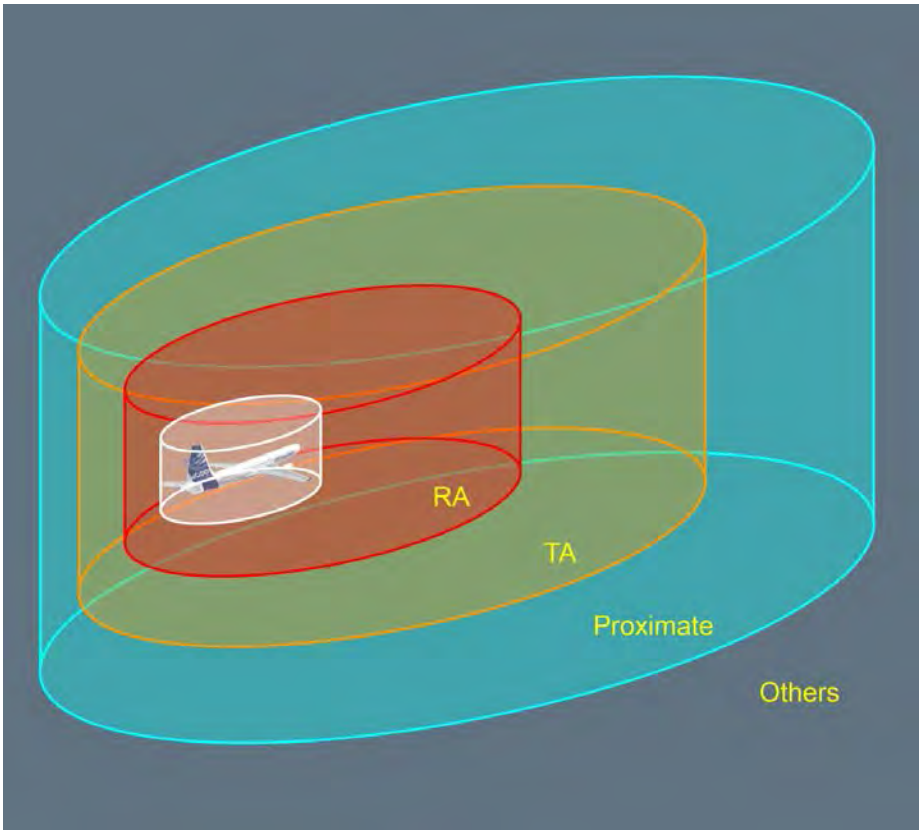
INTRUDER DETECTION CATEGORIES

Ident.: DSC-34-SURV-60-10-00020410.0001001 / 21 MAR 17
Applicable to: ALL

The TCAS divides the space surrounding the aircraft into the following four zones, in order to evaluate and categorize possible collision threats:

- Resolution Advisory (RA)
- Traffic Advisory (TA)
- Proximate intruders
- Other intruders.

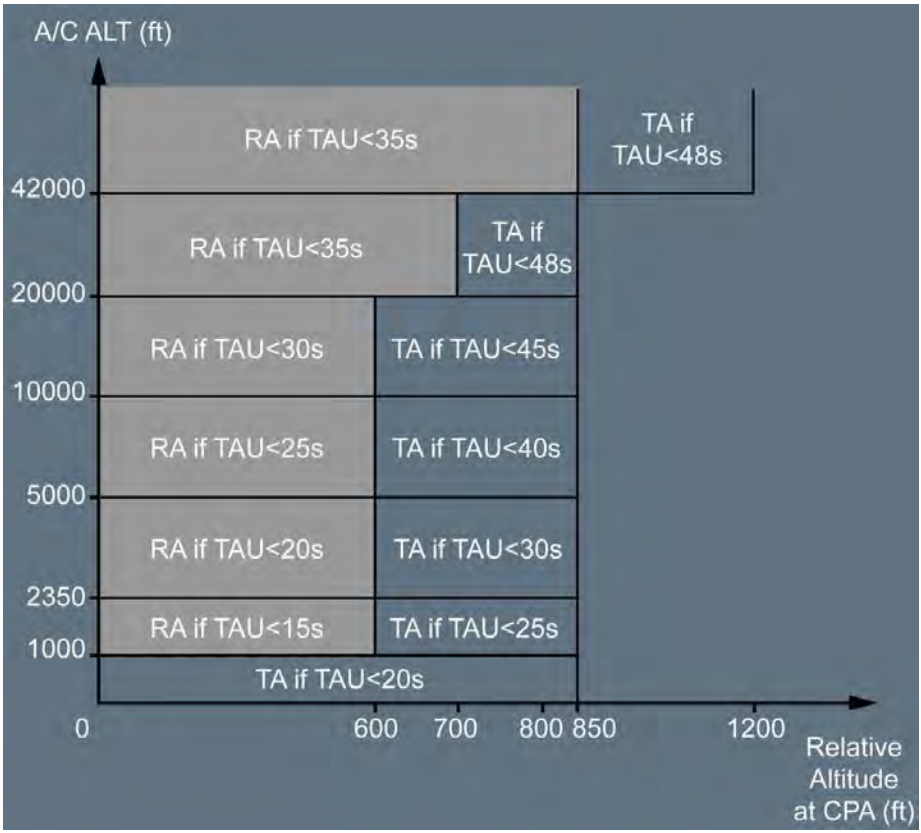
TCAS Envelopes



Depending on the level of the collision threat, the TCAS triggers audio and visual indicators::

LEVEL	INTRUDER POSITION	DISPLAYED INFORMATION AND MESSAGE	
Other intruders	- No collision threat - Any non proximate, TA, RA within the surveillance envelope (lateral range: Closer than 30 NM)	- ND: Intruder position	
Proximate	- No collision threat - Intruder in the vicinity of the A/C (closer than 6 NM laterally and ±1200 ft vertically)	- ND: Intruder position	
Traffic Advisory (TA)	- Potential collision threat - TAU is about 40 s	- ND: Intruder position - Aural messages	
Resolution Advisory (RA)	- Real collision threat - TAU is about 25 s	- ND: Intruder position - Aural messages - PFD: Vertical orders • Maintain actual V/S (Preventive Advisory) or • Modify V/S (Corrective Advisory)	

TA/RA thresholds



TCAS MODES

Applicable to: ALL

Ident.: DSC-34-SURV-60-10-10-00020411.0001001 / 21 MAR 17

TCAS MODES

The TCAS has three different modes of operations that can be selected on the ATC / TCAS control panel:

- The Traffic Advisory/Resolution Advisory (TA/RA) mode
- The Traffic Advisory Only (TA ONLY) mode
- The standby (STBY) mode.

Ident.: DSC-34-SURV-60-10-10-00020412.0001001 / 21 MAR 17

TRAFFIC ADVISORY/RESOLUTION ADVISORY (TA/RA) MODE

The TA/RA mode is the normal TCAS operating mode that enables:

- The ND to display all intruders
- The PFD to display the vertical speed orders that indicate the vertical direction that the aircraft should take, in order to avoid a collision.

Ident.: DSC-34-SURV-60-10-10-00020413.0001001 / 21 MAR 17

TRAFFIC ADVISORY ONLY (TA ONLY) MODE

The TA ONLY mode can be selected:

- Manually in case of aircraft degraded performance (engine failure, landing gear extended), or in specific airports, and for specific procedures (identified by operators) that may provide RA that are neither wanted nor appropriate (e.g. closely-spaced parallel or converging runways)
- Automatically, if TA/RA mode is previously selected and:
  - The windshear alert is triggered
  - The stall warning is triggered
  - GPWS alerts are triggered
  - Aircraft is below 1 000 ft AGL.

When the TCAS is operating in TA ONLY mode:

- All RAs are inhibited and converted into TAs
- TA threshold is set to TAU ≤20 s, irrespective of the aircraft altitude
- No vertical speed advisories are indicated on the PFDs
- “TA ONLY” is displayed on the NDs

Ident.: DSC-34-SURV-60-10-10-00020414.0001001 / 21 MAR 17

STANDBY MODE

In the standby mode, the advisory generation and surveillance functions are not active. The TCAS does not trigger any alert. No TCAS information can be displayed on the PFDs and NDs.

ADVISORY INHIBITION

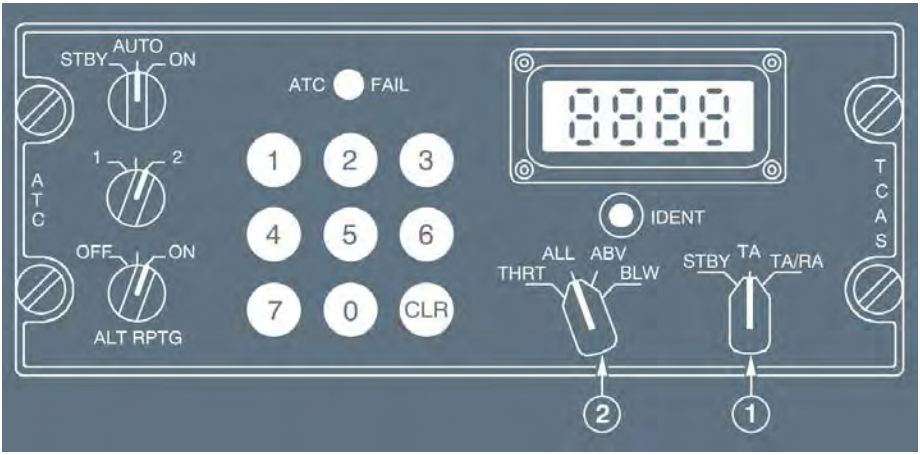
Ident.: DSC-34-SURV-60-10-00020416.0007001 / 17 MAR 17
Applicable to: ALL

Some advisories are inhibited depending on the aircraft altitude:

- All intruders flying below 380 ft AGL when the own aircraft altitude is below 1 700 ft AGL
- All RA below 1 100 ft in climb and 900 ft in descent. In this case, the RAs are converted into TAs
- “Descend” RA below 1 100 ft AGL
- “Increase Descent” RA below 1 550 ft AGL
- All TA aural messages below 600 ft AGL in climb and below 400 ft AGL in descent
- The AP/FD TCAS ◁ flight guidance mode is inhibited below 900 ft.

ATC/TCAS PANEL

Ident.: DSC-34-SURV-60-20-00001429.0004001 / 01 OCT 12
Applicable to: MSN 1882-2078



(1) Mode sel

TA/RA : Normal position.
The RAs, TAs and proximate intruders are displayed if the ALT RPTG switch is ON and the transponder is not on STBY.

TA : The TCAS does not generate any vertical orders. This mode should be used, in case of degraded aircraft performance (engine failure, landing gear extended, or approach on parallel runways).
All RAs are converted into TAs. TAs, proximate and intruders are displayed if the ALT RPTG switch is ON and the transponder is not on STBY
The "TA ONLY" white memo is displayed on the NDs.

STBY : The TCAS is on standby.

(2) TRAFFIC sel

THRT : Proximate and other intruders are displayed only if a TA or RA is present, and they are within 2 700 ft above and 2 700 ft below the aircraft.

ALL : Proximate and other intruders are displayed even if no TA or RA is present (full time function). The altitude range is –2700 ft to +2 700 ft.

ABV : The same as ALL, except that the other intruders are displayed if within 9 900 ft above the aircraft and 2 700 ft below.

BLW : The same as ALL, except that the other intruders are displayed if within 9 900 ft below the aircraft and 2 700 ft above.

ATC/TCAS PANEL

Ident.: DSC-34-SURV-60-20-00001429.0064001 / 01 OCT 12
Applicable to: MSN 3408-4547

(1) Mode selector

TA/RA : Normal position.
TAs, RAs, proximate and other intruders are displayed.

TA ONLY : This mode should be used, in case of degraded aircraft performance (engine failure, landing gear extended, or approach on parallel runways).
All RAs are converted into TAs. TAs, proximate and other intruders are displayed.

STBY : The TCAS and ATC are on standby.

XPNDR :
- The TCAS is on standby
- On ground : The selected ATC Transponder only operates in the selective aircraft interrogation mode of Mode S
- In flight : The selected ATC Transponder operates.

(2) TRAFFIC selector

ABV : The altitude range is set to +7 000 ft above the aircraft, and -2 700 ft below the aircraft.

N : The altitude range is set to -2 700 ft below the aircraft, and +2 700 ft above the aircraft.

BLW : The altitude range is set to -7 000 ft below the aircraft, and +2 700 ft above the aircraft.

(3) AUTO/ON selector or THRT/ALL selector

ON (or ALL) : All intruders are displayed.

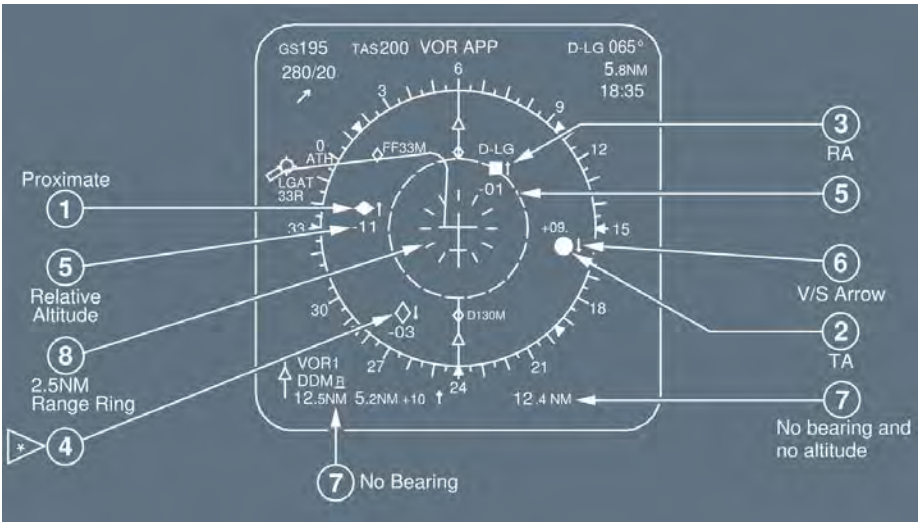
AUTO (or THRT) : Proximate and other intruders are only displayed, if a TA or RA is already presented.

Note: *Some TCAS control panels are equipped with a THRT/ALL selector, instead of the AUTO/ON selector. The associated functions remain unchanged.*

ND INDICATIONS

Ident.: DSC-34-SURV-60-20-00020418.0002001 / 17 MAR 17
Applicable to: ALL

The traffic is displayed in all ROSE modes and ARC mode when 10, 20 or 40 NM range is selected. Only the 8 most threatening intruders are displayed.



(1) Proximate intruder
Indicated by a white filled diamond.

(2) TA intruder
Indicated by an amber circle.
Associated with the TRAFFIC-TRAFFIC aural message.

(3) RA intruder
Indicated by a red square.
Associated with vertical orders displayed on the PFD and aural messages.

(4) Other intruders
Indicated by a white empty diamond.

Note: If the range of an intruder is not available, the intruder is not displayed. An intruder may be partially displayed when its range is out of scale.

(5) Relative altitude
Indicated in hundred of feet above or below the symbol depending on the intruder position.

(6) Vertical speed arrow
Displayed only if the intruder V/S > 500 ft/min.
Relative altitude and vertical speed arrow are displayed in the same color as the associated intruder symbol.

Note: If the altitude of an intruder is not available, neither altitude nor vertical speed indications are displayed.

(7) No bearing intruder

If the bearing of TA or RA intruder is not available the following data is presented in digital form at the bottom of the ND:
- range
- relative altitude and vertical speed arrow if available.

Displayed amber or red according to threat level.

(8) Range ring
A 2.5 NM white range ring is displayed when a 10 NM or 20 NM range is selected.

TCAS MESSAGES

Ident.: DSC-34-SURV-60-20-00020419.0001001 / 17 MAR 17
Applicable to: ALL

(1) Mode and range messages

Following messages can be displayed to draw pilot's attention:

TCAS : REDUCE RANGE : Displayed when a TA or RA is detected and ND range above 40 NM.

TCAS : CHANGE MODE : Displayed when a TA or RA is detected and ND mode is PLAN.

Displayed amber or red depending on the advisory level (TA or RA).

(2) TCAS operation messages

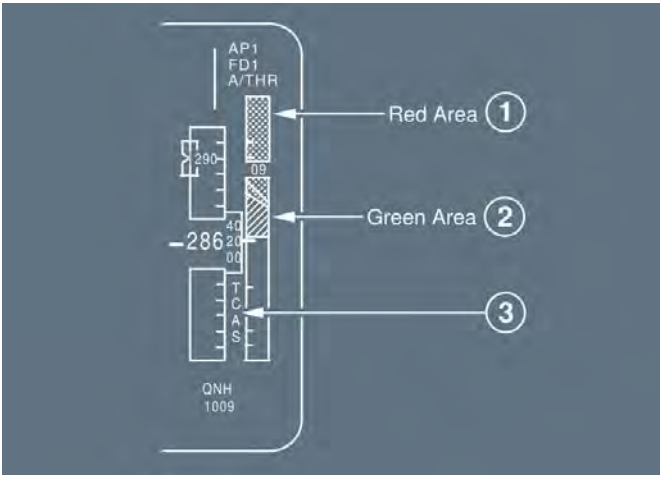
TCAS : Displayed in case of TCAS internal failure.

TA ONLY : Displayed white when the TA mode is selected automatically, or manually by the flight crew.

PFD INDICATIONS

Ident.: DSC-34-SURV-60-20-00020420.0003001 / 17 MAR 17
Applicable to: MSN 1882-2078

In case of RA detection, the PFD presents vertical orders on the vertical speed scale. The vertical speed scale background is normally grey, but may be partially replaced by green and/or red areas.



(1) Red area
Indicates the vertical speed range, when there is a high risk of conflict.

(2) Green area
Indicates the recommended vertical speed range. It is wider than the red area.

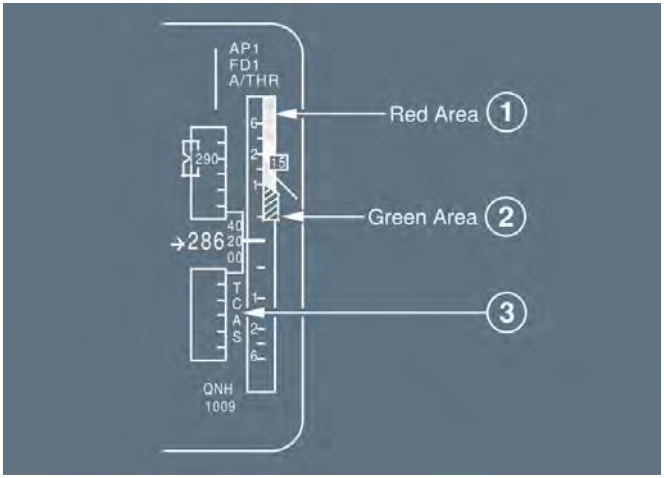
Note:
- *The aircraft can also fly in the grey vertical speed range, without the risk of conflict (preventive RA).*
- *The color of the digits corresponds to the appropriate area.*
- *In case of RA detection, the vertical speed needle that is normally green, becomes white.*

(3) TCAS message
It is displayed when the TCAS cannot deliver RA data, or in case of an internal TCAS failure, provided that the TCAS is not in standby.

PFD INDICATIONS

Ident.: DSC-34-SURV-60-20-00020420.0005001 / 17 MAR 17
Applicable to: MSN 3408-4547

In case of RA detection, the vertical speed scale becomes rectangular and the PFD presents vertical orders on the vertical speed scale. The vertical speed scale background is normally grey, but may be partially replaced by green and/or red areas.



(1) Red area
Indicates the vertical speed range, when there is a high risk of conflict.

(2) Green area
Indicates the recommended vertical speed range. It is wider than the red area.

Note:
- *The aircraft can also fly in the grey vertical speed range, without the risk of conflict (preventive RA).*
- *The color of the digits corresponds to the appropriate area.*
- *In case of RA detection, the vertical speed needle that is normally green, becomes white.*

(3) TCAS message
Appears in amber provided that the TCAS is not in standby, when the TCAS cannot deliver RA data, or in case of an internal TCAS failure.

AURAL MESSAGES

Ident.: DSC-34-SURV-60-20-00001433.0018001 / 08 FEB 13
Applicable to: ALL

TA/RA detection is associated with the following messages:

"TRAFFIC TRAFFIC"	:	Only in case of TA detection.
"CLIMB CLIMB"	:	Climb at the vertical speed indicated by the green area on the PFD.

"CLIMB, CROSSING CLIMB" (twice)	:	Same as above. Indicates that you will cross through the intruder altitude.
"INCREASE CLIMB" (twice)	:	Triggered after the CLIMB message, if vertical speed is insufficient to achieve safe vertical separation.
"DESCEND DESCEND"	:	Descend at the vertical speed indicated by the green area on the PFD.
"DESCEND, CROSSING DESCEND" (twice)	:	Same as above. Indicates that you will cross through the intruder altitude.
"INCREASE DESCEND" (twice)	:	Triggered after the DESCEND message, if the vertical speed is insufficient to achieve safe vertical separation.
"LEVEL OFF, LEVEL OFF"	:	Set the Vertical Speed to 0.
"CLIMB CLIMB NOW" (twice)	:	Triggered after the DESCEND message, if the intruder trajectory has changed.
"DESCEND DESCEND NOW" (twice)	:	Triggered after the CLIMB message, if the intruder trajectory has changed.
"MONITOR VERTICAL SPEED"	:	Ensure that the vertical speed remains outside the red area. Triggered only once, in case of preventive RA.
"MAINTAIN VERTICAL SPEED, MAINTAIN"	:	Maintain the vertical speed indicated on the green area of the PFD.
"MAINTAIN VERTICAL SPEED, CROSSING MAINTAIN"	:	Maintain the vertical speed indicated on the green area of the PFD. Indicates that you will cross through the intruder altitude.
"CLEAR OF CONFLICT"	:	The range increases and separation is adequate. Return to assigned clearance.

MEMO DISPLAY

Ident.: DSC-34-SURV-60-20-00020422.0002001 / 17 MAR 17
Applicable to: MSN 1882-4379

TCAS STBY : This memo appears in green when:

- ATC STBY is selected by the crew, or
- TCAS STBY is selected by the crew during flight phases other than 6, or
- ALT RPTG sw is OFF, or
- both ATCs or both RAs are failed.

TCAS STBY : This memo appears in amber when the flight crew sets the TCAS on STBY in flight phase 6.

MEMO DISPLAY

Ident.: DSC-34-SURV-60-20-00020422.0003001 / 17 MAR 17
Applicable to: MSN 4487-4547

TCAS STBY : This memo appears in green when:

- ATC STBY is selected by the crew, or
- TCAS STBY is selected by the crew during flight phases other than 6, or
- ALT RPTG sw is OFF, or
- both ATCs or both RAs are failed, or
- In the case of a triple ADR failure.

TCAS STBY : This memo appears in amber when the flight crew sets the TCAS on STBY in flight phase 6.

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AIRCRAFT SYSTEMS

OXYGEN

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DESCRIPTION

Ident.: DSC-35-10-00001448.0001001 / 20 DEC 10
Applicable to: ALL

The oxygen system consists of:

- A cockpit-fixed oxygen system, which supplies adequate breathing oxygen to the cockpit occupants in case of depressurization, or emission of smoke and noxious gases.
- A cabin-fixed oxygen system, which supplies oxygen for cabin occupants (passengers and cabin crew) in case of depressurization.
- A portable oxygen system, which is provided in both the cockpit and cabin and is to be used:
  - As PROTECTION for the crew during on board emergencies.
  - For FIRST AID purposes.

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GENERAL

Ident.: DSC-35-20-10-00017801.0001001 / 21 MAR 16
Applicable to: ALL

The cockpit's fixed oxygen system consists of :

- A high-pressure cylinder, located in the left-hand lower fuselage.
- A pressure regulator, connected directly to the cylinder that delivers oxygen, at a pressure suitable for users.
- Two overpressure safety systems to vent oxygen overboard, through a safety port, if the pressure becomes too high.
- A supply solenoid valve that allows the crew to shut off the distribution system.
- Three (or four ◁) full-face quick-donning masks, stowed in readily-accessible boxes adjacent to the crewmembers' seats (one at each seat).

OPERATION

Ident.: DSC-35-20-10-00001450.0001001 / 21 MAR 16
Applicable to: ALL

The crewmember squeezes the red grips to pull the mask out of its box, and this action causes the mask harness to inflate.

A mask-mounted regulator supplies a mixture of air and oxygen or pure oxygen, or performs emergency pressure control. With the regulator set to NORMAL, the user breathes a mixture of cabin air and oxygen up to the cabin altitude at which the regulator supplies 100 % oxygen. The user can select 100 %, in which case the regulator supplies pure oxygen at all cabin altitudes.

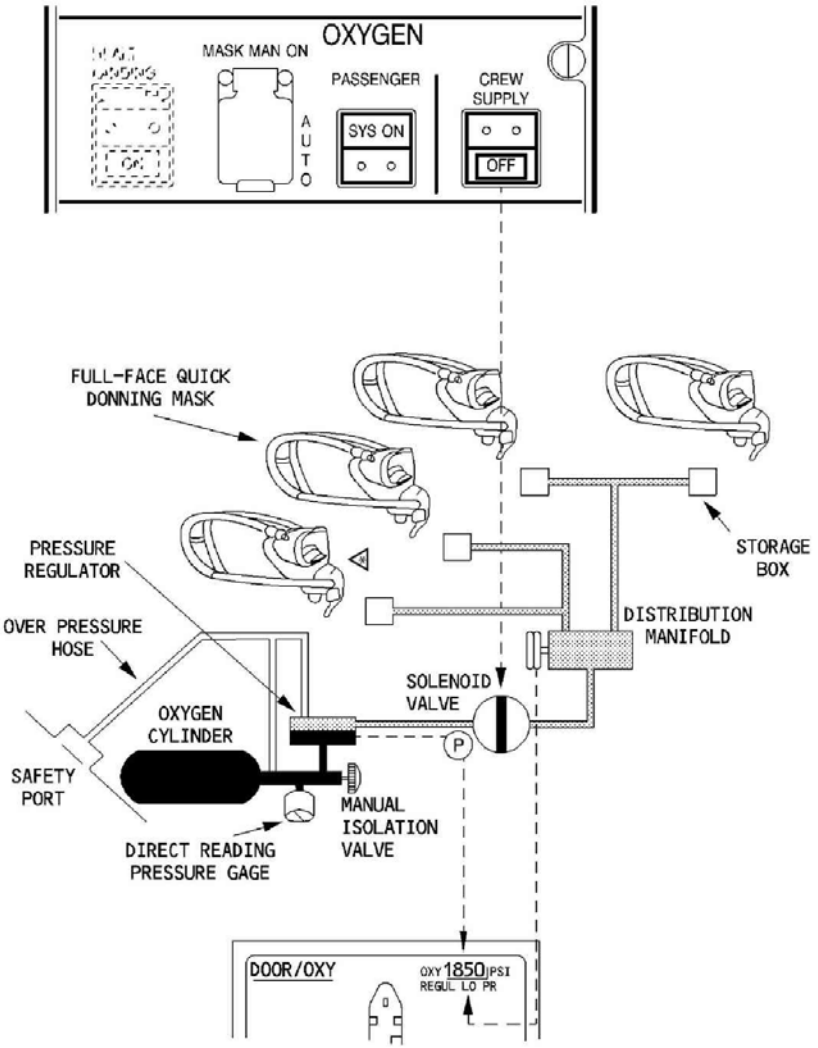
If the situation calls for it, the user can use the emergency overpressure rotating knob and receive pure oxygen at positive pressure.

The storage box contains a microphone lead, with a quick-disconnect, for connection to the appropriate mask microphone cable.

Note: Each mask may have a removable film that protects the visor against scratches. This strip is optional and may be removed from the mask at any time.

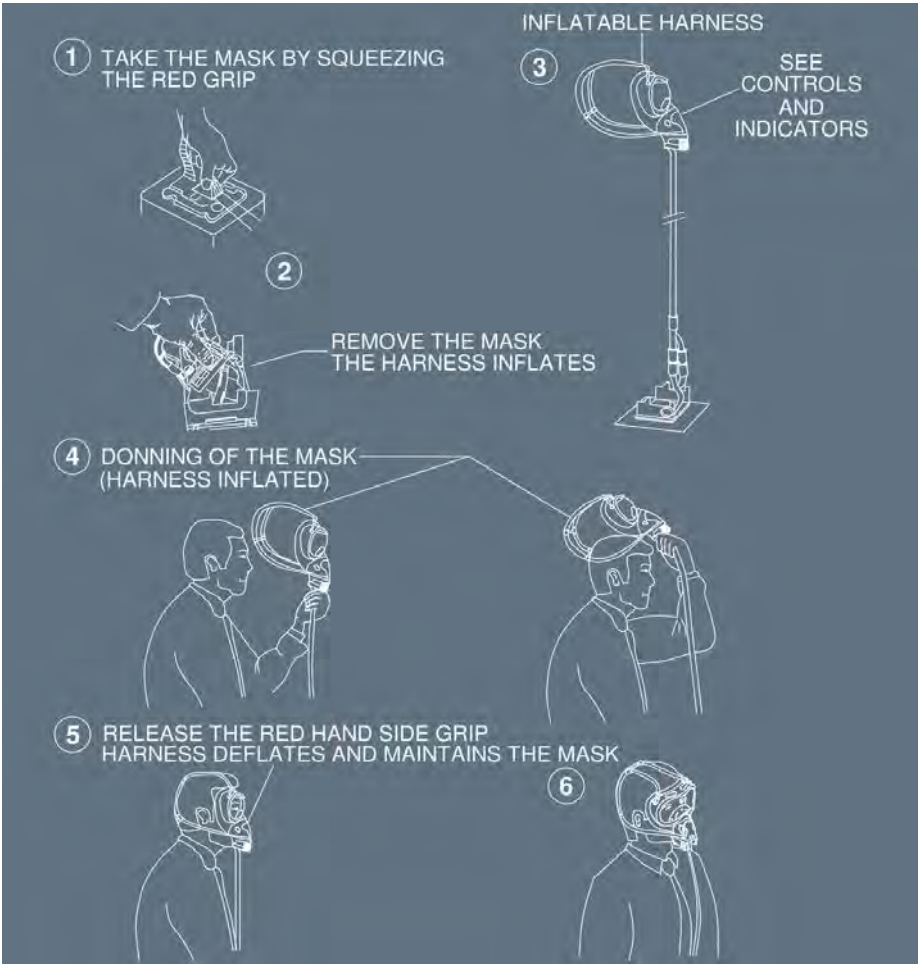
SCHEMATIC

Ident.: DSC-35-20-10-00017802.0001001 / 21 MAR 16
Applicable to: ALL



MASK SETTING

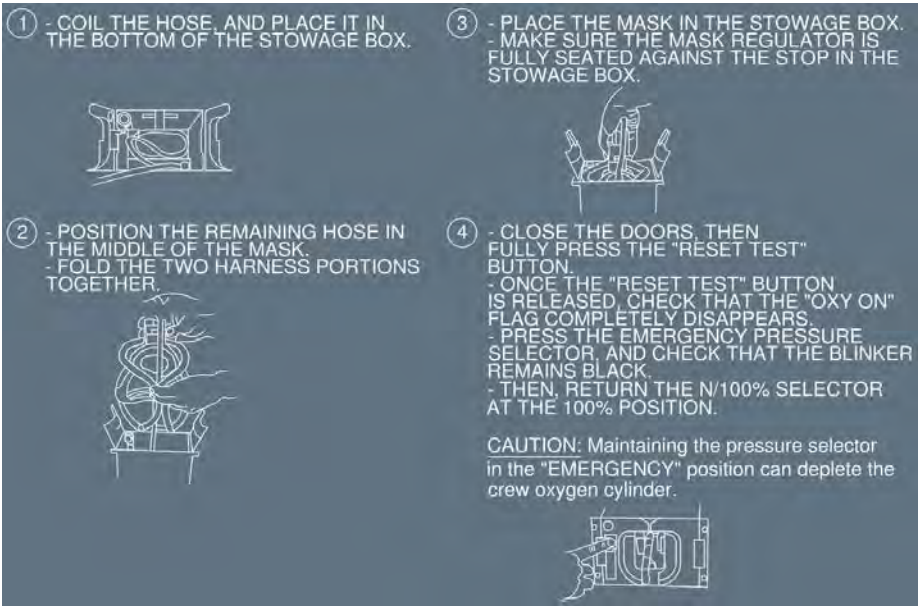
Ident.: DSC-35-20-10-00016919.0001001 / 21 MAR 16
Applicable to: ALL



Note: The captain (first officer) must exercise caution and turn the head to the right (left) in the direction of the first officer (captain) in order to ensure fast donning of the mask when the HUD ◁ on the captain (first officer) side is deployed.

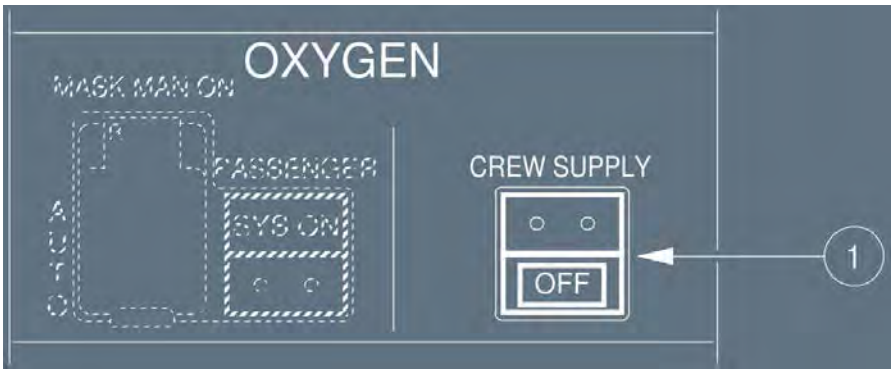
MASK STOWAGE

Ident.: DSC-35-20-10-00001453.0001001 / 21 MAR 16
Applicable to: ALL



OVERHEAD PANEL

Ident.: DSC-35-20-20-00017803.0001001 / 21 MAR 16
Applicable to: ALL



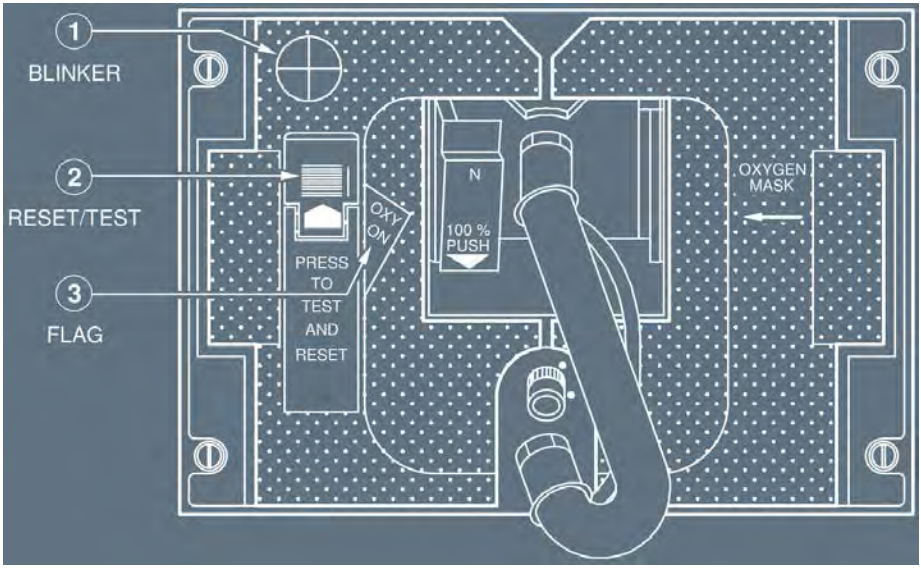
(1) CREW SUPPLY pb
This pushbutton controls the solenoid valve.

On : The valve is open, and supplies low pressure oxygen to the masks (normal position in flight).

OFF: The valve is closed, and the white light comes on.

STOWAGE BOX

Ident.: DSC-35-20-20-00001455.0001001 / 22 MAY 12
Applicable to: ALL



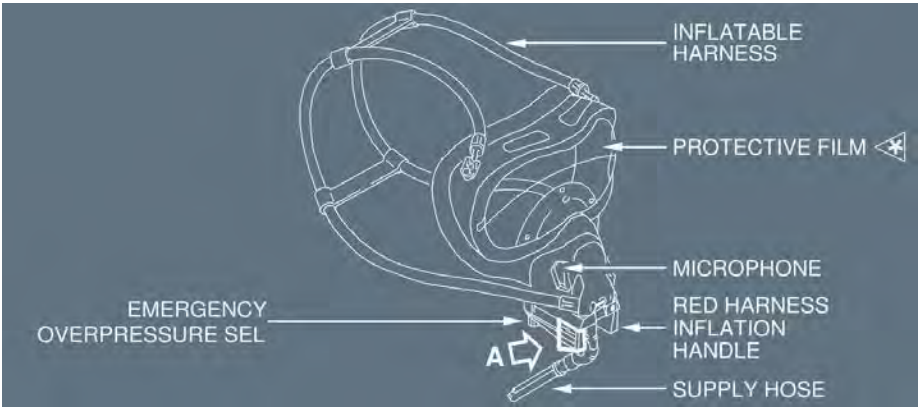
(1) Blinker flowmeter (yellow)
This indicator flashes when oxygen is flowing.

(2) RESET/TEST control slide
The crewmember presses the slide, and pushes it in the direction of the arrow to test: the operation of the blinker; the regulator supply; system sealing downstream of the valve; and the regulator sealing and system operation. Pressing the RESET control slide, after the oxygen mask has been used, cuts off the oxygen, and the mask microphone.

(3) OXY ON flag
As soon as the left flap door opens, the mask is supplied with oxygen and, once it closes (mask still supplied with oxygen), the “OXY ON” flag appears.

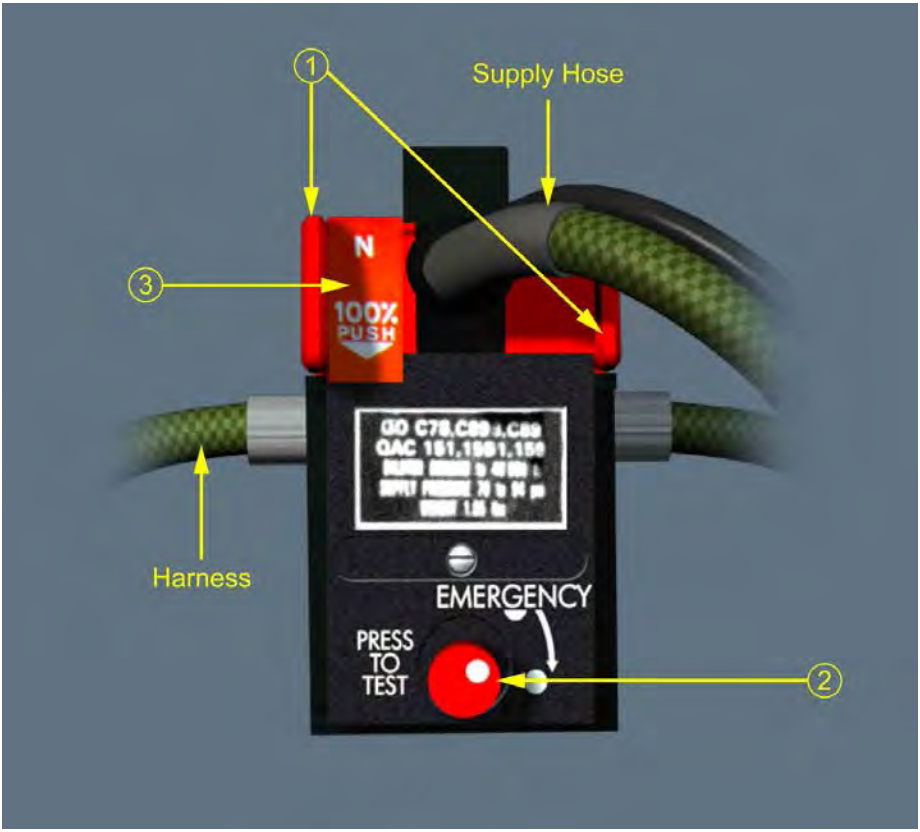
CREW OXYGEN MASK

Ident.: DSC-35-20-20-00001456.0001001 / 21 MAR 16
Applicable to: ALL



PRESSURE REGULATOR

Ident.: DSC-35-20-20-00001457.0001001 / 24 NOV 15
Applicable to: ALL



(1) Red grips
Squeezing the right-hand side grip unlocks the two-flap door, and permits the harness to inflate.

(2) EMERGENCY pressure selector

Use of this selector creates on overpressure which eliminates condensation or fogging of the mask, and prevents smoke, smell or ashes from entering the mask.

- Pressing this knob generates an overpressure for a few seconds.
- Turning the knob, in the direction of the arrow, generates a permanent overpressure.

Note: *1. Overpressure supply is automatically started, when cabin altitude exceeds 30 000 ft.*

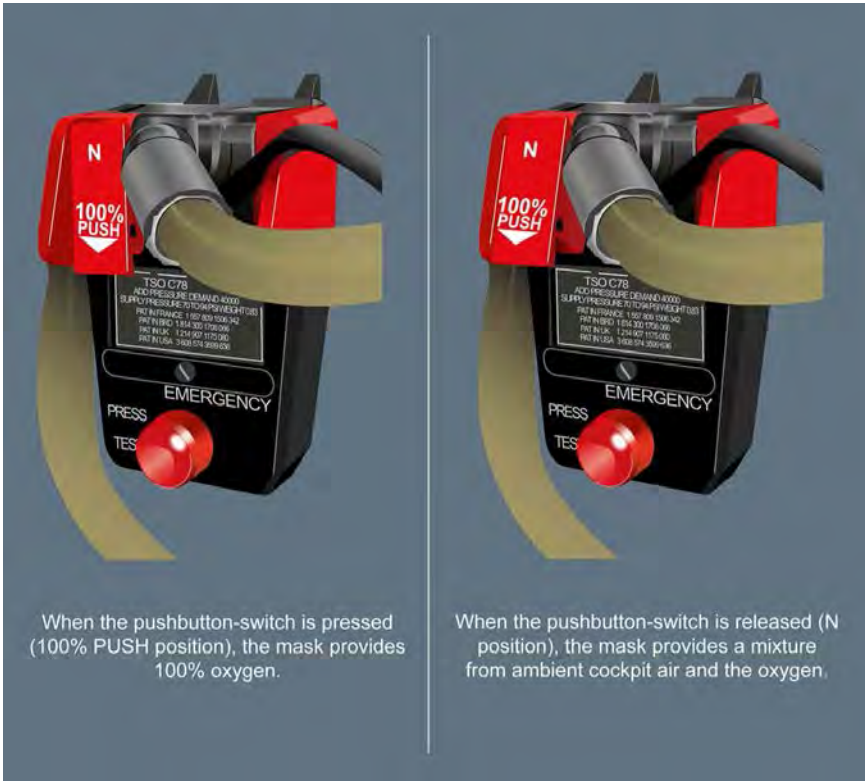
2. Overpressure supply is available only when the N/100% selector is set on the on the 100 % position.

(3) N/100 % selector

This two-position button is locked down (100% position) when the crewmember pulls the mask out of the stowage.Pushing the button up from underneath releases it, and it pops up to the N (normal) position. Pressing it again returns it to 100 %.

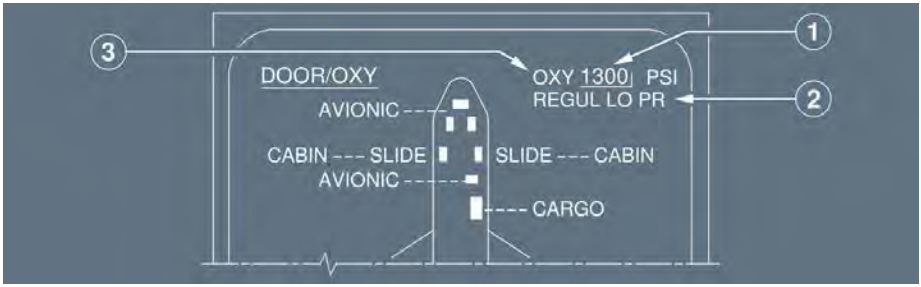
100 % : The mask delivers 100 % oxygen.

N : The mask provides the flight crew with a mixture of air and oxygen. This mixture changes with cabin altitude. The higher the cabin altitude, the more oxygen the mask provides, until the mask supplies 100 % oxygen.



ECAM DOOR/OXY PAGE

Ident.: DSC-35-20-20-00001458.0001001 / 21 MAR 17
Applicable to: MSN 1882-2078



(1) OXY pressure indication
It is in green, when the pressure is ≥ 400 PSI.
It is in amber, when the pressure is < 400 PSI.
On ground, an amber half frame appears when oxygen pressure is < 1 500 PSI.
In this case, the flight crew must check that the remaining quantity is not below the minimum (*Refer to LIM-OXY Minimum Flight Crew Oxygen Pressure*).

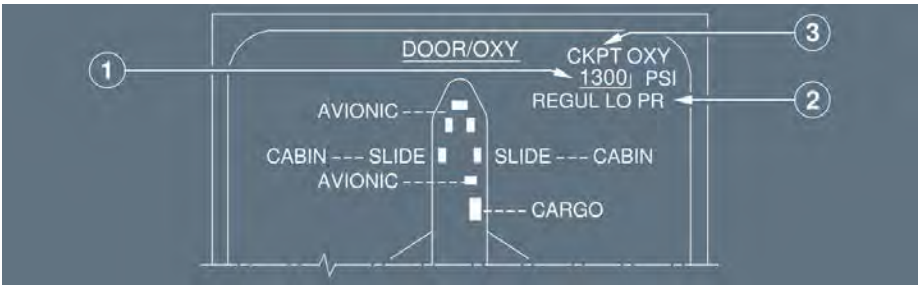
(2) REGUL LO PR indication
It is in amber, if oxygen pressure on the low-pressure circuit is low (50 PSI).

(3) OXY indication
It is normally in green.

It becomes amber, when:
- Pressure goes below 400 PSI
- Low oxygen pressure is detected
- The OXYGEN CREW SUPPLY pushbutton switch on the overhead panel is OFF.

ECAM DOOR/OXY PAGE

Ident.: DSC-35-20-20-00001458.0004001 / 21 MAR 17
Applicable to: MSN 3408-4547



(1) OXY pressure indication
It is in green, when the pressure is ≥ 800 PSI.
It pulses in green, when the pressure is < 800 PSI (the DOOR/OXY SD page is automatically displayed).
It is in amber, when the pressure is < 400 PSI.
On ground, an amber half frame appears when oxygen pressure is < 1 500 PSI.
In this case, the flight crew must check that the remaining quantity is not below the minimum (*Refer to LIM-OXY Minimum Flight Crew Oxygen Pressure*).

(2) REGUL LO PR indication
It is in amber, if oxygen pressure on the low-pressure circuit is low (50 PSI).

(3) CKPT OXY indication
It is normally in white.

It becomes amber, when:
- Pressure goes below 400 PSI
- Low oxygen pressure is detected
- The overhead panel's OXYGEN CREW SUPPLY pb is OFF.

GENERAL

Ident.: DSC-35-30-10-00017804.0001001 / 13 MAY 16
Applicable to: ALL

In the case of depressurization, the fixed oxygen system in the cabin supplies oxygen to the cabin occupants.
Chemical generators produce the oxygen. Each generator feeds a group of 2, 3, or 4 masks.
Oxygen masks are located in containers above the passenger seats, in the lavatories, in each galley ◁ , and at each cabin crew station.

Note: *Gaseous generators ◁ replace chemical generators in the lavatories.*

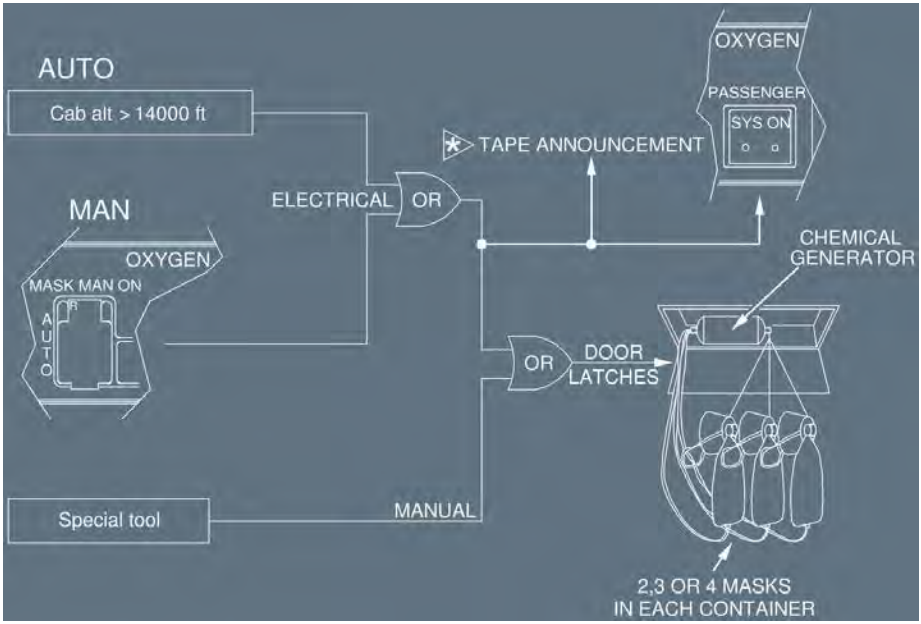
OPERATION

Ident.: DSC-35-30-10-00016920.0001001 / 21 MAR 16
Applicable to: ALL

Each container has an electrical latching mechanism that opens automatically to allow the masks to drop, if the cabin pressure altitude exceeds 14 000 ft (+250, -750 ft), or 16 000 ft (+250, -750 ft) for the operation on high altitude airfields ◁ .
Members of the flight crew can override the automatic control.
When the masks are released, the passenger address system automatically broadcasts prerecorded instructions ◁ .
The generation of oxygen begins when the passenger pulls the mask towards the passenger seat.
The chemical reaction used for oxygen generation creates heat. Therefore, the smell of burning, smokes and cabin temperature increase may be associated with the normal operation of the oxygen generators. The mask receives pure oxygen under positive pressure for about 13 min ◁ , 15 min ◁ , or up to 22 min ◁ , until the generator is exhausted.
A reset is available for the rearming of the system after the masks are restowed. A manual release tool allows crew members to open the doors manually in case of electrical failure.

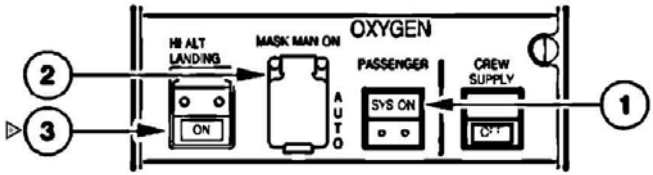
SCHEMATIC

Ident.: DSC-35-30-10-00001461.0001001 / 16 MAY 12
Applicable to: ALL



OVERHEAD PANEL

Ident.: DSC-35-30-20-00017805.0001001 / 21 MAR 16
Applicable to: ALL



(1) PASSENGER SYS ON light
This light comes on in white, when the control for the oxygen mask doors is activated, and it remains on until the TMR RESET pb is pressed (*Refer to DSC-35-30-20 Overhead Maintenance Panel*).

(2) MASK MAN ON pb
The guard keeps this button in the AUTO position.

AUTO : The mask doors open automatically, when the cabin altitude exceeds 14 000 ft, or 16 000 ft if the HI ALT LANDING pb-sw is set to ON.

Pressed : The mask doors open.

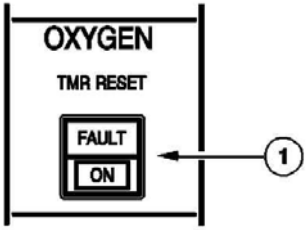
(3) HI ALT LANDING pb-sw
This pushbutton-switch changes the altitude threshold for the deployment of the passenger oxygen masks.

OFF: The masks drop, if the cabin pressure exceeds 14 000 ft (+250, -750 ft).

ON : The masks drop, if the cabin pressure exceeds 16 000 ft (+250, -750 ft).

OVERHEAD MAINTENANCE PANEL

Ident.: DSC-35-30-20-00001463.0001001 / 11 FEB 11
Applicable to: ALL



(1) TMR RESET pushbutton
The maintenance crew uses this pushbutton to reset the control circuit, after the system has operated.

ON : The PASSENGER SYS ON light goes off.

FAULT : This light comes on in white, when the door latch solenoids are energized for more than 30 s.

MEMO DISPLAY

Applicable to: ALL

Ident.: DSC-35-30-20-A-00016865.0001001 / 21 MAR 16

HI ALT SET : This memo appears in green if the crew sets the HI ALT LANDING pb-sw to ON. In this case, the passenger mask release altitude is 16 000 ft (+250 ft, -750 ft).

FLIGHT CREWS PORTABLE OXYGEN SYSTEM

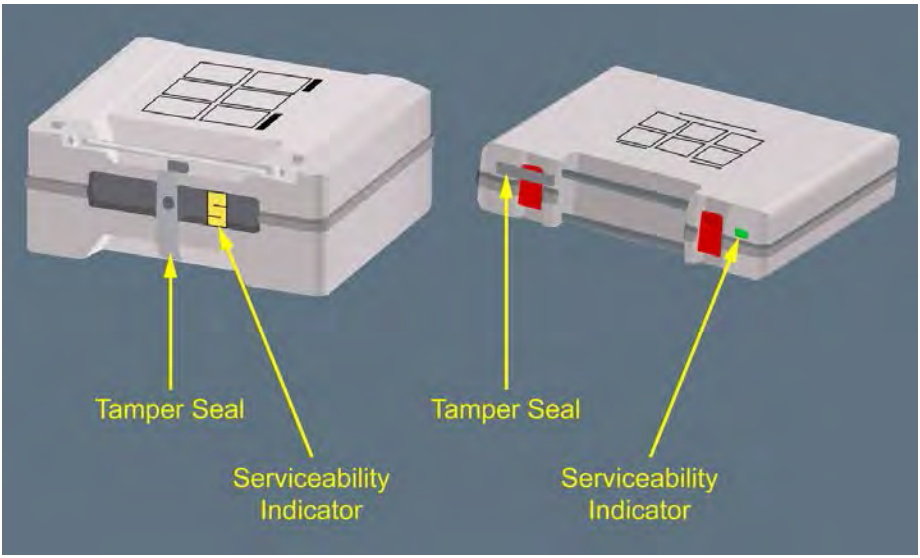
Ident.: DSC-35-40-10-00001465.0005001 / 20 DEC 16
Applicable to: MSN 1882-2078

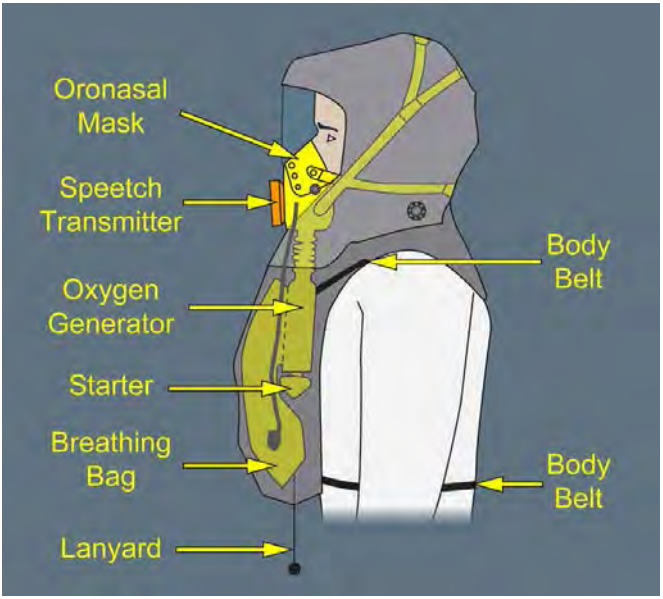
There is one Portable Breathing Equipment (PBE) in the cockpit. The PBE is a hood, located in a container. The PBE is stored on the right aft side of the cockpit. It ensures the eyes and respiratory system protection of one flight crew member when fighting a fire and in case of smoke or noxious gas emissions or cabin depressurization.
The PBE uses a chemical air regeneration system, which is in the breathing key. An oronasal mask allows the user to inhale regenerated air, and it returns the exhaled breath to the regeneration system.

If the container is equipped with a yellow serviceability indicator:
- When the indicator is cracked, the breathing protection can be insufficient and therefore the PBE cannot be used.

If the container is equipped with a red/green serviceability indicator:
- When the indicator is green, the hood can be used.
- When the indicator is red, the breathing protection can be insufficient and therefore the PBE cannot be used.

The hood operates for at least 15 min.



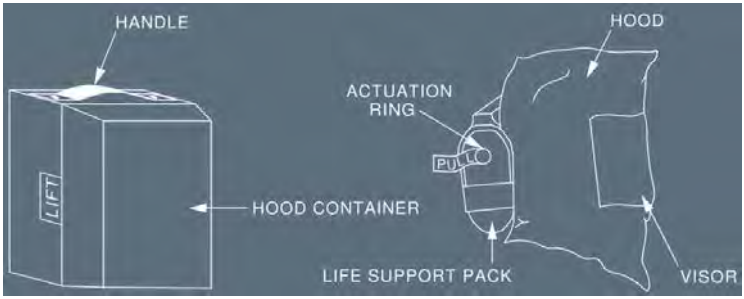


FLIGHT CREWS PORTABLE OXYGEN SYSTEM

Ident.: DSC-35-40-10-00001465.0004001 / 17 MAR 11
Applicable to: MSN 3408-4547

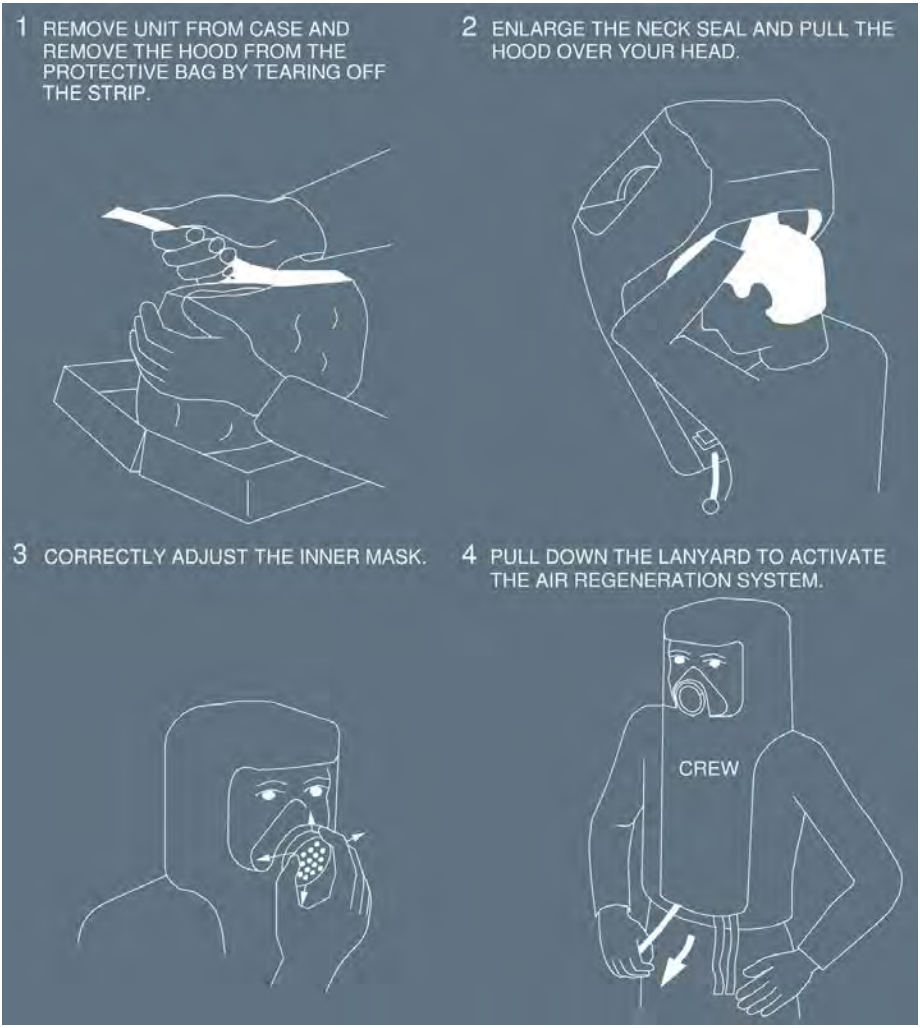
The flight crew smoke hood located on the right back side of the cockpit, ensures the eyes and respiratory system protection of one flight crew member when fighting a fire and in case of smoke or noxious gas emissions or cabin depressurization.

The smoke hood is equipped with one solid state oxygen supply source and one CO2 absorption system, contained in a life support pack which furnish an effective time of use of 15 min.


HANDLE
HOOD
ACTUATION
RING
PULL
LIFT
HOOD CONTAINER
LIFE SUPPORT PACK
VISOR

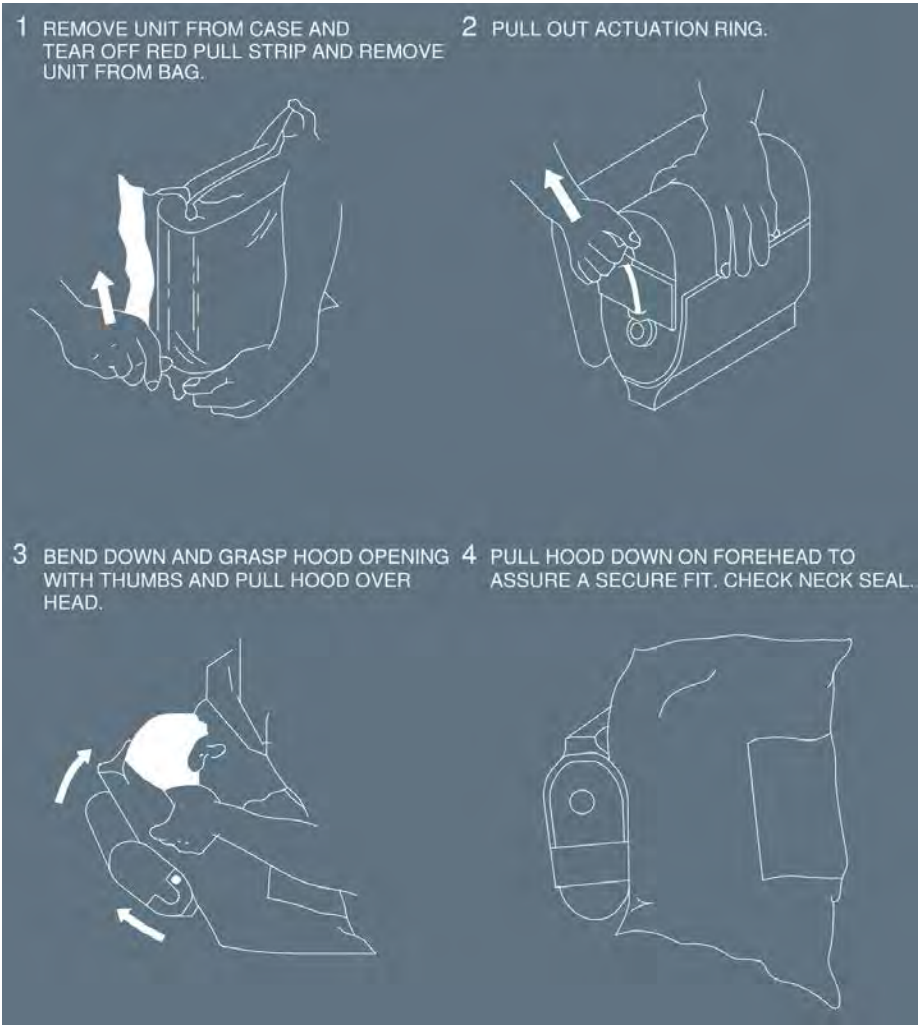
USING THE HOOD

Ident.: DSC-35-40-10-00006226.0005001 / 03 MAR 17
Applicable to: MSN 1882-2078



USING THE HOOD

Ident.: DSC-35-40-10-00006226.0004001 / 22 MAY 12
Applicable to: MSN 3408-4547



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AIRCRAFT SYSTEMS

PNEUMATIC

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GENERAL

Ident.: DSC-36-10-10-00020804.0001001 / 17 MAR 17
Applicable to: ALL

The pneumatic system supplies high-pressure air for :
- Air conditioning
- Engine starting
- Wing anti-icing
- Water pressurization
- Hydraulic reservoir pressurization
- FWD cargo heating ◁✻
- AFT cargo heating ◁✻
- Fuel Tank Inerting System (FTIS) ◁✻ .

High-pressure air has three sources :
- Engine bleed systems
- APU load compressor
- HP ground connection

Note: *An external HP source may be used for air conditioning.*

A crossbleed duct interconnects the engine bleed systems and receives air from the APU and ground sources when appropriate.
A valve mounted on the crossbleed duct allows the left side (engine 1) and right side (engine 2) to be interconnected.
Two Bleed Monitoring Computers (BMC1 and BMC2), the overhead control panel, and the ECAM control and monitor the operation of the pneumatic system.
A leak detection system detects any overheating in the vicinity of hot air ducts.

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GENERAL

Ident.: DSC-36-10-20-00001469.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has two similar engine bleed air systems.

Each system is designed to :
- select the compressor stage to use as a source of air
- regulate the bleed air temperature
- regulate the bleed air pressure.

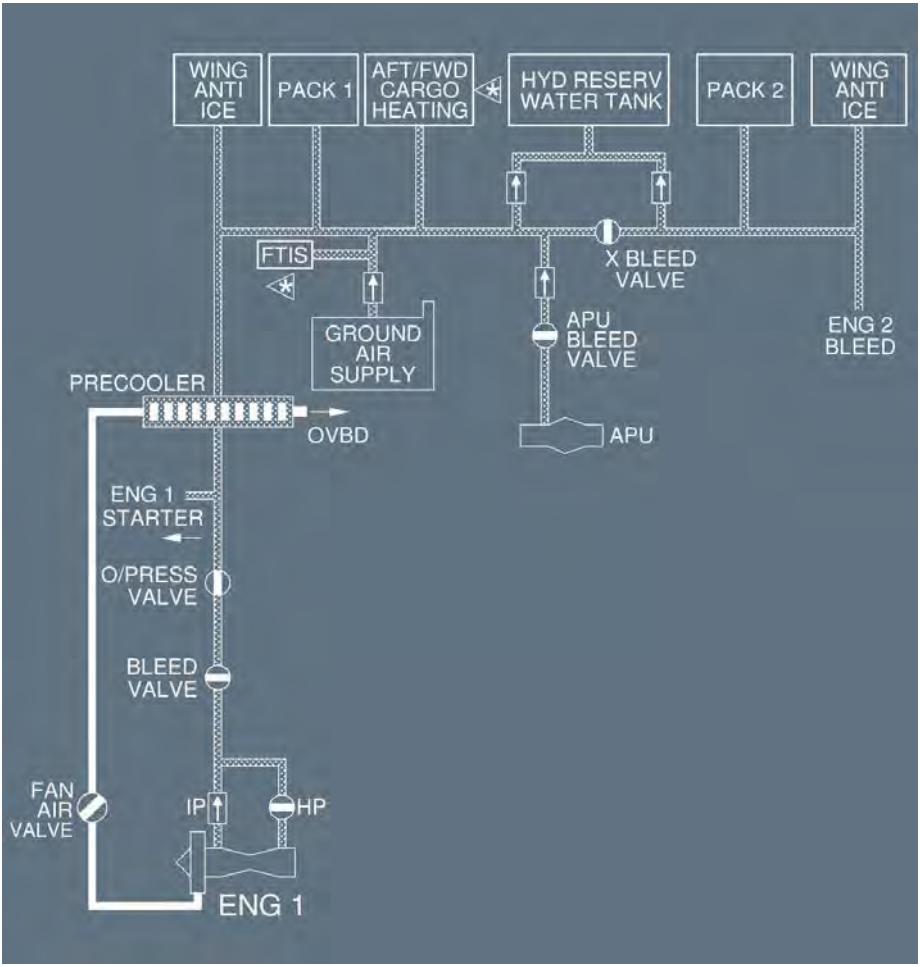
A Bleed Monitoring Computer (BMC) controls and monitors each system.
Each BMC receives information about bleed pressure and temperature and valve position.

Each is connected with :
- other systems using air or information from the bleed system
- the other BMC.

Each supplies indications and warnings to the ECAM and CFDS.
If one BMC fails, the other one takes over most of the monitoring functions.
Each bleed valve is pneumatically operated and controlled electrically by its associated BMC.

ARCHITECTURE

Ident.: DSC-36-10-20-00001470.0005001 / 15 MAR 17
Applicable to: ALL



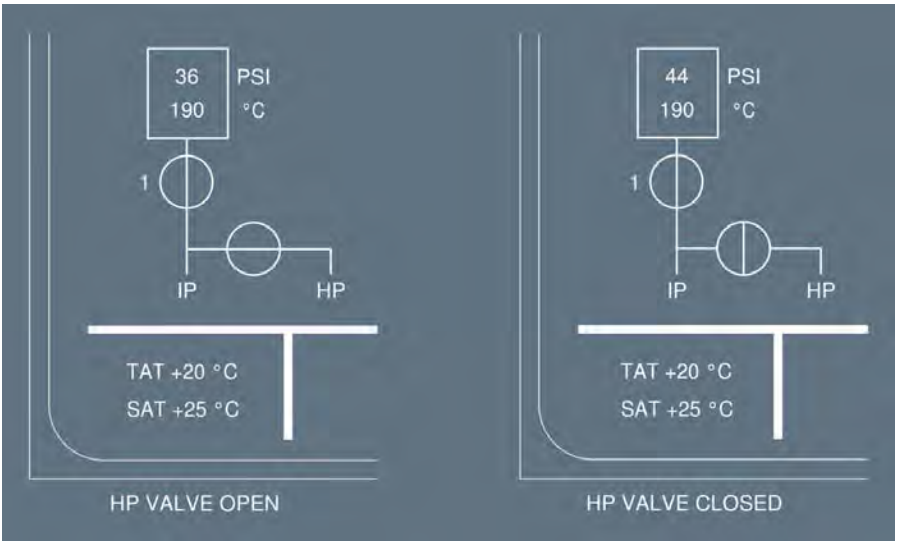
AIR BLEED SELECTION

Ident.: DSC-36-10-20-00001471.0003001 / 09 OCT 12
Applicable to: MSN 3408, 4100-4547

Air is normally bled from the intermediate pressure stage (IP) of engine's high-pressure (HP) compressor to minimize fuel penalty.
At low engine speed, when the pressure and temperature of the IP air are too low, the system bleeds air from the HP stage and maintains it at 36 ± 4 PSI.
An intermediate pressure check valve downstream of the IP port closes to prevent air from the HP stage from being circulated to the IP stage.

L3 The HP valve closes automatically
- • In case of low upstream pressure
  • in case of excessive upstream pressure
- electrically when the bleed valve is closed electrically.

ECAM INDICATION



AIR BLEED SELECTION

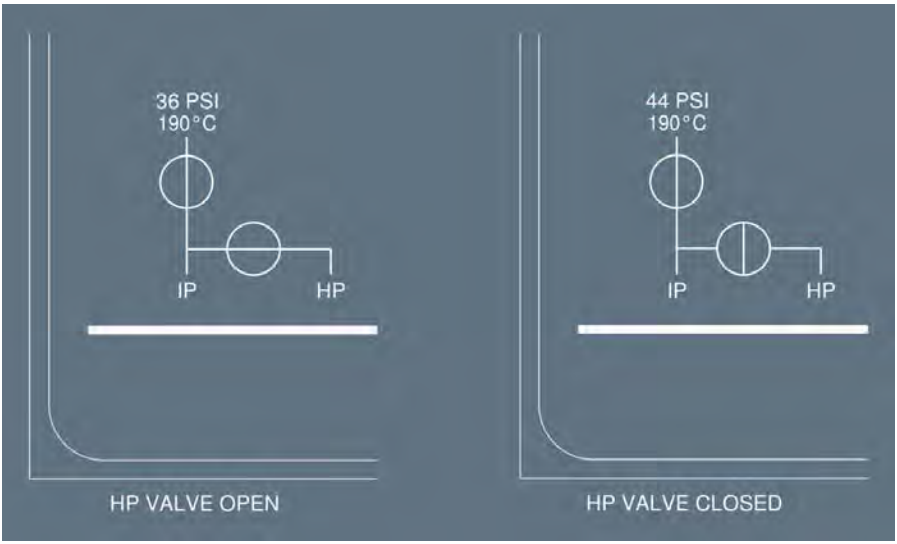
Ident.: DSC-36-10-20-00001471.0002001 / 09 OCT 12
Applicable to: MSN 1882-2078

Air is normally bled from the intermediate pressure stage (IP) of engine's high-pressure (HP) compressor to minimize fuel penalty.
At low engine speed, when the pressure and temperature of the IP air are too low, the system bleeds air from the HP stage and maintains it at 36 ± 4 PSI.
An intermediate pressure check valve downstream of the IP port closes to prevent air from the HP stage from being circulated to the IP stage.

L3 The HP valve closes automatically:

- Pneumatically:
  - In case of low upstream pressure
  - in case of excessive upstream pressure
- Electrically:
  - When the bleed valve is closed electrically
  - In case of overpressure upstream of the HP valve with wing anti-ice off, two packs on and aircraft altitude above 15 000 ft.

ECAM INDICATION



AIR BLEED SELECTION

Ident.: DSC-36-10-20-00001471.0004001 / 09 OCT 12
Applicable to: MSN 3467-3518

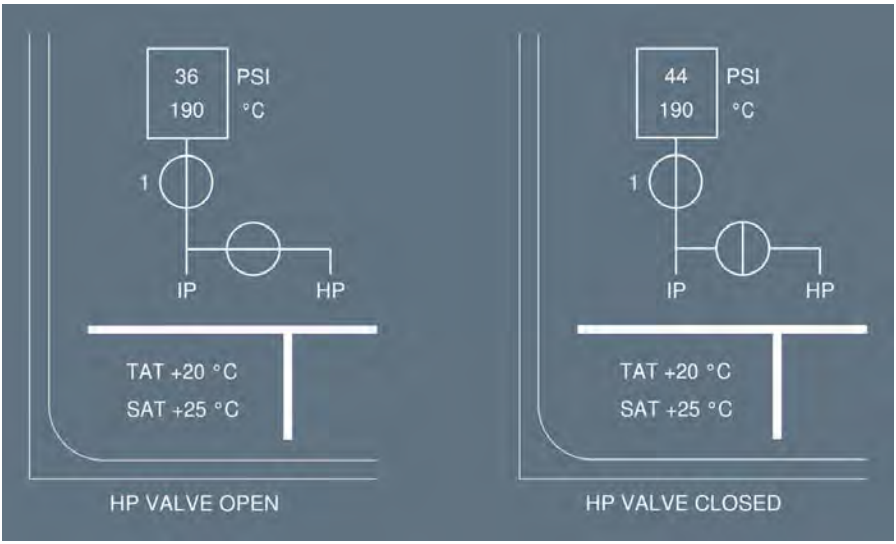
Air is normally bled from the intermediate pressure stage (IP) of engine's high-pressure (HP) compressor to minimize fuel penalty.
At low engine speed, when the pressure and temperature of the IP air are too low, the system bleeds air from the HP stage and maintains it at 36 ± 4 PSI.
An intermediate pressure check valve downstream of the IP port closes to prevent air from the HP stage from being circulated to the IP stage.

L3 The HP valve closes automatically

- In case of low upstream pressure
- in case of excessive upstream pressure

- electrically :
  - when the bleed valve is closed electrically
  - in case of overpressure upstream of the HP valve with wing anti-ice off, two packs on and aircraft altitude above 15 000 ft.

ECAM INDICATION



PRESSURE REGULATION AND LIMITATION

Ident.: DSC-36-10-20-00001472.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

The bleed valve, which is downstream of the junction of HP and IP ducting, acts as a shut-off and pressure regulating valve.
It maintains delivery pressure at 45 ± 5 PSI.

Note: *Bleed pressure may fluctuate between 38 and 56 PSI (with a maximum peak to peak pressure of 16 PSI) particularly at high engine power (takeoff or climb) up to FL 100.*

The bleed valve is fully closed:
- Pneumatically:
  - If upstream pressure goes below 8 PSI
  - If there is return flow
- Electrically by means of:
  - The BLEED pushbutton switch (switched OFF)
  - The ENG FIRE pushbutton (pushed)
  - The Bleed air Monitoring Computer (BMC) in the following cases:
    - Overtemperature
    - Overpressure
    - Leak
    - Open starter valve
    - APU bleed being ON.

If pressure regulation fails, the overpressure valve closes when the pressure goes over 85 PSI.

Note: If APU Bleed is ON and the crossbleed valve is SHUT, the Engine bleed valve 2, remains open.

PRESSURE REGULATION AND LIMITATION

Ident.: DSC-36-10-20-00001472.0004001 / 15 MAR 17
Applicable to: MSN 3408-4547

The bleed valve, which is downstream of the junction of HP and IP ducting, acts as a shut-off and pressure regulating valve.
It maintains delivery pressure at 45 ± 5 PSI.

Note: Bleed pressure may fluctuate between 38 and 56 PSI (with a maximum peak to peak pressure of 16 PSI) particularly at high engine power (takeoff or climb) up to FL 100.

The bleed valve is fully closed:
- Pneumatically:
  - If upstream pressure goes below 8 PSI
  - If there is return flow
- Electrically by means of:
  - The BLEED pushbutton switch (switched OFF)
  - The ENG FIRE pushbutton (pushed)
  - The Bleed air Monitoring Computer (BMC) in the following cases:
    - Overtemperature
    - Overpressure
    - Leak
    - Open starter valve
    - Engine shutdown
    - APU bleed being ON.

If pressure regulation fails, the overpressure valve closes when the pressure goes over 85 PSI.

Note: *If APU Bleed is ON and the crossbleed valve is SHUT, the Engine bleed valve 2, remains open.*

TEMPERATURE REGULATION AND LIMITATION

Ident.: DSC-36-10-20-00001473.0001001 / 21 MAR 16
Applicable to: ALL

A precooler downstream of the bleed valve regulates the temperature of the bleed air.
The precooler is an air-to-air heat exchanger that uses cooling air bleed from the engine fan to regulate the temperature to approximately 200 °C.
The fan air valve controls fan air flow.
A spring keeps the fan air valve closed in the absence of pressure.

GENERAL

Ident.: DSC-36-10-30-00001474.0001001 / 15 MAR 17
Applicable to: ALL

Air from the APU load compressor is available on ground and in flight.
The APU bleed valve operates as a shut-off valve to control APU bleed air.
The APU BLEED pb-sw, on the AIR COND panel, controls the APU bleed valve. When the flight crew selects ON with the pushbutton, APU bleed air supplies the pneumatic system, if the APU speed is above 95 %. This opens the crossbleed valve and closes the engine bleed automatically.
If the APU bleed valve is opened, it automatically closes in the case of APU leak, left wing leak, or engine 1 leak (except during engine start). *Refer to DSC-36-10-50 Leak Detection.*
A check valve near the crossbleed duct protects the APU, when bleed air comes from another source.

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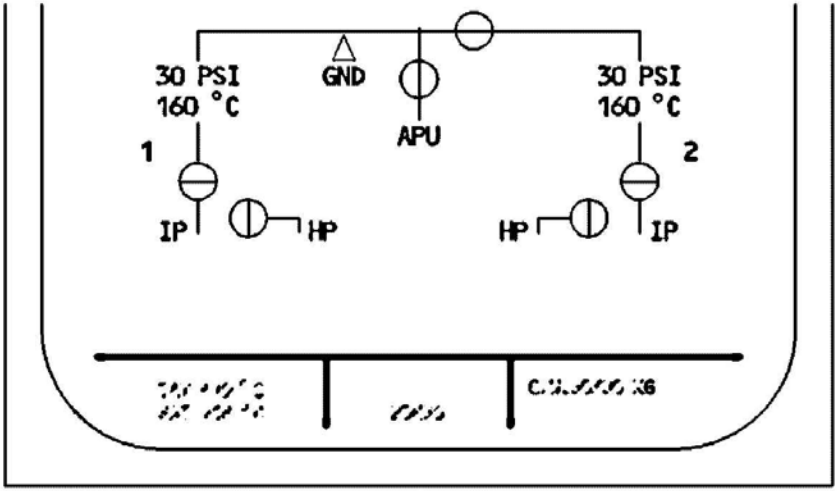
GENERAL

Ident.: DSC-36-10-40-00001476.0001001 / 21 MAR 16
Applicable to: ALL

A crossbleed valve on the crossbleed duct allows the air supply systems of the two engines to be isolated or interconnected.
On the AIR COND panel, a rotary selector controls the crossbleed valve electrically.
Two electric motors, one for automatic mode and one for manual mode, control the valve.
In automatic mode, the crossbleed valve opens when the system uses APU bleed air. It closes, if the system detects an air leak (except during engine start).

ECAM INDICATION

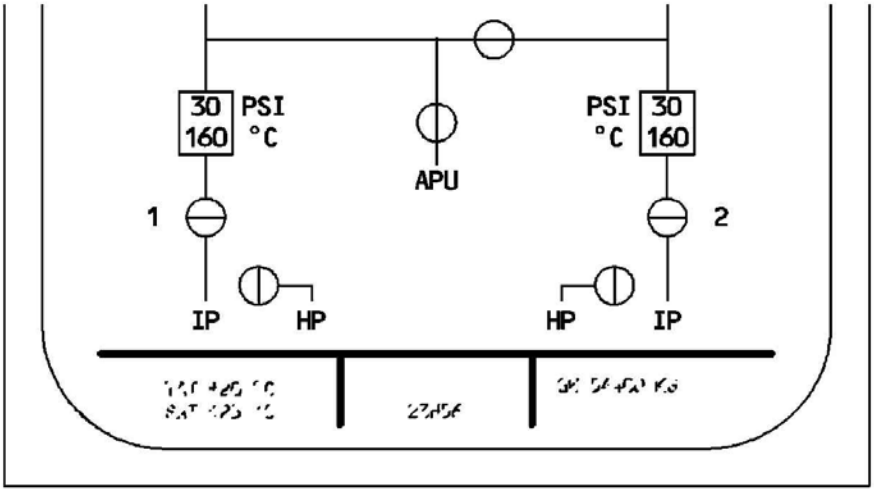
Ident.: DSC-36-10-40-00001478.0001001 / 17 MAR 11
Applicable to: MSN 1882-2078



X-BLEED VALVE OPEN-AIR SUPPLIED FROM APU

ECAM INDICATION

Ident.: DSC-36-10-40-00001478.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



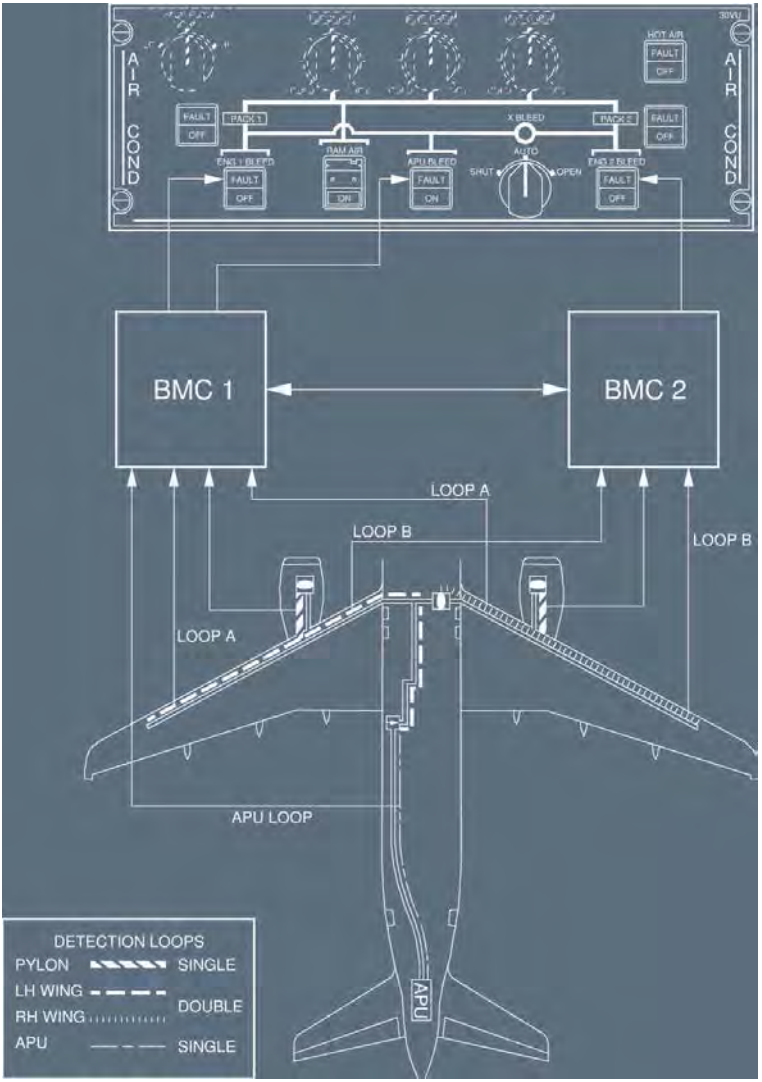
X-BLEED VALVE OPEN.AIR SUPPLIED FROM APU

LEAK DETECTION

Ident.: DSC-36-10-50-00001479.0001001 / 15 MAR 17
Applicable to: ALL

Leak detection loops detect any overheating near the hot air ducts in the fuselage, pylons, and wings.
For the pylon and APU, the sensing elements are tied to form a single loop and for the wing, a double loop.
When the two wing loops detect a leak, or when one loop detects the leak and the other one is inoperative, they activate a wing leak signal.
BMC1 and BMC2 each contain identical control logic for the system.

- A wing leak signal causes :
  - the bleed valve on the related side to close automatically
  - the associated FAULT light on the AIR COND panel to come on
  - the x-bleed valve to close automatically (except during an engine start)
  - the APU bleed valve to close automatically if the APU bleed valve is open and if the leak concerns the left wing (except during engine start).
- A pylon leak signal causes :
  - the bleed valve on the related side to close automatically
  - the FAULT light for the related engine on the AIR COND panel to come on
  - the x-bleed valve to close automatically (except during an engine start).
  - the APU bleed valve to close automatically if the APU bleed valve is open and if the leak concerns the pylon 1 (except during engine start).
- An APU leak signal causes :
  - the APU bleed valve to close automatically (except during engine start).
  - the FAULT light the APU BLEED pushbutton switch on the AIR COND panel to come on
  - the x-bleed valve to close automatically (except during an engine start).


AIR COND
FAULT
OFF
PACK 1
X BLEED
PACK 2
ENG 1 BLEED
RAM AIR
APU BLEED
ON
SHUT
AUTO
OPEN
ENG 2 BLEED
HOT AIR
BMC 1
BMC 2
LOOP A
LOOP B
APU LOOP
APU
DETECTION LOOPS
PYLON
SINGLE
LH WING
DOUBLE
RH WING
APU
SINGLE

BMC FAILURE

Ident.: DSC-36-10-60-00001480.0001001 / 21 MAR 16
Applicable to: ALL

If one BMC fails, the adjacent BMC takes over the monitoring of the bleed system to issue the following ECAM warnings if necessary :

- overpressure
- overtemperature
- wing leak.

Nevertheless, the associated FAULT light on the AIR COND panel is lost, and the associated bleed valve does not close automatically.
ENG BLEED LEAK warning is lost for the associated engine, as is also the APU BLEED LEAK warning if BMC1 has failed.

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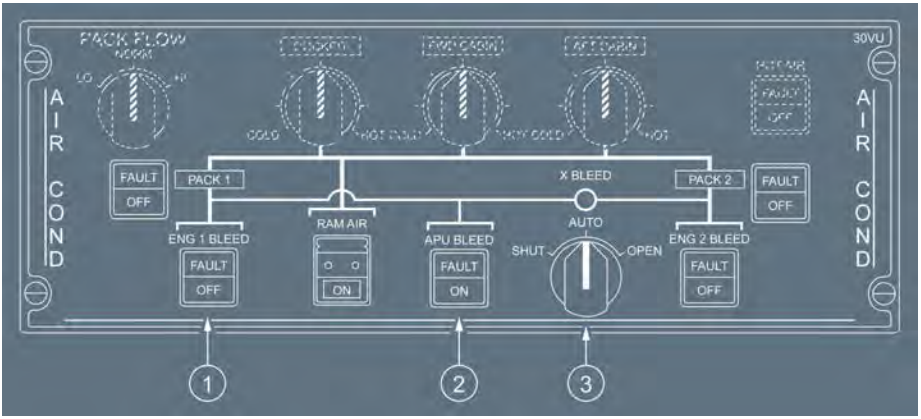
OVERHEAD PANEL

Ident.: DSC-36-20-00001481.0001001 / 20 DEC 16
Applicable to: ALL



(1) ENG 1 and ENG 2 BLEED pb sw

On : Bleed valve opens if :
- Upstream pressure is above 8 PSI.
- APU BLEED pushbutton switch is off or APU bleed valve is closed.
- There is no onside wing or pylon leak, and no overpressure or overtemperature has been detected.
- The ENG FIRE pushbutton has not been popped out.
- The engine start valve is closed.

FAULT lt : This amber light comes on, and an ECAM caution appears, if :
- There is an overpressure downstream of the bleed valve.
- There is a bleed air overheat.
- There is a wing or engine leak on the related side.
- The bleed valve is not closed during engine start.
- The bleed valve is not closed with APU bleed ON.

It goes out when the ENG BLEED pushbutton switch is OFF if the fault has disappeared.

OFF : The bleed valve and HP valve close. The white OFF light comes on.

(2) APU BLEED pb sw

ON : The APU valve opens if N > 95 % and there is no leak in the APU or in the left side bleed. (If there is a leak on the right side, the x-bleed valve closes.) The blue ON light comes on.

Off : The APU valve closes.

FAULT light : This amber light comes on, and an ECAM caution appears, when the system detects an APU leak.

(3) X-BLEED selector sw

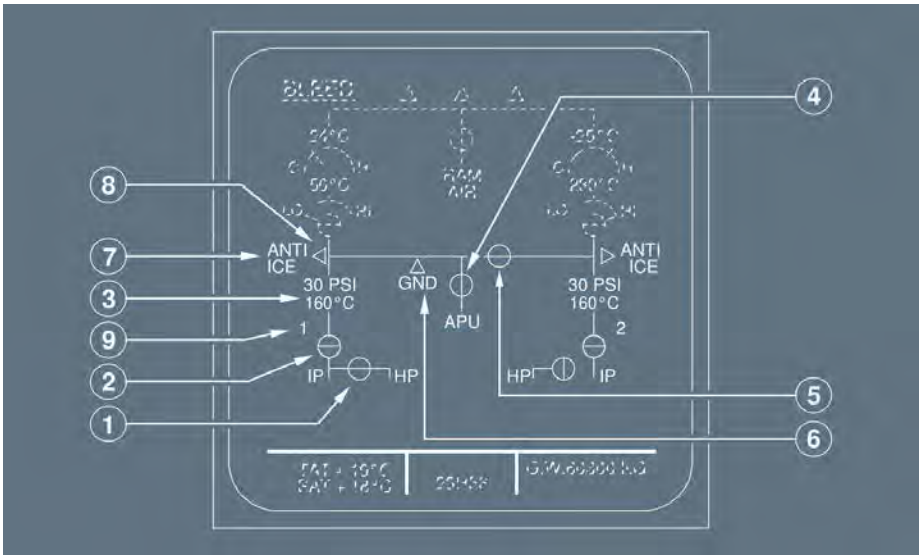
AUTO : The crossbleed valve is open if the APU bleed valve is open. The crossbleed valve is closed if the APU bleed valve is closed or, in case of a wing, pylon, or APU leak (except during engine start).

OPEN : The crossbleed valve is open.

SHUT : The crossbleed valve is closed.

ECAM BLEED PAGE

Ident.: DSC-36-20-00001482.0003001 / 09 OCT 12
Applicable to: MSN 1882-2078



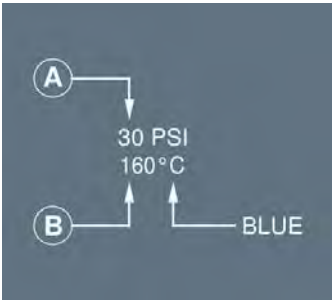
(1) HP VALVES

Crossline - Green	:	HP valve normally fully closed
In line - Green	:	HP valve not fully closed
Crossline - Amber	:	HP valve not in commanded (closed) position

(2) ENGINE BLEED VALVES

In line - Green	:	BLEED valve normally open
Crossline - Green	:	BLEED valve normally fully closed
In line - Amber	:	BLEED valve not in commanded (open) position
Crossline - Amber	:	BLEED valve not in commanded (closed) position

(3) ENGINE BLEED INDICATIONS



(A) Precooler inlet pressure
It is normally in green.
It becomes amber, if under 4 PSI, or if overpressure is detected by the BMC (threshold between 57 and 60 PSI).

(B) Precooler outlet temperature
It is normally in green.
It becomes amber, if the BMC detects an overheat or low temperature.

Overheat: Temperature exceeds:
- 290 °C for more than 5 s, or
- 270 °C for more than 15 s, or
- 257 °C for more than 55 s

Low temperature is detected, if the temperature is lower than 150 °C.

Note: When the engines are at idle, and depending on the ambient temperature, the precooler outlet temperature may be below 150 °C (displayed amber).

(4) APU BLEED VALVE

Crossline - Green	:	The APU valve is not fully open, and the APU master switch is ON.
In line - Green	:	The APU valve is fully open, and the APU master switch is ON.
Crossline - Amber	:	The APU valve is fully closed, the APU master switch is ON, and the APU bleed switch is ON for more than 10 s.

(5) CROSSBLEED VALVE

Crossline - Green	:	The crossbleed valve is normally closed.
In line - Green	:	The crossbleed valve is normally open.
Crossline - Amber	:	The crossbleed valve is not in the commanded (closed) position.
In line - Amber	:	The crossbleed valve is not in the commanded (open) position.
Transit - Amber	:	The crossbleed valve is in transit.

(6) GND HP ground connection indication

: On ground, it is displayed in green.

(7) ANTI ICE indication

It is displayed in white, when the WING pushbutton on the ANTI-ICE panel is ON.

(8) Arrow

: - It is normally not displayed, when the corresponding valve is closed.
- It is normally displayed in green, when the corresponding valve is open.
- It becomes amber, when the
  - Valve is open and air pressure is low or high, or
  - Valve is open on ground for more than 10 s.

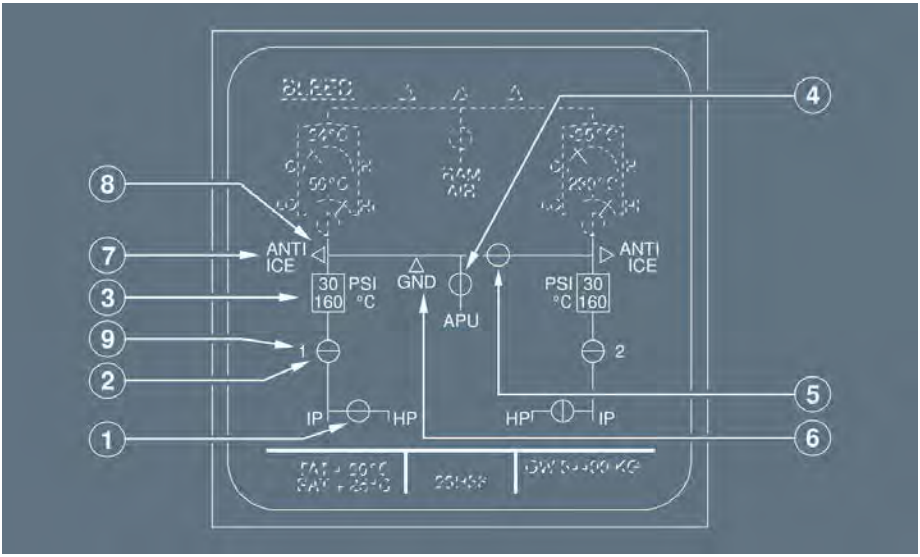
(9) Engine identification (1-2)

It is normally in white.

It becomes amber, when engine N2 is below idle.

ECAM BLEED PAGE

Ident.: DSC-36-20-00001482.0002001 / 09 OCT 12
Applicable to: MSN 3408, 3518-4547



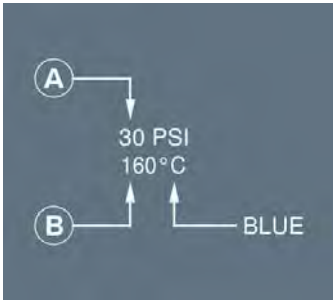
(1) HP VALVES

Crossline - Green	:	HP valve normally fully closed
In line - Green	:	HP valve not fully closed
Crossline - Amber	:	HP valve not in commanded (closed) position

(2) ENGINE BLEED VALVES

In line - Green	:	BLEED valve normally open
Crossline - Green	:	BLEED valve normally fully closed
In line - Amber	:	BLEED valve not in commanded (open) position
Crossline - Amber	:	BLEED valve not in commanded (closed) position

(3) ENGINE BLEED INDICATIONS



(A) Precooler inlet pressure
It is normally in green.
It becomes amber, if under 4 PSI, or if overpressure is detected by the BMC (threshold between 57 and 60 PSI).

(B) Precooler outlet temperature
It is normally in green.
It becomes amber, if the BMC detects an overheat or low temperature.

Overheat: Temperature exceeds:
- 290 °C for more than 5 s, or
- 270 °C for more than 15 s, or
- 257 °C for more than 55 s

Low temperature is detected, if the temperature is lower than 150 °C.

Note: When the engines are at idle, and depending on the ambient temperature, the precooler outlet temperature may be below 150 °C (displayed amber).

(4) APU BLEED VALVE

Crossline - Green	:	The APU valve is not fully open, and the APU master switch is ON.
In line - Green	:	The APU valve is fully open, and the APU master switch is ON.
Crossline - Amber	:	The APU valve is fully closed, the APU master switch is ON, and the APU bleed switch is ON for more than 10 s.

(5) CROSSBLEED VALVE

Crossline - Green	:	The crossbleed valve is normally closed.
In line - Green	:	The crossbleed valve is normally open.
Crossline - Amber	:	The crossbleed valve is not in the commanded (closed) position.

In line - Amber : The crossbleed valve is not in the commanded (open) position.

Transit - Amber : The crossbleed valve is in transit.

(6) GND HP ground connection indication

: Displayed in white when the aircraft is on ground.

(7) ANTI ICE indication

It is displayed in white, when the WING pushbutton on the ANTI-ICE panel is ON.

(8) Arrow

: - It is normally not displayed, when the corresponding valve is closed.
- It is normally displayed in green, when the corresponding valve is open.
- It becomes amber, when the
  - Valve is open and air pressure is low or high, or
  - Valve is open on ground for more than 10 s.

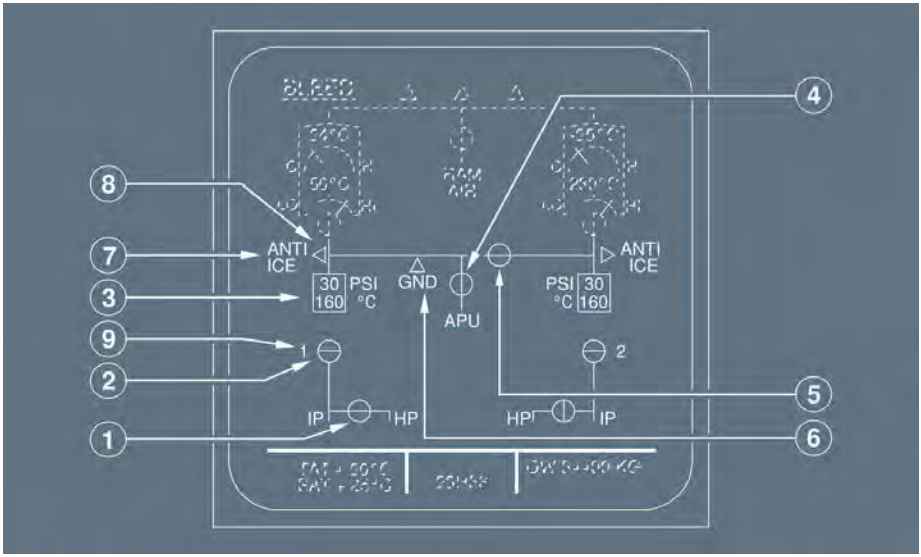
(9) Engine identification (1-2)

It is normally in white.

It becomes amber, when engine N2 is below idle.

ECAM BLEED PAGE

Ident.: DSC-36-20-00001482.0004001 / 03 APR 13
Applicable to: MSN 3467



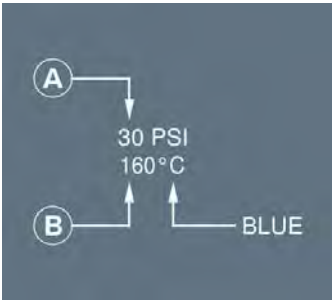
(1) HP VALVES

Crossline - Green	:	HP valve normally fully closed
In line - Green	:	HP valve not fully closed
Crossline - Amber	:	HP valve not in commanded (closed) position

(2) ENGINE BLEED VALVES

In line - Green	:	BLEED valve normally open
Crossline - Green	:	BLEED valve normally fully closed
In line - Amber	:	BLEED valve not in commanded (open) position
Crossline - Amber	:	BLEED valve not in commanded (closed) position

(3) ENGINE BLEED INDICATIONS



(A) Precooler inlet pressure
It is normally in green.
It becomes amber, if under 4 PSI, or if overpressure is detected by the BMC (threshold between 57 and 60 PSI).

(B) Precooler outlet temperature
It is normally in green.
It becomes amber, if the BMC detects an overheat or low temperature.

Overheat: Temperature exceeds:
- 290 °C for more than 5 s, or
- 270 °C for more than 15 s, or
- 257 °C for more than 55 s

Low temperature is detected, if the temperature is lower than 150 °C.

Note: When the engines are at idle, and depending on the ambient temperature, the precooler outlet temperature may be below 150 °C (displayed amber).

(4) APU BLEED VALVE

Crossline - Green	:	The APU valve is not fully open, and the APU master switch is ON.
In line - Green	:	The APU valve is fully open, and the APU master switch is ON.
Crossline - Amber	:	The APU valve is fully closed, the APU master switch is ON, and the APU bleed switch is ON for more than 10 s.

(5) CROSSBLEED VALVE

Crossline - Green	:	The crossbleed valve is normally closed.
In line - Green	:	The crossbleed valve is normally open.
Crossline - Amber	:	The crossbleed valve is not in the commanded (closed) position.

In line - Amber : The crossbleed valve is not in the commanded (open) position.

Transit - Amber : The crossbleed valve is in transit.

(6) GND HP ground connection indication

: Displayed in white when the aircraft is on ground.

(7) ANTI ICE indication

It is displayed in white, when the WING pushbutton on the ANTI-ICE panel is ON.

(8) Arrow

: - It is normally not displayed, when the corresponding valve is closed.
- It is normally displayed in green, when the corresponding valve is open.
- It becomes amber, when the
  - Valve is open and air pressure is low or high, or
  - Valve is open on ground for more than 10 s.

(9) Engine identification (1-2)

It is normally in white.

It becomes amber, when engine N2 is below idle.

MEMO DISPLAY

Ident.: DSC-36-20-00016746.0001001 / 21 MAR 16
Applicable to: ALL

APU BLEED : This memo appears in green, if the APU is available and the APU BLEED pb-sw is ON.

AIRCRAFT SYSTEMS

WATER / WASTE

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DSC-38-10 Description

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GENERAL

Ident.: DSC-38-10-00017274.0001001 / 21 MAR 16
Applicable to: ALL

The water and waste systems :
- Distribute potable water to the toilets and the galleys
- Dispose waste water
- Store toilet wastes.

The systems are insulated to prevent water leaks and ice build up.
Controls of the water and waste systems are located on the Forward Attendant Panel (FAP).

POTABLE WATER

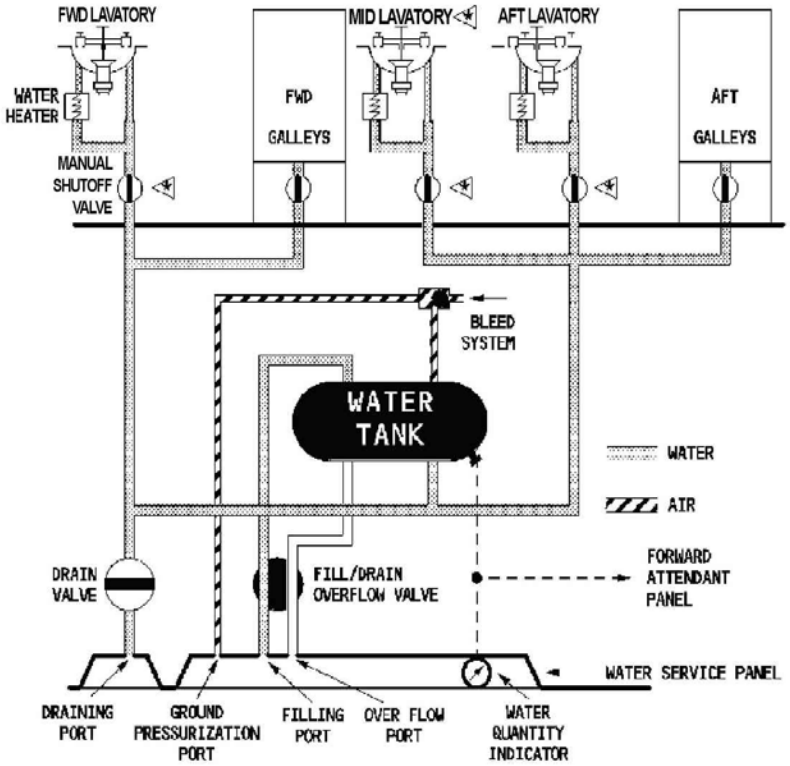
Ident.: DSC-38-10-A-00017286.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078, 3467-3518

Potable water is stored in a 200 l water tank (or 135 l water tank ◁) located in the AFT cargo compartment, in the wall on the left side.
On ground, the water system is pressurized by the air from the service panel pressure port. In flight, the water system is pressurized by the bleed air.
Potable water is piped to the galleys and lavatories. Manual shutoff valves ◁ isolate wet galleys, the FWD lavatory, the MID lavatory ◁ and the AFT lavatory from the water system. Manual shutoff valves are located under the washbasins or toilet bowls. The position of each valve is indicated by OPEN and SHUT legend.
The system can be filled or drained from the service panel at the bottom of the fuselage. The indication of the water quantity in the water tank is displayed on the FAP and the aft service panel.

Ident.: DSC-38-10-A-00017286.0002001 / 21 MAR 16
Applicable to: MSN 3408, 4100-4547

Potable water is stored in a 200 l water tank located in front of the wing box, behind the FWD cargo compartment.
On ground, the water system is pressurized by the air from the service panel pressure port. In flight, the water system is pressurized by the bleed air.
Potable water is piped to the galleys and lavatories. Manual shutoff valves ◁ isolate wet galleys, the FWD lavatory, the MID lavatory ◁ and the AFT lavatory from the water system. Manual shutoff valves are located under the washbasins or toilet bowls. The position of each valve is indicated by OPEN and SHUT legend.
The system can be filled or drained from the service panel under the fuselage. The indication of the water quantity in the water tank is displayed on the FAP and the aft service panel.

Ident.: DSC-38-10-A-00017435.0001001 / 21 MAR 16
Applicable to: ALL

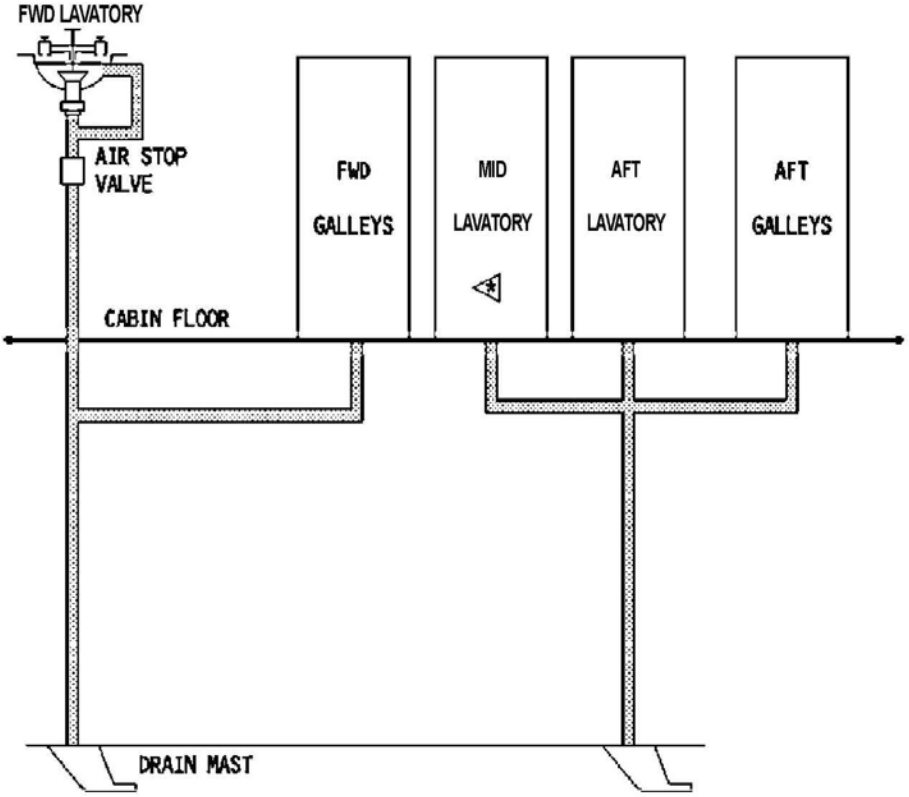


WASTEWATER SYSTEM

Ident.: DSC-38-10-00017287.0001001 / 21 MAR 16
Applicable to: ALL

The waste/water (from galleys and lavatories) drains overboard through two heated drain masts. The forward mast drains the waste/water from the forward cabin. The aft mast drains the waste/water from the aft cabin.

The waste and water are discharged by:
- Gravity, on ground
- Differential pressure, in flight.



TOILET SYSTEM

Ident.: DSC-38-10-00017288.0002001 / 21 MAR 16
Applicable to: ALL

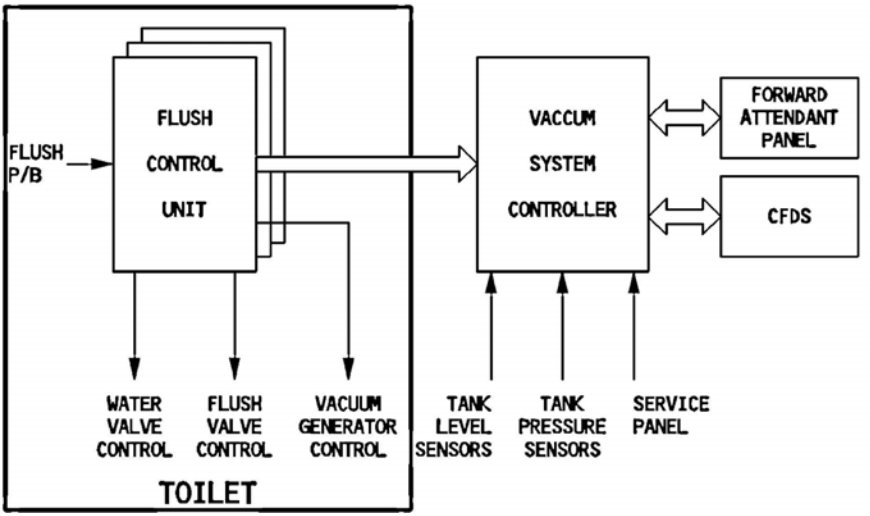
Differential pressure forces the waste from the toilet bowls into the waste tank. The waste tank has a usable capacity of 170 l. On ground, and in flight below 16 000 ft , the differential pressure is generated by the vacuum generator.
Clean water from the potable water system flushes toilets.

A flush control unit controls the flush sequence in each toilet.
The Vacuum System Controller (VSC) ensures system control, monitoring and fault reporting.

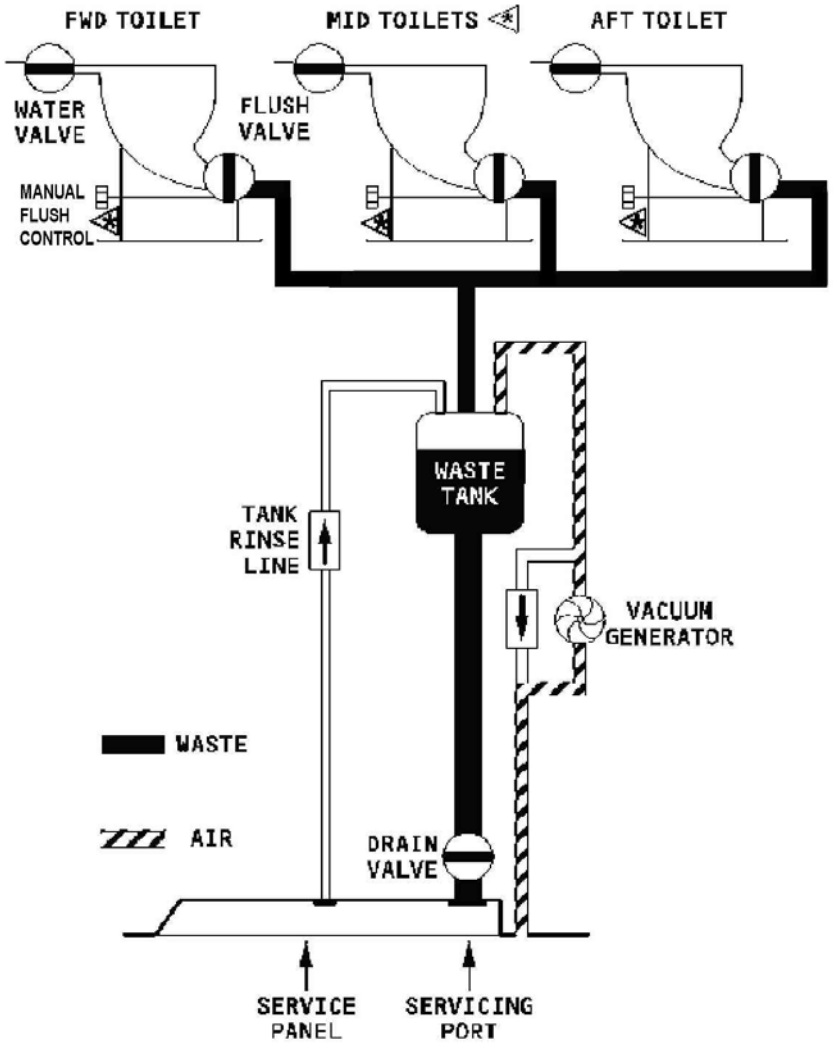
The VSC transmits information to:
- Flight attendant panel to indicate the waste tank levels and report system defects
- Centralized Fault Display System (CFDS) to signal the system defects to the maintenance.

Ground personnel services the waste tank via a service panel, located under the fuselage.
A manual shutoff valve isolates an inoperative toilet. In the case of an electrical failure of flush valve, the manual flush control ⋘ can be used. The manual flush control is located under each toilet bowl.

ARCHITECTURE



SCHEMATIC


FWD TOILET
MID TOILETS
AFT TOILET
WATER VALVE
FLUSH VALVE
MANUAL FLUSH CONTROL
WASTE TANK
TANK RINSE LINE
VACUUM GENERATOR
WASTE
AIR
DRAIN VALVE
SERVICE PANEL
SERVICING PORT

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AIRCRAFT SYSTEMS

MAINTENANCE SYSTEM

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DSC-45-10 Description

DSC-45-20 System Operation

DSC-45-25 Data Loading

DSC-45-30 Printer

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GENERAL

Ident.: DSC-45-10-00001490.0001001 / 21 MAR 16
Applicable to: ALL

The purpose of the Centralized Fault Display System (CFDS) is to make the maintenance task easier by displaying fault messages in the cockpit and permitting the flight crew to make some specific tests.

There are two levels of maintenance :

at the line stop : removal and replacement of equipment
at the main base : troubleshooting

COMPONENTS

Ident.: DSC-45-10-00001491.0001001 / 21 MAR 16
Applicable to: ALL

The CFDS includes :

- the BITE (Built-In Test Equipment) for each electronic system
- a central computer, the Centralized Fault Display Interface Unit (CFDIU)
- two MCDUs (Multipurpose Control and Display Units), used also for FMGS (Flight Management and Guidance System), AIDS (Aircraft Integrated Data System), and ACARS (Aircraft Communication And Reporting System, if installed), which work with the CFDIU to display information or initiate tests
- one printer.

If a main channel of the CFDIU fails, the backup channel takes over.

MODES OF OPERATION

Ident.: DSC-45-10-00001492.0001001 / 22 MAR 16
Applicable to: ALL

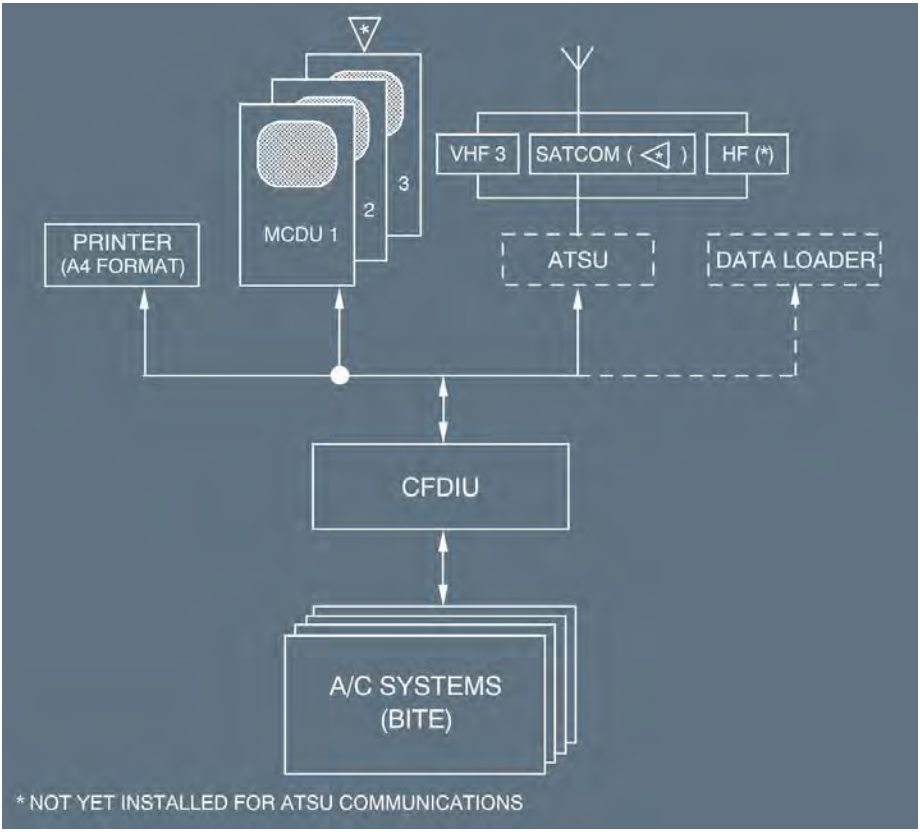
The CFDS operates in two main modes :

- the NORMAL mode or REPORTING mode (in flight)
- the INTERACTIVE mode or MENU mode (on ground).

In NORMAL mode, the CFDS records and displays the failure messages transmitted by each system BITE.
In INTERACTIVE mode, the CFDS allows any BITE to be connected with the MCDU in order to display the maintenance data stored and formatted by the BITE or to initiate a test.

ARCHITECTURE

Ident.: DSC-45-10-00001493.0002001 / 19 DEC 12
Applicable to: ALL



FAILURE/FAULT CLASSIFICATION

Ident.: DSC-45-10-00017082.0001001 / 21 MAR 16
Applicable to: ALL

The Centralized Fault Display System (CFDS) identifies the faulty system and puts any failures or faults into one of three classes :

Class 1 : Failures indicated to the flight crew by means of the ECAM, or other flight deck effect. They must be repaired or entered in the MEL (Minimum Equipment List) before the aircraft can depart.

Class 2 : Faults indicated to maintenance personnel by the CFDS and which trigger a MAINT status entry on the maintenance part of the ECAM status page. The aircraft can operate with these faults, but they must be rectified within the timescale defined in the Trouble Shooting Manual (TSM).

Class 3 : Faults indicated to maintenance personnel by the CFDS, but which do not trigger a MAINT status. The operator may have these faults corrected at his convenience.

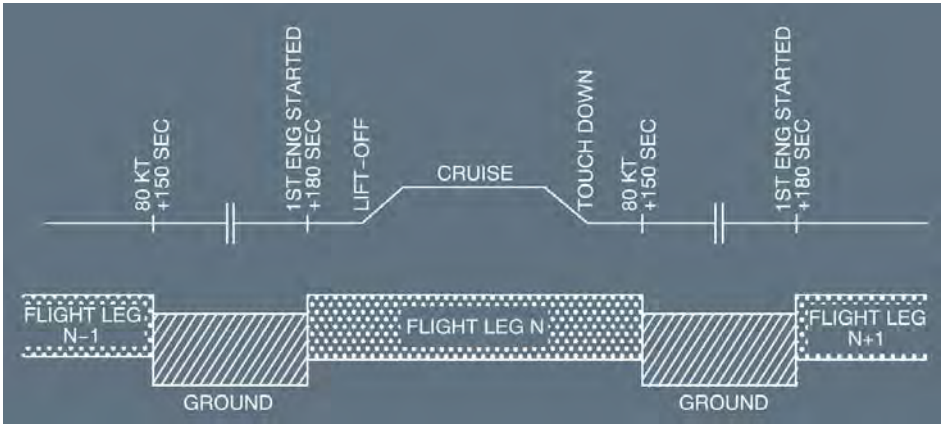
Failure/fault classes	Class 1	Class 2	Class 3
Operational consequences	YES	NO	NO
Indication to the flight crew	YES Automatically displayed - Warning or caution messages on Engine Warning Display - Flag or indication in the flight deck.	YES Available on ECAM status page.	NO
Dispatch consequences	Refer to MEL may be : "GO" "GO IF" "NO GO"	*Refer to MMEL/MI-00-08 ECAM and MAINTENANCE STATUS*	MEL not applicable
Indication to the maintenance team	YES Automatically print out at the end of each flight : Fault messages on the CFDS Post Flight Report.		YES Available on request through system report/Test

FUNCTIONS OF THE CENTRALIZED FAULT DISPLAY SYSTEM (CFDS)

Ident.: DSC-45-10-00001495.0002001 / 21 MAR 16
Applicable to: ALL

The main functions of the CFDS are :

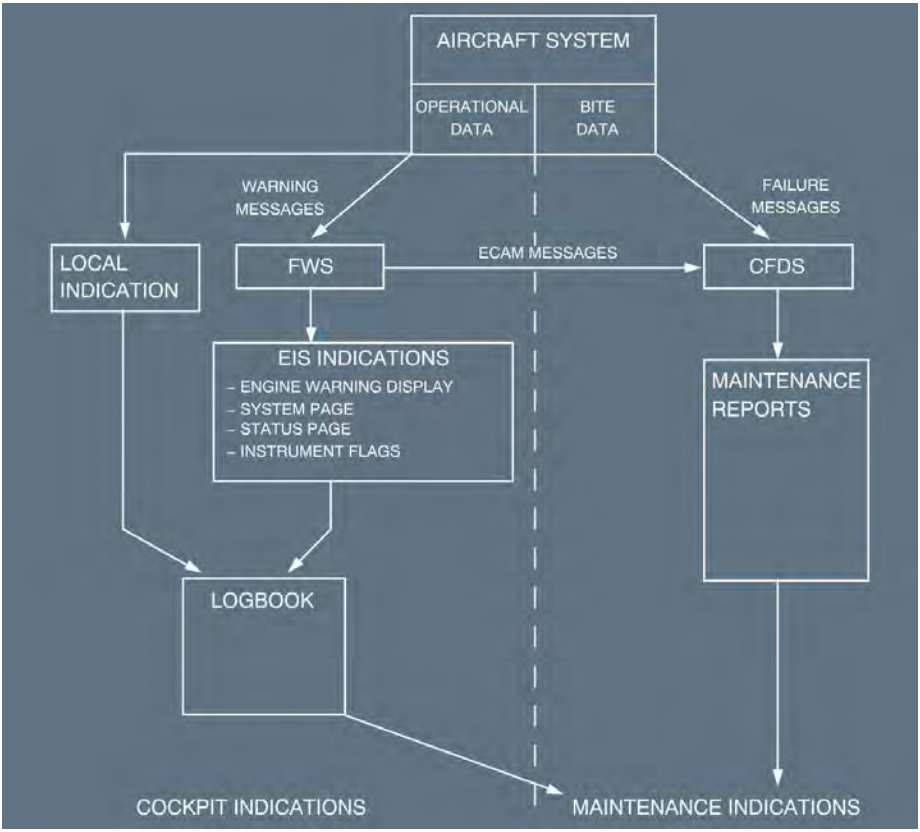
- obtaining and storing messages transmitted by the connected system BITEs, or by the Flight Warning Computer (Warning and Caution titles)
- Detailing the maintenance phases.



- Presenting maintenance reports :
  - Last leg report
  - Last leg ECAM report
  - Previous leg report
  - Avionics status
  - System report test
  - Post-flight report.

COCKPIT/CFDS INTERFACE

Ident.: DSC-45-10-00001496.0001001 / 22 MAR 16
Applicable to: ALL



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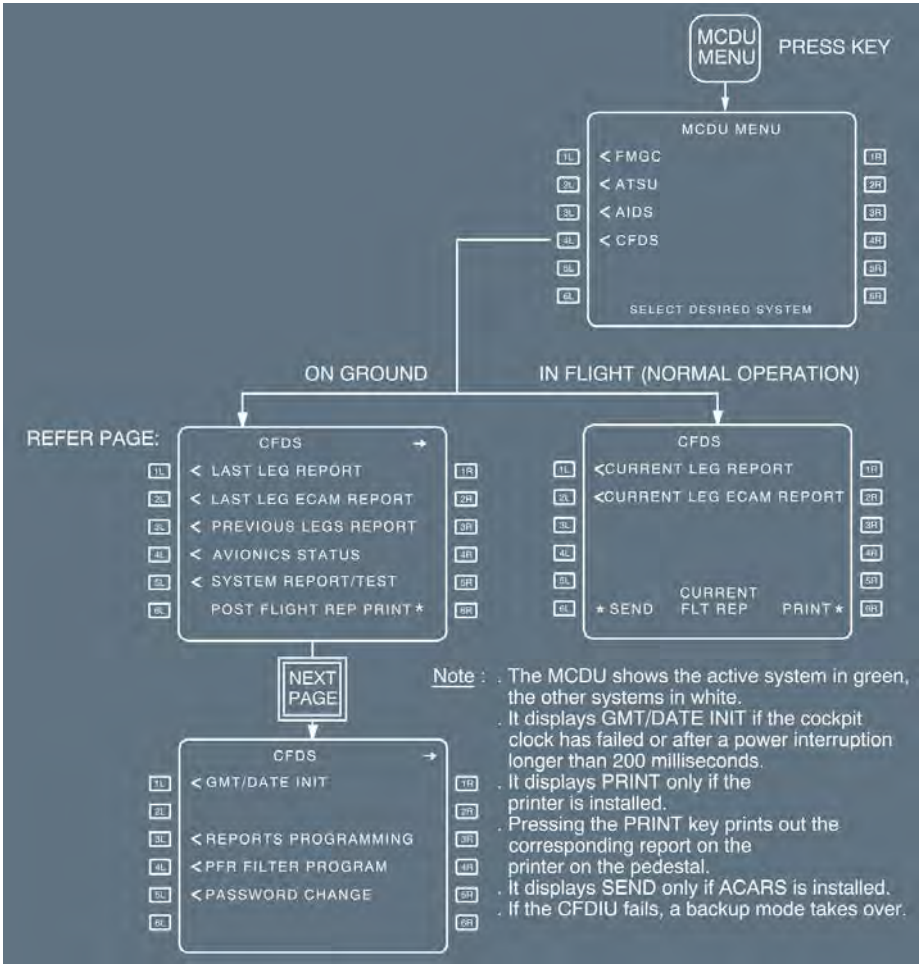
MAINTENANCE MENU

Ident.: DSC-45-20-00001497.0002001 / 14 MAY 12
Applicable to: ALL

The CFDS uses menus displayed on the MCDU. The operator selects functions or reports from these menus.

Pressing the MCDU MENU key and then selecting CFDS brings up the MAINTENANCE MENU page (different pages for the aircraft in flight and the aircraft on the ground).

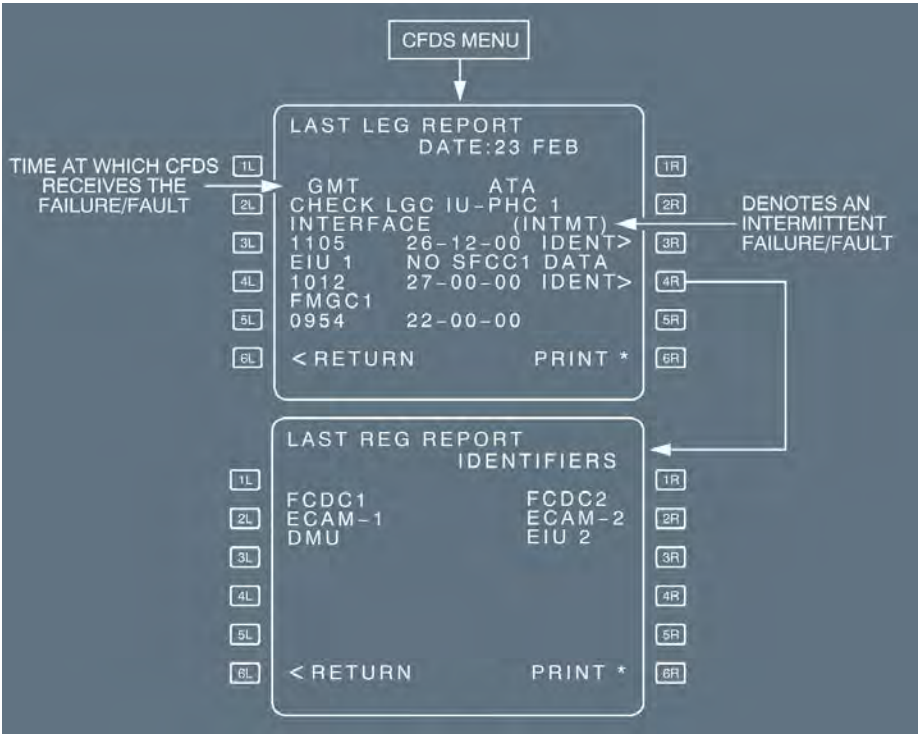


LAST (OR CURRENT) LEG REPORT

Ident.: DSC-45-20-00001498.0001001 / 21 MAR 16
Applicable to: ALL

The LAST LEG REPORT (on the ground) or the CURRENT LEG REPORT (in flight), list all class 1 failures and class 2 faults and all system failure and system fault messages received by the CFDS during the last flight leg or the current flight leg. Pressing the IDENT key displays a list of the systems

(called identifiers) affected by the failure or fault, which helps the pilot or maintenance person to identify the failure or fault.



LAST (OR CURRENT) LEG ECAM REPORT

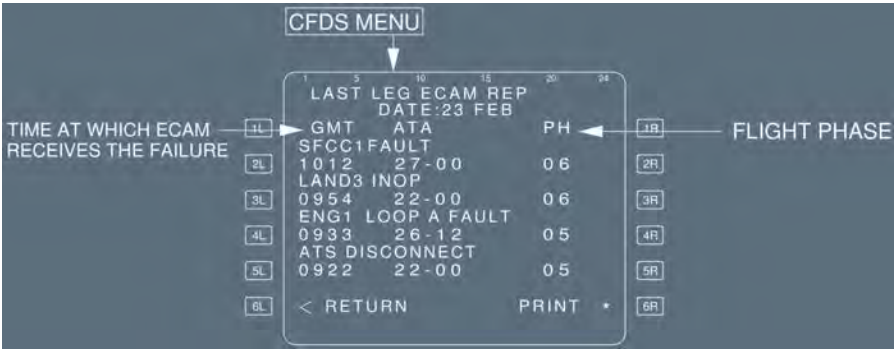
Applicable to: ALL

Ident.: DSC-45-20-A-00001499.0001001 / 21 MAR 16

GENERAL

In flight : The CURRENT LEG ECAM REPORT displays the primary and independent warning (class I) messages and MAINTENANCE STATUS (class II) messages of the current flight leg.

On the ground : The LAST LEG ECAM REPORT displays the primary and independent warning (class I) messages plus MAINTENANCE STATUS (class II) messages of the last flight leg.

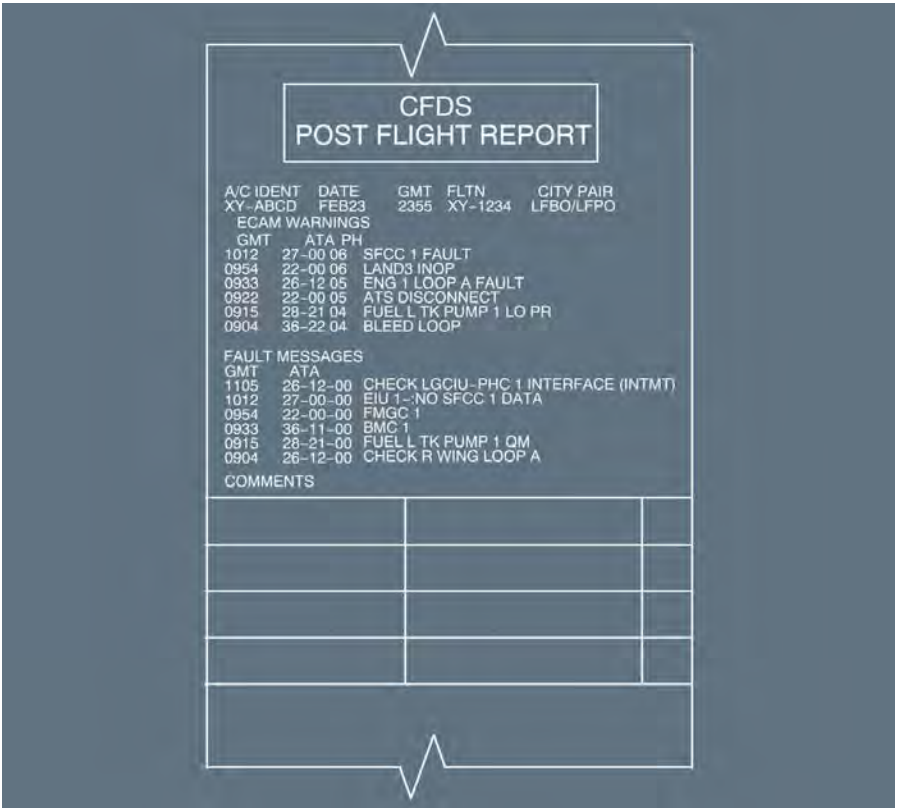


Note: *This screen displays PRINT only if the printer is installed.*

Ident.: DSC-45-20-A-00001500.0001001 / 14 MAY 12

POST FLIGHT REPORT PRINT

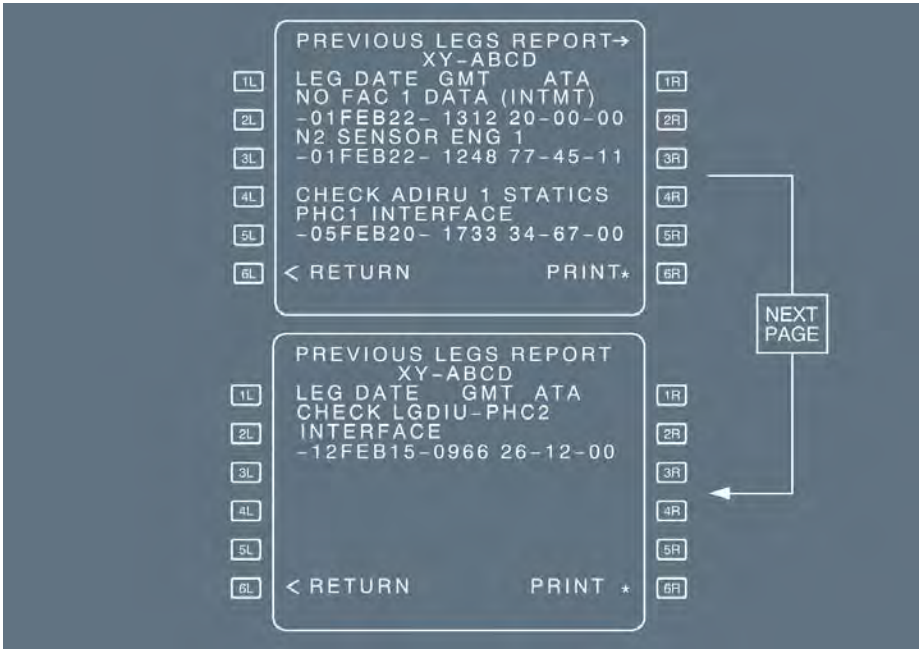
At the end of a flight, LAST LEG and LAST LEG ECAM REPORTS are printed out automatically after the last engine shutdown. The flight or ground crew can also print them out by selecting POST FLIGHT REP PRINT.
The report first lists the ECAM warnings, then the FAULT messages.



PREVIOUS LEG REPORT

Ident.: DSC-45-20-00001501.0001001 / 21 MAR 16
Applicable to: ALL

This report gives access to the POST FLIGHT REPORTS of the previous 63 flight legs.

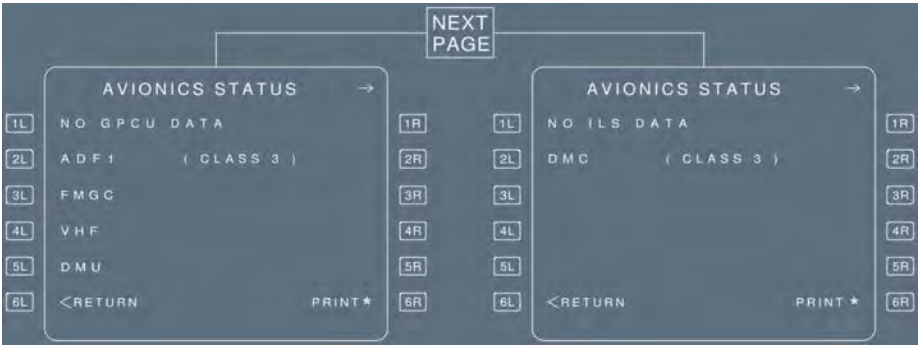


On ground, the Operator can print copies of the screen. If ACARS is installed, the Operator can send the flight report (*Refer to DSC-45-20 Last (or Current) Leg ECAM Report - Post Flight Report Print*).

AVIONICS STATUS

Ident.: DSC-45-20-00001502.0001001 / 21 MAR 16
Applicable to: ALL

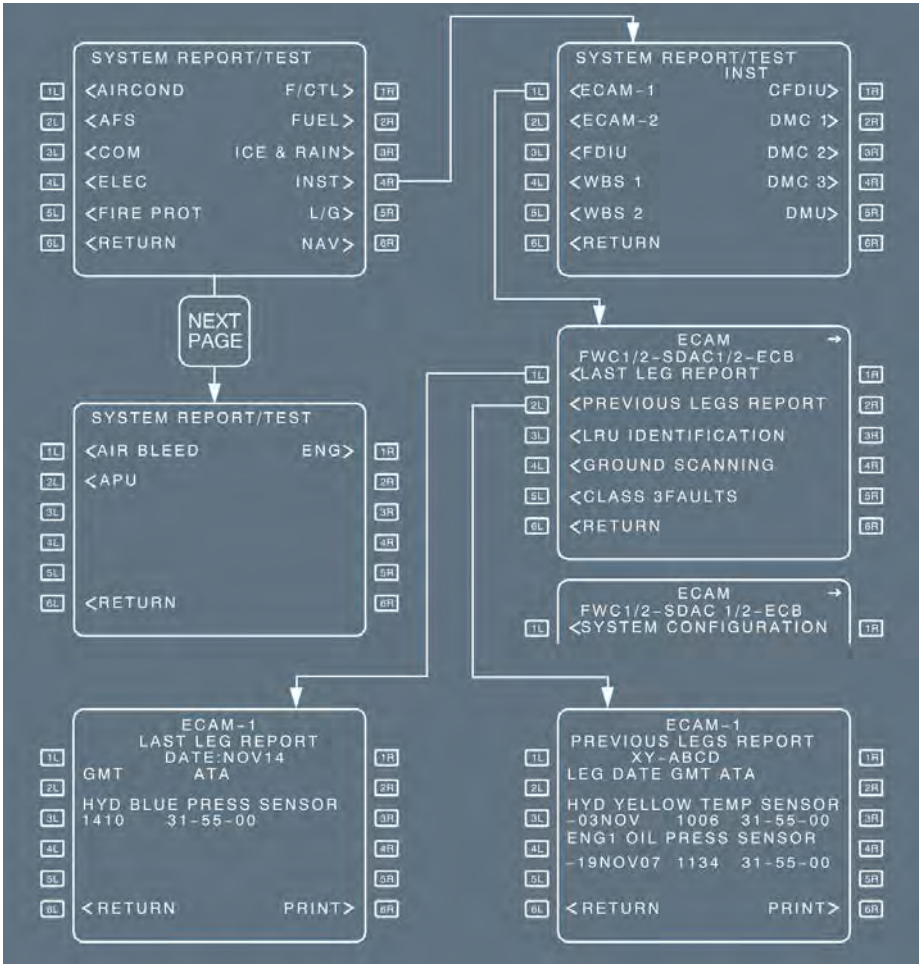
This screen displays the list of systems affected by a failure or fault. If a system is affected by at least a Class 3 fault, CLASS 3 appears beside it. The display is continuously updated.



SYSTEM REPORT/TEST

Ident.: DSC-45-20-00001503.0001001 / 21 MAR 16
Applicable to: ALL

This screen gives the operator access to all electronic systems. The CFDIU enters into interactive dialogue with the selected system.



In the above example, the operator has called up menus of the selected systems :

- LAST or PREVIOUS LEG REPORT presents the list of Line-Replaceable Units (LRUs) affected by a failure.
- LRU IDENTIFICATION contains the part numbers of all LRUs in the system.
- GND SCANNING runs the flight monitoring on the ground and indicates the faulty LRU.
- CLASS 3 FAULTS lists class 3 faults detected by the system during the last flight leg.
- SYSTEM CONFIGURATION presents the system configuration in a digital form.

Note: *These screens (except LAST or PREVIOUS LEG REPORT) are not shown above.*

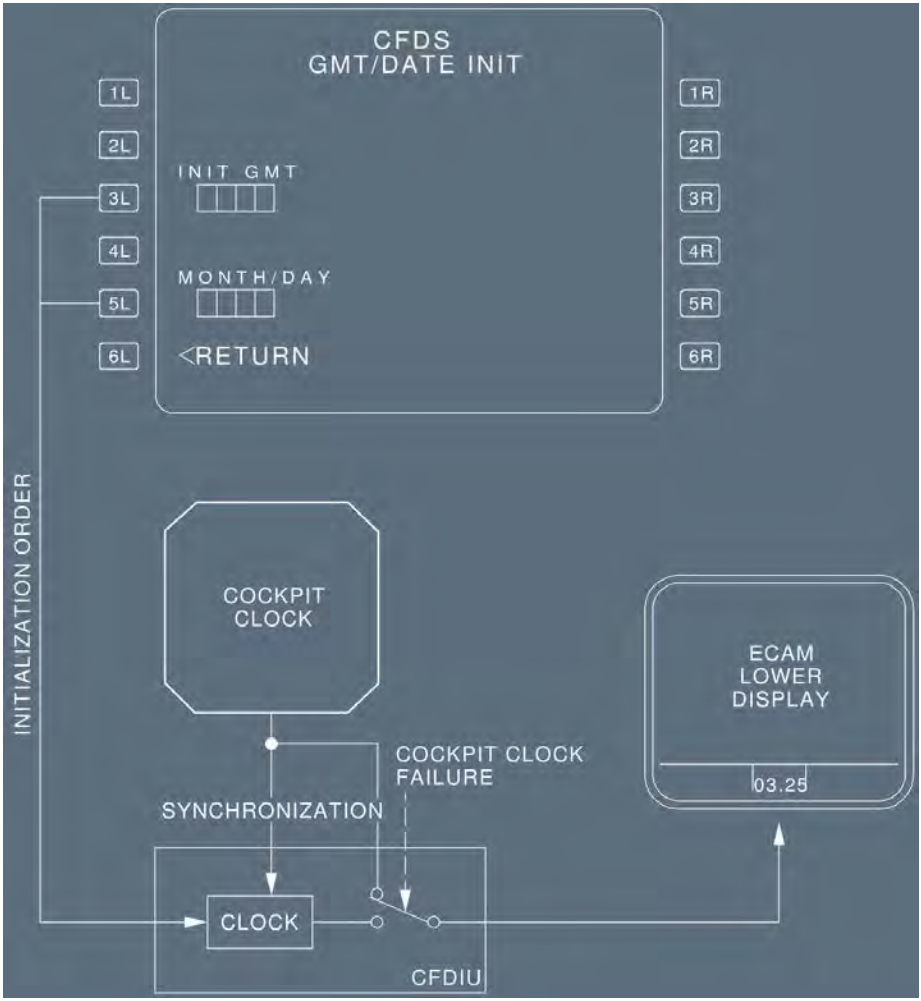
GMT/DATE INITIALIZATION

Ident.: DSC-45-20-00001504.0001001 / 21 MAR 16
Applicable to: ALL

A CFDIU clock is synchronized with the cockpit clock in order to keep GMT (UTC) displayed on the ECAM lower display (except in flight Phases 1 and 2, if the weight and balance system is installed). If the cockpit clock fails, the CFDIU clock continues to display GMT (UTC) on the ECAM lower display.

If electrical power is interrupted for more than 200 ms, the crew initializes GMT (UTC) and the DATE via the MCDU :

- Write GMT (UTC) in the scratchpad, then press the “INIT GMT” key.
- Do the same for the month and day.


CFDS
GMT/DATE INIT
1L
2L
3L
4L
5L
6L
1R
2R
3R
4R
5R
6R
INIT GMT
MONTH/DAY
<RETURN
INITIALIZATION ORDER
COCKPIT
CLOCK
ECAM
LOWER
DISPLAY
03.25
COCKPIT CLOCK
FAILURE
SYNCHRONIZATION
CLOCK
CFDIU

BACKUP MODE

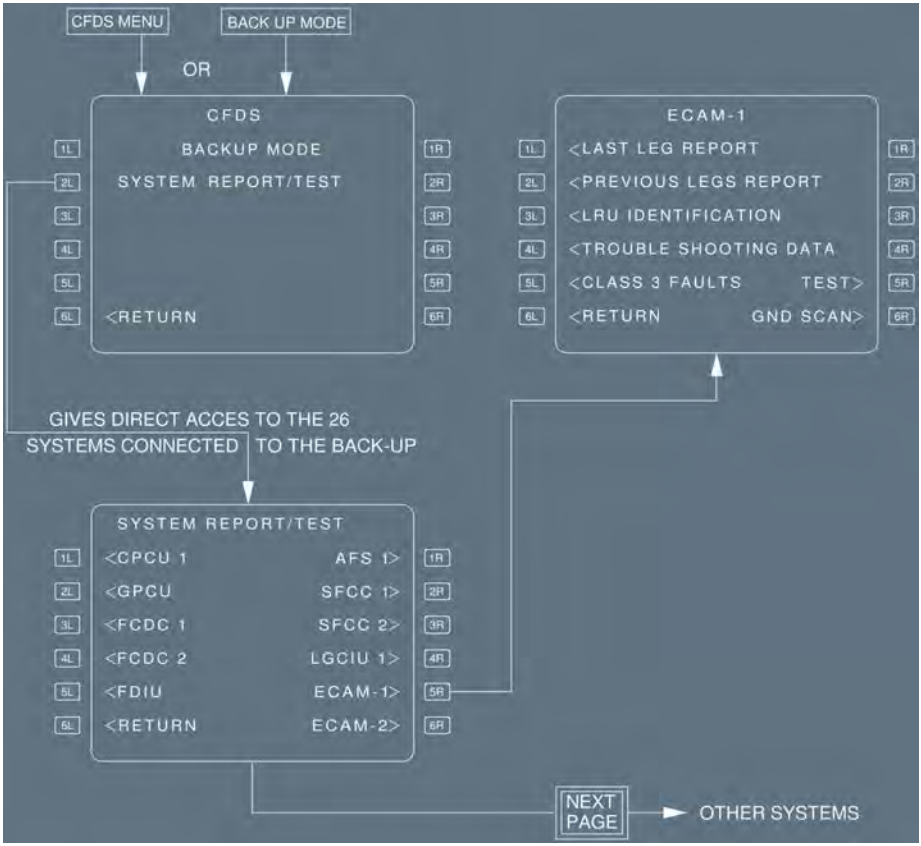
Ident.: DSC-45-20-00017066.0001001 / 21 MAR 16
Applicable to: ALL

If the main channel of the CFDIU fails, the backup channel allows the CFDS to operate in backup mode :

- On the ground only
- Through MCDU1 or MCDU3 ◁
- In one mode of operation only : SYSTEM REPORT/TEST
- Without the PRINTER or ACARS.

The system changes over from main channel to backup channel :

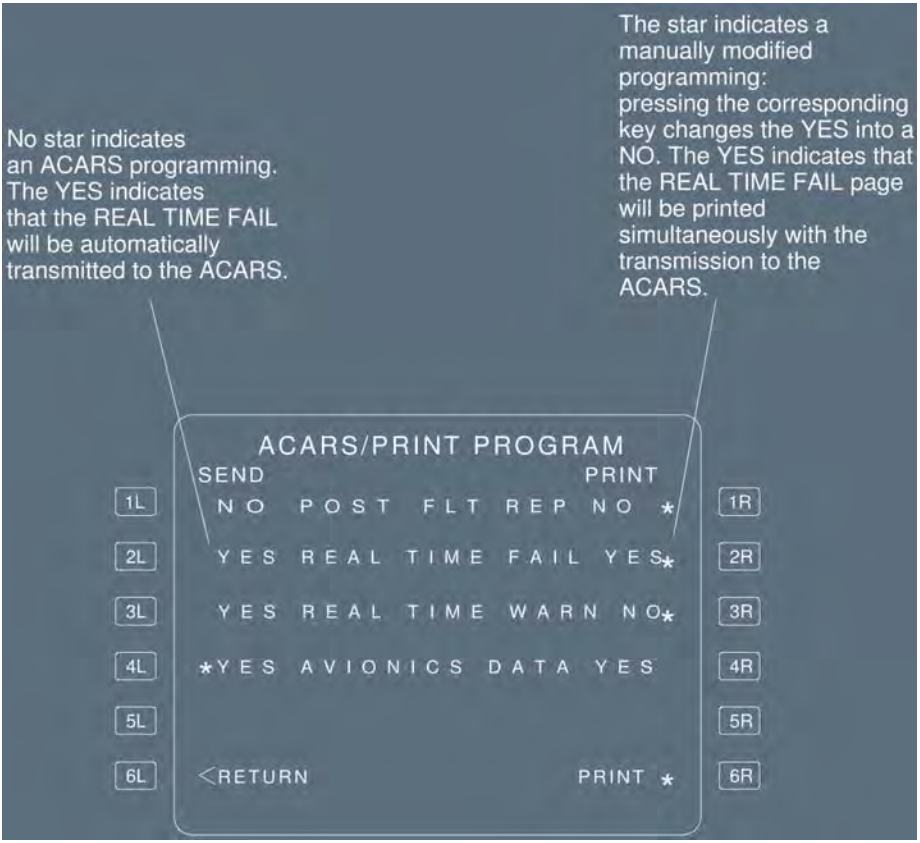
- Automatically in case of an important failure (power supply, for example). In this case, when the operator selects CFDS on the MCDU MENU, it displays the BACKUP MODE page.
- Manually if the operator selects BACKUP MODE on the CFDS menu after a minor failure.



ACARS PRINT PROGRAM

Ident.: DSC-45-20-00005361.0001001 / 14 FEB 11
Applicable to: ALL

This function gives access to reprogramming page.
The programming is provided by the ACARS or manually (on the ground or in flight) :



Note: *The CFDIU memorizes all manual programming so that at initialisation the last configuration will be retained.*

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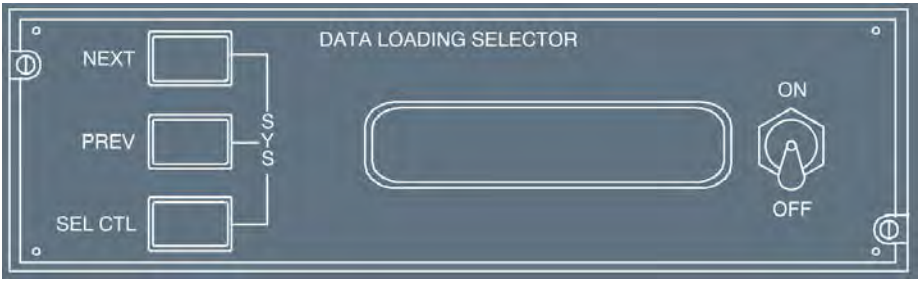
GENERAL

Ident.: DSC-45-25-00001506.0001001 / 10 JAN 11
Applicable to: ALL

With the data loading system, it is possible to upload databases and operational software, or to download system reports from various onboard computers.
The data transfer is performed via 3.5 in disks and a portable data loader, or the aircraft fixed Multipurpose Disk Drive Unit ◁ (MDDU).

DATA LOADING SELECTOR ON THE OVERHEAD PANEL

Ident.: DSC-45-25-00001507.0001001 / 19 DEC 12
Applicable to: ALL



When the data loading selector is ON, the 3 keys (NEXT, PREV, SEL CTRL) enable the display and selection of various applicable aircraft systems (FMGC, TCAS ◁ etc...).

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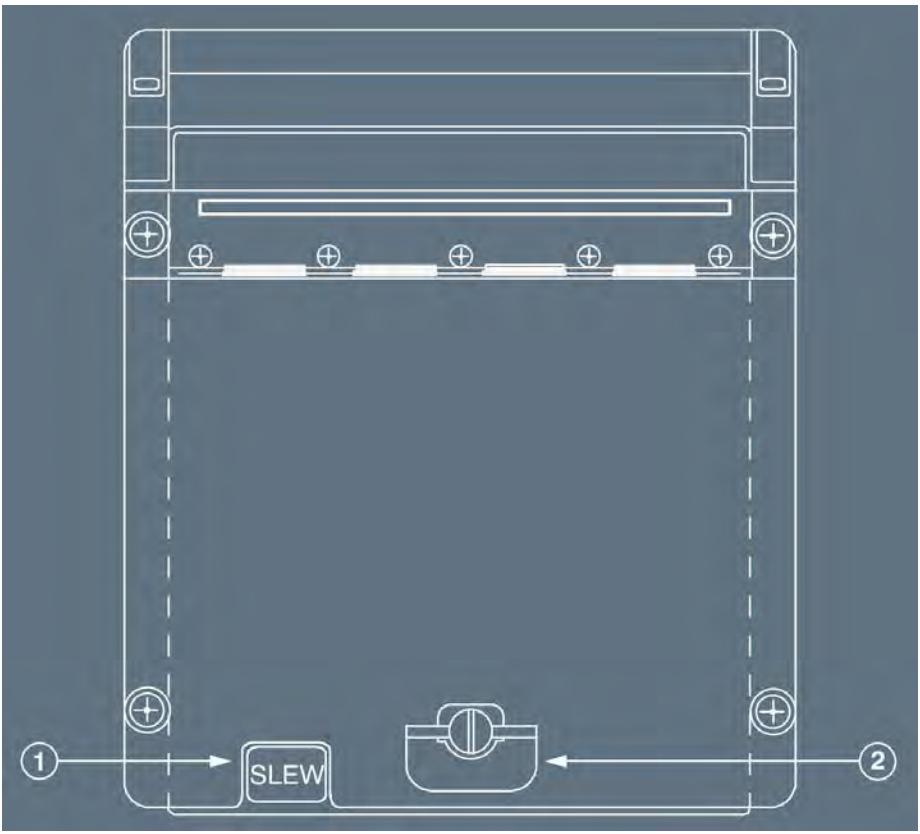
GENERAL

Ident.: DSC-45-30-00001508.0001001 / 21 MAR 16
Applicable to: ALL

The printer prints reports from the following systems (if installed) : ACARS, AIDS, FMGC, CFDIU and EVMU. It prints these on paper, and does so either on the ground or in flight.
The printer is installed at the rear of the pedestal on the right side.

SYSTEM DESCRIPTION

Ident.: DSC-45-30-00001509.0001001 / 21 MAR 16
Applicable to: ALL



(1) SLEW sw :
The SLEW switch is used to feed paper after having loaded a new roll.

(2) PRINTER DOOR LATCH :
The printer door latch locks the door used for loading paper.

AIRCRAFT SYSTEMS

INFORMATION SYSTEMS

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Continued on the following page

Continued from the previous page

DSC-46-40 Pax Entertainment & Connectivity Systems (If Installed)

DSC-46-40-10 General

DSC-46-40-20 In Seat Power Supply System

DSC-46-40-30 Controls and Indicators

OVERVIEW

Ident.: DSC-46-10-10-00020333.0001001 / 17 MAR 17
Applicable to: ALL

The datalink has:
- AOC applications ◁✻
L2 The flight crew uses the AOC applications to communicate with Airline Operational Center (AOC).
L1 - ATC applications ◁✻
L2 The flight crew uses the ATC applications to communicate with Air Traffic Control (ATC) centers.

L1 The ATC datalink provides communication, navigation, and surveillance for Air Traffic Management (ATM) services.
The ATC datalink applications enable air traffic controllers to follow the aircraft navigation, and enhance the air traffic flow.

The datalink communication (messages exchange) between the aircraft and the ground is achieved:
- Automatically (without a flight crew action)
- Manually (with a flight crew action via the DCDU/MCDU and/or RMP).

The datalink messages are:
- Uplink (from a ground facilities to the flight crew), or
- Downlink (from the flight crew to an ground facilities).

COMMUNICATION AND NAVIGATION FOR AIR TRAFFIC MANAGEMENT

At the beginning of the flight, the flight crew sends a notification message to the ATC center, via the MCDU, notification application ◁✻ .
L2 *Refer to DSC-46-10-30-10 Notification* for more information.
L1 Then, an air traffic controller will establish a connection between the aircraft and the ATC center. As a result, the flight crew can exchange messages with the ATC center, via the DCDU (CPDLC application ◁✻). The messages that the flight crew sends to the ATC center can be built with present frames and modified via the MCDU.

Depending on the type of datalink exchange, the datalink uses one of the following communication networks:
- ACARS (*Refer to DSC-23-30-30-10 Introduction*) for FANS A ◁✻ / FANS A+ ◁✻ applications
- ACARS Air Traffic Services (ATS 623) for optional applications ◁✻
- Aeronautical Telecommunication Network (ATN) for FANS B ◁✻ / FANS B+ ◁✻ applications

L2 The ATN supports increasing volume of ATC and AOC communication.

L1 **FUTURE AIR NAVIGATION SYSTEM (FANS)**

The ATC datalink provides:

- FANS A ◁ applications, for operations in remote and in oceanic areas:
  - Notification
  - Controller-Pilot Data Link Communication (CPDLC)
  - Automatic Dependent Surveillance Contract (ADS-C).
- FANS B ◁ applications, for operations in high-density continental areas:
  - Notification
  - Controller-Pilot Data Link Communication (CPDLC).
- Optional applications ◁ (compatible only with FANS A+ or FANS B+):
  - Departure Clearance
  - Oceanic Clearance
  - Digital - Automatic Terminal Information Service (D-ATIS).

NAVIGATION AND SURVEILLANCE FOR AIR TRAFFIC MANAGEMENT

The Automatic Dependent Surveillance (ADS) system sends aircraft position and aircraft navigation data to ATC centers and other aircraft.

There are two different ADS applications:

- ADS-Contract (ADS-C) ◁
  The ADS-C automatically sends aircraft surveillance data to connected ATC centers via ATC Datalink ◁ in remote or oceanic areas.

L2 *Refer to DSC-46-10-30-30 ADS-C* for more information, about ADS-C application.

L1 - ADS-Broadcast (ADS-B) ◁
  The ADS-B automatically broadcasts the aircraft position and navigation data to other users (ATC centers or other aircraft) equipped with a Mode S transponder. The ATC Datalink ◁ does not host the ADS-B ◁ .

L2 *Refer to DSC-34-SURV-10-10 ADS-B OUT* for more information, about the ADS-B.

L1 **SERVICE PROVIDERS**

The role of a communication service provider is to deliver a message from the A/C to a ground end system and vice versa.
A datalink service provider ensures routing of datalink messages between the aircraft and ATC center.

L2 For VHF communication, the two main providers are ARINC and SITA that operate worldwide networks.

L1 REVERSION TO VOICE COMMUNICATION

Voice communication is a primary means of communication on board.

The flight crew must revert from datalink communication to voice communication, if:
- There is an emergency situation (exchange of a critical or urgent message)
- There is a doubt about a datalink message, the voice should be used for clarification
- An operational timer of datalink message exchange times out
- A response to an ATC message was not correctly transmitted via datalink.

CLOCK ACCURACY

The required time precision for ATC datalink communications is +/-1 s UTC. If this constraint is not respected, a rejection of datalink message or acceptance of obsolete datalink message may occur.
Not respecting this constraint may lead to the rejection of messages or to the acceptance of obsolete messages.
For FANS operations, the flight crew should not manually set the clock during cockpit preparation.

ARCHITECTURE

Applicable to: ALL

Ident.: DSC-46-10-10-10-00020329.0001001 / 17 MAR 17

AIR TRAFFIC SERVICE UNIT (ATSU)

The ATSU controls all datalink communication and automatically selects the best available communication media:
- VHF
- HF ◁✻
- SATCOM ◁✻ .

The ATSU hosts:
- AOC applications ◁✻
- ATC applications ◁✻
- Router services
  The ATSU routers automatically select VHF frequency, depending on the aircraft position, in accordance with an entered scan mask (airline policy).
  The scan mask means that a list of VHF datalink service providers, selected via the VHF3 SCAN SELECT page, is scanned, in accordance with their priority level. The VHF scan mask is compulsory for correct router operation. If there is no scan mask, the ECAM displays DATALINK ATSU FAULT – ATSU INIT FAULT.
  Refer to DSC-46-10-40-30 VHF3 SCAN SELECT for more information about the VHF3 SCAN SELECT page.

Ident.: DSC-46-10-10-10-00020319.0001001 / 17 MAR 17

SATELLITE COMMUNICATIONS (SATCOM) ⋖

The SATCOM system ⋖ provides voice and data services. The voice/data are transmitted via satellite, from the aircraft to the ground earth stations, and then switched through international telecommunications networks (ARINC, SITA, etc.) to anywhere in the world (airline operational centers, ATC centers, etc).
The ATSU (router) manages switching to/from SATCOM ⋖ (ACARS environments only).

Ident.: DSC-46-10-10-10-00020321.0002001 / 17 MAR 17

VERY HIGH FREQUENCY (VHF)

The communication between the aircraft and VHF ground stations is established on a VHF frequency. The datalink system primarily uses the VHF 3 radio communication system. The ATSU router automatically selects a VHF frequency, depending on entered configuration, the scan mask for VHF DataLink (VDL), and the aircraft position.
VHF data link service providers are available in each geographical area. *Refer to DSC-23-30-30-40 World Map ACARS Frequencies* for a world map of VHF ACARS frequencies.

The VHF3 radio communication system has:
- Data mode
- Voice mode.

DATALINK/VOICE SWITCHING

The VHF 3 can be used in the voice mode, in case of:
- VHF 1 failure
- VHF 2 failure
- Specific AOC functions (operator's customization).

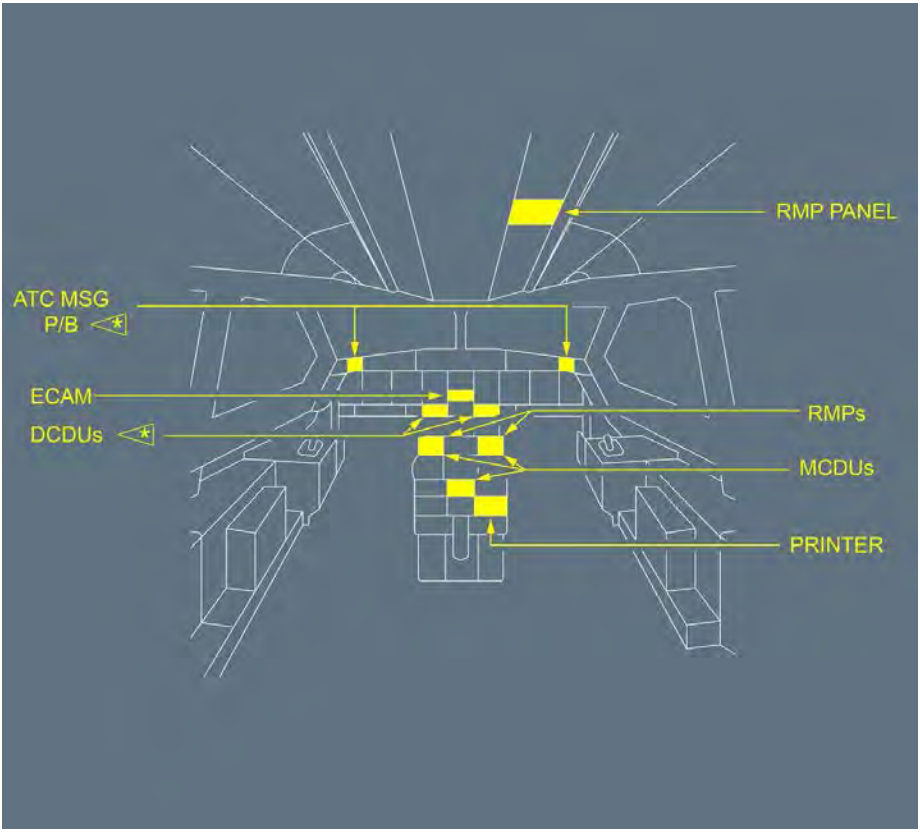
The flight crew can switch datalink/voice via the RMP, or via VHF3 VOICE DIRECTORY page of the MCDU.

The voice frequency can be tuned by:
- ATSU automatically
- Fight crew, via the RMP.

Green HF VOICE memo indicates that VHF 3 datalink communication is interrupted, when the VHF 3 transceiver operates in the voice mode.

COCKPIT INTERFACE

Ident.: DSC-46-10-10-00020373.0001001 / 17 MAR 17
Applicable to: ALL



The cockpit interface of the datalink system has:

- Datalink Control and Display Unit (DCDU) ◁ on the CAPT and F/O side
  The DCDU displays the uplink and downlink messages and enable the flight crew to control the datalink message exchange.
- ATC MSG pb-sw ◁ on the CAPT and F/O side of the glareshield
  The ATC MSG pb-sw alerts when an uplink message is received and enables the flight crew to cancel the alert.

- Multipurpose Control and Display Unit (MCDU)
  The MCDU enables to manage AOC and ATC functions and data transfer to the DCDU ◁
- Printer
  Datalink messages can be printed, when displayed on the DCDU.
- RMP
  The RMP enables frequency tuning.
- ECAM
  The ECAM informs about the abnormal operation.

General

GENERAL

Ident.: DSC-46-10-20-10-00020385.0001001 / 17 MAR 17
Applicable to: ALL

The AOC applications ◁ are datalink applications. The AOC applications enable an exchange of specific messages between the flight crew and the Airline Operational Control (AOC).
The AOC applications are customized by each operator and depend on operator's choices and the datalink service provider.

Note: *Details about AOC applications cannot be provided due to the wide range of customization by the operator.*
Airbus does not supervise customization of AOC applications. It is recommended to insert AOC application description into this chapter in accordance with AOC applications installed on the aircraft.

The AOC applications can offer the following functions:

EXAMPLE	- Preflight Functions:
	  - Flight log
	  - Departure Delay Message
	  - Takeoff Delay Message
	  - Weather Request
	  - NOTAM Request
	  - Loadsheet Request
	  - Others
	- En-Route Functions:
	  - Flight log
	  - Diversion Message
	  - En-route Delay
	  - Estimated Time of Arrival (ETA) Message
	  - Weather Request
	  - NOTAM Request
	  - Others
	- Postflight Functions:
	  - Flight log
	  - Flight summary
	  - Gate delay
	  - Others

The flight crew uses the datalink cockpit interface for the AOC applications.

EXAMPLE	**Flight Plan Modification** This flight plan modification example is based on following assumptions: - The AOC sends a flight plan modification message to the flight crew. - The flight crew loads the fight plan modification in the FMGS, into the secondary F-PLN. - The crew obtains ATC clearance before activating the modified flight plan. - *Refer to DSC-46-10-50 How to Modify FLT Plan* for the flight plan modification based on an AOC request.

MCDU Datalink Pages

ATSU DATALINK

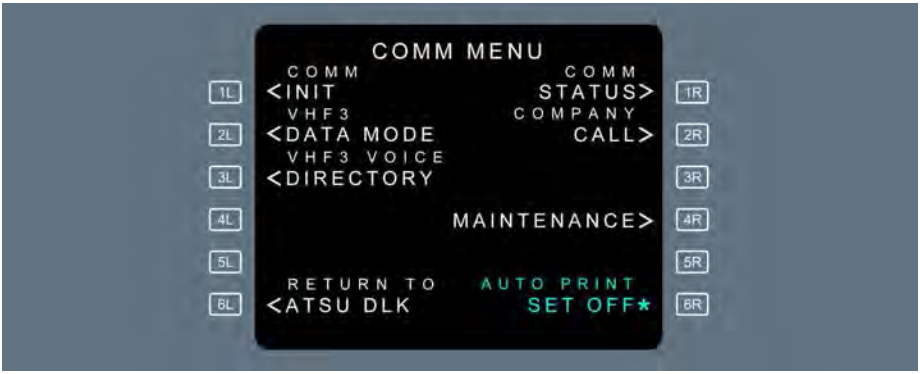
Ident.: DSC-46-10-40-30-00021081.0003001 / 17 MAR 17
Applicable to: ALL

[1R] AOC MENU	When selected, the MCDU displays the AOC MENU page.
[6R] COMM	When selected, the MCDU displays the COMM MENU page.

COMM MENU

Ident.: DSC-46-10-40-30-00021090.0003001 / 17 MAR 17
Applicable to: ALL

EXAMPLE	This is an example of the COMM MENU page. Information, that are displayed on the COMM MENU page and subsequent pages, accessible via the COMM MENU page, depend on datalink customization, selected by each operator for AOC applications.



EXAMPLE	[1L] COMM INIT	When selected, the DCDU displays the COMM INIT page.
	[2L] VHF3 DATA MODE	When selected, the DCDU displays the VHF3 DATA MODE page.
	[3L] VHF3 VOICE DIRECTORY	When selected, the DCDU displays the VHF3 VOICE DIRECTORY page.
	[6L] RETURN TO ATSU DLK	When selected, the MCDU displays the ATSU DATALINK page.
	[1R] COMM STATUS	When selected, the DCDU displays the COMM STATUS page.
	[2R] COMPANY CALL	When selected, the DCDU displays the COMM CONFIG page.
	[4R] MAINTENANCE	When selected, the MCDU displays the MAINTENANCE page.
	[6R] AUTO PRINT	Sets the auto-print on or off.

VHF3 SCAN SELECT

Ident.: DSC-46-10-40-30-00021254.0001001 / 17 MAR 17
Applicable to: ALL

EXAMPLE	This is an example of VHF3 SCAN SELECT pages. Information, that are displayed on the VHF3 SCAN SELECT pages, depend on datalink customization, selected by each operator.

THE VHF 3 SCAN SELECT PAGE 1/4

EXAMPLE	[1L] SITA EUR/AF	Selects the SITA Europe/Africa (datalink service provider).
	[5L]: NEW SCAN SELECT : ACTIVE SEL DISPLAY :	 Selects the scan mask. Displays the scan mask used by ATSU.
	[6L] RETURN	When selected, the MCDU displays the COMM CONFIG page.
	[1R] ARINC EUROPE	Selects the ARINC Europe (datalink service provider).
	[2R] ARINC MIDDLE EAST	Selects the ARINC Eiddle East (datalink service provider).
	[3R] ARINC INDIA	Selects the ARINC India (datalink service provider).
	[5R] EMPTY SCAN ACTIVATE	Activates an emprty scan mask to inhibit VHF datalink communication.
	[6R] SCAN SEL PRINT	When selected, the printer prints information.

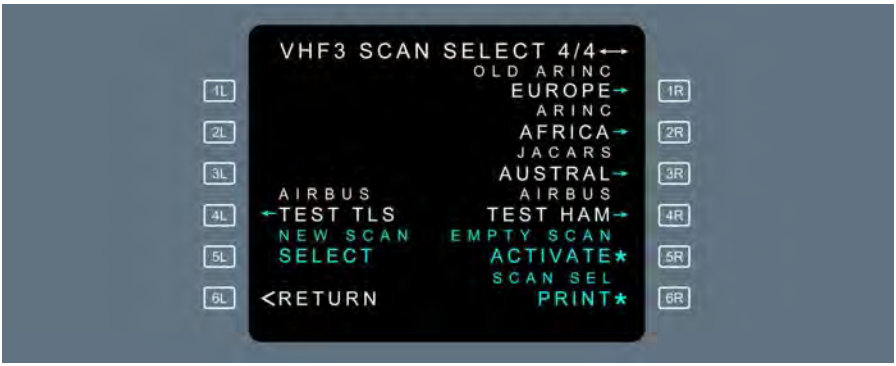
THE VHF 3 SCAN SELECT PAGE 2/4

EXAMPLE	[1L] SITA PACIFIC	Selects the SITA Pacific (datalink service provider).
	[4L] AVICOM JAPAN	Selects the AVCOM Japan (datalink service provider).
	[5L]: NEW SCAN SELECT : ACTIVE SEL DISPLAY :	 Selects the scan mask. Displays the scan mask used by ATSU.
	[6L] RETURN	When selected, the MCDU displays the COMM CONFIG page.
	[1R] ARINC RUSSIA	Selects the ARINC Russia (datalink service provider).
	[2R] ARINC ASIA	Selects the ARINC Asia (datalink service provider).
	[3R] ARINC AUSTRAL	Selects the ARINC Australia (datalink service provider).
	[4R] ARINC KOREA	Selects the ARINC Korea (datalink service provider).
	[5R] EMPTY SCAN ACTIVATE	Activates an emprty scan mask, in order to inhibit VHF datalink communication.
	[6R] SCAN SEL PRINT	When selected, the printer prints information.

THE VHF 3 SCAN SELECT PAGE 3/4

EXAMPLE	[1L] SITA NORTH AM	Selects the SITA North America (datalink service provider).
	[2L] SITA SOUTH AM	Selects the SITA South America (datalink service provider).
	[3L] DEPV BRASIL	Selects the DEPV Brasil (datalink service provider).
	[5L]: NEW SCAN SELECT : ACTIVE SEL DISPLAY :	 Selects the scan mask. Displays the scan mask used by ATSU.
	[6L] RETURN	When selected, the MCDU displays the COMM CONFIG page.
	[1R] ARINC AMERICA	Selects the ARINC America (datalink service provider).
	[5R] EMPTY SCAN ACTIVATE	Activates an emprty scan mask, in order to inhibit VHF datalink communication.
	[6R] SCAN SEL PRINT	When selected, the printer prints information.

THE VHF 3 SCAN SELECT PAGE 4/4



EXAMPLE	[5L]: NEW SCAN SELECT : ACTIVE SEL DISPLAY :	 Selects the scan mask. Displays the scan mask used by ATSU.
	[6L] RETURN	When selected, the MCDU displays the COMM CONFIG page.
	[1R] OLD ARINC EUROPE	Selects the OLD ARINC Europe (datalink service provider).
	[2R] ARINC AFRICA	Selects the ARINC Africa (datalink service provider).
	[3R] JACARS AUSTRAL	Selects the JACARS Australia (datalink service provider).
	[5R] EMPTY SCAN ACTIVATE	Activates an emprty scan mask, in order to inhibit VHF datalink communication.
	[6R] SCAN SEL PRINT	When selected, the printer prints information.

MCDU Scratchpad Messages

MCDU SCRATCHPAD MESSAGES

Applicable to: ALL

Ident.: DSC-46-10-40-40-10-00021338.0001001 / 17 MAR 17

SCRATCHPAD MESSAGES ON THE COMM MENU PAGE

MESSAGE	CONDITIONS
COMMAND NOT AVAIL	The command is not available.
DEFAULT VHF SP LIST	The new SCAN MASK is not available. The system displays the default SCAN MASK instead.
ENTER A/C REGISTR	The aircraft registration number is not valid. To enter this parameter, *Refer to DSC-46-10-50 How to Initialize*.
ENTER A/L ID	The airline identification number is not valid. To enter this parameter, *Refer to DSC-46-10-50 How to Initialize*.
ENTER VHF 3 SCAN MASK	No service provider has been selected.
FAILED COMMAND	The command, selected by the flight crew, cannot currently be performed.
FORMAT ERROR	The message was entered in an inappropriate format.
NOT ALLOWED	It is not permitted to press this key.
PRINT FAILED	A print command is not successful.
PRT MSG PRINT FAIL	Automatic print of an AOC uplink message was not successful.
VHF 3 CAN BE SET IN VOICE	VHF 3 datalink communications are lost. However, VHF 3 can be used in voice mode.
VHF 3 SWITCH IMPOSSIBLE	It is not possible to switch from VHF 3 voice mode to VHF 3 data mode.

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ECAM

MEMO DISPLAY

Applicable to: ALL

Ident.: DSC-46-10-40-60-A-00016906.0001001 / 21 MAR 16

COMPANY ALERT : This memo appears in green when the aircraft receives an uplink alert message, or when an AOC special condition requires a pilot action on the MCDU (depends on AOC programming). This memo pulses green for 180 s, then remains steady. It is associated with a buzzer for 1 s.

Ident.: DSC-46-10-40-60-A-00016904.0001001 / 21 MAR 16

COMPANY CALL : This memo appears in green when the aircraft receives a message from the ground requesting voice communication on VHF.

Ident.: DSC-46-10-40-60-A-00016903.0001001 / 21 MAR 16

COMPANY DATALINK STBY : This memo appears in green when AOC datalink air-ground communication is temporarily unavailable, but not lost.

Ident.: DSC-46-10-40-60-A-00016905.0001001 / 21 MAR 16

COMPANY MSG : This memo appears in green when the aircraft receives a message from the ground.

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INTRODUCTION

Ident.: DSC-46-10-50-00021191.0002001 / 17 MAR 17
Applicable to: ALL

How To chapter contains examples of:
- How to initialize the datalink
- How to modify the flight plan.

Illustrations in How To are generic and do not reflect differences depending on the datalink standard installed in the aircraft.

HOW TO INITIALIZE

Ident.: DSC-46-10-50-00021142.0002001 / 17 MAR 17
Applicable to: ALL

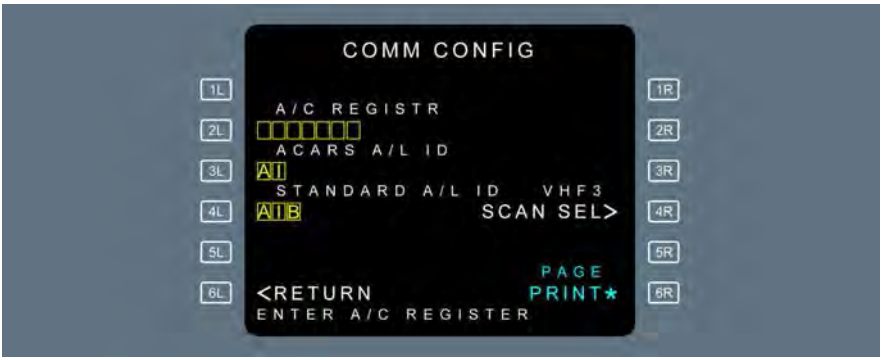
Datalink may be initialized:
- Automatically
  Datalink initializes automatically, provided that a list of service providers is scanned, and all required parameters are received, and validated by the ATSU.
- Manually
  Datalink may be initialized manually, when the system is not correctly initialized automatically.

The VHF3 SCAN SELECT page of the MCDU displays the list of service providers.
The COMM CONFIG / COMM INIT page, on the MCDU displays required parameters.

MANUAL INITIALIZATION

If one of required parameters is not valid, one or more manual entries may be required:

- **If ARN is not valid:**
  The MCDU scratchpad displays ENTER A/C REGISTER:



The flight crew clears the scratchpad, and inserts the A/C registration via the MCDU scratchpad.

A/C REGISTR..... INSERT

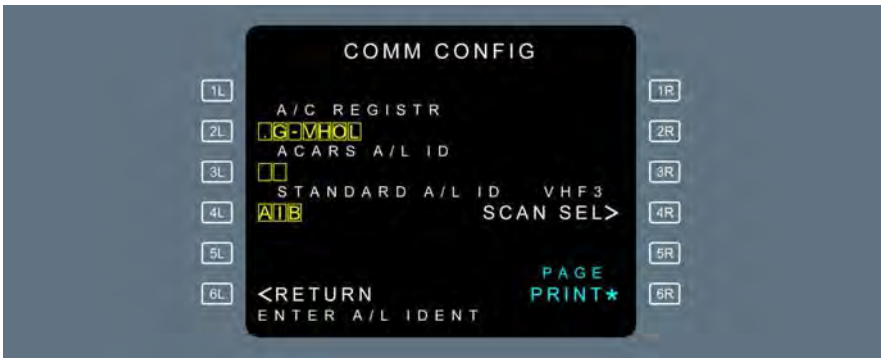
The flight crew inserts A/C ICAO registration via the MCDU scratchpad to A/C REGISTR.

CONFIG ACTIVATE..... SELECT

The flight crew selects 1R/CONFIG ACTIVATE to activate manual entry of the A/C registration.

- **If the A/L ID is not valid:**

  The MCDU scratchpad displays ENTER A/L IDENT:



The flight crew clears the scratchpad, and inserts the two-letter A/L ID code via the MCDU scratchpad.

A/L ID..... INSERT

The flight crew inserts A/L ID code via the MCDU scratchpad to A/L ID.

CONFIG ACTIVATE..... SELECT

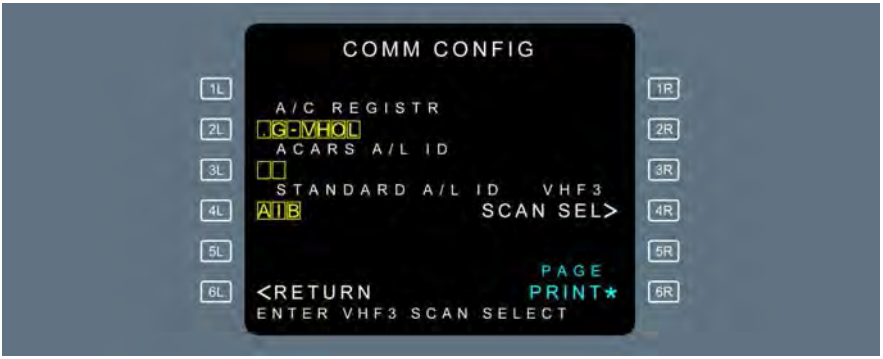
The flight crew selects 1R/CONFIG ACTIVATE to activate manual entry of the A/C registration.

- **If VHF service provider is not selected**

  and

  if the VHF3 SCAN/MASK SELECT menu can be accessed:

  The MCDU scratchpad displays ENTER VHF3 SCAN SELECT:



On the VHF3 SCAN SELECT page, select service providers, in the airline priority order, and activate the VHF SCAN SELECT function.

EXAMPLE OF SELECTION OF DATALINK SERVICE PROVIDERS:

Selection of SITA 725 and ARINC service providers :

1. Press 5L key: The asterisk next to SELECT indication disappears, then reappears.
2. Press 1L key to select SITA 725: SELECT indication goes off, and the priority number of selection 1 appears.
3. Press 1R key to select ARINC: SELECT indication goes off, and the priority number of selection 2 appears.
4. Press 5R key to activate the VHF SCAN SELECT function: The star next to SCAN SELECT ACTIVATE indication disappears, then reappears.

Note: Modification of the SCAN SELECT setting may result in the loss of air-ground VHF datalink communication, and the increase of datalink service provider charges. Therefore, the SCAN SELECT setting should not be modified by the flight crew, unless the flight crew is instructed to do so.

HOW TO MODIFY FLT PLAN

Ident.: DSC-46-10-50-00021153.0001001 / 21 MAR 17
Applicable to: ALL

- **When the scratchpad (1) displays the AOC SEC F-PLN UPLINK message:**
  - **On the MCDU:**
    SEC INDEX Page:

    AOC F-PLN INSERT.....SELECT See (2)

    The flight plan is inserted in the secondary F-PLN See (3).
    The flight can review and modify the flight plan.

    SEC F-PLN REQ DISPLAY.....SELECT See (4)

L2 *The DCDU automatically displays a datalink message See (5).*

L1 *The flight crew sends the message to the ATC from the DCDU.*

- **When ATC clearance is received:**
  - **On the glareshield:**

    ATC MSG pb.....PRESS

    The aural and visual alerts stop.
  - **On the DCDU:**

    STBY.....SELECT See (1)

L2 *The message status changes to STBY on a blue background See (2).*

L1 SEND.....SELECT See (3)

L2 *The background color of the STBY message status changes to green.*

L1 LOAD.....SELECT See (4)

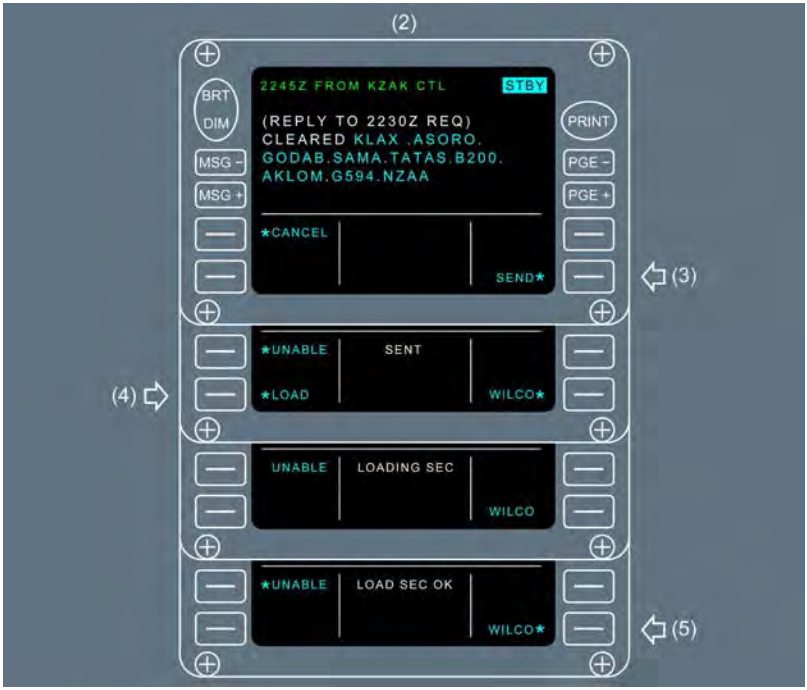
LOAD must be selected. Other selection may prevent loading of the clearance.

The LOAD SEC OK displays in the information field of the DCDU, if loading is successful.

L2 *The flight crew can review the clearance on the MCDU, in SEC F-PLN pages.*

L1

■ **If the flight crew accepts the clearance:**
WILCO.....SELECT See (5)
The flight crew can activate the secondary F-PLN.



■ **If the flight crew decides to modify the clearance:**

- The flight crew loads the clearance into the SEC F-PLN, on the MCDU and modifies it.
- The flight crew rejects the clearance by selecting UNABLE on the DCDU.
- The flight crew sends a new request (with the modified F-PLN) to the ATC.

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INTRODUCTION

Ident.: DSC-46-20-20-00021223.0001001 / 25 JUL 17
Applicable to: ALL

The FlySmart with Airbus application suite is composed of:
- TAKEOFF application
- LANDING application
- LOADSHEET application
- IN–FLIGHT application (available on the latest FlySmart with Airbus applications for Windows version)
- Operational Documentation applications (OLB)
- Manager application (available for iPad version).

The FlySmart with Airbus application suite is designed to:
- Improve access to flight crew's operational information
- Reduce the quantity of paper documents in the cockpit by replacing them with electronic documents
- Enable reduced revision and distribution cycles to ensure better technical data accuracy
- Ease and improve the operational data updating process
- Provide an accurate and optimized computation of performance.

The FlySmart with Airbus application suite can be used by the flight crew on a Portable Electronic Device (PED). The flight crew can use the power outlets ⩤ (110 VAC / 60 Hz) installed on each lateral console to plug their PED.

Note: *The power outlets (115 VAC / 400 Hz) located on the rear of the cockpit are for maintenance use only.*

GENERAL

Ident.: DSC-46-20-20-00021224.0001001 / 20 MAR 17
Applicable to: ALL

The My Flight page enables:
- To check that FlySmart with Airbus applications are up to date. The My Flight page provides the version of the installed applications and data (EFB version)
- To start the Manager application, that enables to update the operational data (performance, manuals)
- To initialize the applications with the applicable aircraft tail number, flight number and citypair. This avoids multiple entries of the same data in the different applications.

There is one My Flight page per application. All the inputs that the user has entered on one My Flight page are retrieved by the other applications.

Note: On the My Flight page of OLB application, the user can only enter the a/c type and a/c registration.

LANDING APPLICATION

Ident.: DSC-46-20-20-00021225.0001001 / 20 MAR 17
Applicable to: ALL

The Landing application aims at computing the landing performance data (maximum landing weight, approach speed) according to the aircraft configuration and external conditions (runway, surrounding obstacles, weather).
The Landing application allows straightforward computations and provides the optimized landing performance for the given conditions.

TAKEOFF APPLICATION

Ident.: DSC-46-20-20-00021226.0001001 / 20 MAR 17
Applicable to: ALL

The Takeoff application aims at computing the takeoff performance data (maximum takeoff weight, takeoff speeds, flexible temperature) according to the aircraft configuration and external conditions (runway, surrounding obstacles, weather).
The Takeoff application allows straightforward computations and provides the optimized takeoff performance for the given conditions.

LOADSHEET APPLICATION

Ident.: DSC-46-20-20-00021227.0001001 / 20 MAR 17
Applicable to: ALL

The Loadsheet application allows the flight crew users to prepare the aircraft loading and to check that all weights and CG remain within the loading operational envelope. This eases the computation of the ZFWCG, ZFW, TOW and TOCG, and enables last–minute changes to the passenger/cargo/fuel distribution.
Depending on airline's authority requirements, the Loadsheet application can also generate a load and trim sheet.

OPS LIBRARY APPLICATION

Ident.: DSC-46-20-20-00021228.0001001 / 20 MAR 17
Applicable to: ALL

The OLB application enables the onboard consultation of any flight operations document published in the relevant format (e.g. airline's manuals), including the ones delivered by Airbus (FCOM, MEL, AFM, CDL, FCTM).

MEL and CDL items (including missing items) selected on OLB application are automatically transferred to Takeoff and Landing applications.

MANAGER APPLICATION

Ident.: DSC-46-20-20-00021229.0001001 / 20 MAR 17
Applicable to: ALL

The Manager application aims at updating on the iPad the operational data used by FlySmart with Airbus applications for iPad: performance data and operational manuals.

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GENERAL

Ident.: DSC-46-30-00021515.0001001 / 17 MAR 17
Applicable to: ALL

The electronic QRH (eQRH) is an EFB application that enables the flight crew to:

- Manage the Normal Checklists and some Abnormal Procedures
- Access to some important operational data (OEBs, system architectures, performance…)

The eQRH has several main interfaces:

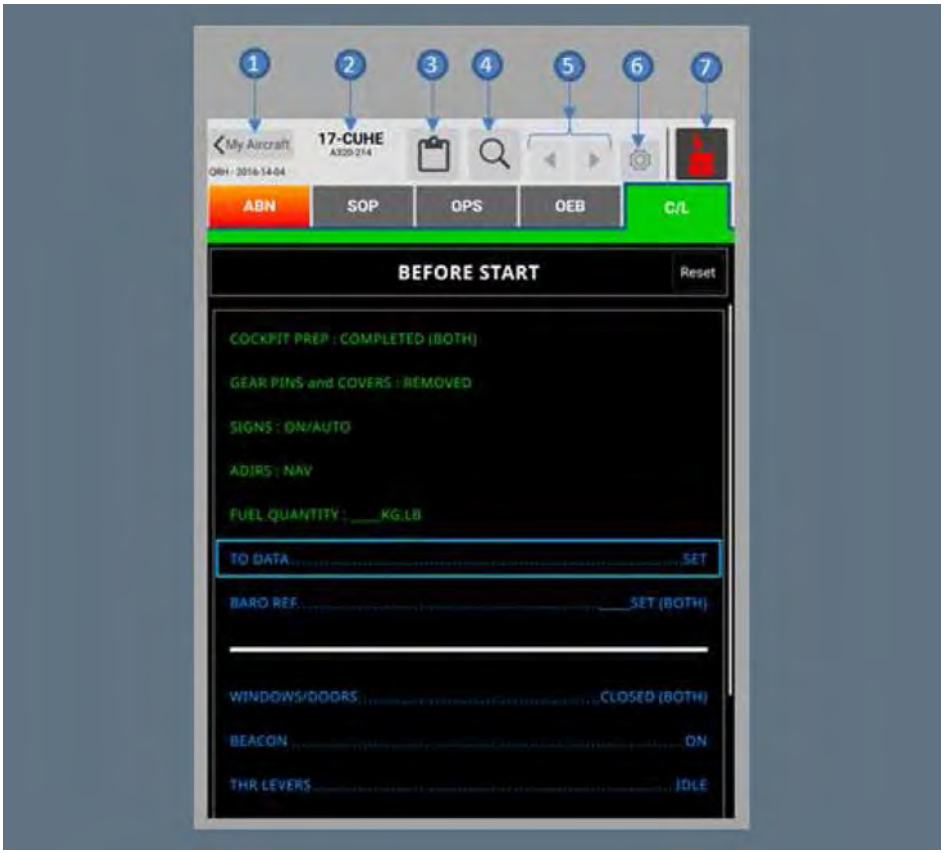
- My Aircraft page:

  The My Aircraft page enables:
  - To check that the eQRH application is up to date. The My Aircraft page provides the version of the installed application and data (EFB version)
  - To initialize the eQRH application with the applicable aircraft tail number. The My Aircraft page retrieves automatically the aircraft tail number when defined in other FlySmart with Airbus applications

- EFB version:

If required, each flight crew member compares the EFB version with the valid version information that is given as reference by the airline. This ensures that the eQRH application and the data installed on their devices correspond to the latest updated version, provided by their airline's flight operations.

- eQRH application:
  The eQRH application enables the pilot to manage the normal checklists and non-sensed Abnormal Procedures. It also gives access to some important operational data that may be required during the flight.



(1) Access to My Aircraft page
(2) Aircraft tail number and type
(3) Working list

(4) Search
(5) Previous/Next Navigation
(6) eQRH options
(7) Rapid Access

GENERAL

Ident.: DSC-46-40-10-00017604.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft is equipped with cabin connectivity systems which enable passengers to use:
- Mobile phones for voice and data services, and/or
- Internet wireless connection for access to the World Wide Web

The use of mobile phones is prohibited in cockpit and lavatories.
The following table provides the list of controls dedicated to Pax Entertainment & Connectivity Systems:

P/B ◁	EQUIPMENTS (FUNCTIONS)	DESCRIPTIONS
GALLEY	Mobile, Wifi, IFE	*Refer to DSC-24-20 Overhead Panel*
COMMERCIAL	Mobile, Wifi, IFE	*Refer to DSC-24-20 Overhead Panel*
NO PED	Signs	*Refer to DSC-33-40-10 Overhead Panel*
PAX SYS	Mobile, Wifi, IFE, Seat actuators, PED	*Refer to DSC-46-40-30 PAX SYS PB-SW*
PAX PERSONAL ELEC SPLY	Mobile, Wifi, IFE, Seat actuators, PED	*Refer to DSC-46-40-30 PAX PERSONAL ELEC SPLY PB-SW*
MOBILE COM	Mobile, Wifi	*Refer to DSC-46-40-30 MOBILE COM PB-SW*
CINS reset	Mobile, Wifi	*Refer to DSC-46-40-30 CINS RESET PB*

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IN SEAT POWER SUPPLY SYSTEM

Ident.: DSC-46-40-20-00017606.0001001 / 10 NOV 15
Applicable to: ALL

The In-Seat Power Supply System (ISPSS) provides electrical power to the In-Seat Power Supply Unit (ISPSU) outlets, and enables passengers to use Portable Electronic Devices (PED) and the In-Flight Entertainment (IFE) system.

It is possible for the flight crew to simultaneously disconnect power from all ISPSUs, In-Flight Entertainment (IFE) and Cabin Connectivity systems, via the PAX SYS pb-sw or the PAX PERSONAL ELEC SPLY pb-sw.

In the case of rapid cabin decompression, both the ISPSS and IFE system are automatically disconnected.

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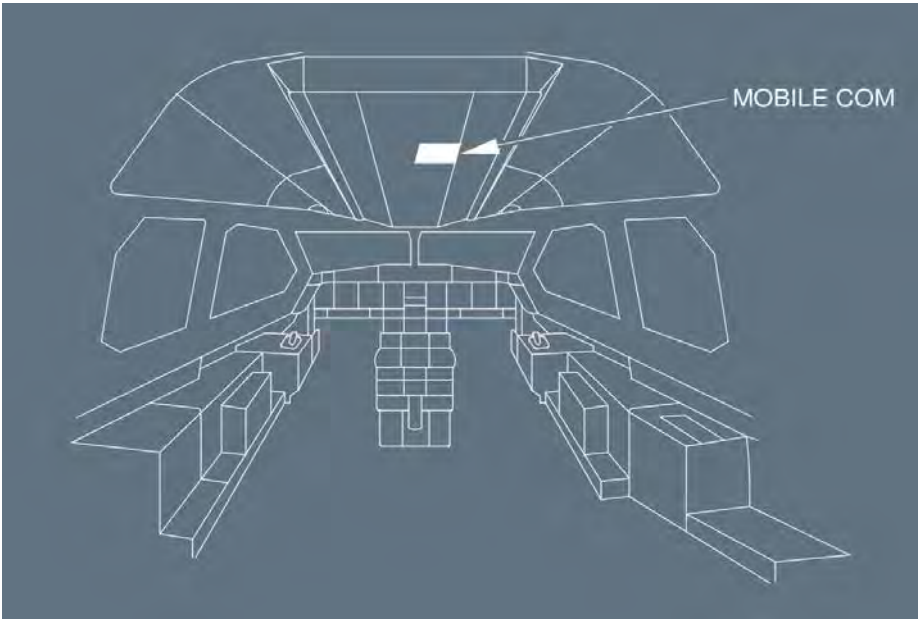
MOBILE COM PB-SW

Ident.: DSC-46-40-30-00017631.0001001 / 19 APR 16
Applicable to: ALL



The pushbutton-switch described here below is installed on the 45 VU panel on the overhead panel.

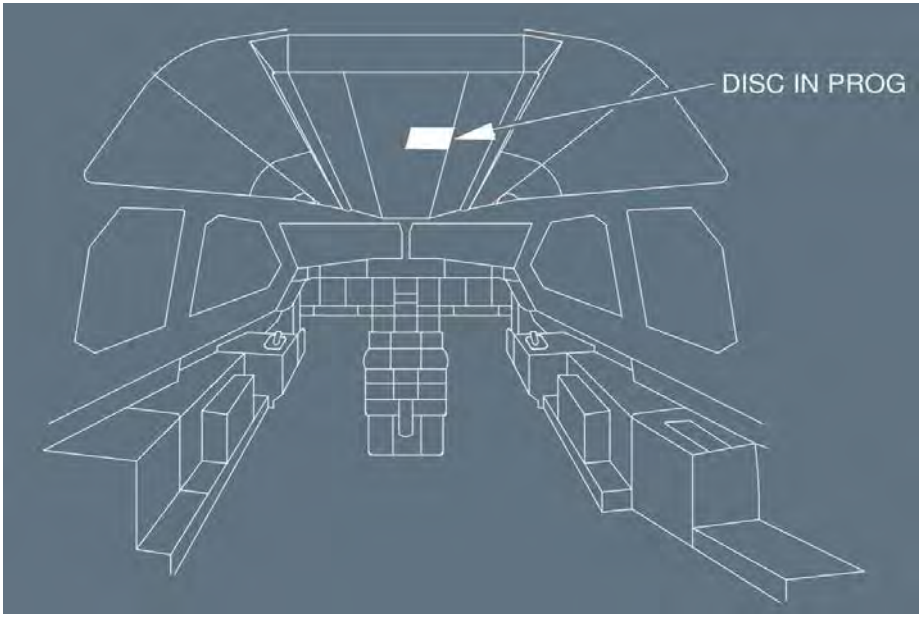
ON : The mobile phone system is activated.

OFF : The mobile phone system is deactivated.

Note: *When the pushbutton is released, the OFF light comes on in white however the system takes approximately 4 min to disconnect. During this disconnection process, the passengers can use their mobile phones.*

DISC IN PROG LIGHT

Ident.: DSC-46-40-30-00019278.0001001 / 21 MAR 17
Applicable to: ALL

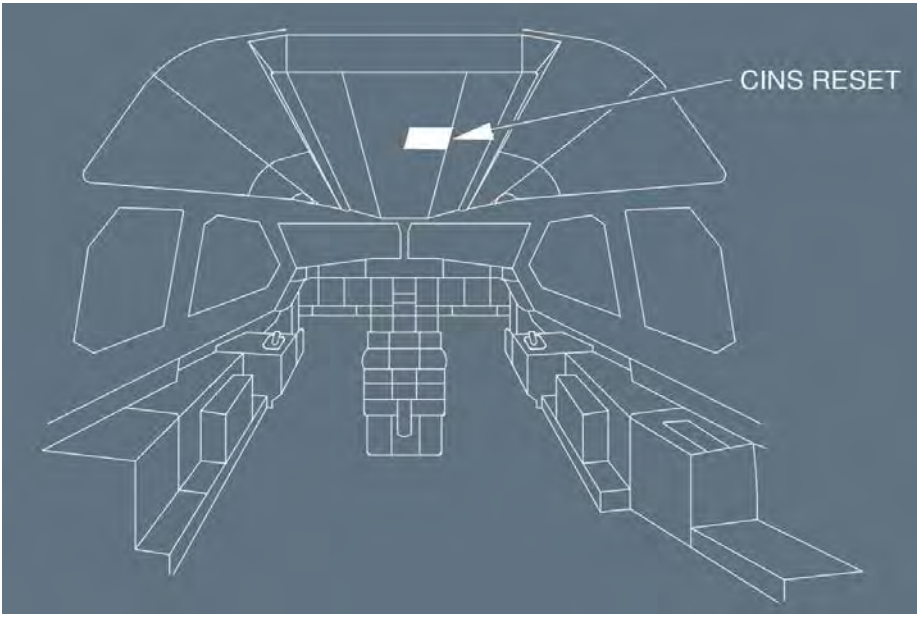


The pushbutton-switch described here below is installed on the 45 VU panel on the overhead panel.

Note: *After the release of Mobile Com pushbutton, the DISC IN PROG light comes in blue and remains on until the total disconnection of the system.*

CINS RESET PB

Ident.: DSC-46-40-30-00017630.0001001 / 10 NOV 15
Applicable to: ALL

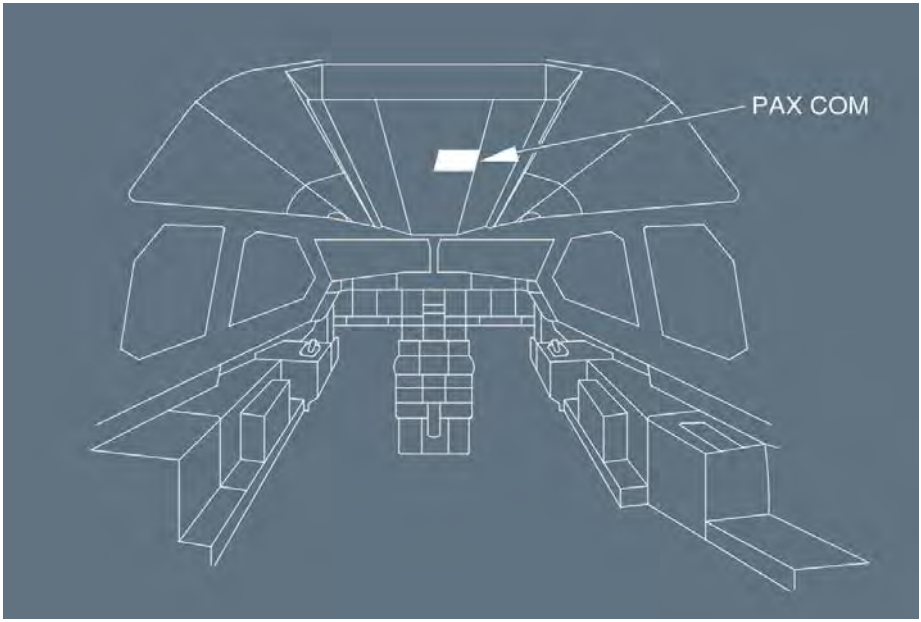


The pushbutton-switch described here below is installed on the 45 VU panel on the overhead panel.

When pressed, it resets all Cabin Connectivity systems.

PAX COM PB-SW ⊲

Ident.: DSC-46-40-30-00021654.0001001 / 02 MAY 17
Applicable to: ALL

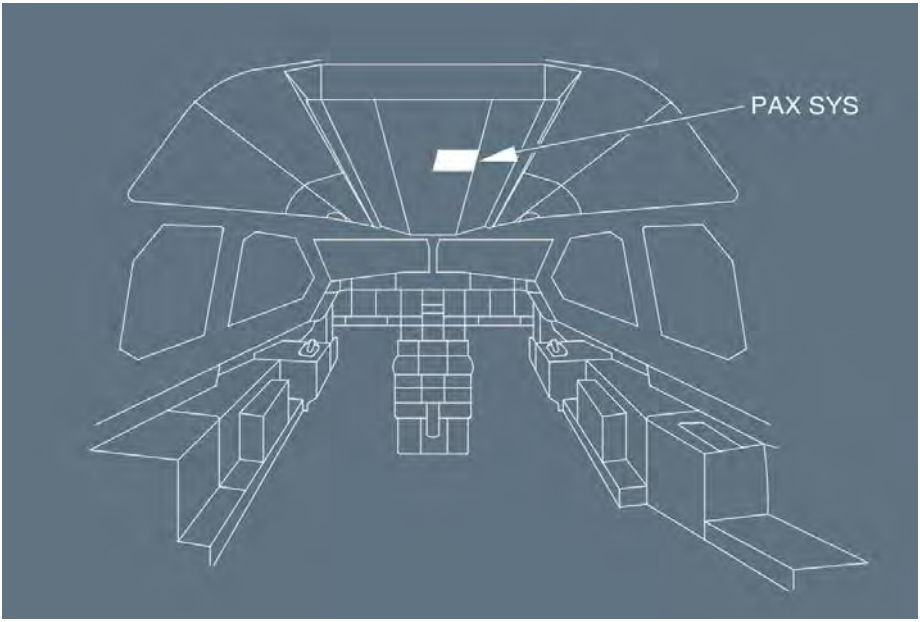


The pushbutton-switch described here below is installed on the 45 VU panel on the overhead panel.

OFF : The Cabin Connectivity system is cut-off. When the pushbutton-switch is released, the OFF light comes on in white.

PAX SYS PB-SW

Ident.: DSC-46-40-30-00017735.0001001 / 10 NOV 15
Applicable to: ALL



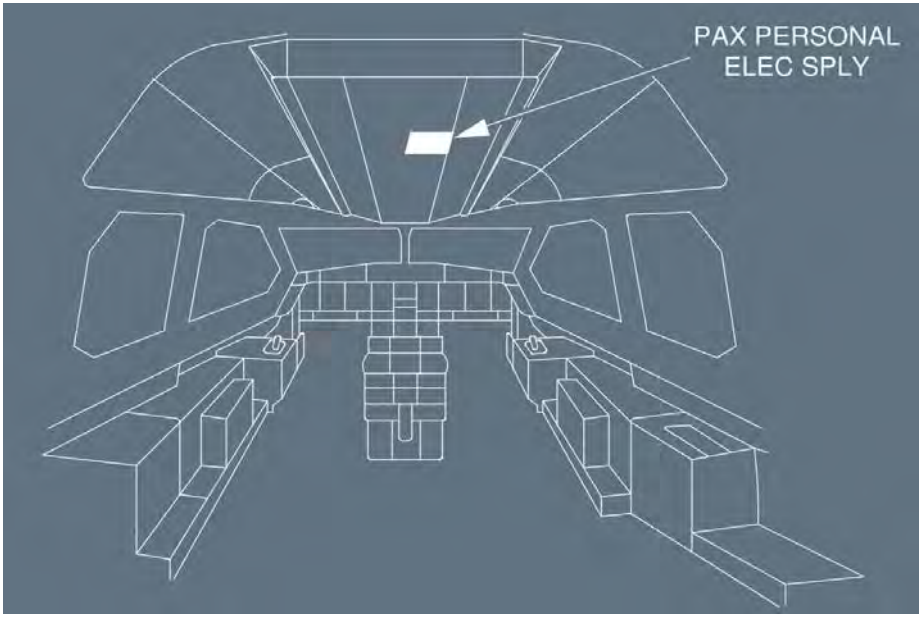
The pushbutton-switch described here below is installed on the 56VU panel on the overhead panel.

AUTO : All ISPSUs, In-Flight Entertainment (IFE) and Cabin Connectivity systems are powered.

OFF : Simultaneously turns off all ISPSUs, In-Flight Entertainment (IFE) and Cabin Connectivity systems.

PAX PERSONAL ELEC SPLY PB-SW ◁

Ident.: DSC-46-40-30-00017629.0001001 / 21 MAR 17
Applicable to: ALL



The pushbutton-switch described here below is installed on the 56VU panel on the overhead panel.

AUTO ◁ : All ISPSUs, In-Flight Entertainment (IFE) and Cabin Connectivity systems are powered, if the pushbutton-switch located in the forward cabin is also in the on position

OFF : Simultaneously turns off all ISPSUs, In-Flight Entertainment (IFE) system and Cabin Connectivity systems.

INOP ◁ : This label indicates that the ISPSS has been deactivated and is inoperative.

MEMO DISPLAY

Ident.: DSC-46-40-30-00017628.0001001 / 10 NOV 15
Applicable to: ALL

"GSM DISC < 4 MN" : This memo appears in green, if the cockpit switch "Mobile Com" is pushed. It initiates a shutdown of the Cabin Connectivity systems within 4 minutes. The message disappears when the shutdown is completed.

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AIRCRAFT SYSTEMS

APU

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DSC-49-10 Description

DSC-49-10-10 General

DSC-49-10-20 Main Components

DSC-49-20 Controls and Indicators

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GENERAL

Ident.: DSC-49-10-10-A-00017436.0001001 / 21 MAR 17
Applicable to: ALL

The Auxiliary Power Unit (APU) is a self-contained unit that supplies the aircraft with pneumatic and electrical power.

On the ground

- It supplies bleed air for starting the engines and for the air conditioning system
- It supplies electrical power to the electrical system.

During takeoff

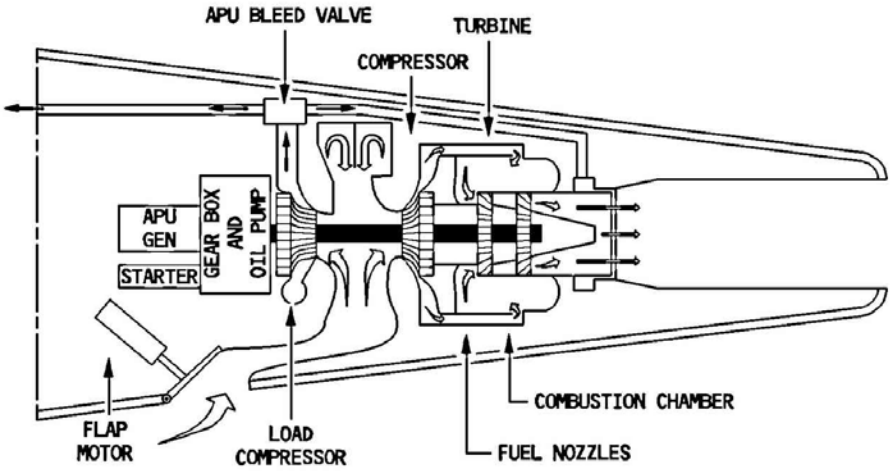
- It supplies bleed air for air conditioning (for example, when optimum aircraft performance is required).

In flight

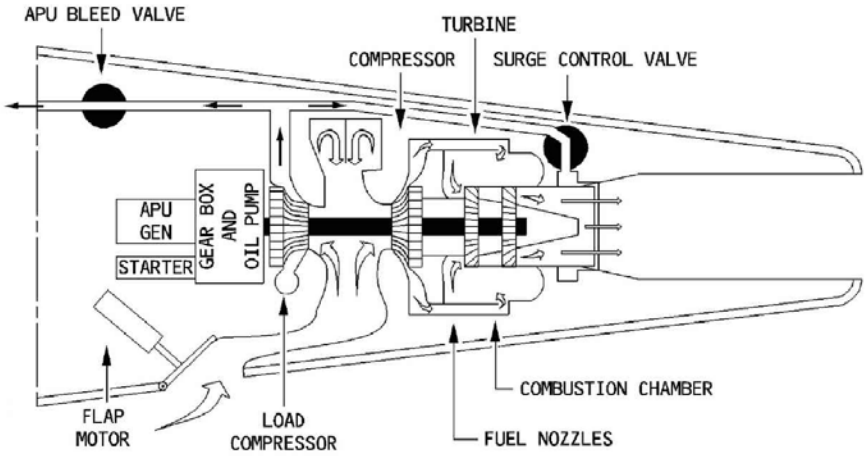
- It backs up the electrical system
- It backs up the air conditioning
- It can be used to start the engines.

The APU may obtain power for starting from the aircraft's batteries or normal electrical system, or from ground service.
APU starting is permitted throughout the normal flight envelope (*Refer to LIM-APU Operational Envelope*).

Ident.: DSC-49-10-10-A-00017437.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547



Ident.: DSC-49-10-10-A-00017437.0003001 / 21 MAR 16
Applicable to: MSN 1882-2078



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APU ENGINE

Ident.: DSC-49-10-20-00001528.0001001 / 21 MAR 16
Applicable to: ALL

The basic element of the APU is a single-shaft gas turbine that delivers mechanical shaft power for driving the accessory gearbox (electrical generator, starter, etc.) and produces bleed air (engine starting and pneumatic supply).

ELECTRONIC CONTROL BOX

Ident.: DSC-49-10-20-00001529.0001001 / 21 MAR 16
Applicable to: ALL

The Electronic Control Box (ECB) is a full-authority digital electronic controller that performs the bulk of the APU system logic for all modes of engine operation, such as :

- Sequences the start and monitors it.
- Monitors speed and temperature.
- Monitors bleed air.
- Sequences the shutdown.
- Controls the automatic shutdown.

AIR INTAKE SYSTEM

Ident.: DSC-49-10-20-00001530.0001001 / 21 MAR 16
Applicable to: ALL

The air intake and an electrically operated flap allow external air to reach the compressor inlet.

STARTER

Ident.: DSC-49-10-20-00001531.0001001 / 21 MAR 16
Applicable to: ALL

The ECB controls the electric starter. The starter engages if the air intake is fully open and the MASTER SW and the START pushbutton are ON.

FUEL SYSTEM

Ident.: DSC-49-10-20-00001532.0001001 / 21 MAR 16
Applicable to: ALL

The left fuel feed line supplies the APU.
The required pressure is normally available from tank pumps.
If pressure is not available (batteries only or pumps off) the APU FUEL PUMP starts automatically.
The ECB controls the fuel flow.

OIL SYSTEM

Ident.: DSC-49-10-20-00001533.0001001 / 21 MAR 16
Applicable to: ALL

The APU has an integral independent lubrication system (for lubrication and cooling).

INLET GUIDE VANES (IGV)

Ident.: DSC-49-10-20-00001534.0001001 / 21 MAR 16
Applicable to: ALL

The IGVs control bleed air flow, and a fuel-pressure-powered actuator positions the IGVs.
The ECB controls the actuator in response to aircraft demand.

AIR BLEED SYSTEM

Ident.: DSC-49-10-20-00001535.0002001 / 03 FEB 11
Applicable to: MSN 3408-4547

The air bleed system is fully automatic.
The APU speed is always 100 % whatever the air bleed system demand and the ground/flight configuration are.

AIR BLEED SYSTEM

Ident.: DSC-49-10-20-00001535.0003001 / 03 FEB 11
Applicable to: MSN 1882-2078

The air bleed system is fully automatic.
The ECB always sets the APU speed to 100 % except for air conditioning demand, if the ambient temperature is between -18 °C and 35 °C. In this case, the ECB sets the APU speed to 99 %. For all other ambient temperatures (less than -18 °C or more than 35 °C), the ECB sets the APU speed to 100 %.

CONTROLS

Ident.: DSC-49-10-20-00001536.0001001 / 21 MAR 16
Applicable to: ALL

The flight crew uses the controls on the APU panel for routine shutdown. For emergency shutdown :
- the flight crew can push the APU FIRE handle, or
- the ground crew can push the APU SHUT OFF pushbutton on the interphone panel under the nose fuselage.

GROUND OPERATION SAFETY DEVICES

Ident.: DSC-49-10-20-00001537.0001001 / 21 MAR 16
Applicable to: ALL

The APU may run without cockpit crew supervision when the aircraft is on the ground. In case of fire in the APU compartment :

- APU fire warnings operate in the cockpit.
- A horn in the nose gear bay sounds.
- The AVAIL light goes out.
- The FAULT light in the MASTER SW lights up.
- The APU shuts down.
- The APU fire extinguisher discharges.

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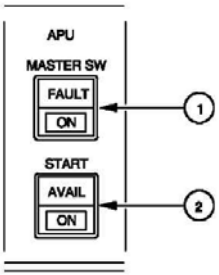
OVERHEAD PANEL

Ident.: DSC-49-20-A-00017438.0001001 / 21 MAR 16
Applicable to: ALL



Ident.: DSC-49-20-A-00017685.0003001 / 21 MAR 16
Applicable to: MSN 3408-4547

(1) MASTER SW pb-sw

This switch controls the electric power supply for the operation of the APU and its protective features. It also controls the starting and shutdown sequences.

ON : The blue ON light comes on.
Electric power goes to the APU system; the ECB performs a power-up test.
The APU air intake flap opens.
The APU fuel isolation valve opens.
If no fuel tank pump is running, the APU fuel pump operates.
If the aircraft has ground power or main generator power, the APU page appears on the ECAM display.

OFF : Manual shutdown sequence.

- The ON light on the MASTER SW pb-sw, and the AVAIL light on the START pb go out.
- If the aircraft was using APU bleed air, the APU keeps running for a cooling period of 60 to 120 s.
- At 7 % the air inlet flap closes.

FAULT lt : Depending on version of the ECB, this amber light comes on, and a caution appears on ECAM, when an automatic APU shutdown occurs, which can happen in case of:

- Fire (on ground only)
- Air inlet flap closed
- Overspeed
- No acceleration
- Slow start
- EGT overtemperature
- No flame
- Reverse flow
- Low oil pressure
- High oil temperature
- DC power lost (BAT OFF when aircraft on batteries only)
- Overcurrent
- Sensor failure
- IGV failure
- ECB failure
- No speed
- Underspeed
- Loss of overspeed protection
- Oil system shutdown
- Inlet overheat
- Clogged oil filter
- Loss of EGT thermocouples

Note: *In the case of an automatic, non-emergency shutdown, the air inlet flap closes 15 min after the APU speed is lower than 7%. If an automatic, non-emergency shutdown happens on ground, the 15 min countdown starts after liftoff.*

Ident.: DSC-49-20-A-00017685.0002001 / 21 MAR 16
Applicable to: MSN 1882-2078

(1) MASTER SW pb-sw

This switch controls the electric power supply for the operation of the APU and its protective features. It also controls the starting and shutdown sequences.

ON : The blue ON light comes on.
Electric power goes to the APU system; the ECB performs a power-up test.
The APU air intake flap opens.
The APU fuel isolation valve opens.
If no fuel tank pump is running, the APU fuel pump operates.
If the aircraft has ground power or main generator power, the APU page appears on the ECAM display.

OFF : Manual shutdown sequence.

- The ON light on the MASTER SW pb-sw, and the AVAIL light on the START pb go out.
- If the aircraft was using APU bleed air, the APU keeps running for a cooling period of 60 to 120 s.
- At 7 % the air inlet flap closes.

FAULT lt : Depending on version of the ECB, this amber light comes on, and a caution appears on ECAM, when an automatic APU shutdown occurs, which can happen in case of:

Fire (on ground only)
Air inlet flap closed
Overspeed
No acceleration
Slow start
EGT overtemperature
No flame
Reverse flow
Low oil pressure
High oil temperature
DC power lost (BAT OFF when aircraft on batteries only)
Overcurrent
Sensor failure
IGV failure
ECB failure
No speed
Underspeed
Loss of overspeed protection
Oil system shutdown
Inlet overheat
Clogged oil filter
Loss of EGT thermocouples

Ident.: DSC-49-20-A-00017439.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

(2) START pb-sw

ON : Blue ON light comes on.
- When the flap is completely open, the APU starter is energized.
- 1.5 s after the starter is energized, the ignition is turned ON.
- When N = 55 %. The APU starter is de-energized. The ignition is turned off.
- 2 s after N reached 95 %, or when N is above 99.5 %:
  The ON light on the START pb goes out.
  The APU may now supply bleed air and electrical power to the aircraft systems.
- 10 s later, the APU page disappears from the ECAM display.

AVAIL lt : This green light comes on when N is above 99.5 % or 2 s after N reaches 95 %.

Ident.: DSC-49-20-A-00017439.0003001 / 21 MAR 16
Applicable to: MSN 1882-2078

(2) START pb-sw

ON : Blue ON light comes on.

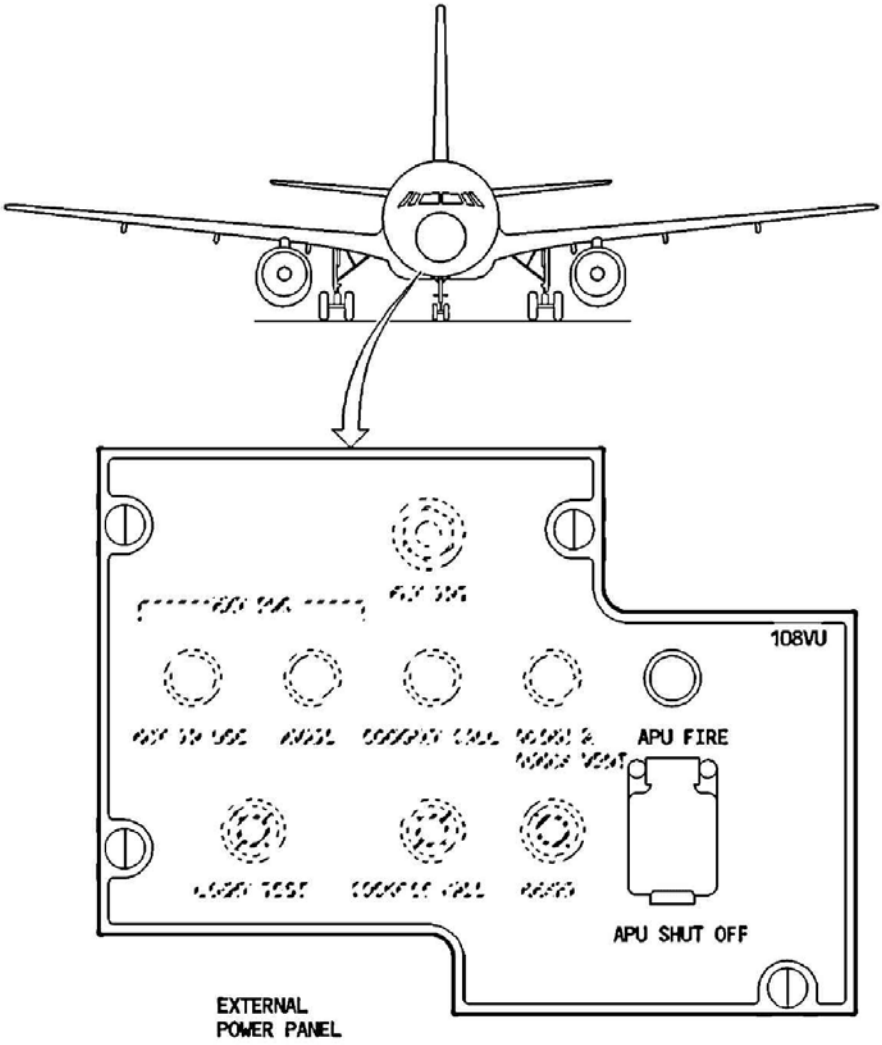
- When the flap is completely open, the starter is energized.
- 1.5 s after the starter is energized, the ignition turns on.
- When N = 60 %. The APU starter is de-energized. The ignition is turned off.
- 2 s after N reached 95 %, or when N is above 99.5 %:
  The ON light on the START pb goes out.
  The APU may now supply bleed air and electrical power to the aircraft systems.
- 10 s later, the APU page disappears from the ECAM display.

AVAIL lt : This green light comes on when N is above 99.5 % or 2 s after N reaches 95 %.

EXTERNAL CONTROLS

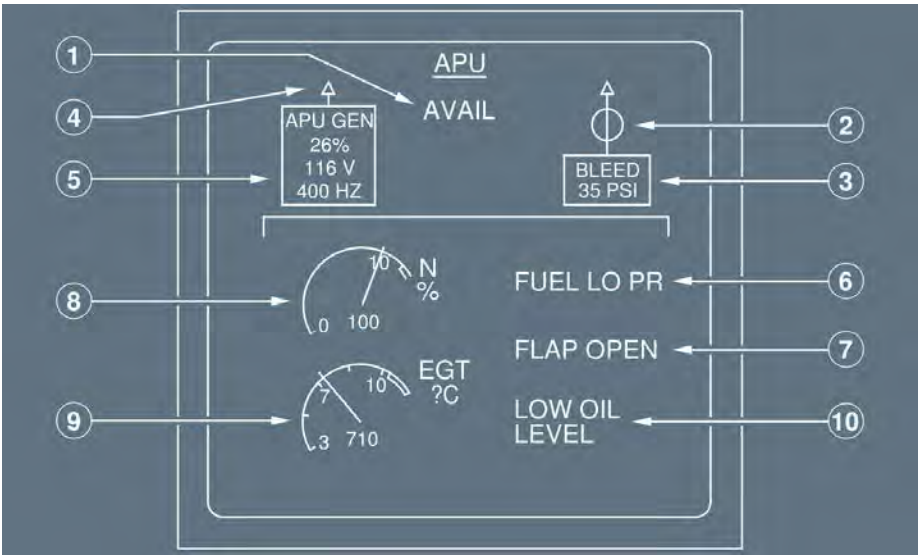
Ident.: DSC-49-20-00001539.0001001 / 21 MAR 16

Applicable to: ALL



ECAM APU PAGE

Ident.: DSC-49-20-B-00017440.0001001 / 21 MAR 16
Applicable to: ALL



Ident.: DSC-49-20-B-00017441.0002001 / 21 MAR 16
Applicable to: MSN 3408-4547

(1) AVAIL

Displayed in green when APU N is above 99.5 % or 2 s after N is above 95 %.

Ident.: DSC-49-20-B-00017441.0001001 / 21 MAR 16
Applicable to: MSN 1882-2078

(1) AVAIL

Displayed in green when APU N is above 95 %.

Ident.: DSC-49-20-B-00017442.0001001 / 21 MAR 16
Applicable to: ALL

(2) APU bleed air valve position

Inline-Green	:	The APU bleed air valve is not closed.
Crossline-Green	:	The APU bleed air valve is closed.
Crossline-Amber	:	The APU bleed air valve is closed and the APU bleed is ON.

XX-Amber : The APU bleed air valve status information is not available, or the APU BLEED pb status is not available.

Ident.: DSC-49-20-B-00017443.0001001 / 21 MAR 16
Applicable to: ALL

(3) APU bleed air pressure

This box displays the relative bleed air pressure in green.
It shows an amber XX when the ADIRS1 or the ADIRS2 is not available or selected OFF or the data from the ECB are invalid or not transmitted.

Ident.: DSC-49-20-B-00017444.0001001 / 21 MAR 16
Applicable to: ALL

(4) APU GEN line contactor indication

Displayed in green when the APU GEN line contactor is closed.

Ident.: DSC-49-20-B-00017445.0001001 / 21 MAR 16
Applicable to: ALL

(5) APU GEN parameters

Identical to the APU GEN parameters on the ELEC page.

Ident.: DSC-49-20-B-00017446.0001001 / 21 MAR 16
Applicable to: ALL

(6) FUEL LO PR

Displayed in amber if APU fuel pressure gets low.

Ident.: DSC-49-20-B-00017447.0003001 / 21 MAR 16
Applicable to: ALL

(7) FLAP OPEN

- Displayed in green when APU air intake flap is fully open.
- Advisory if the flap is not fully closed 3 min after the MASTER sw has been turned OFF.

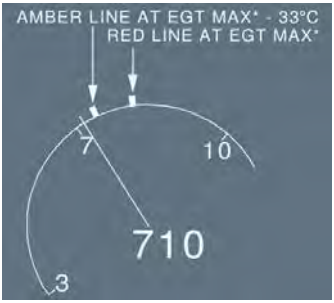
Ident.: DSC-49-20-B-00017448.0001001 / 21 MAR 16
Applicable to: ALL

(8) APU N

- Displays APU speed in green.
- Becomes amber when N ≥ 102 %.
- Becomes red when N ≥ 107 %.

Ident.: DSC-49-20-B-00017449.0002001 / 06 SEP 16
Applicable to: MSN 3408-4547

(9) APU EGT



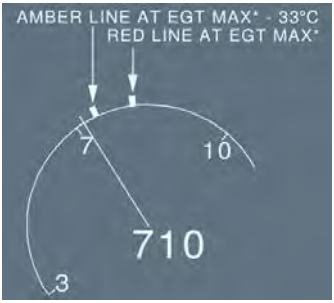
- Displays APU EGT in green.
- Becomes amber when EGT ≥ EGT MAX -33 °C.
- Becomes red when EGT ≥ EGT MAX (automatic shutdown begins).

Note: *ECB calculates EGT MAX and transmits it to the ECAM. It is a function of N during start, and a function of ambient temperature when the APU is running.*
Maximum EGT during start: 982 °C.
Maximum EGT with APU running:

- *682 °C during at least 5 s.*
- *or, 700 °C to 742 °C depending on the ambient temperature.*

Ident.: DSC-49-20-B-00017449.0003001 / 06 SEP 16
Applicable to: MSN 1882-2078

(9) APU EGT



- Displays APU EGT in green.
- Becomes amber when EGT ≥ EGT MAX -33 °C.
- Becomes red when EGT ≥ EGT MAX (automatic shutdown begins).

Note: *ECB calculates EGT MAX and transmits it to the ECAM. It is a function of N during start, and a function of ambient temperature when the APU is running.*
Maximum EGT during start: 1 120 °C (above 35 000 ft).
Maximum EGT during start: 1 090 °C (below 35 000 ft).
Maximum EGT with APU running: 675 °C.

Ident.: DSC-49-20-B-00017450.0001001 / 21 MAR 16
Applicable to: ALL

(10) LOW OIL LEVEL

Advisory: Displayed if the ECB detects a low APU oil level when the aircraft is on the ground, and the APU is not running.

MEMO DISPLAY

Ident.: DSC-49-20-00016689.0001001 / 21 MAR 16
Applicable to: ALL

APU AVAIL : This memo appears in green, when APU N is above 99.5 % or 2 s after N is above 95 % (depending on the aircraft configuration).

AIRCRAFT SYSTEMS

DOORS

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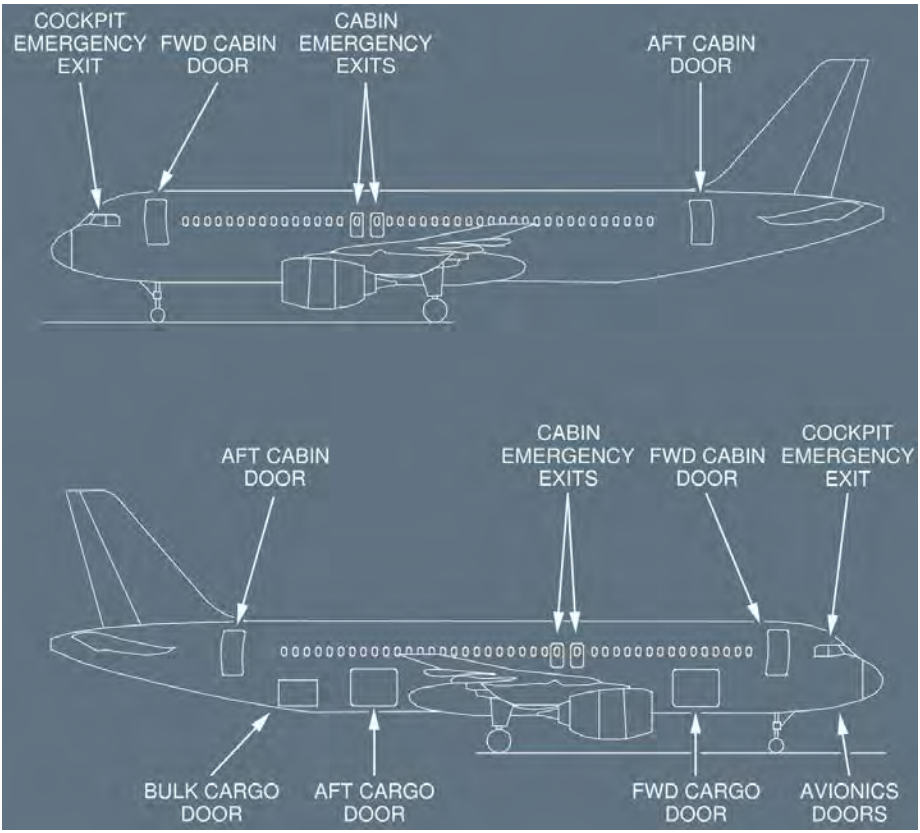
Continued from the previous page

DESCRIPTION

Ident.: DSC-52-10-10-00001544.0002001 / 22 MAY 12
Applicable to: MSN 3408, 4100-4547

The A320's fuselage has:

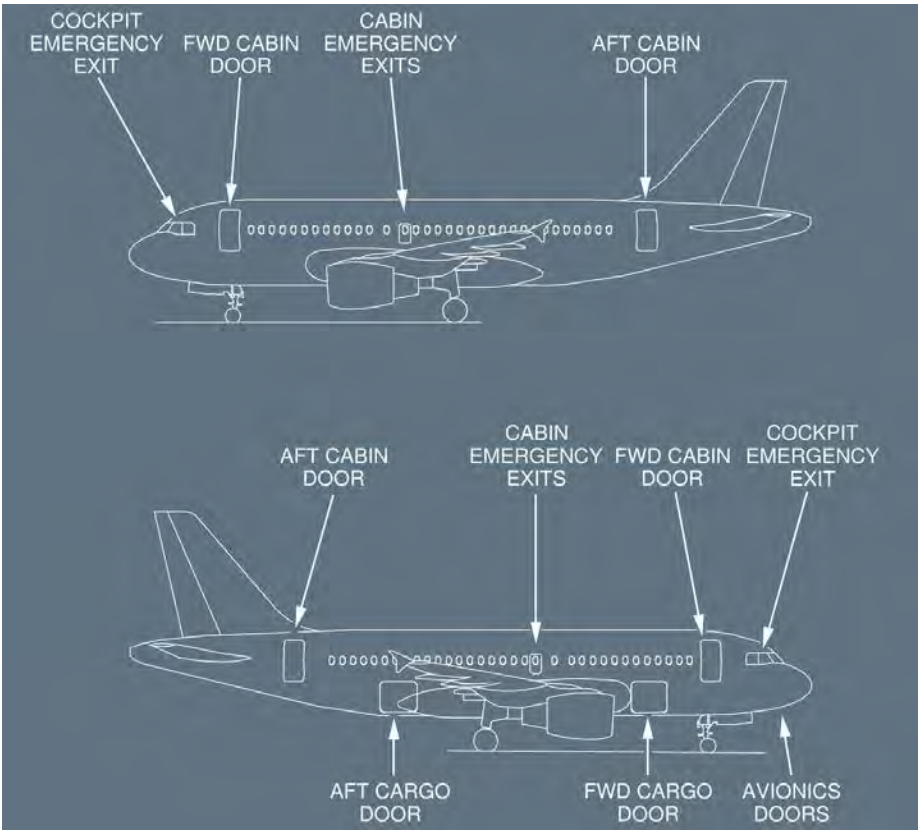
- Four passenger doors
- Four emergency exits in the cabin
- Cockpit emergency exits (two sliding windows)
- Three cargo compartment doors
- Four avionic compartment access doors.



DESCRIPTION

Ident.: DSC-52-10-10-00001544.0004001 / 22 MAY 12
Applicable to: MSN 1882-2078, 3467-3518

The A319's fuselage has:
- Four passenger doors
- Two emergency exits in the cabin
- Cockpit emergency exits (two sliding windows)
- Two cargo compartment doors
- Four avionic compartment access doors.



GENERAL

Ident.: DSC-52-10-20-00017564.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has four plug-type doors that open outward and forward. There are two doors on each side of the fuselage (one door in the FWD section and one door in the AFT section).
The doors are operated from inside or outside of the aircraft. Normal operation is manual, with hydraulic damping.

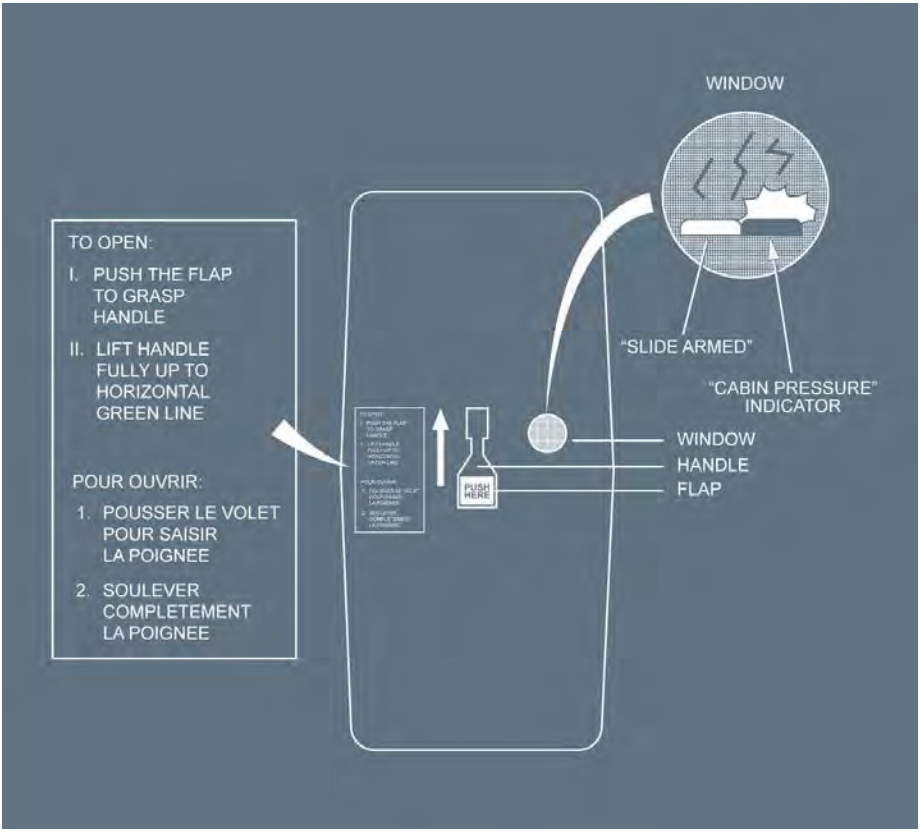
Each door has emergency features:
- An escape slide stowed in a container attached to the inboard lower side of the door
- A damper actuator in normal mode, the damper actuator limits the door travel; in emergency mode, the damper actuator drives the automatic door opening
- A slide arming lever.

When the slide arming lever is in the ARMED position, the slide is connected to the floor brackets on both sides of the door. When the door is open, the slide inflates and deploys automatically. If the inflation bottle fails to discharge automatically, a crew member can open its valve to make it discharge. Opening the door from outside disarms the door and the escape slide.

Each passenger door has :
- A mechanical locking indicator that confirms the locked or unlocked position of the door
- One warning light to show the ARMED or DISARMED indication of the escape slides
- One CABIN PRESSURE warning light that illuminates in the case of a residual pressure in the cabin.

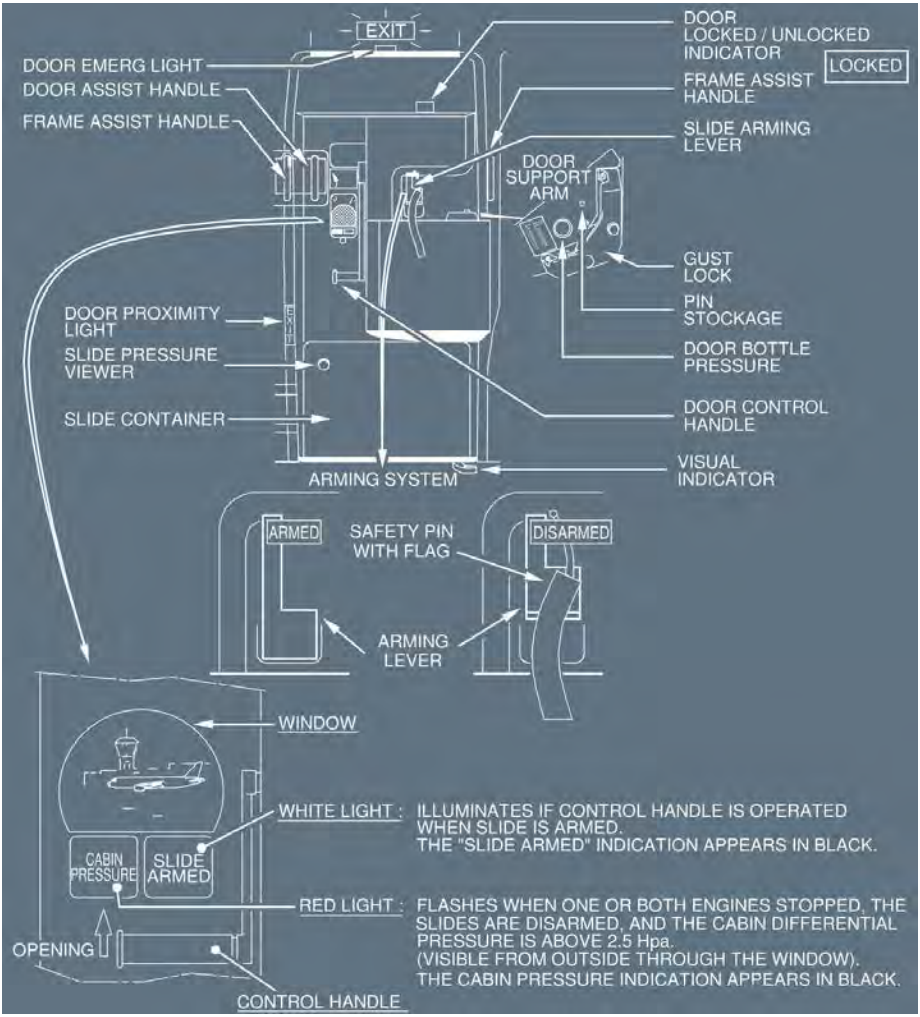
OUTSIDE

Ident.: DSC-52-10-20-00017565.0001001 / 21 MAR 16
Applicable to: ALL



INSIDE

Ident.: DSC-52-10-20-00001547.0002001 / 22 MAY 12
Applicable to: ALL



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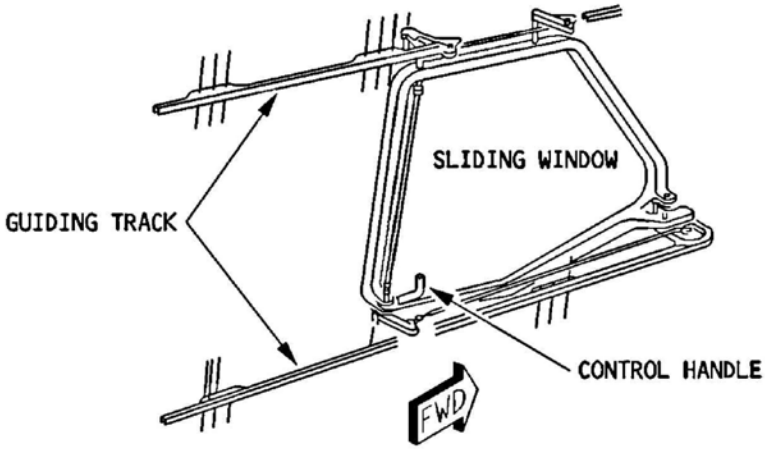
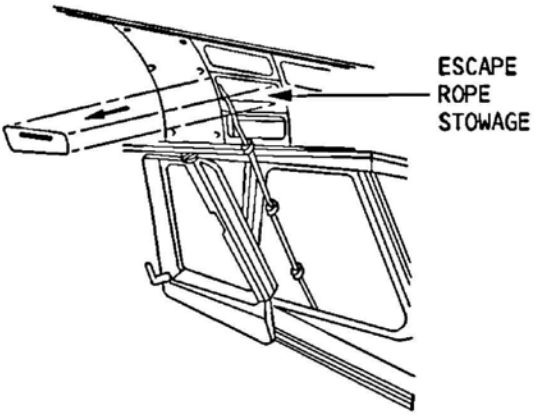
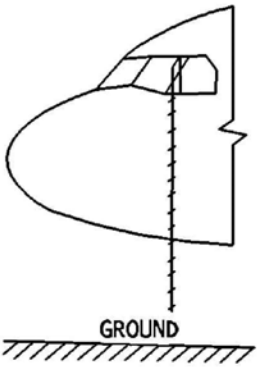
COCKPIT

Ident.: DSC-52-10-30-00017567.0001001 / 21 MAR 16
Applicable to: ALL

The two sliding windows in the cockpit are flight crew emergency exits.
A small compartment, located above each window, contains an escape rope that is long enough to reach the ground when lowered through either sliding window. The cockpit windows can only be opened from inside.





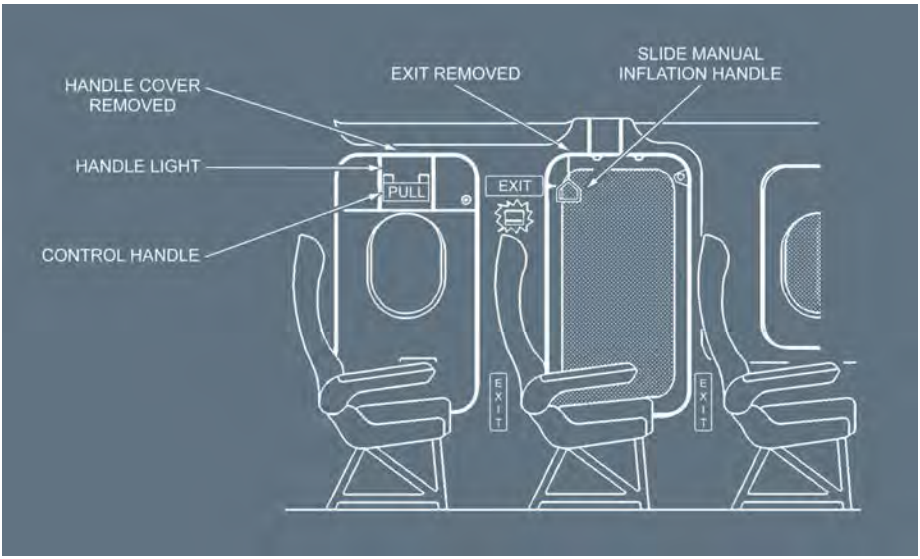


Emergency cockpit evacuation is also possible through the cockpit door escape panel . This panel is designed to be pushed open in the direction of the cabin after removal of the quick-release pins.

CABIN

Ident.: DSC-52-10-30-00017568.0001001 / 06 DEC 16
Applicable to: MSN 3408, 4100-4547

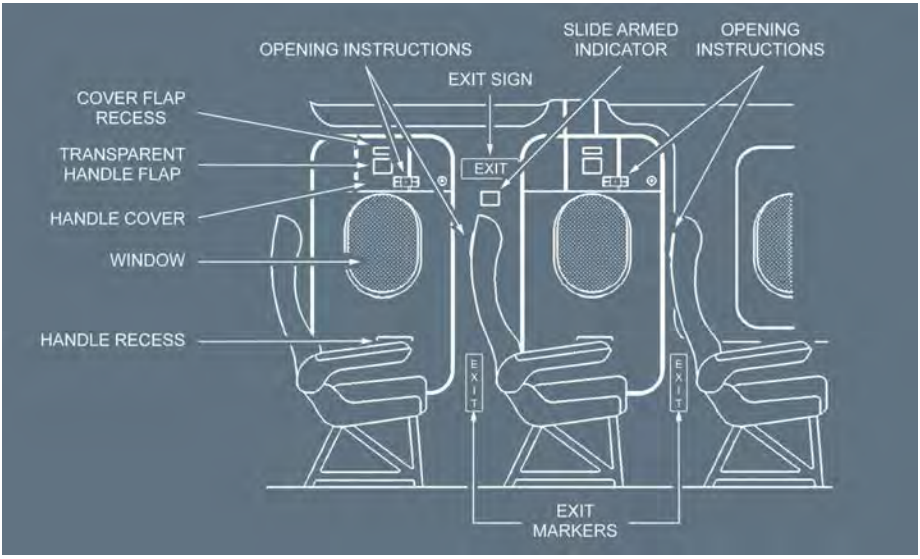
Two emergency exits are located on each side of the cabin, in addition to the passenger doors. The emergency exits are also equipped with escape slides. In the case of an emergency, the exits open inwards.



The slides of the overwing emergency exits are always in armed configuration.

To open :

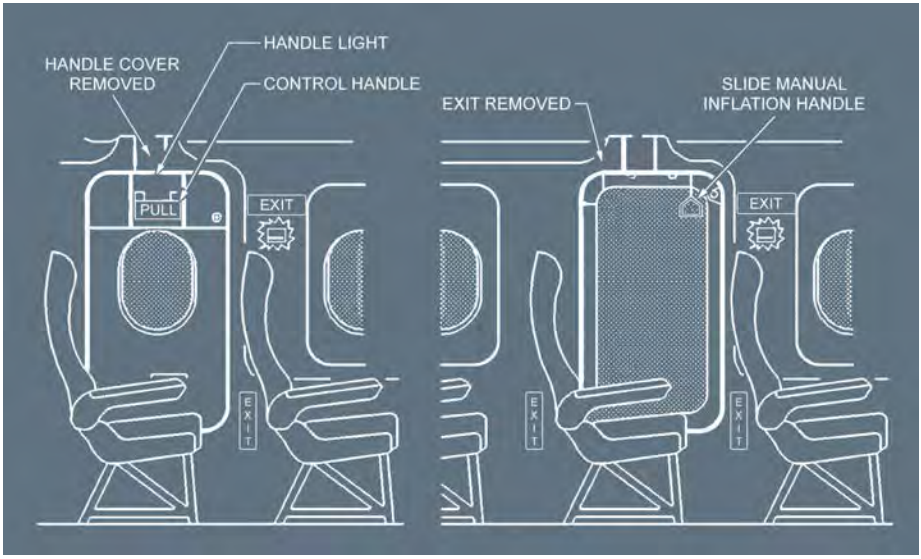
- Remove HANDLE COVER : The HANDLE LIGHT and SLIDE ARMED indicator illuminate
- Pull CONTROL HANDLE : The EXIT moves inwards
- Lift EXIT from frame by holding the HANDLE RECESS
- Throw EXIT out.



CABIN

Ident.: DSC-52-10-30-00017568.0002001 / 20 MAR 17
Applicable to: MSN 1882-2078, 3467-3518

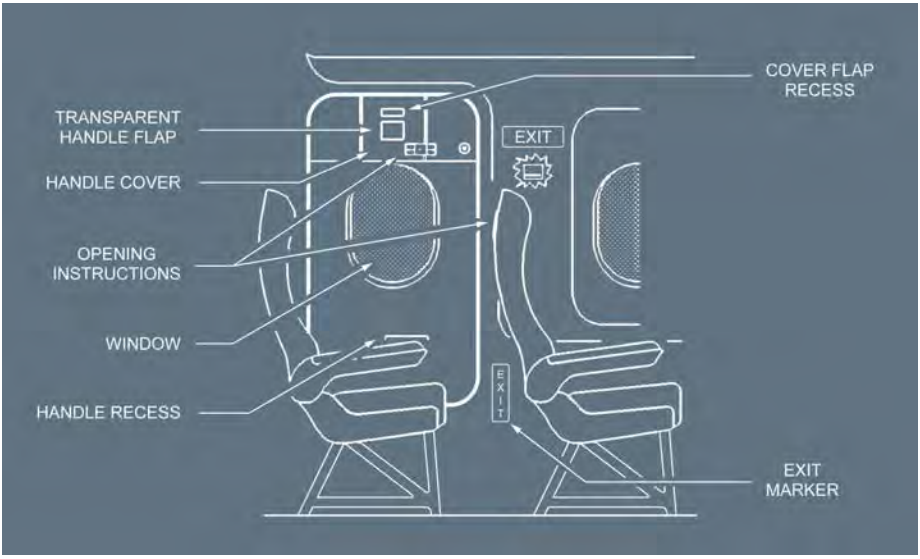
One emergency exits is located on each side of the cabin, in addition to the passenger doors. The emergency exit is also equipped with an escape slide. In the case of an emergency, the exit opens inwards.



The slide of the overwing emergency exits is always in armed configuration.

To open:

- Remove HANDLE COVER : The HANDLE LIGHT and SLIDE ARMED indicator illuminate
- Pull CONTROL HANDLE : The EXIT moves inwards
- Lift EXIT from frame by holding the HANDLE RECESS
- Throw EXIT out.


COVER FLAP RECESS
TRANSPARENT HANDLE FLAP
EXIT
HANDLE COVER
OPENING INSTRUCTIONS
WINDOW
EXIT
HANDLE RECESS
EXIT MARKER

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GENERAL

Ident.: DSC-52-10-40-00017569.0001001 / 21 MAR 16
Applicable to: ALL

The aircraft has two cargo doors (FWD and AFT cargo doors) on the right side of the fuselage below the cabin floor.

FWD AND AFT CARGO DOORS

Ident.: DSC-52-10-40-00017570.0001001 / 21 MAR 16
Applicable to: ALL

The FWD and AFT cargo doors hydraulically open outward and upward. The doors are hydraulically operated by the yellow hydraulic system. The door locking system (locked open/locked closed) is mechanical.
If the electric pump of the yellow hydraulic system fails, the system can be powered by using a hand pump, located on the hydraulic maintenance panel.
The FWD and AFT cargo doors open only from outside.

Note: *When the electric pump operates the FWD or AFT cargo door, the remaining yellow system devices that operate are the brakes and the engine 2 thrust reverser.*

BULK CARGO DOOR ⏪

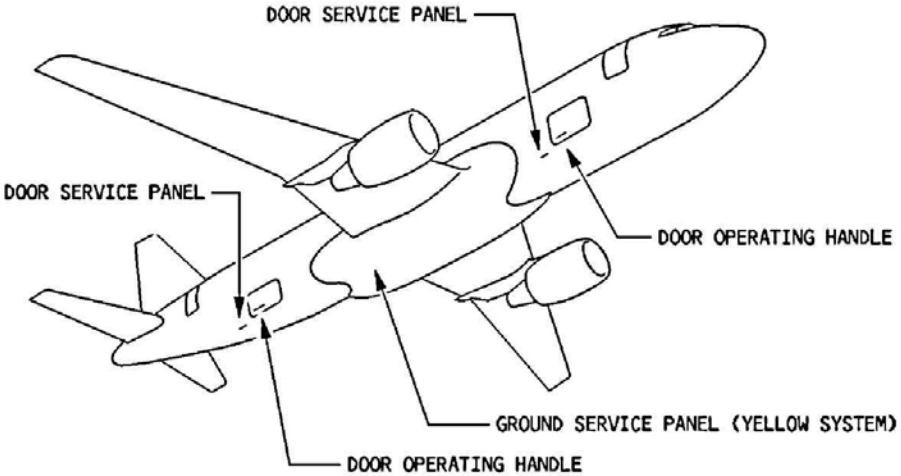
Ident.: DSC-52-10-40-00017571.0001001 / 21 MAR 16
Applicable to: ALL

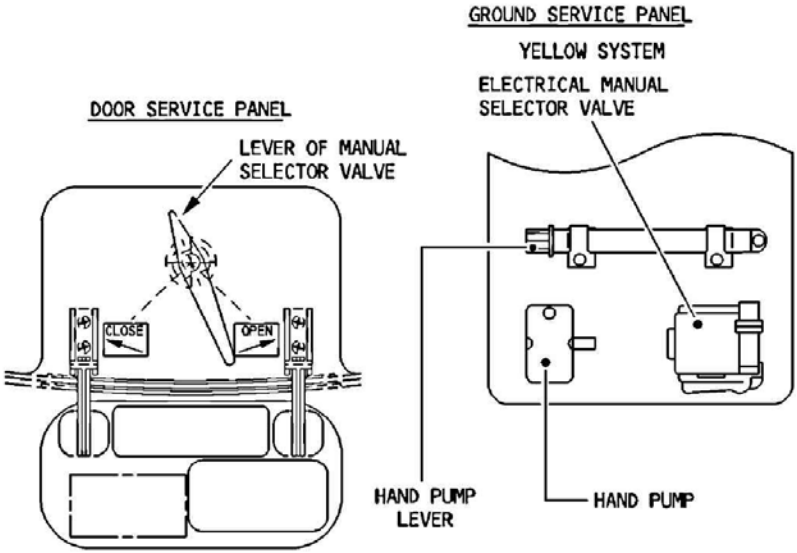
The bulk cargo door opens inward and upward. The bulk cargo door is a plug-type door. The door is mechanically locked and manually operated.
The bulk cargo door opens from the outside or from the inside.

LOCATION OF SERVICE PANELS

Ident.: DSC-52-10-40-00020676.0002001 / 17 MAR 17

Applicable to: ALL





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AVIONICS COMPARTMENT ACCESS DOOR

Ident.: DSC-52-10-50-00017579.0001001 / 21 MAR 16
Applicable to: ALL

Four avionics compartment access doors enable an external access to the avionics compartment.
The doors are manually operated, hinged doors. The doors open inwards.
These doors are in the lower fuselage, around the nose landing gear bay.

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COCKPIT DOOR

Ident.: DSC-52-10-60-00017573.0002001 / 21 MAR 17
Applicable to: ALL

Refer to DSC-52-40-10 Cockpit Door Description for information about the secured cockpit door.

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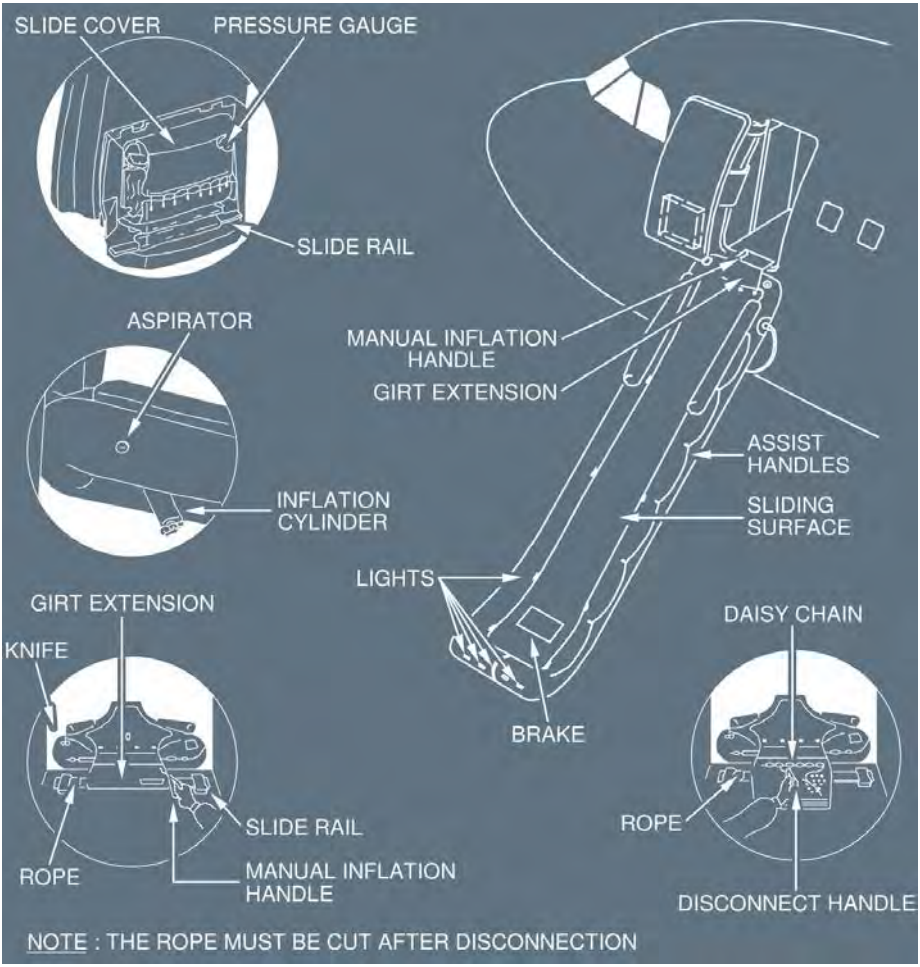
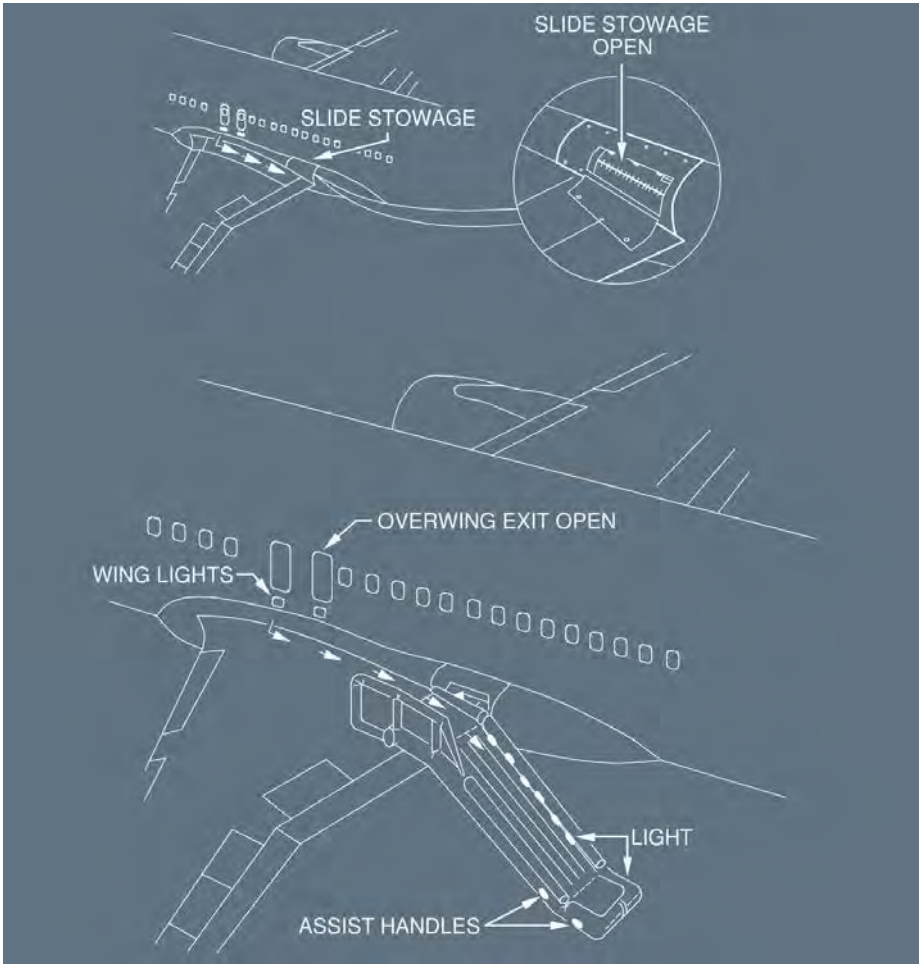
DOOR SLIDES

Ident.: DSC-52-10-80-00001555.0001001 / 09 OCT 12
Applicable to: ALL



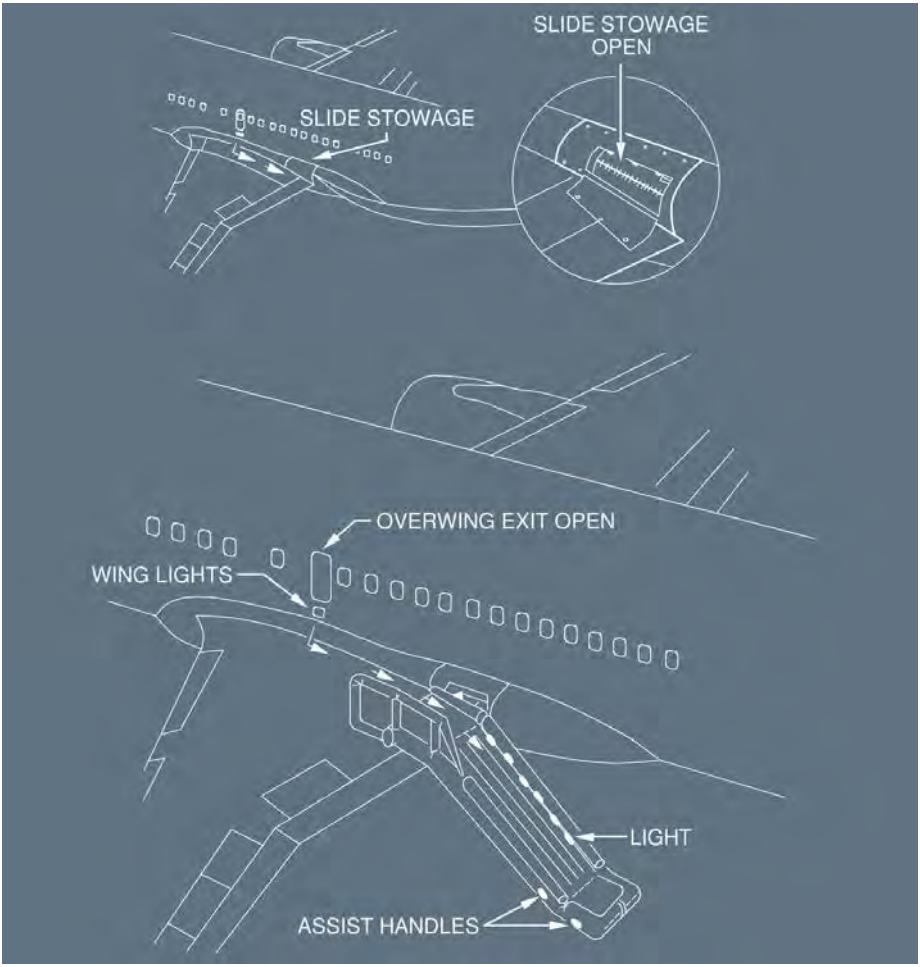
WING SLIDES

Ident.: DSC-52-10-80-00001556.0001001 / 09 OCT 12
Applicable to: MSN 3408, 4100-4547



WING SLIDES

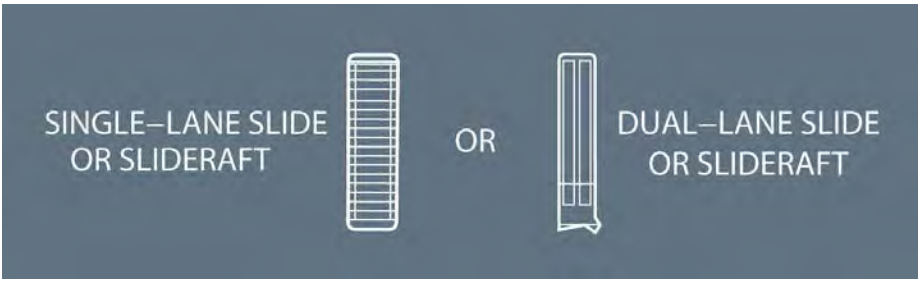
Ident.: DSC-52-10-80-00001556.0002001 / 09 OCT 12
Applicable to: MSN 1882-2078, 3467-3518



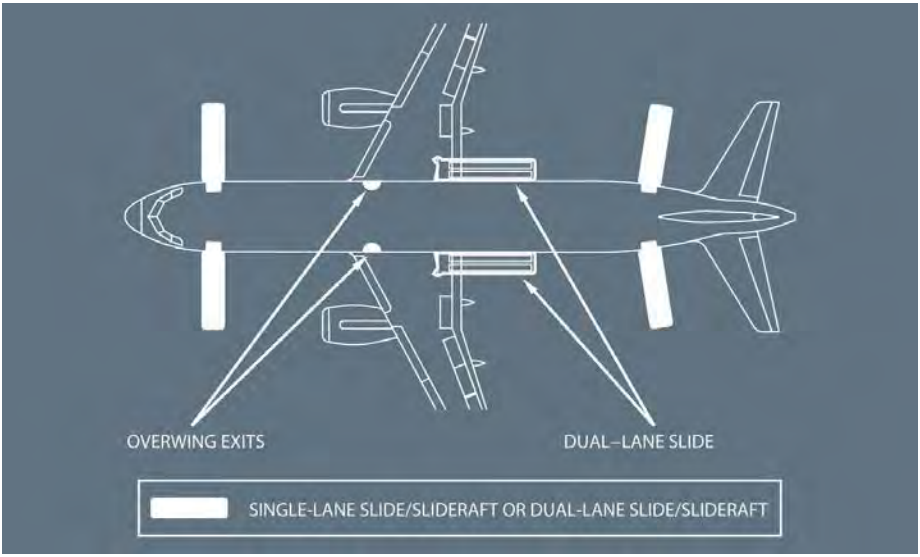
ESCAPE SLIDE ARRANGEMENT

Ident.: DSC-52-10-80-00017577.0003001 / 21 MAR 16
Applicable to: MSN 1882-2078, 3467-3518

There are two types of emergency slides: a single-lane escape slide/slideraft or a dual-lane escape slide/slideraft.



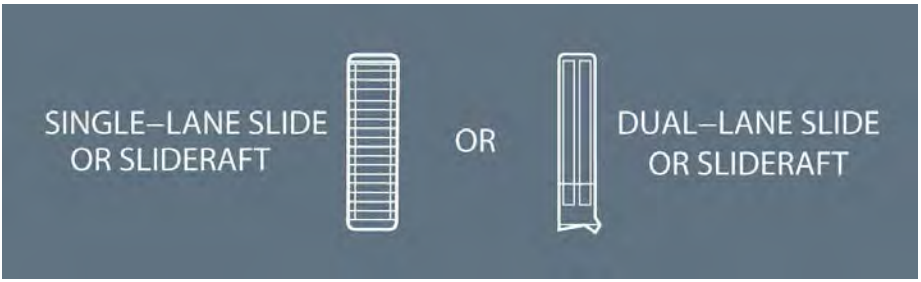
Each passenger door either has a single-lane escape slide/slideraft or a dual-lane escape slide/slideraft, and each emergency exit has a dual-lane escape slide.



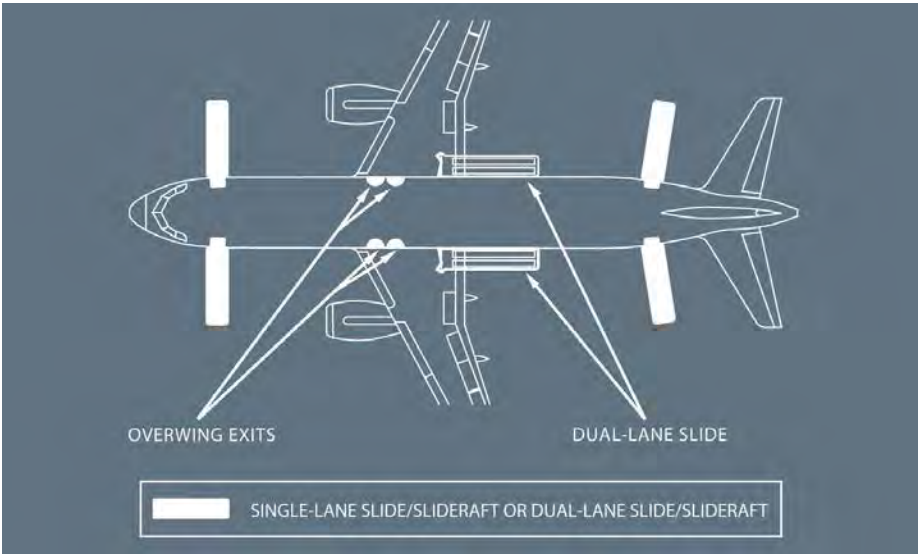
ESCAPE SLIDE ARRANGEMENT

Ident.: DSC-52-10-80-00017577.0001001 / 21 MAR 16
Applicable to: MSN 3408, 4100-4547

There are two types of emergency slides: a single-lane escape slide/slideraft or a dual-lane escape slide/slideraft.



Each passenger door either has a single-lane escape slide, or a single-lane slideraft, and each emergency exit has a dual-lane escape slide.



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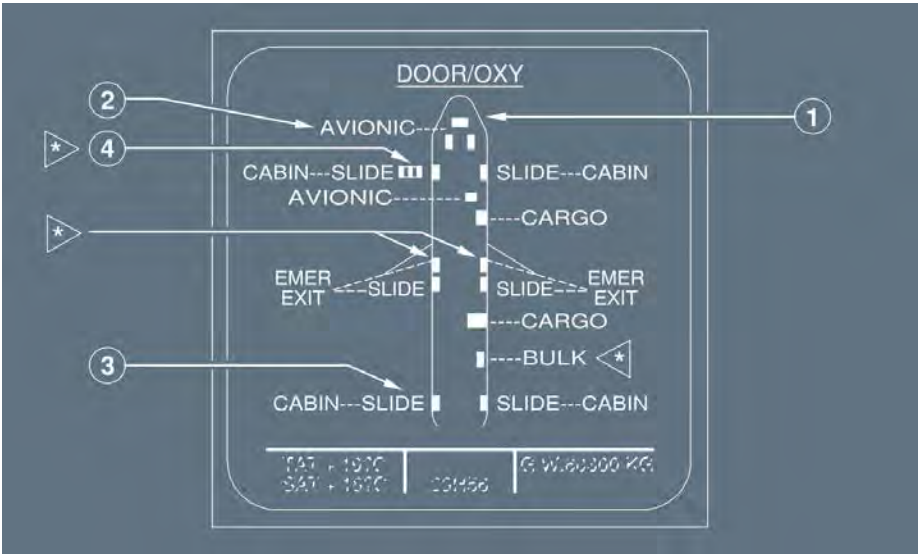
DOOR/OXY SD PAGE

Ident.: DSC-52-20-00017645.0001001 / 21 MAR 16
Applicable to: ALL



(1) Door symbol

Green □ : The door is closed and locked.

Amber ■ : The door is not locked.

(2) Door indication

This appears in amber, when the door is not locked.

(3) SLIDE indication

This appears in white, when the slide is armed.

(4) Stair symbol

This appears in amber, when the stair door is not closed.

Note: For aircraft without FWD EMER EXIT doors, the FWD EMER EXIT door symbols are always displayed in green.

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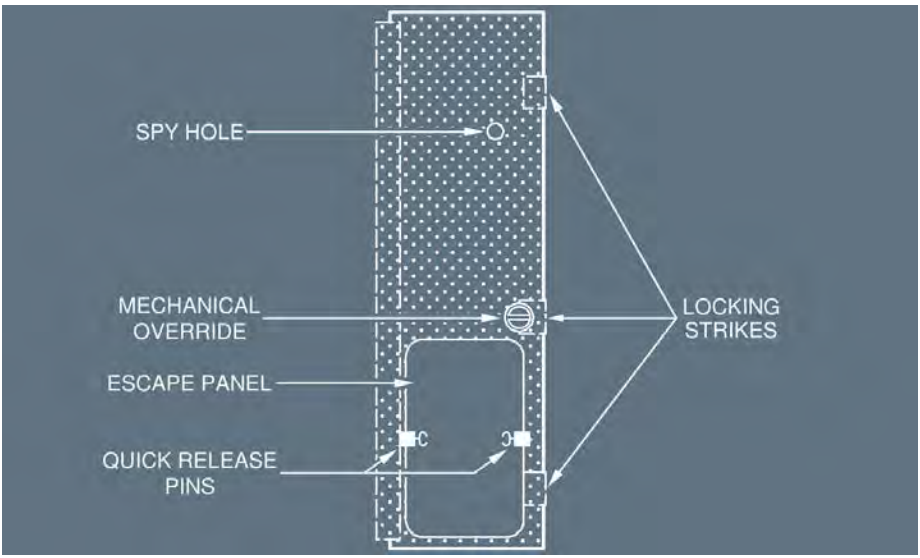
COCKPIT DOOR DESCRIPTION

Ident.: DSC-52-40-10-00017010.0001001 / 17 MAR 17
Applicable to: ALL

A forward-opening hinge door separates the cockpit from the passenger compartment. It has three electric locking strikes, controlled by the flight crew. In normal conditions, when the door is closed, they remain locked. When there is a request to enter the cockpit, the flight crew can authorize entry by unlocking the door, that remains closed until it is pushed open.
When the flight crew does not respond to requests for entry, the door can also be unlocked by the cabin crew, by entering a two to seven-digit code (programmed by the airline) on the keypad, installed on the lateral side of the Forward Attendant Panel (FAP).
The door is bulletproof and fully compliant with rapid decompression requirements.
A mechanical override enables the flight crew to open the door from the cockpit side.
A deadbolt ◁ is installed at the level of the center latch area of the cockpit door. This deadbolt bolts the door from the cockpit side, in the event that more than one locking latch strike fails, or in the case of a total CLS failure.



Note: *1. The escape panel enables the flight crew to evacuate the cockpit, in case of an emergency, when the door is jammed. This panel can only be removed from the cockpit side by pulling the quick release pins towards the center of the flap and kicking the panel open.*

2. In case of an electrical supply failure, the door is automatically unlocked, but remains closed.

COCKPIT DOOR LOCKING SYSTEM (CDLS)

Ident.: DSC-52-40-20-00001007.0001001 / 21 MAR 17
Applicable to: ALL

The Cockpit Door Locking System (CDLS) provides a means of electrically locking and unlocking the cockpit door. This system is mainly composed of :
- A keypad, located in the forward cabin, near the cockpit door,
- A toggle switch, located in the center pedestal's Cockpit Door panel,
- A control unit and its CKPT DOOR CONT normal panel, located on the overhead panel,
- A buzzer.

The keypad enables the cabin crew to request access to the cockpit. There are two different access request types : "Routine" and "Emergency" access request.
The toggle switch enables the flight crew to lock or unlock the cockpit door, following an access request, thereby allowing or denying the entry to the cockpit.

The cockpit door control unit is the system controller, in charge of :
- Locking or unlocking the door latches, upon flight crew action.
- Unlocking the door, in case of cockpit decompression (the door then opens towards the cockpit under differential pressure).
- Indicating system failures of electrical latches and pressure sensors.
- Activating the access request buzzer and turning on the keypad LEDs.

The buzzer sounds in the cockpit for 1 to 9 s to indicate that a routine access request has been made, or sounds continuously if an emergency access procedure has been initiated.

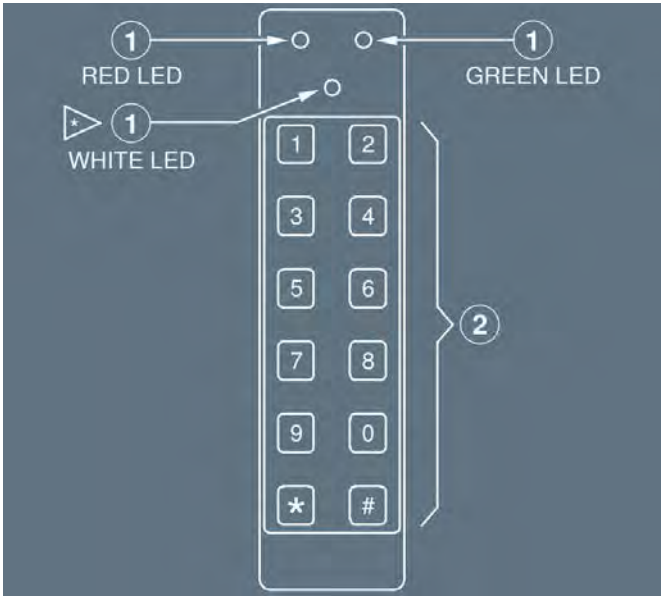
CONTROLS

Applicable to: ALL

Ident.: DSC-52-40-20-A-00001008.0001001 / 21 MAR 17

KEYPAD

The keypad is used by the cabin crew to request pilots to open the door.



(1) Locked/Unlocked Door Indicator

GREEN light ON	:	The door has been unlocked either by a flight crew action, or automatically (during 5 s) when no flight crew action is performed during the delay following an emergency access request. The door can be pushed open.
GREEN light flashes	:	An emergency request to enter the cockpit has been made; the buzzer will sound continuously in the cockpit, but no action has yet been taken by the flight crew.
RED light ON	:	The flight crew has denied access, and the door remains locked.
WHITE light ON ◁✻	:	The light comes on each time the cabin crew presses a key on the keypad.

(2) Digital Keypad

The keypad is used to sound the buzzer in the cockpit for 1 to 9 s (3 s by default), by entering a zero to seven-digit code, as programmed by the airline, followed by the '#' key. It is also used to enter the two to seven-digit emergency code, followed by the '#' key, when the flight crew does not respond.

Note: *During the test performed by the cockpit door control unit, the CDLS keypad remains operational, and the CDLS operates as follows:*
The control unit will store access codes that are entered, and the LOCKED/UNLOCKED DOOR INDICATOR (RED/GREEN LEDs) of the keypad will remain on, as long as the test is running.

- *If the correct access code is entered on the keypad, the buzzer will not sound, until the test is completed.*
- *If the emergency access code is entered, the door will unlock. The cockpit buzzer and the LOCKED/UNLOCKED DOOR INDICATOR will be inoperative.*

Ident.: DSC-52-40-20-A-00018437.0001001 / 17 MAR 17

CENTRAL PEDESTAL COCKPIT DOOR PANEL

The secured cockpit door opening is controlled by a toggle switch, located on the central pedestal.

(1) COCKPIT DOOR toggle switch

UNLOCK position : This position is used to enable the cabin crewmember to open the door. The switch must be pulled and maintained in the unlock position until the door is pushed open.

NORM position : All latches are locked, and EMERGENCY access is possible for the cabin crew.

LOCK position : Once the button has been moved to this position, the door is locked ; emergency access, the buzzer, and the keypad are inhibited for a preselected time (5 to 20 min).

Note: *1. If the LOCK position has not been used by the pilot, for at least 5 to 20 min, the cabin crew is able to request emergency access to open the cockpit door.*
2. The UNLOCK position overrides and resets any previous selection.
3. In case of an electrical supply failure, the cockpit door is automatically unlocked, but remains closed.

(2) COCKPIT DOOR Fault Open indicator

OPEN light ON : The door is not closed.

OPEN light flashes : The cabin crew has started an emergency access procedure. If there is no reaction from the flight crew, the door will unlock at the end of the adjustable time delay (15 to 120 s).

FAULT : This light comes on when a system failure has been identified (Example : Latch, pressure sensors, control unit).
The inoperative item can be identified by checking the strike and pressure sensor status lights on the CKPT DOOR CONT panel.

Ident.: DSC-52-40-20-A-00001010.0001001 / 09 OCT 12

OVERHEAD CONTROL PANEL

The Cockpit Door Locking System's control panel is located on the overhead panel.

(1) Strikes' status lights

Off : The corresponding (upper, mid, or lower) locking latch is operative.

On : The corresponding (upper, mid, or lower) locking latch is faulty.

(2) Pressure sensor

Two redundant differential pressure sensors enable rapid pressure variation in the cockpit to be detected, in order to command simultaneous opening of all latches when a defined pressure drop is detected.

(3) Pressure sensor status lights

Off : The corresponding (1 or 2) pressure sensor is operative.

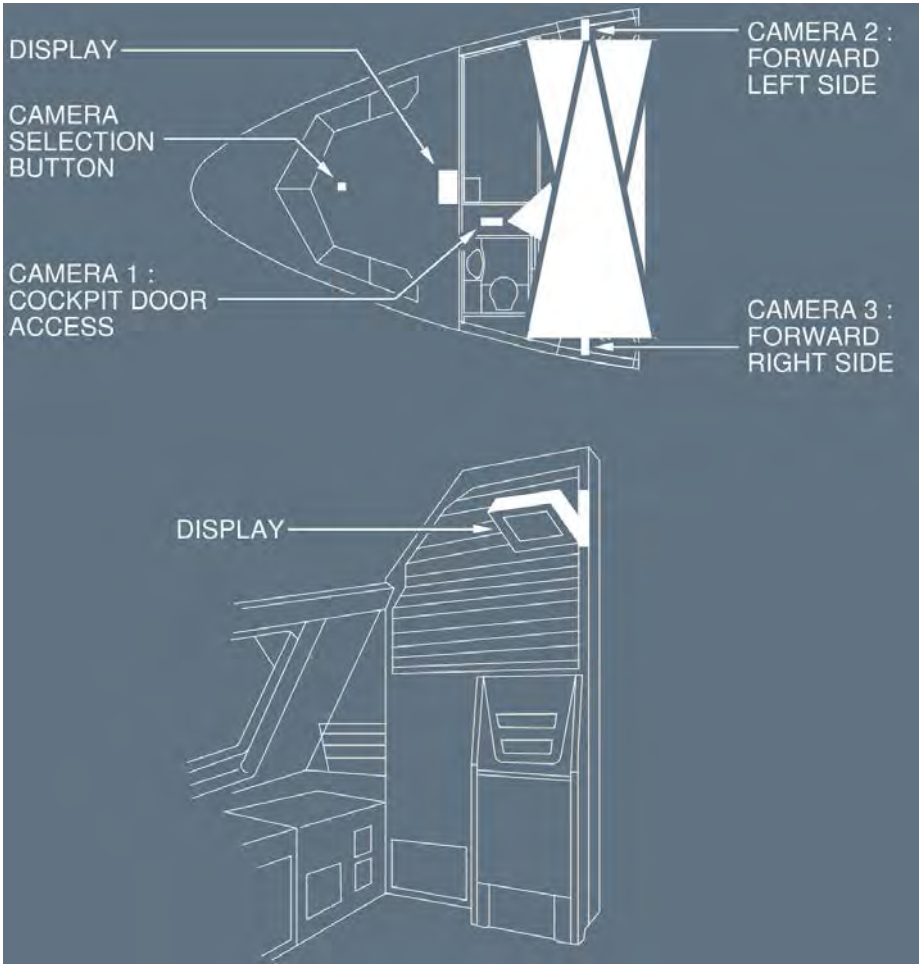
On : The corresponding (1 or 2) pressure sensor is faulty.

Note: These indicators enable the crew to identify the faulty item, when the Central Pedestal Fault indicator light is ON.

GENERAL

Ident.: DSC-52-40-30-00018415.0002001 / 17 MAR 17
Applicable to: MSN 2078

The Cockpit Door Surveillance system consists of three video cameras, which enable the flight crew to identify persons prior to authorizing their entry into the cockpit. An LCD display, located on the rear panel, shows the various camera views. It has automatic brightness adjustment and is activated by the Cockpit Door Video pb.

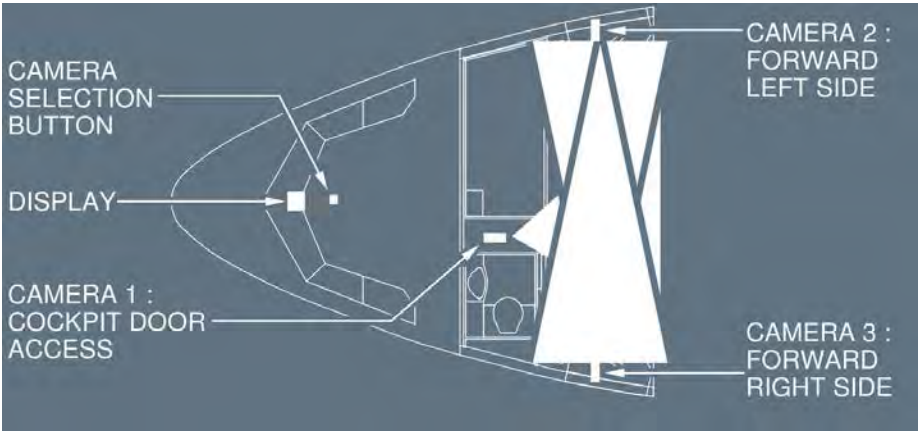


GENERAL

Ident.: DSC-52-40-30-00018415.0001001 / 17 MAR 17
Applicable to: MSN 3408-4547

The Cockpit Door Surveillance System (CDSS) consists of three video cameras, that enable the flight crew to identify persons prior to authorizing their entry into the cockpit. The lower ECAM display displays the various camera views. A control panel, located on the central pedestal allows the flight

crew members to select the CDSS display on the SD and to swap between the different camera views.



CONTROLS

Ident.: DSC-52-40-30-A-00018416.0004001 / 17 MAR 17
Applicable to: MSN 2078

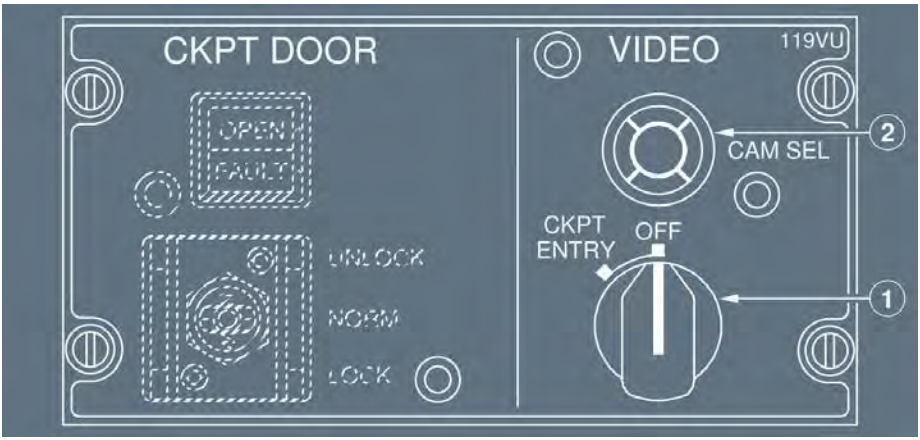
(1) Cockpit Door Video pb
Selects the various camera image displays.

Camera 1 image : Displayed by pressing the pushbutton when the screen is on standby, or after Camera 2 and 3 images have been displayed. Automatically displayed, after an entry request is performed on the keypad.

Camera 2 and 3 images	:	Displayed on a split screen, when the pushbutton is pressed after Camera 1's image has been displayed.
Standby	:	If the pushbutton is maintained pressed for at least two seconds, or if no action has been taken for 5 min, the screen goes blank and remains on standby.

Note: An entry request, performed on the keypad within 30 s following an earlier entry request, will not lead to the automatic selection of Camera 1, since the flight crew is given authority to select any desired camera image via the cockpit door video pb. After these 30 s, the system reverts to its normal operation.

Ident.: DSC-52-40-30-A-00018416.0003001 / 17 MAR 17
Applicable to: MSN 3408-4547



(1) Lower ECAM rotary selector

CKPT ENTRY	:	The lower ECAM displays the camera 1 image. The camera images are not displayed on the Lower ECAM display in the case of: - A subsequent automatic system page call following a warning, a caution, or an advisory, or - A subsequent manual selection of a system page on the ECAM Control Panel (ECP), or - A SD failure, or - An EWD failure.
OFF	:	The lower ECAM display operates normally.

(2) Lower ECAM CAM SEL

Selects various camera image displays, when the lower ECAM rotary selector is set to the CKPT ENTRY position.

The image from camera 1 appears:
- Automatically, when the lower ECAM rotary selector is set to the CKPT ENTRY position.
- When images from cameras 2 and 3 are displayed, and after the flight crew presses the lower ECAM CAM SEL pb
- Automatically, when images from cameras 2 and 3 are displayed, and after a crew member uses the cabin keypad to make an entry request at least 30 s after a previous entry request.

Images from cameras 2 and 3 are displayed simultaneously on a split screen, when the image from camera 1 is displayed, and after the flight crew presses the lower ECAM CAM SEL pb.

Note: *1. The message "PLEASE WAIT" is displayed during the transition between two video images when the flight crew requests an image change.*
2. The message "VIDEO NOT AVAIL" is displayed when the flight crew requests a video image and no image can be displayed.

Ident.: DSC-52-40-30-A-00018417.0001001 / 17 MAR 17
Applicable to: MSN 1882-2078

(1) Cockpit Door Video pb

OFF: The Cockpit Door Surveillance System is manually de-energized.

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HOW TO OPERATE THE COCKPIT DOOR

Ident.: DSC-52-50-00020495.0001001 / 17 MAR 17
Applicable to: ALL

The secured cockpit door operation is controlled by a toggle sw that is located on the COCKPIT DOOR panel (central pedestal).

DOOR OPENING FROM THE COCKPIT

To enable access to the cockpit, set and maintain the COCKPIT DOOR sw to the UNLOCK position until the door is fully opened. When the door is fully opened, the COCKPIT DOOR sw can be released to the NORM position.

DOOR CLOSING FROM THE COCKPIT

Close the door and check that the OPEN indicator goes off. If the COCKPIT DOOR sw is in the NORM position, the door is locked and emergency access is possible from the cabin. When the door is fully closed, if the cockpit door FAULT light is ON, *Refer to PRO-ABN-DOOR [QRH] COCKPIT DOOR FAULT*.

Note: If the OPEN indicator is ON when the door is closed, the door may be unlocked. Repeat the above-mentioned opening/closing procedure.

When the COCKPIT DOOR sw is in the LOCK position the door is locked. In this position, the emergency access, the buzzer, and the keypad are inhibited for a preselected time (5 to 20 min).

ROUTINE ACCESS TO THE COCKPIT FROM THE CABIN (I.E. NORMAL ACCESS)

To request access to the cockpit from the cabin, use the keypad to enter the code and validate with the “#” key.

L2 The Operator defines this code (between 0 and 7 digits).

L1 The buzzer sounds in the cockpit for 1 to 9 s (3 s by default).

After identification of the person (using the Cockpit Door Surveillance System ◁) that requests access, set the COCKPIT DOOR sw to UNLOCK position to unlock the door. A steady green light on the keypad comes on, that indicates that the door is unlocked.

If the flight crew refuses access to the cockpit by setting the COCKPIT DOOR sw to LOCK position, a steady red light on the keypad comes on, that indicates that the door is locked. The keypad and the buzzer are inhibited for a defined period of time.

If the flight crew does not respond, the door remains locked. If the flight crew does not take any action after a routine cabin request, the cabin crew will be able to open the door with the emergency access procedure.

EMERGENCY ACCESS FROM CABIN TO THE COCKPIT

To request emergency access to the cockpit, use the keypad to enter the emergency code and validate with the “#” key.

L2 The Operator defines this emergency code (between 2 and 7 digits).

L1 The buzzer continuously sounds in the cockpit and the OPEN light flashes on the COCKPIT DOOR panel (central pedestal). In the cabin, the green light on the keypad flashes until the flight crew uses the COCKPIT DOOR sw to either lock or unlock the cockpit door.
After identification of the person (via the Cockpit Door Surveillance system ◁) that requests access, use the COCKPIT DOOR sw to unlock the door.
If the flight crew refuses access by setting the COCKPIT DOOR sw to LOCK position, the keypad and the buzzer are inhibited for a defined period of time.
If the flight crew does not respond, after a preselected time between 15 and 120 s, the door automatically unlocks for 5 s and a steady green light on the keypad comes. The buzzer stops and indicates that the door is unlocked.

EVACUATION THROUGH THE DECOMPRESSION AND EVACUATION PANEL

Pull the quick-release pins of the escape panel towards the center of the flap.
Kick the escape panel toward the cabin and evacuate the cockpit.

HOW TO OPERATE THE FWD AND AFT CARGO DOOR

Ident.: DSC-52-50-00020574.0003001 / 17 MAR 17
Applicable to: ALL

NORMAL OPERATION

OPENING

On the cargo door, push the door handle flap inward to release the door handle from the recess of the door structure. Then, pull the door handle away and upward from the LOCKED to the UNLOCKED position.
Open the access door of the service panel to get access to the selector valve lever. Set the selector valve lever to the OPEN position and maintain the lever in this position until the green indicator light comes on. The green indicator light indicates that the door is fully opened and locked.

Note: The yellow hydraulic system is pressurized (the YELLOW ELEC PUMP is energized). The operation of the flight controls and PTU is inhibited.

When the door is fully open, release the selector valve lever. When released, the selector valve lever returns to the neutral position and shuts down the electrical pump.

CLOSING

In order to close the cargo door, set the selector valve lever to the CLOSE position and maintain the lever in this position until the green indicator light goes off. When this light goes off, it means that the door is fully closed and locked.

Note: At first the selector valve lever locks in an intermediate position maintaining a preset pressurization to prevent the door from dropping open.

When the door is fully closed, the selector valve lever returns to the neutral position and shuts down the electrical pump.
On the cargo door, push the door handle flap downwards to the LOCKED position. When the door is locked, the cargo door symbol appears in green on the DOOR/OXY SD page. The CARGO door indication on the ECAM goes off, and the handle flap mechanism locks the operating handle.
Close the access door of the service panel.

HOW TO OPERATE THE FWD AND AFT CARGO DOORS (AUXILIARY OPERATION)

Ident.: DSC-52-50-00020577.0002001 / 17 MAR 17
Applicable to: ALL

AUXILIARY OPERATION

If there is an electrical failure or if the yellow hydraulic electric pump fails, the operator can open or close the cargo door with the use of the hand pump that is accessible via the ground service panel.

Note: Two persons are necessary for this operation.

MANUAL OPENING

To open the cargo door with the use of the hand pump, unlock the cargo door by using the operating handle as for normal operation.
Open the ground service panel of the yellow hydraulic system that is in the belly fairing area.
Open the access door of the door service panel. Set the selector valve lever to the OPEN position and maintain the lever in this position during the operation of the hand pump.
Operate the hand pump until the cargo door is in the fully open position. The green light comes on and indicates that the door is fully opened and locked.
When the cargo door is fully opened, release the selector valve lever of the door service panel.

MANUAL CLOSING

To close the cargo door, set the selector valve lever (on the door service panel) to the CLOSE position and maintain the lever in this position during the operation of the hand pump.
Operate the hand pump until the cargo door is in the fully closed position.
When the cargo door is fully closed, release the selector valve lever of the door service panel.
Lock the cargo door with the use of the operating handle as for normal operation.
Close the access door of the door service panel and of the ground service panel.

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AIRCRAFT SYSTEMS

COCKPIT WINDOWS

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