4.7 Transmit (Talk) Operation

DANGER!

Every radio, when transmitting, radiates energy into the atmosphere, therefore:

- ***Do not operate this radio when the antenna is in an explosive atmosphere (petroleum fuels, solvents, dust, etc.)! Danger by generation of sparks.***
- ***NEVER TRANSMIT in vehicles, aircraft or inside buildings with a rod antenna! This may cause malfunction of the avionics, trigger the airbag or confuse domestic electronic equipment!***
- ***Never place the antenna such as the antenna gets very close to, or touching, exposed parts of the body, especially the face, shoulder or the eyes.***

IMPORTANT!

- *Please keep radio discipline!*
- *Transmit only on a clear channel ("CH BUSY" LED OFF).*
- *Volume is very important. Increasing speaking levels while the lips are facing the microphone (distance 1" to max. 2") will increase clarity. Talk slow, make each word a precise and individual entity.*
- *The radio is equipped with a TX time-out-timer (2 minutes). This is used to limit the duration of transmissions and to guard against accidental PTT locking.*

1. If the display mode shall be changed: Push once or twice the **MD**-button (4).
2. If the USE frequency/channel name shall be changed: refer to paragraph **4.5, SWITCHING ON - SELECTING FREQUENCY/CHANNEL NAME - VOLUME.**
3. Transmitting is only possible on a free channel (no communication audible, "CH BUSY" LED OFF).
4. If you have to transmit (e.g. in case of emergency) although the channel is busy, the Transmit Disabled circuit may be turned OFF by pressing the **SQ** button (3).
5. Press and hold the PTT (Push-To-Talk) key at the mike, or Panel Module (9), or remote audio console. Then the receiver is switched off and the transmitter is switched on. The radio is ready to transmit. As long as a PTT key is pressed the **Transmit Indicator** at the display appears, and the "PTT" button at the Panel Module (9) lights red.
6. Hold or adjust the microphone near to the lips (one to max. two inches) in order to reduce environmental noise. Speak loud, slow, clear and at constant loudness. Make each transmission as brief as possible.
7. Release the PTT key to end the transmission and to open the channel for reception; the **Transmit Indicator** must disappear, the red "PTT" key-light goes off. Switch Squelch ON again, if applicable.
8. The radio is equipped with a TX time-out-timer (TOT). This is used to limit the duration of transmissions to two minutes. When the transmitter is keyed continuously longer than 2 minutes the display of the **FSG 90** starts flashing and transmission is disabled. If you have to make calls longer than 2 minutes momentarily release the PTT key and press again. The TX time-out-timer starts for another 2 minutes.

   Should the TOT disable the transmitter accidentally (e.g. stuck PTT switch) and you have to transmit **turn radio OFF and ON again**. This allows another 2 minutes to transmit.

4.8 Storing a new Frequency/Channel Name

In each active operating mode (8.33/25 kHz mode or '25 kHz only' mode) up to 99 non-volatile channel memories can be user programmed. Channel memories of the **non-active** mode remain stored in the background. They are accessible after calling up the respective mode.

IMPORTANT!

- *Free selection of frequencies/channel names and new storing may be disabled due to Set-Up adjustment (refer to paragraph 5.4.9)!*
- ***Channel memories 1 to 4 are always pre-set** and may be used when called. They can only be changed but not deleted. Ex works and after Master Reset channel memories 1 to 4 are pre-set with either **118.00 MHz or 118.005 MHz!***
- *Storage can be initialized in all three display modes.*
- *The USE frequency/channel name in the upper line of the display can be stored to any of the 99 channel memories.*

1. Set the frequency or channel name to be stored in the upper line at the display!
2. Initialize storage by pressing the **STO** button (2).
3. The last used channel memory number appears, "**CH**" flashes.
4. Select appropriate channel memory number (1 to 99) by turning the **F/CH** knob (8). On a free memory channel an "**F**" appears before "**CH**" and the memory number.
5. To enter the new frequency/channel name push the **STO**-button (2). The frequency/channel name will be stored under the selected channel memory number. A previously stored frequency/ channel name will be overwritten.

4.9 Recall of stored frequencies/channel names:

1. By pushing once or twice the **MD**-button (4) select the CHANNEL mode.
2. By rotating the **F/CH** knob (8) set appropriate channel memory number with its associated frequency/channel name at the display. Only channel numbers that have been programmed before will appear.
3. Now the radio operates on that frequency/channel name indicated at the display.

4.10 Lighting the Frequency Display

Lighting the frequency display (5) is activated by pressing the "DISPLAY ILLUM." push-button (13) of the Panel Module.

Pressing again the push-button turns OFF the display illumination.

4.11 Turning OFF the Panel Module

Always turn OFF the complete unit after use by rotating the **ON/OFF-VOL** switch (1) to the fully ccw position to prevent unnecessary drain of the battery.

NO light or display should be visible!

4.12 Voice Recorder Operation

Independent from SET-UP adjustments or position of **ON/OFF-VOL** control the Audio Output level during receive and transmit at contact 1 of socket "VOICE REC." is ca. 0.5 V.

Make sure the voice recorder is connected according to manufacturer's specification and ready to operate.

Whenever communication takes place (either transmit or receive) a relay is energized and should start the voice recorder. Also audio output is supplied via connector "VOICE REC.", contact 1. This is indicated by a lighting "CH BUSY" LED at the front panel. Adjust recording level of the recorder, if necessary.

At the end of a transmission or reception the voice recorder should stop automatically!

IMPORTANT!

- ***If the transceiver's automatic Squelch circuit is switched OFF (basic receiver noise audible) the voice recorder is continuously operating!***

4.13 Siting

The radio operates in the VHF frequency band, which is a Line-Of-Sight (LOS) frequency; therefore, siting of the antenna greatly affects its operating range. The longest range is normally obtained when a direct LOS is maintained between the radios. Use of hilltop, tower or roof locations will increase the LOS range. Location in valleys with intervening hills, behind vehicles or buildings or in dense woods may reduce or prevent communications. If possible, avoid antenna locations near electrical interference sources, such as computers, power and telephone lines, radar, welders and electrical generators.

4.14 Functional Checks

If the Panel Module together with a transceiver **FSG 90** does not operate correctly, check the following:

- Is the required frequency/channel name visible in the upper line of the display? Adjust required frequency/channel name!
- Is battery supply sufficient? Observe **Supply Indicator** particularly during transmit, at least one segment must be shown! If applicable, press LED indicator of Battery Power Supply particularly during transmit, at least two LEDs must light up!
- Weak RX signal? Push SQ button = switch OFF squelch circuit!
- Weak TX signal? Check microphone, microphone Set-Up, radio, or antenna system! Is the voice volume too low? Speak loud and clear while the lips are facing the microphone!
  Make sure the antenna is vertically positioned and is not screened by nearby placed metallic objects or buildings.
- Singing during transmit? Adjust Sidetone more quietly; put on headset; keep microphone in another position!
- Rattles when receiving? Metal propellers between transmitting airborne radio antenna and ground station antenna!
- Called station hears carrier, but no voice? Check microphone and contacts on microphone jack!
- Noisy - distorted - garbled? Suppress electrical interference of motorized aircraft or vehicle (generator, regulator), check antenna system; check antenna-, microphone- and radio- connector for proper seat! Change location!
- Flashing display, transmitter switches off itself? PTT key sticks! Check PTT key and cables. Transmitter was keyed longer than 2 minutes. Release PTT key, normal operating is possible again.
  In case of emergency turn radio OFF and switch ON again, permits another two minutes to transmit.

In case of doubt, compare operation of the transceiver with another transceiver on the same location or call another station. If service is necessary please consult your authorized dealer or an approved avionics workshop.

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SECTION 5 SET-UP PROCEDURE

This section contains a description of the SET-UP procedure to be carried out **only once** by an **experienced avionics technician**. To carry out the SET-UP procedure the radio must be installed into the Panel Module - completely wired and ready to use.

DANGER!

- ***During SET-UP procedure the radio is partly unable to work. The radio can neither receive nor transmit!***

IMPORTANT!

- *The* **FSG 90(X)** *is factory pre-set for check and testing purposes. To achieve maximum performance it is therefore absolutely necessary to* ***optimize*** *the radio and to adapt the accessories used.*
- *To carry out the Set-Up the radio must be ready for operation (antenna connected, power supply OK, operational microphone/s, headset/s).*
- *If headsets are used turn its volume control to maximum, if applicable.*
- *All frequencies, channel names, channel memory numbers etc., shown in the following illustrations, are* ***examples****!*

The following settings can be selected or adjusted (order):

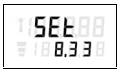
1. 

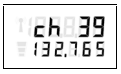
Adjusting the automatic squelch threshold
2. 

Adjusting the microphone sensitivity
3. 

Adjusting the Intercom volume (headset)
4. 

Adjusting the Transmit Sidetone volume (headset)
5. 

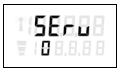
Adjusting the headset volume (during receive, independent from speaker volume)
6. 

Selecting '25 kHz only' channel spacing or combined 8.33 kHz / 25 kHz channel spacing (confirmation with **STO** starts new mode at once).
7. 

Deleting occupied channel memories (one after the other)
8. 

Selecting AF External via loudspeaker ON (1) or OFF (0).
9. 

Selecting 'CHANNEL MODE' only (1) or 'Free Channel Selection' (0)
10. 

Selecting 'TX disabled' ON (1) or OFF (0) during receive
11. 

Service, ON (1) or OFF (0)
12. 

Optional module, ON (1) or OFF (0)
13. 

Entering a password: protects against unauthorized changes of the radio parameters.

5.1 Calling SET-UP without password

Calling the SET-UP procedure without password is possible:

a) at ex works radios **FSG 90(X)**, or

b) at radios which are reset to a factory basic setting (refer to paragraph **5.4.14, RESET**), or

c) at radios which are not protected by a password against unauthorized changes of the Set-Up adjustments.

- Turn OFF the radio (**ON/OFF-VOL** knob fully ccw).
- **PUSH AND HOLD both MD and STO buttons**, then turn **ON** the radio (rotate **ON/OFF-VOL** knob clockwise, approximately mid position).
- All segments of the display appear for a short moment then the display gets blank.
- Release the buttons.

- After releasing the buttons the display shows in the upper line alternately **»FSG90«** and **»SET-UP«.**
- If there is no activity for 60 seconds the radio will return to the mode used before.
- Momentarily pushing the **MD** button once will open the Set-Up menu to adjust the squelch threshold.
- Repeatedly pushing the **MD** button will open all other Set-Up menus in the order described before.

5.2 Calling SET-UP with password

Calling the SET-UP procedure with password must be carried out at radios which are protected by a password against unauthorized changes of the Set-Up adjustments.

- Turn OFF the radio (**ON/OFF-VOL** knob fully ccw).
- **PUSH AND HOLD both MD and STO buttons**, then turn **ON** the radio (rotate **ON/OFF-VOL** knob clockwise, approximately mid position).
- All segments of the display appear for a short moment then the display gets blank.
- Release the buttons.

- After releasing the buttons the display shows in the upper line alternately **»FSG90«** and **»SET-UP«**, in the lower line **5 dashes.**
- If there is no activity for 60 seconds the radio will return to the mode used before.
- With the **F/CH** knob set the first digit of your password (the first dash changes to digit). Confirm the first digit by pushing the **F/CH** knob. The second digit is ready to be adjusted.
- With the **F/CH** knob set the second digit of your password (the second dash changes to digit). Confirm the second digit by pushing the **F/CH** knob.
- Continue till all five digits of your password are entered.
- Confirm the last digit input by pushing the **STO** button. This will open the Set-Up menu to adjust the squelch threshold. Repeatedly pushing the **MD** button will open all other Set-Up menus in the order described before.
- Entering a wrong password will return the Set-Up to the initial status (5 dashes).
- After the fourth attempt to open the Set-Up with a wrong password the radio returns to the operating mode used before trying to open the Set-Up. The **FSG 90(X)** is operational.

5.3 Interrupt the SET-UP procedure

The SET-UP procedure may be interrupted any time:

- Usually by turning OFF the power (**ON/OFF-VOL** knob fully ccw). All changed and individually stored adjustments (by pushing the STO button) are permanently stored and effective after turning ON the radio again.
- or by pushing the **Transfer button** (⇳). The radio returns to the operating mode used before. All changed and individually stored adjustments up to now (by pushing the STO button) are permanently stored and effective.

5.4 SET-UP procedure

IMPORTANT!

- *The settings can be done in any order!*
- *Repeatedly pushing the **MD** button opens the menus step by step.*
- *Only settings confirmed by finally pushing the **STO** key are permanently stored and effective.*
- *When pushing the **STO** button the upper segment of the Onboard supply indicator will light up to confirm storage visually.*

5.4.1 Adjusting the automatic squelch threshold

The display shows in the upper line alternately **»SET«** and **»SQUEL«**, in the lower line **»LO«**, **»MED1«**, **»MED2«** or **»HI«**.
Adjust by rotating the **F/CH** knob the squelch threshold as required.
The lower line shows:

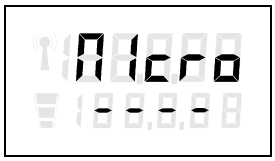
LO	ca. 1,0 µV / -107 dBm (Standard setting)
MED1	ca. 2,5 µV / -99 dBm
MED2	ca. 5,0 µV / -93 dBm
HI	ca. 8,0 µV / -89 dBm (this setting exceeds the required minimum sensitivity, adjust only for test purposes at very strong interference levels!)

- Confirm your adjustment by pushing the **STO** button!
- If you want to carry on with the SET-UP procedure push once or repeatedly the **MD** button till the desired menu appears.

5.4.2 Adjusting the microphone sensitivity (Dynamic or amplified/carbon microphones)

IMPORTANT!

- *This adjustment is important particularly when **FSG 90(X)** is used in noisy environment:*
  Select a free frequency/channel name (no communication audible). Then call the SET-UP procedure.
- *During this adjustment the transmitter is keyed. Carry out adjustment quickly!*
- *Up to two microphones of the same type may be connected parallel to the mic input (dynamic type at the front socket "HEADPHONE/MIC/PTT", amplified/carbon type at the rear side socket "AUX. CONTROL" of the Panel Module).*
- *Parallel operated microphones must have the same specifications.*
- *This adjustment has to be repeated when changing microphones (brand, type or number)*



The display shows in the upper line alternately **»SET«** and **»MICRO«**.

- **ONLY FOR ENGINE POWERED AIRPLANES OR VEHICLES: RUN THE ENGINE IN IDLE.**

Press and hold the PTT key. Talk in a loud, clear voice with the microphone one or two inches from your lips.
While talking the microphone level is measured. By turning the **F/CH** knob left or right set the upper dash line to three to four segments (the lower dash line shows only informative the actual range).
Release the PTT key and stop talking.

- **IF APPLICABLE - RUN THE ENGINE IN CRUISING SPEED:**

Press and hold the PTT key for at least 5 seconds, **do not talk!**
The upper dash line should show not more than one segment.
If the display shows more than one segment the mic input is too sensitive. Repeat adjustment with less sensitivity (only two to three segments visible when talking).

- Confirm your adjustment by pushing the **STO** button!
- If you want to carry on with the SET-UP procedure push once or repeatedly the **MD** button till the desired menu appears.

5.4.3 Adjusting the Intercom volume

NOT APPLICABLE WHEN FSG 90(X) IS OPERATED IN A PANEL MODULE.

5.4.4 Adjusting the Sidetone volume

IMPORTANT!

- *Sidetone audible during transmit is only possible via headphones (if applicable set maximum volume at the headset)*
- *During this adjustment the transmitter is active. Carry out adjustment quickly!*
- *The microphone(s) sensitivity has to be adjusted properly (refer to paragraph **5.4.2**)*

The display shows in the upper line alternately **»SET«** and **»SIDE«**.
Press and hold PTT key, Talk in a loud, clear voice with the microphone one or two inches from your lips.
While talking adjust with the **F/CH** knob a convenient headphone volume. The segments show the actual range. If more than four segments are shown overmodulation occurs.
Release PTT key.

- Confirm your adjustment by pushing the **STO** button!
- If you want to carry on with the SET-UP procedure push once or repeatedly the **MD** button till the desired menu appears.

5.4.5 Adjusting the headset volume

IMPORTANT!

- *Receiving is possible via built-in loudspeaker and headphone.*
- *First set with the **ON/OFF-VOL** knob loudspeaker volume to a convenient level, then adjust with the Set-Up procedure a suitable headphone volume.*

The display shows in the upper line alternately **»SET«** and **»PHONE«**.
With the speaker noise or communication is audible.
With the **ON/OFF-VOL** knob set speaker output to a convenient level, leave **ON/OFF-VOL** knob as it is.
Put on headphone.
By rotating the **F/CH** knob adjust headphone level to a suitable volume. The dashes show the range.
If the adjustment range is not sufficient increase or decrease with the **ON/OFF-VOL** knob.

- Confirm your adjustment by pushing the **STO** button!
- If you want to carry on with the SET-UP procedure push once or repeatedly the **MD** button till the desired menu appears.

5.4.6 Selecting '25 kHz only' or combined 8.33/25 kHz channel spacing

IMPORTANT!

- ***Selecting either 8.33/25 kHz or '25 kHz only' may be necessary due to National Regulations!***

The display shows flashing in the upper line **»SET«**,
in the lower line either **»25«** or **»8.33«**.
By rotating the **F/CH** knob select the required channel spacing:
»25« = '25 kHz only' channel spacing

»8.33« = combined 8.33 and 25 kHz channel spacing.

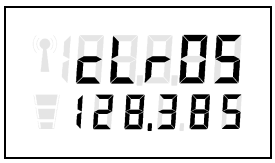
IMPORTANT!

- *Confirm the new channel spacing by pushing the **STO** button! The selected channel spacing becomes active and simultaneously SET-UP procedure will automatically closed down.*
  *The radio returns to the last used operating mode and the settings confirmed with the **STO** button became effective.*
- *If you want to carry on with the SET-UP procedure call again SET-UP. Push once or repeatedly the **MD** button till the required menu appears.*

5.4.7 Deleting occupied channel memories

IMPORTANT!

- *Only channel memory numbers from 5 … 99 can be deleted. Channel memories 1 to 4 can only be overwritten.*
- *On an occupied channel memory the channel memory number is displayed in the upper line, the associated frequency/channel name in the lower line.*
- *On a free channel memory the channel memory number is displayed in the upper line, the lower line shows* **»FREE«**.



EXAMPLE:
The display shows in the upper line alternately **»CLR 05«** and **»CH 05«** and in the lower line the associated frequency.

EXAMPLE: Channel memory number **»39«** (with the channel name 132.765) should be deleted.
By rotating the **F/CH** knob adjust the channel memory number **»39«** at the display.

If this channel memory should really be deleted confirm by pushing the **STO** button. In the lower line the frequency/channel name disappears, it appears **»FREE«**.

- If further memory channels should be deleted adjust with the **F/CH** knob the channel memory number concerned and delete each by pushing the **STO** button.
- If you want to carry on with the SET-UP procedure push once or repeatedly the **MD** button till the desired menu appears.

5.4.8 Selecting AF EXTERNAL (ON/OFF)

NOT APPLICABLE WHEN FSG 90(X) IS OPERATED IN A PANEL MODULE.

5.4.9 Selecting 'CHANNEL MODE ONLY' or 'FREE CHANNEL SELECTION'

IMPORTANT!

- *For certain applications (usually ground operation only) free selection of all frequencies by the operator may be restricted. Then transmitting and receiving is only possible in the* ***CHANNEL MODE****, pre-programmed before by authorized personnel.*

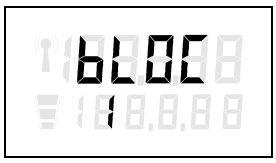
The display shows in the upper line alternately **»SET«** and **»FREQ«**, in the lower line **»0«** or **»1«**.
Adjust by rotating the **F/CH** knob lower line to "0" or "1".
0 = Standard operation, no restriction, free frequency/channel name selection.
1 = **CHANNEL MODE only**, no other frequencies/channel names adjustable by operator.

- Confirm your adjustment by pushing the **STO** button!
- Carry on with the SET-UP procedure by pushing once or repeatedly the **MD** button till the desired menu appears.

5.4.10 Selecting 'TX disabled' during receive (ON/OFF)

IMPORTANT!

- *Whenever 'TX disabled' is ON and squelch is ON transmitting is disabled as long as the frequency/channel name is busy (communication audible). In addition TX Sidetone is OFF.*
- *Whenever the squelch is OFF the 'TX disabled' is OFF and transmitting is possible even on a busy channel.*



The display shows in the upper line alternately **»SET«** and **»BLOC«**, in the lower line **»0«** or **»1«**.
Adjust by rotating the **F/CH** knob the lower line to **»0«** or **»1«**.

0 = 'TX disabled' is OFF. Transmitting is always possible, even on a busy channel.
1 = 'TX disabled' is ON. With squelch ON transmitting is only possible on a free channel.

- Confirm your adjustment by pushing the **STO** button!
- Carry on with the SET-UP procedure by pushing once or repeatedly the **MD** button till the desired menu appears.

5.4.11 Service (ON/OFF)

IMPORTANT!

- ***For approved Avionics Shops only!***

The display shows in the upper line alternately **»SET«** and **»SERV«**, in the lower line **»0«**.
0 = STANDARD MODE, Service OFF.

- If required, confirm adjustment by pushing the **STO** button!
- Carry on with the SET-UP procedure by pushing the **MD** button.

5.4.12 Optional module (ON/OFF)

IMPORTANT!

- ***In this radio without function.***

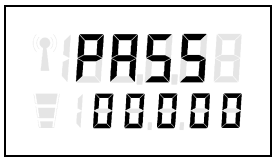
The display shows in the upper line alternately **»SET«** and **»OPTI«**, in the lower line **»0«**.
0 = STANDARD MODE, Optional module OFF.

- Carry on with the SET-UP procedure by pushing the **MD** button.

5.4.13 Entering a password

IMPORTANT!

- *When the SET-UP of your radio is protected by a password it cannot be changed by any unauthorized persons without knowledge of the password.*
- *Your password consists of five digits!*



The display shows in the upper line alternately **»SET«** and **»PASS«**, in the lower line **»00000«**.
If you don't want to enter a password and your SET-UP procedure is finished leave the SET-UP menu by pushing the TRANSFER (⇳) button, or turn OFF the radio (**ON/OFF-VOL** knob).
If you want to enter a password proceed as follows:
Rotate the **F/CH** knob. Adjust the first digit (0 …. 9). Confirm the first digit by pushing the **F/CH** knob.
Adjust the second digit of your password by rotating the **F/CH** knob. Confirm again by pushing the **F/CH** knob.
The third digit is ready now. Continue as described above for the third, fourth and fifth digit.
Make sure the complete password corresponds to your idea.

- Confirm the password by pushing the **STO** button!
- **From now on a new SET-UP may be called only after entering the password first!**

5.4.14 Reset

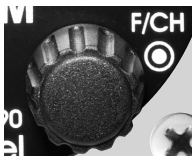
CAUTION!
Every RESET to the factory setting

- ***deletes all your pre-set memory channels 5 to 99 (in both 8.33/ 25 kHz and 25 kHz only mode)! Memory channels 1 - 4 get programmed with 118.00 or 118.005 respectively,***
- ***deletes your password,***
- ***delete all your individual SET-UP adjustments!***

To reset all adjustments proceed as follows:

- Turn OFF the radio (**ON/OFF-VOL** knob fully ccw).
- **PUSH AND HOLD simultaneously the buttons MD, STO and SQ, then turn ON the radio** (rotate **ON/OFF-VOL** knob clockwise, approximately mid position).
- All segments of the display appear for a short moment then the display gets blank.
- Release the buttons.

After releasing the three buttons the display shows in the upper line alternately **»SET«** and **»RESET«**, in the lower line **»0«**.
If there is no activity for 60 seconds the radio will return to the mode used before.



With the **F/CH** knob set lower line to "**1**".

Confirm **RESET** by pushing the **STO** button.
The upper segment of the Onboard Supply Indicator will light up momentarily.

- The VHF radio **FSG 90(X)** is now operable in the factory setting.

SECTION 6 ICAO FREQUENCY / CHANNEL NAME ASSIGNMENT IN THE COMBINED 8.33 KHZ / 25 KHZ OPERATION

The following table shows transmit and receive frequency, the respective channel spacing and the associated display of the **FSG 90** in the range from 118.000 MHz to 118.1000 MHz.
This assignment also applies of course to all other frequencies between 118.1000 MHz and 136.9750 MHz.

Channel frequency (MHz)	Channel Spacing (kHz)	**8.33/25 kHz Mode** Channel Name = Display at **FSG 90**	**25 kHz Mode** Frequency = Display at **FSG 90**
118.0000	**25**	**118.000**	**118.00**
118.0000	8.33	118.005	
118.0083	8.33	118.010	
118.0166	8.33	118.015	
118.0250	**25**	**118.025**	**118.02**
118.0250	8.33	118.030	
118.0333	8.33	118.035	
118.0416	8.33	118.040	
118.0500	**25**	**118.050**	**118.05**
118.0500	8.33	118.055	
118.0583	8.33	118.060	
118.0666	8.33	118.065	
118.0750	**25**	**118.075**	**118.07**
118.0750	8.33	118.080	
118.0833	8.33	118.085	
118.0916	8.33	118.090	
118.1000	**25**	**118.100**	**118.10**
118.1000	8.33	118.105	
etc.	etc.	etc.	etc.

SECTION 7 TECHNICAL SUMMARY

Panel Module plus 6 Watt Dual Mode FSG 90 or 10 W FSG 90-H1

7.1 General

Frequency Range	:	118.000 MHz ... 136.975 MHz, 8.33 and/or 25 kHz increments
Number of Channels	:	2,278 in the combined 8.33/25 kHz channel spacing, free selectable, or 760 in the '25 kHz only' channel spacing, free selectable
Transmitter Output FSG 90	:	≥ 6 Watt / 50 Ω; ca. 20 W PEP at 13.75 Vdc
Transmitter Output FSG 90-H1	:	≥ 10 Watt / 50 Ω; ca. 30 W PEP at 14.0 Vdc
Receiver Sensitivity, m = 30%/ 1 kHz	:	≤ 2.0 µV EMF /≤ 107 dBm / 50 Ohms for 6 dB (S+N/N)
Frequency Accuracy	:	< ± 1 ppm at 0°C … +40°C, < ± 1.5 ppm at -20°C … +55°C
AF Output (K ≤ 10%)	:	≥ 2 Watts into 8 Ohms and ≥ 100 mW into 600 Ohms
Nominal Voltage Transceiver	:	11 … 16.5 Vdc, Emergency 10 … 11 Vdc less 9 Vdc automatic disabling
External Battery	:	Sealed lead accumulator, 12 Vdc / 6.5 Ah, or similar
Battery Charging	:	By external 12 Vdc Battery Charger
Power Consumption	:	Stand-by: 80 mA (typical) Receive (Voice): less than 1A Transmit (Voice): less than 2.5A (10W: 3.5A) Lighting and Supply Check: 20 mA additional
Duty Cycle	:	max. 2 min Transmit (time-out-timer)
Operating Temperature	:	-20°C ... +55°C / +70°C
Dimensions incl. transceiver	:	Width: 213.2 mm, height: 128.5 mm, depth behind panel: 200 mm, allow at least 40 mm for wiring.
Weight	:	1.7 kg / 3.75 lb
ADDITIONAL FEATURES		
		99 user-programmable, non-volatile channel memories; true sidetone via headphone; TX time-out-timer; TX disabled when channel busy. PTT key, "Channel Busy" indicator, built-in loudspeaker, speaker switch, illumination switch.
Sockets to connect	:	External battery charger, external 12 Vdc power supply, Voice recorder, dynamic microphone, standard carbon microphone, Push-to-talk key, headphone, headset, 50 Ohms antenna,
Lighting of frequency display	:	By two LEDs, built-in
Fusing on control p.c. board	:	DC: 3.0 amps, time-lag, self-healing

IMPORTANT!

- ***The transceiver FSG 90(X) together with a Panel Module may only be used after permission by the respective authorities.***

7.2 Approvals, apply for Transceiver FSG 90

Ground Operation (Regulatory Authority For Telecommunications and Posts)	"EC Type-Examination Certificate" no. B132705J, and "TYPE-EXAMINATION CERTIFICATE" no. A132937J"
Ground Operation (DFS)	No. B-7850/97
Requirements for **ground** operated radios	Reg TP 321 ZV 039 (issue March 1998) ETSI ETS 300 676 (8.33 kHz CH spacing, ground operation) DIN / ISO 6737-1 (12 Vdc Vehicle Power System)
Airborne Radio (Regulatory Authority For Telecommunications and Posts)	"EC Type-Examination Certificate" no. B132705J, and "TYPE-EXAMINATION CERTIFICATE" no. A132937J
Airborne Radio (Regulatory Authority For Telecommunications and Posts, and LBA)	Reg TP 321 ZV 034 (issue July 1998) EUROCAE ED-23B: Receiver Class C 25 kHz spacing CLIMAX operation, and Receiver Class E 8,33 kHz spacing Transmitter Class 4 100 NM with 25 kHz spacing, and Transmitter Class 6 100 NM with 8.33 kHz spacing Environmental Requirements EUROCAE ED-14C / RTCA DO-160C: Categories D1-AA(BMN)XXXXXXZBBBATZXXXX
JTSO-Authorization (LBA, airborne)	JTSO-2C37e and JTSO-2C38e No. LBA.O.10.911/98 JTSO
Software	EUROCAE ED-12B / RTCA DO-178B, Level D

7.3 Detailed Receiver Characteristics

Receiver Type	Dual Superhet
IF Frequencies	First IF 10.0 MHz, second IF 455 kHz, high injection
Sensitivity (m = 30% / 1,000 Hz)	≤ 2 µV EMF (≤ -107 dBm/50 Ω) for 6 dB S+N/N
Selectivity a) Reference level m = 60%/1,000 Hz for 12 dB SINAD b) Interference level m = 60%/400 Hz (additional)	Condition: 1 kHz SINAD decreased from 12 dB to 6 dB ≤ 6 dB for ± 8 kHz (25 kHz CH spacing) ≥ 60 dB for ± 17 kHz (25 kHz CH spacing) ≥ 70 dB for ± 25 kHz (25 kHz CH spacing) ≤ 6 dB for ± 3 kHz (8,33 kHz CH spacing) ≥ 60 dB for ± 7.37 kHz (8,33 kHz CH spacing)
Squelch Type	Automatic (FM/AM), adjustable (SET-UP); manual override.
AGC Characteristic	≤ 6 dB, 2 µV EMF (-107 dBm) ... 2 V EMF (+13 dBm/50 Ω), m = 30%/1,000 Hz
AGC Delay (RX)	≤ 0.1 sec, 200 mV EMF (-1 dBm) … 2 µV EMF (-107 dBm / 50 Ω), m = 30%/1,000 Hz)
AGC Recovery after TX	≤ 0.1 sec at 10 µV EMF (-93 dBm / 50 Ω), after TX end
Transfer time TX / RX	≤ 50 msec
Modulation distortion (AF Processor OFF)	≤ 10%, 350 ... 2,500 Hz (m = 85%)

Audio Frequency Response / AF Fidelity	≤ +2 dB and -4 dB, 350 ... 2,500 Hz, 25 kHz and 8.33 kHz CH spacing ≥ -20 dB, 4,000 Hz, 25 kHz CH spacing (Climax Offset Operation)
Audio Frequency AGC	≤ 1.5 dB, m = 30% … 90%
Nominal AF Output (Speaker)	≥ 4 Watt / 4 Ω, or ≥ 8 Watt / 2 Ω (at 13.75 Vdc) ≥ 1.5 Watt / 4 Ω (at 10 Vdc)
Nominal AF Output (Phone)	≥ 100 mW / 600 Ω (at 13.75 Vdc) ≥ 50 mW / 600 Ω (at 10 Vdc)
AF Noise Level	≥ 40 dB, m = 30%/1,000 Hz 200 µV EMF (-67 dBm/50 Ω) ... 10 mV EMF (-33 dBm/ 50 Ω)
AF External Input	≤ 1 Volt into 600 Ω for rated AF output (13.75 Vdc supply)
Spurious Response	≥ 10 mV EMF (-33 dBm), m = 30%/1 kHz, for S+N/N ≤ 6 dB a) 108 - 156 MHz (of any Test Channel ≤ ± 8 kHz), at other than the assigned channel and the adjacent channels b) 50 kHz – 1,215 MHz (except 108 - 156 MHz)
Cross Modulation (AF Processor OFF)	Max. AF output level ≥ 10 dB <u>below</u> nominal AF output level: a) Wanted signal 20 µV EMF (-87 dBm) ... 500 µV EMF (-59 dBm/50 Ω), unmodulated at RX frequency, additional b) Unwanted signal 10 mV EMF (-33 dBm), m = 30%/1,000 Hz, frequency 100 - 156 MHz (frequency ≤ ± 2 RX channels)
Intermodulation (AF Processor OFF)	≤ 6 dB AF Quieting (-5 dBm/50 Ω, 87.5 – 107.9 MHz), 2 signals
Desensitization	Wanted signal 20 µV EMF (-87 dBm), m = 30%/1,000 Hz, at RX frequency, for S+N/N ≥ 6 dB, in the presence of Unwanted signal **<u>A</u>** 10 mV EMF (-33 dBm/50 Ω), unmodulated, frequency 108 ... 156 MHz, except used CH, but includes ≥ 1 RX CH, or Unwanted signal **<u>B</u>** 200 mV EMF (-7 dBm/50 Ω); minimum 10 mV EMF (-87 dBm), unmodulated, frequency 50 kHz – 1,215 MHz, except 87.5 MHz ... 156 MHz, or Unwanted signal **<u>C</u>** 250 mV EMF (-5 dBm), unmodulated, frequency 87.5 ... 107.9 MHz
Receiver Spurious Emission	≤ 400 pW / -64 dBm (50 kHz ... 1,215 MHz)
Channel Selection Time	≤ 0.4 sec, AF level within 3 dB, max. 99 Channel memories
Receiver Muting, Squelch (CLIMAX)	Simultaneous input at RX frequency: a) Wanted Signal **A**: 10 µV EMF (-93 dBm) +8 kHz (m = 30%/1,000 Hz), Squelch is open. b) Unwanted Signal **B**: More than 24 µV EMF (-85 dBm), m = 30% / 1,000 Hz, vary this frequency slowly from -8 kHz to +4 kHz. Squelch must remain open.

7.4 Detailed Transmitter Characteristics

FSG 90: Nominal TX RF Output Power (normal operation)	≥ 6 Watt / 50 Ω (carrier), ≥ 20 Watt PEP, @ 13.75 Vdc
FSG 90: Nominal TX RF Output Power (emergency operation)	≥ 1.5 Watt / 50 Ω (carrier) @ 10 Vdc supply
FSG 90-H1: Nominal TX RF Output Power (normal operation)	≥ 10 Watt / 50 Ω (carrier), ≥ 30 Watt PEP, @ 14.0 Vdc
FSG 90-H1: Nominal TX RF Output Power (emergency operation)	≥ 3.5 Watt / 50 Ω (carrier) @ 10 Vdc supply
TX Duty Cycle	1 : 4 (1 minute TX / 4 minutes RX)
TX Time Out Timer	After 2 minutes continuous TX. Transmitter is unkeyed automatically and the radio display flashes as a warning.
Modulation	Amplitude modulation, AM (A3E)
Depth of Modulation	≥ 75% (Voice processor with dynamic compression)
Modulation Distortion	≤ 10% (m = 70% / 1,000 Hz) ≤ 15% (m = 70% / 350 ... 2,500 Hz)
Modulation Audio Frequency Response	≤ +2 dB and -4 dB (350 ... 2,500 Hz)
Modulation AF Input for m = 70%	Dynamic Microphone: ≤ 0.5 ... 10 mV symmetrical, sensitivity adjustable in SET-UP. Amplified/Carbon Microphone: ≤ 80 ... 500 mV unsymmetrical, sensitivity adjustable in SET-UP.
True Transmit Sidetone (derived from modulated TX RF signal)	≥ 100 mW / 600 Ω (at 13.75 Vdc supply), ≥ 50 mW / 600 Ω (at 10 Vdc), volume adjustable in SET-UP, independent from speaker volume
Carrier Noise Level	≥ 45 dB (m = 70%/1,000 Hz)
Emission of RF Energy (≤ 1000 MHz)	≤ 0,25 µW (-36 dBm) / 71 dB µV / 3.54 mV / 50 Ω ≤ 4 nW (-54 dBm) / 53 dB µV / 446 µV / 50 Ω, from 47 ... 68, 87.5 ... 137, 162 ... 244, 328 ... 336, 470 ... 862 MHz
Emission of RF Energy (≥ 1000 MHz)	≪ 1 µW / ≪ -30 dBm / ≪ 77 dB µV / ≪ 7 mV / 50 Ω
Transmitter Spectrum Mask	Max. +2 / -4 dB at 350 … 2,500 Hz modulation (8.33 kHz spacing) ≥ 45 dB at 3,200 Hz modulation (8.33 kHz spacing) ≥ 60 dB at ≥ 5,000 Hz modulation (8,33 kHz spacing)
Channel Selection Time	≤ 0.5 sec
Frequency Tolerance	≤ 1 ppm (0°C ... + 40°C / 32°F ... 104°F), ≤ 1.5 ppm (-20°C ... + 55°C / -4°F ... + 131°F)
Unwanted FM (Frequency modulation)	≤ 1.0 kHz at m = 70% / 1,000 Hz
TX Intermodulation	≥ 45 dB
Antenna Mismatching	VSWR ≤ 3 : 1, normal operation At VSWR 3 : 1 the requirements for modulation distortion, spurious and harmonics output as well as frequency stability are met. In addition, the RF output is ≥ 40 % / ≥ 2.4 Watt into 50 Ω at 13.75 Vdc. At VSWR ≤ 5 : 1 still functional.

7.5 Environmental Performance Classification

Compliance measurements according to EUROCAE ED-14C / RTCA DO-160 C were performed and the following Environmental Categories fulfilled.

Environmental Conditions	ED-14C DO-160C	Description of conducted tests	Category
Temperature and Altitude	4.0	Equipment tested to category	**D1**
• Low Temperature	4.5.1	Operation -20°C (-4°F) Storage -55°C (-67°F)	
• High Temperature	4.5.2	Operation +55°C (131°F) Storage +85°C (185°F)	
• in-flight Loss of Cooling	4.5.3	No auxiliary cooling required	-
• Low Pressure (Altitude)	4.6.1	50,000 ft /15,240 m	
• Decompression	4.6.2	No test required in category D1	
• High Pressure	4.6.3	No test required in category D1	
Temperature Variation	5.0	10°C/min (18°F/min), Equipment tested to category	**A**
Humidity	6.0	Equipment tested to category	**A**
Shock	7.0	Equipment tested to	
• Operational shocks	7.2	6 g	
• Crash safety	7.3	15 g	
Vibration	8.0	Equipment tested to category	**BMN**
Explosion	9.0	No test required	**X**
Waterproofness	10.0	No test required	**X**
Fluids Susceptibility	11.0	No test required	**X**
Sand and Dust	12.0	No test required	**X**
Fungus	13.0	No test required	**X**
Salt Spray	14.0	No test required	**X**
Magnetic Effect	15.0	≤ 13 cm/1°, Equipment tested to category	**Z**
Power Input	16.0	Equipment tested to category	**B**
Voltage Spike	17.0	Equipment tested to category	**B**
Audio Frequency Susceptibility	18.0	Equipment tested to category	**B**
Induced Signal Susceptibility	19.0	Equipment tested to category	**A**
Radio Frequency Susceptibility	20.0	Equipment tested to category	**T**
Radio Frequency Emission	21.0	Equipment tested to category	**Z**
Lightning Induced Susceptibility	22.0	No test required	**X**
Lightning effects	23.0	No test required	**X**
Icing	24.0	No test required	**X**
Other Test	---	No test required	**X**

CETECOM ICT Services GmbH

beliehen nach der Beleihungs- und Akkreditierungsverordnung vom 10. Dezember 1997
als Benannte Stelle der Bundesrepublik Deutschland, vertreten durch die
recognised in accordance with the Recognition and Accreditation Ordinance of December 10, 1997
as Notified Body for the Federal Republic of Germany, represented by

Regulierungsbehörde für Telekommunikation und Post

DEUTSCHE BAUMUSTERPRÜFBESCHEINIGUNG
GERMAN TYPE-EXAMINATION CERTIFICATE

Registriernummer: Registration No.:	**A132937J**
Bescheinigungsinhaber: Certificate Holder:	**Walter Dittel GmbH** **Luftfahrtgerätebau** **Erpftinger Str. 36** **D-86899 Landsberg**
Produktbezeichnung: Product Designation:	**FSG 90, FSG 90F, FSG 90L , FSG 90FL** **FSG 90-H1, FSG 90F-H1, FSG 90L-H1 , FSG 90FL-H1**
Produktbeschreibung: Product Description:	Funkanlage des beweglichen Flugfunks als Bodenfunkstelle oder an Bord eines Luftfahrzeuges als VHF - Sprechfunkanlage
Produkthersteller: Product Manufacturer:	**Walter Dittel GmbH** **Luftfahrtgerätebau** **Erpftinger Str. 36** **D-86899 Landsberg**
Vorschriften: Specifications:	**FTZ 17 TR 2010 , Ausgabe März 1988** **FTZ 17 TR 2013 , Ausgabe Juni 1989** **BAPT 211 ZV 034 (Entwurf) , Ausgabe Januar 1997** **BAPT 211 ZV 039 (Entwurf) , Ausgabe Januar 1997** **RegTP 321 ZV 034 , Ausgabe Juli 1998** **RegTP 321 ZV 039 , Ausgabe März 1998**
Prüfergebnis: Examination Result:	**Das geprüfte Baumuster ist konform zu den genannten Vorschriften.** **The examined type meets the requirements of the above mentioned specifications**

Diese Bescheinigung ist erstellt in Übereinstimmung mit der Telekommunikationszulassungsverordnung vom 20. August 1997 und gilt nur in Verbindung mit der nachfolgenden **Anzahl** von Anlagen.
The certificate is issued in accordance with the Telecommunications Approval Ordinance from August 20, 1997 and is only valid in conjunction with the following **number** of annexes .
Diese Baumusterprüfbescheinigung ersetzt die Baumusterprüfbescheinigung der Benannten Stelle Regulierungsbehörde für Telekommunikation und Post mit gleicher Registriernummer und Datum vom 13.01.1998 .
This certificate replaces the certificate with the same registration number dated 13.01.1998 by Notified Body Regulierungsbehörde für Telekommunikation und Post .

Anzahl der Anlagen: **1**
Number of annexes:

Saarbrücken, 02.12.1998
Ort, Ausstellungsdatum
Place, Date of Issue

Unterzeichnet von / Signed by Michael Klos
Benannte Stelle / Notified Body

CETECOM ICT Services GmbH, Untertürkheimer Straße 6-10, D-66117 Saarbrücken, Germany

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Anlage 1 zur Deutschen Baumusterprüfbescheinigung Registriernummer: A132937J Datum: 02.12.1998 Seite 1 (2)	Annex 1 of the German Type-Examination Certificate Registration no.: A132937J Date: 02.12.1998 Page 1 of 2

PRODUKT-EIGENSCHAFTEN:
Product characteristics

1.) Produktbestandteile („FSG 90 mit:6 Watt Sender")

- **FSG 90** P/N : F10185 oder F10191
- **FSG 90F** P/N : F10194 oder F10195
- **FSG 90L** P/N : F10208
- **FSG 90FL** P/N : F10210

Produktmerkmale:

Sende-/ Empfangsfrequenzbereich	:	**118,000 MHz ... 136,975 MHz**
Kanalraster	:	**25 kHz und/oder 8,33 kHz**
Betriebskanäle	:	**760 Kanäle** bei 25 kHz - Kanalraster
Betriebskanäle	:	**2278 Kanäle** bei 8,33 kHz - Kanalraster
RF-Leistung	:	**7 W**
Sendeart nach VO-Funk	:	**A3E**
Spannungsversorgung	:	**13,75 VDC (Bereich : 10,5 - 16,5 VDC)**

2.) Produktbestandteile („FSG 90 mit:10 Watt Sender")

- **FSG 90-H1** P/N : F10302 oder F10303
- **FSG 90F-H1** P/N : F10306 oder F10307
- **FSG 90L-H1** P/N : F10310
- **FSG 90FL-H1** P/N : F10312

Produktmerkmale:

Sende-/ Empfangsfrequenzbereich	:	**118,000 MHz ... 136,975 MHz**
Kanalraster	:	**25 kHz und/oder 8,33 kHz**
Betriebskanäle	:	**760 Kanäle** bei 25 kHz - Kanalraster
Betriebskanäle	:	**2278 Kanäle** bei 8,33 kHz - Kanalraster
RF-Leistung	:	**10 W**
Sendeart nach VO-Funk	:	**A3E**
Spannungsversorgung	:	**14,0 VDC (Bereich : 10,5 - 16,5 VDC)**

TECHNISCHE DOKUMENTATION:
Technical Documentation

Prüfberichte:
Testreports

- Nummer: **5234/59632.2/97**
  Number

Prüflabor: BAPT (BZT) , Untertürkheimer Str. 6-10 , 66117 , Saarbrücken

Prüfberichte:
Testreports

- Nummer: **2-0539-A/98** Seiten: **24** Datum: **09.09.1998**
  Number Pages Date

Prüflabor: CETECOM ICT Services GmbH , Untertürkheimer Str. 6-10 , 66117 , Saarbrücken

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Anlage 1 zur Deutschen Baumusterprüfbescheinigung Registriernummer: A132937J Datum: 02.12.1998 Seite 2 (2)	Annex 1 of the German Type-Examination Certificate Registration no.: A132937J Date: 02.12.1998 Page 2 of 2

Technische Beschreibungen / Handbücher / Schaltpläne / Stromlaufpläne etc.:
Technical Descriptions / Manuals / Circuit schematics :

- Baumusterprüfbescheinigung der Benannten Stelle Regulierungsbehörde für Telekommunikation und Post , Reg.-Nr.: A132937J vom 13.01.1998 mit Verweis auf folgende technische Dokumente :
  - Handbuch FSG 90 Dual-Mode 8.33 kHz / 25 kHz VHF/AM Flugfunkgerät , Stand : Februar 1997
  - Declaration of Design and Performance , Document No.: DDP 031.00, Issue : B , Date of Issue : December 01/1997
  - Prüfbericht : 5234/59632.2/97
- Declaration of Design and Performance , Document No.: DDP 031.00, Issue : D , Date of Issue : November 24 ,1998

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DFS Deutsche Flugsicherung

Zertifikat

Zertifikat

Eine	***Funkanlage des beweglichen Flugfunks in Bodenfunkstellen als VHF-Sprechfunkanlage***
Typen	***FSG 90, FSG 90F, FSG 90L, FSG 90FL, FSG 90-H1, FSG 90F-H1, FSG 90L-H1, FSG 90FL-H1***
Frequenzbereich	***118,00 – 136,975 MHz***
der Firma	***Walter Dittel GmbH Postfach 1261 86882 Landsberg/Lech***
bestehend aus	***Sender/Empfänger mit Stromversorgung aus dem Niederspannungsnetz oder Batterien***
für die Betriebsart	***A 3 E***

ist auf Einhaltung der Forderungen der DFS Deutsche Flugsicherung GmbH, die in der technischen Vorschrift der Regulierungsbehörde für Telekommunikation und Post (Reg TP 321 ZV 039 Ausgabe März 1998) niedergelegt ist, geprüft worden. Das Gerät entspricht den Vorschriften, die von der DFS Deutsche Flugsicherung GmbH und der Regulierungsbehörde für Telekommunikation und Post auf Grund der Vollzugsordnung für den Funkdienst (VO Funk) des internationalen Fernmeldevertrages aufgestellt wurden, sowie den Forderungen des Bundesministers für Verkehr (BMV) und den Richtlinien und Empfehlungen der internationalen Zivilluftfahrt-Organisation (ICAO) für den Flugfernmeldeverkehr. Es wird daher mit den umseitig aufgeführten Auflagen als Muster zur Herstellung und zum Vertrieb in der Bundesrepublik Deutschland zugelassen.

Die Gerätetypen haben die Serienprüfnummer ***B-7850/97*** erhalten

Das Zertifikat für o.g. Serienprüfnummer mit Ausstellungsdatum 20.3.1998 wird hiermit ungültig.

Offenbach/Main, den 17.2.1999

i. V. W. Bellen
Leiter Navigation

i. A. H. Günzel

Auflagen

1. Jedes Gerät mit der Bezeichnung FSG 90, FSG 90F, FSG 90L, FSG 90FL, FSG 90-H1, FSG 90F-H1, FSG 90L-H1 und FSG 90FL-H1 das mit der umstehenden Serienprüfnummer und mit der Registriernummer der Baumusterprüfbescheinigung der Regulierungsbehörde für Telekommunikation und Post versehen ist, muß mit dem durch die Regulierungsbehörde für Telekommunikation und Post und der DFS Deutsche Flugsicherung GmbH geprüften Mustergerät elektrisch und mechanisch übereinstimmen.

2. Jede Änderung oder Ergänzung des Aufbaues oder der Schaltung des Gerätes gegenüber dem Mustergerät macht eine Nachprüfung dieses Gerätes durch die Regulierungsbehörde für Telekommunikation und Post und die DFS Deutsche Flugsicherung GmbH erforderlich.

3. Bei Herstellung von Seriengeräten die dem Mustergerät entsprechen, bleiben der DFS Deutsche Flugsicherung GmbH Stichproben in Form einer Stückprüfung vorbehalten.

4. Dieses Zertifikat allein berechtigt nicht zum Betrieb eines Gerätes. Einrichten, Errichten und Betreiben einer Funkstelle unter Verwendung dieses Gerätes, auch wenn es sich um eine Vorführung handelt, sind vom Besitz einer Genehmigung der Regulierungsbehörde für Telekommunikation und Post abhängig.

5. Dieses Zertifikat ersetzt keine Zertifizierung nach dem Telekommunikationsgesetz (TKG) oder nach dem Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG).

6. Aus der Zertifizierung durch die DFS Deutsche Flugsicherung GmbH können keine Ansprüche auf Zulassung gegenüber anderen Zertifizierungsstellen abgeleitet werden.

7. Aus der Ausstellung des Zertifikates der DFS Deutsche Flugsicherung GmbH können keine Forderungen patentrechtlicher Art hergeleitet werden. Sie befreit in keinem Fall von der Beachtung fremder Schutzrechte und stellt keinen Rechtsschutz, ähnlich dem im Patentgesetz vorgesehen, dar.

8. Für die Einhaltung der Sicherheitsforderungen, die sich aus den Deutschen Normen ergeben und auf das Gerät anzuwenden sind, ist der Hersteller selbst verantwortlich. Die Einhaltung der in Deutschland gültingen Normen ist nicht Gegenstand der Musterprüfung.

BUNDESREPUBLIK DEUTSCHLAND

LUFTFAHRT-BUNDESAMT

a member of

JOINT AVIATION AUTHORITIES

JOINT TECHNICAL STANDARD ORDER (JTSO) AUTHORISATION

Pursuant to the National Regulations for the time being in force and subject to the conditions specified below, the National Aviation Authority Luftfahrt-Bundesamt in accordance with the JAA Procedures for JTSO Authorisation hereby grants

Walter Dittel GmbH

Luftfahrtgerätebau
D-86899 Landsberg/Lech

POA No. LBA.G.0100

a JTSO AUTHORISATION
No. LBA.O.10.911/98 JTSO

according to JAR-21, Subpart O and JAR-TSO,
JTSO-2C37e and JTSO-2C38e

for

8,33kHz and 25kHz 6W/10W VHF Communications Transceiver Families
FSG 90(X) and FSG 90(X)-H1
DDP No. 031.00

CONDITIONS:

1. The JTSO Authorisation Holder is only authorised to identify an article with this JTSO marking whilst remaining in compliance with the conditions for the issue of this Authorisation.

2. This AUTHORISATION shall remain valid until surrendered, withdrawn or otherwise terminated.

Date of issue: 27.10.1999

LUFTFAHRT-BUNDESAMT 10 BRAUNSCHWEIG

Acting
Hentschel

REGULIERUNGSBEHÖRDE FÜR TELEKOMMUNIKATION UND POST
Regulatory Authority For Telecommunications and Posts

EG-BAUMUSTERBESCHEINIGUNG
EC Type-Examination Certificate

Registriernummer: B132705J — **Anlage(n): 1**
Registration no.: — Annex(es)

Benannte Stelle: Regulierungsbehörde für Telekommunikation und Post
Notified Body:

Bescheinigungsinhaber: Walter Dittel GmbH
Certificate Holder: Erpftinger Straße 36

D-86899 Landsberg/Lech

Produktbezeichnung: FSG 90(X) oder FSG 90(X)-H1, Modellvarianten siehe Anlage 1
Designation of product:

Produktbeschreibung: VHF/AM Sprechfunkgerätefamilie im beweglichen Flugfunkdienst
Product description: VHF/AM Air Band Communications Transceiver Family

Angewandte Normen:
Used Norms:

Störaussendung: DRAFT prETS 300 339 (01/97), EN 55022
(Emission)

Klasse: B
(Class)

Störfestigkeit: DRAFT prETS 300 339 (01/97)
(Immunity)

Die EG-Baumusterbescheinigung mit Ausstellungsdatum 13.01.98 wird hiermit ungültig.

Diese Bescheinigung ist erstellt in Übereinstimmung mit der Richtlinie 89/336/EWG (Amtsblatt der Europäischen Gemeinschaften Nr. L 139 v. 23. Mai 1989)
This certificate is issued according to the directive 89/336/EEC (Office Journal of the European Communities L 139 from 23. May 1989)

Ort, Datum: Saarbrücken, 10.02.99
Place, Date:

Unterschrift:
Signed:

Stefan Bach

Regulierungsbehörde für Telekommunikation und Post, Talstraße 34-42, D-66119 Saarbrücken, Tel.:(06 81) 9330-0, Fax: (06 81) 9330-700

Anlage 1 zur EG-Baumusterbescheinigung
Nr. B132705J vom 10.02.99
Seite 1 (2)

Annex 1 to EC Type-Examination Certificate
No. B132705J Date: 10.02.99
Page 1 of 2

Modellvarianten:
System variants

FSG 90	Model 90-25/8.33 Model 90-25/000	**FSG 90-H1**	Model 90-25/8.33-H1 Model 90-25/000-H1
FSG 90E	Model 90E-25/8.33 Model 90E-25/000	**FSG 90E-H1**	Model 90E-25/8.33-H1 Model 90E-25/000-H1
FSG 90F	Model 90F-25/8.33 Model 90F-25/000	**FSG 90F-H1**	Model 90F-25/8.33-H1 Model 90F-25/000-H1
FSG 90FE	Model 90FE-25/8.33 Model 90FE-25/000	**FSG 90FE-H1**	Model 90FE-25/8.33-H1 Model 90FE-25/000-H1
FSG 90L	Model 90L-25/000	**FSG 90L-H1**	Model 90L-25/000-H1
FSG 90EL	Model 90EL-25/000	**FSG 90EL-H1**	Model 90EL-25/000-H1
FSG 90FL	Model 90FL-25/000	**FSG 90FL-H1**	Model 90FL-25/000-H1
FSG 90FEL	Model 90FEL-25/000	**FSG 90FEL-H1**	Model 90FEL-25/000-H1

Technische Eigenschaften:
Technical Characteristics

Frequenzbereich: 118,000 - 136,975 MHz [all models without suffix (E)] oder/or
Frequency range
118,000 - 149,975 MHz [all models with suffix (E)]

Kanalabstand: 25 kHz und/oder and/or 8,33 kHz
Channel spacing

Sendeleistung: 6 W [FSG 90(X)] bzw. 10 W [FSG 90(X)-H1]
Transmitter power

Spannungsversorgung: 10,5 - 16,5 V; DC
Power supply

Anlage 1 zur EG-Baumusterbescheinigung
Nr. B132705J vom 10.02.99
Seite 2 (2)

Annex 1 to EC Type-Examination Certificate
No. B132705J Date: 10.02.99
Page 2 of 2

Wesentliche Teile der technischen Dokumentation:
Relevant parts of the technical documentation

Prüfbericht Nr.: 1388/00089/97 vom: 17.06.1997
Test Report No.: of

Prüfbericht Nr.: 1388/00099/97 vom: 16.07.1997
Test Report No.: of

Prüfbericht Nr.: 2_0539-A/98 vom: 09.09.1998
Test Report No.: of

Declaration of Design and Performance, Document No.: DDP 031.00, Issue D
Date of Issue: November 24, 1998

Bemerkung(en):
Remark(s)

Betrieb in

a) Luftfunkstellen oder

b) Bodenfunkstellen (stationär, portabel oder mobil) des beweglichen Flugfunks

Operation in

a) aircraft stations or

b) ground-based stations (fixed, portable or mobile use) in the aeronautical mobile service

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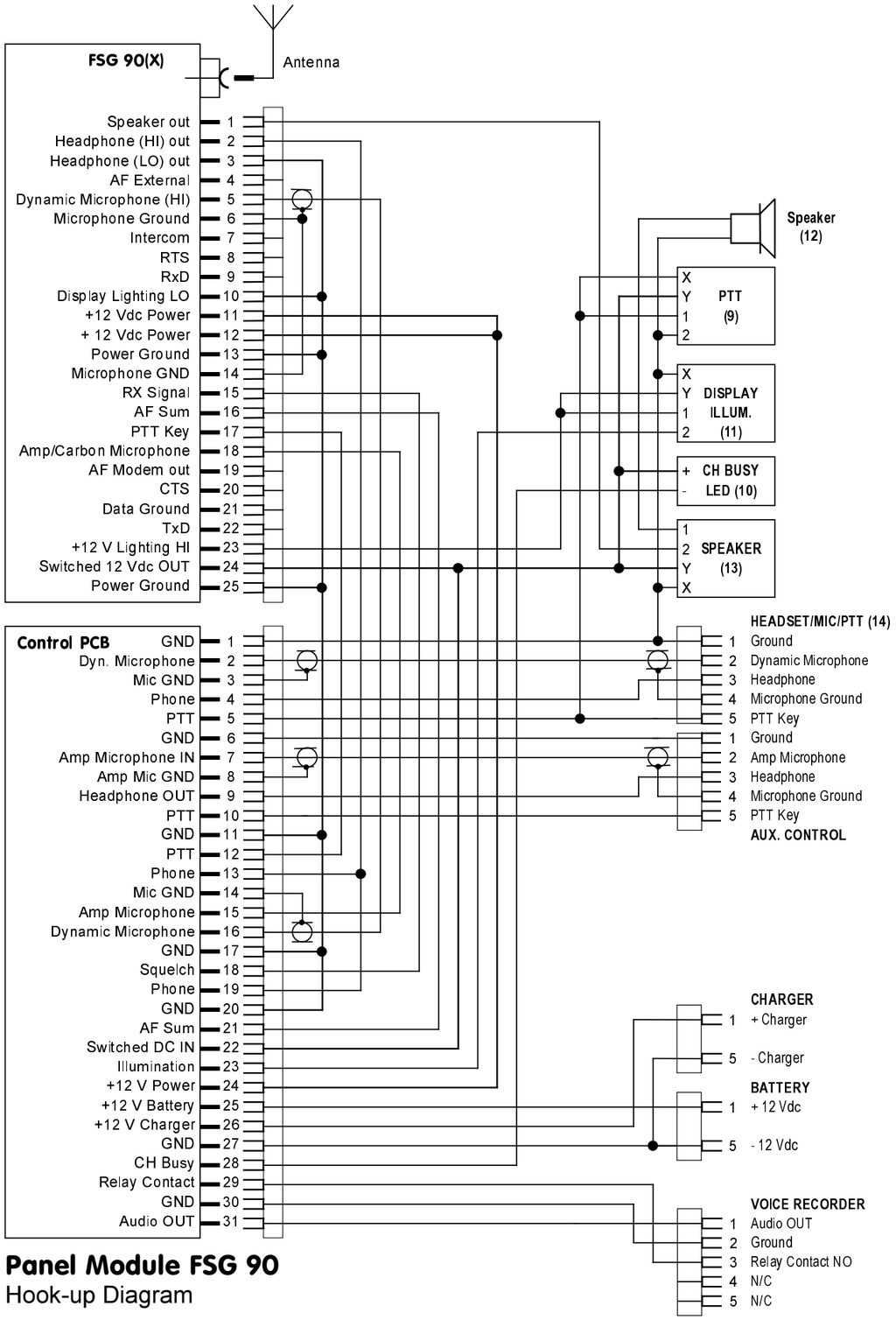
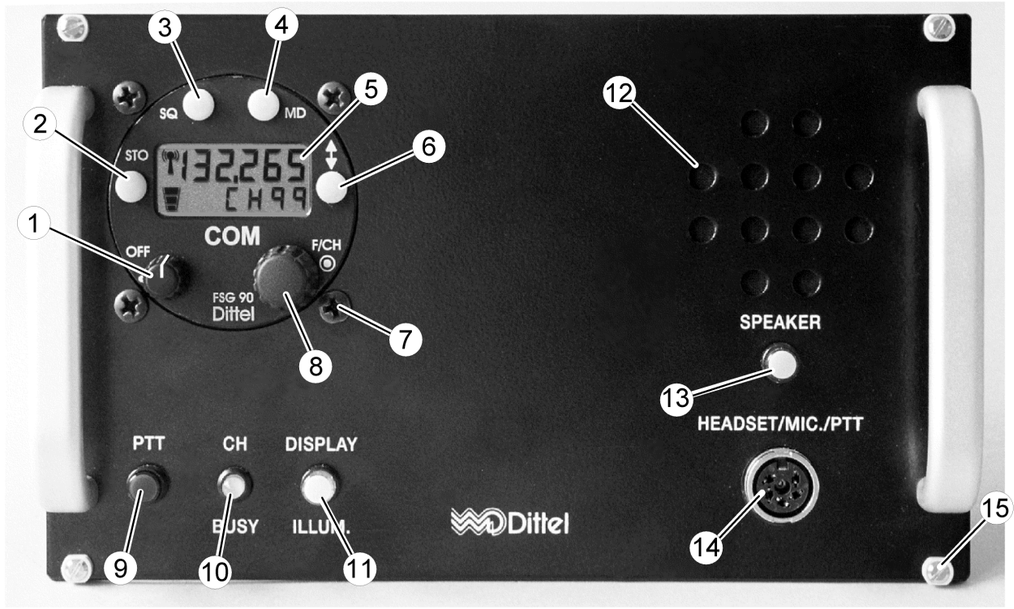
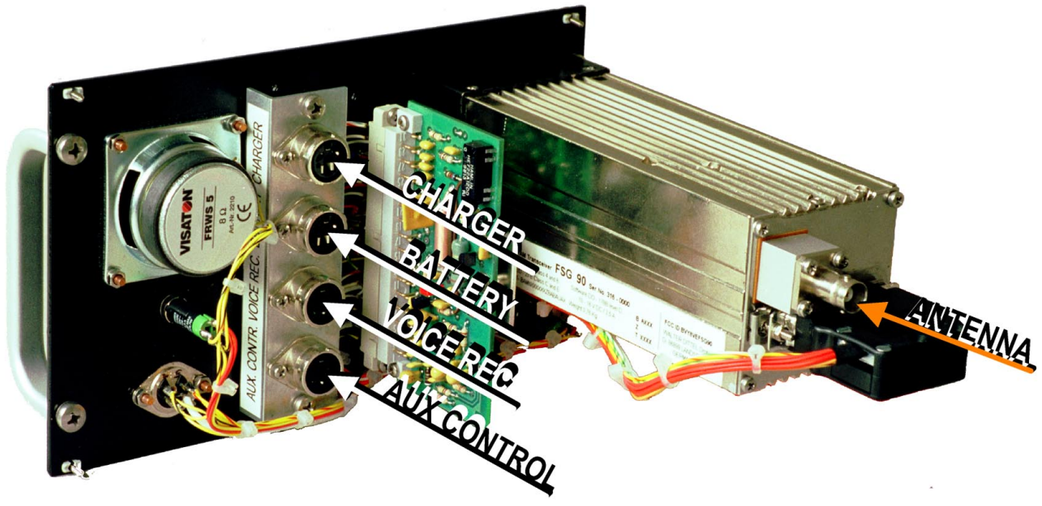


Panel Module FSG 90
Hook-up Diagram



Operator's Controls and Indicators



Panel Module
Front and rear view
with transceiver **FSG 90** installed