VVDED397047NA
02/01
Raleigh, NC, USA

Instruction Bulletin | Boletín de instrucciones | Directives d'utilisation

ALTIVAR® 58

Adjustable Speed Drive Controllers

Keypad Display

VW3A58101U

Variadores de velocidad ajustable

Terminal de programación y ajustes

VW3A58101U

Variateurs de vitesse

Terminal d'exploitation

VW3A58101U

Retain for future use.

Conservar para uso futuro.

À conserver pour usage ultérieur.

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SQUARE D

ALTIVAR® 58 Adjustable Speed Drive Controllers
Keypad Display
VW3A58101U

ENGLISH

Variadores de velocidad ajustable ALTIVAR® 58
Terminal de programación y ajustes
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ESPAÑOL

Variateurs de vitesse ALTIVAR® 58
Terminal d'exploitation
VW3A58101U

FRANÇAIS

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this bulletin in its entirety before installing or operating ALTIVAR 58 drive controllers. Installation, adjustment, repair, and maintenance of the drive controllers must be performed by qualified personnel.
- Disconnect all power including external control power that may be present before servicing the drive controller. WAIT THREE MINUTES for the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 75 to verify that the DC voltage is less than 45 V. The drive controller LEDs are not accurate indicators of the absence of DC bus voltage.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- Install and close all covers before applying power or starting and stopping the drive controller.
- User is responsible for conforming to all applicable code requirements with respect to grounding all equipment.
- Many parts in this drive controller, including printed wiring boards, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.

Before servicing the drive controller:

- Disconnect all power.
- Place a “DO NOT TURN ON” label on the drive controller disconnect.
- Lock disconnect in open position.

Electrical shock will result in death or serious injury.

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CHAPTER 1—OVERVIEW

INTRODUCTION

The ALTIVAR 58 family of adjustable frequency AC drive controllers is used for controlling three-phase asynchronous motors. This manual covers programming for controllers ranging from:

- 1–75 hp (0.75–55 kW) constant torque (100 hp variable torque), 400/460 V, three-phase input
- 0.5–7.5 hp (0.37–5.5 kW) constant torque, 208/230 V, single-phase input
- 2–40 hp (1.5–30 kW) constant torque (50 hp variable torque), 208/230 V, three-phase input.

This bulletin covers the operation of the ALTIVAR 58 drive controllers with the keypad display, part number VW3A58101U. Additional functionality can be obtained by installing the analog I/O option card (part no. VW3A58201U) or the digital I/O card (part no. VW3A58202U). The additional functionality provided by these option cards is documented in this bulletin.

For other I/O option cards and communication option cards and for information on programming the additional parameters available with those cards installed, refer to the manual provided with the card.

See Appendix B for a complete list of options and accessories.

Certain modes, menus, and operation can be modified if the drive controller is equipped with other options. Consult the documentation pertaining to each of these options.

For installation, wiring, start-up, and maintenance, consult the drive controller instruction bulletin, VVDED397048US and the instruction bulletin provided with the I/O extension card if applicable.

REVISION LEVEL

Several functions have been added to the product since it was first introduced to the marketplace. This document can be used with earlier devices, but the following parameters are not present in drive controllers produced before the dates provided below.

In July of 1999 the following functions / parameters were added: USP, OPr, SdC, USC, PIC, U ramp type, Fdb, rln, bSP.

In August of 2000 Square D Company began producing 5–25 hp, 460 Vac variable torque rated drive controllers without the integrated EMC filter for 460 Vac installations where the filter is not required. Removing this filter allows the product to be rated for additional horsepower at 460 Vac. These drive controllers have the ability to be configured for VT plus as described on page 24.

KEYPAD DISPLAY

The keypad display allows:

- Display of the drive controller part number, electrical values, parameters, and faults
- Adjustment and configuration of the drive controller
- Local command
- Storage of four controller configurations which can be read or downloaded to multiple drive controllers

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Mounting

To mount the keypad display, first remove the protective cover. Insert the keypad into the sub D connector and tighten the finger-tight retaining screw by turning clockwise.

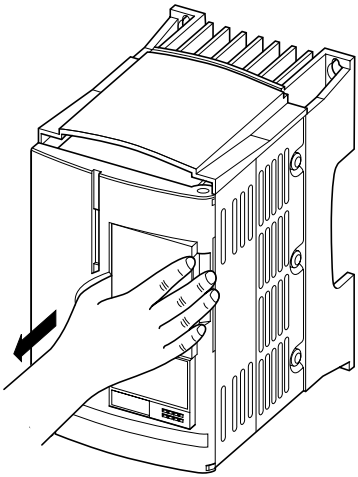

Figure 1: Removal of Protective Cover

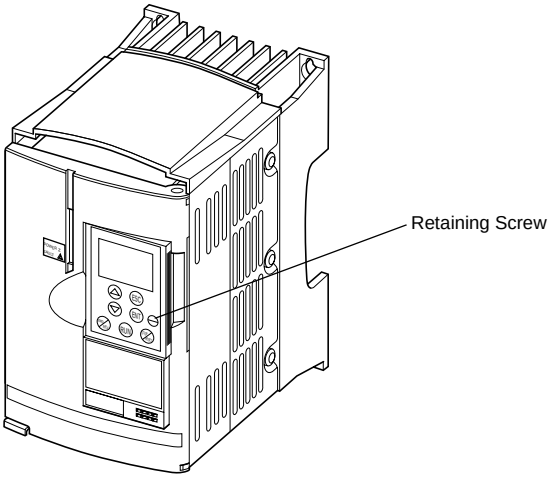

Figure 2: Drive Controller with Keypad Mounted

The keypad can be mounted and removed while there is power to the drive controller. If the keypad is removed while command of the drive controller from the keypad is active, the drive controller will trip on the serial link fault. See SLF in Table 25 beginning on page 79.

Remote Mounting

To remotely mount the keypad, use the keypad remote mounting kit, part number VW3A58103. This kit has an IP65 rating. This kit contains a three meter (9.8 ft.) cable with connectors, parts for mounting the keypad on the cover of an enclosure, and an instruction sheet.

Setting the 50/60 Hz Switch

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this bulletin in its entirety before installing or operating ALTIVAR 58 drive controllers. Installation, adjustment, repair, and maintenance of these drive controllers must be performed by qualified personnel.
- Disconnect all power before servicing the drive controller. WAIT THREE MINUTES until the DC bus capacitors discharge, then measure DC bus capacitor voltage between J2-4 (+) and J2-5 (-) for drive controllers ATV58U09M2 and U18M2, or between J2-5 (PA) and J18-7 for drive controllers ATV58U29M2 to U72M2 and ATV58U18N4 to U90N4, to verify that the DC voltage is less than 45 V. Refer to the Bus Voltage Measurement Procedure page 75.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- User is responsible for conforming to all applicable code requirements with respect to grounding all equipment.
- Many parts in this drive controller, including printed wiring boards, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.

Electrical shock will result in death or serious injury.

Figure 3 (page 11) shows the location of the 50/60 Hz switch on the drive controller. **Before powering up the drive controller and using the keypad display, you must set the 50/60 Hz switch to correspond with the frequency of the incoming AC power.**

Unlock and open the cover to access the 50/60 Hz switch on the control board. If an option card is present, the switch is still accessible through the card. Set the switch to the position corresponding to the frequency of the incoming AC power.

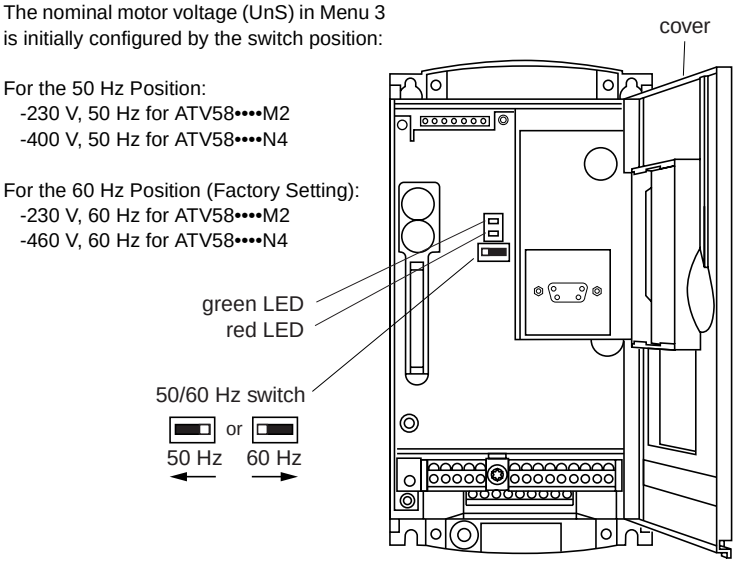

Figure 3: Location of 50/60 Hz Switch

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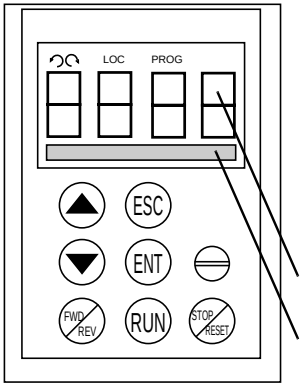
Function of Keys and Meaning of Displays

Figure 4 shows the front of the keypad display. The keys and displays are explained below.



Flashing display: indicates the selected direction of motor rotation.
Fixed display: indicates the actual direction of motor rotation.

LOC — Indicates the keypad command mode.

PROG — Appears in setup and programming mode. Flashing display indicates that a parameter has been modified but not saved.

Four 7-segment LCD: displays numerical values and codes

16-character LCD display: display of messages in plain language

Figure 4: Front View of Keypad

Press to move within the menus or among the parameters, and to scroll a numeric value up or down.

ESC — Press to return to the previous menu, or abandon an adjustment in progress and return to the original value.

ENT — Press to select a menu, or to validate and save a choice or an adjustment parameter.

If command by the keypad has been selected:

FWD/REV — Press to change the direction of motor rotation

RUN — Press to start the motor

STOP/RESET — Press to stop the motor or reset a fault. The STOP function can also stop the drive controller in terminal command mode if so configured (see page 43).

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Configuration Recommendations

⚠ WARNING

UNINTENDED EQUIPMENT ACTION

Parameter changes affect drive controller operation. Most parameter changes require pressing ENT. Some parameter changes, such as reference frequency, take effect as soon as you press the up or down arrow keys. Read and understand this manual before using the keypad display.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

First prepare your program settings using the form in Appendix A at the back of this manual.

Programming of the ALTIVAR 58 is facilitated by internal checks. In order to understand and become comfortable with the keypad, we recommend that you access the menus and program in the following order. All of the steps are not obligatory in all cases.

1. Set the 50/60 Hz switch.
2. Select the language.
3. Select the macro-configuration.
4. Select 2 or 3-wire control (4—Control menu).
5. Configure parameters in the 3—Drive Configuration menu.
6. Assign the I/O.
7. Configure parameters in the 4—Control menu.
8. Configure switching frequency type.
9. Configure fault management parameters in the 6—Fault menu.
10. Make Communication or Application configurations (if one of these options is used).
11. Make settings in the 2—Adjust menu.

NOTE: You must ensure that the functions which are programmed are compatible with the control scheme used.

If the Freewheel Stop / Run Permissive function is assigned to a logic input, the drive controller will not start the motor unless that logic input is connected to +24 V.

Minimum Start-up

This procedure can be used as a minimum start-up:

- In simple applications where the drive controller factory settings are sufficient
- In installation when it is necessary to turn the motor before fully completing the start-up sequence

Procedure:

1. Make sure that the **50/60 Hz switch** is in the correct position, corresponding to the frequency of the incoming AC power, as shown on page 11.
2. Ensure that the **macro-configuration** factory setting is suitable for the application. Refer to Table 1 on page 22. If not, change the configuration **MACRO-CONFIG** menu.
3. Verify that the **control scheme is compatible** with the macro-configuration, ensuring that the necessary safety precautions have been taken.
4. Verify in the **3—DRIVE** menu that the factory settings are compatible with the **motor nameplate values**. Refer to Table 9 on page 34. Modify them to match the nameplate values.
5. In the **3—DRIVE** menu, run the **Autotuning** function.
6. If necessary, **adjust the parameters** in the **2—ADJUST** menu (ramps, motor thermal protection, etc.). See Table 4 on page 27.

If the Freewheel Stop / Run Permissive function is assigned to a logic input, the drive controller will not start that motor unless the logic input is connected to +24 V.

ACCESS LEVELS

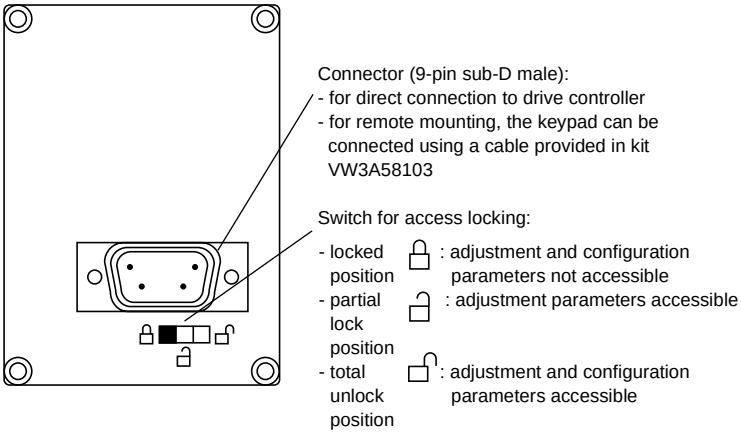

Figure 5: Rear View of Keypad

The position of the access locking switch on the back of the programming keypad allows three levels of access to the menus. Access to the menus can also be prevented by using an access code (see the 7—File menu on page 67).

Locked Position  **– Display Mode:** use when the motor is running to prevent modifications to drive controller programming.

- You can select the dialog language in the **LANGUAGE** menu.
- You can display the macro-configuration or the pre-programmed values for the selected application in the **MACRO-CONFIG** menu.
- You can display the voltage and power rating of your drive controller in the **IDENTIFICATION** menu.
- You can display the electrical values, the operational status, or fault in the **1—DISPLAY** menu.

Partial Lock Position  **– Display and Adjustment Modes:** this level is used during start-up for access to basic set up parameters.

- You can do everything listed above and
- You can use the **2—ADJUST** menu to adjust parameters which are accessible when the motor is running.

Total Unlock Position  **– All modes:** this level is used during start up for access to advanced set up parameters.

- You can do everything listed in both access levels above.
- You can also select a different macro-configuration in the **MACRO-CONFIG** menu.
- You can adjust the performance of the motor-drive controller system, in the **3—DRIVE** menu.
- You can configure the drive controller command to be either from the terminal strip, the keypad, or the integrated serial link using the **4—CONTROL** menu.
- You can change the assignments of the inputs and outputs in the **5—I/O** menu.
- You can configure motor protection, drive controller protection, and response after a fault has occurred in the **6—FAULT** menu.
- You can save the drive controller configurations, recall them from memory, return to factory settings, or protect your configuration in the **7—FILES** menu.
- You can adjust the parameters pertaining to communication in the **8—COMMUNICATION** menu, if a communication card is installed.
- You can access the **8—APPLICATION** menu, if a customer application card is installed.

Access To Menus

The number of menus which can be accessed depends on the position of the access locking switch. Each menu contains parameters to be adjusted or configured. Figure 6 shows the menus as they appear on the display when the access locking switch is in the **Total Unlock Position.**

NOTE: If an access code (password) has already been programmed, certain menus may not be modifiable, or may not be visible. In this case refer to “Access Code” on page 69 for how to enter the access code.

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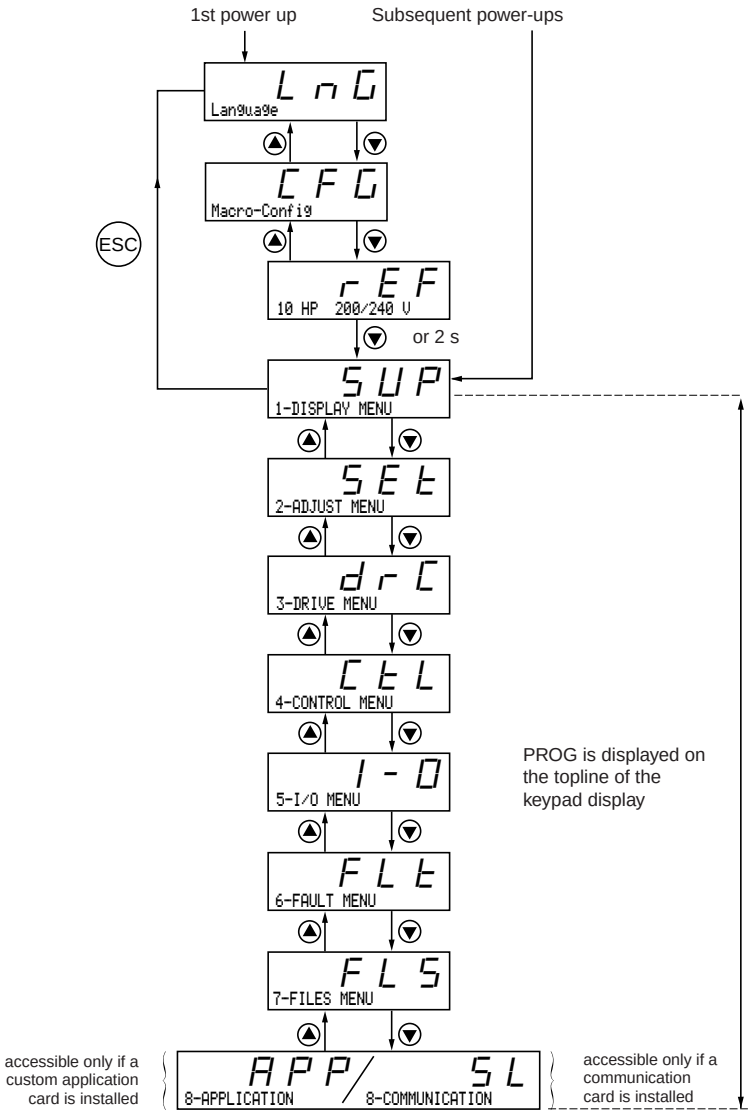

Figure 6: Menus

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Principles of Programming

The principle of programming is always the same, regardless of the access locking switch. Figures 7 and 8 show examples of programming steps.

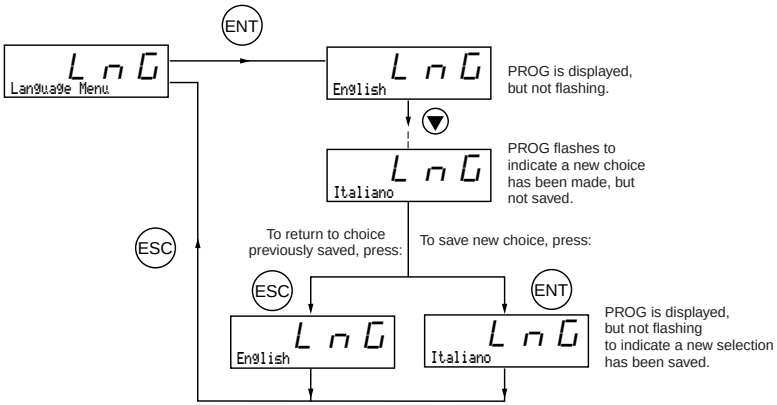

Figure 7: Language Selection Programming Example

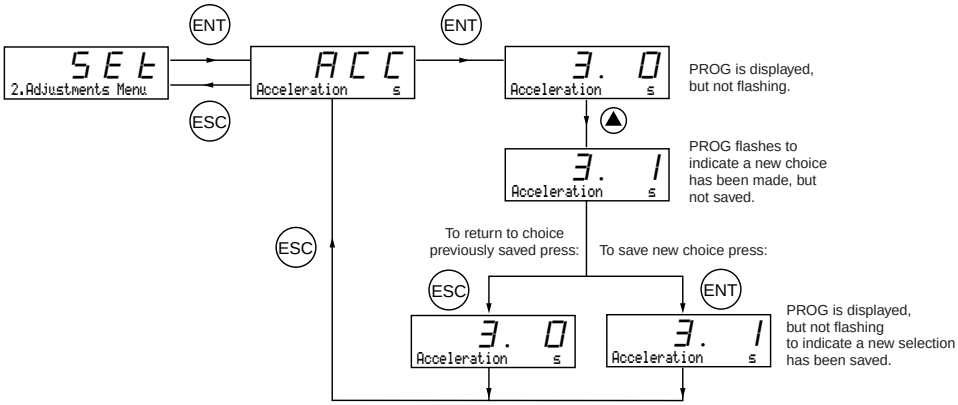

Figure 8: Acceleration Time Programming Example

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CHAPTER 2—MENUS

This chapter explains menus and parameter functions.

LANGUAGE MENU

The Language menu (see Figure 7 on page 19) is accessible no matter how the access locking switch is set. The languages that can be selected are English (factory setting), French, German, Spanish, or Italian. The language can be modified with the motor stopped or running.

MACRO-CONFIGURATION MENU

Selecting a macro-configuration automatically configures the drive controller for an application. The macro-configuration menu can always be displayed, but can only be modified when the access level switch is in the position and when the motor is stopped. There are three application types available:

- Material handling (Hdg)
- Variable torque for pump and fan applications (VT)
- General use (GEn)

The macro-configuration automatically assigns the inputs and outputs to functions suitable for the application. The parameters related to these functions are then available. **The factory-set macro-configuration is Material Handling**. Table 1 shows the drive controller I/O assignments as a function of the macro-configuration selected when the drive controller is set for 2-wire control. For the logic input assignments when the drive controller is set for 3-wire control, refer to Table 10 on page 39.

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Table 1: Drive Controller I/O Assignments

Note: LI1, AI1, and R1 assignments are not visible in the I/O menu. LI1 and R1 can not be reassigned.

	Hdg: Material Handling [1]	GEn: General Use	VT: Variable Torque
Logic Input LI1	Forward	Forward	Forward
Logic Input LI2	Reverse	Reverse	Reverse
Logic Input LI3	2 Preset speeds	Jog	Auto/manual
Logic Input LI4	4 Preset speeds	Freewheel stop [2]	DC injection braking
Analog Input AI1	Reference summing	Reference summing	Speed reference 1
Analog Input AI2	Reference summing	Reference summing	Speed reference 2
Relay R1	Drive fault relay	Drive fault relay	Drive fault relay
Relay R2	Output contactor command	Motor thermal state attained	Frequency reference attained

[1] Factory default setting.

[2] If the Freewheel Stop/ Run Permissive function is configured, the drive controller will not start the motor unless the logic input is connected to +24 V.

Table 2: I/O Extension Card Factory Presets

Note: You must ensure that the functions which are programmed are compatible with the control scheme used.

	Hdg: Material Handling	GEn: General Use	VT: Variable Torque
Logic Input LI5	8 preset speeds	Fault reset	Freewheel stop [1]
Logic Input LI6	Fault reset	Current limit [2] or Torque limit 2 [3]	Ramp switching
Analog Input AI3 [2] or Logic Inputs A, A-, B, B- [3]	Reference summing [2]	Reference summing [2]	PI regulator feedback [2]
	Speed feedback	Speed feedback	Speed feedback
Logic Output LO	Current level attained	Output contactor command	High speed attained
Analog Output AO	Motor frequency	Motor frequency	Motor frequency

[1] If the Freewheel Stop/ Run Permissive function is configured, the drive controller will not start the motor unless the logic input is connected to +24 V.

[2] With analog I/O extension card (VW3A58201U).

[3] With digital I/O extension card (VW3A58202U).

Transferring a file created for a drive controller without an I/O extension card to a drive controller with an I/O extension card may result in unexpected I/O assignment. Verify all I/O assignments. It is recommended that I/O functions not used in the application be un-assigned.

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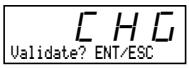
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

If both LI1 and LI2 are selected (high state) and LI1 reverts to a zero state, the drive controller will reverse direction. The logic inputs must be programmed appropriately for the application to prevent the motor from rotating in an unintended direction.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Modification of the macro-configuration requires two confirmations since it automatically changes the function assignments. When a change to the macro-configuration is requested the following screen is displayed:



Press ENT to proceed with change
Press ESC to return to the previous configuration

Figure 9: Macro-configuration Validation

⚠ WARNING

UNINTENDED EQUIPMENT ACTION

Factory default settings will be substituted for present settings when the macro-configuration is changed and confirmed.

Factory default settings may not be compatible with the application. After changing the macro-configuration, verify that the factory settings are compatible with application requirements.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Customizing the Configuration

The drive controller configuration can be customized by changing the assignment of the inputs and outputs in the 5—I/O menu when the access locking switch is in the 🔓 position. When an I/O assignment is modified, the macro-configuration screen displays the following:

Figure 10: Customized Macro-configuration

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DRIVE CONTROLLER IDENTIFICATION SCREEN

This screen can always be displayed. Refer to Figure 11 for the access path. This screen shows the power rating and the voltage indicated on the drive controller nameplate.

Increasing the Power Rating for Variable Torque Applications

The power rating can be increased for variable torque applications on the drive controller identification screen for the following products:

- 208/230 Vac drive controllers 15 hp and larger. (ATV58HD16M2–D46M2)
- 400/460 Vac drive controllers 25 hp and larger. (ATV58HD28N4–D79N4)
- 460 Vac drive controllers 5 hp to 25 hp that do not have an integrated EMC filter. (ATV58HU54N4X–D23N4X)

To increase the horsepower rating, begin at the rEF screen and follow this procedure:

1. Press ENT. rEF begins flashing.
2. Press ▲. A higher horsepower rating is displayed with a “+” sign indicating that the rating has been increased.
3. Press ENT then ESC. The drive controller is now configured for the higher horsepower rating.

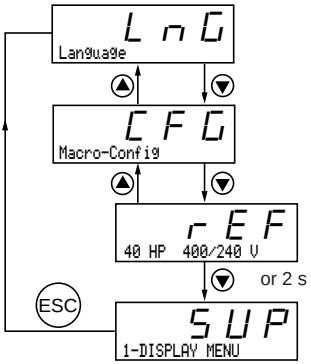

Figure 11: Drive Controller Identification Screen

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1—DISPLAY MENU

Display parameters can be viewed in any access level. You can scroll through these parameters with the motor running.

Menu 1

Table 3: 1—Display Menu Parameters

Parameter	Code	Function	Units
Drive. state Use this parameter to monitor drive status.		Drive controller status: indicates a fault or the state of the drive controller: rdY = drive controller ready rUn = motor in steady state ACC =accelerating dEC = decelerating CLI = in current limit dCb = DC injection braking nSt = commanded to freewheel stop Obr = braking with deceleration ramp adaptation	-
Freq. Ref. - Hz	FrH	Reference frequency	Hz
Output Freq. - Hz	rFr	Output frequency applied to the motor	Hz
Motor Speed - RPM	SPd	Motor speed estimated by the drive controller. Based on nominal motor speed (nSP) entry. See Table 9 on page 34.	RPM
Motor Current - A	LCr	Motor current	A
Machine Spd.	USP	Machine speed estimated by the drive controller. USP is proportional to rFr scaled by the coefficient, USC, which is adjustable in the Adjust menu.	—
Output Power - %	OPr	Output power estimated by the drive controller. 100% corresponds to nominal power.	%
Mains Voltage V	ULn	Mains voltage	V
Motor Thermal - %	tHr	Thermal state: 100% corresponds to the nominal motor thermal state. Above 118%, the drive trips on OLF (motor overload fault).	%
Drive Thermal - %	tHd	Thermal state of the drive controller: 100% corresponds to the nominal drive controller thermal state. Above 118%, the drive trips on OHF (drive overheating fault). It resets when the thermal state goes below 70%.	%
Last Fault	LFt	Displays the last fault	-
Freq. Ref	LFr	This adjustment parameter appears in place of the FrH parameter when command of the drive controller by the keypad has been activated with the LCC parameter in the Control menu (see page 43).	Hz

Note: If USP is greater than 9999, the display value is USP/1000.

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2—ADJUST MENU

The Adjust menu is accessible when the access locking switch is set to either  or  . Adjustment parameters can be modified whether the drive controller is commanding the motor to run or not, however, it is recommended that you make all adjustments with the motor stopped.

⚠ WARNING

UNINTENDED EQUIPMENT ACTION

Changes made to adjustment parameters while the motor is running may cause unintended equipment action. When changing adjustment parameters, ensure that the motor is stopped.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

There are two types of adjustment parameters: parameters which are always accessible (fixed adjustment parameters), and parameters which may be accessible depending on:

- The macro-configuration selected
- The presence of an I/O extension card
- The input and output reassignments

The fixed set of adjustment parameters, shown in Table 4, are accessible in every macro-configuration.

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Menu 2

Table 4: 2—Fixed Set of Adjustment Parameters (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
Freq. Ref. - Hz	LFr	Appears when drive controller command from the keypad has been activated using the LCC parameter in the Control menu (see page 43).	LSP to HSP	
Acceleration -s Deceleration -s	ACC dEC	Acceleration and deceleration ramp times. Defined for going between 0 and FRS.	0.05 to 999.9 0.05 to 999.9	3 s 3 s
Low SPeed - Hz	LSP	Low speed	0 to HSP	0 Hz
High SPeed - Hz	HSP	High speed. Ensure that this adjustment is suitable for the motor and the application.	LSP to tFr	50/60 Hz depending on switch setting
Gain - %	FLG	Frequency loop gain. Allows adaptation of the speed of response to changes in machine speed as a function of the load. For machines with high resistant torque or high inertia, or machines with fast cycles, progressively increase the gain.	0 to 100	20
Stability - %	StA	Allows ability to attain steady state after a change in machine speed as a function of the load. Progressively increase stability to suppress overshoot in speed.	0 to 100	20
ThermCurrent - A	ItH	Current used for the motor thermal protection. Adjust ItH to the nominal current which appears on the motor nameplate.	0.25 to 1.36 In [1]	Varies according to drive controller size.

⚠ CAUTION

MOTOR OVERHEATING

This drive controller does not provide direct thermal protection for the motor. Use of a thermal sensor in the motor may be required for protection at all speeds or loading conditions. Consult motor manufacturer for thermal capability of motor when operated over desired speed range.

Failure to follow this instruction can result in injury or equipment damage.

[1] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

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Menu 2

NOTE: DC Inj. Time is only available if automatic DC injection (AdC) is set to Yes.

DC Inj. Current Level is only available if tdC is set to continuous.

Table 4: 2—Fixed Set of Adjustment Parameters (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
DC Inj. Time- s	tdC	DC injection braking time. If tdC = Cont, DC injection is continuous.	0 to 30 s Cont	0.5 s
dc I at rest - A	SdC	DC injection braking current level if tdC is set to continuous.	0.1 to 1.36 In	Varies according to drive controller size.

⚠ WARNING

NO HOLDING TORQUE

- DC injection braking does not provide holding torque at zero speed.
- DC injection braking does not function during loss of power or drive controller fault.
- When required, use separate brake for holding torque.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

⚠ CAUTION

MOTOR OVERHEATING AND DAMAGE

Application of DC injection braking for long periods of time can cause motor overheating and damage. Protect motor from extended periods of DC injection braking.

Failure to follow this instruction can result in injury or equipment damage.

NOTE: Additional parameters appear in this menu at this point if certain Macro Configurations are selected. See Tables 5–7.

Jump Freq. - Hz	JPF	Jump frequency with a bandwidth of +/- 2.5 Hz around JPF. Suppression of a critical speed which causes mechanical resonance.	0 to HSP	0 Hz
LSP Time - s	tLS	Low speed run time. Following operation at LSP for the amount of time defined by tLS, the motor is automatically commanded to stop. The motor restarts if the frequency reference is greater than LSP, if a run command continues to be present. “0” means that no time period is set.	0.0 to 999.9 s	0
Machine Coef.	USC	Machine Speed Coefficient. Coefficient applied to rTr permitting the display of machine speed by the parameter USP. USP = rFr x USC	0.01 to 100.0	1.00

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Additional Adjustment Parameters for Material Handling

Table 5 lists the additional parameters that are accessible when the macro-configuration is set to Material Handling.

Menu 2

Table 5: 2—Additional Adjustment Parameters with Material Handling Macro-configuration

Parameter	Code	Description	Adjustment Range	Factory Setting
IR Compens. - %	UFr	Allows adjustment of the default value of IR Compensation or the value measured during auto-tuning. The adjustment range is extended to 800% if the SPC parameter (special motor) is set to yes in the Drive menu (see page 38).	0 to 150% or 0 to 800%	100%
Slip Comp. - %	SLP	Allows adjustment of the slip compensation around a fixed value set by the nSP parameter (motor nominal speed) in the Drive menu (see page 34).	0 to 150%	100%
Preset SP.2- Hz	SP2	Second preset speed	LSP to HSP	10 Hz
Preset SP.3- Hz	SP3	Third preset speed	LSP to HSP	15 Hz
Preset SP.4- Hz ★	SP4	Fourth preset speed	LSP to HSP	20 Hz
Preset SP.5- Hz ★	SP5	Fifth preset speed	LSP to HSP	25 Hz
Preset SP.6- Hz ★	SP6	Sixth preset speed	LSP to HSP	30 Hz
Preset SP.7- Hz ★	SP7	Seventh preset speed	LSP to HSP	35 Hz
Curr.Lev.Att: A ★	Ctd	Current threshold above which the logic output or the relay changes to 1	0.25 to 1.36 In [1]	1.36 In [1]

[1] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.
★ Parameters appear if an I/O extension card is installed.

ENGLISH

Additional Adjustment Parameters for General Use

Table 6 lists the additional parameters that are accessible when the macro-configuration is set to General Use.

Menu 2

Table 6: 2—Additional Adjustment Parameters with General Use Macro-configuration

Parameter	Code	Description	Adjustment Range	Factory Setting
IR Compens. - %	UFr	Allows adjustment of the default value of IR Compensation or the value measured during auto-tuning. The adjustment range is extended to 800% if the parameter SPC (special motor) is set to yes in the Drive menu (see page 38).	0 to 150% or 0 to 800%	100%
Slip Comp. - %	SLP	Allows adjustment of the slip compensation around a fixed value set by the motor nominal speed	0 to 150%	100%
Jog Freq. -Hz	JOG	Frequency when operating in Jog	0 to 10 Hz	10 Hz
Jog Delay - s	JGt	Delay between two consecutive jog operations	0 to 2 s	0.5 s
ThermLev.Att- %	ttd	Motor thermal state threshold above which the logic output or relay goes to state 1 (high)	0 to 118%	100%

Additional Adjustment Parameters for Variable Torque

Table 7 lists the additional parameters that are accessible when the macro-configuration is set to Variable Torque.

Menu 2

Table 7: 2—Additional Adjustment Parameters with Variable Torque Macro-configuration

Parameter	Code	Description	Adjustment Range	Factory Setting
DC Inj.Curr.- A	IdC	DC injection braking current level.[1] This parameter is accessible if a logic input is assigned to DC injection braking. After 30 seconds, IdC is automatically set to 0.5 ItH if previously set to a higher value.	0.10 to 1.36 In [1]	Varies according to drive size.
V/f Profile - %	PFL	Allows adjustment of the V/f law.	0 to 100%	20%

[1] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

NOTE: V/f Profile is available only if the energy savings function (nld) is set to No.

ENGLISH

Additional Adjustment Parameters After I/O Reassignment

Table 8 on the following page lists the additional parameters that may be accessible after the base product inputs or outputs have been reassigned.

Menu 2

Table 8: 2—Additional Adjustment Parameters After I/O Reassignment (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
Preset Sp.2-Hz	SP2	Second preset speed	LSP to HSP	10 Hz
Preset Sp.3-Hz	SP3	Third preset speed	LSP to HSP	15 Hz
Preset Sp.4-Hz	SP4	Fourth preset speed	LSP to HSP	20 Hz
Preset Sp.5-Hz	SP5	Fifth preset speed	LSP to HSP	25 Hz
Preset Sp.6-Hz	SP6	Sixth preset speed	LSP to HSP	30 Hz
Preset Sp.7-Hz	SP7	Seventh preset speed	LSP to HSP	35 Hz
Jog Freq. - Hz	JOG	Frequency when operating in jog	0 to 10 Hz	10 Hz
Jog Delay - s	JGt	Delay between two consecutive jog operations.	0 to 2 s	0.5 s
BrReleaseLev-Hz	brL	Brake release frequency	0 to 10 Hz	0 Hz
BrReleaseI -A	Ibr	Brake release current	0 to 1.36 In [3]	0 A
BrReleasTime -s	brt	Brake release time	0 to 5 s	0 s
BrEngageLev- Hz	bEn	Brake engage frequency	0 to LSP	0 Hz
BrEngageTime -s	bEt	Brake engage time	0 to 5 s	0 s
PI Prop. Gain	rPG	Proportional gain for PI regulator	0.01 to 100	1
PI Int. Gain-/s	rIG	Integral gain for PI regulator	0.01 to 100 /s	1 /s
PI Coeff.	FbS	Feedback scaling factor for PI regulator	1 to 100	1
PI Inversion	PIC	Inverts the PI feedback signal No: Normal Yes: Inverted	Yes - No	No
Freq. Detect-Hz	Ftd	Motor frequency threshold above which the logic output goes to state 1.	LSP to HSP	50/60 Hz [1]
Curr.Lev.Att- A	Ctd	Current threshold above which the logic output or relay goes to state 1.	0.25 to 1.36 In [3]	1.36 In [3]
ThermLevAtt - %	ttd	Motor thermal state threshold above which the logic output or relay goes to state 1 (high).	0 to 118%	100%
Torque lim2 -A	tL2	Second torque limit, activated by a logic input.	0% to 200% [2]	200%

★ These parameters are available only with the I/O extension card installed.

[1] Depending on the position of the 50/60 Hz switch.

[2] 100% corresponds to the nominal torque of a motor with horsepower size equal to that of the drive controller at its constant torque rating.

[3] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

ENGLISH

Menu 2

Table 8: 2—Additional Adjustment Parameters After I/O Reassignment (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
DC Inj. Curr. -A	IdC	DC injection braking current level. Accessible if a logic input is assigned to DC injection braking. After 30 s, IdC is automatically set to 0.5 ItH if previously set to a higher value.	0.10 to 1.36 In [3]	0.7 ItH
Accelerate 2- s Decelerate 2- s	AC2 dE2	Second acceleration and deceleration ramp times. These parameters are accessible if a logic input is assigned to ramp switching or if Frt is not 0.	0.05 to 999.9	5 s
TachFBCoeff ★	dtS	Tachometer scaling factor associated with the tachometer feedback function: $dtS = \frac{9}{\text{tachometer voltage at HSP}}$	1 to 2	1

★ These parameters are available only with the I/O extension card installed.

ENGLISH

3—DRIVE MENU

This menu is accessible when the access locking switch is in the position. The parameters can only be modified when the motor is stopped.

Optimal performance is obtained:

- By entering the motor nameplate values into the Drive menu
- By initiating an autotune (on a standard asynchronous motor). See page 34 for more information concerning the auto-tune function (tUn).

Parallel and Special Motor Applications

When special motors are used such as synchronous permanent magnet, synchronous wound field, or synchronous reluctance motors, or if motors are used in parallel, the following must be done:

1. Select either the “Hdg: Material Handling” or “GEn: General Use” macro-configuration (see page 21).
2. Configure the Special Motor parameter (SPC) in the Drive menu to “yes” (see page 38).
3. Adjust the IR Compensation parameter (UFr) in the Adjust menu to obtain satisfactory performance (see pages 29 and 30).

Table 9 on page 34 shows the parameters accessed in the Drive menu.

ENGLISH

Menu 3

Table 9: 3—Drive Menu Parameters

Parameter	Code	Description	Adjustment Range	Factory Setting
Nom.Mot.Volt- V	UnS	Nominal motor voltage given on the motor nameplate label. ATV58••••M2 ATV58••••N4	 200 to 240 V 380 to 500 V	 230 V or 400/460 V [1]
Nom.Mot.Freq - Hz	FrS	Nominal motor frequency given on the motor nameplate label	40 to tFr	50/60 Hz [1]
NomMotCurr.- A	nCr	Nominal motor current given on the motor nameplate label	0.25 to 1.36 In [2]	0.9 I_n [2]
Nom.MotSpeed -rpm	nSP	Nominal motor speed given on the motor nameplate label	0 to 9999 rpm	depends on drive rating
Mot.CosPhi	CoS	Motor Cos Phi (power factor) given on the motor nameplate label. This defines power factor at drive controller full load amperes.	0.5 to 1	depends on drive rating
Auto Tuning	tUn	Initiates an autotune when the tUn parameter is set to “yes”. After the auto-tune is complete, the display will show “done”. “No” is displayed if the autotune was not successful or completed. “No” is also displayed if the motor rating is less than 25% of drive controller In rating or if multiple motors are connected. The CoS parameter may need to be manually adjusted for optimum performance. This feature will not work if any logic inputs are activated. If freewheel stop or fast stop are assigned to a logic input, they must be in the high state to autotune.	no - yes	no

[1] Depending on the position of the 50/60 Hz switch.

[2] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

[3] The factory setting depends on the macro-configuration used: no for Material handling, yes for General use and Variable torque.

[4] Refer to the drive controller instruction bulletin VVDED397048US for duty cycle ratings of the drive controllers.

★ These parameters are available only with the I/O extension card installed.

ENGLISH

Menu 3

Table 9: 3—Drive Menu Parameters (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
Max.Freq. - Hz	tFr	Maximum output frequency. The maximum value is a function of the switching frequency (SFr, see page 37).	40 to 500 Hz	60/72 Hz [1]

⚠ CAUTION

MACHINERY OVERSPEED

Some motors and/or loads may not be suited for operation above nameplate motor speed and frequency. Consult motor manufacturer before operating motor above rated speed.

Failure to follow this instruction can result in injury or equipment damage.

NOTE: Energy Eco. is available only in variable torque mode.

NOTE: I Limit is available only in variable torque mode.

Energy Eco	nLd	Optimizes the motor efficiency by automatically adjusting the V/Hz ratio.	no - yes	yes
I Limit adapt.	Fdb	Current limit adaptation. When configured for yes, the current limit setting will increase as a function of output frequency.	no - yes	no
DecRampAdapt	brA	Activation allows the deceleration ramp time to be automatically increased, avoiding an overbraking fault (ObF) if the ramp time was too short. This function may be incompatible with ramp positioning and with dynamic braking. If relay R2 is assigned to Brake Logic, brA can only be set to no.	no - yes	no [3]

NOTE: Switch Ramp 2 is not available if LI is assigned to ramp switching.

SwitchRamp2- Hz	Frt	Frequency for ramp switching. When the output frequency is greater than Frt, the ramp times will be AC2 and dE2.	0 to HSP	0 Hz

[1] Depending on the position of the 50/60 Hz switch.

[2] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

[3] The factory setting depends on the macro-configuration used: no for Material handling, yes for General use and Variable torque.

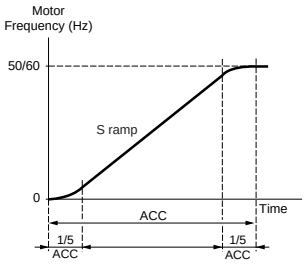
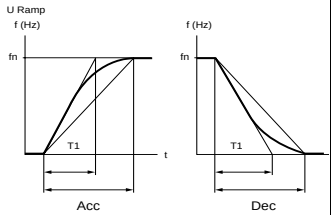
[4] Refer to the drive controller instruction bulletin VVDED397048US for duty cycle ratings of the drive controllers.

★ These parameters are available only with the I/O extension card installed.

ENGLISH

Menu 3

Table 9: 3—Drive Menu Parameters (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
Ramp Type	rPt	Defines the type of acceleration and deceleration ramps. LIN: linear S: S ramp U: U ramp  	LIN - S - U	LIN
DecRamp Coeff	dCF	Coefficient for reducing the deceleration ramp time when a logic input has been assigned to the Fast Stop function. For example: If dec=20 s, setting dCF to 2 results in a 10 s dec ramp setting.	1 to 10	4
Trq.Limit1 -%	tL1	Torque limit allows limitation of the maximum motor torque	0 to 200%	200%
Int.I Lim -A	CL1	Current limit used to limit the maximum motor heating	0 to 1.36 In [2]	1.36 In [2]
Auto DC Inj.	AdC	Allows deactivation of automatic dc injection at stop	no - yes	yes

NOTE: DecRamp Coeff is only available if fast stop is enabled.

[1] Depending on the position of the 50/60 Hz switch.

[2] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

[3] The factory setting depends on the macro-configuration used: no for Material handling, yes for General use and Variable torque.

[4] Refer to the drive controller instruction bulletin VVDED397048US for duty cycle ratings of the drive controllers.

★ These parameters are available only with the I/O extension card installed.

Menu 3

NOTE: Mot P Coef. is only available if motor switching is enabled.

NOTE: Modifying SFt causes the following parameters to revert to factory settings:
Drive Menu (3)
nCr, CLI, SFr, nrd
Adjust Menu (2)
itH, IdC, Ibr, Ctd

Table 9: 3—Drive Menu Parameters (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
Mot P Coef.	PCC	Defines the ratio between the nominal drive controller power and the motor with the lowest power rating when a logic input is assigned to the motor switching function (see page 54).	0.2 to 1	1
Sw. Freq. Type	SFt	Allows selection of the type of switching frequency. • LF allows adjustment between 0.5 and 4 kHz using the SFr parameter. • HF1 and HF2 allow adjustment between 4 and 16 kHz: — HF1 is for applications with a low duty cycle, without derating the drive controller. If the drive controller thermal state goes above 95%, the switching frequency automatically goes to 2 or 4 kHz (depending on rating). When the thermal state returns to 70%, the switching frequency returns to the set value. — HF2 is for machines with a high duty cycle with derating of the drive controller by one power rating. The drive parameters (current limit, thermal current, etc.) are automatically scaled.	LF - HF1 - HF2 [4]	LF
Sw Freq -kHz	SFr	Selection of switching frequency. The range depends on the SFt parameter. The maximum operational frequency (tFr) is limited depending on the switching frequency: SFr (kHZ) 0.5 1 2 4 8 12 16 tFr (Hz) 62 125 250 500 500 500 500	LF: 0.5-1-2-4 kHz HF1 or HF2: 4- 8-12-16 kHz [4]	LF: 4 kHz HF1 or HF2: (depending on controller rating)
Noise Reduct	nrd	This function randomly modulates the switching frequency in order to reduce audible motor noise.	no - yes	yes if SFt = LF no if SFt = HF1 or HF2

[1] Depending on the position of the 50/60 Hz switch.

[2] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

[3] The factory setting depends on the macro-configuration used: no for Material handling, yes for General use and Variable torque.

[4] Refer to the drive controller instruction bulletin VVDED397048US for duty cycle ratings of the drive controllers.

★ These parameters are available only with the I/O extension card installed.

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Menu 3

NOTE: Special Mot. is not available in variable torque mode.

Table 9: 3—Drive Menu Parameters (Continued)

Parameter	Code	Description	Adjustment Range	Factory Setting
Special Mot.	SPC	This function extends the adjustment range of the UFr parameter (IR Compensation) in the Adjustments menu to allow adaptation to special motors.	no - yes	no
PG Type ★	PGt	Defines the type of sensor used when an encoder feedback I/O card is installed. INC: incremental encoder (A, A+, B, B+ are wired). DET Detector (only A is wired).	INC-DET	DET
Num. Pulses ★	PLS	Defines the number of pulses for each revolution of the sensor.	1 to 1024	1

[1] Depending on the position of the 50/60 Hz switch.

[2] In = drive controller constant torque output current rating shown in the drive controller instruction bulletin, VVDED397048US, and on the drive controller nameplate.

[3] The factory setting depends on the macro-configuration used: no for Material handling, yes for General use and Variable torque.

[4] Refer to the drive controller instruction bulletin VVDED397048US for duty cycle ratings of the drive controllers.

★ These parameters are available only with the I/O extension card installed.

ENGLISH

4—CONTROL MENU

The Control Menu is accessible when the access locking switch is in the 🔓 position. The parameters can only be modified when the motor is stopped.

Menu 4

Table 10: 4—Control Menu: Keypad or 2- and 3-Wire Control

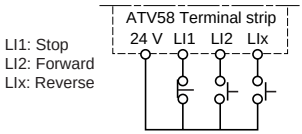
Parameter	Code	Description	Adjustment Range	Factory Setting
TermStripCon.	tCC	Configuration of the terminal strip command: 2- or 3-wire control.	2W - 3W	2W

Note: modification of this parameter requires two confirmations since it causes a reassignment of the logic inputs. Shown below are the LI assignments when 3-wire control is selected. When 2-wire control is selected, the assignments are those shown in Table 1 on page 22. In 3-wire control, LI1 and LI2 cannot be reassigned.

I/O	Material Handling	General Use	Variable Torque
LI1	STOP	STOP	STOP
LI2	Run forward	Run forward	Run forward
LI3	Run reverse	Run reverse	Run reverse
LI4	2 Preset speeds	Jog	Reference switching
LI5★	4 Preset speeds	Freewheel stop	Injection braking
LI6★	8 Preset speeds	Clear faults	Freewheel stop

Selecting 3-wire control inhibits the automatic restart function.

3-wire control wiring example:



★ These I/O can be accessed if an I/O extension card has been installed.

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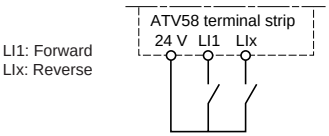
Menu 4

NOTE: Type 2 Wire appears if 2-wire control is selected.

Table 11: 4—Control Menu: 2-Wire Control Type

Parameter	Code	Description	Adjustment Range	Factory Setting
Type 2 Wire	tCt	Defines the type of 2-wire control: • LEL: If the forward or reverse input is high when the drive controller is powered up, the drive controller will start the motor. If both inputs are high on power up, the controller will run forward. • TrN: The drive controller must see a transition from low to high of the forward or reverse input before it will start the motor. Therefore, if the forward or reverse input is high when the drive controller is powered up, the input must be cycled before the drive controller will start the motor. • PFW: Forward input has priority over reverse input with this control. If forward is activated while the controller is running in reverse, the controller will run forward. 2-wire control wiring example: 	LEL-TrN-PFW	LEL
RV inhibit	rIn	When configured for yes, this function inhibits reverse operation even if reverse operation is requested by a summing or PI regulator function. This parameter is not available if a logic input is configured for reverse. A logic input cannot be configured for reverse if this parameter is configured for yes.	yes - no	no

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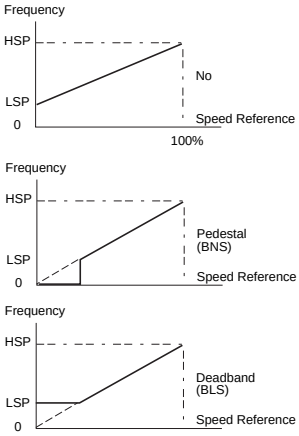
Menu 4

Table 11: 4—Control Menu: 2-Wire Control Type

Parameter	Code	Description	Adjustment Range	Factory Setting
deadb./Pedst	bSP	This function can be used to manage low speed operation. 	No BLS BnS	No

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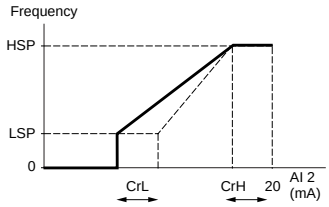
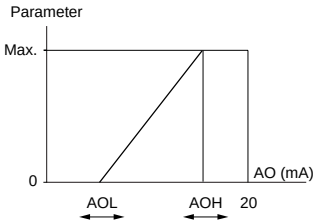
Menu 4

Note: If CRL is set higher than CRH, reverse sense operation will result (i.e., 20 mA will equal low speed and 4 mA will equal high speed).

Table 12: 4—Control Menu: Other Parameters

Parameter	Code	Description	Adjustment Range	Factory Setting
AI2 min Ref.-mA AI2 Max. Ref-mA	CrL CrH	• CrL: Minimum value of the signal on analog input AI2 • CrH: Maximum value of the signal on analog input AI2 These two parameters allow definition of the signal at AI2. The input can be configured for 0-20 mA, 4-20 mA, 20-4 mA, among other possibilities. 	CrL: 0-20 mA CrH: 4-20 mA	CrL: 4 mA CrH: 20 mA
AO min Val-mA ★ AO Max. Val-mA ★	AOL AOH	Min. value of the signal on output AO Max. value of the signal output on AO These two parameters are used to define the output signal on AO. Eg. : 0–20 mA, 4–20 mA, 20–4 mA, etc. 		

★ These parameters are available only with the I/O extension card installed.

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Menu 4

NOTE: Save Reference is only available if LIs are assigned to +Speed/-Speed.

Table 12: 4—Control Menu: Other Parameters

Parameter	Code	Description	Adjustment Range	Factory Setting
Save Ref	StrE	This function allows saving the reference, either when the run command is removed (RAM) or when mains power is removed (EEP). When the motor is next started, the reference speed will be the last saved reference. In order for speed reference to be saved in EEP mode, the run command should not be present when re-applying power.	NO-RAM-EEP	NO
KeypadCom.	LCC	Allows command of the drive controller via the keypad. The STOP/RESET, RUN and FWD/REV keys are active. The reference speed is given by the LFr parameter (see page 27). **Only the freewheel stop, fast stop, and stop by DC injection commands remain active at the terminal strip.** If the link between the drive controller and keypad is lost, the drive controller will trip on the SLF fault (serial link fault).	No-Yes	No
Stop Priorit.	PSt	This function gives priority to the STOP key on the keypad no matter what the command source (terminal strip, keypad or serial link). To change the PSt parameter to no: 1. Display no. 2. Press ENT. 3. The drive controller displays “See manual”. 4. Press the up arrow key, then the down arrow key, then ENT, then ESC. **When set to no, the stop key on the keypad will be inactive**. To return to yes, display yes then press enter.	No - Yes	Yes

★ These parameters are available only with the I/O extension card installed.

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Menu 4

Table 12: 4—Control Menu: Other Parameters

Parameter	Code	Description	Adjustment Range	Factory Setting
		⚠ WARNING **UNINTENDED EQUIPMENT OPERATION** Disabling the stop key on the keypad will prevent the drive controller from stopping when the stop key is pressed. An external stop command must be installed to stop the motor. **Failure to follow this instruction can result in death, serious injury, or equipment damage.**		
DriveAddress	Add	Drive controller address controlled through the RS485 port by a MODBUS device (i.e., without the programming or operating keypad display).	0 to 31	0

★ These parameters are available only with the I/O extension card installed.

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5—I/O MENU

This menu allows you to assign functions to the inputs and outputs. It is accessible when the access locking switch is in the position. The I/O assignments can only be modified if the motor is not running.

The inputs and outputs displayed in the I/O menu vary depending on selections made in the control menu and whether or not an I/O extension card is installed. The default settings depend on the macro-configuration selected (see Table 1 on page 22 for factory settings).

Table 13 shows which functions can be assigned to the analog input and which can be assigned to a logic input. Additional inputs are available and can be assigned when an I/O extension card is installed. *LI1 and R1 cannot be reassigned. AI1, LI1, and R1 are not displayed in the I/O menu.*

Menu 5

NOTE: When reassigning inputs from +Speed and -Speed, reassign -Speed first.

When reassigning inputs from preset speeds, reassign PS8 first then PS4, then PS2.

Table 13: Possible Assignments for Configurable Inputs

I/O Extension Card			2 Logic Inputs LI5-LI6	Analog Input AI3	Logic Input [1] A, A-, B, B-
Drive controller without an I/O Extension Card		**Analog Input AI2**	**3 Logic Inputs LI2–LI4**		
Code and Parameter	**Description**				
NO: Not assigned	Not assigned	X	X	X	X
RV: Reverse	Run reverse		X		
RP2: Switch ramp2	Ramp switching		X		
JOG	Jog		X		
+SP: + Speed	+Speed		X		
-SP: - Speed	-Speed		X		
PS2: 2 Preset SP	2 preset speeds		X		
PS4: 4 Preset SP	4 preset speeds		X		
PS8: 8 Preset SP	8 preset speeds		X		
NST: Freewhl Stop	Freewheel stop/Run permissive		X		
DCI: DC inject	DC injection braking		X		
FST: Fast stop	Fast stop		X		
CHP: Multi.Motor	Switching between two motors		X		
TL2: Torque Lim2	Second torque limit		X		
FLO: Forced Local	Force to local		X		

[1] The menu for assigning encoder input A, A-, B, B- is called “Assign AI3”.

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Menu 5

Table 13: Possible Assignments for Configurable Inputs

I/O Extension Card			2 Logic Inputs LI5-LI6	Analog Input AI3	Logic Input [1] A, A-, B, B-
Drive controller without an I/O Extension Card		**Analog Input AI2**	**3 Logic Inputs LI2–LI4**		
Code and Parameter	**Description**				
RST: Fault Reset	Fault reset		X		
RFC: Auto/manu	Reference switching		X		
ATN: Auto-tune	Auto-tuning		X		
FR2: SPeed Ref2	Speed reference 2	X			
SAI: Summed Ref.	Reference summing	X		X	
PIF: PI regulator	PI regulator feedback	X		X	
SFB: Tacho feedbk	Tachogenerator			X	
PTC: Therm. Sensor	PTC probes			X	
ATL: Torque Lim.	Torque limit			X	
RGI: PG feedbk	Encoder or sensor feedback				X

[1] The menu for assigning encoder input A, A-, B, B- is called “Assign AI3”.

Menu 5

Table 14: Possible Assignments for Configurable Outputs

I/O Extension Card			Logic output LO	Analog output AO
Drive Controller without an I/O Extension Module		**Relay R2**		
NO: Not assigned	No assigned	X	X	X
RUN: DriveRunning	Drive controller running	X	X	
OCC: Output Cont.	Output contactor command	X	X	
FTA: Freq Attain.	Frequency threshold attained	X	X	
FLA: HSP Attained	High speed attained	X	X	
CTA: I Attained	Current level attained	X	X	
SRA: FRH Attained	Reference speed attained	X	X	
TSA: Mtr Therm Lv1	Motor thermal level attained	X	X	
BLC: Brk Logic	Brake logic	X		
OCR: Motor current	Motor current			X
OFR: Motor Frequency	Motor speed			X
ORP: Output Ramp	Ramp output			X
TRQ: Motor torque	Motor torque			X
STQ: Signed Torq.	Signed motor torque			X

Table 14 shows which functions can be assigned to relay output R2, logic output LO, and analog output AO.

ENGLISH

Menu 2

After the I/O have been assigned, additional parameters related to the functions automatically appear in the menus, and the macro-configuration is CUS: Customized. The additional parameters are listed in Tables 15 and 16.

Table 15: New Parameters in 2—Adjustment Menu After I/O Reassignment

I/O	Assignment		New Parameters to Adjust
LI	RP2	Ramp switching	AC2 dE2
LI	JOG	Jog	JOG JGt
LI	PS4	4 preset speeds	SP2 SP3
LI	PS8	8 preset speeds	SP4 SP5 SP6 SP7
LI	DCI	DC injection braking	IdC
LI	TL2	Second torque limit	tL2
AI	PIF	PI regulator	rPG rIG FbS PIC
AI	SFB	Tachogenerator	dtS
R2	BLC	Brake logic	brL Ibr brt bEn bEt
R2	FTA	Frequency threshold attained	Ftd
R2	CTA	Current threshold attained	Ctd
R2	TSA	Thermal threshold attained	ttd

Table 16: Other New Parameters After I/O Reassignment

I/O	Assignment		Parameters to Adjust
LI	-SP	- Speed	Str (4—Control menu)
LI	FST	Fast stop	dCF (3—Drive menu)
LI	CHP	Motor switching	PCC (3—Drive menu)
LI	RST	Fault reset	rSt (6—Fault menu)
AI	SFB	Tachogenerator	Sdd (6—Fault menu)
A+, A-, B+, B-	SAI	Summing reference	PGt, PLS (3—Drive menu)
A+, A-, B+, B-	RGI	Encoder feedback	PGt, PLS (3—Drive menu)

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Function Compatibility

The compatibility of certain functions can limit the application functions which can be assigned. Figure 12 shows the incompatibilities between functions. The functions not listed in Figure 12 are compatible with all other functions.

	Automatic DC injection braking	Summing inputs	PI Regulator	+Speed/-Speed	Reference switching (Auto/manual)	Freewheel stop	Fast stop	Jog	Preset Speeds	Reverse operation	Inhibit reverse operation	Speed regulation with tachogenerator or encoder	Torque limitation via AI3	Torque limitation via LI
Automatic DC injection braking						↑								
Summing inputs					●									
PI Regulator					←			●	●			●		
+Speed/-Speed					●			↑	●					
Reference switching (Auto/manual)		●	↑	●					●					
Freewheel stop	←						←							
Fast stop						↑								
Jog			●	←					←					
Preset Speeds			●	●	●			↑						
Reverse operation											●			
Inhibit reverse operation										●				
Speed regulation with tachogenerator or encoder			●										●	
Torque limitation via AI3												●		
Torque limitation via LI														

● Incompatible functions

Compatible functions

No significance

Function priority (functions which cannot be active at the same time):

← ↑ The arrow points to the function that has priority.

The stop functions have priority over run commands.
The speed references from a logic command have priority over analog references.

Note: An incompatible function must be deselected before the desired function can be programmed. For example, if preset speeds is programmed, it must be cleared before the +/- speed parameter can be selected.

Figure 12: Function Compatibility Chart

ENGLISH

Using The Logic Inputs

Run Forward and Run Reverse

The logic input used for run reverse can be reassigned if the application has only one rotation direction.

2-wire Control

In 2-wire control, run (forward or reverse) and stop are commanded by the same logic input. When the logic input is closed (set to state 1), run is commanded; when it is opened (set to state 0), stop is commanded. See tCt on page 40 for more information.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

If both LI1 and LI2 are selected (high state) and LI1 reverts to a zero state, the drive controller will reverse direction. The logic inputs must be programmed appropriately for the application to prevent the motor from rotating in an unintended direction.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

3-wire Control

In 3-wire control, run (forward or reverse) and stop are commanded by two different logic inputs. LI1 is always assigned to stop which is obtained by opening LI1 (setting it to state 0). A pulse on the run input is saved until the stop input is opened.

Whenever the drive is powered up or reset, the motor will only run after resetting the Forward, Reverse, and DC injection inputs.

Ramp Switching

This function allows switching between the first and second ramps. The first ramps are ACC and dEC, the second ramps are AC2 and dE2. There are two ways to activate the function:

- Assign a logic input to RP2 and close the assigned input (set it to state 1).

- By detection of a frequency threshold. This must be configured with the Frt parameter.

If a logic input is assigned to the function, ramp switching can only be initiated by the assigned input.

Jog

A logic input can be assigned to the Jog function to define a motor speed from 0 to 10 Hz. A run command (FWD or REV) is also required.

If the Jog contact is closed (set to state 1) and then a run command is given, the acceleration ramp is 0.1 s. The deceleration ramp will be 0.1 s when the run command is removed.

If a run command is given and then the Jog contact is closed (set to state 1):

- The acceleration ramp is 0.1 s if the motor speed is less than the programmed Jog speed.
- The deceleration ramp will be followed if the motor speed is higher than the programmed Jog speed.

When the Jog contact is opened (set to state 0), the ACC and dEC ramp settings will be used to adjust the motor speed.

The following Jog parameters can be modified in the 2—Adjust menu:

- Jog speed (JOG)
- Delay between jog pulses (JGt)

+Speed/-Speed

There are two types of operation for +Speed/-Speed. In both, the maximum speed is set by the reference speeds at the analog inputs. For example, if 60 Hz is the desired maximum speed, a jumper can be installed from +10 Vdc to AI1.

1. Use of pushbuttons. Two logic inputs are required in addition to the run direction inputs. The +Speed input increases the speed and the -Speed input decreases the speed. If logic inputs are assigned to +Speed/-Speed, the Str parameter appears in the Control menu allowing the reference speed to be saved (see page 43).

NOTE: When 3-wire control is selected, -Speed is automatically assigned to the next input after the one assigned to +Speed.

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2. Use of selector switches. Only one logic input, assigned to +Speed, is required. When using selector switches, there is one position for each rotation direction.

   NOTE: This type of operation is not compatible with 3-wire control.

   The Save Reference (Str) parameter can be used to save the last speed reference when the run command is removed or when the power is removed.

Figures 13 and 14 illustrate wiring and timing for +Speed/-Speed.

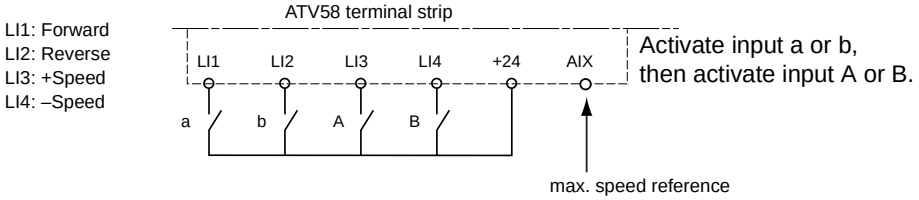
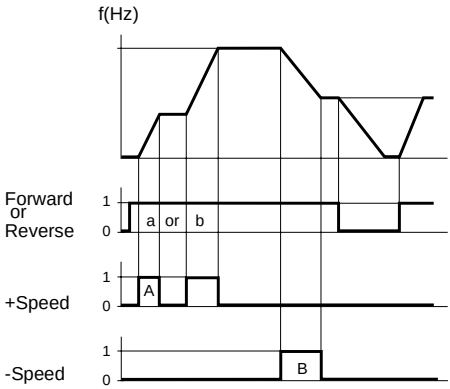


Figure 13: +Speed / -Speed Wiring Diagram



NOTE: To reassign the logic inputs to a function other than +Speed/-Speed, -Speed must be cleared first.

Figure 14: +Speed/-Speed Timing Diagram

ENGLISH

Figures 15 and 16 show a wiring example and timing diagram for +Speed using selector switches. This function requires maximum speed reference input.

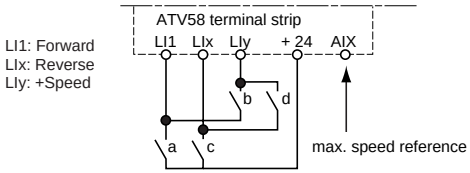


Figure 15: Wiring Example for +Speed (Selector Switches)

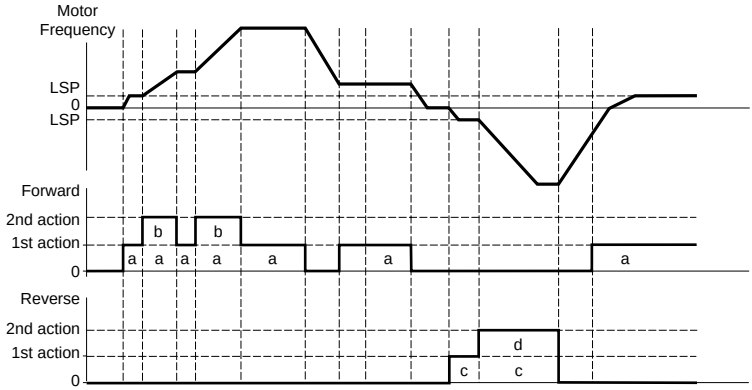


Figure 16: +Speed Timing Diagram (Selector Switches)

ENGLISH

Preset Speeds

2, 4, or 8 speeds can be preset, requiring 1, 2, or 3 logic inputs, respectively.

Table 17 shows how the logic inputs are configured for Preset Speeds and the input states that activate them.

Table 17: Preset Speed Logic

2 Preset Speeds		4 Preset Speeds			8 Preset Speeds			
Assign LIx to PS2.		Assign LIx to PS2, then LIy to PS4.			Assign LIx to PS2, then LIy to PS4, then LIz to PS8.			
LIx	**Speed reference**	**LIy**	**LIx**	**Speed reference**	**LIz**	**LIy**	**LIx**	**Speed reference**
0	LSP + AI reference	0	0	LSP + AI reference	0	0	0	LSP + AI reference
1	HSP	0	1	SP2	0	0	1	SP2
		1	0	SP3	0	1	0	SP3
		1	1	HSP	0	1	1	SP4
					1	0	0	SP5
					1	0	1	SP6
					1	1	0	SP7
					1	1	1	HSP

NOTE: To reassign the logic inputs to a function other than Preset Speeds, PS8 (LIz) must be cleared, then PS4 (LIy), then PS2 (LIx).

Reference Switching (Auto/Manual)

Switching between two references (at AI1 and AI2) by a logic input command. This function automatically assigns AI2 to Speed Reference 2.

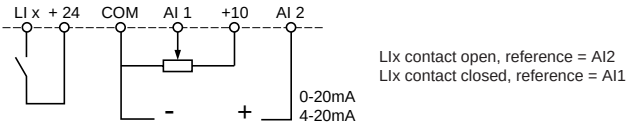


Figure 17: Reference Switching Wiring Diagram

Freewheel Stop (Coast to Stop) / Run Permissive

A logic input can be assigned to the Freewheel Stop / Run Permissive (NST) function. The drive controller will not run until the logic input is closed. Opening the logic input assigned to the function (setting it to state 0) causes the drive controller to stop applying power to the motor and the motor to coast to a stop. When the logic input is open, NST is displayed in the Drive state screen on the keypad display to indicate that a freewheel stop has been requested. The drive controller will not run until the logic input is closed. This can be used with the Forced Local function for drive controllers on communication networks.

DC Injection Braking

DC injection braking can be activated at the end of each stop cycle (Adc=yes) or DC injection braking can be obtained by closing the logic input assigned to the DC Injection Braking function (setting it to state 1).

Fast Stop

⚠ WARNING

EXTENDED STOPPING TIME

Deceleration time during fast stop may be automatically extended depending on braking ability of the drive controller. A dynamic brake or mechanical stopping/holding brake may be required for consistent stopping times independent of motor load conditions. Fast stop does not function during loss of power or drive controller fault.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Fast stop is a braked stop with the deceleration ramp time reduced by a programmable coefficient (see dCF on page 36). Fast stop is obtained by opening the logic input assigned to the function (setting it to state 0).

Motor Switching

This function allows a single drive controller to control two motors with different power ratings, one at a time. The ratio between the motor power ratings is set with the PCC parameter in the Drive menu (see page 37).

If the two motors have different power ratings, enclosure types, or speed ratings, then separate motor contactors, thermal protection, and short

circuit protection will be required for each motor. **This function automatically inhibits motor thermal protection of the second motor.**

A Switching command will not be taken into account unless the motor is stopped. If the output contactor opens while the motor is running, the drive controller may trip on overcurrent or overvoltage which may result in damage to the drive controller. The following parameters are automatically scaled by the command from the logic input:

- DC injection current
- Brake release current
- Nominal motor current

Second Torque Limit

Second torque limit reduces the maximum motor torque when the logic input is closed (state set to 1). The tL2 parameter in the Adjust menu must be set.

Fault Reset

Fault reset erases a saved fault and resets the drive controller if the cause of the fault has disappeared. Two types of reset are possible: partial or total. This is set by the rSt parameter in the Fault menu. For a partial reset (rSt = RSP), the following faults are reset and cleared from the display:

mains overvoltage	communication fault	motor overheating
DC bus overvoltage	motor overload	serial link fault
output phase loss	loss of 4-20 mA	drive controller overheating
ramp not followed	external fault	overspeed

For a Total reset (rSt = RSG), all faults except SCF (Motor Short Circuit) are overridden as long as the logic input assigned to Fault Reset is closed.

CAUTION

MOTOR OVERHEATING

Repeated reset of the thermal state after a thermal overload can result in thermal stress to the motor.

When faults occur, promptly inspect the motor and driven equipment for problems (locked shaft, mechanical overload, etc.) before restarting. Also check the power supplied to motor for abnormal conditions (phase loss, phase imbalance, etc.).

Failure to follow this instruction can result in equipment damage.

Force to Local

Permits going from serial link command to local command using the keypad or terminal strip, depending on the setting of the LCC parameter in the Control menu.

Auto-tuning

When the assigned logic input changes to 1 an auto-tuning operation is triggered, in the same way as parameter TUN in the “drive” menu.

Auto tuning is only performed if no command has been activated. If a “freewheel stop” or “fast stop” function is assigned to a logic input, this input must be set to 1 (active at 0).

Encoder Inputs

(Only with an I/O extension card with encoder input, VW3A58202U)

Speed regulation

The inputs can be used to connect an encoder for improving speed regulation in applications where the load is changing. To program the encoder speed feedback, configure AI3 in Menu 5 for RGI: Encoder Feedback. Then configure the encoder type and number of pulses in Menu 3.

The A, A-, B, and B- inputs on the I/O option card are for use in forward and reverse directions.

The A input can also be used with an inductive sensor of a photoelectric detector for simplified, but less accurate regulation.

ENGLISH

Summing speed reference

The setpoint from the encoder input is summed with AI1.

Using The Analog Inputs

The AI1 input is set for speed reference unless the PI Regulator function is enabled. In this case, AI1 is used for the set point reference. The possible assignments of AI2 and AI3 are Speed Reference Summing and PI Regulator.

Speed Reference Summing

The frequency references at AI2 can be summed with that at AI1.

PI Regulator

This function is available only in variable torque mode.

PI Regulator can be assigned to AI2 (in 5—I/O menu). It allows connection of process feedback and activates the PI Regulator. AI1 is used for setpoint input. AI2 is used for feedback input.

Parameters accessible in the 2—Adjust menu:

NOTE: Jog and Reference Select are not compatible with PI Regulator.

- PI regulator proportional gain (rPG)
- PI regulator integral gain (rIG)
- PI feedback scaling factor (FbS) permits adjustment of the maximum value of the PI feedback so that it corresponds to the maximum value of the PI regulator speed reference.
- PI inversion (PIC) permits an inverted (reverse-acting) response to the PI regulator speed reference signal. If PIC=no, the motor speed increases when the error is positive. If PIC=yes, the motor speed decreases when the error is positive.

If a logic input is assigned to “reference switching,” only AI3 can be used for PI Regulator.

Assignment of AI2 and AI3

Summing speed reference: The frequency setpoints given by AI2 and AI3 can be summed with AI1.

Speed regulation with tachogenerator: (Assignment on AI3 only with an I/O extension card VW3A58201U)

An external divider bridge is required to adapt the voltage of the tachogenerator. The maximum voltage must be between 5 and 9 V. A precise setting is then obtained by setting the dtS parameter available in the adjust menu.

PTC probe processing: (only with an I/O extension card using the analog input). Used for the direct thermal protection of the motor by connecting the PTC probes in the motor windings to analog input AI3.

Total resistance of the probe circuit at 20 °C = 750 Ω.

Torque limit: (Assignment on AI3 only with an I/O extension card VW3A58201U). The signal applied at AI3 operates in a linear fashion on the internal torque limit (parameter TLI in the “drive menu”):

— If AI3 = 0 V: limit = TLI x 0 = 0
— If AI3 = 10 V: limit = TLI.

Using the Controller Relay and Logic Outputs

The relay R2 on the drive controller or the logic output (LO) on an option card can be configured as follows:

Output Contactor Command (OCC)

The Output Contactor Command function allows the drive controller to command a contactor between the controller and the motor. The controller closes the contactor when a run command is given. When there is no longer any current in the motor, the controller opens the contactor. When using an output contactor, set outphase loss (OPL) to No.

NOTE: If the braking by DC injection function is configured, do not exceed contactor rating, because the contactor will not open until the end of braking.

Drive running (RUN)

The logic output is at state 1 if the motor is being fed by the drive controller (current present) or if a run command is generated with a zero speed reference.

Frequency Threshold Attained (FTA)

The logic output is at state 1 if the motor frequency is greater than or equal to the frequency threshold set by the Ftd parameter in the Adjust menu.

Frequency Reference Attained (SRA)

The logic output is at state 1 if the motor frequency is equal to the speed reference value.

High Speed Attained (FLA)

The logic output is at state 1 if the motor frequency is equal to the high speed value (HSP).

Current Threshold Attained (CTA)

The logic output is at state 1 if the motor current is greater than or equal to the current threshold set by the Ctd parameter in the Adjust menu.

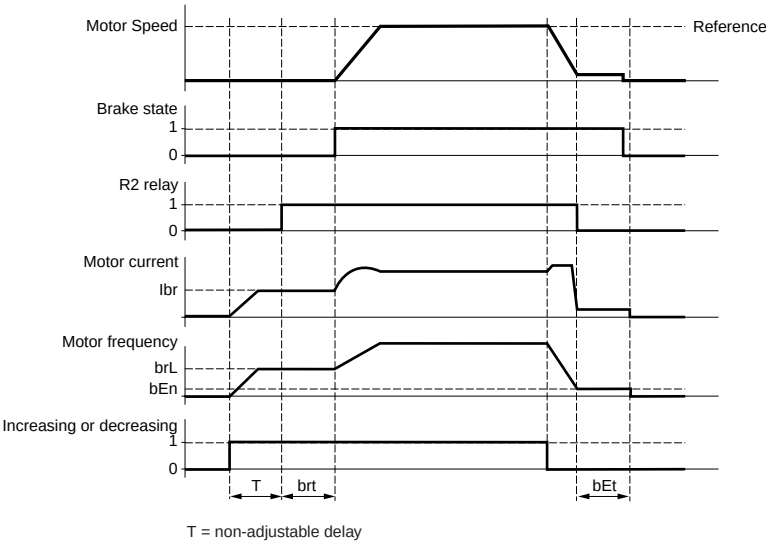
Thermal State Attained (TSA)

The logic output is at state 1 if the motor thermal state is greater than or equal to the thermal state set by the ttd parameter in the Adjust menu.

Brake Logic Command (BLC) (This parameter is assignable to R2)

Brake Logic Command allows management of a mechanical brake by the drive controller. Figure 18 on page 60 shows a timing diagram for Brake Logic.

ENGLISH



T = non-adjustable delay

Figure 18: Brake Logic Timing Diagram

Parameters accessible in the Adjust menu:

- brake release frequency (brL)
- brake release current (Ibr)
- brake release time (brt)
- brake engage frequency (bEn)
- brake engage time (bEt)

ENGLISH

Using the Analog Outputs on the I/O Extension Cards

The analog outputs on the Analog I/O and Digital I/O extension cards are current outputs. The minimum and maximum values are configurable, each with a range of 0–20 mA.

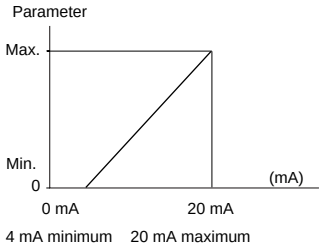


Figure 19: I/O Extension Card Minimums and Maximums

Motor Current

When configured for motor current, the analog output provides a signal proportional to motor current. The minimum configured value corresponds to zero while the maximum configured value of the analog output corresponds to 200% of the drive controller's constant torque rating.

Output Frequency

When configured for output frequency, the analog ouptut provides a signal proportional to the motor frequency estimated by the drive controller. The minimum configured value corresponds to zero while the maximum configured value of the analog output corresponds to the maximum frequency setting, not the high speed setting.

Ramp Output

When configured for ramp output, the analog output provides a signal proportional to the frequency the drive controller is commanding the motor to run. The minimum configured value corresponds to zero while maximum configured value of the analog output corresponds to the maximum frequency setting, not the high speed setting.

Motor Torque

When configured for motor torque, the the analog output provides a signal proportional to motor torque as an absolute value. The minimum configured value corresponds to zero while the maximum configured value of the analog output corresponds to 200% of the nominal motor torque.

Signed Motor Torque

When configured for signed motor torque, the analog output provides a signal proportional to motor torque and gives an indication of braking torque or motoring torque. The minimum configured value corresponds to 200% braking torque while the maximum value of the analog output corresponds to 200% of the nominal torque. Zero torque corresponds to (minimum value + maximum value)/2.

ENGLISH

6—FAULT MENU

This menu is only accessible when the access locking switch is in the position. Modifications can only be made when the motor is stopped.

Menu 6

Table 18: 6—Fault Menu

Parameter	Code	Description	Adjustment Range	Factory Setting
Auto Restart	AtR	This function allows an automatic restart of the drive controller if the cause of the fault has disappeared and a run command is maintained. An automatic restart is possible after the following faults: • Input overvoltage • DC bus overvoltage • External fault • Serial link fault • Loss of 4-20 mA follower • Motor overload (after the thermal state has decreased below 100%) • Drive controller overheating (when the thermal state has decreased below 70%) • Motor overheating (when the thermal sensor resistance is less than 1500 ohms) • Communication fault. When the Auto restart is active, the fault relay remains energized. If the fault has disappeared, the drive controller will attempt to restart the motor after a delay of 30 s. If the drive controller remains faulted after 6 attempts, the fault relay de-energizes and the drive controller must be reset by cycling power.	Yes - No	No

⚠ WARNING

UNINTENDED EQUIPMENT ACTION

Automatic restart can only be used for machines or installations that present no danger in the event of automatic restarting, either for personnel or equipment.

Equipment operation must conform with national and local safety regulations.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

ENGLISH

Menu 6

NOTE: Reset Type is accessible if the Reset Fault function is assigned to a logic input.

Table 18: 6—Fault Menu

Parameter	Code	Description	Adjustment Range	Factory Setting
Reset Type	rSt	Faults reset by a partial reset (rSt = RSP) are: • OSF overvoltage • ObF overbraking • OtF motor overheating • LFF loss of 4-20 mA • OLF motor overload • RnF ramp not followed • OFF motor phase loss • OHF drive overheating • SLF loss of RS-485 • EPF external fault Faults reset by a total reset (rSt = RSG) are all faults except motor short circuit fault. Total reset overrides all other faults. To configure rSt to RSG: 1. Display RSG 2. Press the ENT key. 3. The drive displays “See manual”. 4. Press the up arrow key, then the down arrow key, then ENT twice.	RSP (partial reset) RSG (total reset)	RSP

CAUTION

MOTOR OVERHEATING

Repeated reset of the thermal state after a thermal overload can result in thermal stress to the motor.

When faults occur, promptly inspect the motor and driven equipment for problems (locked shaft, mechanical overload, etc.) before restarting. Also check the power supplied to the motor for abnormal conditions (phase loss, phase imbalance, etc.).

Failure to follow this instruction can result in equipment damage.

OutPhaseLoss	OPL	Allows activation of the output phase loss fault. **The fault should be set to No if there is a contactor between the drive controller and the motor.**	Yes - No	Yes
Input Phase Loss	IPL	Allows activation of the Input Phase Loss fault. This fault is not configurable on the ATV58•U09M2 and ATV58•U18M2.	Yes - No	Yes

ENGLISH

Menu 6

Table 18: 6—Fault Menu

Parameter	Code	Description	Adjustment Range	Factory Setting
ThermalProType	tHt	This function defines the type of thermal protection carried out by the drive controller. Choices: • No: No motor thermal protection. • ACL: Self-cooled motor. The drive controller takes into account a derating as a function of the rotation frequency. • FCL: Force-cooled motor. The drive controller does not take into account a derating as a function of the rotation frequency.	No - ACL - FCL	ACL
LossFollower	LFL	Allows activation of a loss of 4-20 mA follower fault. This fault can only be configured if the minimum and maximum reference parameters for AI2 (CrL and CrH) are greater than 3 mA. If CrL > CrH, LFL is automatically set to Yes.	Yes - No	No
Catch On Fly	FLr	Allows a smooth restart after: • Brief loss of input power, • Fault reset or automatic restart, • Freewheel stop or DC injection braking with a logic input, • Momentary interruption of the drive controller output. If relay R2 is assigned to the Brake Logic function, FLr will always be set to No.	Yes - No	No

⚠ WARNING

UNINTENDED EQUIPMENT ACTION

Automatic catch on the fly can only be used for machines or installations that present no danger in the event of automatic restarting, either for personnel or equipment.

Equipment operation must conform with national and local safety regulations.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

ENGLISH

Menu 6

Table 18: 6—Fault Menu

Parameter	Code	Description	Adjustment Range	Factory Setting
Cont. StoP	StP	Controlled stop upon loss of input phase. This function is only operational if the IPL parameter (Input Phase Loss) is set to No. If IPL is set to Yes, leave StP set to No. Possible choices: • No: loss of input phase causes drive to trip • NMS: Maintenance of DC bus: the DC bus is kept energized by regenerating the kinetic energy from the machine inertia, until the USF (Undervoltage) fault appears. • FRP: Following a ramp: deceleration following the programmed ramp, either dEC or dE2 until the motor stops or the USF (Undervoltage) fault appears. This operation is not available on the ATV58•U09M2, U18M2, U29M2 and U41M2.	No - NMS - FRP	No
RampNotFoll	Sdd	This function can be accessed if feedback via tachogenerator or pulse generator is programmed. When enabled, it is used to lock the speed controller if a speed error is detected (difference between the stator frequency and the measured speed). Yes / No options.		No

ENGLISH

7—FILES MENU

The Files menu is accessible when the access locking switch is set to the position. Changes can only be made when the motor is stopped.

The keypad can store 4 drive controller configuration files.

Menu 7

Table 19: 7—File Menu

Parameter	Code	Description	Factory Setting
File 1 State File 2 State File 3 State File 4 State	F 1S F 2S F 3S F 4S	Displays state of corresponding file. Possible states: FRE: File free EnG: A configuration has already been saved in this file	FRE FRE FRE FRE
Operat. Type	F0t	Allows selection of the operation concerning a file. Possible operations: • NO: no operation requested (value by default each time the keypad is reconnected to the drive controller). • STR: save the configuration in a keypad file. • REC: transfer a file to the drive controller. • Ini: return the drive controller to factory settings.	NO

NOTE: The stored program will be substituted for present settings when a file is transferred to the drive controller.

NOTE: Factory default settings will be substituted for present settings when Ini is selected and confirmed by pressing ENT twice when prompted.

⚠ WARNING

UNINTENDED EQUIPMENT ACTION

Factory default settings or settings in a transferred file may not be compatible with the application. After changing the controller program, verify that the settings are compatible with the application requirements.

If the stop key is disabled in a stored file, this will be transferred if the file is downloaded. An external stop command must be installed to stop the motor.

Failure to follow this instruction can result in death, serious injury or equipment damage.

Password	COd	See “Access Code” on page 69.	

ENGLISH

Reinitializing the Drive Controller

Figure 20 shows the process of storing and recalling files to reinitialize the drive controller. Follow the path indicated by the bold lines.

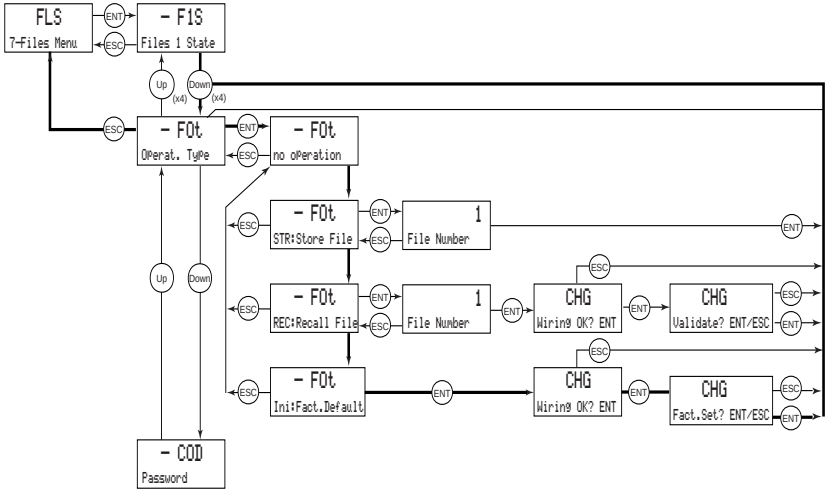


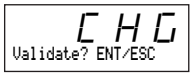
Figure 20: Reinitializing the Drive Controller

File Operation

To store or recall a file:

- Select STR to store a file or REC to recall a file.
- Select FILE number to specify the file.
- If Operation = STR: the display automatically returns to the Operation parameter, set to No.
- If Operation = REC, a second confirmation must be made:

The display indicates:



Press ENT to confirm.

The display then indicates:

Press ENT to confirm.

The display automatically returns to the Operation parameter, set to No.

Access Code

The drive controller configuration can be protected by an access code (password).

Table 20: Access Code

Parameter	Code	Description	Factory setting
Config. Code	COd	Configuration code used as an access code.	0000

NOTE: This parameter should be used with caution. It can prohibit access to parameters. Any modification of the value of this parameter must be carefully noted and saved.

The access code is expressed with four digits. The first three are user-assigned and do not affect access to the menus. The fourth digit can range from 0 to 9 and determines which menus can be accessed. See Table 21 on page 70 for an explanation of the last digit codes.

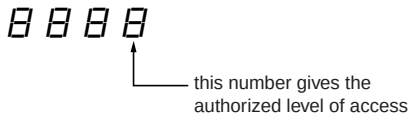


Figure 21: Access code

NOTE: Menu access allowed by the locking switch setting can be limited by the access code.

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Table 21: Significance of Access Code Last Digit

Menus Affected:	*Access is locked* if last digit of code is:	*Display is allowed* if last digit of code is:	*Modification is allowed* if last digit of code is:
2	0[1] or 9	1	2
2, 3, 4, 5, 6, 7, 8, and Macro Configuration	0[1] or 9	3	4
8	0[1] or 9	5	6
2, 3, 4, 5, 6, 7, 8	0[1] or 9	7	8

[1] Unless the factory setting, 0000, is used in which case access to the menus is completely unlimited.

For example, if the access code is “2337”, display of the menus 2, 3, 4, 5, 6, 7, and 8 is allowed, but modification is not allowed.

The access code is modified by using the ▲ and ▼ keys. If an incorrect code is entered, it is refused, with the following message displayed:

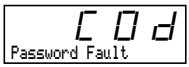

Figure 22: Incorrect Code Display

After pressing ENT or ESC on the keypad, the value displayed by the Code parameter becomes 0000, however the level of accessibility remains unchanged. The user can then try again to enter the correct code.

To access the menus protected by the access code, the correct code must first be entered in the File menu. The File menu is always accessible.

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COMMUNICATION MENU

The Communication menu is displayed only if a communication card is installed. It is accessible when the access locking switch on the back of the keypad is set to the position. Configuration can only be done while the motor is stopped.

For information on the Communication Option Card, refer to the manual for that card.

For information concerning communication using the RS485 refer to VVDED397057US. For information on the base product, refer to the ALTIVAR 58 Installation Guide, bulletin no. VVDED397048US.

APPLICATION MENU

The Application menu is only displayed if a Custom Application card is installed. It is accessible when the access locking switch on the back of the keypad is set to the position. Configuration can only be done while the motor is stopped.

For more information concerning the Custom Application card, see the document provided with the card.

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CHAPTER 3—DIAGNOSTICS AND TROUBLESHOOTING

KEYPAD DISPLAY AND INDICATING LEDS

When a fault condition is detected, a fault code and a plain language message will be displayed as long as power is maintained. See Table 25 on page 79 for fault codes and messages. In addition, the LEDs on the front of the drive controller indicate several states:

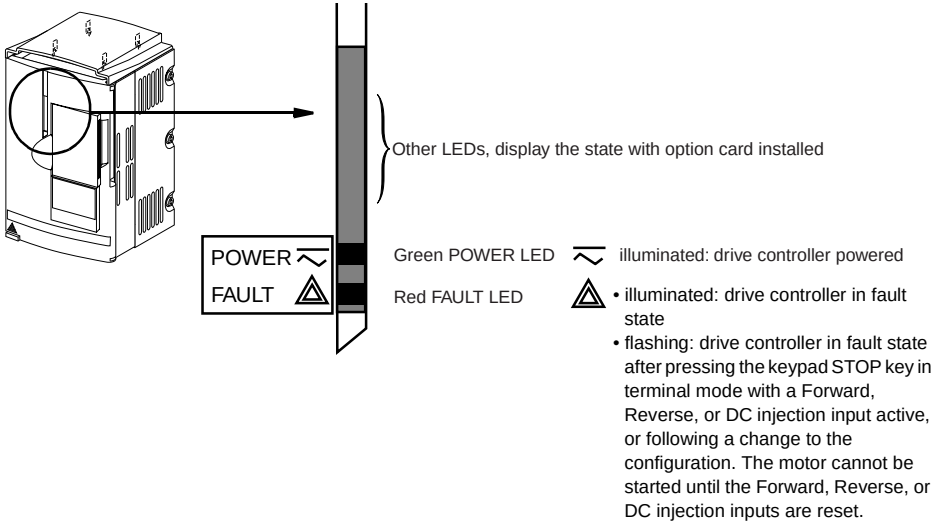

Figure 23: Location and Description of LEDs

FAULT STORAGE

The first fault detected is saved and displayed on the keypad if power is maintained. The drive controller trips, the red fault LED illuminates, and the fault relay de-energizes. To reset the fault:

1. Remove power from the drive controller.
2. Before restoring power, identify and correct the cause of the fault.
3. Restore power. This will reset the fault if it has been corrected.

In certain cases, if automatic restart has been enabled, the drive can be automatically restarted after the cause of the fault has disappeared. See page 63.

USING FAULT CODES AND MESSAGES TO SOLVE PROBLEMS

The fault messages displayed on the keypad can be used to troubleshoot problems. The fault messages can be divided into three categories:

- Protective faults: These faults are displayed when the drive detects conditions that, if left uncorrected, may result in damage to the drive controller and/or motor. The drive controller shuts down to prevent further damage from occurring.
- Drive faults: These faults are displayed when a problem is detected in the drive.
- Process faults: These faults are displayed when a process feedback or communication signal used by the drive controller is interrupted momentarily or completely.

Table 23: Fault Messages

Protective Faults	Drive Faults	Process Faults
Input phase loss	Precharge fault	Loss of 4-20 mA signal
Undervoltage	EEPROM fault	Loss of RS-485
Overvoltage	Internal fault	External fault
Drive overheating	Internal communication fault	Speed feedback fault
Motor overload	Power rating error	Communication network fault
Overbraking	Option error	
Motor phase loss	Option removed	
Overcurrent	EEPROM checks	
Motor short circuit		
Motor overheating		
Thermal sensor fault		
Overspeed		
Ramp not followed		

MAINTENANCE

Read the safety statements on page 75 before proceeding with any maintenance or troubleshooting procedures.

The following steps should be done at regular intervals:

- Check the condition and tightness of the connections.
- Make sure ventilation is effective and temperature around the drive controller remains within specified levels.
- Remove dust and debris from the drive controller, if necessary.

PRECAUTIONS

Table 25 on page 79 lists faults, associated codes, the probable causes of the faults, and the associated corrective action. When taking corrective action, follow the procedures outlined on pages 75-78.

⚠ DANGER

HAZARDOUS VOLTAGE

Read and understand these procedures before servicing ALTIVAR 58 drive controllers. Installation, adjustment, and maintenance of these drive controllers must be performed by qualified personnel.

Electrical shock will result in death or serious injury.

The following procedures are intended for use by qualified electrical maintenance personnel and should not be viewed as sufficient instruction for those who are not otherwise qualified to operate, service, or maintain the equipment discussed.

PROCEDURE 1: BUS VOLTAGE MEASUREMENT

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand the bus voltage measurement procedure before performing procedure. Measurement of bus capacitor voltage must be performed by qualified personnel.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- Many parts in this drive controller, including printed wiring boards, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.

Electrical shock will result in death or serious injury.

The DC bus voltage level is determined by monitoring the (+) and (-) measurement points. Their location varies by drive controller model number as listed in Table 24 and shown in Figure 24. The drive controller model number is listed on its nameplate.

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Table 24: (+) and (-) Measurement Points

Drive Controller ATV58•	(+) Measurement Point		(-) Measurement Point	
	Terminal Block or Connector	Terminal Designation	Terminal Block or Connector	Terminal Designation
U09M2• and U18M2•	J2	(+)	J2	(-)
U29M2• to D12M2•	J2	PA	J18	7
U18N4• to D23N4•				
D16M2• to D46M2•	J2	(+)	J2	(-)
D28N4• to D79N4•				

To measure the DC bus capacitor voltage:

1. Disconnect all power from the drive controller including external control power that may be present on the control board and the option board terminals.
2. Wait three minutes for the DC bus capacitors to discharge.
3. Read the model number of the drive controller from the nameplate and identify the corresponding (+) and (-) measurement points from Table 24 and Figure 24.
4. Open the door or cover of the drive controller.
5. Set the voltmeter to the 1000 Vdc scale. Measure the voltage between the (+) and (-) measurement points identified in step 3. Verify that the DC bus voltage has discharged below 45 V before servicing the drive controller.
6. If the DC bus capacitors will not discharge below 45 V, contact your local Square D representative. **Do not operate the drive controller.**
7. Replace all of the covers after servicing the drive controller.

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The J18 connector is in the upper left hand corner of the main control board behind the flexible shield. Use a thin probe to access the connector pin.

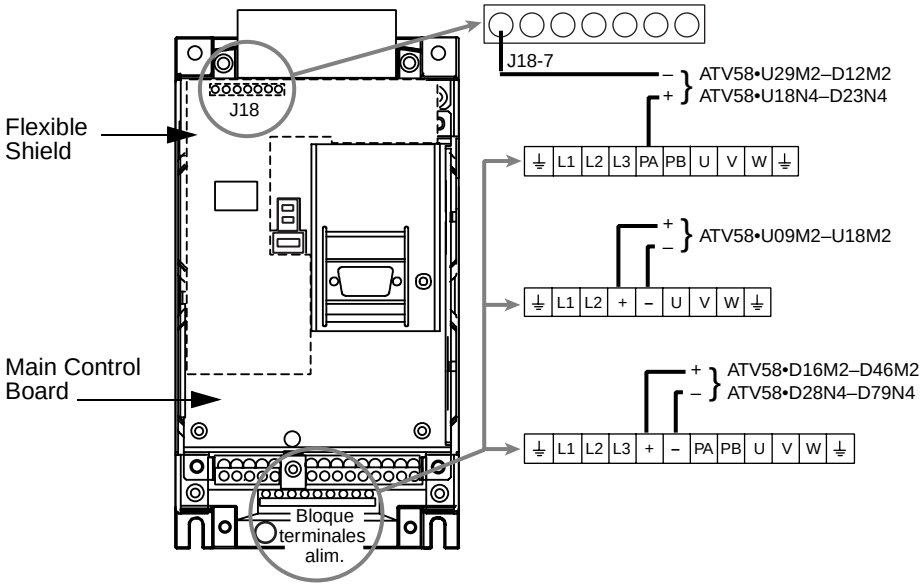

Figure 24: DC Bus Measurement Terminals

PROCEDURE 2: CHECKING SUPPLY VOLTAGE

Measure the input line voltage to determine if the voltage is within the drive controller tolerance.

1. Perform the Bus Voltage Measurement procedure on page 75.
2. Attach meter leads to L1 and L2. Set the voltmeter to the 600 Vac scale.
3. Reapply power and check for the correct line voltage, shown on the drive controller nameplate rating.
4. Remove power and repeat the procedure for L2 and L3, and L1 and L3.
5. When all phases have been measured, remove power. Remove leads and replace all covers.

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PROCEDURE 3: CHECKING THE PERIPHERAL EQUIPMENT

The following equipment may need to be checked. Follow the manufacturers' procedures when checking this equipment.

1. A protective device, such as a circuit breaker, may have tripped or a fuse may have blown.
2. A switching device, such as a contactor, may not be closing at the correct time.
3. Conductors may require repair or replacement.
4. Connection cables to the motor or high resistance connections to ground may need to be checked. Follow NEMA standard procedure WC-53.
5. Motor insulation may need to be checked. Follow NEMA standard procedure MG-1. Do not apply high voltage to U, V, or W. Do not connect the high potential dielectric test equipment or insulation resistance tester to the drive controller since the test voltages used may damage the drive controller. Always disconnect the drive controller from the conductors or motor while performing such tests.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Do not perform high potential dielectric tests on circuits while the circuits are connected to the drive controller.

Any circuit requiring high potential dielectric tests must be disconnected from the drive controller prior to performing the test.

Failure to follow this instruction can result in injury or equipment damage.

FAULT CODES AND MESSAGES

Table 25: Fault Codes and Messages

Fault	Probable Causes	Corrective Actions
PHF INPUT PHASE LOSS	1. Input phase loss. 2. Power fuses blown. 3. Input line failure (t>1s).	1. Check input line voltage (Procedure 2 on page 77). 2. Check fuses and circuit breaker (Procedure 3 on page 78). 3. Reset.
USF UNDERVOLTAGE	1. Supply too low. 2. Temporary voltage drop (t≥200 ms).	1. Check input line voltage (Procedure 2 on page 77).
OSF OVERVOLTAGE	1. Supply too high. See Table 26.	1. Check input line voltage (Procedure 2 on page 77). 2. Reset the drive controller.
OHF DRIVE OVERHEATING	1. Heatsink temperature too high.	1. Check motor load, fan and ambient temperature around drive controller. Wait for drive controller to cool down before resetting.
OLF MOTOR OVERLOAD	1. If thermal trip setting is ≥118% of normal thermal state, thermal trip is due to prolonged overload or output phase failure. 2. Motor power rating too low for application.	1. Check setting of Thermal Current (ItH, see page 27) and compare with motor I_n (FLA). Check load and compare with operating speed. Check braking conditions (possibility of single-phase operation). Wait approximately 7 minutes before resetting. 2. Verify that motor and drive controller selection are correct for application.
ObF OVERBRAKING	1. Overvoltage or overcurrent due to excessive braking or an overhauling load. See Table 26.	1. Increase deceleration time. Add dynamic braking option if necessary.
OPF MOTOR PHASE LOSS	1. Loss of a phase on the output of the drive controller. 2. Drive oversized for motor.	1. Check the wiring to the motor (Procedure 3 on page 78). 2. Disable OPL and provide external overload protection.
LFF LOSS OF 4-20 mA	1. Loss of 4-20 mA follower signal on AI2 input. See Table 27	1. Verify signal connections. 2. Check signal.
OCF OVERCURRENT	1. Ramp too short. 2. Inertia too high, or load too large 3. Mechanical blockage.	1. Check the parameter adjustments 2. Check the sizing of the drive controller, motor and load. 3. Remove all power. With drive controller disconnected, check for mechanical blockage.

Table 25: Fault Codes and Messages (Continued)

Fault	Probable Causes	Corrective Actions
SCF MOT SHORT CKT	1. Short circuit or grounding on drive controller output.	1. Remove all power. With drive controller disconnected, check connecting cables and motor insulation. 2. Check the drive controller transistors.
CrF PRECHARGE FAULT	1. Capacitor charge relay closure command fault. 2. Failed precharge resistor.	1. Perform Bus Voltage Measurement Procedure (Procedure 1 on page 75). Check connections in drive controller.
SLF LOSS OF RS485	1. Bad connection between the drive controller and the programming keypad.	1. Check the connection between the drive controller and the programming keypad.
OtF MOTOR OVERHEATING	1. Motor temperature too high.	1. Check the motor ventilation, ambient temperature, and the motor load. 2. Check the type of thermal sensors used.
tSF THERMAL SENSOR FAULT	1. Bad connection between the motor thermal sensors and the drive controller.	1. Check the connection between the thermal sensors and the drive controller. 2. Check the thermal sensors.
EEF EEPROM FAULT	1. Memory error.	1. Remove power from drive controller and reset.
InF INTERNAL FAULT	1. Internal fault. 2. Internal connection fault.	1. Perform Bus Voltage Measurement procedure (Procedure 1 on page 75), then check internal connections.
EPF EXTERNAL FAULT	1. Fault caused by an external source such as a PLC or GPO card.	1. Verify the external source which caused the fault and reset.
SPF SPEED FEEDBACK FAULT	1. Loss of speed feedback.	1. Check the wiring of the sensor.
AnF RAMP NOT FOLLOWED	1. Ramp not followed. 2. Speed opposite from reference.	1. Check the adjustment and wiring of the speed feedback. 2. Check the adjustments against the load. 3. Check the sizing of the motor/drive controller combination. Dynamic Braking may be necessary.
SOF OVERSPEED	1. Instability. 2. Overhauling load.	1. Check parameter adjustments. 2. Add Dynamic Braking. 3. Verify the sizing of the motor, drive controller and load.
CnF COMM. NETWORK FAULT	1. Fault on the communication network.	1. Check the connection of the communication network to the drive controller. 2. Check the time-out.

Table 25: Fault Codes and Messages (Continued)

Fault	Probable Causes	Corrective Actions
ILF INTERNAL COMM. FAULT	1. Communication fault between the control board and the option card.	1. Perform Bus Voltage Measurement procedure (Procedure 1 on page 75). Check the connection between the option card and the control board.
CFF PWR RATE ERR-ENT OPTION ERR.-ENT OPT. REMOVED-ENT EEP CKS.-ENT	Error probably caused by changing a card. - Change of the power rating on the power board - Change of the type of option card or installation of an option card if one had not been installed before and the macro-configuration was CUS - Option card removed - Saved configuration cannot be read Pressing Ent causes the message: “Fact.Setting? ENT/ESC” to appear.	1. Check the configuration of the power board and other boards. 2. Reset by cycling power. 3. Save the configuration in a file on the keypad. 4. Press ENT to return to factory settings.
CFI CONFIG FAULT	1. The configuration sent to the drive controller via the serial link cannot be read.	1. Verify the configuration sent. 2. Send a configuration which can be read.
Inl	Incompatible drive	

Table 26: Overvoltage/ Overbraking Trip and Reset Points

	Overvoltage Trip Point	Overbraking Trip Point	Reset Point
ATV58••••M2	395 V	415 V	385 V
ATV58••••N4	800 V	840 V	785 V

Table 27: Trip and Reset Points when Loss of 4–20 mA

	Trip Point	Reset Point
ATV58••••M2	AI2 < 2 mA	AI2 > 2.5 mA
ATV58••••N4		

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APPENDIX A—DRIVE CONTROLLER CONFIGURATION

Use these pages to note the configuration and adjustments of the ATV58 drive controller.

Drive catalog number: ATV58.....

Customer identification number: .....

Option card: No Yes Catalog number: .....

Access code: No Yes: .....

Configuration is in file number ..... of the programming terminal.

Macro-configuration: .....

For customized configuration (CUS), record assignments of inputs/ outputs in Tables 24 to 28.

For a menu overview, see page 87.

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The following tables list the factory setting for each parameter. The new customer setting can be noted in the Customer Setting column. If no change has been made to the factory setting, the customer can note “no change” in the Customer Setting column.

Table 28: Menu 2—Adjustment Parameters

Code	Fact. Setting	Cust. Setting	Code	Fact. Setting	Cust. Setting
ACC	3 s	s	SP5	25 Hz	Hz
dEC	3 s	s	SP6	30 Hz	Hz
LSP	0 Hz	Hz	SP7	35 Hz	Hz
HSP	50 / 60 Hz	Hz	JOG	10 Hz	Hz
FLG	20%	%	JGt	0.5 s	s
StA	20%	%	brL	0 Hz	Hz
ItH	0.9 In	A	Ibr	0 A	A
IdC	0.7 ItH	A	brt	0 s	s
tdC	0.5 s	s	bEn	0 Hz	Hz
SdC	Varies	A	bEt	0 s	s
JPF	0 Hz	Hz	rPG	1	
AC2	5 s	s	r IG	1 / s	/ s
dE2	5 s	s	Fbs	0.1	
tLS	no	no or s	PIC	no	
USC	1		dts	1	
Ftd	50/60 Hz	Hz	Ctd	1.36 In	A
UFr	100%	%	ttd	100%	%
SLP	100%	%	tL2	200%	%
PFL	20%	%			
SP2	10 Hz	Hz			
SP3	15 Hz	Hz			
SP4	20 Hz	Hz			

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Table 29: Menu 3—Drive Menu Parameters

Code	Fact. Setting	Cust. Setting	Code	Fact. Setting	Cust. Setting
UnS	depends on catalog number	V	dCF	4	
FrS	50 / 60 Hz	Hz	tLI	200 %	%
nCr	0.9 In	A	CLI	1.3 6 In	
nSP	depends on catalog number	rpm	AdC	yes	
COS	depends on catalog number		PCC	1	
tUn	no		SFt	LF	
tFr	60 / 72 Hz	Hz	SFr	depends on catalog number	kHz
nLd	no		nrd	yes	
Fdb	no		SPC	no	
Frt	0 Hz	Hz	PGt	DET	
rPt	LIN		PLS	1	
brA	no				

Table 30: Menu 4—Command Menu Parameters

Code	Factory Setting	Customer Setting	Code	Factory Setting	Customer Setting
tCC	2 W		AOL	0 mA	mA
tCt	LEL		AOH	20 mA	mA
rIn	no		Str	No	
bSP	no		LCC	No	
CrL	4 mA	mA	PSt	Yes	
CrH	20 mA	mA	Add	0	

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Table 31: Menu 5—I/O Assignment

Code	Factory Setting	Customer Setting	Code	Factory Setting	Customer Setting
AI1	Factory settings depend on the macro configuration . See page 22.		LI5	Factory settings depend on the macro configuration . See page 22.	
AI2			LI6		
AI3			r1		Fault
LI1			r2		
LI2			LO		
LI3			AO		
LI4					

Table 32: Menu 6—Fault Menu Parameters

Code	Factory Setting	Customer Setting	Code	Factory Setting	Customer Setting
Atr	no		LFL	no	
rSt	RSP		FLr	no	
OPL	yes		StP	no	
IPL	yes		Sdd	no	
tHt	ACL				

Use the table below to note what drive controller configuration is stored in a file.

Table 33: Menu 7—File Menu

Code	Factory Setting	Customer Notes (e.g. File stored for HVAC Drive #11)
F15	Free	
F25	Free	
F35	Free	
F45	Free	

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MENU OVERVIEW

LANGUAGE Menu page 21

Parameter	Code
English	LnG
Francais	LnG
Deutsch	LnG
Espanol	LnG
Italiano	LnG

MACRO-CONFIG Menu page 21

Parameter	Code
Hdg: Material Handling	CFG
GEn: General Use	CFG
VT: Variable Torque	CFG
CUS: Customize	CFG

Menu 1—DISPLAY Menu page 25

Parameter	Code
Drive State	rdY
Steady State	rUn
Accelerating	Acc
Decelerating	dEC
In Current Limit	CLI
DC Injection Braking	dCb
Command Freewheel Stop	nSt
Braking with Dec. Ramp Adoption	Obr
Freq. Ref.	FrH
Output Freq.	rFr
Motor Speed	SPd
Motor Current	LCr
Machine Speed	USP
Output Power	OPr
Mains Voltage	ULn
Motor Thermal	tHr
Drive Thermal	tHd
Last Fault	LFt

Menu 2—ADJUST Menu page 26

Parameter	Code
Freq. Ref.	LFr
Acceleration - s	ACC
Deceleration - s	dEC
Accelerate2 - s	AC2
Decelerate2 - s	dE2
Low Speed - Hz	LSP
High Speed - Hz	HSP
Gain - %	FLG
Stability - %	StA
ThermCurrent- A	ItH
DC Inj. Time - s	tdC
DC inj. Curr. -A	IdC
DC inj. Curr-A	SdC
Jump Freq. - Hz	JPF
LSP Time - s	tLS
Machine Speed coeff.	USC
IR Compens. - %	UFr
Slip Comp. - %	SLP
Preset Sp.2 - Hz	SP2
Preset Sp.3 - Hz	SP3
Preset Sp.4 - Hz	SP4
Preset Sp.5 - Hz	SP5
Preset Sp.6 - Hz	SP6
Preset Sp.7 - Hz	SP7

Menu 2—ADJUST Menu, continued

Parameter	Code
Freq.Lev.Att. - Hz	Ftd
Trq. Limit. 2 - %	tL2
Curr. Lev. Att. - A	Ctd
BrReleaseLev-Hz	brL
BrRelease I - A	Ibr
BrReleasTime - s	brt
BrEngageLev- Hz	bEn
BrEngageTime -s	bEt
Tacho Coeff ★	dtS
Curr. Lev. Att A ★	ctd
Jog Freq. - Hz	JOG
Jog Delay - s	JGt
V/f Profile - %	PFL
Therm. Lev. Att. - %	ttd
PI Prop.Gain	rPG
PI Int. Gain - /s	rIG
PI Coeff	FbS
PI Inversion	PIC

Menu 3—DRIVE Menu page 33

Parameter	Code
Nom.Mot.Volt - V	UnS
Nom.Mot.Freq -Hz	FrS
Nom.Mot.Curr - A	nCr
Nom.MotSpeed -rpm	nSP
Mot.CosPhi	CoS
Auto Tuning	tUn
Max.Freq - Hz	tFr
Energy Eco	nLd
I Limit	Fdb
DecRampAdapt	brA
Switch Ramp 2 - Hz	Frt
Ramp Type	rPt
DecRamp Coef	dCF
Torque Lim - %	tLI
Int. I Lim - A	CLI
Auto DC Inj.	AdC
Mot P Coef.	PCC
Sw. Freq. Type	SFt
Sw Freq -kHz	SFr
Noise Reduct	nrd
Special Mot.	SPC
PG Type ★	PGt
Num. Pulses ★	PLS

★ These parameters are available only with the analog or digital I/O extension card installed.

These diagrams include all parameters that may appear in the designated menu. The parameters that are actually visible on your drive controller depends on its configuration and options installed.

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Menu 4—CONTROL Menu page 39

Parameter	Code
Term.Strip Con	tCC
Type 2 wire	tCt
Inhib Rev	rIn
Low Speed Magmt	bSP
AI2 min Ref. -mA	CrL
AI2 Max. Ref -mA	CrH
Min Val. AO: mA	AOL
Max Val. AO: mA	AOH
ReferenceMem	Str
KeypadCom.	LCC
Stop Priorit	PSt
DriveAddress	Add

Menu 5—I/O Menu page 45

Parameter	Code
LI2 Assign	LI2
LI3 Assign	LI3
LI4 Assign	LI4
LI5 Assign ★	LI5
LI6 Assign ★	LI6
Not assigned	nO
RV: Reverse	r
Switch ramp2	rP2
JOG	JOG
+SP: +Speed	SP
-Speed	-SP
2 preset Sp	PS2
4 preset Sp	PS4
8 preset Sp	PS8
Freewhl Stop	nSt
DC inject	DCI
Fast stop	FSt
Multi.Motor	CHP
Torque Lim2	tL2
Forced Local	FLO
Fault Reset	rSt
Auto/manu	rFC
Auto-tune	AtN
AI2 Assign	AI2
AI3 Assign ★	AI3
Not assigned	nO
Speed Ref 2	Fr2
Summed Ref.	SAI
PI regulator	PIF
Tacho feedbk ★	SFB
Therm. Sensor ★	PtC
Encoder Feedbk ★	rGI

★ These parameters are available only with the analog or digital I/O extension card installed.

Menu 5—I/O Menu, continued

Parameter	Code
R2 Assign	r2
LO Assign ★	LO
Not assigned	nO
Driverunning	rUN
Output Cont.	OCC
Freq. Ref. Attain.	FtA
HSP Attained	FLA
Current Level Attained	CtA
FRH Attained	SrA
Mtr Therm Lv1	tSA
Brk Logic	BLC
AO Assign ★	AO
Not Assigned ★	nO
Motor Curr. ★	OCr
Motor Freq. ★	OFr
Output Ramp ★	OrP
Motor Torque ★	trq

Menu 6—FAULT Menu page 63

Parameter	Code
Auto Restart	Atr
Reset Type	rSt
OutPhaseLoss	OPL
Input Phase Loss	IPL
ThermalPro.Type	tHt
LossFollower	LFL
Catch On Fly	FLr
Cont. Stop	StP
Ramp not Followed ★	Sdd

Menu 7—FILES Menu page 67

Parameter	Code
File 1 State	FIS
File 2 State	F2S
File 3 State	F3S
File 4 State	F4S
Operat. Type	FOt
File number	FLn
Password	Cod

COMMUNICATION Menu
Consult the instruction manual provided with the communication option card.

APPLICATION Menu
Consult the instruction manual provided with the application option card.

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APPENDIX B—OPTIONS AND ACCESSORIES

The following table shows the accessories available for ALTIVAR 58 drive controllers.

Catalog No.	Description
VW3A58101U	Keypad
VW3A58102L1U VW3A58102L2U	Programming Terminal (English, French, Spanish) Programming Terminal (English, German, Italian)
VW3A58103	Remote Mounting Kit
VW3A58104	Test & Commissioning Software
VW3A58201U	Analog I/O Option Card
VW3A58202U	Digital I/O Option Card
VW3A58253U	General Purpose Option Card
VW3A58301U	FIPIO® Communication Card
VW3A58302U	MODBUS® Plus Communication Card
VW3A58303U	MODBUS/UNITELWAY™ Communication Card
VW3A58304EU	Interbus S Communication Card. Requires external power supply.
VW3A58306U	RS485 Cable w/ MODBUS Mapping Guide
VW3A58307U	Profibus DP Communication Card
VW3A58701	DB Transistor for ATV58HU09M2 and U18M2
VW3A58821	Fan Kit for ATV58HU09M2 and U18M2
VW3A58822	Fan Kit for ATV58HU29M2, U41M2, and U18N4 to U41N4
VW3A58823	Fan Kit for ATV58HU54M2, U72M2, and U54N4 to U90N4
VW3A58824	Fan Kit for ATV58HU90M2, D12M2, and D12N4 to D23N4
VW3A58825	Fan Kit for ATV58HD16M2, D23M2, and D28N4 to D46N4
VW3A58826	Fan Kit for ATV58HD28M2 to D46M2 and D54N4 to D79N4
VW3A58831	EMC Kit for ATV58HU09M2 and U18M2
VW3A58832	EMC Kit for ATV58HU29M2, U41M2, and U18N4 to U41N4
VW3A58833	EMC Kit for ATV58HU54M2, U72M2, and U54N4 to U90N4
VW3A58834	EMC Kit for ATV58HU90M2, D12M2, and D12N4 to D23N4
VW3A58842	Conduit Box Kit for ATV58HU09M2 and U18M2
VW3A58843	Conduit Box Kit for ATV58HU29M2, U41M2, and U18N4 to U41N4
VW3A58844	Conduit Box Kit for ATV58HU54M2, U72M2, and U54N4 to U90N4
VW3A58845	Conduit Box Kit for ATV58HU90M2, D12M2, and D12N4 to D23N4
VW3A58846	Conduit Box for ATV58HD16M2, D23M2, and D28N4 to D46N4
VW3A58847	Conduit Box for ATV58HD28M2 to D46M2 and D54N4 to D79N4

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Catalog No.	Description
VW3A66711	DB Resistor Kit for ATV58HU09M2, U18M2, U18N4 to U72N4
VW3A66712	DB Resistor Kit for ATV58HU29M2, U41M2, U90N4, D12N4
VW3A66713	DB Resistor Kit for ATV58HU54M2, U72M2, D16N4, D23N4
VW3A66714	DB Resistor Kit for ATV58HU90M2 and D12M2

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Symbols

Numerics

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