SD300

VARIABLE SPEED DRIVE

Variable Speed Drive

Programming and Software Manual

POWER ELECTRONICS®

SD300

Variable Speed Drive

Programming and Software Manual

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ABOUT THIS MANUAL

PURPOSE

This manual contains important instructions for the installation and maintenance of Power Electronics SD300 variable speed drives.

INTENDED USERS

This manual is intended for qualified customers who will install, operate and maintain Power Electronics SD300 variable speed drives.

Only trained electricians approved by the installation company may install and commission the drives. The instructions assume that the installer is familiar with electrical installation rules and regulations.

REFERENCE MANUALS

The following reference guides are available for the SD300 variable speed drives:

- SD300 Programming and Software Manual.
- SD300 Hardware and Installation Manual.

POWER ELECTRONICS CONTACT INFORMATION

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SAFETY SYMBOLS

Always follow safety instructions to prevent accidents and potential hazards from occurring.

In this manual, safety messages are classified as follows:

 **WARNING**	Identifies potentially hazardous situations where dangerous voltage may be present which if not avoided could result in minor personal injury, serious injury or death Be extremely careful and follow the instructions to avoid the risk of electrical shocks.
 **CAUTION**	Identifies potentially hazardous situations which if not avoided could result in product damage or minor or moderate personal injury. Read the message and follow the instructions carefully.
 **NOTICE**	Identifies important measures to take in order to prevent damage equipment and warranty lost, as well as encouraging good use and environmental practices.

Other symbols used in this manual for CAUTION messages are the following:

	Hot surface. Be careful and follow the instructions to avoid burns and personal injuries.
	Risk of fire. Be careful and follow the instructions to prevent causing an unintentional fire.

Revisions

Date	Revision	Description
17 / 02 / 2017	A	First edition

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SAFETY INSTRUCTIONS

IMPORTANT!

Read carefully this manual to maximize the performance of the product and to ensure its safe use.

In order to use appropriately the drive, please, follow all instructions described in the installation manual referred to transport, installation, electrical connection and commissioning of the equipment.

Power Electronics accepts no responsibility or liability for partial or total damages resulting from inappropriate equipment use.

Please, pay careful attention to the following recommendations:

WARNING

Do not run the drive with the front cover removed.
Otherwise, you may get an electric shock.

The drive does not remove the voltage from its input terminals. Before working on the drive, isolate the whole drive from the supply.
If you do not remove the power supply, you may get an electric shock.

Do not remove the cover except for periodic inspections or wiring, even if the input power is not applied.
Otherwise, you may get an electric shock.

Before opening the covers for wiring and periodic inspections, ensure DC voltage has been fully discharged. Check with a multimeter the following measures:

- **Measure between the output power busbars U, V, W and the cabinet and check that the voltage is around 0V.**
- **Measure that the DC link terminals P2(+), N(-) and chassis voltage are below 30VDC.**

Otherwise, you may get an electric shock.

Operate the drive with dry hands.
Otherwise, you may get an electric shock.

Do not use cables with damaged insulation.
Otherwise, you may get an electric shock.

Do not subject the cables to abrasions, excessive stress, heavy loads or pinching.
Otherwise, you may get an electric shock.

Do not make any insulation or voltage withstand tests on the motor while the drive is connected.

CAUTION

Install the drive on a non-flammable surface. Do not place flammable material nearby. Otherwise, a fire could occur.

Disconnect the input power if the drive is damaged.
Otherwise, it could result in a secondary accident or fire.

Do not allow lint, paper, wood chips, dust, metallic chips or other foreign matter into the drive. Otherwise, a fire or accident could occur.

The inverter becomes hot during operation. Wait until it cools down before performing any actions.
Touching hot parts may result in skin burns.

Do not apply power to a damaged drive or to a drive with parts missing, even if the installation is complete.
Otherwise, you may get an electric shock.

NOTICE

RECEPTION

- SD300 drives are carefully tested and perfectly packed before delivering.
- In the event of transport damage, please ensure to notify the transport agency and POWER ELECTRONICS: 902 40 20 70 (International +34 96 136 65 57), or your nearest agent, within 24hrs from receiving the goods.

UNPACKING

- Make sure model and serial number of the variable speed drive are the same on the box, delivery note and unit.
- Each variable speed drive is delivered with Hardware and Software technical manuals.

RECYCLING

- Packing of the equipment should be recycled. For this, it is necessary to separate the different included materials (plastic, paper, cardboard...) and deposit them on proper banks.
- Waste products of electric and electronic devices should be selectively collected for their correct environmental management.

ELECTROMAGNETIC COMPATIBILITY (EMC)

- The drive is intended to be used in industrial environments (Second Environment). It achieves compliance with C3 category defined in IEC/EN 61800-3 standard when the installation recommendation within this manual are followed.
- Select communication and control system according to the drive EMC environment. Otherwise, systems could suffer from interferences due to a low EMS level.

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SAFETY

Before operating the drive, read this manual thoroughly to gain an understanding of the unit. If any doubt exists, please contact POWER ELECTRONICS, (902 40 20 70 / +34 96 136 65 57) or your nearest agent.

- Wear safety glasses when operating the drive with power applied or the front cover is removed.
- Handle and transport the drive following the recommendations within this manual.
- Install the drive according to the instructions within this manual and local regulations.
- Do not place heavy objects on the drive.
- Ensure that the drive is mounted vertically and keeping the minimum clearance distances.
- Do not drop the drive or subject it to impact.
- The SD300 drives contain static sensitive printed circuits boards. Use static safety procedures when handling these boards.
- Avoid installing the drive in conditions that differ from those described in the Environmental Ratings section.

CONNECTION PRECAUTIONS

- To ensure a correct operation of the drive, it is recommended to use a SCREENED CABLE for the control wiring.
- The motor cable should comply with the requirements within this manual. Due to increased leakage capacitance between conductors, external ground fault protection threshold value should be adjusted ad hoc.
- Do not disconnect motor cables if the input power supply remains connected.
- The internal circuits of the SD300 Series will be damaged if the incoming power is connected and applied to the output terminals (U, V, W).
- Do not use power factor correction capacitors banks, surge suppressors, or RFI filters on the output side of the drive. Doing so may damage these components.
- Before wiring terminals, make sure that the inverter keypad display is turned off and the front cover is off as well. The inverter may hold a high voltage electric charge long after the power supply has been turned off.

TRIAL RUN

- Verify all parameters before operating the drive. Alteration of parameters may be required depending on application and load.
- Always apply voltage and current signals to each terminal that are within the levels indicated in this manual. Otherwise, damage to the drive may occur.

EARTH CONNECTION

- Ground the drive and adjoining cabinets to ensure a safe operation and to reduce electromagnetic emission.
- Connect the input PE terminal only to the dedicated PE terminal of the drive. Do not use the case, nor chassis screws for grounding.
- Ground the drive chassis through the labelled terminals. Use appropriate conductors to comply with local regulations. The ground conductor should be connected first and removed last.
- Motor ground cable must be connected to the PE output terminal of the drive and not to the installation's ground. We recommend that the section of the ground conductor (PE) is equal or greater than the active conductor (U, V, W).

1. DISPLAY AND CONTROL UNITS

1.1. Seven Segment Display

The SD300 variable drives, up to 30kW, have a built-in seven segment display which provides intuitive data presentation, an easy navigation through the control parameters and allows storing thousands of user-customized configurations.

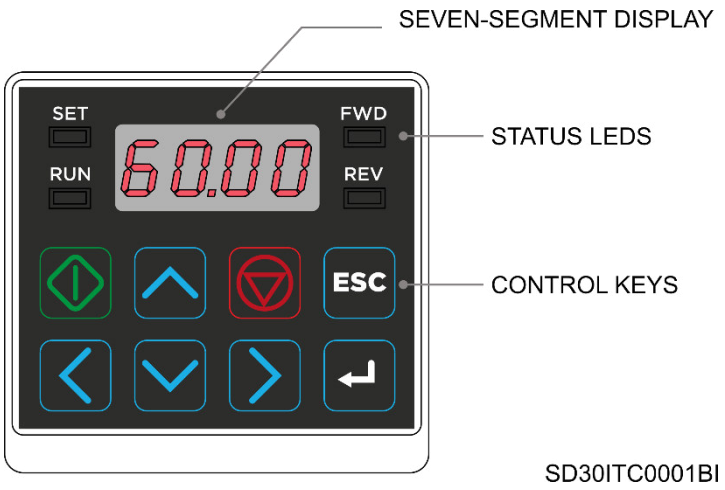

Figure 1.1 Integrated display unit

It has four indicator leds that supply information about the drive operational status, plus eight control keys. They are described in the table below:

KEY / LED	NAME	FUNCTION
	RUN key	Run command.
	STOP/RESET key	STOP: Stop command during operation. RESET: Reset command when a fault occurs.
	UP key	Used both to scroll up through the parameters of a group and to increase a parameter value.
	DOWN key	Used both to scroll down through the parameters of a group and to decrease a parameter value.
	Left key	Used to jump to other parameter groups or move the cursor to the left.
	Right key	Used to jump to other parameter groups or move the cursor to the right.
	Enter key	Used to set a parameter value or to save the changed parameter value.
	Escape key	Used to cancel the Jog or Remote/Local change key or when editing.
FWD LED	Forward Run	Illuminated during forward run. LEDS flicker when a fault occurs.
REV LED	Reverse Run	Illuminated during reverse run.
RUN LED	Run	Illuminated during operation / Flickering during acceleration/deceleration.
SET LED	Setting	Illuminated during parameter setting / Flickering when the ESC key is operating as a multi-key.
Seven-segment display	Current value	Indicates operating conditions and parameter data.

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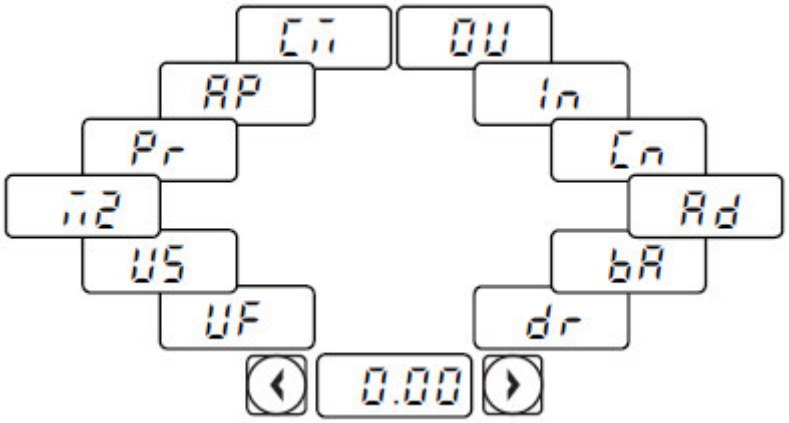
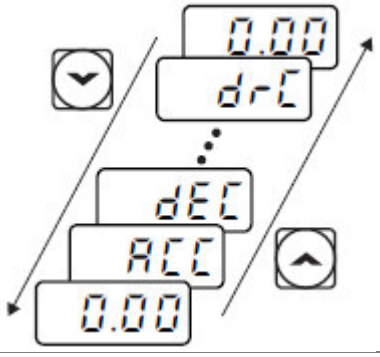
The following table shows the different characters of the seven-segment display:

0	0	A	A	K	K	U	U
1	1	b	B	L	L	v	V
2	2	C	C	M	M	W	W
3	3	d	D	n	N	X	X
4	4	E	E	O	O	y	Y
5	5	F	F	P	P	Z	Z
6	6	G	G	q	Q	-	-
7	7	H	H	r	R	-	-
8	8	I	I	S	S	-	-
9	9	J	J	t	T	-	-

To learn how to switch between groups and parameters, follow the next examples:

Step	Instruction	Keypad display
1	Move to the desired group using the [◂] & [▸] keys.	
2	Move up and down through the parameters using the [▲] and [▼] keys.	
3	Press the [ENT] key to save the changes.	

Binary numbers are shown in the integrated display as segment lines. “1” is displayed in the top part of the display and “0” in the bottom part. For example, “010” is represented as:

1.2. LCD Display

As an option, there is a remote LCD display for remote installation. The removable display integrates three LEDs indicating the drive operating status, an LCD display screen with 4 lines of 16 characters and control keypad for parameter setting and commissioning.

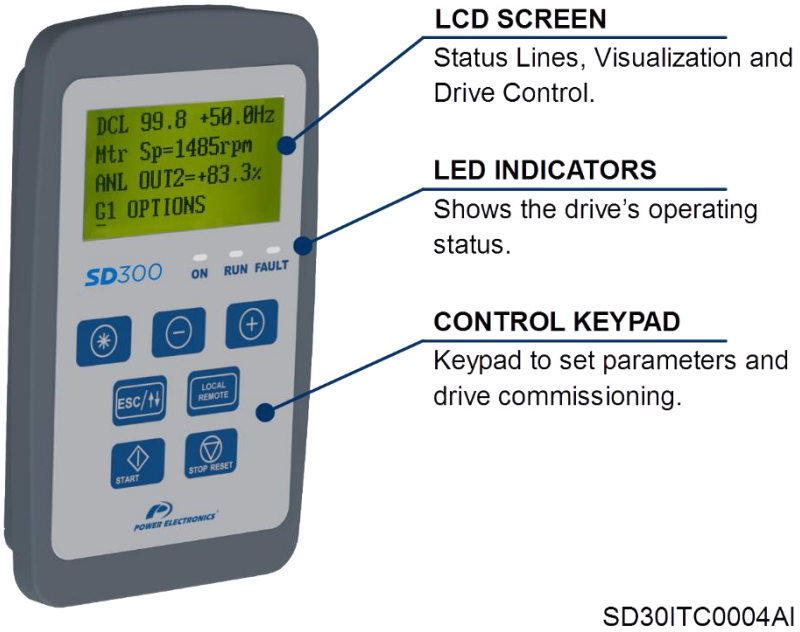


Figure 1.2 Removable display

LED Status Indicators

Leds show at any time, and in a comprehensive way for the user, information about output voltage or if a fault has taken place.

LED	COLOR	FUNCTION
ON	Yellow	Switched on indicates the equipment is powered.
RUN	Green	Switched on indicates the motor receives voltage from the SD500.
FAULT	Red	Flashing indicates the equipment is in fault.

Figure 1.3 Display status indicators

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Alphanumeric LCD Display Screen

The removable display integrates a four-line LCD screen with sixteen characters per line (16x4). Each line has different functions.

Status Line: Upper line.
Shows the drive status (RUN, STP, etc…)
as well as the motor output current and speed.
It is not configurable by the user.

Display Line 1: Second screen line.
Allows the user to select the different variables within the display menu. It is configurable by the user.

Display Line 2: Third screen line.
Allows the user to select the different variables within the display menu.

Programming Line: Lower line
The user can view and set the different parameters.

Figure 1.4 Display lines detail

Control Keypad

The keypad items have different function depending on their individual or combined use:

Enter into a parameter group to access the subgroups. In case a group does not have subgroups, the access would be straight to the group parameters.

To modify numeric parameters:

 &  Pressed simultaneously, the value increases

 &  Pressed simultaneously, the value decreases

To modify enumerated parameters:

 By pressing this key, the extended description is shown.

 &  Press these two keys simultaneously to switch between possible values in ascending order.

 &  Press these two keys simultaneously to switch between possible values in descending order.

Scroll through the parameter groups. Within a parameter group, it is possible to browse the different parameters in ascending order. It also allows setting (increase) the value of configurable parameters.

Same function as the previous key, but downwards. It also allows setting (decrease) the value of configurable parameters.

By pressing for a 2 second period (approximately), the cursor changes within the different lines configurable by the user. It also allows to exit from a menu location to a previous one.

By pressing this key, the drive starts if it is configured in local control mode (check equipment configuration). This button will only operate when the equipment is configured in local control mode.

Pressing this key stops the drive if it is running. In case the equipment is at fault, pressing this button will reset the drive whenever the fault conditions have disappeared. This button will only work when the equipment is configured in local control.

Not used.

The figure below shows a programming example, following the previous explication.

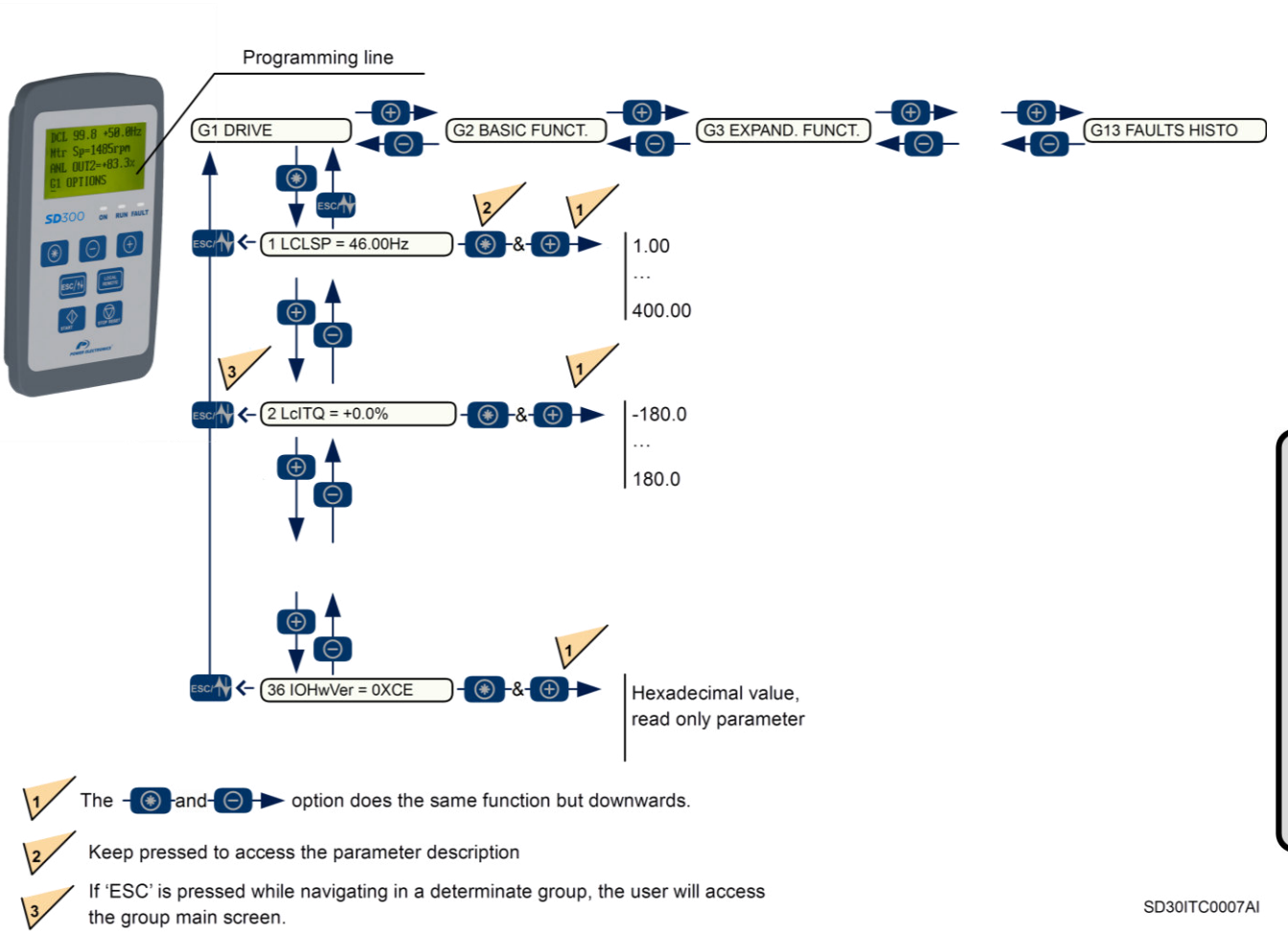

Figure 1.5 Parameter navigation example

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2. STATUS MESSAGES

The upper line of the display corresponds to the status line. In this line, the equipment status, motor mean current consumption (A), and motor speed (Hz) are displayed. This line is always visible in the display screen and cannot be modified by the user.

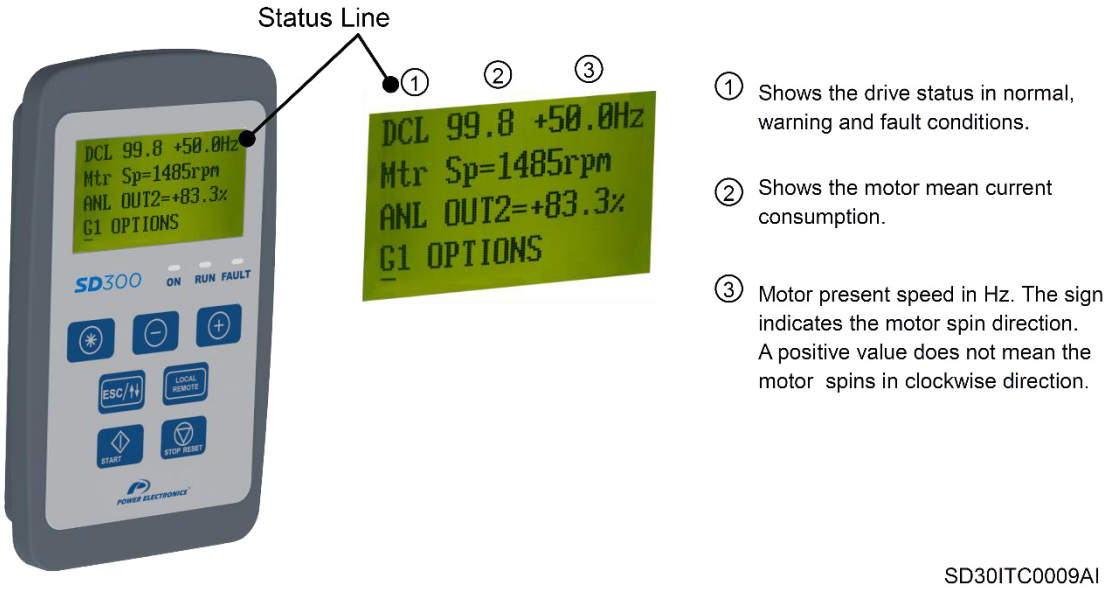


Figure 2.1 Description of the Status Line

Note: The user can access to the displayed information in the status line through Modbus communication. Refer to section "Modbus Communication".

2.1. List of Status Messages

Screen	Name	Description
FLT	Fault trip	The drive is in fault state
DCB	DC Brake	The SD300 has injected DC current to stop the motor.
STP	Stopping	The drive is decreasing the output frequency due to a stop order.
DCL	Decelerating	The drive is decreasing the output frequency. The motor is decreasing its speed, it is decelerating.
ACL	Accelerating	The drive is increasing the output frequency. The motor is increasing its speed, it is accelerating.
RUN	Running	The drive is operating at reference speed. The motor will keep the introduced speed. Operating in nominal rate.
RDY	Ready	The drive is ready for commissioning.

3. WARNING & FAULT MESSAGES

3.1. List of Warning Messages

The following table summarizes the possible warning messages that may be displayed and their description. Please notice **that these messages are only shown in the integrated display**.

Screen	Name	Description
OLU	Over Load	Displayed when the motor is overloaded. Operates when 'G9.17' is set to 1. To operate, select 5. Set the digital output terminal or relay 'G6.31'or 'G6.33' to 5 (Over Load) to receive overload warning output signals.
ULU	Under Load	Displayed when the motor is underloaded. Operates when 'G9.25' is set to 1. Set the digital output terminal or relay 'G6.31'or 'G6.33' to 7 (Under Load) to receive underload warning output signals.
IOLU	INV Over Load	Displayed when the overload time equivalent to 60% of the inverter overheat protection (inverter IOLT) level, is accumulated. Set the digital output terminal or relay 'G6.31'or 'G6.33' to 6 (IOL) to receive inverter overload warning output signals.
LCU	Lost Command	Lost command warning alarm occurs even with 'G9.12' set to 0. The warning alarm occurs based on the condition set at 'G9.13' to 'G9.15'. Set the digital output terminal or relay 'G6.31'or 'G6.33' to 13 (Lost Command) to receive lost command warning output signals. If the communication settings and status are not suitable for P2P, a Lost Command alarm occurs.
FANU	Fan Warning	Displayed when an error is detected from the cooling fan while 'G9.79' is set to 1. Set the digital output terminal or relay 'G6.31'or 'G6.33' to 8 (Fan Warning) to receive fan warning output signals.
EFAN	Fan Exchange	An alarm occurs when the value set at 'G9.86' is less than the value set at 'G9.87'. To receive fan exchange output signals, set the digital output terminal or relay 'G6.31' or 'G6.33' to 38 (Fan Exchange)
ECAP	CAP Exchange	An alarm occurs when the value set at 'G9.63' is less than the value set at 'G9.62' (the value set at 'G9.61' must be 2 (Pre Diag)). To receive CAP exchange signals, set the digital output terminal or relay 'G6.31' or 'G6.33' to 36 (CAP Exchange).
DBU	DB Warn %ED	Displayed when the DB resistor usage rate exceeds the set value. Set the detection level at 'G9.66'
TRTR	Retry Tr Tune	Tr tune error warning alarm is activated when 'G1.9' is set to 4. The warning alarm occurs when the motor's rotor time constant (Tr) is either too low or too high.

3.2. List of Fault Messages & Troubleshooting

Whenever a fault is produced, the SD300 will stop the motor.

The lower line (programming line) of the removable display will show the fault description, while the upper line will show the fault code and the values of current and speed at the instant the fault occurred.

Press the  key to view fault details.

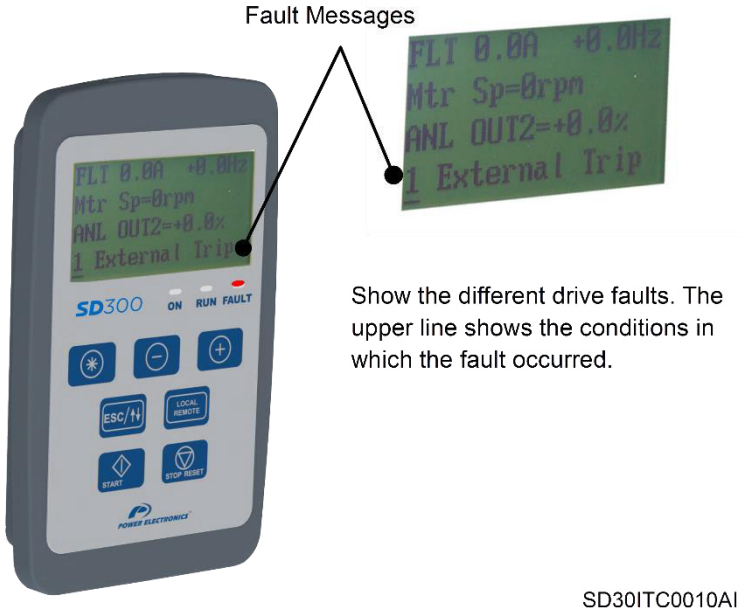


Figure 2.2 Fault visualization – Programming Line

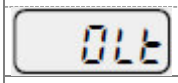
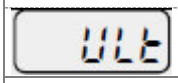
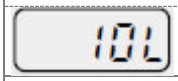
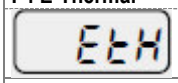
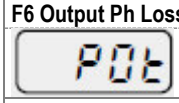
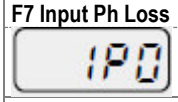
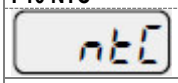
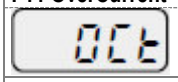
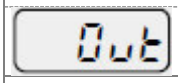
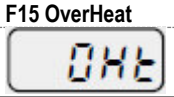
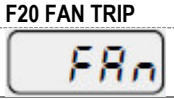
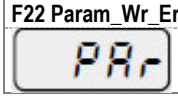
Without resetting the fault, it is possible to navigate and access the visualization lines parameters to find out more information about the fault. See section “Visualization and Status Parameters” for details about these parameters.

On the other hand, the FAULT led will remain enabled and the fault message displayed until the breakdown is repaired and the equipment reset.

In the integrated display, faults are stored in parameters Pr.90 to Pr.96.

Section 3.2.1 shows a list of all possible faults. Probable causes and troubleshooting for each fault are listed in section 3.2.2.

3.2.1. List of fault messages

Removable display Integrated display	DESCRIPTION
F0 No Fault -	The equipment is operative. No fault is present.
F1 OverLoad 	The drive trips when the output current reaches the value set in parameter [G9.21], exceeding the time limit set in parameter [G9.22]. The protection is operative if the parameter [G9.20] has been set with a value different to 'NONE'.
F2 UnderLoad 	The motor is working with insufficient load. The drive trips when its current is within the values set in parameter [G9.29] and [G9.30] exceeding the time limit set in parameter [G9.28]. The protection will be enabled if the parameter [G9.27] has been set with a value different to 'NONE'.
F3 Inv OverLoad 	The drive cuts the output supply when the output current exceeds the value set in the corresponding parameters (150% for 1 minute, 200% for 4 seconds of the drive rated current). The 200% for 4 seconds can vary depending on the drives capacity.
F4 E-Thermal 	The internal thermo-electronic protection determines the motor overheating. If the motor is overheated, the drive stops its output. The protection is enabled setting the parameter [G9.40] to a value different to 'NONE'.
F5 Ground Fault 	The drive trips when an earth leakage and its current exceed the internal value configured in the drive. The overload protection function will protect the drive from any ground fault caused by a small leakage resistance.
F6 Output Ph Loss 	One of the three output phases is open. The protection will be enabled if the parameter [G9.5] is set as 'OUTPUT' or 'ALL'.
F7 Input Ph Loss 	One of the three output phases is open. The protection will be enabled if the parameter [G9.5] is set as 'INPUT' or 'ALL'.
F8 OverSpeed	The motor speed has reached the speed limit set in G1.20 (dr20).
F10 NTC 	The drive uses a NTC thermal sensor to detect temperature increases within the supply system. When this message is displayed, the thermal sensor cable may have been cut. (The drive will continue running).
F11 OverCurrent 	The drive trips when the output current exceeds the 200% of the rated current value.
F12 OverVoltage 	The drive trips if the DC voltage within bus exceeds the value established. This value has been established in the internal configuration during the deceleration process or when the motor regenerative energy return to the drive is excessive for the capacitors which compose the DC bus. This fault can also be caused due to a transitory overvoltage within the supply system.
F13 External Trip 	This function can be used whenever the user needs to cut the output by the use of an external trip signal. The open /closed contact use will depend on the configuration within the digital inputs configured as 'External Trip'. The drive cuts the motor output protecting it from the controlled situation within the terminal.
F14 Short ARM 	The drive trips when a short-circuit occurs in the IGBT or in the output power.
F15 OverHeat 	The drive trips if overheated caused by a damaged cooling fan or by the presence of any strange substance within the cooling system.
F20 FAN TRIP 	An anomaly detecting within the cooling fan. The protection will be enabled if the parameter [G9.79] is set as 'Trip'.
F22 Param_Wr_Err 	A problem has been detected during the writing of a parameter by keypad.

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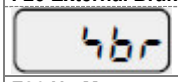
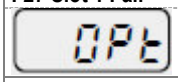
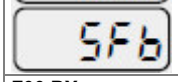
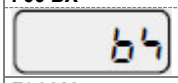
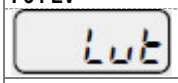
Removable display Integrated display	DESCRIPTION
F23 Pipe Fill Flt 	An error has been detected which makes the PID feedback be always under the established value. Possible pipe breakdown.
F25 External Brake 	Drive trips when the braking unit reaches a dangerous temperature.
F26 No Motor 	The drive has not detected a connected motor at its output when the Start order has been given. The protection is enabled setting the parameter [G9.31] to a value different to 'NONE'.
F27 Slot 1 Fail 	The optional board located in the slot1 has been extracted or there is no possible communication.
F30 STO  	Automatic internal protection of several of the IGBT semiconductors has acted or the safe stop contact of the drive (connected to an external circuit by the user) has been activated (for example, emergency stop).
F33 BX 	One of the digital inputs has been enabled configured as 'DIS START', forcing the drive to cut the output supply and making it stop due to inertia.
F34 LV 	The drive trips when the voltage within the DC bus is under the detection level. Therefore, the torque generated can be insufficient or the motor can be overheated if the input voltage decreases.
F35 Lost Command 	The drive trips due to a loss of speed set point established by the use of the control or communication terminals.
F36 KeyPadLostCMD	Drive trips if display is not connected.
F49 ADC Error 	Analog Input error.
F50 EEPROM 	The (EEPROM) memory is defective.
F51 Watchdog-1 Err 	Micro-controller internal fault.
F52 Watchdog-2 Err 	Micro-controller internal fault.

3.2.2. Fault troubleshooting

Screen	Description or possible cause	Actions
F1: Over Load	Elevated motor consumption caused by an excessive load.	Increase the motor and drive capacity.
	Load defined in parameter [G9.21] is too low	Increase the defined value in parameter [G9.21].
F2 UnderLoad	A connection problem between the motor and the load is present.	Check the connection between motor and load is correctly set.
	The load defined in parameters [G9.29] and [G9.30] is too low.	Increase the value defined in parameters [G9.29] and [G9.30].
F3 Inv OverLoad	The load within the drive is greater than the rated value of the drive.	Increase the motor and drive capacity.
	The start torque setting is too high.	Reduce the start torque value.
F4 E-Thermal	Motor overheated.	Reduce load and / or operating cycle
	Load exceeds the drive capacity.	Use a more powerful drive.
	Electro-thermal protection level (ETH) too low.	Set the ETH level properly.
	Invalid selection of the drive rated power.	Select a correct drive power.
	Invalid V/f pattern setting.	Select a correct V/f pattern.
F5 Ground Fault	Ground leakage produced in the drive output.	Check the drive output wiring.
	The motor insulation is damaged due to heat.	Change the motor.
F6 Output Ph Loss	Problem present in the drive output electric connection.	Check the output electric connections.
	Poor output electric distribution.	Check that the output electric distribution is correct.
F7 Input Ph Loss	Problem present in the drive input electric connection.	Check the input electric connections.
	Bad input electric distribution.	Check that the input electric distribution is correct.
	The drive DC capacitor must be replaced.	Replace the drive DC capacitor. Contact the Technical Service.
F8 OverSpeed	Speed reference is higher or equal that the speed limit.	Check the reference source and the motor load.
	Motor speed is out of control	Verify speed limits.
F10 NTC	The room temperature is over the allowed range.	Keep the installation location at room temperature within the specified limits.
	Problem present in the drive internal temperature sensor.	Contact the Technical Service.
F11 OverCurrent	Acceleration / deceleration time too short compared to the load inertia.	Increase the acceleration /deceleration time.
	The load exceeds the drive rated power.	Increase the drive rated power.
	The drive attempts to start the motor while spinning.	Ensure the correct programming spin start conditions. Set the load inertia and the parameters which enable the speed search properly. **Note:** Adequate spin start conditions fulfilment depends on each installation.
	Ground fault or short circuit produced.	Check the output wiring.
	The mechanic brake enters too quickly.	Check the mechanic brake.
	The power circuit components overheated due to a cooling fan malfunction.	Check the cooling fan. Verify it is correctly powered and not blocked by dirt.
	⚠ **Caution: Starting the drive without correcting anomalies may damage the IGBTs.**	
F12 OverVoltage	The deceleration time is too short compared to the load inertia.	Increase the deceleration time.
	Excessive energy regeneration in the drive.	Use an optional brake resistor (dynamic brake units).
	Line with High Voltage.	Check the supply line voltage.
F13 External Trip	External fault produced.	Delete the circuit fault connected by the input fault terminal configured.

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Screen	Description or possible cause	Actions
F14 Short ARM	Short circuit upper and lower IGBT.	Check IGBT.
	Short circuit at the inverter output.	Check the wiring of the inverter output circuit.
	Acceleration / deceleration time is too short compared with the inertia of the load (GD^2)	Increase acceleration / deceleration time.
F15 OverHeat	Cooling fan damaged or foreign matter present.	Replace the cooling fans and / or remove the foreign matter.
	Fault within the cooling system.	Check the foreign matter presence.
	Excessive room temperature.	Keep the room temperature under 50ºC or verify the drive capacity according to temperature.
	Motor overheat produced (PTC / NTC external signal) produced.	Check the motor cooling. Reduce the load and / or operating cycle.
F20 FAN TRIP	Cooling fan damaged or foreign matter present.	Replace the cooling fans and or remove the foreign matter.
F22 Param Wr Err		
F23 Pipe Fill Flt	Possible pipe breakdown inhibits pressure to reach the minimum level.	Check installation pipe status.
	PID feedback sensor is not showing the correct values.	Check the PID feedback pressure sensor is measuring properly. In case it is damaged, replace it.
F25 External Brake	The braking unit has reached a dangerous temperature.	Check the braking unit.
F26 No Motor	No motor connected to the drive output or defective wiring.	Check the motor is correctly connected to the drive output.
	The value set in parameter [G11.21 NomtrlLvl] is too high.	Reduce the parameter [G11.21 NoMtrLvl] value.
F27 Slot 1 Fail	The port 1 optional board is not connected properly.	Check the board is inserted in the expansion board slot.
	Defective optional board.	Replace the optional board for a new one.
	Defective optional board.	Replace the optional board.
F30 STO		
F33 BX	One of the digital inputs configured as 'DIS START' has been enabled.	Disable the digital input configured as 'DIS START'
F34 LV	Low voltage in the line	Check the line voltage.
	Load exceeds the line rated power (welding machine, motor with high start current connected to the commercial line)	Increase the line rated power.
	Defective magnetothermic switch in the drive supply circuit.	Change the magnetothermic switch.
F35 Lost Command	Speed reference lost introduced through the communications or keypad inputs.	Check the drive communications or the inputs are within the defined ranges to provide the speed references.
F36 KeypadLostCMD	Display connection is not correct.	Check the connection.
F49 ADC Error	Analog input error produced.	Contact the Technical Service.
F50 EEPROM	EEP Error (memory fault).	Disconnect and reconnect the power supply. If fail, contact the Power Electronics Technical Service.
F51 Watchdog-1 Err	Wdog Error (CPU fault).	Disconnect and reconnect the power supply. If fail, contact the Power Electronics Technical Service.
F52 Watchdog-2 Err	Wdog Error (CPU fault).	Disconnect and reconnect the power supply. If fail, contact the Power Electronics Technical Service.

4. VISUALIZATION AND STATUS PARAMETERS

These parameters constantly indicate the input signal status and dynamic parameter status of the SD300. Visualization lines are the second and the third lines. The user can select the parameter to be displayed in each line from the different visualization options.

To select a display parameter, move the cursor to the second or third line. To do this, press the **ESC / ↑↓** key for approximately two seconds; the cursor moves from one line to the next. Once located on the second or third line, navigate through parameter groups, enter using the ***** key. and select the desired parameter to be displayed. Once selected, these parameters are saved into memory and will be displayed on lines 2 and 3 whenever the drive is powered up.

Thanks to these lines user can display desired parameters and obtain additional information easily.

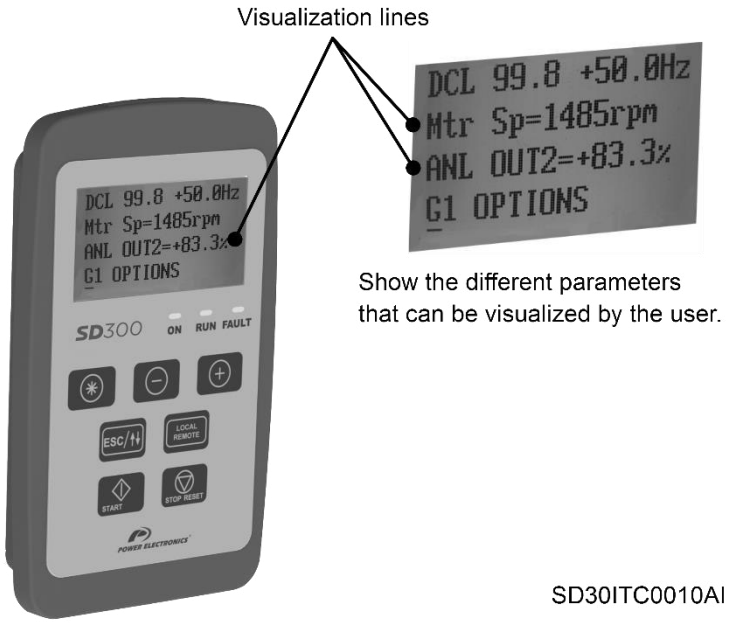

Figure 3.1 Visualization Lines Description

4.1. Parameters SV.1 – Motor Visualization

Screen	Units	Description
Mtr Iout=0.0 **MTR O/P current**	A	Shows the current running through the motor, corresponding to the second field of the status line ➔ **OFF 0.0A +0.0Hz**
Mtr Freq= 0.00Hz **Motor Frequency**	Hz	Shows the motor frequency
Mtr Sp= 0rpm **Motor Speed(rpm)**	rpm	Shows the motor speed in rpm
Mtr FBSp=+0rpm **MTR FBK Speed**	rpm	Shows the motor encoder speed. The value will be only shown if an encoder board has been installed in the drive.
Mtr Vout=0V **MTR O/P voltage**	V	Shows the motor voltage
Mtr Pow = 0.00kW **MTR O/P power**	kW	Shows the motor instantaneous power consumption
Mtr Torq = 0.0% **MTR O/P torque**	% Motor torque	Shows the torque applied to the motor.

4.2. Parameters SV.2 – Drive Visualization

Screen	Units	Description
Bus vol = 528V Bus voltage	VDC	Shows the DC voltage measured in the driver bus.
Temperature = 27ºC Temperature	ºC	Shows the internal temperature of the drive.

4.3. Parameters SV.3 – External Visualization

Screen	Units	Description
ANLG IN1 = +0.0V AI1 Monitor	V	Shows the Analog Input 1 mean value.
ANLG IN2 = +0.0mA AI2 Monitor	mA	Shows the Analog Input 2 mean value.
DigI= 0000000 Dig I/P Status	-	Shows the activation or rest status of the Digital Inputs, from left to right P7 to P1. The number of Digital Inputs varies depending on the equipment. IP20 drives integrate 7 Digital Inputs and IP66 drives integrate 5.
ANL OUT1 = 0.0% Anl Out1 Monitor	%	Shows the value of the Analog Output 1.
ANL OUT2 = 0.0% Anl Out2 Monitor	%	Shows the value of the Analog Output 2.
DOstatus= 0-00 Dig Output status	-	Shows the status of the digital outputs in the following order: SD1-Relay2 Relay1.

4.4. Parameters SV.4 – Internal Visualization

Screen	Units	Description
Inv.Power= Inv.Power	kW	Shows the drive power in kW.
Inv. S/W Inv.SW	-	Shows the last software version installed in the drive Ex. 0xE6 = v2.30.
SW Disp= Display Rev Num	-	Shows the last software version installed in the display.

4.5. Parameters SV.5 – PID Visualization

This display group appears when the parameter [G8.1 Apmod] has been set to the PID option.

Screen	Units	Description
S=0.0% F=0.0% Set- Fdb PID	%	Shows the PID set point value of the analog PID (left) and the sensor value that sends the feedback signal (right).
PID Out=+0.00% PID Out	%	Shows the t PID Output.

4.6. Parameters SV.6 – Registers

Screen	Units	Description
Tiempo Funcion. Total runtime	-	Shows the total runtime in days and minutes.
Consumed Energy Consumed Energy	-	Shows the total consumed energy, in MWh and kWh.

5. DESCRIPTION OF PROGRAMMING PARAMETERS

The different parameters of the SD300 are organized in groups (G1, G2, G3, …) and can be set both from the integrated display and from the removable display.

In the integrated display, use the left and right arrow keys to jump from a parameter group to another. Use the up and down keys to navigate between the parameters of the selected group.

In the removable LCD display, configuration parameters are shown in the bottom line.

Use the plus and minus keys to jump from a parameter group to another. Press the key to enter a group and, again, the plus and minus keys to navigate between the parameters of the selected group. Details about each parameter can be seen by pressing the key. Please refer to section 1, *Display Unit and Control Keypad,* for instructions on how to modify parameter values.

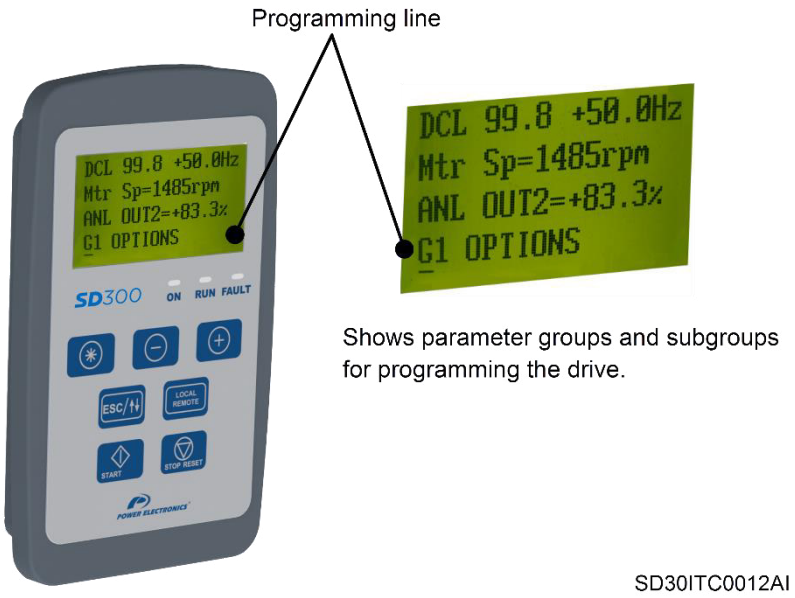

Figure 4.1 Detail of Programming Line.

See the following subsections for the complete parameter list for each group.

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5.1. Group 0: Operation

This group is only available in the integrated display. It allows performing a basic set up of the inverter with its main parameters.

Parameter	Address	Function
Target frequency =0.00Hz	0h1F00	See G1.1
Acceleration time = 20.0s	0h1F01	See G1.3
Deceleration time = 30.0s	0h1F02	See G1.4
Command source = Remote	0h1F03	See G1.6
Frequency reference source = LOCAL-1	0h1F04	See G1.7
Multi-step speed frequency 1 = 10.00Hz	0h1F05	See G2.50
Multi-step speed frequency 2 = 20.00Hz	0h1F06	See G2.51
Multi-step speed frequency 3 = 30.0Hz	0h1F07	See G2.52
Output current	0h1F08	These values depend on drive characteristics.
Motor revolutions per minute	0h1F09	
Inverter direct current voltage	0h1F0A	
Inverter output voltage	0h1F0B	
Out of order signal	0h1F0C	
Select rotation direction	0h1F0D	

5.2. Group 1 – G1: Drive → dr

<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>1 LCLSP=0.00Hz [1]</td><td>G1.1 / Local Speed</td><td>[G1.19] to [G1.20]</td><td>Set the motor speed value. Minimum value is set in ‘G1.19’ and the maximum value in ‘G1.20’.</td><td>YES</td></tr>
<tr><td>2 LclTQ=0.0%
dr.2</td><td>G1.2 / Local Torque</td><td>-180.0 to 180.0%</td><td>Set the torque value of the motor.</td><td>YES</td></tr>
<tr><td>3 ACC1=20.0s [1]</td><td>G1.3 / Acc Ramp</td><td>0.0 to 600.0s</td><td>Set the acceleration ramp 1, in seconds. This ramp will be set according to the requirements of each process.</td><td>YES</td></tr>
<tr><td>4 DECEL1=30.0s [1]</td><td>G1.4 / Decel Ramp</td><td>0.0 to 600.0s</td><td>Set the deceleration ramp 1, in seconds. This ramp will be set according to the requirements of each process.</td><td>YES</td></tr>
<tr><td>6 CONTROLMODE1= REMOTE [1]</td><td>G1.6 / Control Mode 1</td><td>0 to 5</td><td>Set the control mode to command the drive (Start/Stop, Reset...).
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>LOCAL</td><td>Drive is controlled from the keypad.</td></tr>
<tr><td>1</td><td>REMOTE</td><td>Commands are sent from the control terminals.</td></tr>
<tr><td>3</td><td>MODBUS</td><td>The drive is controlled through the communications bus, integrated in the equipment.</td></tr>
<tr><td>4</td><td>COMMS</td><td>The drive control is carried out by the use of any of the optional communication boards.</td></tr>
<tr><td>5</td><td>PLC</td><td>The common area can be linked with the user sequence output and can be used as command.</td></tr>
</table></td><td>NO</td></tr>
</table>

[1] Only displayed in the removable LCD display.

<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>7 REF1 SP= LOCAL [1]</td><td>G1.7 / Speed Reference1</td><td>0 to 12</td><td>Select the source for the speed reference.<table><tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr><tr><td>0</td><td>LOCAL</td><td>Reference will be given by keypad and will be set in ‘G1.1’ Local Speed.</td></tr><tr><td>2</td><td>V1</td><td>Reference will be introduced through the Analog Input 1.</td></tr><tr><td>4</td><td>AI2</td><td>Reference will be introduced through the Analog Input 2.</td></tr><tr><td>5</td><td>AI3</td><td>Reference will be introduced through the Analog Input 3.</td></tr><tr><td>6</td><td>MODBUS</td><td>The reference will be introduced through Modbus.</td></tr><tr><td>8</td><td>COMMS</td><td>The reference will be introduced through the communications.</td></tr><tr><td>9</td><td>PLC</td><td>The common area can be linked with user sequence output and can be used as command.</td></tr><tr><td>12</td><td>PULSE</td><td>Reference will be introduced through the Pulse input.</td></tr></table></td><td>NO</td></tr>
<tr><td>8 REF1 TQ= LOCAL

dr.8</td><td>G1.8 / Torque Ref1</td><td>0 to 12</td><td>Select the source for the torque reference.<table><tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr><tr><td>0</td><td>LOCAL</td><td>Reference will be given by keypad and will be set in ‘G1.1’ Local Speed.</td></tr><tr><td>2</td><td>AI1</td><td>Reference will be introduced through the Analog Input 1.</td></tr><tr><td>4</td><td>V2</td><td>Reference will be introduced through the Analog Input 2.</td></tr><tr><td>5</td><td>V3</td><td>Reference will be introduced through the Analog Input 3.</td></tr><tr><td>6</td><td>MODBUS</td><td>The reference will be introduced through Modbus.</td></tr><tr><td>8</td><td>COMMS</td><td>The reference will be introduced through communications.</td></tr><tr><td>9</td><td>PLC</td><td>The common area can be linked with user sequence output and can be used as command.</td></tr><tr><td>12</td><td>PULSE</td><td>Reference will be introduced through the Pulse input.</td></tr></table></td><td>NO</td></tr>
<tr><td>9 Ctr.T=V/Hz

dr.9</td><td>G1.9 / Control Type</td><td>0 to 4</td><td>Define the drive control type.<table><tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr><tr><td>0</td><td>V/Hz</td><td>A linear V/Hz pattern configures the inverter to increase or decrease the output voltage at a fixed rate for different operation frequencies. This is particularly useful when a constant torque load is applied.</td></tr><tr><td>2</td><td>SlipCom</td><td>Slip refers to the variation between frequency (synchronous speed) and motor rotation speed. As the load increases, there can be variations between the set frequency and motor rotation speed. Slip compensation is used for loads that require compensation of these speed variations.</td></tr><tr><td>4</td><td>S-less1</td><td>Sensorless vector control is an operation to carry out vector control without the rotation speed feedback from the motor but with an estimation of the motor rotation speed calculated by the inverter. Sensorless vector control can generate greater torque at a lower current level than V/Hz control</td></tr></table></td><td>NO</td></tr>
<tr><td>10 Torq CTRL=N
dr.10</td><td>G1.10 / Speed or Torque</td><td>N
Y</td><td>Not configurable by users.</td><td>NO</td></tr>
</table>

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<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>11 InchF=10.00Hz
dr.11</td><td>G1.11 / Inch Frequency</td><td>[G1.19] to [G1.20]</td><td>Set the motor inch frequency.</td><td>YES</td></tr>
<tr><td>12 InchAcT=20.0s
dr.12</td><td>G1.12 / INCH Acc Time</td><td>0.0 to 600.0s</td><td>Set the time in which the drive accelerates to reach the inch speed.</td><td>YES</td></tr>
<tr><td>13 InchDeT=30.0s
dr.13</td><td>G1.13 / INCH Dec Time</td><td>0.0 to 600.0s</td><td>Set the time in which the drive decelerates to reach the inch speed.</td><td>YES</td></tr>
<tr><td>14 MTRPWR= (*)
dr.14</td><td>G1.14 / Motor Power</td><td>0.2 kW
0.4 kW
0.75 kW
1.1 kW
1.5 kW
2.2 kW
3.0 kW
3.7 kW
4.0 kW
5.5 kW
7.5 kW
11.0 kW
15.0 kW
18.5 kW
22.0 kW
30.0 kW</td><td>Set the motor rated power according to its nameplate.</td><td>NO</td></tr>
<tr><td>15 TqBoost=Manual
dr.15</td><td>G1.15 / Torque Boost</td><td>Manual
Auto1
Auto2</td><td>Proportional to the initial voltage value applied to the motor in the start moment to overcome the resisting torque in heavy starts.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>Manual</td><td>Starting voltage manual setting by the use of parameters ‘G1.16’ (FWBoost) and ‘G1.17’ (RVBoost).</td></tr>
<tr><td>1</td><td>Auto1</td><td>The drive automatically calculates the voltage to apply at the start using the motor parameters.</td></tr>
<tr><td>2</td><td>Auto2</td><td></td></tr>
</table></td><td>NO</td></tr>
<tr><td>16 FWBoost=2.0%
dr.16</td><td>G1.16 / Fwd Boost</td><td>0.0 to 15.0%</td><td>Set the intensified torque in forward direction.</td><td>NO</td></tr>
<tr><td>17 RVBoost=2.0%
dr.17</td><td>G1.17 / Rev Boost</td><td>0.0 to 15.0%</td><td>Set the intensified torque in reverse direction.</td><td>NO</td></tr>
<tr><td>18 MTRFRQ=60.00Hz
dr.18</td><td>G1.18 / Motor Frequency</td><td>30.00 to 400.00Hz</td><td>Set the base frequency (drive output frequency when running at its rated voltage) according to the motor nameplate</td><td>NO</td></tr>
<tr><td>19 STRFRQ=0.5Hz
dr.19</td><td>G1.19 / Start Frequency</td><td>0.01 to 10.00Hz</td><td>Set the start frequency. A start frequency is a frequency at which the inverter starts voltage output. The inverter does not produce output voltage while the frequency reference is lower than the set frequency. However, if a deceleration stop is made while operating above the start frequency, output voltage will continue until the operation frequency reaches a full-stop (0Hz).</td><td>NO</td></tr>
<tr><td>20 MxSpL=60.00Hz
dr.20</td><td>G1.20 / Max Speed Lt</td><td>40.00 to 400.00 Hz</td><td>Set upper and lower frequency limits. All frequency selections are restricted to frequencies from within the upper and lower limits.
This restriction also applies when you in input a frequency reference using the keypad.</td><td>NO</td></tr>
<tr><td>21 Hz/Rpm=Hz [1]</td><td>G1.21 / Hz/Rpm Display</td><td>Hz
Rpm</td><td>Change the units used to display the operational speed of the inverter by setting to 0 (Hz) or 1 (Rpm). This function is only available in he removable display.</td><td>YES</td></tr>
<tr><td>80 SelRngEnt=Run Freq.
dr.80</td><td>G1.80 / Select ranges at power input</td><td>0 to 17</td><td>Select ranges displayed by the inverter at power input.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>Run Freq.</td><td>9</td><td>Motor RPM</td></tr>
<tr><td>1</td><td>Accel. Time</td><td>10</td><td>DC Voltage</td></tr>
<tr><td>2</td><td>Decel. Time</td><td>11</td><td>User Sel. 1</td></tr>
<tr><td>3</td><td>Cmd Source</td><td>12</td><td>Out of Order</td></tr>
<tr><td>4</td><td>Ref. Source</td><td>13</td><td>Sel. Run Dir.</td></tr>
<tr><td>5</td><td>MultiStep 1</td><td>14</td><td>Oupt. Curr. 2</td></tr>
<tr><td>6</td><td>MultiStep 2</td><td>15</td><td>Motor2 RPM</td></tr>
<tr><td>7</td><td>MultiStep 3</td><td>16</td><td>DC Voltage2</td></tr>
<tr><td>8</td><td>Oupt. Curr.</td><td>17</td><td>User Sel. 2</td></tr>
</table></td><td>YES</td></tr>
</table>

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
81 SelCod=Volt V / **dr.81**	**G1.81 /** Select monitor code	0 to 2	Select the monitor code. OPT. 0 – FUNCTION: Volt V – DESCRIPTION: Scalar control mode. Drive carries out the control applying a voltage / frequency ramp to the motor. OPT. 1 – FUNCTION: Pow kW OPT. 2 – FUNCTION: Tq kgf	YES
89 DspChng=All / **dr.89**	**G1.89 /** Display changed parameter	All Chang	Displays all parameters that are different from the factory defaults. Use this feature to track changed parameters. OPT. 0 – FUNCTION: All – DESCRIPTION: Display all parameters. OPT. 1 – FUNCTION: Chang – DESCRIPTION: Display changed parameters.	YES
90 ESC Func= Mov. In. Pos. / **dr.90**	**G1.90 /** ESC Key Func.	0 to 2	The [ESC] key is a multi-functional key that can be configured to carry out a number of different functions. OPT. 0 – FUNCTION: Mov. In. Pos. – DESCRIPTION: Move to the initial position. OPT. 1 – FUNCTION: JOG Key – DESCRIPTION: Perform a jog operation. OPT. 2 – FUNCTION: Local/Rem	NO
91 Eloader=None [1]	**G1.91 /** Eloader	0 to 3	Set eloader function OPT. 0 – FUNCTION: None – DESCRIPTION: No actions to be executed. OPT. 1 – FUNCTION: Download – DESCRIPTION: Download upgrade file. OPT. 3 – FUNCTION: Upload – DESCRIPTION: Update data.	NO
93 INITIALIS=No / **dr.93**	**G1.93 /** Parameter Initialization	No All dr bA Ad Cn In OU CM AP Pr M2 run	Set all parameters back to their factory value. OPT. 0 – FUNCTION: No – DESCRIPTION: All parameters keep their current value. OPT. 1 – FUNCTION: All – DESCRIPTION: Initializes all parameter groups (set to factory values). OPT. 2 – FUNCTION: dr – DESCRIPTION: Initializes “G1 Drive” parameters. OPT. 3 – FUNCTION: bA – DESCRIPTION: Initializes “G2 Basic funtion” parameters. OPT. 4 – FUNCTION: Ad – DESCRIPTION: Initializes “G3 Expanded function” parameters. OPT. 5 – FUNCTION: Cn – DESCRIPTION: Initializes “G4 Control Function” parameters. OPT. 6 – FUNCTION: In – DESCRIPTION: Initializes “G5 Inputs” parameters. OPT. 7 – FUNCTION: OU – DESCRIPTION: Initializes “G6 Outputs” parameters. OPT. 8 – FUNCTION: CM – DESCRIPTION: Initializes “G7 Bus Communication” parameters. OPT. 9 – FUNCTION: AP – DESCRIPTION: Initializes “G8 PID” parameters. OPT. 12 – FUNCTION: Pr – DESCRIPTION: Initializes “G9 Protections” parameters. OPT. 13 – FUNCTION: M2 – DESCRIPTION: Initializes “G10 2nd motor” parameters. OPT. 16 – FUNCTION: run	NO
94 PswRg=0 / **dr.94**	**G1.94 /** Password registration.	0 to 9999	Register password.	YES
95 PrmLock=0 / **dr.95**	**G1.95 /** Parameter lock settings	0 to 9999	Lock parameter settings.	YES
97 SoftVer=0 / **dr.97**	**G1.97 /** Software Version	0 to 9999	Displays the software version. Ex: 0xE6 = v2.30.	YES
98 IOSwVer=0 / **dr.98**	**G1.98 /** Software Version	0 to 65535	Displays the IO software version.	YES
99 IOHwVer=0 / **dr.99**	**G1.99 /** Hardware Version	0 to 65535	Displays the hardware version.	YES

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5.3. Group 2 – G2: Basic Functions → bA

<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>1 REF2 SP=None
bA.1</td><td>G2.1 / Alt Speed Ref</td><td>0 to 6</td><td>Select the speed reference source according to the following table:
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>None</td><td>The reference will be introduced by using the keypad.</td></tr>
<tr><td>1</td><td>V1</td><td>Reference will be introduced through the Analog Input 1.</td></tr>
<tr><td>3</td><td>V2</td><td>Reference will be introduced through the Analog Input 2.</td></tr>
<tr><td>4</td><td>V3</td><td>Reference will be introduced through the Analog Input 3.</td></tr>
<tr><td>6</td><td>Pulse</td><td>Reference will be introduced through the Pulse input.</td></tr>
</table></td><td>NO</td></tr>
<tr><td>2 AuxCalcType= M+(G*A) [2]
bA.2 [2]</td><td>G2.2 / Aux Calc Type</td><td>0 to 7</td><td>Set the auxiliary reference gain to configure the auxiliary reference and set the percentage to be reflected when calculating the main reference.
<table>
<tr><th>OPT.</th><th>CALCULATION</th><th>OPT.</th><th>CALCULATION</th></tr>
<tr><td>0</td><td>M+(G*A)</td><td>4</td><td>M+G*2(A-50%)</td></tr>
<tr><td>1</td><td>Mx(G*A)</td><td>5</td><td>Mx[G*2(A-50%)</td></tr>
<tr><td>2</td><td>M/(G*A)</td><td>6</td><td>M/[G*2(A-50%)]</td></tr>
<tr><td>3</td><td>M+[M*(G*A)]</td><td>7</td><td>M+M*G*2(A-50%)</td></tr>
</table></td><td>NO</td></tr>
<tr><td>3 AuxRfG=100.0% [2]
bA.3 [2]</td><td>G2.3 / Aux. Ref. Gain</td><td>-200.0 to 200.0%</td><td>Adjust the size of the configured input for auxiliary frequency.</td><td>YES</td></tr>
<tr><td>4 CONTROLMODE2= REMOTE
bA.4</td><td>G2.4 / Alt Ctrl Mode</td><td>0 to 5</td><td>Set the alternative control mode to command the drive (Start/Stop, Reset...).
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>LOCAL</td><td>Drive is controlled from the keypad.</td></tr>
<tr><td>1</td><td>REMOTE</td><td>Commands are sent from the control terminals.</td></tr>
<tr><td>3</td><td>MODBUS</td><td>The drive is controlled through the communications bus, integrated in the equipment.</td></tr>
<tr><td>4</td><td>COMMS</td><td>The drive control is carried out by the use of any of the optional communication boards.</td></tr>
</table></td><td>NO</td></tr>
<tr><td>5 REF2 SP=LOCAL
bA.5</td><td>G2.5 / Alt Speed Ref</td><td rowspan="2">0 to 9</td><td rowspan="2">Select the alternative source for the speed and torque reference respectively.
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>LOCAL</td><td>Reference will be given by keypad and will be set in ‘G1.1’ Local Speed.</td></tr>
<tr><td>2</td><td>V1</td><td>Reference will be introduced through the Analog Input 1.</td></tr>
<tr><td>4</td><td>V2</td><td>Reference will be introduced through the Analog Input 2.</td></tr>
<tr><td>5</td><td>V3</td><td>Reference will be introduced through the Analog Input 3.</td></tr>
<tr><td>6</td><td>MODBUS</td><td>The reference will be introduced through Modbus.</td></tr>
<tr><td>8</td><td>COMMS</td><td>The reference will be introduced through the communications.</td></tr>
</table></td><td>YES</td></tr>
<tr><td>6 REF2 TQ= LOCAL
bA.6</td><td>G2.6 / Torque Ref2</td><td>YES</td></tr>
</table>

[2] These parameters will only be displayed if ‘G2.1’ (bA. 1 in integrated display) is not set to 0 (NONE).

<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>7 V/FPn=Linear
bA.7</td><td>G2.7 / V/F Pattern</td><td>0 to 3</td><td>Set the alternative acceleration ramp.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>Linear</td><td>Output voltage increases and decreases at constant rate proportional to voltage/frequency (V/F) relation. Used to achieve a constant torque load regardless the frequency.</td></tr><tr><td>1</td><td>Square</td><td>Output voltage increases quadratically according to the frequency. K=1.5.</td></tr><tr><td>2</td><td>V/F Us</td><td>Define a customized V/F pattern.</td></tr><tr><td>3</td><td>Square2</td><td>Output voltage increases quadratically according to the frequency. K=2.</td></tr></table></td><td>NO</td></tr>
<tr><td>8 RmpT= MaxFreq
bA.8</td><td>G2.8 / Ramp T Mode</td><td>MaxFreq
DeltaFreq</td><td>Enables the acceleration ramp settings:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>MaxFreq</td><td>Allows accelerating or decelerating with the same ramp based on the maximum frequency, independently from the operating frequency.</td></tr><tr><td>1</td><td>DeltaFreq</td><td>Allows defining the accelerating/decelerating time which will reach the next speed reference when working at constant speed.</td></tr></table></td><td>NO</td></tr>
<tr><td>9 TimScl=0.1s
bA.9</td><td>G2.9 / Time scale</td><td>0.01s
0.1s
1s</td><td>Set the time scale for all time-related values. It is particularly useful when a more accurate Acc/Dec times are required because of load characteristics, or when the maximum time range needs to be extended.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>0.01s</td><td>Sets 0.01 second as the minimum unit</td></tr><tr><td>1</td><td>0.1s</td><td>Sets 0.1 second as the minimum unit.</td></tr><tr><td>2</td><td>1s</td><td>Sets 1 second as the minimum unit</td></tr></table></td><td>NO</td></tr>
<tr><td>10 I/P Freq=60Hz
bA.10</td><td>G2.10 / Input Frequency</td><td>60Hz
50Hz</td><td>Set the input frequency. If the frequency changes, so do all related settings (base frequency, maximum frequency…).
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>60Hz</td><td>Set inverter frequency to 60Hz.</td></tr><tr><td>1</td><td>50Hz</td><td>Set inverter frequency to 50Hz.</td></tr></table></td><td>NO</td></tr>
<tr><td>11 POLE Numbr=4 (*)
bA.11</td><td>G2.11 / POLE Number</td><td>2 to 48</td><td>Set the number of poles in the motor according to its nameplate.</td><td>NO</td></tr>
<tr><td>12 RtSlp=40rpm (*)
bA.12</td><td>G2.12 / Rated Slip</td><td>0 to 3000rpm</td><td>When facing a heavy load capable of producing a big slip during the start, configure this parameter to compensate the motor slip.</td><td>NO</td></tr>
<tr><td>13 MTRCUR=3.6A (*)
bA.13</td><td>G2.13 / Motor Current</td><td>1.0 to 200.0A</td><td>Set the motor nominal current in accordance with the nameplate.</td><td>NO</td></tr>
<tr><td>14 NOLODC=1.6A (*)
bA.14</td><td>G2.14 / No load Current</td><td>0.5 to 200.0A</td><td>Set the measured current at rated frequency without load. If any difficulties are found when measuring the current without load, this setting should be between 30% and 50% of the motor nameplate rated current.</td><td>NO</td></tr>
<tr><td>15 MTR VOLT=0V
bA.15</td><td>G2.15 / Motor Voltage</td><td>180 to 480V</td><td>Set the motor rated voltage according to its nameplate.</td><td>NO</td></tr>
<tr><td>16 EFFICIEN=72% (*)
bA.16</td><td>G2.16 / Efficiency</td><td>70 to 100%</td><td>Set the motor efficiency according to its nameplate.</td><td>NO</td></tr>
<tr><td>17 InertiaRate=0
bA.17</td><td>G2.17 / Inertia Rate</td><td>0 to 8</td><td>Select load inertia based on motor inertia.
<table><tr><th>OPT.</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>Less than 10 times motor inertia</td></tr><tr><td>1</td><td>10 times motor inertia</td></tr><tr><td>2-8</td><td>More than 10 times motor inertia</td></tr></table></td><td>NO</td></tr>
<tr><td>18 TrimPwr%=100%
bA.18</td><td>G2.18 / Trim Power %</td><td>70 to 130%</td><td>Set the output power display, increasing its value if it is lower than expected or reducing it to match the real value.</td><td>YES</td></tr>
<tr><td>19 ACi/Volt=380V
bA.19</td><td>G2.19 / AC Input Volt</td><td>170 to 240V
320 to 480V</td><td>Set the input voltage.
Note: The default setting value and this parameter range will vary depending on the drive supply voltage:
220V ➔220
400V ➔380</td><td>YES</td></tr>
</table>

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<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>20 AutoTuning=None

bA.20</td><td>G2.20 / Auto tuning</td><td>0 to 6</td><td>Set autotuning type:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>Auto-tunning is not active</td></tr><tr><td>1</td><td>All</td><td>The motor parameters are measured with the motor rotating. The stator resistance (Rs), leak inductance (Lσ), stator inductance (Ls), no-load current and rotor time constant are all measured. The encoder state is also measured. The encoder related functions should be rightly set. If load is connected to the motor axis, the parameter might not be correctly measured so remove the load before measurement.</td></tr><tr><td>2</td><td>Allst</td><td>Motor parameters are measured when the motor is stopped. Stator resistance (Rs), leak inductance (Lσ) and rotor time constant are measured at the same time.</td></tr><tr><td>3</td><td>Rs+Lsig</td><td>The parameter is measured when the motor is not operating. The measured values are used for auto torque boost and sensorless vector control.</td></tr><tr><td>6</td><td>Tr</td><td>Measures the rotor time constant (Tr) with the motor in the stopped position and Control Mode (‘G1.9’) is set to IM Sensorless.</td></tr></table></td><td>NO</td></tr>
<tr><td>21 Rs=0 (*)
bA.21 (*)</td><td>G2.21 / Stator Resistor</td><td>*</td><td>Stator resistor fine setting.</td><td>NO</td></tr>
<tr><td>22 LSigma=0mH (*)
bA.22 (*)</td><td>G2.22 / Leak Inductor</td><td>*</td><td>Leak inductor fine setting.</td><td>NO</td></tr>
<tr><td>23 Ls=0mH (*)
bA.23 (*)</td><td>G2.23 / Stator Inductor</td><td>*</td><td>Inductor stator fine setting.</td><td>NO</td></tr>
<tr><td>24 Tr=145ms [3]
bA.24 [3]</td><td>G2.24 / Rotor Time Const</td><td>25 to 5000ms</td><td>Rotor time constant fine setting.</td><td>NO</td></tr>
<tr><td>25 Ls Scl=100% [3]
bA.25 [3]</td><td>G2.25 / Stator Ind. Sca.</td><td>50 to 150%</td><td>Set stator inductance scale.</td><td>NO</td></tr>
<tr><td>26 Tr Scl=100% [3]
bA.26 [3]</td><td>G2.26 / Rotor Ti Co Sca.</td><td>50 to 150%</td><td>Set rotor time constant scale.</td><td>NO</td></tr>
<tr><td>31 LsR Scl=80% [3]
bA.31 [3]</td><td>G2.31 / Regen. Ind. Scl.</td><td>70 to 100%</td><td>Set regeneration inductance scale.</td><td>NO</td></tr>
<tr><td>41 UsFq1=15.00Hz [4]
bA.41 [4]</td><td>G2.41 / User Frequency 1</td><td>0.00 to [G1.20]</td><td>Set user frequency 1. At this frequency value, the drive will provide the voltage set in parameter ‘G2.42 User V1’.</td><td>NO</td></tr>
<tr><td>42 User V1=25% [4]
bA.42 [4]</td><td>G2.42 / User Voltage 1</td><td>0 to 100%</td><td>Set user voltage 1. At this voltage, the drive will provide the frequency set in parameter ‘G2.41 UsFq1’.</td><td>NO</td></tr>
<tr><td>43 UsFq2=30.00Hz [4]
bA.43 [4]</td><td>G2.43 / User Frequency 2</td><td>0.00 to [G1.20]</td><td>Set user frequency 2. At this frequency value, the drive will provide the voltage set in parameter ‘G2.44 User V2’.</td><td>NO</td></tr>
<tr><td>44 User V2=50% [4]
bA.44 [4]</td><td>G2.44 / User Voltage 2</td><td>0 to 100%</td><td>Set user voltage 2. At this voltage, the drive will provide the frequency set in parameter ‘G2.43 UsFq2’.</td><td>NO</td></tr>
<tr><td>45 UsFq3=45.00Hz [5]
bA.45 [5]</td><td>G2.45 / User Frequency 3</td><td>0.00 to [G1.20]</td><td>Set user frequency 3. At this frequency value, the drive will provide the voltage set in parameter ‘G2.46 User I2’.</td><td>NO</td></tr>
<tr><td>46 User I2=75% [5]
bA.46 [5]</td><td>G2.46 / User Voltage 3</td><td>0 to 100%</td><td>Set user voltage 3. At this voltage, the drive will provide the frequency set in parameter ‘G2.45 UsFq3’.</td><td>NO</td></tr>
<tr><td>47 UsFrq4=0.00Hz [4]
bA.47 [4]</td><td>G2.47 / User Frequency 4</td><td>0.00 to [G1.20]</td><td>Set user frequency 4. At this frequency value, the drive will provide the voltage set in parameter ‘G2.48 User V4’.</td><td>NO</td></tr>
<tr><td>48 User V4=0% [4]
bA.48 [4]</td><td>G2.48 / User Voltage 4</td><td>0 to 100%</td><td>Set user voltage 4. At this voltage, the drive will provide the frequency set in parameter ‘G2.47 UsFq2’.</td><td>NO</td></tr>
</table>

* These values depend on the motor setting.
[3] These parameters will only be displayed if ‘G1.9’ (dr.19 in integrated display) is set to 4 (S-less1).
[4] These parameters will only be displayed if ‘G2.7’ (bA.7 in integrated display) is set to 2 (V/F Us).

<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>50 MREF1=10.00% [5]</td><td>G2.50 / Multi-Reference1</td><td rowspan="15">0.00 to [G1.20]</td><td rowspan="15">The user can set multiple references for the drive. This will be enabled by the use of the digital inputs configured as speed multi-references.

The speed applied in each situation will depend on the digital inputs that control the multi-references, which are set as SPEED-L, SPEED-M and SPEED-H.

For example, with the following options:

- G5.65 DI1 = 'Speed-H'
- G5.66 DI2 = 'Speed-M'
- G5.67 DI3 = 'Speed -L'

The adjustment is carried out by assigning a speed value for every parameter within this group, from [G2.50] to [G2.56].

The following table links the digital inputs configured as SPEED to the selected multi-reference:

<table><tr><th colspan="3">DIGITAL. OUTPUT: SPEED</th><th rowspan="2">PID REFERENCE</th><th rowspan="2">PARAM.</th></tr><tr><th>H</th><th>M</th><th>L</th></tr><tr><td>0</td><td>0</td><td>X</td><td>Multi-reference 1</td><td>G2.50</td></tr><tr><td>0</td><td>X</td><td>0</td><td>Multi-reference 2</td><td>G2.51</td></tr><tr><td>0</td><td>X</td><td>X</td><td>Multi-reference 3</td><td>G2.52</td></tr><tr><td>X</td><td>0</td><td>0</td><td>Multi-reference 4</td><td>G2.53</td></tr><tr><td>X</td><td>0</td><td>X</td><td>Multi-reference 5</td><td>G2.54</td></tr><tr><td>X</td><td>X</td><td>0</td><td>Multi-reference 6</td><td>G2.55</td></tr><tr><td>X</td><td>X</td><td>X</td><td>Multi-reference 7</td><td>G2.56</td></tr></table>
Note: 0: Inactive and X: Active.</td><td>YES</td></tr>
<tr><td>51 MREF2=20.00 % [5]</td><td>G2.51 / Multi-Reference2</td><td>YES</td></tr>
<tr><td>52 MREF3=30.00% [5]</td><td>G2.52 / Multi-Reference3</td><td>YES</td></tr>
<tr><td>53 MREF4=40.00% [5]
bA.53 [5]</td><td>G2.53 / Multi-Reference4</td><td>YES</td></tr>
<tr><td>54 MREF5=50.00% [5]
bA.54 [5]</td><td>G2.54 / Multi-Reference5</td><td>YES</td></tr>
<tr><td>55 MREF6=60.00% [5]
bA.55 [5]</td><td>G2.55 / Multi-Reference6</td><td>YES</td></tr>
<tr><td>56 MREF7=60.00% [5]
bA.56 [5]</td><td>G2.56 / Multi-Reference7</td><td>YES</td></tr>
<tr><td>70 ACC2=20.0s
bA.70</td><td>G2.70 / Acc Ramp 2</td><td rowspan="16">0.0 to 600.0s</td><td rowspan="16">Set acceleration and deceleration ramps.

The established setting within the parameter is the time required to reach the maximum frequency value, starting from 0Hz. This ramp will be set according to the process necessities.</td><td>YES</td></tr>
<tr><td>71 DEC2=30.0s
bA.71</td><td>G2.71 / Decel Ramp 2</td><td>YES</td></tr>
<tr><td>72 ACC3=20.0s
bA.72</td><td>G2.72 / Acc Ramp 3</td><td>YES</td></tr>
<tr><td>73 DEC3=30.0s [6]
bA.73 [6]</td><td>G2.73 / Decel Ramp 3</td><td>YES</td></tr>
<tr><td>74 ACC4=20.0s [6]
bA.74 [6]</td><td>G2.74 / Acc Ramp 4</td><td>YES</td></tr>
<tr><td>75 DEC4=30.0s [6]
bA.75 [6]</td><td>G2.75 / Decel Ramp 4</td><td>YES</td></tr>
<tr><td>76 ACC5=20.0s [6]
bA.76 [6]</td><td>G2.76 / Acc Ramp 5</td><td>YES</td></tr>
<tr><td>77 DEC5=30.0s [6]
bA.77 [6]</td><td>G2.77 / Decel Ramp 5</td><td>YES</td></tr>
<tr><td>78 ACC6=20.0s [6]
bA.78 [6]</td><td>G2.78 / Acc Ramp 6</td><td>YES</td></tr>
<tr><td>79 DEC6=30.0s [6]
bA.79 [6]</td><td>G2.79 / Decel Ramp 6</td><td>YES</td></tr>
<tr><td>80 ACC7=20.0s [6]
bA.80 [6]</td><td>G2.80 / Acc Ramp 7</td><td>YES</td></tr>
<tr><td>81 DEC7=30.0s [6]
bA.81 [6]</td><td>G2.81 / Decel Ramp 7</td><td>YES</td></tr>
<tr><td>82 ACC8=20.0s [6]
bA.82 [6]</td><td>G2.82 / Acc Ramp 8</td><td>YES</td></tr>
<tr><td>83 DEC8=30.0s [6]
bA.83 [6]</td><td>G2.83 / Decel Ramp 8</td><td>YES</td></tr>
</table>

[5] These parameters will only be displayed if one of 'G5.65'-'G5.71' (In.65-In71 in integrated display) is set to Speed-L/M/H.

[6] These parameters will only be displayed if one of 'G5.65'-'G5.71' (In.65-In71 in integrated display) is set to Xcel-L/M/H.

5.4. Group 3 – G3: Expanded Functions → Ad

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
1 AccPn=Linear / **Ad.1**	**G3.1 /** Acc Pattern	Linear S-curve	Set the type of acceleration and deceleration depending on the application: **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / Linear / The output frequency is constant and increases/ decreases linearly. 1 / S-curve / Used in applications which require a soft acceleration/ deceleration, such as lifting loads. The S curve index can be set from parameters 'G3.3' – 'G3.6'.	NO
2 DecPn=Linear / **Ad.2**	**G3.2 /** Dec Pattern			
3 AccSSrt=40% [7] / **Ad.3** [7]	**G3.3 /** Acc S Start	1 to 100%	Set the curve whenever the acceleration/deceleration pattern is defined as S curve. It is used to set the S curve curvilinear relation when starting the acceleration.	NO
4 AccSEnd=40% [7] / **Ad.4** [7]	**G3.4 /** Acc S End	1 to 100%	Set the curve's ramp once the acceleration/deceleration pattern has been defined as S Curve. It is used to set the S Curve curvilinear relation when ending the acceleration.	NO
5 DecSSrt=40% [8] / **Ad.5** [8]	**G3.5 /** Dec S Start	1 to 100%	Set the curve whenever the acceleration/deceleration pattern is defined as S curve. It is used to set the S curve curvilinear relation when starting the deceleration.	NO
6 DecSEnd=40% [8] / **Ad.6** [8]	**G3.6 /** Dec S End	1 to 100%	Set the curve's ramp once the acceleration/deceleration pattern has been defined as S Curve. It is used to set the S Curve curvilinear relation when ending the deceleration.	NO
7 START=RAMP / **Ad.7**	**G3.7 /** Start Mode	RAMP DCSTART	Define the motor start **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / RAMP / The drive will start applying a frequency ramp to the motor. 1 / DCSTART / Allows accelerating after having stopped the motor by the use of the DC Brake. It can also be used after a normal brake whenever some torque is needed after opening the external brake. To configure this option, see parameters 'G3.12 DCSt T' and 'G3.13 DC Curr'.	NO
8 STOP=RAMP / **Ad.8**	**G3.8 /** Stop Mode	0 to 4	Select the drive main stop mode. This value should be adequate for each application. **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / RAMP / The drive will stop applying a frequency ramp to stop the motor. 1 / DC BRAKE / The drive will apply DC to stop the motor. To configure this option, see parameters from 'G3.14 PreDC T' to 'G3.17 DCBk F'. 2 / SPIN / The drive will cut the motor output supply, stopping due to inertia. 4 / POW BRKE / The drive will stop the motor as soon as possible by controlling the regenerative energy to avoid an overvoltage fault. This option may increase or decrease the deceleration time according to the inertia of the load. **Note:** Do not use this option in applications where decelerations are frequent. It may cause overheating.	NO
9 FWR/RV=None / **Ad.9**	**G3.9 /** Prevention Rotat	None FWDPrev REVPrev	Invert motor speed. This function helps to prevent the motor from rotating in inverse direction. **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / None / The motor can spin in both directions. 1 / FWDPrev / Motor cannot rotate clockwise. 2 / RevPrev / Motor cannot rotate anti clockwise.	NO
10 Run Aft VIF=N / **Ad.10**	**G3.10 /** Power-on Run	NO YES	This parameter allows operating the drive once it is powered up. **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / NO / The drive will NOT operate on power-on even if the start command is given. 1 / YES / The drive starts after powering up.	YES

[7] These parameters will only be displayed if 'G3.1' (Ad.1 in integrated display) is set to1 (S-curve).
[8] These parameters will only be displayed if 'G3.2' (Ad.2) is set to 1 (S-curve).

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
12 DCSt T=0.00s [9] / **Ad.12** [9]	**G3.12 /** Time to DC Start	0.00 to 60.00s	Set the time during which the equipment applies DC voltage before starting to accelerate when the equipment is set in DC start mode. To enable the DC start, parameter 'G3.7' must be set to 'DCSTART'.	NO
13 DC Curr=50% / **Ad.13**	**G3.13 /** Curr Inj DC Strt	0 to 200%	Set the start current level when the equipment is set in DC START mode. To enable DC start option, parameter 'G3.1' must be set to 'DCSTART'.	NO
14 PreDCT=0.10s [10] / **Ad.14** [10]	**G3.14 /** Pre DCBrake Time	0.00 to 60.00s	Set the time before starting the DC Brake. Once the frequency is below the value adjusted in parameter 'G3.17 DCBkF' the drive will wait this time before starting the DC Brake operation.	NO
15 DCBrkT=1.00s [10] / **Ad.15** [10]	**G3.15 /** DC Brake Time	0.00 to 60.00s	Set the DC Brake operation time.	NO
16 DCBkCur=50% [10] / **Ad.16** [10]	**G3.16 /** Levl Cur DCBrake	0 to 200%	Set the current level which will be applied to the motor in percentage of the motor rated current during DC Brake operation.	NO
17 DCBkF=5.00Hz [10] / **Ad.17** [10]	**G3.17 /** Frq Strt DCBrake	[G1.19] to 60.00	Set the frequency value at which the drive will enable the DC brake. The DC Brake operation will start once the frequency is below this value and the time set in parameter 'G3.14 PreDCT' has elapsed.	NO
20 AcDF=5.00Hz [10] / **Ad.20** [10]	**G3.20 /** Acc Dwell Freq	[G1.19] to [G1.20]	During the acceleration process, the drive will pause at this frequency, keeping it constant during the time set in parameter 'G3.21 AccDWT'.	NO
21 AccDWT=0.0s / **Ad.21**	**G3.21 /** Acc Dwell Time	0.0 to 60.0s	During the acceleration process, this parameter allows to define during how long the drive will operate at the constant frequency set in parameter 'G3.20 AccDF'.	NO
22 DeDF=5.00Hz / **Ad.22**	**G3.22 /** Dec Dwell Freq	[G1.19] to [G1.20]	During the deceleration process, the drive will pause at this frequency value, remaining constant during the time period established in parameter 'G3.23 DecDWT'.	NO
23 DecDWT=0.0s / **Ad.23**	**G3.23 /** Dec Dwell Time	0.0 to 60.0s	During the deceleration process, this parameter allows to set how long will the drive be operating at the constant frequency set in parameter 'G3.22 DecDF'.	NO
24 UseFrqLimit=N / **Ad.24**	**G3.24 /** Use Freq Limit	NO YES	Enable or disable the frequency limit. OPT. 0 NO Frequency limit disabled. OPT. 1 YES Frequency limit enabled.	NO
25 FLtLo=0.50Hz [11] / **Ad.25** [11]	**G3.25 /** Freq Limit Lo	0.00 to [G3.26]	Set the lower frequency limit if parameter 'G3.25' is set as YES.	YES
26 FLtHi=[G1.20] Hz [11] / **Ad.26** [11]	**G3.26 /** Freq Limit Hi	[G3.25] to [G1.20]	Set the upper frequency limit whenever parameter 'G3.25' is set as YES.	NO
27 Jump Freq=N / **Ad.27**	**G3.27 /** Jump Frequency	NO YES	The user can enable or disable a band of jump frequencies to avoid resonance frequencies or other frequency types that the motor will avoid as references. The drive will pass these frequencies during the speed changes (acceleration and/or deceleration) but will not operate within these values. OPT. 0 NO Disable the frequency jump function. OPT. 1 YES Enable the frequency jump function.	NO
28 JmpL1=10.00Hz [12] / **Ad.28** [12]	**G3.28 /** Jump Low 1	0.00 to [G3.29]	Set the frequency jump 1 lower limit.	YES
29 JmpH1=15.00Hz [12] / **Ad.29** [12]	**G3.29 /** Jump High 1	[G3.28] to [G1.20]	Set the frequency jump 1 upper limit.	YES
30 JmpL2=20.00Hz [12] / **Ad.30** [12]	**G3.30 /** Jump Low 2	0.00 to [G3.31]	Set the frequency jump 2 lower limit.	YES
31 JmpH2=25.00Hz [12] / **Ad.31** [12]	**G3.31 /** Jump High 2	[G3.30] to [G1.20]	Set the frequency jump 2 upper limit.	YES
32 JmpL3=30.00Hz [12] / **Ad.32** [12]	**G3.32 /** Jump Low 3	0.00 to [G3.33]	Set the frequency jump 3 lower limit.	YES
33 JmpH3=35.00Hz [12] / **Ad.33** [12]	**G3.33 /** Jump High 3	[G3.32] to [G1.20]	Set the frequency jump 3 upper limit.	YES
41 RlsCur=50.0% [13] / **Ad.41** [13]	**G3.41 /** Brake Open Curr	0.0 to 180.0%	Set the brake current opening of the relay configured as 'BRCtrl'. See parameter 'G6.31'.	NO

[9] This parameter will only be displayed if 'G3.7' (Ad.7) is set to 1 (DCSTART).
[10] These parameters will only be displayed if 'G3.8' (Ad.8) is set to 1 (DCBRAKE).
[11] These parameters will only be displayed if 'G3.24' (Ad.24) is set to 1 (YES).
[12] These parameters will only be displayed if 'G3.27' (Ad.27) is set to 1 (YES).
[13] These parameters will only be displayed if either 'G6.31' or 'G6.33' (OU.31, OU.33 for integrated display) is set to BRCtrl.

<table>
<tr><th>Removable display
Integrated display</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>42 RlsDly=1.00s [13]
Ad.42 [13]</td><td>G3.42 / Brake Open Delay</td><td>0.00 to 10.00s</td><td>Once the motor current is greater than the one set in parameter ‘G3.41 RlsCurr’ and the frequency reached in the motor is the same as the one set in parameter ‘G3.44 FwdFrq’, the drive will open the relay configured as ‘BRCtrl’ and will keep this speed during the time established in this parameter.</td><td>NO</td></tr>
<tr><td>44 FwdFq=1.00Hz [13]
Ad.44 [13]</td><td>G3.44 / Brake Open Forward Frequency</td><td>0.00 to [G1.20]</td><td>In order to set the brake opening frequency of the relay configured as ‘BRCtrl’ while the motor is accelerating in positive direction.</td><td>NO</td></tr>
<tr><td>45 RevFq=1.00Hz [13]
Ad.45 [13]</td><td>G3.45 / BrakeOpenRevFrq</td><td>0.00 to [G1.20]</td><td>In order to set the brake opening frequency of the relay configured as ‘BRCtrl’ while the motor is accelerating in negative direction.</td><td>NO</td></tr>
<tr><td>46 BEngDly=1.00s [13]
Ad.46 [13]</td><td>G3.46 / Brake Close Dly</td><td>0.00 to 10.00s</td><td>Once the motor has reached the frequency set in ‘G3.47 BEngFr’, the drive will close the braking relay and will keep this speed during the time established in this parameter.</td><td>NO</td></tr>
<tr><td>47 BEngF=2.00Hz [13]
Ad.47 [13]</td><td>G3.47 / Brake Close Freq</td><td>0.00 to [G1.20]</td><td>Set the frequency value at which the braking relay will stop operating, allowing the closed brake function.</td><td>NO</td></tr>
<tr><td>50 FLX MIN=NONE
Ad.50</td><td>G3.50 / Flux min mode</td><td>0 to 2</td><td>Set the minimum flux that the motor can employ to operate under low load conditions. With this optimized flux system, noises and power losses will be reduced due to the automatic flux level arrangement. The following table shows the different available configurations:
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>NONE</td><td>No action is executed</td></tr>
<tr><td>1</td><td>MANU</td><td>Selects the manual mode. If the output current is lower than the parameter ‘G2.14 NOLODC’ (no load motor current), output voltage will be reduced in the magnitude set in parameter ‘G3.51 FluxLVEL’</td></tr>
<tr><td>2</td><td>AUTO</td><td>Selects the automatic mode. The output voltage is set taking into account the motor rated current set in ‘G2.13 MTRCUR’ and ‘G2.14 NOLODC’.</td></tr>
</table></td><td>NO</td></tr>
<tr><td>51 FluxLVEL=0% [14]
Ad.51 [14]</td><td>G3.51 / Flux min manual</td><td>0 to 30%</td><td>Set the output voltage reducing magnitude if parameter ‘G3.50’ is set to ‘MANU’.</td><td>YES</td></tr>
<tr><td>60 XclCF=0.00Hz
Ad.60</td><td>G3.60 / Acc Dwell Freq</td><td>0.00 to [G1.20]</td><td>Acceleration / deceleration time transition frequency.</td><td>NO</td></tr>
<tr><td>64 FAN=During Run
Ad.64</td><td>G3.64 / FAN Control</td><td>0 to 2</td><td>Choose the fan operating mode.
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>DuringRun</td><td>The drive fans will connect with the start command and disconnect three minutes after the drive stops.</td></tr>
<tr><td>1</td><td>Always ON</td><td>The fans are permanently working whenever the drive is powered.</td></tr>
<tr><td>2</td><td>Temp Ctrl</td><td>The fan will connect when the temperature in the heat sink reaches the control preset temperature.</td></tr>
</table></td><td>YES</td></tr>
<tr><td>65 SaveMot Frq=N
Ad.65</td><td>G3.65 / Save motpot freq</td><td>NO
YES</td><td>Automatically save the speed reference defined by the motorized potentiometer.
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>NO</td><td>Speed reference is not saved.</td></tr>
<tr><td>1</td><td>YES</td><td>Save the speed reference.</td></tr>
</table></td><td>YES</td></tr>
<tr><td>66 SLCOM=None
Ad.66</td><td>G3.66 / Selec sourc comp</td><td>0 to 6</td><td>The comparator source can be set according to the following table:
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>None</td><td>There is no source for the comparator</td></tr>
<tr><td>1</td><td>V1</td><td>Analog input 1 will be used as source by the comparator.</td></tr>
<tr><td>2</td><td>V2</td><td>Analog input 2 will be used as source by the comparator.</td></tr>
<tr><td>3</td><td>V3</td><td>Analog input 3 will be used as source by the comparator.</td></tr>
<tr><td>6</td><td>Pulse</td><td>Pulse input will be used as source by the comparator.</td></tr>
</table>
Note: Option V3 will only be available whenever the I/O expansion board is installed.</td><td>NO</td></tr>
</table>

[14] These parameters will only be displayed if ‘G3.50’ (Ad.50 in integrated display) is different than ‘NONE’.

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
67 ScON=90.00% / **Ad.67**	**G3.67 /** Setpoint On comp	[G3.68] to 100.00	Define the level to compare with the source selected in parameter 'G3.66 SLCOM'. In case this level is over passed, one of the digital outputs adjusted as 'COMPARAT' in [G6 Outputs] will enable. See parameters 'G6.31' and 'G6.32'.	NO
68 SC OF=10.00% / **Ad.68**	**G3.68 /** Stpoint Off comp	-100.00 to [G3.67]	Define the level to compare with the source selected in parameter 'G3.66 SLCOM'. In case this level is over passed, one of the digital outputs adjusted as 'COMPARAT' in [G6 Outputs] will enable. See parameters 'G6.31' and 'G6.32'.	NO
70 RunEMod=Always Enable / **Ad.70**	**G3.70 /** Safe Oper. Sel.	Always Enable DI Dependent	OPT. 0 – FUNCTION: Always Enable – DESCRIPTION: Enables safe operation mode. OPT. 1 – FUNCTION: DI Dependent – DESCRIPTION: Recognizes the operation command from a multifunction input terminal.	NO
71 RunDStp=Free Run [15] / **Ad.71** [15]	**G3.71 /** Safe Oper. Stop	Free-Run Q-Stop Q-Stop Res	Set the operation of the inverter when the multi-function input terminal in safe operation mode is off. OPT. 0 – FUNCTION: Free-Run – DESCRIPTION: Blocks the inverter output when the multifunction terminal is off. OPT. 1 – FUNCTION: Q-Stop – DESCRIPTION: Deceleration time (Q-Stop Time) used in safe operation mode. It stops after deceleration and then the operation can only resume when the operation command is entered again. The operation will not begin if only the multi-function terminal is on. OPT. 2 – FUNCTION: Q-Stop Res – DESCRIPTION: The inverter decelerates to the deceleration time (Q-Stop Time) in safe operation mode. It stops after deceleration. Then if the multi-function terminal is on, the operation resumes as soon as the operation command is entered again.	NO
72 QStpT=5.0s [15] / **Ad.72** [15]	**G3.72 /** Q-Stop Time	0.0 to 600.0s	Set the deceleration time when 'G3.71' (Ad.71 in the integrated display) is set to 1 (Q-Stop) or 2 (Q-Stop Resume).	YES
74 RegAvdSel=N / **Ad.74**	**G3.74 /** Regen. Avd. Sel.	N Y	Frequent regeneration voltage from a press load during constant speed motor operation may force excessive work on the brake unit which may damage or shorten the brake life. To prevent this situation, select this parameter to control DC link voltage and disable the brake unit operation.	NO
75 VlRegL=350V / 700V / **Ad.75**	**G3.75 /** Regen. Avd Level	300 to 800V	Set brake operation prevention level voltage when the DC link voltage goes up due to regeneration. **Note:** The default value and parameter range will vary depending on the drive supply voltage: 220V➔300 to 400V 380V➔600 to 800V	NO / NO
76 CpFrL=1.00Hz [16] / **Ad.76** [16]	**G3.76 /** Comp. Frq. Lim.	0.00 to 10.00Hz	Set alternative frequency width that can replace actual operation frequency during regeneration prevention.	NO
77 RegAvP=50.0% [16] / **Ad.77** [16]	**G3.77 /** Regen. Avd Pgain	0.0 to 100.0%	To prevent regeneration zone, set P gain/I gain in the DC link voltage suppress PI controller. **Note:** Press regeneration prevention does not operate during accelerations or decelerations; it only operates during constant speed motor operation. When regeneration prevention is activated, output frequency may change within the range set at 'G3.76'(Ad.76).	YES
78 RgAvI=50.0ms [16] / **Ad.78** [16]	**G3.78 /** Regen. Avd Igain	0.0 to 3000.0ms		YES

[15] These parameters will only be displayed if 'G3.70' (Ad.70) is set to 1(DI DEPENDENT).
[16] Displayed when 'G3.74' (Ad.74) is set to YES.

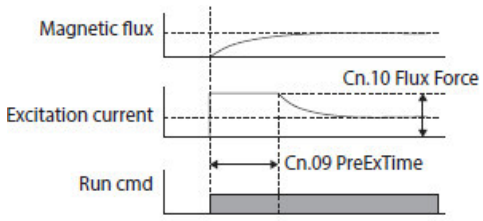
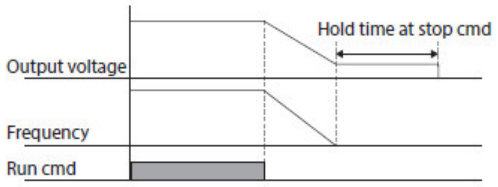
ENGLISH

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
80 FireModSel=None [17] / **Ad.80** [17]	**G3.80 /** Fire Mode Sel.	0 to 2	The inverter runs in Fire mode when this parameter is set to '1 (Fire Mode)', and the multifunction terminal 'G5.65-71' (In. 65-71) configured for Fire mode is turned on. **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / None / Blocks the inverter output when the multifunction terminal is off. 1 / Fire Mode / The inverter decelerates to the deceleration time (Q-Stop Time) used in safe operation mode. It stops after deceleration and then the operation can only resume when the operation command is entered again. Operation will not begin if only the multi-function terminal is on. 2 / Fire Mode Test / The inverter decelerates to the deceleration time (Q-Stop Time) in safe operation mode. It stops after deceleration. Then if the multi-function terminal is on, the operation resumes as soon as the operation command is entered again.	NO
81 FMdFr=60.00Hz [17] / **Ad.81** [17]	**G3.81 /** Fire Mode Freq.	0.00 to 60.00Hz	Set the frequency for the inverter operation in Fire mode. The Fire mode frequency takes priority over the Jog frequency, Multi-step frequencies, and the keypad input frequency.	NO
82 FModD=Forward [17] / **Ad.82** [17]	**G3.82 /** Fire Mode Direc.	Forward Reverse	Set Fire mode direction according to the following table: **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / Forward / Forward direction. 1 / Reverse / Reverse direction.	NO

5.5. Group 4 – G4: Control Functions → Cn

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
4 FREQ=2.0 / 3.0kHz / **Cn.4**	**G4.4 /** Modulat Frecuenc	-	Adjust motor operational noise by varying the commutation frequency in the motor output stage If the frequency is set high, it reduces operational noise from the motor, and if it is set low, the operational noise from the motor increases. Default value and range for this parameter depend on the load rate: **Normal load**: 2kHz (Max 5kHz). **Heavy load**: 3kHz (Max 15kHz).	YES
5 PWM=Normal PWM / **Cn.5**	**G4.5 /** PWM Mode	0 to 1	Change the load rate to reduce the heat loss and leakage current from the inverter. **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / Normal PWM / No changes to load rate. 1 / LowLeakage PWM / Reduces heat loss and leakage current compared to Normal PWM, but the motor noise increases.	NO
9 PreExT=1.00s / **Cn.9**	**G4.9 /** Pre-excit Time	0.00 to 60.00s	Set the initial excitation time. Pre-excitation is used to start the operation after performing excitation up to the motor's rated flux.	NO

[17] Displayed when 'G3.80'(Ad.80) is set to YES.

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
10 PreExF=100.0% / **Cn.10**	**G4.10 /** Pre-excit Flux	100.0 to 500.0%	Set the flux supplied during the pre-excit time configured in 'G4.9'. The motor flux increases up to the rated flux with the time constant as shown in the following figure. To reduce the time taken to reach the rated flux, a higher motor flux base value than the rated flux must be provided. When the magnetic flux reaches the rated flux, the provided motor flux base value is reduced. 	NO
11 PwofDl=0.00s / **Cn.11**	**G4.11 /** Power off Delay	0.00 to 60.00s	After the motor stops, this parameter sets the time during which direct current from the drive is fed into the motor. 	NO
20 SL2GaViSel=N / **Cn.20**	**G4.20 /** Sensorless control gain	YES NO	Allows configuring the sensorless control gain. OPT. 0 – FUNCTION: YES – DESCRIPTION: Sensorless control gain configuration parameters will not be shown. OPT. 1 – FUNCTION: NO – DESCRIPTION: Enables sensorless control gain configuration. Parameters 'G4.21-32' will be displayed.	YES
21 ASR P1=500% (*) / **Cn.21**	**G4.21 /** Vec. Gain Prop.1	0 to 5000%	Set the proportional gain 1 of the speed controller (ASR). The higher the proportional gain, the faster the response will be. But if the gain is too high, the speed of the motor might oscillate.	YES
22 ASR I1=300ms (*) / **Cn.22**	**G4.22 /** Vec. Intg time 1	10 to 9999ms	Set the integral gain 1 of the speed controller (ASR).	YES
23 ASR P2=120.0% [18] (*) / **Cn.23 [18]**	**G4.23 /** Vec. Gain Prop.2	1.0 to 1000.0%	Set the proportional gain 2 of a separate controller. The higher the proportional gain, the faster the response will be. But if the gain is too high, the speed of the motor might oscillate.	YES
24 ASR I2=30.0% [18] (*) / **Cn.24 [18]**	**G4.24 /** Vec. Intg time 2	1.0 to 1000.0%	Set the integral gain 2 of a separate controller.	YES
25 ASR I1=300ms [18] (*) / **Cn.25 [18]**	**G4.25 /** Vec. Intg time 1	10 to 999ms	Sensorless speed controller integral gain 0.	YES
26 P Flux=50% [18] (*) / **Cn.26 [18]**	**G4.26 /** Flux Prop. Gain	1 to 200%	Sensorless vector control requires the rotor flux estimator. Use these parameters to adjust flux estimator gain.	YES
27 I Flux=50% [18] (*) / **Cn.27 [18]**	**G4.27 /** Flux Integ. Gain	1 to 200%		YES

* These values depend on the motor setting.
[18] Displayed when 'G1.9' (dr.9 in integrated display) is set to 4 (IM Sensorless) and 'G4.20' (Cn.20) is set to 1 (YES)

Removable display / Integrated display	Name / Description	Range	Function	Set on RUN
28 SpEsP1=100 [18] (*) / **Cn.28** [18]	**G4.28 /** Spd Est Gain P1	0 to 32767	Adjusts speed estimator gain for sensorless vector control: • At low speed (10Hz or lower), increase the value of 'G4.29' by increments of 5. • At mid speed (30 Hz or higher), increase the value of 'G4.28' by increments of 500. If the parameter setting is too extreme, over current trip may occur at low speed.	YES
29 SpEsI1=500 [18] (*) / **Cn.29** [18]	**G4.29 /** Spd Est Gain I1	100 to 1000		YES
30 SpEsI2=2000 [18] (*) / **Cn.30** [18]	**G4.30 /** Spd Est Gain I2	100 to 10000		YES
31 ACR P2=500 [18] (*) / **Cn.31** [18]	**G4.31 /** Vec. Gain Prop.1	10 to 1000	Adjusts the P and I gains of the sensorless current controller. If the value of G4.10 is high, an overcurrent trip at start can occur. In this case, reduce the value of G4.31 by decrements of 10.	YES
32 ACR I2=500 [18] (*) / **Cn.32** [18]	**G4.32 /** Vec. Gain Integ.	10 to 1000		YES
48 ACR P1=1200 / **Cn.48**	**G4.48 /** Vec. Gain Prop.1	10 to 10000	Adjust current controller P gain.	YES
49 ACR I1=120 / **Cn.49**	**G4.49 /** Vec. Gain Prop.1	10 to 10000	Adjust current controller I gain	YES
52 OuFVec=0ms / **Cn.52**	**G4.52 /** Out Filt Vector	0 to 2000ms	Set the torque controller output filter	NO
53 TqLimRef=LOCAL / **Cn.53**	**G4.53 /** Torque lim Ref	0 to 12	Select the source to introduce the torque limit reference.	NO
54 TLpsFW=180.0% [19] / **Cn.54** [19]	**G4.54 /** Tq lim positv FW	0.0 to 200.0%	The user can set the forward motoring operation torque limit whenever the torque limit reference has been set as LOCAL	YES
55 TLngFW=180.0% [19] / **Cn.55** [19]	**G4.55 /** Tq lim negatv FW	0.0 to 200.0%	The user can set the forward regeneration operation torque limit whenever the torque limit reference has been set as LOCAL	YES
56 TLpsRV=180.0% [19] / **Cn.56** [19]	**G4.56 /** Tq lim positv RV	0.0 to 200.0%	The user can set the reverse motoring operation torque limit whenever the torque limit reference has been set as LOCAL	YES

OPT.	FUNCTION	DESCRIPTION
0	LOCAL	Reference will be given by keypad and will be set in 'G1.1' Local Speed.
2	V1	Reference will be introduced through the Analog Input 1.
4	V2	Reference will be introduced through the Analog Input 2.
5	V3	Reference will be introduced through the Analog Input 3.
6	MODBUS	The reference will be introduced through Modbus.
8	COMMS	The reference will be introduced through the communications.
9	PLC	The common area can be linked with user sequence output and can be used as command.
12	PULSE	Reference will be introduced through the Pulse input.

[19] Displayed when 'G1.9' is set to 4 (IM Sensorless). This will change the initial value of 'G3.74', Torque limit, to 150%.

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>57 TLngRV=180.0% [19]
Cn.57 [19]</td><td>G4.57 / Tq lim negatv RV</td><td>0.0 to 200.0%</td><td>The user can set the reverse regeneration operation torque limit whenever the torque limit reference has been set as LOCAL</td><td>YES</td></tr>
<tr><td>62 SpLiRf=LOCAL [19]
Cn.62 [19]</td><td>G4.62 / Speed Lim Ref</td><td>0 to 8</td><td>Select the source to introduce the speed limit reference.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>LOCAL</td><td>Reference will be given by keypad and will be set in ‘G1.1’ Local Speed.</td></tr><tr><td>2</td><td>V1</td><td>Reference will be introduced through the Analog Input 1.</td></tr><tr><td>4</td><td>V2</td><td>Reference will be introduced through the Analog Input 2.</td></tr><tr><td>5</td><td>V3</td><td>Reference will be introduced through the Analog Input 3.</td></tr><tr><td>6</td><td>MODBUS</td><td>The reference will be introduced through Modbus.</td></tr><tr><td>7</td><td>COMMS</td><td>The reference will be introduced through the communications.</td></tr><tr><td>8</td><td>PLC</td><td>The common area can be linked with user sequence output and can be used as command.</td></tr></table></td><td>NO</td></tr>
<tr><td>63 SpL(+)=60.00Hz [19]
Cn.63 [19]</td><td>G4.63 / Speed lim FW</td><td>0.00 to 400.00Hz</td><td>The user can set the forward speed limit whenever the speed limit reference has been set as LOCAL.</td><td>YES</td></tr>
<tr><td>64 SpL(-)=60.00Hz [19]
Cn.64 [19]</td><td>G4.64 / Speed lim REV</td><td>0.00 to 400.00Hz</td><td>The user can set the reverse speed limit whenever the speed limit reference has been set as LOCAL.</td><td>YES</td></tr>
<tr><td>65 SpLGa=500% [19]
Cn.65 [19]</td><td>G4.65 / Speed lim Gain</td><td>100 to 5000%</td><td>Set how much the speed reference has to decrease when motor speed exceeds the speed limit.</td><td>YES</td></tr>
<tr><td>70 SSMode=Flying Start1
Cn.70</td><td>G4.70 / Speed Search Mod</td><td>Flying Start1
Flying Start2</td><td>Select a speed search type.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>Flying Start1</td><td>Speed search is carried out as it controls the inverter output current during idling below the G4.72 parameter setting. If the direction of the idling motor and the direction of operation command at restart are the same, a stable speed search function can be performed at about 10 Hz or lower. However, if the direction of the idling motor and of operation command at restart are different, the speed search does not produce a satisfactory result because the direction of idling cannot be established.</td></tr><tr><td>1</td><td>Flying Start2</td><td>The speed search is carried out as it controls the ripple current which is generated by the counter electromotive force during no-load rotation. This mode establishes the direction of the idling motor (forward/reverse), thus the speed search function is stable regardless the direction of the idling motor and of operation command. However, since ripple current is used, the idle frequency is not accurately determined and re-acceleration may start from zero speed when the speed search is performed for the idling motor at low speed (about 10 - 15 Hz, though it depends on motor characteristics).</td></tr></table></td><td>NO</td></tr>
<tr><td>71 Srch Mod=0000
Cn.71</td><td>G4.71 / Search Mode</td><td>00 to 15</td><td>Set the search mode. Adjust each bit to 0 or 1 according to the table below:
<table><tr><th>OPT</th><th>DESCRIPTION</th></tr><tr><td>0001</td><td>Selection of speed search on acceleration.</td></tr><tr><td>0010</td><td>When starting on initialization after fault trip.</td></tr><tr><td>0100</td><td>When restarting after instantaneous power interruption.</td></tr><tr><td>1000</td><td>When starting with power on.</td></tr></table></td><td>NO</td></tr>
</table>

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Screen / Default value	Name / Description	Range	Function	Set on RUN
72 Srch I=150% [20] **Cn.72** [20]	**G4.72 /** Search Current	80 to 200%	Allows controlling the current during the speed search in percentage in relation with the motor rated current.	YES
73 Kp Srch [21] **Cn.73** [21]	**G4.73 /** Search Proporc.	0 to 9999	'G4.73 Search Proporc' allows setting the proportional gain for the speed search. 'G4.74 Search integral' sets the integral gain for the speed search. **Note:** Default value of these parameters depends on [G4.70]: Flying Start1➔100 Flying Start2➔600	YES
74 Ki Srch [21] **Cn.74** [21]	**G4.74 /** Search Integral	0 to 9999		YES
75 SrchDly=1.0s [21] **Cn.75** [21]	**G4.75 /** Search Sp Delay	0.0 to 60.0s	Allows locking the output during an established time before proceeding with the speed search.	NO
76 SpEsGa=100% [21] **Cn.76** [21]	**G4.76 /** Speed Est. Gain	50 to 150%	Speed search estimator gain.	YES
77 KEB Sel=No **Cn.77**	**G4.77 /** KEB Select	0 to 2	When the input power supply is disconnected, the inverter's DC link voltage decreases and a low voltage trip occurs blocking the output. A kinetic energy buffering operation uses regenerative energy generated by the motor during the blackout to maintain the DC link voltage. This extends the time for a low voltage trip to occur after a sudden power interruption. This parameter allows selecting the kinetic energy buffering operation. If 1 or 2 is selected, it controls the inverter's output frequency and charges the DC link (inverter's DC part) with energy generated from the motor. **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / No / General deceleration is carried out until a low voltage trip occurs. 1 / KEB1 / When the input power is blocked, it charges the DC link with regenerated energy. When the input power is restored, so does normal operation from energy buffering operation to the frequency reference operation. Operation frequency acceleration is set in G4.89. 2 / KEB2 / When the input power is blocked, it charges the DC link with regenerated energy. When the input power is restored, it changes from the energy buffering operation to the deceleration stop operation. The operation frequency deceleration time is set in G1.4.	NO
78 KEBStr=125.0% [22] **Cn.78** [22]	**G4.78 /** KEB Start	110.0 to 140.0%	Sets the start and stop points of the kinetic energy buffering operation. The set values must be based on the low voltage trip level as 100% and the stop level (G4.79) must be higher than the start level (G4.78)	NO
79 KEBStp=130.0% [22] **Cn.79** [22]	**G4.79 /** KEB Stop	[G4.78] to 140.0		NO
80 KEBPGn=10000 [22] **Cn.80** [22]	**G4.80 /** KEB Prop. Gain	1 to 20000	Maintain the voltage of the DC power section during the kinetic energy buffering operation. Change the setting value when a low voltage trip occurs right after a power failure.	YES
81 KEBIGn=500 [22] **Cn.81** [22]	**G4.81 /** KEB Integ. Gain	1 to 20000	Maintain the voltage of the DC power section during the kinetic energy buffering operation. Sets the gain value to maintain the frequency during the kinetic energy buffering operation until the inverter stops.	YES
85 FlxPrGa1=370 [23] **Cn.85** [23]	**G4.85 /** Flux Prop. Gain	100 to 700	Flux estimator proportional gain 1.	YES
86 FlxPrGa2=0 [23] **Cn.86** [23]	**G4.86 /** Flux Prop. Gain	0 to 100	Flux estimator proportional gain 2.	YES
87 FlxPrGa3=100 [23] **Cn.87** [23]	**G4.87 /** Flux Prop. Gain	0 to 500	Flux estimator proportional gain 3.	YES

* These values depend on the motor setting.
[20] Displayed when 'G4.70' (Cn.70) is set to 0 (YES).
[21] Displayed when any of the 'G4.71' (Cn.71) bits are set to 1.
[22] Displayed when 'G4.77' is not set to 0 (NO).
[23] Displayed when 'G4.20' is set to 1 (YES).

Screen / Default value	Name / Description	Range	Function	Set on RUN
88 FlxInGa1=50 [23] **Cn.88** [23]	**G4.88 /** Flux Integ. Gain	0 to 200	Flux estimator integral gain 1.	YES
89 FlxInGa2=50 [23] **Cn.89** [23]	**G4.89 /** Flux Integ. Gain	0 to 200	Flux estimator integral gain 2.	YES
90 FlxInGa3=50 [23] **Cn.90** [23]	**G4.90 /** Flux Integ. Gain	0 to 200	Flux estimator integral gain 3.	YES
91 SLVoCmp1=20 (*) [23] **Cn.91** [23]	**G4.91 /** SL Volt. Comp.	0 to 60	Adjust output voltage compensation values for sensorless vector control. • If the output frequency is higher than the base frequency during no-load operation at low speed, decrease the value of G4.91 by decrements of 5 (10Hz or lower). • If the torque is insufficient, increase G4.93 by increments of 5. • If the motor hunts or overcurrent trip occurs in regenerative load at low speed (10 Hz or lower), increase the value of G4.92-93 by increments of 5 at the same time.	YES
92 SLVoCmp2=20 (*) [23] **Cn.92** [23]	**G4.92 /** SL Volt. Comp.	0 to 60		YES
93 SLVoCmp3=20 (*) [23] **Cn.93** [23]	**G4.93 /** SL Volt. Comp.	0 to 60		YES
94 FWFrS=100.0% [23] **Cn.94** [23]	**G4.94 /** SL FW Freq.	80.0 to 110.0%	If an over current trip occurs due to sudden load fluctuation at high speed (50 Hz or higher), increase/decrease the value of Cn.94 by increments/decrements of 5% (set below 100%).	YES
95 FcFrS=2.00Hz [23] **Cn.95** [23]	**G4.95 /** SL Fc Freq.	0.00 to 8.00Hz	Set sensorless gain switching frequency.	YES

5.6. Group 5 – G5: Inputs → In

Screen / Default value	Name / Description	Range	Function	Set on RUN
1 MxFA=[G1.20] **In.1**	**G5.1 /** Max Freq Ang Inp	[G1.19] to [G1.20]	Set drive operating frequency at the maximum voltage input of the analog input.	YES
2 MaxTrq=100.0% **In.2**	**G5.2 /** Max. Torque EA	0.0 to 200.0%	Configures the frequency reference at the maximum input voltage when a potentiometer is connected to the control terminal block. A frequency set with this parameter becomes the maximum frequency only if the value set in G5.11 (or G5.15) is 100.00%. • Set G5.2 to 40.0% and use default values for parameters G5.2–16. Motor will run at 40.00Hz when a 10V input is provided at V1. • Set G5.2 to 50.0% and use default values for codes G5.1–16. Motor will run at 30.00Hz (50% of the default maximum frequency–60Hz) when a 10V input is provided at V1.	YES
5 AnIgIN1=0.00V **In.5**	**G5.5 /** V1 Monitor	0.00 to 12.00	Configures the inverter to monitor the input voltage at V1.	
6 An1PT=0-10V **In.6**	**G5.6 /** Ain1 PolarityType	0-10V -/+10V	This parameter allows setting the operation directions of the drive. **OPTION** / **FUNCTION** 0-10V / Unipolar (forward operation) ±10V / Bipolar (forward and reverse operation directions)	NO
7 Ain1LP=10ms **In.7**	**G5.7 /** Ain1 LPF	0 to 10000ms	Low Pass Filter for V1. Allows setting the time response to a change produced in the speed reference, to reduce the speed fluctuation due to unstable signs or noise. Thus, the response becomes slower.	YES
8 A1MnV=0.00V **In.8**	**G5.8 /** Ain1 Min V	0.00 to 10.00V	Define the minimum voltage for the analog input 1 according to the connected sensor characteristics	YES
9 A1MnR=0.00% **In.9**	**G5.9 /** Ain1 Min. Ref	0.00 to 100.00%	Set the speed reference corresponding to the analog input 1 minimum negative range. Is corresponds to the minimum voltage level set in 'G5.12 A1NMn'. It is configured to introduce the speed reference through the AI. The value is a percentage of the frequency set in 'G5.1 MxFA'.	YES
10 An1MxV=10.00V **In.10**	**G5.10 /** Ain1 Max V.	0.00 to 10.00V	Define the maximum voltage for the analog input 1, according to the connected sensor characteristics.	YES
11 A1MxR=100.00% **In.11**	**G5.11 /** Ain1 Max Ref.	0.00 to 100.00%	Set the speed reference corresponding to the analog input 1 minimum range. It corresponds to the minimum voltage level set in 'G5.10 An1MxV'. It is configured to introduce the speed reference through the analog input. The value is a percentage of 'G5.1 MxFA'.	YES

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Screen / Default value	Name / Description	Range	Function	Set on RUN
12 A1NMn=0.00V [24] **In.12** [24]	**G5.12 /** Ain1 neg min V	-10.00 to 0.00V	Define the negative minimum voltage for the analog input 1, according to the connected sensor characteristics.	YES
13 A1MnR=0.00% [24] **In.13** [24]	**G5.13 /** Ain1 Neg Min Ref	-100.00 to 0.00%	Set the speed reference corresponding to the analog input 1 minimum negative range. Is corresponds to the minimum voltage level set in 'G5.12 A1NMn'. It is configured to introduce the speed reference through the analog input. The value is a percentage of the frequency adjusted in parameter 'G5.1 MxFA'.	YES
14 A1MxV=-10.00V [24] **In.14** [24]	**G5.14 /** Ain1 Neg Max V	-10.00 to 0.00V	Define the maximum negative voltage for the analog input 1 according to the connected sensor characteristics.	YES
15 A1Mx=-100.00% [24] **In.15** [24]	**G5.15 /** Ain1 Neg Max Ref	-100.00 to 0.00%	Set the speed reference corresponding to the analog input 1 maximum negative range. It corresponds to the maximum voltage level set in 'G5.13 A1MnR'. It is configured to introduce the speed reference through an analog input. The value is a percentage of 'G5.1 MxFA'.	YES
16 V1 Invert=N **In.16**	**G5.16 /** V1 Inverting	N Y	Inverts the direction of rotation. Set this parameter to 1 (NO) if you need the motor to run in the opposite direction from the current rotation.	YES
17 A1DeLI=0.04% **In.17**	**G5.17 /** Ain1 Discre. Lvl	0.04 to 10.00%	Set the analog input 1 quantification level. It is used when too much noise is present within the analog input signals. The quantification value is defined as the analog input 1 maximum percentage value. For example, if the input maximum value is 10V and the quantification level is 1%, the frequency will change in 0.05Hz (when the maximum frequency is 50Hz), in 0.1V intervals. As the input voltage increases or decreases, the output frequency will differ, removing the fluctuation effect within the analog input value.	YES
35 AngIN2=0.00V [25] **In.35** [25]	**G5.35 /** V2 Monitor	0.00 to 12.00V	Configures the inverter to monitor the input voltage at V2.	YES
37 A2LPF=10ms [25] **In.37** [25]	**G5.37 /** Ain2 LPF	0 to 10000ms	Set the time response against a change produced in the speed reference, so that it can reduce the speed fluctuation due to unstable signs or noise. Thus, the response becomes slower.	NO
38 A2MnC=0.00V [25] **In.38** [25]	**G5.38 /** Ain2 Min V	0.00 to 10.00V	Define the minimum current for the analog input 2 according to the connected sensor characteristics.	
39 A2MnR=0.00% [25] **In.39** [25]	**G5.39 /** Ain2 Min Ref	0.00 to 100.00%	Set the speed reference corresponding to the analog input 2 minimum range. It corresponds to the minimum voltage level set in 'G5.38 A2MnC'. It is configured to introduce the speed reference through the analog input. The value is a percentage of the frequency adjusted in parameter 'G5.1 MxFA'.	YES
40 A2MxC=10.00V [25] **In.40** [25]	**G5.40 /** Ain2 Max Curr.	0.00 to 10.00V	Define the maximum current for the analog input 2, according to the connected sensor characteristics.	YES
41 A2MxR=100.00% [25] **In.41** [25]	**G5.41 /** Ain2 Max Ref.	0.00 to 100.00%	Set the speed reference corresponding to the analog input 2 maximum range. It corresponds to the maximum current level set in 'G5.40 A2MxC'. It is configured to introduce the speed reference through the analog input. The value is a percentage of the frequency adjusted in parameter 'G5.1 MxFA'.	YES
46 V2 Invert=N [25] **In.46** [25]	**G5.46 /** V2 Inverting	YES NO	Same as 'G5.16 V1 Invert', but for the analog input 2.	YES
47 A2DeLI=0.04% [25] **In.47** [25]	**G5.47 /** Ain2 Dze Level	0.04 to 10.00%	Same as 'G5.17 A1DeLI', but for the analog input 2.	YES
50 AnI2=0.00mA [26] **In.50** [26]	**G5.50 /** V2 Monitor	0.00 to 24.00mA	Used to monitor input current at analog input 2.	
52 AI2LF=10ms [26] **In.52** [26]	**G5.52 /** Ain2LPF	0 to 10000ms	Configures the time for the operation frequency to reach 63% of target frequency based on the input current at the analog input 2.	YES
53 A3MnC=4.00mA [26] **In.53** [26]	**G5.53 /** Ain3 Min V	0.00 to 20.00mA	Same as 'G5.38 A2MnC', but for the analog input 3.	YES
54 A3MnR=0.00% [26] **In.54** [26]	**G5.54 /** Ain3 Min. Ref	0.00 to 100.00%	Same as 'G5.13 A1MnR', but for the analog input 3.	YES
55 A2MxC=20.00mA [26] **In.55** [26]	**G5.55 /** Ain3 Max V.	0.00 to 24.00mA	Same as 'G5.40 A2MxC', but for the analog input 3.	YES

[24] Displayed if 'G5.6' (In.6 in integrated display) is configured as bipolar (±10V).
[25] Displayed when V is selected on the analog current/voltage input circuit selection switch (SW2).
[26] Displayed when I is selected on the analog current/voltage input circuit selection switch (SW2).

Screen / Default value	Name / Description	Range	Function	Set on RUN
56 A2MxR=100.00% [26] **In.56** [26]	**G5.56 /** Ain3 Max Ref	0.00 to 100.00	Same as 'G5.11 A1MxR', but for the analog input 3.	YES
61 I2 Invert=N [26] **In.61** [26]	**G5.61 /** V2 Inverting	N Y	Same as 'G5.16 V1 Invert', but for the analog input 3.	YES
62 A2DeLI=0.04% [26] **In.62** [26]	**G5.62 /** Ain2 Discre. Lvl	0.04 to 10.00%	Same as 'G5.17 A1DeLI', but for the analog input 3.	YES
65 DI1=START(+) **In.65**	**G5.65 /** Digital I/P1	0 to 54	Digital Inputs configuration for individual use.	NO
66 DI2=START(-) **In.66**	**G5.66 /** Digital I/P2			NO
67 DI3=RESET **In.67**	**G5.67 /** Digital I/p3			NO
68 DI4=RESET	**G5.68 /** Digital I/p4			NO

OPT.	FUNCTION	DESCRIPTION
0	None	Not programmed entry.
1	START(+)	Send the 'Direct Start' command through the selector (YES). This option will not work if there is any digital input programmed as '3 WIRE', 'UP', or 'DOWN'.
2	START(-)	Send the 'Inverse Start' command through the selector (YES). This option will not work if there is any digital input programmed as '3 WIRE', 'UP', or 'DOWN'.
3	RESET	Send a 'Reset' command through digital inputs. (YES)
4	EXTTRIP	Allow an extreme fault generation in order to stop the drive through digital inputs (YES). Is advisable to invert the digital input logic configured as Extreme Fault and set it as contact (NC). See parameter 'G5.87'.
5	DISSTART	Stop the drive by removing the motor output power supply, forcing a stop by inertia. (YES)
6	INCH1	Enable the speed reference programmed in 'G1.11 InchFq'. (YES)
7	SPEED-L	Bit 0 speed reference. Allows selecting the multiple preconfigured speed references. See multi-references in 'G2.50' to 'G2.57' (YES).
8	SPEED-M	Bit 1 speed reference. Allows selecting the multiple preconfigured speed references. See multi-references in 'G2.50' to 'G2.57' (YES).
9	SPEED-H	Bit 2 speed reference. Allows selecting the multiple preconfigured speed references. See multi-references in 'G2.50' to 'G2.57' (YES).
11	XCEL-L	Bit 0 for alternative acceleration ramps. Allows the selection of the multiple preconfigured acceleration/deceleration ramps. See 'G2.70' to 'G2.83'.
12	XCEL-M	Bit 1 for alternative acceleration ramps. Allows the selection of the multiple preconfigured acceleration/deceleration ramps. See 'G2.70' to 'G2.83'.
13	RUNEnable	Sets the digital input to safe operation mode.
14	3-WIRE	'Speed through Buttons' function. **Example:** DI1 = 1➔ START(+) (YES) DI2 = 14➔ 3 WIRE (NC) DI3 = 18➔ DOWN (YES) This way, the DI1 button orders to start and the DI2 orders to stop. The DI3 button decreases the speed.
15	CTR/REF2	Enable the alternative control mode programmed in 'G2.4 Alt Ctrl Mode' (YES).
16	Exchange	When the motor power source changes from inverter output to main supply power, select a digital input and set its value to 16 (Exchange). Power will be switched when the selected terminal is on. To reverse the transition, switch off the terminal.

Note: Continues on the next page.

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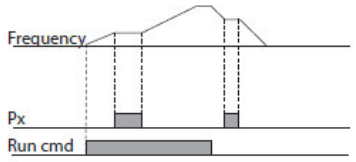
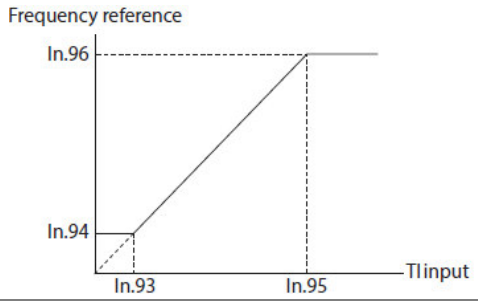
<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th colspan="3">Function</th><th>Set on RUN</th></tr>
<tr><td>In.68</td><td></td><td rowspan="5"></td><td colspan="3">Note: Comes from the previous page.</td><td></td></tr>
<tr><td rowspan="2">69 DI5= SPEED-L

In.69</td><td rowspan="2">G5.69 / Digital I/p5</td><td>17</td><td>UP</td><td>Set digital input to increase the speed reference.</td><td rowspan="2">NO</td></tr>
<tr><td>18</td><td>DOWN</td><td>Set digital input to decrease the speed reference by the use of a button (YES). The reference limits will be those set on ‘G.1 Drive’.</td></tr>
<tr><td rowspan="3">70 DI6= SPEED-M

In.70</td><td rowspan="3">G5.70 / Digital I/p 6</td><td>19</td><td>RESERVED</td><td>-</td><td rowspan="5">NO</td></tr>
<tr><td>20</td><td>POTCLEAR</td><td>Delete the speed reference memory set with motorized potentiometer. This way, even if parameter ‘G3.65’ is set to NO, when restarting the drive, the drive will operate at the reference set in ‘G1.1 Local Speed’.</td></tr>
<tr><td>22</td><td>PIDOPLoop</td><td>Allows disabling the PID function. When it is disabled, the control PID will be resumed. Note: This option must be used when the PID reference is set by analogue input. If PID reference is set by display, use option ‘INCH1’.</td></tr>
<tr><td rowspan="4">71 DI7= SPEED-H

In.71</td><td rowspan="4">G5.71 / Digital I/p7</td><td>24</td><td>PGain2</td><td>Sets the output volume for the rate of change in errors. If the differential time is set to 1ms and the rate of change in errors per sec is 100%, output occurs at 1% per 10ms.</td></tr>
<tr><td>25</td><td>XCELStop</td><td>Sets the digital input to stop acceleration or deceleration.
 
</td></tr>
<tr><td>26</td><td>2ndMotor</td><td>Sets the digital input as 2nd motor operation, which is used when a single drive switch operates two motors.</td></tr>
<tr><td>34</td><td>Pre-Excit</td><td>Enable the motor pre-excitation activation, before start. The user can adjust this functionality in parameters ‘G3.7 START’, ‘G3.12 DCSt T’ and ‘G3.13 DC Curr’.</td></tr>
<tr><td></td><td></td><td>38</td><td>TimerIN</td><td>Change a multi-function input terminal to a timer terminal.</td><td></td></tr>
<tr><td></td><td></td><td>40</td><td>disAuxRef.</td><td>Set one of the multi-function input terminals to this value and turn it on to disable the auxiliary frequency reference. The inverter will operate using the main frequency reference only.</td><td rowspan="9">NO</td></tr>
<tr><td></td><td></td><td>46</td><td>INCH(+)</td><td>Define the direct starting fix speed reference to the one set in parameter ‘G1.11 InchFq’.</td></tr>
<tr><td></td><td></td><td>47</td><td>INCH(-)</td><td>Define the direct starting fix speed reference to the one set in parameter ‘G1.11 InchFq’.</td></tr>
<tr><td></td><td></td><td>49</td><td>XCEL-H</td><td>Bit 2 for alternative acceleration ramps. Allows the selection of the multiple preconfigured acceleration/deceleration ramps. See ‘G2.70’ to ‘G2.83’.</td></tr>
<tr><td></td><td></td><td>50</td><td>PLC</td><td>Enables the user to implement simple sequences using various function blocks.</td></tr>
<tr><td></td><td></td><td>51</td><td>FireMode</td><td>The inverter runs in Fire mode when ‘G3.80’ is set to 2 and the multifunction terminal (‘G5.65-71’) configured for Fire mode is turned on.</td></tr>
<tr><td></td><td></td><td>52</td><td>KEB1Sel</td><td>For kinetic energy buffering operation, select the multifunction terminal, set it to ‘KEB1Sel’ and turn it on.</td></tr>
<tr><td></td><td></td><td>54</td><td>TI</td><td>In case of Standard I/O, Pulse input TI and Multi-function terminal P5 share the same therminal. Set the ‘G5.69’ to 54(TI).</td></tr>
</table>

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>85 DIOnF=10ms
In.85</td><td>G5.85 / DiOnFilter</td><td>0 to 10000ms</td><td>Set the delay time when activating the digital input. In case any variation occurs within a smaller time gap, the input will remain disabled.</td><td>YES</td></tr>
<tr><td>86 DIOfF=3ms
In.86</td><td>G5.86 / DI Off Filter</td><td>0 to 10000ms</td><td>Set the delay time when disabling a digital input. In case any variations occur within a smaller time gap, the input will remain enabled.</td><td>YES</td></tr>
<tr><td>87 DCTy=0000000
In.87</td><td>G5.87 / DiContactType</td><td>0000000 to 1111111</td><td>Allows defining the digital inputs as usually opened contactors (YES). or usually closed (NC).
<table><tr><th>BIT SETTING</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>Contact normally open (YES)</td></tr><tr><td>1</td><td>Contact normally closed (NC)</td></tr></table>The assignment order is P1, P2, …, P7 starting from the bit placed farthest to the right. The number of Digital Inputs varies depending on the equipment. IP20 drives integrate 7 Digital Inputs and IP66 drives integrate 5.</td><td>NO</td></tr>
<tr><td>89 DiScan=1ms
In.89</td><td>G5.89 / DI Scan Time</td><td>1 to 5000ms</td><td>Set the time to wait before refreshing the digital inputs configured as multireference.</td><td>NO</td></tr>
<tr><td>90 StDI=0000000
In.90</td><td>G5.90 / Dig. Inp. Filter</td><td>0000000 to 1111111</td><td>Multi-function input terminal status. Set each bit to 0 or 1 according to the table below:
<table><tr><th>BIT SETTING</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>Release (Off)</td></tr><tr><td>1</td><td>Connection (On)</td></tr></table>The assignment order is P1, P2, …, P7 starting from the bit placed farthest to the right. The number of Digital Inputs varies depending on the equipment. IP20 drives integrate 7 Digital Inputs and IP66 drives integrate 5.</td><td></td></tr>
<tr><td>91 TIPls=0.00kHz
In.91</td><td>G5.91 / TI Monitor</td><td>0.00 to 50.00kHz</td><td>This parameter shows the pulse frequency in this input.</td><td></td></tr>
<tr><td>92 TIFlt=10
In.92</td><td>G5.92 / TI Filter</td><td>0 to 9999</td><td>This parameter allows setting the time in which the pulse input reaches 63% of its nominal frequency. It is useful when the pulse frequency is supplied in multiple steps.</td><td>YES</td></tr>
<tr><td>93 TIMn=0.00kHz
In.93</td><td>G5.93 / TI Min Pulse</td><td>0.00 to 32.00kHz</td><td rowspan="4"><table><tr><th>PARAMETER</th><th>DESCRIPTION</th></tr><tr><td>G5.93/In93</td><td>This parameter allows setting the minimum input frequency through TI.</td></tr><tr><td>G5.94/In94</td><td>This parameter allows setting the minimum input frequency percentage through TI.</td></tr><tr><td>G5.95/In95</td><td>This parameter allows setting the maximum input frequency through TI.</td></tr><tr><td>G5.96/In96</td><td>This parameter allows setting the maximum input frequency percentage through TI.</td></tr></table>  </td><td>YES</td></tr>
<tr><td>94 TIMnR=0.00%
In.94</td><td>G5.94 / TI Min. Ref</td><td>0.00 to 100.00%</td><td>YES</td></tr>
<tr><td>95 TIMx=32.00kHz
In.95</td><td>G5.95 / TI Max.</td><td>0.00 to 32.00kHz</td><td>YES</td></tr>
<tr><td>96 TIMxR=100.00%
In.96</td><td>G5.96 / TI Max Ref</td><td>0.00 to 100.00%</td><td>YES</td></tr>
<tr><td>97 TI Invert=N
In.97</td><td>G5.97 / TI Inverting</td><td>N
Y</td><td>This parameter allows inverting the TI signal. Set this parameter to 1 (NO) if you need a reverse signal.</td><td>YES</td></tr>
<tr><td>98 TIDeLI=0.04%
In.98</td><td>G5.98 / TI Discre. Lvl</td><td>0.04 to 10.00%</td><td>This parameter is used to reduce noise in the TI input signal. The quantification value is defined as the input maximum percentage value.</td><td>YES</td></tr>
<tr><td>99 IOSWST=00
In.99</td><td>G5.99 / IO Config.</td><td>00 to 11</td><td>Software status. Set each bit to 0 or 1 according to the following table:
<table><tr><th>BIT SETTING</th><th>DESCRIPTION</th></tr><tr><td>00</td><td>V2, NPN</td></tr><tr><td>01</td><td>V2, PNP</td></tr><tr><td>10</td><td>I2, NPN</td></tr><tr><td>11</td><td>I2, PNP</td></tr></table></td><td>NO</td></tr>
</table>

ENGLISH

5.7. Group 6 – G6: Outputs → OU

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>1 AO1=Frequency

OU.1</td><td>G6.1 / AO1 Mode</td><td>0 to 15</td><td>The analog output 1 is programmable according to the following table:
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>Frequency</td><td>Proportional signal to the motor speed. For the maximum frequency defined in ‘G10.20 MsSpL’, a 10V voltage will be present</td></tr>
<tr><td>1</td><td>O/pCurr</td><td>Proportional signal to the motor current. 10V are generated when the drive rated current is at 200%.</td></tr>
<tr><td>2</td><td>O/pVolt</td><td>Proportional signal to the motor voltage. For the voltage value defined in ‘G2.15 MTR VOLT’, a 10V voltage will be present.</td></tr>
<tr><td>3</td><td>DCLinkV</td><td>Proportional signal to the bus DC voltage. The analogue output is 10V when the DC voltage is 410Vdc for 220Vac drives and 820Vdc for 400Vac drives.</td></tr>
<tr><td>4</td><td>Torque</td><td>Proportional signal to the generated torque. Outputs 10V at 250% of motor rated torque.</td></tr>
<tr><td>5</td><td>O/pPower</td><td>Proportional signal to the output power. 10V are generated operating 200% of the nominal power.</td></tr>
<tr><td>6</td><td>Idse</td><td>Outputs the maximum voltage at 200% of no load current.</td></tr>
<tr><td>7</td><td>Iqse</td><td>Outputs the maximum voltage at 250% of rated torque current.</td></tr>
<tr><td>8</td><td>TargetFq</td><td>Proportional signal to the target frequency set in the drive.</td></tr>
<tr><td>9</td><td>RampFreq</td><td>Proportional signal to the frequency which has executed the acceleration and deceleration functions and it can be different to the real output frequency.</td></tr>
<tr><td>10</td><td>SpeedFdb</td><td>Speed reference signal.</td></tr>
<tr><td>12</td><td>PIDRefVal</td><td>PID reference value signal. Generates 6.6V working to the 100% of the reference.</td></tr>
<tr><td>13</td><td>PIDFdbVal</td><td>Signal proportional to the feedback in PID mode. Generates 6.6V at 100% of the reference value.</td></tr>
<tr><td>14</td><td>PIDO/p</td><td>Signal proportional to the PID controller output value. Generates 5V at 100% of the reference value.</td></tr>
<tr><td>15</td><td>Constant</td><td>‘G6.5 AO1Con’ value.</td></tr>
</table></td><td>YES</td></tr>
<tr><td>2 AO1Ga=100.0%

OU.2</td><td>G6.2 / AO1 Gain</td><td>-1000.0 to 1000.0%</td><td rowspan="2">These parameters allow adjusting the gain and offset level of the analogue output 1. If a current signal is desired, the set value will be 20%.
For example, when the analogue output is configured as ‘Frequency’, the equation that governs the operation is:
$$AO1 = \frac{Frequency}{MaxFreq} \times Gain\ AO1 + Offset\ AO1$$
where Gain AO1 is set in parameter ‘G6.2 AO1Ga’ and Offset AO1 is set in parameter ‘G6.3 AO1Ofs’.</td><td>YES</td></tr>
<tr><td>3 AO1Ofs=0.0%

OU.3</td><td>G6.3 / AO1 Bias</td><td>-100.0 to 100.0%</td><td>YES</td></tr>
<tr><td>4 AO1Fil=5ms

OU.4</td><td>G6.4 / AO1 Filter</td><td>0 to 10000ms</td><td>Filter for the analog output 1 value.
Occasionally, the analog signal is slightly unstable. It can be improved selecting another filter value.
Note: The use of a filter can add a slight delay within the analog output</td><td>YES</td></tr>
<tr><td>5 AO1Con=0.0%
OU.5</td><td>G6.5 / AO1 Const Set</td><td>0.0 to 100.0%</td><td>Set a constant speed in the analog output 1, whenever it has been configured as ‘Constant’ in parameter ‘G6.1 AO1’.</td><td>YES</td></tr>
<tr><td>6 ANOUT1=0.0%
OU.6</td><td>G6.6 / Anl Out1 Monitor</td><td>0.0 to 1000.0%</td><td>Analog output 1 monitor.</td><td>YES</td></tr>
</table>

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>30 OP FLT RLY=010

OU.30</td><td>G6.30 / Operate flt rely</td><td>000 to 111</td><td>This parameter allows setting when the relay output will be set as [29 FAULT]:
<table><tr><th>OPT</th><th>OPTION</th></tr><tr><td>001</td><td>Fault due to low voltage.</td></tr><tr><td>010</td><td>Any faults other than low voltage.</td></tr><tr><td>100</td><td>Automatic restart final failure.
Final fault automatic restart. The relay will enable whenever all restarting attempts have been carried out (as set in ‘G9.9 Retry Num’) or the time set in parameter ‘G9.10 Retry Dly’ has elapsed.</td></tr></table></td><td>YES</td></tr>
<tr><td>31 RLY1=Trip

OU.31</td><td>G6.31 / Function Relay 1</td><td>0 to 35</td><td>Configures each relay and digital output according to the following table:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>The output has no effect.</td></tr><tr><td>1</td><td>FDT-1</td><td>Check when the output frequency has reached the user defined frequency. The relay will be enabled if the following equation is satisfied:
(set frequency–output frequency) < detected frequency width / 2.</td></tr><tr><td>2</td><td>FDT-2</td><td>The relay is active whenever the FDT-1 condition is fulfilled and:
Absolute value (set frequency-detected frequency) < detected frequency width / 2.</td></tr><tr><td>3</td><td>FDT-3</td><td>The relay will enable when:
Absolute value (output frequency – operation frequency) < detected frequency width / 2.</td></tr><tr><td>4</td><td>FDT-4</td><td>The relay will be active whenever the output frequency is greater than the Operation frequency and remains closed until it decreases below Detected frequency–Detected frequency width/2.</td></tr><tr><td>5</td><td>OverLoad</td><td>The relay will be active when the motor is in overload.</td></tr><tr><td>6</td><td>IOL</td><td>The relay will be active in case a fault due to overload protection occurs.</td></tr><tr><td>7</td><td>UndrLoad</td><td>The relay will be active in case of an underload warning.</td></tr><tr><td>8</td><td>VentWarn</td><td>The relay will be active in case a fan fault occurs and parameter ‘G9.79 FANTrip’ is set as ‘WARN’.</td></tr><tr><td>9</td><td>Stall</td><td>The relay will enable whenever the drives DC bus voltage is greater than the protection voltage.</td></tr><tr><td>10</td><td>OverVolt</td><td>The relay will enable whenever the drives bus DC voltage is lower than the protection voltage.</td></tr><tr><td>11</td><td>LowVolt</td><td>The relay will be active whenever the inverter DC link voltage drops below the low voltage protective level.</td></tr><tr><td>12</td><td>OverHeat</td><td>The relay will enable if the cooling fan is out of service.</td></tr><tr><td>14</td><td>Run</td><td>The relay will enable with the start command. However, it will not enable during the DC brake.</td></tr><tr><td>15</td><td>Stop</td><td>The relay will enable whenever no start command has been sent and no output voltage is present within the drive.</td></tr><tr><td>16</td><td>Steady</td><td>The relay will enable when the drive operates at constant speed.</td></tr><tr><td>17</td><td>Inv. Line</td><td>Outputs a signal while the motor is driven by the inverter line.</td></tr><tr><td>18</td><td>Comm Line</td><td>Outputs a signal while the motor is driven by a commercial power source.</td></tr><tr><td>19</td><td>Spd Srch</td><td>The relay will be active during a speed search operation.</td></tr><tr><td>22</td><td>Ready</td><td>The relay will enable whenever the drive is ready to start (without any warnings or trips).</td></tr><tr><td>28</td><td>Timer Out</td><td>The relay will be enabled after the set time has elapsed.</td></tr><tr><td>29</td><td>Trip</td><td>The relay will be enabled when a fault trip occurs.</td></tr><tr><td>31</td><td>DBWarn%ED</td><td>Set braking resistor configuration (%ED: Duty cycle). Braking resistor configuration sets the rate at which the braking resistor operates for one operation cycle.</td></tr></table>
Note: continues on the next page.</td><td>YES</td></tr>
</table>

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td></td><td></td><td></td><td>Note: comes from the previous page
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>34</td><td>COMPARAT</td><td>The relay will enable whenever the setting conditions found in [Group 9: ‘Comparators’] are satisfied.</td></tr>
<tr><td>35</td><td>BRCtrl</td><td>Used to control the brake opening.</td></tr>
<tr><td>36</td><td>CAP Exch.</td><td>The relay will enable CAP exchange options according to the setting of ‘G9.62’.</td></tr>
<tr><td>37</td><td>FAN Exch.</td><td>The relay will enable FAN exchange according to the setting of ‘G9.87’.</td></tr>
<tr><td>38</td><td>Fire Mode</td><td>Fire mode configuration.</td></tr>
<tr><td>39</td><td>TO</td><td>Sends pulse signals to external devices to provide a single output value from the inverter of either: output frequency, output current, output voltage, or DC voltage.</td></tr>
<tr><td>40</td><td>KEB Op.</td><td>The relay will be active when the energy buffering operation has started because of low voltage of the inverter's DC power section due to a power failure on the input power.</td></tr>
</table></td><td></td></tr>
<tr><td>33 DOP1=Run
OU.33</td><td>G6.33 / Digital Ouput1</td><td>0 to 35</td><td>See ‘G6.31’.</td><td>YES</td></tr>
<tr><td>41 DO Sts=00
OU.41</td><td>G6.41 / DO Status</td><td>00 to 11</td><td>Multi-function output monitor.
<table>
<tr><th>OPTION</th><th>FUNCTION</th></tr>
<tr><td>00</td><td>No ouputs enabled</td></tr>
<tr><td>01</td><td>Output 1 enabled</td></tr>
<tr><td>10</td><td>Output 1 enabled</td></tr>
<tr><td>11</td><td>Output 1 and 2 enabled</td></tr>
</table></td><td>YES</td></tr>
<tr><td>50 TRLON=0.00s
OU.50</td><td>G6.50 / Delay Dig O/P On</td><td>0.00 to 100.00s</td><td>The user is able to specify a delay in the relays and digital output 1 connections. If during the connection delay time the activation condition disappears, the relay will not be enabled.</td><td>YES</td></tr>
<tr><td>51 TRLOF=0.00s
OU.51</td><td>G6.51 / Delay Dig O/P Off</td><td>0.00 to 100.00s</td><td>The user is able to specify a delay within the digital output 1 and relays disconnection. If during the disconnection delay time, the disable condition disappears, the relay will not be disabled.</td><td>YES</td></tr>
<tr><td>52 INV YES/NC=00
OU.52</td><td>G6.52 / Logic NC/NO Relays</td><td>0 to 1</td><td>Defines the type of contact following this order: Digital Output 1, Relay 2 and Relay 1, from left to right according to the bit assignment.
<table>
<tr><th>OPTION</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>Contact normally open (NO)</td></tr>
<tr><td>1</td><td>Contact normally closed (NC)</td></tr>
</table></td><td>YES</td></tr>
<tr><td>53 TOnDl=0.00s
OU.53</td><td>G6.53 / Del. DO Fault On</td><td>0.00 to 100.00s</td><td rowspan="2">If a fault trip occurs, trip relay or multi-function output operates after the time delay set in ‘G6.53’. Terminal is off with the input initialized after the time delay set in ‘G6.54’.</td><td>YES</td></tr>
<tr><td>54 TOfDl=0.00s
OU.54</td><td>G6.54 / Del DO Fault Off</td><td>0.00 to 100.00s</td><td>YES</td></tr>
<tr><td>55 TiOnD=0.00s
OU.55</td><td>G6.55 / Del. DO Timer On</td><td>0.00 to 100.00s</td><td rowspan="2">Input a signal (On) to the timer terminal to operate a timer output (Timer out) after the time set at ‘G6.55’ has passed. When the multi-function input terminal is off, multi-function output or relay turns off after the time set at ‘G6.56’.</td><td>YES</td></tr>
<tr><td>56 TOfDl=0.00s
OU.56</td><td>G6.56 / Del DO Timer Off</td><td>0.00 to 100.00s</td><td>YES</td></tr>
<tr><td>57 FDTLv=30.00Hz
OU.57</td><td>G6.57 / Relay FDT level</td><td>0.00 to [G1.20]</td><td>Detection frequency.</td><td>YES</td></tr>
<tr><td>58 FDTBd=10.00Hz
OU.58</td><td>G6.58 / Relay FDT band</td><td>0.00 to [G1.20]</td><td>Detection frequency band.</td><td>YES</td></tr>
<tr><td>61 TOM=Frequency
OU.61</td><td>G6.61 / Output Pulse Mod</td><td>0 to 15</td><td>Pulse output setting.
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>OPT.</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>Frequency</td><td>8</td><td>TargetFq</td></tr>
<tr><td>1</td><td>O/pCurr</td><td>9</td><td>RampFreq</td></tr>
<tr><td>2</td><td>O/pVolt</td><td>10</td><td>SpeedFdb</td></tr>
<tr><td>3</td><td>DCLinkV</td><td>12</td><td>PIDRefVal</td></tr>
<tr><td>4</td><td>Torque</td><td>13</td><td>PIDFdbVal</td></tr>
<tr><td>5</td><td>O/pPower</td><td>14</td><td>PIDO/p</td></tr>
<tr><td>6</td><td>Idse</td><td>15</td><td>Constant</td></tr>
<tr><td>7</td><td>Iqse</td><td></td><td></td></tr>
</table></td><td>YES</td></tr>
</table>

Screen / Default value	Name / Description	Range	Function	Set on RUN
62 TOGa=100.0% **OU.62**	**G6.62 /** TO Gain	-1000.0 to 1000.0%	Adjusts output value and offset. If frequency is selected as an output, it will operate according to the following equation: $TO = \frac{Frequency}{MaxFreq} \times TO\ gain \times TO\ Bias$	YES
63 TOOfs=0.0% **OU.63**	**G6.63 /** TO Bias	-100.0 to 100.0%		YES
64 TOFil=5ms **OU.64**	**G6.64 /** TO Filter	0 to 10000ms	Sets filter time constant on analog output.	YES
65 TOCon=0.0% **OU.65**	**G6.65 /** TO Const Set	0.0 to 100.0%	If analog output item is set to constant, the analog pulse output is dependent on the set parameter values.	YES
66 TO=0.0% **OU.66**	**G6.66 /** TO Monitor	0.0 to 1000.0%	Monitors analog output value. Displays the maximum output pulse (32kHz) as a percentage (%) of the standard.	YES

5.8. Group 7 – G7: Communication Bus → CM

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>1 ComUpdate=N</td><td>G7.1 / Comm Update</td><td>N
Y</td><td>This parameter enables the possibility of reconnecting communications when a parameter has been changed. For example, the communication speed, frame definition, etc.</td><td>YES</td></tr>
<tr><td>2 Slave Addr=1</td><td>G7.2 / Int485 SlaveAddr</td><td>1 to 250</td><td>Drive identifier to communicate within the network. When communicating with several equipments, each one should be assigned to a different address.</td><td>YES</td></tr>
<tr><td>3 Prot=Modbus [27]</td><td>G7.3 / Int485 Protocol</td><td>ModBus RTU
PE BUS 485</td><td>Select the protocol used in communications:
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>Modbus RTU</td><td>Communication protocol compatible with MODBUS-RTU.</td></tr>
<tr><td>2</td><td>PE BUS 485</td><td>Communication protocol used to communicate drives.</td></tr>
</table></td><td>YES</td></tr>
<tr><td>4 BaudR=9600bps [27]</td><td>G7.4 / Int485 BaudRate</td><td>0 to 7</td><td>This parameter establishes the data transfer speed. It sets the Modbus communications transfer rate which must match with the bus communication master within the drive.
<table>
<tr><th>OPT.</th><th>Baud Rate</th><th>OPT.</th><th>Baud Rate</th></tr>
<tr><td>0</td><td>1200 bps</td><td>4</td><td>19200 bps</td></tr>
<tr><td>1</td><td>2400 bps</td><td>5</td><td>38400 bps</td></tr>
<tr><td>2</td><td>4800 bps</td><td>6</td><td>56 Kbps</td></tr>
<tr><td>3</td><td>9600 bps</td><td>7</td><td>112 Kbps</td></tr>
</table></td><td>YES</td></tr>
<tr><td>5 Mode=D8/PN/S1 [27]</td><td>G7.5 / Int485 Mode</td><td>0 to 3</td><td>Select the communication frame structure and defines the data length, parity confirmation method and the number of stop bits:
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>D8/PN/S1</td><td>8-bit data / no parity check / 1 stop bit</td></tr>
<tr><td>1</td><td>D8/PN/S2</td><td>8-bit data / no parity check / 2 stop bits</td></tr>
<tr><td>2</td><td>D8/PE/S1</td><td>8-bit data / even parity / 1 stop bit</td></tr>
<tr><td>3</td><td>D8/PO/S1</td><td>8-bit data / odd parity / 1 stop bit</td></tr>
</table></td><td>YES</td></tr>
<tr><td>6 RespDly=5ms [27]</td><td>G7.6 / Response Delay</td><td>0 to 100.0 ms</td><td>The MODBUS-RTU communication plays the role of the slave device. The slave will reply after the time period set in this parameter. This allows the master device attending the communications within a system where the master can not manage a quick slave answer.</td><td>YES</td></tr>
</table>

[27] Will not be displayed when P2P and MultiKD is set.

5.9. Group 8 – G8: PID → AP

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>1 ApMod=Proc PID
AP.1</td><td>G8.1 / App. Sel. Func.</td><td>0: None
2: Proc PID</td><td>Application function selection.

Set this parameter to ‘2’ (Proc PID) to select functions for the process PID.</td><td>NO</td></tr>
<tr><td>2 UsSeqEn=N
AP.2</td><td>G8.2 / Enable user sequence</td><td>YES
NO</td><td>Display the parameter groups related to a user sequence.</td><td>NO</td></tr>
<tr><td>16 PIDOut=+0.0% [28]
AP.16 [28]</td><td>G8.16 / PID Output</td><td>-327.68 to 327.68%</td><td>Displays the existing output value of the PID controller. The unit, gain, and scale set at ‘G8.42-44’ are applied.</td><td>YES</td></tr>
<tr><td>17 PIDRef=+50.00% [28]
AP.17 [28]</td><td>G8.17 / PID Reference</td><td>-327.68 to 327.68%</td><td>Displays the existing reference value set for the PID controller. The unit, gain, and scale set at ‘G8.42-44’ are applied.</td><td>YES</td></tr>
<tr><td>18 PIDFdb=+0.00% [28]
AP.18 [28]</td><td>G8.18 / PID Feedback</td><td>-327.68 to 327.68%</td><td>Displays the input value of the PID controller that is included in the latest feedback. The unit, gain, and scale set at ‘G8.42-44’ are applied.</td><td>YES</td></tr>
<tr><td>19 PIDLo=+50.00% [28]
AP.19 [28]</td><td>G8.19 / PID Local</td><td>-100.00 to 100.00%</td><td>When ‘G8.20’ is set to 0 (MREF), the reference value can be entered. If the reference source is set to any other value, the setting values for ‘G8.19’ are voided.</td><td>YES</td></tr>
<tr><td>20 SELREF=MREF [28]
AP.20 [28]</td><td>G8.20 / Select Reference</td><td>0 to 8</td><td>Select the source to introduce the PID regulator set point:
<table>
<tr><th>OPT</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>MREF</td><td>PID set point introduced from keypad.</td></tr>
<tr><td>1</td><td>V1</td><td>PID set point introduced by analog input 1.</td></tr>
<tr><td>3</td><td>V2</td><td>PID set point introduced by analog input 2.</td></tr>
<tr><td>4</td><td>V3</td><td>PID set point introduced by analog input 3.</td></tr>
<tr><td>5</td><td>MODBUS</td><td>PID set point introduced through the Modbus communication protocol.</td></tr>
<tr><td>7</td><td>COMMS</td><td>PID set point introduced through any of the optional communication boards.</td></tr>
<tr><td>8</td><td>PLC</td><td>PID set point introduced through PLC.</td></tr>
<tr><td>11</td><td>PULSE</td><td>Reference signal through the pulse input.</td></tr>
</table>
Notes:
• In case an unavailable option is selected, the parameter will return to its previous value.
• Option V3 will only be available if the I/O expansion board is installed.
• Options COMMS and PLC will only be available if any of the optional communication boards is installed.</td><td>NO</td></tr>
<tr><td>21 SELFBK=V1 [28]
AP.21 [28]</td><td>G8.21 / Select Feedback</td><td>0 to 10</td><td>Select the source through which the feedback signal will be introduced to close the control loop.
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>V1</td><td>Feedback signal through analog input 1.</td></tr>
<tr><td>2</td><td>V2</td><td>Feedback signal through analog input 2.</td></tr>
<tr><td>3</td><td>V3</td><td>Feedback signal through analog input 3.</td></tr>
<tr><td>4</td><td>MODBUS</td><td>Feedback signal through Modbus communications integrated in the drive.</td></tr>
<tr><td>6</td><td>COMMS</td><td>Feedback signal through any optional communication boards.</td></tr>
<tr><td>7</td><td>PLC</td><td>Feedback signal through the equipment’s PLC.</td></tr>
<tr><td>10</td><td>PULSE</td><td>Feedback signal through the pulse input.</td></tr>
</table>
Note:
• In case an unavailable option is selected, the parameter will return to its previous value.
• Options V3 will only be available if the I/O expansion board is installed.
• Options COMMS and PLC will only be available if any of the optional communication boards is installed.</td><td>NO</td></tr>
<tr><td>22 GANKp=+50.0% [28]
AP.22 [28]</td><td>G8.22 / Gain Kp</td><td>0.0 to 1000.0%</td><td>Set the value of the proportional gain controller. This value should be increased whenever a greater control response is needed. Note: Increasing too much this value can cause a greater system instability.</td><td>YES</td></tr>
<tr><td>23 INTEGRL=10.0ms [28]
AP.23 [28]</td><td>G8.23 / PID Integral</td><td>0 to 200.0s</td><td>Set the regulator integration time. In case greater precision is needed, increase this value.
Note: Increasing this value may slow down the system.</td><td>YES</td></tr>
</table>

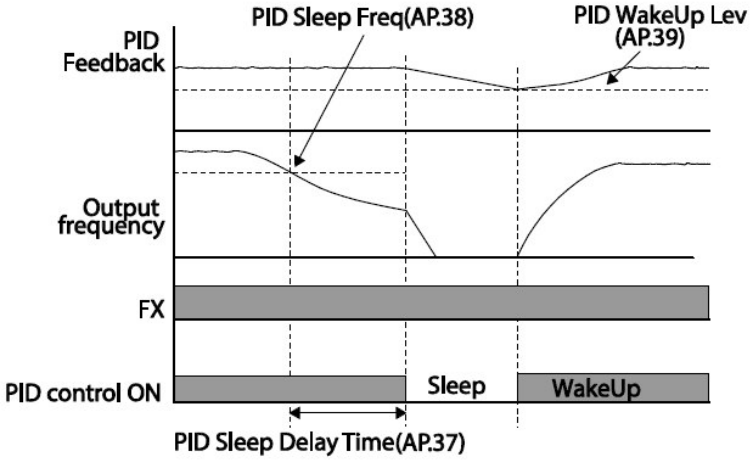
[28] Displayed when ‘G8.1’ (AP.1 in integrated display) is set to Proc Pid.

Screen / Default value	Name / Description	Range	Function	Set on RUN
24 DIFFE=0ms [28] **AP.24** [28]	**G8.24** / PID Differential	0.0 to 1000ms	Set the regulator differential time. Whenever a greater response is needed, this value can be increased. **Note:** Increasing too much this value can cause a precision loss.	YES
25 GAINF=+0.0% [28] **AP.25** [28]	**G8.25** / Compens. Gain	0.0 to 100.0%	Sets the ratio that adds the target to the PID output. Adjusting this value leads to a faster response.	YES
26 PGaSca=100.0% [28] **AP.26** [28]	**G8.26** / Gain P Scale	0.0 to 100.0%	This parameter, along with 'G8.22' allow setting output ratio for errors between reference and feedback. If 'G8.22' is set to 50%, then 50% of the error is output. For ratios below 0.1% use 'G8.26'.	NO
27 PIDFI=0ms [28] **AP.27** [28]	**G8.27** / PID Filter	0 to 1000ms	Used when the output of the PID controller changes too fast or the entire system is unstable, due to severe oscillation. In general, a lower value (default value=0) is used to speed up response time, but in some cases a higher value increases stability. The higher the value, the more stable the PID controller output is, but the slower the response time.	YES
28 PIDMd=Process [28] **AP.28** [28]	**G8.28** / PID Mode	Process Normal	Set PID Mode. **OPT.** / **FUNCTION** 0 – Process 1 – Normal	NO
29 MxSL=+60.00Hz [28] **AP.29** [28]	**G8.29** / Max Speed LIM	[G8.30] to 300.00Hz	Set the PID output upper limit.	YES
30 MnSL=-60.00Hz [28] **AP.30** [28]	**G8.30** / Min Speel LIM	-300.00Hz to [G8.29]	Set the PID output lower limit.	YES
31 INVERT PID=N [28] **AP.31** [28]	**G8.31** / Invert PID	0: YES 1: NO	Define whether to invert the PID output or not. **OPTION** / **FUNCTION** YES – The PID regulator answers in normal mode. Therefore, when the feedback value exceeds the reference signal, it will decrease its speed. However, if the feedback is lower than the reference signal value, the speed will be increased. NO – The PID regulator answers in inverse mode. Therefore, when the feedback exceeds the reference signal, speed will be increased. However, when the feedback value is lower than the reference signal, the speed will be decreased.	NO
32 OutSc=+100.00% [28] **AP.32** [28]	**G8.32** / Out Scale	0.1 to 1000.0%	Set the PID regulator output magnitude.	NO
34 PPIDR=0.00Hz [28] **AP.34** [28]	**G8.34** / PrePID Reference	0.00 to [G1.20]	Set PID controller motion frequency.	NO
35 PPIDE=0.0% **AP.35**	**G8.35** / PrePID Exit	0.0 to 100.0%	Set PID controller motion level.	NO
36 PPIDTim=600s **AP.36**	**G8.36** / PrePID End Delay	0 to 9999s	Set PID controller motion delay time.	YES
37 LPTSlp=60.0s **AP.37**	**G8.37** / Drive Sleep Delay	0.0 to 999.9s	Set the delay time for enabling the sleep mode. If the drive operates at a speed value under the value of [G8.38], it will stop running and enter in sleep mode.	YES
38 SlpSp=0.00Hz **AP.38**	**G8.38** / Drv Sleep Speed	0.00Hz to [G1.20]	Set the speed under which if a time period greater than the one defined in parameter [G8.37], the drive will stop operating and enter in sleep mode.	YES
39 LPPon=+35% **AP.39**	**G8.39** / Awakening Level	0 to 100%	Set the resuming PID control level after a suspension period (sleep mode).	YES

ENGLISH

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>40 WkUPID=Below
AP.40</td><td>G8.40 / PID WakeUp Mode</td><td>0 to 2</td><td>Set PID wake-up mode, according to the following table:
<table>
<tr><th>OPT</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>Below</td><td>The PID operation starts when the frequence is lower than the value set in G8.39.</td></tr>
<tr><td>1</td><td>Above</td><td>The PID operation starts when the frequence is higher than the value set in G8.39.</td></tr>
<tr><td>2</td><td>Beyond</td><td>The PID operation starts when the difference between between the reference value and the feedback variable is greater than the value set in G8.39.</td></tr>
</table></td><td>YES</td></tr>
<tr><td>42 PIDUn=%
AP.42</td><td>G8.42 / PID Unit</td><td>0 to 12</td><td>Set PID controller unit, according to the following table:
<table>
<tr><th>OPT</th><th>DESCRIPTION</th><th>OPT</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>%</td><td>7</td><td>V</td></tr>
<tr><td>1</td><td>Bar</td><td>8</td><td>I</td></tr>
<tr><td>2</td><td>mBar</td><td>9</td><td>kW</td></tr>
<tr><td>3</td><td>Pa</td><td>10</td><td>HP</td></tr>
<tr><td>4</td><td>kPa</td><td>11</td><td>°C</td></tr>
<tr><td>5</td><td>Hz</td><td>12</td><td>°F</td></tr>
<tr><td>6</td><td>rpm</td><td></td><td></td></tr>
</table>
Note: this parameter can only be adjusted in the removable LCD display.</td><td>YES</td></tr>
<tr><td>43 PIDuG=100.00%
AP.43</td><td>G8.43 / PID Unit Gain</td><td>0.00 to 300.00%</td><td>Allows setting the PID unit gain.</td><td>YES</td></tr>
<tr><td>44 PIDUnSc=x1
AP.44</td><td>G8.44 / PID Unit Scale</td><td>0 to 4</td><td>Adjusts the size to fit the unit selected at ‘G8.21’.
<table>
<tr><th>OPT</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>x 100</td></tr>
<tr><td>1</td><td>x 10</td></tr>
<tr><td>2</td><td>x 1</td></tr>
<tr><td>3</td><td>x 0.1</td></tr>
<tr><td>4</td><td>x 0.01</td></tr>
</table></td><td>YES</td></tr>
<tr><td>45 GaKp2=100.0%
AP.45</td><td>G8.45 / Gain Kp 2</td><td>0.0 to 100.0%</td><td>Set the value of the proportional gain controller 2. This value should be increased whenever a greater control response is needed. Note: Increasing too much this value can cause a greater system instability.</td><td>NO</td></tr>
</table>

The next figure shows the PID operation sleep mode setting details:



5.10. Group 9 – G9: Protections → Pr

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>4 Load Duty=Hevy
Pr.4</td><td>G9.4 / Load Duty Type</td><td>NRML
HEVY</td><td>Selects the load type.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>NRML</td><td>Selects the normal load type (variable torque) for applications such as fans or pumps.</td></tr><tr><td>1</td><td>HEVY</td><td>Selects the heavy load type (constant torque) for applications such as elevators and cranes.</td></tr></table></td><td>NO</td></tr>
<tr><td>5 LSS PH=NONE
Pr.5</td><td>G9.5 / Lss Phase Type</td><td>0 to 4</td><td>Selects the applied load type.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>NONE</td><td>Phase loss protection disabled.</td></tr><tr><td>1</td><td>OUTPUT</td><td>Output phase loss protection enabled.</td></tr><tr><td>2</td><td>INPUT</td><td>Input phase loss protection enabled. For its correct operation, the user should set the parameter ‘G9.6’.</td></tr><tr><td>3</td><td>ALL</td><td>Input and output phase loss protection enabled. For its correct operation, set the parameter ‘G9.6’.</td></tr></table>⚠ Caution: Users should ensure that disabling this protection does not compromise the operation of the installation and/or equipment.</td><td>NO</td></tr>
<tr><td>6 Ripple V=15V
Pr.6</td><td>G9.6 / Ripple Voltage</td><td>1 to 100V</td><td>Set the DC Bus ripple voltage that must be exceeded to get a phase loss phase input fault when ‘G9.5’ is set as “INPUT” or “ALL”. This value is set following customer’s requirements.</td><td>NO</td></tr>
<tr><td>7 FlDecT=3.0s
Pr.7</td><td>G9.7 / Fault decel time</td><td>0.0 to 600.0s</td><td>Deceleration time at fault trip.</td><td>YES</td></tr>
<tr><td>8 Str Aft Rst=N
Pr.8</td><td>G9.8 / Str Aft Restart</td><td>N
Y</td><td rowspan="3">Parameters ‘G9.9’ and ‘G9.10’ only operate when ‘G9.8’ is set to 1(Yes).
The number of attempts to try the auto restart is set at ‘G9.9’.
If a fault trip occurs during operation, the inverter automatically restarts after the set time programmed at ‘G9.10’.
At each restart, the inverter counts the number of tries and subtracts it from the number set at ‘G9.9’ until the retry number count reaches 0. After an auto restart, if a fault trip does not occur within 60 secs, it will increase the restart count number. The maximum count number is limited by ‘G9.10’.</td><td>YES</td></tr>
<tr><td>9 Retry Num=0
Pr.9</td><td>G9.9 / Retry Number</td><td>0 to 10</td><td>YES</td></tr>
<tr><td>10 RetryDly=1.0s [29]
Pr.10 [29]</td><td>G9.10 / Retry Delay</td><td>0.0 to 60.0s</td><td>YES</td></tr>
<tr><td>12 RIRLs=None
Pr.12</td><td>G9.12 / Response in case of a Speed Reference Loss</td><td>0 to 5</td><td>Set the action to be taken if the drive loses a speed reference:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>Protection is disabled.</td></tr><tr><td>1</td><td>Free-Run</td><td>The drive cuts the output voltage and allows the motor free run.</td></tr><tr><td>2</td><td>Dec</td><td>The motor decelerates and then stops at the time set at ‘G9.7’.</td></tr><tr><td>3</td><td>Hold Input</td><td>The drive will keep operating to the input value, mean value obtained from the last 10 seconds until the moment the reference lo s has been detected.</td></tr><tr><td>4</td><td>Hold Output</td><td>The drive will keep operating to the input value, mean value obtained from the last 10 seconds until the moment the reference loss has been detected.</td></tr><tr><td>5</td><td>Lost Preset</td><td>The drive operates to the frequency defined in parameter ‘G9.14’.</td></tr></table>⚠ Caution: Users should ensure that disabling this protection does not compromise the operation of the equipment.</td><td>YES</td></tr>
<tr><td>13 RfLsDl=1.0s [30]
Pr.13 [30]</td><td>G9.13 / Ref Loss Dly.</td><td>0.1 to 120.0s</td><td>Delay time setting after which the speed reference loss protection will enable.</td><td>YES</td></tr>
<tr><td>14 RfLRf=0.00Hz [30]
Pr.14 [30]</td><td>G9.14 / Ref Loss Ref</td><td>[G1.19] to [G1.20]</td><td>In order to set the frequency value at which the drive will operate in case a speed reference loss occurs. Therefore, the parameter ‘G9.12 RIRLs’ must be set to ‘LostPreset’.</td><td>YES</td></tr>
<tr><td>15 AILL=Half [30]
Pr.15 [30]</td><td>G9.15 / AI Lost Level</td><td>Half
Below</td><td>Analog input loss decision level.</td><td>YES</td></tr>
</table>

[29] Displayed when ‘G9.9’ (PR.9 in integrated display) is higher than zero.
[30] Displayed when [G9.12] is not set to None.

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>17 OlWarnSel=YES
Pr.17</td><td>G9.17 / OL Warn Select</td><td>YES
NO</td><td>If the overload reaches the warning level, the terminal block multi-function output terminal and relay are used to output a warning signal. If 1 (Yes) is selected, it will operate. If 0 (No) is selected, it will not operate.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>YES</td><td>Overload warning disabled.</td></tr><tr><td>1</td><td>NO</td><td>Overload warning enabled.</td></tr></table></td><td>YES</td></tr>
<tr><td>18 OLWrnL=+150%
Pr.18</td><td>G9.18 / OL Warn Level</td><td>30 to 200%</td><td rowspan="2">The overload warning is a combination of the parameters ‘G9.18’, ‘G9.19’ and ‘G9.20’. The drive will enable some of the digital outputs configured as ‘OverLoad’ whenever the current flowing within the motor is greater than the value defined in parameter ‘G9.18 OLWrnL’ during the time established in parameter ‘G9.19 OLWrnT’.</td><td>YES</td></tr>
<tr><td>19 OLWrnT=10.0s
Pr.19</td><td>G9.19 / OL Warn Time</td><td>0.0 to 30.0s</td><td>YES</td></tr>
<tr><td>20 OLTS=Freerun
Pr.20</td><td>G9.20 / OL Trip Select</td><td>0 to 2</td><td>The drive will take the following actions in case an overload fault occurs:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>Protection is disabled.</td></tr><tr><td>1</td><td>FreeRun</td><td>The drive’s output is cut, having as a consequence the motor free run.</td></tr><tr><td>2</td><td>Dec</td><td>A deceleration until stop is produced in the time defined in parameter ‘G9.7’.</td></tr></table>⚠ Caution: Users should ensure that disabling this protection does not compromise the operation of the installation and/or equipment.</td><td>YES</td></tr>
<tr><td>21 OLLevel=180%
Pr.21</td><td>G9.21 / Overload Level</td><td>30 to 200%</td><td rowspan="2">The overload warning protection is a combination of the parameters ‘G9.20’, ‘G9.21’ and ‘G9.22’. The drive will carry out the action selected in parameter ‘G9.20 OLTS’ whenever the current flow within the motor is greater than the parameter ‘G9.21 OLLevel’ value during the time defined in parameter ‘G9.22 OLTrpT’.</td><td>YES</td></tr>
<tr><td>22 OLTrpT=60.0s
Pr.22</td><td>G9.22 / OL Trip Time</td><td>0.0 to 60.0s</td><td>YES</td></tr>
<tr><td>25 EnableUL=YES
Pr.25</td><td>G9.25 / Enable UL</td><td>YES
NO</td><td>Sets the underload warning options. Set to 1(Yes) and set the multi-function output terminals (at ‘G6.31’ and ‘G6.33’) to ‘Underload’. The warning signals are output when an underload condition arises.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>YES</td><td>Underload warning disabled.</td></tr><tr><td>1</td><td>NO</td><td>Underload warning enabled.</td></tr></table></td><td>YES</td></tr>
<tr><td>26 ULWnDl=10.0s
Pr.26</td><td>G9.26 / UL Warn Dly</td><td>0.0 to 600.0s</td><td>Set delay time when enabling the underload warning. The drive will wait this time before enabling the warning.</td><td>YES</td></tr>
<tr><td>27 ULFM=None
Pr.27</td><td>G9.27 / UL Fault Mode</td><td>None
Free-Run
Dec</td><td>Set the underload fault trip protection.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>Protection is disabled.</td></tr><tr><td>1</td><td>Free-Run</td><td>Output is blocked in an underload fault trip situation.</td></tr><tr><td>2</td><td>Dec</td><td>The motor decelerates and stops.</td></tr></table></td><td>YES</td></tr>
<tr><td>28 ULFIDl=30.0
Pr.28</td><td>G9.28 / UL Fault Dly</td><td>0.0 to 600.0s</td><td>Set the delay time the inverter will wait before triggering the underload fault.</td><td>YES</td></tr>
<tr><td>29 UlMnL=+30%
Pr.29</td><td>G9.29 / UL Min Level</td><td>10 to 100%</td><td rowspan="2">• Heavy Duty:
‘G9.29’ is not supported. At ‘G9.30’, underload level is decided based on the motor rated current.
• Normal Duty:
At ‘G9.29’, underload rate is decided based on twice the operation frequency of the motor rated slip speed (‘G8.12’).
At ‘G9.30’, the underload rate is determined based on the frequency set at ‘G4.18’. Upper and lower limits are based on the drive rated current.</td><td>YES</td></tr>
<tr><td>30 ULMxL=+30%
Pr.30</td><td>G9.30 / UL Max Level</td><td>10 to 100%</td><td>YES</td></tr>
<tr><td>31 NoMD=None
Pr.31</td><td>G9.31 / No Motor Detect</td><td>None
Free-Run
Dec</td><td>The drive will carry out one of the following actions whenever a fault is present due to the fact that no motor has been connected to the drives output terminal:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>Protection is disabled.</td></tr><tr><td>1</td><td>Free-Run</td><td>The drive’s output is cut, having as a consequence the motor free run.</td></tr><tr><td>2</td><td>Dec</td><td>The motor decelerates and stops.</td></tr></table>⚠ Caution: Users should ensure that disabling this protection does not compromise the operation of the installation and/or equipment.</td><td>YES</td></tr>
</table>

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>32 NoMtrLv=+5%
Pr.32</td><td>G9.32 / No Motor Level</td><td>1 to 100%</td><td rowspan="2">The fault protection if no motor is detected is a combination of parameters ‘G9.31’, ‘G9.32’ and ‘G9.33’. The drive will carry out the action set in parameter ‘G9.31 NoMD’ whenever the current flowing within the motor does not exceed the value defined in parameter ‘G9.32 NoMtrLvl’ during the time defined in parameter ‘G9.33 NoMtrDl’.</td><td>YES</td></tr>
<tr><td>33 NoMtrDl=3.0s
Pr.33</td><td>G9.33 / No Motor Dly</td><td>0.1 to 10.0s</td><td>YES</td></tr>
<tr><td>40 ThMM=None
Pr.40</td><td>G9.40 / ThermModelMode</td><td>None
Free-Run
Dec</td><td>The drive will carry out one of the following actions in case of a motor thermo-electronic fault:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>The ETH function is not activated.</td></tr><tr><td>1</td><td>Free-Run</td><td>The drive output is blocked. The motor coasts to a halt (free-run).</td></tr><tr><td>2</td><td>Dec</td><td>The drive decelerates the motor until it stops.</td></tr></table></td><td>YES</td></tr>
<tr><td>41 MTCOOL=SELF
Pr.41</td><td>G9.41 / Motor Cooling</td><td>SELF
FORCED</td><td>Select the drive mode of the cooling fan, attached to the motor.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>SELF</td><td>As the cooling fan is connected to the motor axis, the cooling effect varies, based on motor speed. Most universal induction motors have this design.</td></tr><tr><td>1</td><td>FORCED</td><td>Additional power is supplied to operate the cooling fan. This provides extended operation at low speeds. Motors designed for drives typically have this design.</td></tr></table></td><td>YES</td></tr>
<tr><td>42 ETH1min=150%
Pr.42</td><td>G9.42 / ETH 1min</td><td>50 to 200%</td><td>Set the current level which flows continuously during one minute in % referenced to the motor nominal current. The motor nominal current is set in parameter ‘G2.13 MTRCUR’. Whenever this limit is over passed, the thermo-electronic protection will be enabled, and the action defined in parameter ‘G9.40 ThMM’ will be executed.</td><td>YES</td></tr>
<tr><td>43 ETHcont=+120%
Pr.43</td><td>G9.43 / ETH Cont Rating</td><td>50 to 200%</td><td>Set the overcurrent level under which the drive is able to work without enabling the thermo-electronic protection.</td><td>YES</td></tr>
<tr><td>45 BSMod=FreeRun
Pr.45</td><td>G9.45 / BX trip mode</td><td>FreeRun
Dec</td><td><table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>FreeRun</td><td>The drive cuts the output voltage and allows the motor free run.</td></tr><tr><td>1</td><td>Dec</td><td>The motor decelerates and then stops.</td></tr></table></td><td>NO</td></tr>
<tr><td>50 StallPR=00
Pr.50</td><td>G9.50 / Stall Prevent</td><td>00 to 11</td><td>Stall prevention can be configured for acceleration, deceleration, or while operating a motor at constant speed.
<table><tr><th>OPT</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>00</td><td>Accelerating</td><td>Stall protection during acceleration.</td></tr><tr><td>01</td><td>At constant speed</td><td>Stall protection while operating at a constant speed.</td></tr><tr><td>10</td><td>At deceleration</td><td>Stall protection during deceleration.</td></tr><tr><td>11</td><td>FluxBraking</td><td>Flux braking during deceleration.</td></tr></table></td><td>NO</td></tr>
<tr><td>51 StFr1=60Hz
Pr.51</td><td>G9.51 / Stall Freq 1</td><td>[G1.19] to [G9.53] Hz</td><td rowspan="8">Additional stall protection levels can be configured for different frequencies, based on the load type.
The stall level can be set above the base frequency. The lower and upper limits are set using numbers that correspond in ascending order. For example, the range for Stall Frequency 2 (Stall Freq 2) becomes the lower limit for Stall Frequency 1 (Stall Freq 1) and the upper limit for Stall Frequency 3 (Stall Freq 3).</td><td>YES</td></tr>
<tr><td>52 StlLev1=180%
Pr.52</td><td>G9.52 / Stall Level 1</td><td>30 to 250%</td><td>NO</td></tr>
<tr><td>53 StFr2=60Hz
Pr.53</td><td>G9.53 / Stall Freq 2</td><td>[G5.51] to [G9.55] Hz</td><td>YES</td></tr>
<tr><td>54 StlLev2=180%
Pr.54</td><td>G9.54 / Stall Level 2</td><td>30 to 250%</td><td>NO</td></tr>
<tr><td>55 StFr3=60Hz
Pr.55</td><td>G9.55 / Stall Freq 3</td><td>[G5.53] to [G9.57] Hz</td><td>YES</td></tr>
<tr><td>56 StlLev3=180%
Pr.56</td><td>G9.56 / Stall Level 3</td><td>30 to 250%</td><td>NO</td></tr>
<tr><td>57 StFr4=60Hz
Pr.57</td><td>G9.57 / Stall Freq 4</td><td>[G5.55] to [G1.20] Hz</td><td>YES</td></tr>
<tr><td>58 StlLev4=180%
Pr.58</td><td>G9.58 / Stall Level 4</td><td>30 to 250%</td><td>NO</td></tr>
</table>

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<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>59 FB Kp=0%
Pr.59</td><td>G9.59 / Flux Bake Kp</td><td>0 to 150[%]</td><td>Set flux braking gain.</td><td>YES</td></tr>
<tr><td>60 CAPDgLV=0%
Pr.60</td><td>G9.60 / CAP Diag. Level</td><td>10 to 100[%]</td><td>Set CAP diagnosis percentage.</td><td>YES</td></tr>
<tr><td>61 CAPDg=+0%[31]
Pr.61 [31]</td><td>G9.61 / CAP Diag</td><td>0 to 3</td><td>This parameter allows performing a capacitor diagnosis.
<table><tr><th>OPT</th><th>FUNCTION</th></tr><tr><td>0</td><td>Nonde</td></tr><tr><td>1</td><td>RefDiag *</td></tr><tr><td>2</td><td>PreDiag</td></tr><tr><td>3</td><td>InitDiag</td></tr></table>(*) Note: This option is used to set a capacitance reference. It is recommended to use it when the drive is operated for the first time.</td><td>NO</td></tr>
<tr><td>62 CAPExLv=0% [31]
Pr.62 [31]</td><td>G9.62 / CAP Exchange Level</td><td>0.0 to 95.0%</td><td>Sets the capacitor exchange warning level. The warning “ECAP” will be displayed when this value is reached.</td><td>NO</td></tr>
<tr><td>63 CAPDgL=0.0% [31]
Pr.63 [31]</td><td>G9.63 / CAP Diag Level</td><td>0.0 to 100.0%</td><td>This parameter shows the capacitance reference measured in G9.61. This value must be equal to 100.0% when the drive is operated for the first time.</td><td>YES</td></tr>
<tr><td>66 DBWarnED=+0%
Pr.66</td><td>G9.66 / DB Res Warn Lvl</td><td>0 to 30%</td><td>Set braking resistor configuration (%ED: Duty cycle). Braking resistor configuration sets the rate at which the braking resistor operates for one operation cycle.</td><td>YES</td></tr>
<tr><td>73 SpdDev=N
Pr.73</td><td>G9.73 / Speed Deviation</td><td>N
Y</td><td>Speed deviation trip.</td><td>YES</td></tr>
<tr><td>74 SpdDevLv=50 [32]
Pr.74 [32]</td><td>G9.74 / Overheat Sensor</td><td>1 to 20</td><td>Speed deviation band.</td><td>YES</td></tr>
<tr><td>75 SpdDevTi=60 [32]
Pr.75 [32]</td><td>G9.75 / Speed Dev. Time</td><td>1 to 120</td><td>Speed deviation time.</td><td>YES</td></tr>
<tr><td>79 FANTrip=Warn
Pr.79</td><td>G9.79 / FAN Trip Mode</td><td>Trip
Warn</td><td>Select the action to carry out in case a fault within the cooling fan is detected:
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>Trip</td><td>The drive generates a Fan-trip.</td></tr><tr><td>1</td><td>Warn</td><td>The drive will enable the relay configured as ‘VentWarn’.</td></tr></table></td><td>YES</td></tr>
<tr><td>80 TrpMd=FreeRun
Pr.80</td><td>G9.80 / Opt Trip Mode</td><td>0 to 2</td><td>Option card trips may occur when an option card is used with the inverter. Set the operation mode for the inverter when a communication error occurs between the option card and the inverter body, or when the option card is detached during operation.
<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>0</td><td>None</td><td>No operation.</td></tr><tr><td>1</td><td>FreeRun</td><td>The drive output is blocked and fault trip information is shown on the keypad.</td></tr><tr><td>2</td><td>Dec</td><td>The motor decelerates to the value set at ‘G9.7’.</td></tr></table></td><td>YES</td></tr>
<tr><td>81 LVT Dly=0.0s
Pr.81</td><td>G9.81 / Low voltage trip delay</td><td>0.0 to 60.0s</td><td>It allows setting a delay for low voltage fault.</td><td>NO</td></tr>
<tr><td>82 LV2 On=YES
Pr.82</td><td>G9.82 / LV2 Enable</td><td>YES
NO</td><td>When this parameter is set to NO and a low voltage situation occurs, the drive trips.</td><td>NO</td></tr>
<tr><td>86 FanTi=0%
Pr.86</td><td>G9.86 / Fan Time Perc.</td><td>0.0 to 100.0%</td><td>This parameter allows showing the accumulated percent of fan usage.</td><td>YES</td></tr>
<tr><td>87 FanELv=90.0%
Pr.87</td><td>G9.87 / Fan Exch War Level</td><td>0.0 to 100.0%</td><td>Set fan exchange warning level. When the value is reached, the EFAN warning appears.</td><td>YES</td></tr>
<tr><td>88 FanTiRst=N [33]
Pr.88 [33]</td><td>G9.88 / Fan Time Reset</td><td>YES
NO</td><td>Sets the fan reset time.</td><td>NO</td></tr>
</table>

[31] These parameters are displayed when ‘G9.60’ is set to more than 0.
[32] Displayed when ‘G9.73’ is set to YES.
[33] Will only be shown in the internal display.

Screen / Default value	Name / Description	Range	Function	Set on RUN
89 CAP FAN St=0 **Pr.89**	**G9.89** / CAP FAN Status	00 to 11	OPT: 00 – FUNCTION: None – DESCRIPTION: There are not warnings neither in the capacitors nor in fans. OPT: 01 – FUNCTION: CAP warning – DESCRIPTION: There is a warning in the capacitor. OPT: 10 – FUNCTION: FAN warning – DESCRIPTION: There is a warning in the fan.	YES

5.11. Group 10 – G10: Second Motor → M2

This group appears if any of 'G5.65' – 'G5.71' (In.65-71 in integrated display) is set to 26 (second motor). In the following table, data shaded in grey will be displayed when a related code has been selected.

Screen / Default value	Name / Description	Range	Function	Set on RUN
4 AccTi=20.0s **M2.4**	**G10.4** / Acc Ramp 2	0.0 to 600.0s	Set the acceleration ramp 2. The established setting within the parameter is the time required to reach the maximum frequency value, starting form 0Hz.This ramp will be set according to the process necessities.	YES
5 DECEL=30.0s **M2.5**	**G10.5** / Decel Ramp 2	0.0 to 600.0s	Set the deceleration ramp 2. The established setting within the parameter is the time required to reach the maximum frequency value, starting form 0Hz.This ramp will be set according to the process necessities.	YES
6 MTR2PWR=4.0Kw **M2.6**	**G10.6** / Motor 2 Power	0.2 kW 0.4 kW 0.75 kW 1.1 kW 1.5 kW 2.2 kW 3.0 kW 3.7 kW 4.0 kW 5.5 kW 7.5 kW 11.0 kW 15.0 kW 18.5 kW 22.0 kW 30.0 kW	Set the second motor rated power according to its nameplate.	NO
7 MTRFRQ=60.00Hz **M2.7**	**G10.7** / Motor 2 Frequency	30.00 to 400.00Hz	Set the second motor frequency to rated value according to its nameplate.	NO
8 Ctr. T=V/Hz **M2.8**	**G10.8** / Control Type	0 to 4	Define the drive control type. OPT. 0 – FUNCTION: V/Hz – DESCRIPTION: Scalar control mode. Drive carries out the control applying a voltage / frequency ramp to the motor. OPT. 2 – FUNCTION: SlipCom – DESCRIPTION: Slip compensation mode. This mode reduces the effect of motor slip. OPT. 4 – FUNCTION: S-less1 – DESCRIPTION: Sensorless control mode.	NO

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Screen / Default value	Name / Description	Range	Function	Set on RUN
10 POLE Numbr=4 (*) **M2.10**	**G10.10** / POLE Number	2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48	Set the number of poles in the motor according to its nameplate.	NO
11 RtSlp=64rpm (*) **M2.11**	**G10.11** / Rated Slip	0 to 3000rpm	When facing a heavy load capable of producing a big slip during the start, configure this parameter to compensate the motor slip.	NO
12 MTRCUR=8.6A (*) **M2.12**	**G10.12** / Motor 2 Current	1.0 to 200.0A	Set the motor nominal current in accordance with the nameplate.	NO
13 NOLODC=3.1A (*) **M2.13**	**G10.13** / No load current	0.5 to 200.0A	Set the measured current at rated frequency without load. If any difficulties are found when measuring the current without load, this setting should be between 30% and 50% of the motor nameplate rated current.	NO
14 MTR VOLT=0V (*) **M2.14**	**G10.14** / Motor 2 Voltage	180 to 480V	Set the motor rated voltage according to its nameplate.	NO
15 EFFICIEN=+84% (*) **M2.15**	**G10.15** / Efficiency Motor 2	70 to 100%	Set the motor efficiency according to its nameplate.	NO
16 InertiaRate=0 (*) **M2.16**	**G10.16** / Inertia Rate M2	0 to 8	Set the load inertia rate.	NO
17 Rs=138.8mΩ (*) **M2.17**	**G10.17** / Stator Resistor	(*)	Stator resistor fine setting.	NO
18 LSigma=1.244m (*) **M2.18**	**G10.18** / Leak Inductor	(*)	Leak inductor fine setting.	NO
19 Ls=16.45mH (*) **M2.19**	**G10.19** / Stator Inductor	(*)	Inductor stator fine setting.	NO
20 Tr=228ms [34] **M2.20** [34]	**G10.20** /Rotor Time Const	25 to 5000ms	Rotor time constant fine setting.	NO
25 V/FPn=Linear **M2.25**	**G10.25** / V/F Pattern M2	0 to 3	Set V/F pattern according to the following table: **OPT.** / **FUNCTION** / **DESCRIPTION** 0 / Linear / Output voltage increases and decreases at constant rate proportional to voltage/frequency (V/F) relation 1 / Square / Output voltage increases quadratically according to the frequency. K=1.5. 2 / V/F User / Define a customized V/F pattern. 3 / Square2 / Output voltage increases quadratically according to the frequency. K=2.	NO

* These values depend on the motor setting.

[34] Displayed when 'G10.8' (M2.8 in integrated display) is set to S-less.

Screen / Default value	Name / Description	Range	Function	Set on RUN
26 FWBoost=+2.0% **M2.26**	**G10.26** / Fwd Boost	0.0 to 15.0%	Set the intensified torque in forward direction.	NO
27 RVBoost=+2.0% **M2.27**	**G10.27** / Rev Boost	0.0 to 15.0%	Set the intensified torque in reverse direction.	NO
28 StlLev1=150% **M2.28**	**G10.28** / Stall Level M2	30 to 150%	Set the stall prevention level.	NO
29 ETH1min=+150% **M2.29**	**G10.29** / ETH 1min M2	100 to 200%	Set the current level which flows continuously during one minute in % referenced to the motor nominal current. The motor nominal current is set in parameter 'G2.13 MTRCUR'. Whenever this limit is over passed, the thermo-electronic protection will be enabled, and the action defined in parameter 'G9.40 ThMM' will be executed.	NO
30 ETHcont=+100% **M2.30**	**G10.30** / ETH Cont Rating	50 to 150%	Set the overcurrent level under which the drive is able to work without enabling the thermo-electronic protection.	NO

5.12. Group 11 – G11: PLC Sequence → US

This group appears when 'G8.2' (AP.2) is set to 1 (NO) or CM.95 is set to 2 (P2P Master) (*).

A PLC sequence creates a simple sequence from a combination of different function blocks. The sequence can comprise of a maximum of 18 steps using 29 function blocks and 30 parameters.

One loop refers to a single execution of a user configured sequence that contains a maximum of 18 steps. Users can select a Loop Time of between 10-1,000ms.

The parameters for configuring PLC sequences configuration can be found in groups 11 and 12 of the removable display; which are equivalent to groups US (for user sequence settings) and UF (for function block settings).

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>1 OpComm=Stop
US.1</td><td>G11.1 / OP. COMMAND PLC</td><td>0 to 2</td><td>This parameter allows setting the run and stop sequences.
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>Stop</td><td>Stop PLC sequence.</td></tr>
<tr><td>1</td><td>Run</td><td>Run PLC sequence.</td></tr>
<tr><td>2</td><td>Run DI</td><td>Run DI Sequence</td></tr>
</table></td><td>NO</td></tr>
<tr><td>2 LoopTime=0.02s
US.2</td><td>G11.2 / LOOP TIME PLC</td><td>0 to 5</td><td>Set the PLC sequence loop time.
<table>
<tr><th>OPT.</th><th>TIME LOOP</th><th>OPT.</th><th>TIME LOOP</th></tr>
<tr><td>0</td><td>0.01s</td><td>3</td><td>0.1s</td></tr>
<tr><td>1</td><td>0.02s</td><td>4</td><td>0.5s</td></tr>
<tr><td>2</td><td>0.05s</td><td>5</td><td>1s</td></tr>
</table></td><td>NO</td></tr>
<tr><td>11 LkOut1=0
US.11</td><td>G11.11 / OUTPUT LINK 1</td><td rowspan="2">0 to 65535</td><td rowspan="2">Use registers 'G11.11' to 'G11.28' to set the parameters to connect 18 Function Blocks. If the input value is 0, an output value cannot be used.

To use the output value in step 1 for the frequency reference (Cmd Frequency), enter the communication address (0x1101) of the Cmd frequency as the Link UserOut1 parameter.</td><td rowspan="2">NO</td></tr>
<tr><td>12 LkOut2=0
US.12</td><td>G11.12 / OUTPUT LINK 2</td></tr>
<tr><td colspan="5">...</td></tr>
<tr><td>27 LkOut17=0
US.27</td><td>G11.27 / OUTPUT LINK 17</td><td rowspan="2">0 to 65535</td><td rowspan="2">See G11.11.</td><td rowspan="2">NO</td></tr>
<tr><td>28 LkOut18=0
US.28</td><td>G11.28 / OUTPUT LINK 18</td></tr>
</table>

(*) Parameter CM.95 is only available in the integrated display

Screen / Default value	Name / Description	Range	Function	Set on RUN
31 UFInp1=0 **US.31**	**G11.31** / UF1 INPUT VAL	-9999 to 9999	Use registers 'G11.31' to 'G11.60' to set 30 void parameters. Use when constant (Const) parameter input is needed in the user function block.	NO
32 UFInp2=0 **US.32**	**G11.32** / UF2 INPUT VAL			
…				
60 UFInp30=0 **US.60**	**G11.60** / UF30 INPUT VAL	-9999 to 9999	See G11.31.	NO
80 InV1=0.000 **US.80**	**G11.80** / Analogue input V1 value	0 to 12.000%	Allows setting the analog input V1 voltage value.	NO
81 InI2=+0.000 **US.81**	**G11.81** / Analogue input 2 I2 value	-12.000 to 12.000%	Allows setting the analog input I2 voltage or current values.	NO
82 DIValue=0 **US.82**	**G11.82** / Digital input value	0 to 127	Allows setting the digital inputs voltage value.	NO
85 AOVal=0.000 **US.85**	**G11.85** / Analogue output value	0.000 to 10.000%	Allows setting the analog output AO voltage or current values.	NO
88 DOValue=0 **US.88**	**G11.88** / Digital output value	0 to 3	Allows setting the digital output Q1 voltage value.	NO

5.13. Group 12 – G12: PLC Function → UF

This group appears when 'G8.2' is set to 1 (Yes) or 'G7.95' is set to 2 (P2P Master).

Set user defined functions for the 18 function blocks. If the function block setting is invalid, the output of the User Output is -1. All outputs are read only, and can be used with the user output link of the G11 (US in the integrated display) group.

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr>
<td>1 Func1=NOP</td>
<td>G12.1 / PLC Function 1</td>
<td>0 to 28</td>
<td>Choose the function to perform in the function block, according to the following table:
<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>NOP</td><td>No operation</td></tr>
<tr><td>1</td><td>ADD</td><td>Addition, (A + B) + C</td></tr>
<tr><td>2</td><td>SUB</td><td>Substraction, (A – B) – C</td></tr>
<tr><td>3</td><td>ADDSUB</td><td>Addition and substraction compound, (A + B) – C</td></tr>
<tr><td>4</td><td>MIN</td><td>Smallest value of the input values, MIN(A, B, C).</td></tr>
<tr><td>5</td><td>MAX</td><td>Largest value of the input values, MAX(A, B, C).</td></tr>
<tr><td>6</td><td>ABS</td><td>Absolute value of the A parameter, | A |</td></tr>
<tr><td>7</td><td>NEGATE</td><td>Negative value of the A parameter, -(A).</td></tr>
<tr><td>8</td><td>MPYDIV</td><td>Compound multiplication and division, (A x B)/C.</td></tr>
<tr><td>9</td><td>REMAINDER</td><td>Remainder operation of A and B, A % B</td></tr>
<tr><td>10</td><td>COMPARE-GT</td><td>Comparison operation: if (A > B) the output is C; if (A </=B) the output is 0.</td></tr>
<tr><td>11</td><td>COMPARE-GEQ</td><td>Comparison operation; if (A >/= B) output is C; if (A<B) the output is 0.</td></tr>
<tr><td>12</td><td>COMPARE-EQUAL</td><td>Comparison operation, if (A == B) then the output is C. Otherwise, the output is 0.</td></tr>
<tr><td>13</td><td>COMPARE-NEQUAL</td><td>Comparison operation, if (A != B) then the output is C. Otherwise, the output is 0.</td></tr>
<tr><td>14</td><td>TIMER</td><td>Adds 1 each time a user sequence completes a loop.
A: Max Loop, B: Timer Run/Stop, C: Choose output mode.
If B input is 1, timer stops (output is 0). If input is 0, timer runs. If C input is 1, output the current timer value. If input of C is 0, output 1 when timer value exceeds A(Max) value. If C is 0x0000, C will be recognized as 0.
Timer overflow Initializes the timer value to 0.</td></tr>
<tr><td>15</td><td>LIMIT</td><td>Sets a limit for the A parameter.
If input to A is between B and C, output the input to A. If input to A is larger than B, output B. If input of A is smaller than C, output C.
B must be greater than or equal to C.</td></tr>
<tr><td>16</td><td>AND</td><td>Output the AND operation, (A and B) and C.</td></tr>
<tr><td>17</td><td>OR</td><td>Output the OR operation, (A | B) | C.</td></tr>
<tr><td>18</td><td>XOR</td><td>Output the XOR operation, (A ^ B) ^ C.</td></tr>
<tr><td>19</td><td>ANDOR</td><td>Output the AND/OR operation, (A andB) | C.</td></tr>
<tr><td>20</td><td>SWITCH</td><td>Output a value after selecting one of two inputs, if (A) then B, otherwise C.
If the input at A is 1, the output will be B. If the input at A is 0, the output parameter will be C.</td></tr>
<tr><td>21</td><td>BITTEST</td><td>Test the B bit of the A parameter, BITTEST(A, B).
If the B bit of the A input is 1, the output is 1. If it is 0, then the output is 0.
The input value of B must be between 0–16. If the value is higher than 16, it will be recognized as 16. If input at B is 0, the output is always 0.</td></tr>
</table>
Note: Continues in the next page.
</td>
<td>NO</td>
</tr>
</table>

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>UF.1</td><td></td><td></td><td>ç
Note: Comes from the previous page.

<table>
<tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr>
<tr><td>22</td><td>BITSET</td><td>Set the B bit of the A parameter, BITSET(A, B).
Output the changed value after setting the B bit to input at A.
The input value of B must be between 0–16. If the value is higher than 16, it will be recognized as 16. If the input at B is 0, the output is always 0.</td></tr>
<tr><td>23</td><td>BITCLEAR</td><td>Clear the B bit of the A parameter, BITCLEAR(A, B).
Output the changed value after clearing the B bit to input at A.
The input value of B must be between 0–16. If the value is higher than 16, it will be recognized as 16. If the input at B is 0, the output is always 0.</td></tr>
<tr><td>24</td><td>LOWPASSFILTER</td><td>Output the input at A as the B filter gains time constant, B x ‘G11.2’.
In the above formula, set the time when the output of A reaches 63.3% C stands for the filter operation. If it is 0, the operation is started.</td></tr>
<tr><td>25</td><td>PI_CONTORL</td><td>P, I gain = A, B parameter input, then output as C.
Conditions for PI_PROCESS output:
C = 0: Const PI,
C = 1: PI_PROCESS-B >= PI_PROCESS-OUT >= 0,
C = 2: PI_PROCESS-B >= PI_PROCESS-OUT >= -(PI_PROCESS-B),
P gain = A/100, I gain = 1/(Bx Loop Time),
If there is an error with PI settings, output is -1.</td></tr>
<tr><td>26</td><td>PI_PROCESS</td><td>A is an input error, B is an output limit, C is the value of Const PI output.
Range of C is 0 to 32767.</td></tr>
<tr><td>27</td><td>UPCOUNT</td><td>Upcounts the pulses and then output the value UPCOUNT(A, B, C).
After receiving a trigger input (A), outputs are upcounted by C conditions. If the B inputs is 1, do not operate and display 0. If the B inputs is 0, operate.
If C is 0, upcount when A changes from 0 to 1.
If C is 1, upcount when A is changed from 1 to 0.
If C is 2, upcount whenever the input at A changes.
Output range is: 0 to 32767.</td></tr>
<tr><td>28</td><td>DOWNCOUNT</td><td>Downcounts the pulses and then output the value-DOWNCOUNT(A, B, C).
After receiving a trigger input (A), outputs are downcounted by C conditions. If the B input is 1, do not operate and display the initial value of C. If the B input is 0, operate. Downcounts when the A parameter changes from 0 to 1.</td></tr>
</table></td><td></td></tr>
<tr><td>2 Inpt1A=0
UF.2</td><td>G12.2 / Inp Func 1A PLC</td><td>0 to 65535</td><td>Communication address of the first input parameter of the PLC function.</td><td>NO</td></tr>
<tr><td>3 Inpt1B=0
UF.3</td><td>G12.3 / Inp Func 1B PLC</td><td>0 to 65535</td><td>Communication address of the second input parameter of the PLC function.</td><td>NO</td></tr>
<tr><td>4 Inpt1C=0
UF.4</td><td>G12.4 / Inp Func 1C PLC</td><td>0 to 65535</td><td>Communication address of the third input parameter of the PLC function.</td><td>NO</td></tr>
<tr><td>5 Outp1=+0
UF.5</td><td>G12.5 / Outpt Func 1 PLC</td><td>-32767 to 32767</td><td>Output value (Read Only) after performing the function block.</td><td>NO</td></tr>
<tr><td>6 Func2=NOP
UF.6</td><td>G12.6 / PLC Function 2</td><td>See G12.1</td><td>See G12.1</td><td>NO</td></tr>
<tr><td>7 Inpt2A=0
UF.7</td><td>G12.7 / Inp Func 2A PLC</td><td>See G12.2</td><td>See G12.2</td><td>NO</td></tr>
<tr><td>8 Inpt2B=0
UF.8</td><td>G12.8 / Inp Func 2A PLC</td><td>See G12.3</td><td>See G12.3</td><td>NO</td></tr>
</table>

Screen / Default value	Name / Description	Range	Function	Set on RUN
9 Inpt2C=0 **UF.9**	G12.9 / Inp Func 2A PLC	See G12.4	See G12.4	NO
10 Outp2=+0 **UF.10**	G12.10 / Outpt Func 2 PLC	See G12.5	See G12.5	NO
...				
86 Func18=NOP **UF.86**	G12.86 / PLC Function 18	See G12.1	See G12.1	NO
87 Inpt18A=0 **UF.87**	G12.87 / Inp Func 18A PLC	See G12.2	See G12.2	NO
88 Inpt18B=0 **UF.88**	G12.88 / Inp Func 18A PLC	See G12.3	See G12.3	NO
89 Inpt18C=0 **UF.89**	G12.89 / Inp Func 18A PLC	See G12.4	See G12.4	NO
90 Outp18=+0 **UF.90**	G12.90 / Outpt Func 18 PLC	See G12.5	See G12.5	NO

5.14. Group 13 – G13: Fault History

This group is only shown in the removable LCD display. TO

For the integrated display, faults are shown in parameters Pr.90 to Pr9.96.

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>Fault = No Fault</td><td>G13.1 /Current Fault status visualization</td><td>-</td><td>This screen will be automatically displayed every time the drive trips with a new fault.
Shows the current fault status of the drive. In case there is no fault the screen will display the message ‘No Fault’. By pressing the ‘*’ key the fault number will be displayed.
The drive resets pressing the display STOP-RESET key or using an external reset when available. Faults can be automatically reset using the Auto Reset function. See parameter group [G12 'Auto Reset'].

The following table shows all of the possible faults:
<table>
<tr><th>COD</th><th>FAULT</th><th>COD</th><th>FAULT</th></tr>
<tr><td>0</td><td>No Fault</td><td>21</td><td>RESERVED</td></tr>
<tr><td>1</td><td>OverLoad</td><td>22</td><td>Param_Wr_Err</td></tr>
<tr><td>2</td><td>UnderLoad</td><td>23</td><td>Pipe Fill Flt</td></tr>
<tr><td>3</td><td>Inv OverLoad</td><td>24</td><td>IO Board Fail</td></tr>
<tr><td>4</td><td>E-Thermal</td><td>25</td><td>External Brake</td></tr>
<tr><td>5</td><td>Ground Fault</td><td>26</td><td>No Motor</td></tr>
<tr><td>6</td><td>Output Ph Loss</td><td>27</td><td>Slot 1 Fail</td></tr>
<tr><td>7</td><td>Input Ph Loss</td><td>28</td><td>Slot 2 Fail</td></tr>
<tr><td>8</td><td>OverSpeed</td><td>29</td><td>Slot 3 Fail</td></tr>
<tr><td>10</td><td>NTC</td><td>30</td><td>STO Fault</td></tr>
<tr><td>11</td><td>OverCurrent</td><td>33</td><td>Free Run</td></tr>
<tr><td>12</td><td>OverVoltage</td><td>34</td><td>Low Voltage</td></tr>
<tr><td>13</td><td>External Trip</td><td>35</td><td>Lost Command</td></tr>
<tr><td>14</td><td>Arm Short</td><td>36</td><td>KeypadLostCMD</td></tr>
<tr><td>15</td><td>OverHeat</td><td>49</td><td>ADC Error</td></tr>
<tr><td>16</td><td>Fuse Open</td><td>50</td><td>EEPROM Error</td></tr>
<tr><td>17</td><td>MC Fail</td><td>51</td><td>Watchdog-1 Err</td></tr>
<tr><td>18</td><td>Encoder Error</td><td>52</td><td>Watchdog-2 Err</td></tr>
<tr><td>19</td><td>PTC</td><td>53</td><td>DrivePowerLoss</td></tr>
<tr><td>20</td><td>FAN Trip</td><td></td><td></td></tr>
</table>
Note: For further information about faults see section 3, Warning & Fault Messages.</td><td>-</td></tr>
<tr><td>FAULT 1 INFO [1]</td><td>G13.2 / Fault History Register 1</td><td>-</td><td rowspan="6">The first group (FAULT INFO 1) shows the information of the last fault and will be used as the first fault history register.

The last five faults, listed in chronological order, are shown as new faults occur, with the most recent fault in the first place (FAULT INFO 1). Every time a fault is produced, the drive shows the (FAULT INFO 1) screen, moving the previous fault to the next register position (FAULT INFO 2). The rest of stored faults will move down a position. The oldest fault message (FAULT INFO 5) will be lost.

These groups enable accessing to the extended information of every one of the last five faults registers. This information displays the drive status in the moment the fault has been produced.
<table>
<tr><th>OPT.</th><th>FUNCTION</th></tr>
<tr><td>X Fault=</td><td>Fault register X display</td></tr>
<tr><td>X Op Fq=</td><td>Output frequency value when fault occurred.</td></tr>
<tr><td>X Out I=</td><td>Output current value when fault occurred</td></tr>
<tr><td>X DC Volt=</td><td>Bus voltage value when fault occurred</td></tr>
<tr><td>X Temp=</td><td>Equipments temperature when fault occurred.</td></tr>
<tr><td>X DI=</td><td>Digital input s status values when fault occurred.</td></tr>
<tr><td>X DO Sta=</td><td>Digital outputs status values when fault occurred</td></tr>
<tr><td>X On Days=</td><td>Number of days the equipment has been turned on until fault.</td></tr>
<tr><td>X On Min=</td><td>Number of minutes the equipment has been turned on until fault.</td></tr>
<tr><td>X RUN Days=</td><td>Number of days the equipment has been running until fault.</td></tr>
<tr><td>X RUN Min=</td><td>Number of minutes the equipment has been running until fault.</td></tr>
</table></td><td>-</td></tr>
<tr><td>FAULT 2 INFO [1]</td><td>G13.3 / Fault History Register 2</td><td>-</td><td>-</td></tr>
<tr><td>FAULT 3 INFO [1]</td><td>G13.4 / Fault History Register 3</td><td>-</td><td>-</td></tr>
<tr><td>FAULT 4 INFO [1]</td><td>G13.5 / Fault History Register 4</td><td>-</td><td>-</td></tr>
<tr><td>FAULT 5 INFO [1]</td><td>G13.6 / Fault History Register 5</td><td>-</td><td>-</td></tr>
</table>

<table>
<tr><th>Screen / Default value</th><th>Name / Description</th><th>Range</th><th>Function</th><th>Set on RUN</th></tr>
<tr><td>Clr FaultHist= N</td><td>G13.7 / Clear Fault History</td><td>NO
NO</td><td><table><tr><th>OPT.</th><th>FUNCTION</th></tr><tr><td>NO</td><td>Function disabled.</td></tr><tr><td>NO</td><td>Deletes the fault history (the last five faults). The screen will return to the default value ‘NO’ once all of the faults have been deleted.</td></tr></table></td><td>NO</td></tr>
<tr><td>ENB/DIS LV Flt= D</td><td>G13.8 / Low Voltage fault register</td><td>D
E</td><td>In order to select if Low Voltage fault must be saved in the fault history register or not.<table><tr><th>OPT.</th><th>FUNCTION</th><th>DESCRIPTION</th></tr><tr><td>D</td><td>DISABLED</td><td>The Low Voltage fault will not be saved in the fault history.</td></tr><tr><td>E</td><td>ENABLED</td><td>The Low Voltage fault will be saved in the fault history.</td></tr></table>Note: If the drive losses power completely before displaying the fault, the Low Voltage fault will not be saved despite having enabled this parameter.</td><td>NO</td></tr>
</table>

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[1] These groups will be displayed as new faults occur.

6. MODBUS COMMUNICATION

To control the variable speed drive with a PLC or a computer. the industrial standard communications protocol of Modicon, Modbus, is used. Connect the communication cables (*) and set the communication parameters on the drive according to the guidelines within this section.

6.1. Introduction

Various drives, or other slave devices, can be connected in a RS485 network to be controlled by a PLC or computer. This way, parameter setting and monitoring can be done from a computer, via a user program.

To communicate, any kind of RS485 converter can be used. Specifications depend on the manufacturer.

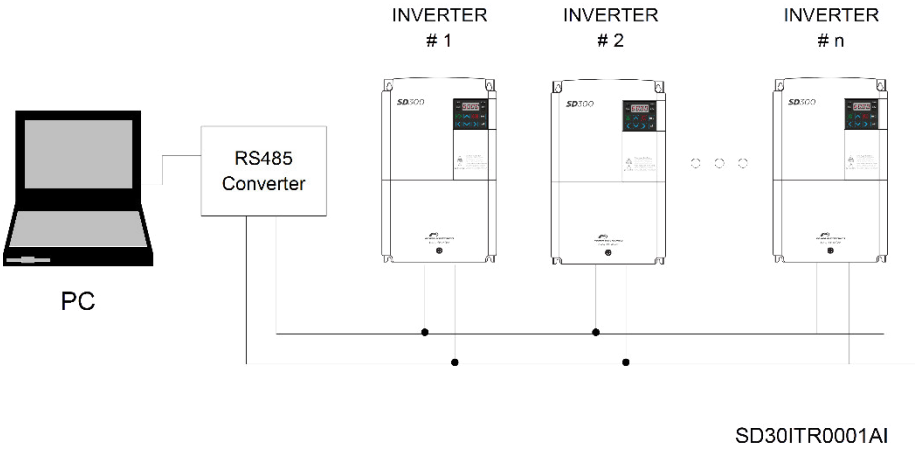

Figure 6.1 RS485 network system configuration

The purpose of the Serial Communication Network of the SD300 is to integrate the drive into a network compatible with the Modbus communications protocol. This is possible using the RS485 physical communications port or USB port.

Modbus communication system allows SD300 drives to be controlled and/or monitored as a slave by a Modbus master from a remote location.

RS485 network allows connecting up to 16 equipments in the same network.

SD300 drives operate as a peripheral slave when connected to Modbus system. This means that the drive does not start the communication task, the master does.

Practically all of the operating modes, parameters and drive characteristics are accessible through serial communications. For example, master can give start and stop order to the drive, control SD300 status, read the current used by the motor etc., in short, the master can access all of the features of the drive.

(*) For detailed instructions on how to make the connections, please refer to the *Hardware and Installation Manual*

6.2. Supported Modbus Function Codes

Serial communications protocol provided by SD300 drive adhere to Modbus. The drive uses reading and writing functions between all of the functions that exist in Modbus protocol. The used functions by the drive are the following ones:

Function	Description	Registers Number
3	Registers Reading	120
16	Registers Writing	120

The implementation of this function code in the drive allows reading up to 120 registers into a Parameters Group in a frame. If you want to access to a consecutive memory registers. but belonging to different groups. you should access in so many frames as groups are involved.

6.2.1. Modbus Function Code Nº 3: Registers Reading

This function code allows the Modbus controller (master) to read the content of the data registers indicated in the drive (slave). This function code only admits unicast addressing. Broadcast or groupcast addressing are not possible with this function code.

The implementation of this function code in the drive allows reading up to 120 registers with consecutive addresses of the drive in a single frame.

Next. a frame is shown where the master tries to read the content of 3 registers of a drive where the current used by each phase is. The information that should be attached in the ask frame is the following one:

- Data address of the drive.
- Modbus function code (3 Registers reading).
- Starting Data address.
- Registers number for reading.
- CRC-16 code.

The answer of the drive (slave) should contain the following fields:

- Data address of the slave.
- Modbus function code (3 Registers reading).
- Bytes number for reading.
- Bytes number / 2 registers.
- CRC-16 code.

Each register consists of 2 bytes (2x8bits=16 bits). This is the default length for all registers.

Example:

Suppose that we want to read the motor current (nameplate data) via communications. This data corresponds to the parameter G2.1 '1 MTR CUR=00.00A'. The frame that should be transmitted is:

Modbus Address	Modbus Function Code	Starting Data Address (40282)	Registers Number	CRC-16
0x0A	0x03	0x0119	0x0001	0x2493

Suppose that instantaneous current of the equipment is 8.2 A. (Modbus value 82 decimal = 0x52 Hexadecimal). The answer of the slave will be:

Modbus Address	Modbus Function Code	Bytes Number	Data (address 20) (=110)	CRC-16
0x0A	0x03	0x02	0x0052	0x9C78

6.2.2. Modbus Function Code Nº 16: Registers Writing

This function code allows the Modbus controller (master) to write the content of the data registers indicated in the drive (slave). whenever those registers are not of Read only. Registers writing by the master does not impede the later modification of those registers by the slave.

The implementation of this function code in the drive allows writing up to 5 registers of the drive in a single frame.

Next. a frame is shown where the master tries to write the content of 1 register that stores the acceleration time. The information that should be attached in the ask frame is the following one:

- Data address of the slave.
- Modbus function code (16 Registers writing).
- Starting Data Address.
- Registers number for writing.
- Bytes number for writing.
- Content of registers for writing.
- CRC-16 code.

The answer of the slaves includes:

- Data address of the slave.
- Modbus function code (16 Registers writing).
- Starting Data Address.
- Written registers number.
- CRC-16 code.

6.3. Addressing Modes

6.3.1. Broadcast Addressing Mode

Broadcast addressing mode allows the master to access at the same time to all of the slaves connected to the Modbus network. The Modbus function code that admits this global addressing mode is:

Function	Description
16	Registers Writing

In order to access to all of the equipments connected in a Modbus network. you must use the address 0.

When this address is used. all of the slaves in the Modbus network make the required task but they do not prepare any answer.

6.4. Summary of Modbus Addresses

6.4.1. Common Area

Address	Parameter	Scale	Units	R/W	Data Values
40000	Inverter Model			R	B: SD500
40001	Drives Power Ratings			R	0: 0.75kW 1: 1.5kW 2: 2.2kW 3: 3.7kW 4: 5.5kW 5: 7.5kW 6: 11kW 7: 15kW 8: 18.5kW 9: 22kW A: 30kW B: 37kW C: 45kW D: 55kW E: 75kW
40002	Drive Input Voltage			R	0: 220VAC 1: 400VAC
40003	SW Version			R	(Ex) 0x0100: Version 1.0 (Ex) 0x0101: Version 1.1
40004	Reserved				
40005	Reference Frequency	0.01	Hz	R/W	Starting Freq to Max Freq
40006	Start / Stop Command			R/W	Bit 0: Stop
					Bit 1: Forward Start
					Bit 2: Reverse Start
					Bit 3: Fault Reset
					Bit 4: Emergency Stop
				-	Bit 5: Not used
				R	Bit 6 – 8: Setpoint Introduction 0: Local 1: Start/Stop-1 2: Start/Stop-2 3: RS485 integrated 4: Communications Option 5: PLC Option
					Bit 9 – 14: Reference Frequency 0: Local Reference 1: Not used 2: Step frequency 1 3: Step frequency 2 4: Step frequency 3 5: Step frequency 4 6: Step frequency 5 7: Step frequency 6 8: Step frequency 7 9: Step frequency 8 10: Step frequency 9 11: Step frequency 10 12: Step frequency 11 13: Step frequency 12 14: Step frequency 13 15: Step frequency 14 16: Step frequency 15 17: Up Speed 18: Down Speed 19: Constant 20 – 21: Reserved 22: Analog V1 23: Analog I1 24: Analog V2 25: Analog I2 26: Reserved 27: RS485 28: Communication Option 29: PLC Option 30: Fix Frequency 31: PID
					Bit 15: Network Error
40007	Acceleration Time	0.1	Sec	R/W	
40008	Deceleration Time	0.1	Sec	R/W	

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Address	Parameter	Scale	Units	R/W	Data Values
40009	Output Current	0.1	A	R	
40010	Output Frequency	0.01	Hz	R	
40011	Output Voltage	1	V	R	
40012	DC Bus Voltage	1	V	R	
40013	Output Power	0.1	kW	R	
40014	Drive Status			R	Bit 0: Stop Bit 1: Start (+) Bit 2: Start (-) Bit 3: Fault Bit 4: Accelerating Bit 5: Decelerating Bit 6: Steady Status Bit 7: DC Brake Bit 8: Stop Bit 9: Fix Frequency Bit 10: Open Brake Bit 11: Start (+) Command Bit 12: Start (-) Command Bit 13: Start / Stop by Communication Bit 14: Freq. Reference by Communication Bit 15: 0-Remote; 1-Local
40016	Digital Inputs Status			R	Bit 0: P1 Bit 1: P2 Bit 2: P3 Bit 3: P4 Bit 4: P5 Bit 5: P6 Bit 6: P7 Bit 7: P8
40017	Digital Outputs Status			R	Bit 0: Relay 1 Bit 1: Relay 2 Bit 2: Digital Output 1 (Q1) Bit 3: Relay 3 (Option I/O) Bit 4: Relay 4 (Option I/O) Bit 5: Relay 5 (Option I/O)
40018	V1			R	Voltage input V1
40019	V2			R	Voltage Input V2 (Option I/O)
40020	I			R	Current Input I1
40021	RPM			R	Speed Output
40026	Display unit			R	0: Hz 1: rpm
40027	Number of poles			R	Motor poles visualisation
40904	PID Reference	0.1	%	R/W	PID reference value
40905	PID Feedback	0.1	%	R/W	PID feedback value.

Notes:

1. Start / Stop order through communications (address 41007)

Every bit is enabled when they change their status from 0 to 1. For example, the drive stops due to a fault during start. Until the fault has been reset and the start order is given, the drive will not operate.

2. Addresses 41006 and 41007

The values stored in these addresses will be deleted if the drive losses it power supply. These addresses will only keep their values while the equipment remains powered.

6.4.2. Programming Parameters

Parameter	Screen	Description	Address	Range	Modbus Range
G1.1	1 LCLSP=0.00Hz	Local Speed	**44354**	[G1.19] to [G1.20]	1 to 40000
G1.2	2 LclTQ=0.0%	Local Torque	**44355**	-180.0 to 180.0%	-1800 to 1800
G1.3	3 ACC1=20.0s	Acc Ramp	**44356**	0.0 to 600.0s	0 to 6000
G1.4	4 DECEL1=30.0s	Decel Ramp	**44357**	0.0 to 600.0s	0 to 6000
G1.6	6 CONTROLMODE1=REMOTE	Control Mode 1	**44359**	LOCAL REMOTE MODBUS COMMS	0 1 3 4
G1.7	7 REF1 SP= LOCAL	Speed Reference1	**44360**	LOCAL V1 V2 V3 MDBUS COMMS	0 2 4 5 6 8
G1.8	8 REF1 TQ= LOCAL	Torque Ref1	**44361**	LOCAL V1 V2 V3 MDBUS COMMS	0 2 4 5 6 8
G1.9	9 Ctr.T=V/Hz	Control Type	**44362**	V/Hz SlipCom S-less1	0 2 4
G1.10	10 Torq CTRL=N	Speed or Torque	**44363**	N / Y	0 / 1
G1.11	11 InchF=10.00Hz	Inch Frequency	**44364**	[G1.19] to [G1.20]	1 to 40000
G1.12	12 InchAcT=20.0s	INCH Acc Time	**44365**	0.0 to 600.0s	0 to 6000
G1.13	13 InchDeT=30.0s	INCH Dec Time	**44366**	0.0 to 600.0s	0 to 6000
G1.14	14 MTRPWR= *	Motor Power	**44367**	0.2 kW 0.4 kW 0.75 kW 1.1 kW 1.5 kW 2.2 kW 3.0 kW 3.7 kW 4.0 kW 5.5 kW 7.5 kW 11.0 kW 15.0 kW 18.5 kW 22.0 kW 30.0 kW	0 to 15
G1.15	15 TqBoost=Manual	Torque Boost	**44368**	Manual Auto1 Auto2	0 1 2
G1.16	16 FWBoost=2.0%	Fwd Boost	**44369**	0.0 to 15.0%	0 to 150
G1.17	17 RVBoost=2.0%	Rev Boost	**44370**	0.0 to 15.0%	0 to 150
G1.18	18MTRFRQ=60.00Hz	Motor Frequency	**44371**	30.00 to 400.00Hz	3000 to 40000
G1.19	19 STRFRQ=0.5Hz	Start Frequency	**44372**	0.01 to 10.00Hz	1 to 1000
G1.20	20 MxSpL=60.00Hz	Max Speed Lt	**44373**	40.00 to 400.00Hz	4000 to 40000
G1.21	21 Hz/Rpm=Hz	Hz/Rpm Display	**44374**	Hz Rpm	0 1

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* This value depends on the motor setting.

Parameter	Screen	Description	Address	Range	Modbus Range
G1.81	81 SelCod=Volt V	Select monitor code	**44434**	Volt V Pow kW Tq kgf	0 1 2
G1.89	89 DspChng=All	Display changed parameter	**40996**	All Chang	0 1
G1.90	90 ESC Func= Mov. In. Pos.	ESC Key Func.	**44443**	Mov. In. Pos. JOG Key Local/Rem.	0 1 2
G1.91	91 Eloader=None	Eloader	**44444**	None Download Upload	0 1 2
G1.93	93 INITIALIS=No	Parameter Initialization	**44446**	No All	0 1
G1.94	94 PswRg=0	Password registration	**44447**	0 to 9999	0 to 9999
G1.95	95 PrmLock=0	Parameter lock settings	**44448**	0 to 9999	0 to 9999
G1.97	97 SoftVer=0	Software Version	**44450**	0 to 9999	0 to 9999
G1.98	98 IOSwVer=0	IOS Software Version	**44451**	0 to 65535	0 to 65535
G1.99	99 IOHwVer=0	Hardware Version	**44451**	0 to 65535	0 to 65535
G2.1	1 REF2 SP=None	Alt Speed Ref	**44610**	None EA1 EA2 EA3 Pulse	0 1 3 4 6
G2.2	2 AuxCalcType=M+(G*A)	Aux Calc Type	**44611**	M+(G*A) Mx (G*A) M/(G*A) M+[M*(G*A)] M+G*2(A-50%) Mx[G*2(A-50%) M/[G*2(A-50%)] M+M*G*2(A-50%)	0 1 2 3 4 5 6 7
G2.3	3 AuxRfG=100.0%	Aux. Ref. Gain	**44612**	-200.0 to 200.0	-2000 to 2000
G2.4	4 CONTROLMODE2=REMOTE	Alt Ctrl Mode	**44613**	LOCAL REMOTE MODBUS COMMS	0 1 3 4
G2.5	5 REF2 SP=LOCAL	Alt Speed Ref	**44614**	LOCAL V1 V2 V3 MDBUS COMMS	0 2 3 4 6 8
G2.6	6 REF2 TQ= LOCAL	Torque Ref2	**44615**		
G2.7	7 V/FPn=Linear	V/F Pattern	**44616**	Linear Square V/F Us Square2	0 1 2 3
G2.8	8 RmpT= MaxFreq	Ramp T Mode	**44617**	MaxFreq DeltaFreq	0 1
G2.9	9 TimScl=0.1s	Time scale	**44618**	0.01s 0.1s 1s	0 1 2
G2.10	10 I/P Freq=60Hz	Input Frequency	**44619**	60Hz 50Hz	0 1
G2.11	11 POLE Numbr=4	POLE Number	**44620**	2 to 48	2 to 48
G2.12	12 RtSlp=40rpm	Rated Slip	**44621**	0 to 3000rpm	0 to 3000
G2.13	13 MTRCUR=3.6A	Motor Current	**44622**	1.0 to 200.0A	10 to 2000
G2.14	14 NOLODC=1.6A	No load Current	**44623**	0.5 to 200.0A	5 to 2000
G2.15	15 MTR VOLT=0V	Motor Voltage	**44624**	180 to 480V	180 to 480
G2.16	16 EFFICIEN=72%	Efficiency	**44625**	70 to 100%	70 to 100
G2.17	17 InertiaRate=0	Inertia Rate	**44626**	0 to 8	0 to 8
G2.18	18 TrimPwr%=100%	Trim Power %	**44627**	70 to 130%	70 to 130
G2.19	19 ACi/Volt=380V	AC Input Volt	**44628**	170 to 230V 320 to 480V	170 to 230 320 to 480
G2.20	20 AutoTuning=None	Auto tuning	**44629**	None All Allst Rs+Lsig Tr	0 1 2 3 6
G2.21	21 Rs=0	Stator Resistor	**44630**	*	0 to 9999
G2.22	22 LSigma=0mH	Leak Inductor	**44631**	*	0 to 9999
G2.23	23 Ls=0mH	Stator Inductor	**44632**	*	0 to 9999

Parameter	Screen	Description	Address	Range	Modbus Range
G2.24	24 Tr=145ms	Rotor Time Const	**44633**	25 to 5000ms	25 to 5000
G2.25	25 Ls Scl=100%	Stator Ind. Sca.	**44634**	50 to 150%	50 to 150
G2.26	26 Tr Scl=100%	Rotor Ti Co Sca.	**44635**	50 to 150%	50 to 150
G2.31	31 LsR Scl=80%	Regen. Ind. Scl.	**44640**	70 to 100%	70 to 100
G2.41	41 UsFq1=15.00Hz	User Frequency 1	**44650**	0.00 to [G1.20]	0 to 40000
G2.42	42 User V1=25%	User Voltage 1	**44651**	0 to 100%	0 to 100
G2.43	43 UsFq2=30.00Hz	User Frequency 2	**44652**	0.00 to [G1.20]	0 to 40000
G2.44	44 User V2=50%	User Voltage 2	**44653**	0 to 100%	0 to 100
G2.45	45 UsFq3=45.00Hz	User Frequency 3	**44654**	0.00 to [G1.20]	0 to 40000
G2.46	46 User I2=75%	User Voltage 3	**44655**	0 to 100%	0 to 100
G2.47	47 UsFrq4=0.00Hz	User Frequency 4	**44656**	0.00 to [G1.20]	0 to 40000
G2.48	48 User V4=0%	User Voltage 4	**44657**	0 to 100%	0 to 100
G2.50	50 MREF1=10.00%	Multi-Reference1	**44659**		
G2.51	51 MREF2=20.00%	Multi-Reference2	**44660**		
G2.52	52 MREF3=30.00%	Multi-Reference3	**44661**		
G2.53	53 MREF4=40.00%	Multi-Reference4	**44662**	0.00 to [G1.20]	1 to 40000
G2.54	54 MREF5=50.00%	Multi-Reference5	**44663**		
G2.55	55 MREF6=60.00%	Multi-Reference6	**44664**		
G2.56	56 MREF7=60.00%	Multi-Reference7	**44665**		
G2.70	70 ACC2=20.0s	Acc Ramp 2	**44679**		
G2.71	71 DEC2=30.0s	Decel Ramp 2	**44680**		
G2.72	72 ACC3=20.0s	Acc Ramp 3	**44681**		
G2.73	73 DEC3=30.0s	Decel Ramp 3	**44682**		
G2.74	74 ACC4=20.0s	Acc Ramp 4	**44683**		
G2.75	75 DEC4=30.0s	Decel Ramp 4	**44684**		
G2.76	76 ACC5=20.0s	Acc Ramp 5	**44685**	0.0 to 600.0s	0 to 6000
G2.77	77 DEC5=30.0s	Decel Ramp 5	**44686**		
G2.78	78 ACC6=20.0s	Acc Ramp 6	**44687**		
G2.79	79 DEC6=30.0s	Decel Ramp 6	**44688**		
G2.80	80 ACC7=20.0s	Acc Ramp 7	**44689**		
G2.81	81 DEC7=30.0s	Decel Ramp 7	**44690**		
G2.82	82 ACC8=20.0s	Acc Ramp 8	**44691**		
G2.83	83 DEC8=30.0s	Decel Ramp 8	**44692**		
G3.1	1 AccPn=Linear	Acc Pattern	**44866**	Linear	0
G3.2	2 DecPn=Linear	Dec Pattern	**44867**	S-curve	1
G3.3	3 AccSSrt=40%	Acc S Start	**44868**	1 to 100%	1 to 100
G3.4	4 AccSEnd=40%	Acc S End	**44869**	1 to 100%	1 to 100
G3.5	5 DecSSrt=40%	Dec S Start	**44870**	1 to 100%	1 to 100
G3.6	6 DecSEnd=40%	Dec S End	**44871**	1 to 100%	1 to 100
G3.7	7 START=RAMP	Start Mode	**44872**	RAMP DCSTART	0 1
G3.8	8 STOP=RAMP	Stop Mode	**44873**	RAMP DC BRAKE SPIN POW BRKE	0 1 2 4
G3.9	9 FWR/RV=None	Prevention Rotat	**44874**	None FWDPrev REVPrev	0 1 2
G3.10	10 Run Aft VIF=N	Power-on Run	**44875**	N Y	0 1
G3.12	12 DCSt T=0.00s	Time to DC Start	**44877**	0.00 to 60.00s	0 to 6000
G3.13	13 DC Curr=50%	Curr Inj DC Strt	**44878**	0 to 200%	0 to 200
G3.14	14 PreDCT=0.10s	Pre DCBrake Time	**44879**	0.00 to 60.00s	0 to 6000
G3.15	15 DCBrkT=1.00s	DC Brake Time	**44880**	0.00 to 60.00s	0 to 6000
G3.16	16 DCBkCur=50%	Levl Cur DCBrake	**44881**	0 to 200%	0 to 200
G3.17	17 DCBkF=5.00Hz	Frq Strt DCBrake	**44882**	[G1.19] to 60.00	0 to 6000
G3.20	20 AcDF=5.00Hz	Acc Dwell Freq	**44885**	[G1.19] to [G1.20]	1 to 40000
G3.21	21 AccDWT=0.0s	Acc Dwell Time	**44886**	0.0 to 60.0	0 to 600
G3.22	22 DeDF=5.00Hz	Dec Dwell Freq	**44887**	[G1.19] to [G1.20]	1 to 40000
G3.23	23 DecDWT=0.0s	Dec Dwell Time	**44888**	0.0 to 60.0S	0 to 600
G3.24	24 UseFrqLimit=N	Use Freq Limit	**44889**	NO YES	0 1
G3.25	25 FLtLo=0.50Hz	Freq Limit Lo	**44890**	0.00 to [G3.26]	0 to 4372
G3.26	26 FLtHi=[G1.20]Hz	Freq Limit Hi	**44891**	[G3.25] to [G1.20]	0 to 40000
G3.27	27 Jump Freq=N	Jump Frequency	**44892**	NO YES	0 1
G3.28	28 JmpL1=10.00Hz	Jump Low 1	**44893**	0.00 to [G3.29]	0 to 4372
G3.29	29 JmpH1=15.00Hz	Jump High 1	**44894**	[G3.28] to [G1.20]	0 to 40000

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Parameter	Screen	Description	Address	Range	Modbus Range
G3.30	30 JmpL2=20.00Hz	Jump Low 2	**44895**	0.00 to [G3.31]	0 to 4372
G3.31	31 JmpH2=25.00Hz	Jump High 2	**44896**	[G3.30] to [G1.20]	0 to 40000
G3.32	32 JmpL3=30.00Hz	Jump Low 3	**44897**	0.00 to [G3.33]	0 to 4372
G3.33	33 JmpH3=35.00Hz	Jump High 3	**44898**	[G3.32] to [G1.20]	0 to 40000
G3.41	41 RlsCur=50.0%	Brake Open Curr	**44906**	0.0 to 180.0%	0 to 1800
G3.42	42 RlsDly=1.00s	Brake Open Delay	**44907**	0.00 to 10.00s	0 to 1000
G3.44	44 FwdFq=1.00Hz	BrakeOpenFWDFrq	**44909**	0.00 to [G1.20]	0 to 40000
G3.45	45 RevFq=1.00Hz	BrakeOpenRevFrq	**44910**	0.00 to [G1.20]	0 to 40000
G3.46	46 BEngDly=1.00s	Brake Close Dly	**44911**	0.00 to 10.00s	0 to 1000
G3.47	47 BEngF=2.00Hz	Brake Close Freq	**44912**	0.00 to [G1.20]	0 to 40000
G3.50	50 FLX MIN=NONE	Flux min mode	**44915**	NONE MANU AUTO	0 1 2
G3.51	51 FluxLVEL=0%	Flux min manual	**44916**	0 to 30%	0 to 30
G3.60	60 XclCF=0.00Hz	Acc Dwell Freq	**44925**	0.00 to [G1.20]	0 to 40000
G3.64	64 FAN=During Run	FAN Control	**44929**	DuringRun Always ON Temp Ctrl	0 1 2
G3.65	65 SaveMot Frq=N	Save motpot freq	**44930**	N Y	0 1
G3.66	66 SLCOM=None	Selec sourc comp	**44931**	None V1 V2 V3 Pulse	0 to 6
G3.67	67 ScON=90.00%	Setpoint On comp	**44932**	[G3.68] to 100.00	-10000 to 10000
G3.68	68 SC OF=10.00%	Stpoint Off comp	**44933**	-100.00 to [G3.67]	-10000 to 10000
G3.70	70 RunEMod=Always Enable	Safe Oper. Sel.	**44935**	Always Enable DI Dependent	0 1
G3.71	71 RunDStp=Free Run	Safe Oper. Stop	**44936**	Free-Run Q-Stop Q-Stop Res	0 1 2
G3.72	72 QStpT=5.0s	Q-Stop Time	**44937**	0.0 to 600.0s	0 to 6000
G3.74	74 RegAvdSel=N	Regen. Avd. Sel.	**44939**	NO YES	0 1
G3.75	75 VlRegL=350V / 700V	Regen. Avd Level	**44940**	300 to 400V 600 to 800V	300 to 400 600 to 800
G3.76	76 CpFrL=1.00Hz	Comp. Frq. Lim.	**44941**	0.00 to 10.00Hz	0 to 1000
G3.77	77 RegAvP=50.0%	Regen. Avd Pgain	**44942**	0.0 to 100.0%	0 to 1000
G3.78	78 RgAvI=50.0ms	Regen. Avd Igain	**44943**	0.0 to 3000.0ms	0 to 30000
G3.80	80 FireModSel=None	Fire Mode Sel.	**44945**	None Fire Mode Fire Mode Test	0 1 2
G3.81	81 FMdFr=60.00Hz	Fire Mode Freq.	**44946**	0.00 to 60.00Hz	0 to 6000
G3.82	82 FModD=Forward	Fire Mode Direc.	**44947**	Forward Reverse	0 1
G4.4	4 FREQ=2.0 / 3.0kHz	Modulat Frecuenc	**45125**	0.7 to 15.0	7 to 150
G4.5	5 PWM=Normal PWM	PWM Mode	**45126**	Normal PWM LowLeakage PWM	0 1
G4.9	9 PreExT=1.00s	Pre-excit Time	**45130**	0.00 to 60.00s	0 to 6000
G4.10	10 PreExF=100.0%	Pre-excit Flux	**45131**	100.0 to 500.0%	1000 to 5000
G4.11	11 PwofDl=0.00s	Power off Delay	**45132**	0.00 to 60.00s	0 to 6000
G4.20	20 SL2GaViSel=N	Save motpot freq	**45141**	NO YES	0 1
G4.21	21 ASR P1=500%	Vec. Gain Prop.1	**45142**	0 to 5000%	0 to 5000
G4.22	22 ASR I1=300ms	Vec. Intg time 1	**45143**	10 to 9999ms	10 to 9999
G4.23	23 ASR P2=120.0%	Vec. Gain Prop.2	**45144**	1.0 to 1000.0%	10 to 10000
G4.24	24 ASR I2=30.0%	Vec. Intg time 2	**45145**	1.0 to 1000.0%	10 to 10000
G4.25	25 ASR I1=300ms	Vec. Intg time 0	**45146**	10 to 999ms	10 to 9999
G4.26	26 P Flux=50%	Flux Prop. Gain	**45147**	1 to 200%	1 to 200
G4.27	27 I Flux=50%	Flux Integ. Gain	**45148**	1 to 200%	1 to 200
G4.28	28 SpEsP1=100	Spd Est Gain P1	**45149**	0 to 32767	0 to 32767
G4.29	29 SpEsI1=500	Spd Est Gain I1	**45150**	100 to 1000	100 to 1000
G4.30	30 SpEsI2=2000	Spd Est Gain I2	**45151**	100 to 10000	100 to 10000
G4.31	31 ACR P2=500	Vec. Gain Prop.1	**45152**	10 to 1000	10 to 1000
G4.32	32 ACR I2=500	Vec. Gain Integ.	**45153**	10 to 1000	10 to 1000
G4.48	48 ACR P1=1200	Vec. Gain Prop.1	**45169**	10 to 10000	10 to 10000
G4.49	49 ACR I1=120	Vec. Gain Prop.1	**45170**	10 to 10000	10 to 10000

Parameter	Screen	Description	Address	Range	Modbus Range
G4.52	52 OuFVec=0ms	Out Filt Vector	**45173**	0 to 2000ms	0 to 2000
G4.53	53 TqLimRef=LOCAL	Torque lim Ref	**45174**	LOCAL V1 V2 V3 MDBUS COMMS PLC Pulse	0 2 4 5 6 8 9 12
G4.54	54 TLpsFW=180.0%	Tq lim positv FW	**45175**	0.0 to 200.0%	0 to 2000
G4.55	55 TLngFW=180.0%	Tq lim negatv FW	**45176**	0.0 to 200.0%	0 to 2000
G4.56	56 TLpsRV=180.0%	Tq lim positv RV	**45177**	0.0 to 200.0%	0 to 2000
G4.57	57 TLngRV=180.0%	Tq lim negatv RV	**45178**	0.0 to 200.0%	0 to 2000
G4.62	62 SpLiRf=LOCAL	Speed Lim Ref	**45183**	LOCAL V1 V2 V3 MDBUS COMMS PLC	0 2 4 5 6 7 8
G4.63	63 SpL(+)=50.00Hz	Speed lim FW	**45184**	0.00 to 400.00Hz	0 to 40000
G4.64	64 SpL(-)=50.00Hz	Speed lim REV	**45185**	0.00 to 400.00Hz	0 to 40000
G4.65	65 SpLGa=500%	Speed lim Gain	**45186**	100 to 5000%	100 to 5000
G4.70	70 SSMode=Flying Start1	Speed Search Mod	**45191**	Flying Start1 Flying Start2	0 1
G4.71	71 Srch Mod=0000	Search Mode	**45192**	00 to 15	0 to 15
G4.72	72 Srch I=150%	Search Current	**45193**	80 to 200%	80 to 200
G4.73	73 Kp Srch=100/600	Search Proporc.	**45194**	0 to 9999	0 to 9999
G4.74	74 Ki Srch=100/600	Search Integral	**45195**	0 to 9999	0 to 9999
G4.75	75 SrchDly=1.0s	Search Sp Delay	**45196**	0.0 to 60.0s	0 to 600
G4.76	76 SpEsGa=100%	Speed Est. Gain	**45197**	50 to 150%	50 to 150
G4.77	77 KEB Sel=No	Vec. Gain Prop.1	**45198**	No KEB1 KEB2	0 1 2
G4.78	78 KEBStr=125.0%	Vec. Gain Integ.	**45199**	110.0 to 140.0%	1100 to 1400
G4.79	79 KEBStp=130.0%	Vec. Gain Prop.1	**45200**	[G4.78] to 140.0	1100 to 1450
G4.80	80 KEBPGn=10000	Vec. Gain Prop.1	**45201**	1 to 20000	1 to 20000
G4.81	81 KEBIGn=500	Out Filt Vector	**45202**	1 to 20000	1 to 20000
G4.85	85 FlxPrGa1=370	Flux Prop. Gain	**45206**	100 to 700	100 to 700
G4.86	86 FlxPrGa2=0	Flux Prop. Gain	**45207**	0 to 100	0 to 100
G4.87	87 FlxPrGa3=100	Flux Prop. Gain	**45208**	0 to 500	0 to 500
G4.88	88 FlxInGa1=50	Flux Integ. Gain	**45209**	0 to 200	0 to 200
G4.89	89 FlxInGa2=50	Flux Integ. Gain	**45210**	0 to 200	0 to 200
G4.90	90 FlxInGa3=50	Flux Integ. Gain	**45211**	0 to 200	0 to 200
G4.91	91 SLVoCmp1=20	SL Volt. Comp.	**45212**	0 to 60	0 to 60
G4.92	92 SLVoCmp2=20	SL Volt. Comp.	**45213**	0 to 60	0 to 60
G4.93	93 SLVoCmp3=20	SL Volt. Comp.	**45214**	0 to 60	0 to 60
G4.94	94 FWFrS=100.0%	SL FW Freq.	**45215**	80.0 to 110.0%	800 to 1100
G4.95	95 FcFrS= 2.00Hz	SL Fc Freq.	**45216**	0.00 to 8.00Hz	0 to 800
G5.1	1 MxFA=[G1.20]Hz	Max Freq Ang Inp	**45378**	[G1.19] to [G1.20]	1 to 40000
G5.2	2 MaxTrq=100.0%	Max. Torque EA	**45379**	0.0 to 200.0	0 to 2000
G5.5	5 AnIgIN1=0.00V	V1 Monitor	**45382**	0.00 to 12.00%	0 to 1200
G5.6	6 An1PT=0-10V	Ain1PolarityType	**45383**	0-10V -/+10V	0 1
G5.7	7 Ain1LP=10ms	Ain1 LPF	**45384**	0 to 10000ms	0 to 10000
G5.8	8 A1MnV=0.00V	Ain1 Min V	**45385**	0.00 to 10.00V	0 to 1000
G5.9	9 A1MnR=0.00%	Ain1 Min. Ref	**45386**	0.00 to 100.00%	0 to 10000
G5.10	10 An1MxV=10.00V	Ain1 Max V.	**45387**	0.00 to 10.00V	0 to 1000
G5.11	11 A1MxR=100.00%	Ain1 Max Ref.	**45388**	0.00 to 100.00%	0 to 10000
G5.12	12 A1NMn=0.00V	Ain1 neg min V	**45389**	-10.00 to 0.00V	-1000 to 0
G5.13	13 A1MnR=0.00%	Ain1 Neg Min Ref	**45390**	-100.00 to 0.00%	-10000 to 0
G5.14	14 A1MxV=-10.00V	Ain1 Neg Max V	**45391**	-10.00 to 0.00V	-1000 to 0
G5.15	15 A1Mx=-100.00%	Ain1 Neg Max Ref	**45392**	-100.00 to 0.00%	-10000 to 0
G5.16	16 V1 Invert=N	V1 Inverting	**45393**	NO YES	0 1
G5.17	17 A1DeLl=0.04%	Ain1 Discre. Lvl	**45394**	0.04 to 10.00%	4 to 1000
G5.35	35 AngIN2=0.00V	V2 Monitor	**45412**	0.00 to 12.00V	0 to 1200
G5.37	37 A2LPF=10ms	Ain2 LPF	**45414**	0 to 10000ms	0 to 10000
G5.38	38 A2MnC=0.00V	Ain2 Min V	**45415**	0.00 to 10.00V	0 to 1000
G5.39	39 A2MnR=0.00%	Ain2 Min Ref	**45416**	0.00 to 100.00%	0 to 10000

Parameter	Screen	Description	Address	Range	Modbus Range
G5.40	40 A2MxC=10.00V	Ain2 Max Curr.	**45417**	0.00 to 10.00V	0 to 1000
G5.41	41 A2MxR=100.00%	Ain2 Max Ref.	**45418**	0.00 to 100.00%	0 to 10000
G5.46	46 V2 Invert=N	V2 Inverting	**45423**	NO YES	0 1
G5.47	47 A2DeLI=0.04%	Ain2 Dze Level	**45424**	0.04 to 10.00%	4 to 1000
G5.50	50 AnI2=0.00mA	V2 Monitor	**45427**	0.00 to 24.00mA	0 to 2500
G5.52	52 AI2LF=10ms	Ain2LPF	**45429**	0 to 10000ms	0 to 10000
G5.53	53 A3MnC=4.00mA	Ain2 Min V	**45430**	0.00 to 20.00mA	0 to 2000
G5.54	54 A3MnR=0.00%	Ain3 Min. Ref	**45431**	0.00 to 100.00%	0 to 10000
G5.55	55 A2MxC=10.00mA	Ain3 Max V.	**45432**	0.00 to 24.00mA	0 to 1000
G5.56	56 A2MxR=100.00%	Ain3 Max Ref	**45433**	0.00 to 100.00	0 to 10000
G5.61	61 I2 Invert=N	V2 Inverting	**45438**	N Y	0 1
G5.62	62 A2DeLI=0.04%	Ain2 Discre. Lvl	**45439**	0.04 to 10.00%	4 to 1000
G5.65	65 DI1=1	Digital I/P1	**45442**	None START(+) START(-) RESET EXT TRIP DIS START INCH 1 SPEED-L SPEED-M SPEED-H XCEL-L XCEL-M RUN Enable 3-WIRE CTR/REF 2 Exchange UP DOWN RESERVED POT CLEAR AnalogHLD PIDOPLoop P Gain 2 XCEL Stop 2nd Motor Pre-Excit Timer IN disAuxRef. INCH(+) INCH(-) XCEL-H PLC Fire Mode KEB1 Sel TI	0 1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18 19 20 21 22 24 25 26 34 38 40 46 47 49 50 51 52 54
G5.66	66 DI2=2	Digital I/P2	**45443**		
G5.67	67 DI3=5	Digital I/p3	**45444**		
G5.68	68 DI4=4	Digital I/p4	**45445**		
G5.69	69 DI5=7	Digital I/p5	**45446**		
G5.70	70 DI6=8	Digital I/p 6	**45447**		
G5.71	71 DI7=9	Digital I/p7	**45448**		
G5.85	85 DIOnF=10ms	DiOnFliter	**45462**	0 to 10000ms	0 to 10000
G5.86	86 DIOfF=3ms	DI Off Fliter	**45463**	0 to 10000ms	0 to 10000
G5.87	87 DCTy=0000	DiContactType	**45464**	0: Contact normally open (YES) 1: Contact normally closed (NC)	0000 to 1111
G5.89	89 DiScan=1ms	Di Scan Time	**45466**	1 to 5000ms	1 to 5000
G5.90	90 StDI=0000	Dig. Inp. Filter	**45467**	0: Contact normally open (YES) 1: Contact normally closed (NC)	0000 to 1111
G5.91	91 TIPls=0.00kHz	TI Monitor	**45468**	0.00 to 50.00kHz	0 to 5000
G5.92	92 TIFlt=400ms	TI Filter	**45469**	0 to 9999	0 to 9999
G5.93	93 TIMn=0.00kHz	TI Min Pulse	**45470**	0.00 to 32.00kHz	0 to 3200
G5.94	94 TIMnR=0.00%	TI Min. Ref	**45471**	0.00 to 100.00%	0 to 10000
G5.95	95 TIMx=32.00kHz	TI Max.	**45472**	0.00 to 32.00kHz	0 to 3200
G5.96	96 TIMxR=100.00%	TI Max Ref	**45473**	0.00 to 100.00%	0 to 10000
G5.97	97 TI Invert=N	TI Inverting	**45474**	NO YES	0 1
G5.98	98 TIDeLI=0.04%	TI Discre. Lvl	**45475**	0.04 to 10.00%	4 to 1000
G5.99	99 IOSWST=00	IO Config.	**45476**	V2, NPN V2, PNP I2, NPN I2, PNP	00 01 10 11

Parameter	Screen	Description	Address	Range	Modbus Range
G6.1	1 AO1=Frequency	AO1 Mode	**45634**	Frequency O/pCurr O/pVolt DCLinkV Torque O/pPower Idse Iqse TargetFq RampFreq Speed Fdb PIDRefVal PIDFdbVal PIDO/p Constant	0 1 2 3 4 5 6 7 8 9 10 12 13 14 15
G6.2	2 AO1Ga=100.0%	AO1 Gain	**45635**	-1000.0 to 1000.0%	-10000 to 10000
G6.3	3 AO1Ofs=0.0%	AO1 Bias	**45636**	-100.0 to 100.0%	-1000 to 1000
G6.4	4 AO1Fil=5ms	AO1 Filter	**45637**	0 to 10000ms	0 to 10000
G6.5	5 AO1Con=0.0%	AO1 Const Set	**45638**	0.0 to 100.0%	0 to 1000
G6.6	6 ANOUT1=0.0%	Anl Out1 Monitor	**45639**	0.0 to 1000.0%	0 to 10000
G6.30	30 OP FLT RLY=010	Operate flt rely	**45663**	Low voltage Other than low voltage Automatic restart	001 010 100
G6.31	31 RLY1=Trip	Function Relay 1	**45664**	None FDT-1 FDT-2 FDT-3 FDT-4 OverLoad IOL UndrLoad VentWarn Stall OverVolt LowVolt OverHeat Run Stop Steady Inv. Line Comm Line Spd Srch Ready Timer Out Trip DBWarn%ED COMPARAT BRCtrl CAP Exch. FAN Exch. Fire Mode TO KEB Op.	0 1 2 3 4 5 6 7 8 9 10 12 13 14 15 16 17 18 19 22 28 29 31 34 35 36 37 38 39 40
G6.33	33 DOP1=Run	Digital Ouput1	**45666**		0 to 35
G6.41	41 DO Sts=00	DO Status	**45674**		00 01 10 11
G6.50	50 TRLON=0.00s	Delay Dig O/P On	**45683**	0.00 to 100.00s	0 to 10000
G6.51	51 TRLOF=0.00s	Dely Dig O/P Off	**45684**	0.00 to 100.00s	0 to 10000
G6.52	52 INV YES/NC=00	Logic NC/YES Rlys	**45685**	0: Contact normally open (YES) 1: Contact normally closed (NC)	0 to 1
G6.53	53 TOnDl=0.00s	Del. DO Fault On	**45686**	0.00 to 100.00s	0 to 10000
G6.54	54 TOfDl=0.00s	Del DO Fault Off	**45687**	0.00 to 100.00s	0 to 10000
G6.55	55 TiOnD=0.00s	Del. DO Timer On	**45688**	0.00 to 100.00s	0 to 10000
G6.56	56 TOfDl=0.00s	Del DO Timer Off	**45689**	0.00 to 100.00s	0 to 10000
G6.57	57 FDTLv=30.00Hz	Relay FDT level	**45690**	0.00 to [G1.20]	0 to 40000
G6.58	58 FDTBd=10.00Hz	Relay FDT band	**45691**	0.00 to [G1.20]	0 to 40000

Parameter	Screen	Description	Address	Range	Modbus Range
G6.61	61 TOM=Frequency	Output Pulse Mod	**45694**	Frequency O/pCurr O/pVolt DCLinkV Torque O/pPower Idse Iqse TargetFq RampFreq Speed Fdb PIDRefVal PIDFdbVal PIDO/p Constant	0 1 2 3 4 5 6 7 8 9 10 12 13 14 15
G6.62	62 TOGa=100.0%	TO Gain	**45695**	-1000.0 to 1000.0%	-10000 to 10000
G6.63	63 TOOfs=0.0%	TO Bias	**45696**	-100.0 to 100.0%	-1000 to 1000
G6.64	64 TOFil=5ms	TO Filter	**45697**	0 to 10000ms	0 to 10000
G6.65	65 TOCon=0.0%	TO Const Set	**45698**	0.0 to 100.0%	0 to 1000
G6.66	66 TO=0.0%	TO Monitor	**45699**	0.0 to 1000.0%	0 to 10000
G7.1	1 ComUpdate=N	Comm Update	**45983**	N Y	0 1
G7.2	2 Slave Addr=1	Int485 SlaveAddr	**45890**	1 to 250	1 to 250
G7.3	3 Prot=Modbus	Int485 Protocol	**45891**	ModBus RTU LS Inv 485	0 1
G7.4	4 BaudR=9600bps	Int485 BaudRate	**45892**	1200 bps 2400 bps 4800 bps 9600 bps 19200 bps 38400 bps 56 Kbps 115 Kbps	0 1 2 3 4 5 6 7
G7.5	5 Mode=D8/PN/S1	Int485 Mode	**45893**	D8/PN/S1 D8/PN/S2 D8/PE/S1 D8/PO/S1	0 1 2 3
G7.6	6 RespDly=5ms	Response delay	**45894**	0 to 100.0 ms	0 to 1000
G8.1	1 ApMod=Proc PID	App. Sel. Func.	**46146**	None Proc PID	0 2
G8.2	2 UsSeqEn=N	Enable user sequence	**46147**	N Y	0 1
G8.16	16 PIDOut=+0.0%	PID Output	**46161**	-327.68 to 327.68%	
G8.17	17 PIDRef=+50.00%	PID Reference	**46162**	-327.68 to 327.68%	
G8.18	18 PIDFdb=+0.00%	PID Feedback	**46163**	-327.68 to 327.68%	
G8.19	19 PIDLo=+50.00%	PID Local	**46164**	-100.00 to 100.00%	
G8.20	20 SELREF=MREF	Select Reference	**46165**	MREF V1 V2 V3 MODBUS COMMS PLC PULSE	0 1 3 4 5 7 8 11
G8.21	21 SELFBK=V1	Select Feedback	**46166**	V1 V2 V3 MODBUS COMMS PLC PULSE	0 2 3 4 6 7 10
G8.22	22 GANKp=+50.0%	Gain Kp	**46167**	0.0 to 1000.0%	0 to 10000
G8.23	23 INTEGRL=10.0ms	PID Integral	**46168**	0 to 200.0s	0 to 2000
G8.24	24 DIFFE=0ms	PID Differential	**46169**	0.0 to 100.0ms	0 to 1000
G8.25	25 GAINF=+0.0%	Compens. Gain	**46170**	0.0 to 1000.0%	0 to 10000
G8.26	26 PGaSca=100.0%	Gain P Scale	**46171**	0.0 to 100.0%	0 to 1000
G8.27	27 PIDFl=0ms	PID Filter	**46172**	0 to 10000ms	0 to 10000
G8.28	28 PIDMd=Process	PID Mode	**46173**	Process Normal	0 1
G8.29	29 MxSL=+60.00Hz	Max Speed LIM	**46174**	[G8.30] to 300.00Hz	-30000 to 30000

Parameter		Description	Address	Range	Modbus Range
G8.30	30 MnSL=-60.00Hz	Min Speel LIM	**46175**	-300.00Hz to [G8.29]	-30000 to 30000
G8.31	31 INVERT PID=N	Invert PID	**46176**	NO YES	0 1
G8.32	32 OutSc=+100.00%	Out Scale	**46177**	0.1 to 1000.0%	1 to 10000
G8.34	34 PPIDR=0.00Hz	PrePID Reference	**46179**	0.00 to [G1.20]	0 to 40000
G8.35	35 PPIDE=0.0%	PrePID Exit	**46180**	0.0 to 100.0%	0 to 1000
G8.36	36 PPIDTim=600s	PrePID End Delay	**46181**	0 to 9999s	0 to 9999
G8.37	37 LPTSlp=60.0s	Drive Sleep Delay	**46182**	0.0 to 999.9s	0 to 9999
G8.38	38 SlpSp=0.00Hz	Drv Sleep Speed	**46183**	0.00Hz to [G1.20]	0 to 40000
G8.39	39 LPPon=+35%	Awakening Level	**46184**	0 to 100%	
G8.40	40 WkUPID=Below	PID WakeUp Mode	**46185**	0 to 2	0 1 2
G8.42	42 PIDUn=%	PID Unit	**46187**	% Bar mBar Pa kPa Hz rpm V I kW HP °C ºF	0 1 2 3 4 5 6 7 8 9 10 11 12
G8.43	43 PIDuG=100.00%	PID Unit Gain	**46188**	0.00 to 300.00%	0 to 30000
G8.44	44 PIDUnSc=x1	PID Unit Scale	**46189**	x100 x10 x 1 x 0.1 x 0.01	0 1 2 3 4
G8.45	45 GaKp2=100.0%	Gain Kp 2	**46190**	0.0 to 1000.0%	0 to 10000
G9.4	4 Load Duty=Hevy	Load Duty Type	**46917**	NRML HEVY	0 1
G9.5	5 LSS PH=NONE	Lss Phase Type	**46918**	NONE OUTPUT INPUT ALL	0 1 2 3
G9.6	6 Ripple V=15V	Ripple Voltage	**46919**	1 to 100V	1 to 100
G9.7	7 FlDecT=3.0s	Fault decel time	**46920**	0.0 to 600.0s	0 to 60000
G9.8	8 Str Aft Rst=N	Str Aft Restart	**46921**	N Y	0 1
G9.9	9 Retry Num=0	Retry Number	**46922**	0 to 10	0 to 10
G9.10	10 RetryDly=1.0s	Retry Delay	**46923**	0.0 to 60.0s	0 to 600
G9.12	12 RlRLs=None	Response in case of a Speed Reference Loss	**46925**	None Free-Run Dec Hold Input Hold Output Lost Preset	0 1 2 3 4 5
G9.13	13 RfLsDl=1.0s	Ref Loss Dly.	**46926**	0.1 to 120.0s	0 to 1200
G9.14	14 RfLRf=0.00Hz	Ref Loss Ref	**46927**	[G1.19] to [G1.20]	0 to 40000
G9.15	15 AILL=Half	AI Lost Level	**46929**	Half Below	0 1
G9.17	17 OlWarnSel=YES	OL Warn Select	**46930**	NO YES	0 1
G9.18	18 OLWrnL=+150%	OL Warn Level	**46931**	30 to 200%	30 to 200
G9.19	19 OLWrnT=10.0s	OL Warn Time	**46932**	0.0 to 30.0s	0 to 300
G9.20	20 OLTS=Freerun	OL Trip Select	**46933**	None Free-Run Dec	0 1 2
G9.21	21 OLLevel=180%	Overload Level	**46934**	30 to 200%	30 to 200
G9.22	22 OLTrpT=60.0s	OL Trip Time	**46935**	0.0 to 60.0s	0 to 600
G9.25	25 EnableUL=YES	Enable UL	**46938**	NO YES	0 1
G9.26	26 ULWnDl=10.0s	UL Warn Dly	**46939**	0.0 to 600.0s	0 to 6000

ENGLISH

Parameter		Description	Address	Range	Modbus Range
G9.27	27 ULFM=None	UL Fault Mode	**46940**	None Free-Run Dec	0 1 2
G9.28	28 ULFlDl=30.0	UL Fault Dly	**46941**	0.0 to 600.0s	0 to 6000
G9.29	29 UlMnL=+30%	UL Min Level	**46942**	10 to 100%	10 to 100
G9.30	30 ULMxL=+30%	UL Max Level	**46943**	10 to 100%	10 to 100
G9.31	31 NoMD=None	No Motor Detect	**46944**	None Free-Run Dec	0 1 2
G9.32	32 NoMtrLv=+5%	No Motor Level	**46945**	1 to 100%	1 to 100
G9.33	33 NoMtrDl=3.0s	No Motor Dly	**46946**	0.1 to 10.0s	1 to 100
G9.40	40 ThMM=None	ThermModelMode	**46953**	None Free-Run Dec	0 1 2
G9.41	41 MTCOOL=SELF	Motor Cooling	**46954**	SELF FORCED	0 1
G9.42	42 ETH1min=150%	ETH 1min	**46955**	50 to 200%	50 to 200
G9.43	43 ETHcont=+120%	ETH Cont Rating	**46956**	50 to 200%	50 to 200
G9.45	45 BSMod=FreeRun	BX trip mode	**46958**	FreeRun Dec	0 1
G9.50	50 StallPR=00	Stall Prevent	**46963**	Accelerating At constant speed At deceleration FluxBraking	00 01 10 11
G9.51	51 StFr1=60Hz	Stall Freq 1	**46964**	[G1.19] to [G9.53] Hz	0 to 6967
G9.52	52 StlLev1=180%	Stall Level 1	**46965**	30 to 250%	30 to 250
G9.53	53 StFr2=60Hz	Stall Freq 2	**46966**	[G5.51] to [G9.55] Hz	0 to 6967
G9.54	54 StlLev2=180%	Stall Level 2	**46967**	30 to 250%	30 to 250
G9.55	55 StFr3=60Hz	Stall Freq 3	**46968**	[G5.53] to [G9.57] Hz	0 to 6967
G9.56	56 StlLev3=180%	Stall Level 3	**46969**	30 to 250%	30 to 250
G9.57	57 StFr4=60Hz	Stall Freq 4	**46970**	[G5.55] to [G1.20] Hz	0 to 6967
G9.58	58 StlLev4=180%	Stall Level 4	**46971**	30 to 250%	30 to 250
G9.59	59 FB Kp=0%	Flux Bake Kp	**46972**	0 to 150%	0 to 150
G9.60	60 CAPDgLV=0%	CAP Diag. Level	**46973**	0 to 100%	0 to 100
G9.61	61 CAPDg=+0%	CAP Diag	**46974**	Nonde RefDiag PreDiag InitDiag	0 1 2 3
G9.62	62 CAPExLv=0%	CAP Exchange Level	**46975**	0.0 to 95.0%	0 to 950
G9.63	63 CAPDgL=0.0%	CAP Diag Level	**46976**	0.0 to 100.0%	0 to 1000
G9.66	66 DBWarnED=+0%	DB Res Warn Lvl	**46979**	0 to 30%	0 to 30
G9.73	73 SpdDev=N	Speed Deviation	**46947**	N Y	0 1
G9.74	74 SpdDevLv=50	Overheat Sensor	**46948**	1 to 20	1 to 20
G9.75	75 SpdDevTi=60	Speed Dev. Time	**46949**	1 to 120	1 to 120
G9.79	79 FANTrip=Warn	FAN Trip Mode	**46992**	Trip Warn	0 1
G9.80	80 TrpMd=FreeRun	Opt Trip Mode	**46993**	None Free-Run Dec	0 1 2
G9.81	81 LVT Dly=0.0s	LVT Delay	**46994**	0.0 to 60.0s	0 to 600
G9.82	82 LV2 On=YES	LV2 Enable	**46995**	NO YES	0 1
G9.86	86 FanTi=0%	Fan Time Perc.	**46999**	0.0 to 100.0%	0 to 1000
G9.87	87 FanELv=90.0%	Fan Exch War Level	**47000**	0.0 to 100.0%	0 to 1000
G9.88	88 FanTiRst=N	Fan Time Reset	**47001**	N Y	0 1
G9.89	89 CAP FAN St=0	CAP FAN Status	**47002**	None CAP warning FAN warning	00 01 10
G10.4	4 AccTi=20.0s	Acc Ramp 2	**47173**	0.0 to 600.0s	0 to 6000
G10.5	5 DECEL=30.0s	Decel Ramp 2	**47174**	0.0 to 600.0s	0 to 6000

Parameter		Description	Address	Range	Modbus Range
G10.6	6 MTR2PWR=4.0kW	Motor 2 Power	**47175**	0.2kW 0.4kW 0.75kW 1.1kW 1.5kW 2.2kW 3.0kW 3.7kW 4.0kW 5.5kW 7.5kW 11.0kW 15.0kW 18.5kW 22.0kW 30.0kW	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
G10.7	7 MTRFRQ=60.00Hz	Motor 2 Frequency	**47176**	30.00 to 400.00Hz	3000 to 40000
G10.8	8 Ctr. T=V/Hz	Control Type	**47177**	V/Hz SlipCom S-less1	0 2 4
G10.10	10 POLE Numbr=4	POLE Number	**47179**	2 4 … 48	2 4 … 48
G10.11	11 RtSlp=64rpm	Rated Slip	**47180**	0 to 3000rpm	0 to 3000
G10.12	12 MTRCUR=8.6A	Motor 2 Current	**47181**	1.0 to 200.0A	10 to 2000
G10.13	13 NOLODC=3.1A	No load current	**47182**	0.5 to 200.0A	5 to 2000
G10.14	14 MTR VOLT=0V	Motor 2 Voltage	**47183**	180 to 480V	180 to 480
G10.15	15 EFFICIEN=+84%	Efficiency Motor 2	**47184**	70 to 100%	70 to 100
G10.16	16 InertiaRate=0	Inertia Rate M2	**47185**	0 to 8	0 to 8
G10.17	17 Rs=138.8mΩ*	Stator Resistor	**47186**	*	0 to 9999
G10.18	18 LSigma=1.244mH	Leak Inductor	**47187**	*	0 to 9999
G10.19	19 Ls=16.45mH	Stator Inductor	**47188**	*	0 to 9999
G10.20	20 Tr=228ms	G10.20 /Rotor Time Const	**47189**	25 to 5000ms	5000
G10.25	25 V/FPn=Linear	V/F Pattern M2	**47194**	Linear Square V/F User	0 1 2
G10.26	26 FWBoost=+2.0%	Fwd Boost	**47195**	0.0 to 15.0%	0 to 150
G10.27	27 RVBoost=+2.0%	Rev Boost	**47196**	0.0 to 15.0%	0 to 150
G10.28	28 StlLev1=150%	Stall Level M2	**47197**	30 to 150%	30 to 150
G10.29	29 ETH1min=+150%	ETH 1min M2	**47198**	100 to 200%	100 to 200
G10.30	30 ETHcont=+100%	ETH Cont Rating	**47199**	50 to 150%	50 to 150
G11.1	1 OpComm=Stop	OP. COMMAND PLC	**47426**	Stop Run Run DI	0 1 2
G11.2	2 LoopTime=0.02s	LOOP TIME PLC	**47427**	0.01s 0.02s 0.05s 0.1s 0.5s 1s	0 1 2 3 4 5
G11.11	11 LkOut1=0	OUTPUT LINK 1	**47436**	0 to 65535	0 to 65535
G11.12	12 LkOut2=0	OUTPUT LINK 2	**47437**	0 to 65535	0 to 65535
G11.13	13 LkOut3=0	OUTPUT LINK 3	**47438**	0 to 65535	0 to 65535
G11.14	14 LkOut4=0	OUTPUT LINK 4	**47439**	0 to 65535	0 to 65535
G11.15	15 LkOut5=0	OUTPUT LINK 5	**47440**	0 to 65535	0 to 65535
G11.16	16 LkOut6=0	OUTPUT LINK 6	**47441**	0 to 65535	0 to 65535
G11.17	17 LkOut7=0	OUTPUT LINK 7	**47442**	0 to 65535	0 to 65535
G11.18	18 LkOut8=0	OUTPUT LINK 8	**47443**	0 to 65535	0 to 65535
G11.19	19 LkOut9=0	OUTPUT LINK 9	**47444**	0 to 65535	0 to 65535
G11.20	20 LkOut10=0	OUTPUT LINK 10	**47445**	0 to 65535	0 to 65535
G11.21	21 LkOut11=0	OUTPUT LINK 11	**47446**	0 to 65535	0 to 65535
G11.22	22 LkOut12=0	OUTPUT LINK 12	**47447**	0 to 65535	0 to 65535
G11.23	23 LkOut13=0	OUTPUT LINK 13	**47448**	0 to 65535	0 to 65535
G11.24	24 LkOut14=0	OUTPUT LINK 14	**47449**	0 to 65535	0 to 65535
G11.25	25 LkOut15=0	OUTPUT LINK 15	**47450**	0 to 65535	0 to 65535
G11.26	26 LkOut16=0	OUTPUT LINK 16	**47451**	0 to 65535	0 to 65535
G11.27	27 LkOut17=0	OUTPUT LINK 17	**47452**	0 to 65535	0 to 65535
G11.28	28 LkOut18=0	OUTPUT LINK 18	**47453**	0 to 65535	0 to 65535

Parameter		Description	Address	Range	Modbus Range
G11.31	31 UFInp1=0	UF1 INPUT VAL	**47456**	-9999 to 9999	-9999 to 9999
G11.32	32 UFInp2=0	UF2 INPUT VAL	**47457**	-9999 to 9999	-9999 to 9999
G11.33	33 UFInp3=0	UF3 INPUT VAL	**47458**	-9999 to 9999	-9999 to 9999
G11.34	34 UFInp4=0	UF4 INPUT VAL	**47459**	-9999 to 9999	-9999 to 9999
G11.35	35 UFInp5=0	UF5 INPUT VAL	**47460**	-9999 to 9999	-9999 to 9999
G11.36	36 UFInp6=0	UF6 INPUT VAL	**47461**	-9999 to 9999	-9999 to 9999
G11.37	37 UFInp7=0	UF7 INPUT VAL	**47462**	-9999 to 9999	-9999 to 9999
G11.38	38 UFInp8=0	UF8 INPUT VAL	**47463**	-9999 to 9999	-9999 to 9999
G11.39	39 UFInp9=0	UF9 INPUT VAL	**47464**	-9999 to 9999	-9999 to 9999
G11.40	40 UFInp10=0	UF10 INPUT VAL	**47465**	-9999 to 9999	-9999 to 9999
G11.41	41 UFInp11=0	UFI 1 INPUT VAL	**47466**	-9999 to 9999	-9999 to 9999
G11.42	42 UFInp12=0	UF12 INPUT VAL	**47467**	-9999 to 9999	-9999 to 9999
G11.43	43 UFInp13=0	UF13 INPUT VAL	**47468**	-9999 to 9999	-9999 to 9999
G11.44	44 UFInp14=0	UF14 INPUT VAL	**47469**	-9999 to 9999	-9999 to 9999
G11.45	45 UFInp15=0	UF15 INPUT VAL	**47470**	-9999 to 9999	-9999 to 9999
G11.46	46 UFInp16=0	UF16 INPUT VAL	**47471**	-9999 to 9999	-9999 to 9999
G11.47	47 UFInp17=0	UF17 INPUT VAL	**47472**	-9999 to 9999	-9999 to 9999
G11.48	48 UFInp18=0	UF18 INPUT VAL	**47473**	-9999 to 9999	-9999 to 9999
G11.49	49 UFInp19=0	UF19 INPUT VAL	**47474**	-9999 to 9999	-9999 to 9999
G11.50	50 UFInp20=0	UF20 INPUT VAL	**47475**	-9999 to 9999	-9999 to 9999
G11.51	51 UFInp21=0	UF21 INPUT VAL	**47476**	-9999 to 9999	-9999 to 9999
G11.52	52 UFInp22=0	UF22 INPUT VAL	**47477**	-9999 to 9999	-9999 to 9999
G11.53	53 UFInp23=0	UF23 INPUT VAL	**47478**	-9999 to 9999	-9999 to 9999
G11.54	54 UFInp24=0	UF24 INPUT VAL	**47479**	-9999 to 9999	-9999 to 9999
G11.55	55 UFInp25=0	UF25 INPUT VAL	**47480**	-9999 to 9999	-9999 to 9999
G11.56	56 UFInp26=0	UF26 INPUT VAL	**47481**	-9999 to 9999	-9999 to 9999
G11.57	57 UFInp27=0	UF27 INPUT VAL	**47482**	-9999 to 9999	-9999 to 9999
G11.58	58 UFInp28=0	UF28 INPUT VAL	**47483**	-9999 to 9999	-9999 to 9999
G11.59	59 UFInp29=0	UF29 INPUT VAL	**47484**	-9999 to 9999	-9999 to 9999
G11.60	60 UFInp30=0	UF30 INPUT VAL	**47485**	-9999 to 9999	-9999 to 9999
G11.80	80 InV1=0.000	V1 VALUE	**47505**	0.0 to 1.2000	0 to 12000
G11.81	81 InI1=+0.000	I2 VALUE	**47506**	-1.2000 to 1.2000	-12000 to 12000
G11.82	82 DIValue=0	DIG. INP. VALUE	**47507**	0 to 127	0 to 127
G11.85	85 AOVal=0.000	ANLG OPT. VALUE	**47510**	0.000 to 10.000	0 to 10000
G11.88	88 DOValue=0	DIG. OUT. VALUE	**47513**	0 to 3	0 to 3
				NOP	0
				ADD	1
				SUB	2
				ADDSUB	3
				MIN	4
				MAX	5
				ABS	6
				NEGATE	7
				MPYDIV	8
				REMAINDER	9
				COMPARE-GT	10
				COMPARE-GEQ	11
				COMPARE-EQUAL	12
				COMPARE-NEQUAL	13
G12.1	1 Func1=NOP	PLC Function 1	**47682**	TIMER	14
				LIMIT	15
				AND	16
				OR	17
				XOR	18
				ANDOR	19
				SWITCH	20
				BITTEST	21
				BITSET	22
				BITCLEAR	23
				LOWPASSFILTER	24
				PI_CONTORL	25
				PI_PROCESS	26
				UPCOUNT	27
				DOWNCOUNT	28

Parameter		Description	Address	Range	Modbus Range
G12.2	2 Inpt1A=0	Inp Func 1A PLC	**47683**	0 to 65535	0 to 65535
G12.3	3 Inpt1B=0	Inp Func 1A PLC	**47684**	0 to 65535	0 to 65535
G12.4	4 Inpt1C=0	Inp Func 1A PLC	**47685**	0 to 65535	0 to 65535
G12.5	5 Outp1=+0	Outpt Func 1 PLC	**47686**	-32767 to 32767	-32767 to 32767
G12.6	6 Func2=NOP	PLC Function 2	**47687**	See G12.1	See G12.1
G12.7	7 Inpt2A=0	Inp Func 2A PLC	**47688**	See G12.2	See G12.2
G12.8	8 Inpt2B=0	Inp Func 2A PLC	**47689**	See G12.3	See G12.3
G12.9	9 Inpt2C=0	Inp Func 2A PLC	**47690**	See G12.4	See G12.4
G12.10	10 Outp2=+0	Outpt Func 2 PLC	**47691**	See G12.5	See G12.5
G12.11	11 Func3=NOP	PLC Function 3	**47692**	See G12.1	See G12.1
G12.12	12 Inpt3A=0	Inp Func 3A PLC	**47693**	See G12.2	See G12.2
G12.13	13 Inpt3B=0	Inp Func 3A PLC	**47694**	See G12.3	See G12.3
G12.14	14 Inpt3C=0	Inp Func 3A PLC	**47695**	See G12.4	See G12.4
G12.15	15 Outp3=+0	Outpt Func 3 PLC	**47696**	See G12.5	See G12.5
G12.16	16 Func4=NOP	PLC Function 4	**47697**	See G12.1	See G12.1
G12.17	17 Inpt4A=0	Inp Func 4A PLC	**47698**	See G12.2	See G12.2
G12.18	18 Inpt4B=0	Inp Func 4A PLC	**47699**	See G12.3	See G12.3
G12.19	19 Inpt4C=0	Inp Func 4A PLC	**47700**	See G12.4	See G12.4
G12.20	20 Outp4=+0	Outpt Func 4 PLC	**47701**	See G12.5	See G12.5
G12.21	21 Func5=NOP	PLC Function 5	**47702**	See G12.1	See G12.1
G12.22	22 Inpt5A=0	Inp Func 5A PLC	**47703**	See G12.2	See G12.2
G12.23	23 Inpt5B=0	Inp Func 5A PLC	**47704**	See G12.3	See G12.3
G12.24	24 Inpt5C=0	Inp Func 5A PLC	**47705**	See G12.4	See G12.4
G12.25	25 Outp5=+0	Outpt Func 5 PLC	**47706**	See G12.5	See G12.5
G12.26	26 Func6=NOP	PLC Function 6	**47707**	See G12.1	See G12.1
G12.27	27 Inpt6A=0	Inp Func 6A PLC	**47708**	See G12.2	See G12.2
G12.28	28 Inpt6B=0	Inp Func 6A PLC	**47709**	See G12.3	See G12.3
G12.29	29 Inpt6C=0	Inp Func 6A PLC	**47710**	See G12.4	See G12.4
G12.30	30 Outp6=+0	Outpt Func 6 PLC	**47711**	See G12.5	See G12.5
G12.31	31 Func7=NOP	PLC Function 7	**47712**	See G12.1	See G12.1
G12.32	32 Inpt7A=0	Inp Func 7A PLC	**47713**	See G12.2	See G12.2
G12.33	33 Inpt7B=0	Inp Func 7A PLC	**47714**	See G12.3	See G12.3
G12.34	34 Inpt7C=0	Inp Func 7A PLC	**47715**	See G12.4	See G12.4
G12.35	35 Outp7=+0	Outpt Func 7 PLC	**47716**	See G12.5	See G12.5
G12.36	36 Func8=NOP	PLC Function 8	**47717**	See G12.1	See G12.1
G12.37	37 Inpt8A=0	Inp Func 8A PLC	**47718**	See G12.2	See G12.2
G12.38	38 Inpt8B=0	Inp Func 8A PLC	**47719**	See G12.3	See G12.3
G12.39	39 Inpt8C=0	Inp Func 8A PLC	**47720**	See G12.4	See G12.4
G12.40	40 Outp8=+0	Outpt Func 8 PLC	**47721**	See G12.5	See G12.5
G12.41	41 Func9=NOP	PLC Function 9	**47722**	See G12.1	See G12.1
G12.42	42 Inpt9A=0	Inp Func 9A PLC	**47723**	See G12.2	See G12.2
G12.43	43 Inpt9B=0	Inp Func 9A PLC	**47724**	See G12.3	See G12.3
G12.44	44 Inpt9C=0	Inp Func 9A PLC	**47725**	See G12.4	See G12.4
G12.45	45 Outp9=+0	Outpt Func 9 PLC	**47726**	See G12.5	See G12.5
G12.46	46 Func10=NOP	PLC Function 10	**47727**	See G12.1	See G12.1
G12.47	47 Inpt10A=0	Inp Func 10A PLC	**47728**	See G12.2	See G12.2
G12.48	48 Inpt10B=0	Inp Func 10A PLC	**47729**	See G12.3	See G12.3
G12.49	49 Inpt10C=0	Inp Func 10A PLC	**47730**	See G12.4	See G12.4
G12.50	50 Outp10=+0	Outpt Func 10 PLC	**47731**	See G12.5	See G12.5
G12.51	51 Func11=NOP	PLC Function 11	**47732**	See G12.1	See G12.1
G12.52	52 Inpt11A=0	Inp Func 11A PLC	**47733**	See G12.2	See G12.2
G12.53	53 Inpt11B=0	Inp Func 11A PLC	**47734**	See G12.3	See G12.3
G12.54	54 Inpt11C=0	Inp Func 11A PLC	**47735**	See G12.4	See G12.4
G12.55	55 Outp11=+0	Outpt Func 11 PLC	**47736**	See G12.5	See G12.5
G12.56	56 Func12=NOP	PLC Function 12	**47737**	See G12.1	See G12.1
G12.57	57 Inpt12A=0	Inp Func 12A PLC	**47738**	See G12.2	See G12.2
G12.58	58 Inpt12B=0	Inp Func 12A PLC	**47739**	See G12.3	See G12.3
G12.59	59 Inpt12C=0	Inp Func 12A PLC	**47740**	See G12.4	See G12.4
G12.60	60 Outp12=+0	Outpt Func 12 PLC	**47741**	See G12.5	See G12.5
G12.61	61 Func13=NOP	PLC Function 13	**47742**	See G12.1	See G12.1
G12.62	62 Inpt13A=0	Inp Func 13A PLC	**47743**	See G12.2	See G12.2

Parameter		Description	Address	Range	Modbus Range
G12.63	63 Inpt13B=0	Inp Func 13A PLC	**47744**	See G12.3	See G12.3
G12.64	64 Inpt13C=0	Inp Func 13A PLC	**47745**	See G12.4	See G12.4
G12.65	65 Outp13=+0	Outpt Func 13 PLC	**47746**	See G12.5	See G12.5
G12.66	66 Func14=NOP	PLC Function 14	**47747**	See G12.1	See G12.1
G12.67	67 Inpt14A=0	Inp Func 14A PLC	**47748**	See G12.2	See G12.2
G12.68	68 Inpt14B=0	Inp Func 14A PLC	**47749**	See G12.3	See G12.3
G12.69	69 Inpt14C=0	Inp Func 14A PLC	**47750**	See G12.4	See G12.4
G12.70	70 Outp14=+0	Outpt Func 14 PLC	**47751**	See G12.5	See G12.5
G12.71	71 Func15=NOP	PLC Function 15	**47752**	See G12.1	See G12.1
G12.72	72 Inpt15A=0	Inp Func 15A PLC	**47753**	See G12.2	See G12.2
G12.73	73 Inpt15B=0	Inp Func 15A PLC	**47754**	See G12.3	See G12.3
G12.74	74 Inpt15C=0	Inp Func 15A PLC	**47755**	See G12.4	See G12.4
G12.75	75 Outp15=+0	Outpt Func 15 PLC	**47756**	See G12.5	See G12.5
G12.76	76 Func16=NOP	PLC Function 16	**47757**	See G12.1	See G12.1
G12.77	77 Inpt16A=0	Inp Func 16A PLC	**47758**	See G12.2	See G12.2
G12.78	78 Inpt16B=0	Inp Func 16A PLC	**47759**	See G12.3	See G12.3
G12.79	79 Inpt16C=0	Inp Func 16A PLC	**47760**	See G12.4	See G12.4
G12.80	80 Outp16=+0	Outpt Func 16 PLC	**47761**	See G12.5	See G12.5
G12.81	81 Func17=NOP	PLC Function 17	**47762**	See G12.1	See G12.1
G12.82	82 Inpt17A=0	Inp Func 17A PLC	**47763**	See G12.2	See G12.2
G12.83	83 Inpt17B=0	Inp Func 17A PLC	**47764**	See G12.3	See G12.3
G12.84	84 Inpt17C=0	Inp Func 17A PLC	**47765**	See G12.4	See G12.4
G12.85	85 Outp17=+0	Outpt Func 17 PLC	**47766**	See G12.5	See G12.5
G12.86	86 Func18=NOP	PLC Function 18	**47767**	See G12.1	See G12.1
G12.87	87 Inpt18A=0	Inp Func 18A PLC	**47768**	See G12.2	See G12.2
G12.88	88 Inpt18B=0	Inp Func 18A PLC	**47769**	See G12.3	See G12.3
G12.89	89 Inpt18C=0	Inp Func 18A PLC	**47770**	See G12.4	See G12.4
G12.90	90 Outp18=+0	Outpt Func 18 PLC	**47771**	See G12.5	See G12.5

6.4.3. Visualization Parameters

Visualization parameters slightly differ depending on the display that is being used (integrated or removable).

Parameter	Screen	Description	Address	Modbus Range
SV1.1	Sp Ref =+000%	Value of current speed reference.	**40162**	8192 = 100% of motor rated speed
SV1.2	Tq Ref=000	Torque Reference Value	**41316**	-20480 to +20480
SV1.3	Mtr Speed = +0rpm	It shows the motor speed in rpm.	**40169**	Real value = Modbus value
SV1.4	Mtr Sp = +0.0%	It shows the motor speed in %.	**40170**	8192 = 100% of motor rated speed
SV1.5	Mtr Freq = +0.0Hz	Frequency at which motor is running.	**40167**	Real value = Modbus value
SV1.6	Mtr Vout = 0V	It shows the present voltage applied to the motor.	**40166**	Real value = Modbus value
SV1.7	Mtr Iout = 0.0A	Present current flowing to the motor.	**40163**	Real value = (Modbus value / 10)
SV1.8	Mtr Torqe = 0.0%	It shows the present torque applied to the motor.	**40164**	8192 = 100% of motor rated torque
SV1.9	Mtr Pfactr = 0.0	It shows the power factor of the motor.	**40168**	Real value = (Modbus value / 10)
SV1.10	Mtr Pwr = +0.0kW	Instantaneous power consumption of the motor.	**40165**	Real value = (Modbus value / 10)
SV1.11	0.0A 0.0A 0.0A	Instantaneous current per phase of the motor (U. V y W).	**40177 → U** **40178 → V** **40179 → W**	Real value = (Modbus value / 10)
SV1.12	Vmt= 0 0 0V	Compound Instantaneous voltage (UV. VW. UW).	**40180 → UV** **40181 → VW** **40182 → UW**	Real value = Modbus value
SV1.13	PTC Motor = 0	It shows if the motor PTC is connected or not.	**40218**	0 to 1
SV1.14	Motor T. = 0.0%	Theoretical heating level of the motor.	**40173**	8192 = 100% of motor temperature
SV1.15	Enco. Pulso = 0	It shows the encoder pulses	**40337**	Real value = Modbus value
SV1.16	Clsped = 0 rpm	Real speed measured by the encoder	**40336**	Real value = Modbus value
SV2.1	390 390 390V	Input instantaneous voltage.	**40183 → RS** **40184 → ST** **40185 → RT**	Real value = Modbus value
SV2.2	Inp Vol = 390V	Average input voltage to the drive.	**-**	Non-accessible from this SW version
SV2.3	50.0 50.0 50.0Hz	Frequency of input voltage.	**40159 → RS** **40160 → ST** **40161 → RT**	Real value = (Modbus value / 10)
SV2.4	Bus vol = 540V	DC Link voltage of the drive.	**40171**	Real value = Modbus value
SV2.5	IGBT Temp =+23ºC	Temperature measured at the power stage.	**40172**	Real value = Modbus value
SV2.6	Drive Temp =+26ºC	Internal temperature of the drive.	**40240**	Real value = (Modbus value / 100)
SV3.1	ANLG IN1 = +0.0V	Average value of the Analog Input 1.	**40186**	Real value = (Modbus value / 1000)
SV3.2	AIN1 Refr = +0.00%	Speed reference or PID setpoint proportional to the V1.	**40190**	8192 = 100% maximum range of the Analog Input 1
SV3.3	AIN1 S = +0.00l/s	Value of sensor 1 associated to the V1.	**40262**	Real value = (Modbus value / 10)
SV3.4	ANLG IN2 = +0.0V	Average value of V2.	**40187**	Real value = (Modbus value / 1000)
SV3.5	AIN2 Refr = +0.00%	Speed reference or PID setpoint proportional to the V2.	**40191**	8192 = 100% maximum range of the Analog Input 2
SV3.6	AIN 2 S = +0.00Bar	Value of sensor 2 associated to the V2.	**40263**	Real value = (Modbus value / 10)
SV3.7	ANL OUT1 = +4.0mA	It shows the value of the Analog Output 1.	**40192**	Real value = (Modbus value / 1000)
SV3.8	AOUT1 Refer = +0.0%	Value of the magnitude associated to the AO1.	**40194**	8192 = 100% maximum range of the Analog Output 1
SV3.9	ANL OUT2 = +4.0mA	It shows the value of the Analog Output 2.	**40193**	Real value = (Modbus value / 1000)
SV3.10	AOUT2 Refer = +0.0%	Value of the magnitude associated to the AO2.	**40195**	8192 = 100% maximum range of the Analog Output 2
SV3.11	DI: 000000 0	Digital Inputs and PTC status.	**40196**	LSB → BIT0 → MFI1 BIT6 → PTC 0 to 1
SV3.12	Relays 1-3: X0X	Output relays status.	**40197**	BIT 0 → R1; Range from 0 to 1 BIT 1 → R2; Range from 0 to 1 BIT 2 → R3; Range from 0 to 1
SV3.13	Speed M = +0.000m/s	Machine speed associated to the motor (speed motor in engine. Units).	**-**	
SV3.14	Modbus Traffic=O	Traffic in user port (Modbus RTU)	**40418**	0 to 1
SV3.15	Display_traffi = 0	Presence of the Display Unit	**40422**	0 to 1
SV4.1	Actual Fault = 00	Present code fault.	**40235**	Fault number
SV4.2	Drive Curr = 170A	Drive rated current.	**40209**	Real value = (Modbus value / 10)
SV4.3	Drive Volt = 400V	It shows the drive rated voltage.	**40210**	Real value = (Modbus value / 10)
SV4.4	S/W	Software version installed into the equipment.	**40206**	Real value = Modbus value
SV4.5	H/W y.y	It shows the hardware version of the equipment.	**40207**	Real value = (Modbus value / 100)
SV4.6	PID R% = +0.0%	PID setpoint value of the equipment standard program.	**40204**	8192 = 100% maximum range of AI

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Parameter	Screen	Description	Address	Modbus Range
SV4.7	PID F% = +0.0%	PID feedback value of the equipment standard program.	**40205**	8192 = 100% maximum range of AI
SV4.8	PID Error = +0.0%	Error value in PID mode.	**40203**	8192 = 100% maximum range of AI
SV4.9	Comparators: 000	Status of the three comparators.	**40232 → C1** **40233 → C2** **40234 → C3**	0 to 1
SV4.10	FLT.STAT.=YES FLT	Drive status before occurring the fault	**40559**	0 to 17 (See fault message list)
SV4.11	Fault Diag.=N	Fault diagnosis	**41601**	0 to 1
SV5.1	Local Sp = +100%	Speed reference in local mode.	**40124**	-20480 to 20480
SV5.2	PID Local = +100%	PID setpoint in local mode.	**40149**	0 to 32760
SV5.3	Mref 1 = +10.0%	Speed value assigned to Multi-reference 1.	**40052**	-20480 to 20480
SV5.4	Mref 2 = +20.0%	Speed value assigned to Multi-reference 2.	**40053**	-20480 to 20480
SV5.5	Mref 3 = +30.0%	Speed value assigned to Multi-reference 3.	**40054**	-20480 to 20480
SV5.6	Mref 4 = +40.0%	Speed value assigned to Multi-reference 4.	**40055**	-20480 to 20480
SV5.7	Mref 5 = +50.0%	Speed value assigned to Multi-reference 5.	**40056**	-20480 to 20480
SV5.8	Mref 6 = +60.0%	Speed value assigned to Multi-reference 6.	**40057**	-20480 to 20480
SV5.9	Mref 7 = +70.0%	Speed value assigned to Multi-reference 7.	**40058**	-20480 to 20480
SV5.10	Inch Spd1 = 0.00%	Inch speed 1.	**40092**	-20480 to 20480
SV5.11	Inch Spd2 = 0.00%	Inch speed 2.	**40093**	-20480 to 20480
SV5.12	Inch Spd3 = 0.00%	Inch speed 3.	**40094**	-20480 to 20480
SV5.13	PMP manSP=+0.0%	LOCAL manual speed reference.	**42042**	-20480 to 20480
SV5.14	PMP Mre1=0.0%	Local setpoint 1 of PID. Multi-reference 1.	**42151**	0 to 32760
SV5.15	PMP Mre2=0.0%	Local setpoint 2 of PID. Multi-reference 2.	**42152**	0 to 32760
SV5.16	PMP Mre3=0.0%	Local setpoint 3 of PID. Multi-reference 3.	**42153**	0 to 32760
SV5.17	PMP Mre4=0.0%	Local setpoint 4 of PID. Multi-reference 4.	**42154**	0 to 32760
SV5.18	PMP Mre5=0.0%	Local setpoint 5 of PID. Multi-reference 5.	**42155**	0 to 32760
SV5.19	PMP Mre6=0.0%	Local setpoint 6 of PID. Multi-reference 6.	**42156**	0 to 32760
SV5.20	PMP Mre7=0.0%	Local setpoint 7 of PID. Multi-reference 7.	**42157**	0 to 32760
SV5.21	PMP Mre8=0.0%	Local setpoint 8 of PID. Multi-reference 8.	**42158**	0 to 32760
SV5.22	T AutOFF=OFF	Time for Automatic Stop.	**42044**	0 to 999
SV5.23	TIME OFF=OFF	It shows the resting time in minutes for the automatic stopping of the system.	**42356**	0 to 6000
SV5.24	MAX flow=1000l/s	Level of maximum flow.	**42143**	0 to 32760
SV5.25	RESET LEVL=+100%	Reset level for the flow control algorithm.	**42145**	0 to 100
SV5.26	SLEP FLO=0.0l/s	Flow level to sleep the drive.	**42324**	0 to 32760
SV6.1	TOT= d h	Total time during which the drive is running (RUN).	**40550 → Days** **40551 → Hours**	Days → Real value = Modbus value Hours → 1 = 0.1 hours
SV6.2	PAR= d h	Partial time during which the drive is running (RUN).	**40552 → Days** **40553 → Hours**	Days → Real value = Modbus value Hours → 1 = 0.1 hours
SV6.3	CLEAR PARTIAL=N	To reset the counter of partial time for running status (RUN).	**40554**	0 to 1
SV6.4	TOTAL ENERGY	Total drive energy counter in kW	**41552**	0 to 999kW
SV6.4	TOTAL ENERGY	Total drive energy counter in MW	**41553**	1MW to 999MW
SV6.4	TOTAL ENERGY	Total drive energy counter in GW	**41554**	1GB to 5000GB
SV6.5.1	PARTIAL ENERGY	Partial drive energy counter in kW	**41556**	0 to 999kW
SV6.5.1	PARTIAL ENERGY	Partial drive energy counter in MW	**41557**	1MW to 999MW
SV6.5.1	PARTIAL ENERGY	Partial drive energy counter in GW	**41558**	1GB to 5000GB
SV6.5.2	RSET PRTL ENRG=N	Partial drive energy counter reset	**41559**	0 to 1

In the case of the integrated display, there is a specific group of parameters which summarize data when a warning or fault occurs. These are:

Parameter	Description	Address	Modbus Range
Pr.90	Warning information	**47003**	See fault descriptionS and codes in sections 3.2.1, 5.9, and at the beginning of this section (6.5.2).
Pr.91	Fifth fault	**47004**	
Pr.92	Fourth fault	**47005**	
Pr.93	Third fault	**46917**	
Pr.94	Second fault	**46918**	
Pr.95	First fault	**46919**	
Pr.96	Delete fault history	**46920**	0 to 1

7. CONFIGURATION REGISTER

VARIABLE SPEED DRIVE: SD300.
SERIAL Nº: MODEL:
APPLICATION:
DATE:
CUSTOMER:
NOTES:

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
	G1: Drive		
1 LCLSP=0.00Hz	0.00Hz		
2 LclTQ=0.0%	0.0%		
3 ACC1=20.0s	20.0s		
4 DECEL1=30.0s	30.0s		
6 CONTROLMODE1=REMOTE	REMOTE		
7 REF1 SP= LOCAL	LOCAL		
8 REF1 TQ= LOCAL	LOCAL		
9 Ctr.T=V/Hz	V/Hz		
10 Torq CTRL=N	N		
11 InchF=10.00Hz	10.00Hz		
12 InchAcT=20.0s	20.0s		
13 InchDeT=30.0s	30.0s		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
14 MTRPWR= (*)9	_._kW		
15 TqBoost=Manual	Manual		
16 FWBoost=2.0%	2.0%		
17 RVBoost=2.0%	2.0%		
18MTRFRQ=60.00Hz	60.00Hz		
19 STRFRQ=0.5Hz	0.5Hz		
20 MxSpL=60.00Hz	60.00Hz		
21 Hz/Rpm=Hz	Hz		
80 SelRngEnt=Run Freq.	Run Freq.		
81 SelCod=Volt V	Volt V		
89 DspChng=All	All		
90 ESC Func= Mov. In. Pos.	Mov. In. Pos.		
91 Eloader=None	None		
93 INITIALIS=No	No		
94 PswRg=0	0		
95 PrmLock=0	0		
97 SoftVer=0	0		
98 IOSwVer=0	0		
99 IOHwVer=0	0		
	G2: Basic Functions		
1 REF2 SP=None	None		
2 AuxCalcType=M+(G*A)	M+(G*A)		
3 AuxRfG=100.0%	100.0%		
4 CONTROLMODE2=REMOTE	REMOTE		
5 REF2 SP=LOCAL	LOCAL		
6 REF2 TQ= LOCAL	LOCAL		
7 V/FPn=Linear	Linear		
8 RmpT= MaxFreq	MaxFreq		
9 TimScl=0.1s	0.1s		
10 I/P Freq=60Hz	60Hz		
11 POLE Numbr=4	4		
12 RtSlp=40rpm	40rpm		
13 MTRCUR=3.6A	3.6A		
14 NOLODC=1.6A	1.6A		

* This value depends on the motor setting

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
15 MTR VOLT=0V	0V		
16 EFFICIEN=72%	72%		
17 InertiaRate=0	0		
18 TrimPwr%=100%	100%		
19 ACi/Volt=220V / 380V	220V➔220 440V➔380		
20 AutoTuning=None	None		
21 Rs=0 (*)	0		
22 LSigma=0mH	__mH		
23 Ls=0mH	__mH		
24 Tr=145ms	145ms		
25 Ls Scl=100%	100%		
26 Tr Scl=100%	100%		
31 LsR Scl=80%	80%		
41 UsFq1=15.00Hz	15.00Hz		
42 User V1=25%	25%		
43 UsFq2=30.00Hz	30.00Hz		
44 User V2=50%	50%		
45 UsFq3=45.00Hz	45.00Hz		
46 User I2=75%	75%		
47 UsFrq4=0.00Hz	0.00Hz		
48 User V4=0%	0%		
50 MREF1=10.00%	10.00%		
51 MREF2=20.00%	20.00%		
52 MREF3=30.00%	30.00%		
53 MREF4=40.00%	40.00%		
54 MREF5=50.00%	50.00%		
55 MREF6=60.00%	60.00%		
56 MREF7=60.00%	60.00%		
70 ACC2=20.0s	20.0s		
71 DEC2=30.0s	30.0s		
72 ACC3=20.0s	20.0s		
73 DEC3=30.0s	30.0s		
74 ACC4=20.0s	20.0s		
75 DEC4=30.0s	30.0s		

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
76 ACC5=20.0s	20.0s		
77 DEC5=30.0s	30.0s		
78 ACC6=20.0s	20.0s		
79 DEC6=30.0s	30.0s		
80 ACC7=20.0s	20.0s		
81 DEC7=30.0s	30.0s		
82 ACC8=20.0s	20.0s		
83 DEC8=30.0s	30.0s		
G3: Expanded Functions			
1 AccPn=Linear	Linear		
2 DecPn=Linear	Linear		
3 AccSSrt=40%	40%		
4 AccSEnd=40%	40%		
5 DecSSrt=40%	40%		
6 DecSEnd=40%	40%		
7 START=RAMP	RAMP		
8 STOP=RAMP	RAMP		
9 FWR/RV=None	None		
10 Run Aft VIF=N	N		
12 DCSt T=0.00s	0.00s		
13 DC Curr=50%	50%		
14 PreDCT=0.10s	0.10s		
15 DCBrkT=1.00s	1.00s		
16 DCBkCur=50%	50%		
17 DCBkF=5.00Hz	5.00Hz		
20 AcDF=5.00Hz	5.00Hz		
21 AccDWT=0.0s	0.0s		
22 DeDF=5.00Hz	5.00Hz		
23 DecDWT=0.0s	0.0s		
24 UseFrqLimit=N	N		
25 FLtLo=0.50Hz	0.50Hz		
26 FLtHi=[G1.20]Hz	[G1.20]Hz		
27 Jump Freq=N	N		
28 JmpL1=10.00Hz	10.00Hz		
29 JmpH1=15.00Hz	15.00Hz		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
30 JmpL2=20.00Hz	20.00Hz		
31 JmpH2=25.00Hz	25.00Hz		
32 JmpL3=30.00Hz	30.00Hz		
33 JmpH3=35.00Hz	35.00Hz		
41 RlsCur=50.0%	50.0%		
42 RlsDly=1.00s	1.00s		
44 FwdFq=1.00Hz	1.00Hz		
45 RevFq=1.00Hz	1.00Hz		
46 BEngDly=1.00s	1.00s		
47 BEngF=2.00Hz	2.00Hz		
50 FLX MIN=NONE	NONE		
51 FluxLVEL=0%	0%		
60 XclCF=0.00Hz	0.00Hz		
64 FAN=During Run	During Run		
65 SaveMot Frq=N	N		
66 SLCOM=None	None		
67 ScON=90.00%	90.00%		
68 SC OF=10.00%	10.00%		
70 RunEMod=Always Enable	Always Enable		
71 RunDStp=Free Run	Free Run		
72 QStpT=5.0s	5.0s		
74 RegAvdSel=N	N		
75 VlRegL=350V / 700V	350V / 700V		
76 CpFrL=1.00Hz	1.00Hz		
77 RegAvP=50.0%	50.0%		
78 RgAvI=50.0ms	50.0ms		
80 FireModSel=None	None		
81 FMdFr=60.00Hz	60.00Hz		
82 FModD=Forward	Forward		
	G4: Control Functions		
4 FREQ=2.0 / 3.0kHz	2.0 / 3.0kHz		
5 PWM=Normal PWM	Normal PWM		
9 PreExT=1.00s	1.00s		
10 PreExF=100.0%	100.0%		
11 PwofDl=0.00s	0.00s		

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
20 SL2GaViSel=N	N		
21 ASR P1=500%	___%		
22 ASR I1=300ms	___ms		
23 ASR P2=120.0%	___._%		
24 ASR I2=30.0%	___._%		
25 ASR I1=300ms	___ms		
26 P Flux=50%	__%		
27 I Flux=50%	__%		
28 SpEsP1=100	___		
29 SpEsI1=500	___		
30 SpEsI2=2000	___		
31 ACR P2=500	___		
32 ACR I2=500	___		
48 ACR P1=1200	1200		
49 ACR I1=120	120		
52 OuFVec=0ms	0ms		
53 TqLimRef=LOCAL	LOCAL		
54 TLpsFW=180.0%	180.0%		
55 TLngFW=180.0%	180.0%		
56 TLpsRV=180.0%	180.0%		
57 TLngRV=180.0%	180.0%		
62 SpLiRf=LOCAL	LOCAL		
63 SpL(+)=50.00Hz	50.00Hz		
64 SpL(-)=50.00Hz	50.00Hz		
65 SpLGa=500%	500%		
70 SSMode=Flying Start1	Flying Start1		
71 Srch Mod=0000	0000		
72 Srch I=150%	150%		
73 Kp Srch=100/600	100/600		
74 Ki Srch=100/600	100/600		
75 SrchDly=1.0s	1.0s		
76 SpEsGa=100%	100%		
77 KEB Sel=No	No		
78 KEBStr=125.0%	125.0%		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
79 KEBStp=130.0%	130.0%		
80 KEBPGn=10000	10000		
81 KEBIGn=500	500		
85 FlxPrGa1=370	370		
86 FlxPrGa2=0	0		
87 FlxPrGa3=100	100		
88 FlxInGa1=50	50		
89 FlxInGa2=50	50		
90 FlxInGa3=50	—		
91 SLVoCmp1=20	—		
92 SLVoCmp2=20	—		
93 SLVoCmp3=20	20		
94 FWFrS=100.0%	100.0%		
95 FcFrS= 2.00Hz	2.00Hz		
G5: Inputs			
1 MxFA=[G1.20]Hz	[G1.20]Hz		
2 MaxTrq=100.0%	100.0%		
5 AnIgIN1=0.00V	0.00V		
6 An1PT=0-10V	0-10V		
7 Ain1LP=10ms	10ms		
8 A1MnV=0.00V	0.00V		
9 A1MnR=0.00%	0.00%		
10 An1MxV=10.00V	10.00V		
11 A1MxR=100.00%	100.00%		
12 A1NMn=0.00V	0.00V		
13 A1MnR=0.00%	0.00%		
14 A1MxV=-10.00V	-10.00V		
15 A1Mx=-100.00%	-100.00%		
16 V1 Invert=N	N		
17 A1DeLI=0.04%	0.04%		
35 AngIN2=0.00V	0.00V		
37 A2LPF=10ms	10ms		
38 A2MnC=0.00V	0.00V		
39 A2MnR=0.00%	0.00%		
40 A2MxC=10.00V	10.00V		

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
41 A2MxR=100.00%	100.00%		
46 V2 Invert=N	N		
47 A2DeLI=0.04%	0.04%		
50 AnI2=0.00mA	0.00mA		
52 AI2LF=10ms	10ms		
53 A3MnC=4.00mA	4.00mA		
54 A3MnR=0.00%	0.00%		
55 A2MxC=10.00mA	10.00mA		
56 A2MxR=100.00%	100.00%		
61 I2 Invert=N	N		
62 A2DeLI=0.04%	0.04%		
65 DI1=1	1		
66 DI2=2	2		
67 DI3=5	5		
68 DI4=4	4		
69 DI5=7	7		
70 DI6=8	8		
71 DI7=9	9		
85 DIOnF=10ms	10ms		
86 DIOfF=3ms	3ms		
87 DCTy=0000	0000		
89 DiScan=1ms	1ms		
90 StDI=0000	0000		
91 TIPls=0.00kHz	0.00kHz		
92 TIFIt=400ms	400ms		
93 TIMn=0.00kHz	0.00kHz		
94 TIMnR=0.00%	0.00%		
95 TIMx=32.00kHz	32.00kHz		
96 TIMxR=100.00%	100.00%		
97 TI Invert=N	N		
98 TIDeLI=0.04%	0.04%		
99 IOSWST=0.0Bit	00		
	G6: Outputs		
1 AO1=Frequency	Frequency		
2 AO1Ga=100.0%	100.0%		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
3 AO1Ofs=0.0%	0.0%		
4 AO1Fil=5ms	5ms		
5 AO1Con=0.0%	0.0%		
6 ANOUT1=0.0%	0.0%		
30 OP FLT RLY=010	010		
31 RLY1=Trip	Trip		
33 DOP1=Run	Run		
41 DO Sts=00	00		
50 TRLON=0.00s	0.00s		
51 TRLOF=0.00s	0.00s		
52 INV YES/NC=00	00		
53 TOnDl=0.00s	0.00s		
54 TOfDl=0.00s	0.00s		
55 TiOnD=0.00s	0.00s		
56 TOfDl=0.00s	0.00s		
57 FDTLv=30.00Hz	30.00Hz		
58 FDTBd=10.00Hz	10.00Hz		
61 TOM=Frequency	Frequency		
62 TOGa=100.0%	100.0%		
63 TOOfs=0.0%	0.0%		
64 TOFil=5ms	5ms		
65 TOCon=0.0%	0.0%		
66 TO=0.0%	0.0%		
G7: Communications			
1 ComUpdate=N	N		
2 Slave Addr=1	1		
3 Prot=Modbus	Modbus		
4 BaudR=9600bps	9600bps		
5 Mode=D8/PN/S1	D8/PN/S1		
6 RespDly=5ms	5ms		
G8: PID			
1 ApMod=Proc PID	Proc PID		
2 UsSeqEn=N	N		
16 PIDOut=+0.0%	+0.0%		
17 PIDRef=+50.00%	+50.00%		

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
18 PIDFdb=+0.00%	+0.00%		
19 PIDLo=+50.00%	+50.00%		
20 SELREF=MREF	MREF		
21 SELFBK=V1	V1		
22 GANKp=+50.00%	+50.00%		
23 INTEGRL=10.0ms	10.0ms		
24 DIFFE=0ms	0ms		
25 GAINF=+0.0%	+0.0%		
26 PGaSca=100.0%	100.0%		
27 PIDFl=0ms	0ms		
28 PIDMd=Process	Process		
29 MxSL=+60.00Hz	+60.00Hz		
30 MnSL=-60.00Hz	-60.00Hz		
31 INVERT PID=N	N		
32 OutSc=+100.00%	+100.00%		
34 PPIDR=0.00Hz	0.00Hz		
35 PPIDE=0.0%	0.0%		
36 PPIDTim=600s	600s		
37 LPTSlp=60.0s	60.0s		
38 SlpSp=0.00Hz	0.00Hz		
39 LPPon=+35%	+35%		
40 WkUPID=Below	Below		
42 PIDUn=%	%		
43 PIDuG=100.00%	100.00%		
44 PIDUnSc=x1	x1		
45 GaKp2=100.0%	100.0%		
	G9: Protections		
4 Load Duty=Hevy	Hevy		
5 LSS PH=NONE	NONE		
6 Ripple V=15V	15V		
7 FlDecT=3.0s	3.0s		
8 Str Aft Rst=N	N		
9 Retry Num=0	0		
10 RetryDly=1.0s	1.0s		
12 RlRLs=None	None		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
13 RfLsDl=1.0s	1.0s		
14 RfLRf=0.00Hz	0.00Hz		
15 AILL=Half	Half		
17 OlWarnSel=YES	YES		
18 OLWrnL=+150%	+150%		
19 OLWrnT=10.0s	10.0s		
20 OLTS=Freerun	Freerun		
21 OLLevel=180%	180%		
22 OLTrpT=60.0s	60.0s		
25 EnableUL=YES	YES		
26 ULWnDl=10.0s	10.0s		
27 ULFM=None	None		
28 ULFlDl=30.0	30.0		
29 UlMnL=+30%	+30%		
30 ULMxL=+30%	+30%		
31 NoMD=None	None		
32 NoMtrLv=+5%	+5%		
33 NoMtrDl=3.0s	3.0s		
40 ThMM=None	None		
41 MTCOOL=SELF	SELF		
42 ETH1min=150%	150%		
43 ETHcont=+120%	+120%		
45 BSMod=FreeRun	FreeRun		
50 StallPR=00	00		
51 StFr1=60Hz	60Hz		
52 StlLev1=180%	180%		
53 StFr2=60Hz	60Hz		
54 StlLev2=180%	180%		
55 StFr3=60Hz	60Hz		
56 StlLev3=180%	180%		
57 StFr4=60Hz	60Hz		
58 StlLev4=180%	180%		
59 FB Kp=0%	0%		
60 CAPDgLV=0%	0%		

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
61 CAPDg=+0%	+0%		
62 CAPExLv=0%	0%		
63 CAPDgL=0.0%	0.0%		
66 DBWarnED=+0%	+0%		
73 SpdDev=N	N		
74 SpdDevLv=50	50		
75 SpdDevTi=60	60		
79 FANTrip=Warn	Warn		
80 TrpMd=FreeRun	FreeRun		
81 LVT Dly=0.0s	0.0s		
82 LV2 On=YES	YES		
86 FanTi=0%	0%		
87 FanELv=90.0%	90.0%		
88 FanTiRst=N	N		
89 CAP FAN St=0	0		
G10: Second Motor			
4 AccTi=20.0s	20.0s		
5 DECEL=30.0s	30.0s		
6 MTR2PWR=4.0kW	4.0kW		
7 MTRFRQ=60.00Hz	60.00Hz		
8 Ctr. T=V/Hz	V/Hz		
10 POLE Numbr=4	__		
11 RtSlp=64rpm	__rpm		
12 MTRCUR=8.6A	_._A		
13 NOLODC=3.1A	_._A		
14 MTR VOLT=0V	__V		
15 EFFICIEN=+84%	___%		
16 InertiaRate=0	__		
17 Rs=138.8mΩ	___mΩ		
18 LSigma=1.244m	_.___m		
19 Ls=16.45mH	__.__mH		
20 Tr=228ms	___ms		
25 V/FPn=Linear	Linear		
26 FWBoost=+2.0%	+2.0%		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
27 RVBoost=+2.0%	+2.0%		
28 StlLev1=150%	150%		
29 ETH1min=+150%	+150%		
30 ETHcont=+100%	+100%		
G11: PLC Sequence			
1 OpComm=Stop	Stop		
2 LoopTime=0.02s	0.02s		
11 LkOut1=0	0		
12 LkOut2=0	0		
13 LkOut3=0	0		
14 LkOut4=0	0		
15 LkOut5=0	0		
16 LkOut6=0	0		
17 LkOut7=0	0		
18 LkOut8=0	0		
19 LkOut9=0	0		
20 LkOut10=0	0		
21 LkOut11=0	0		
22 LkOut12=0	0		
23 LkOut13=0	0		
24 LkOut14=0	0		
25 LkOut15=0	0		
26 LkOut16=0	0		
27 LkOut17=0	0		
28 LkOut18=0	0		
31 UFInp1=0	0		
32 UFInp2=0	0		
33 UFInp3=0	0		
34 UFInp4=0	0		
35 UFInp5=0	0		
36 UFInp6=0	0		
37 UFInp7=0	0		
38 UFInp8=0	0		
39 UFInp9=0	0		

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
40 UFInp10=0	0		
41 UFInp11=0	0		
42 UFInp12=0	0		
43 UFInp13=0	0		
44 UFInp14=0	0		
45 UFInp15=0	0		
46 UFInp16=0	0		
47 UFInp17=0	0		
48 UFInp18=0	0		
49 UFInp19=0	0		
50 UFInp20=0	0		
51 UFInp21=0	0		
52 UFInp22=0	0		
53 UFInp23=0	0		
54 UFInp24=0	0		
55 UFInp25=0	0		
56 UFInp26=0	0		
57 UFInp27=0	0		
58 UFInp28=0	0		
59 UFInp29=0	0		
60 UFInp30=0	0		
80 InV1=0.000	0.000		
81 InI1=+0.000	+0.000		
82 DIValue=0	0		
85 AOVal=	-		
88 DOValue=0	0		
G12: PLC Function			
1 Func1=NOP	NOP		
2 Inpt1A=0	0		
3 Inpt1B=0	0		
4 Inpt1C=0	0		
5 Outp1=+0	+0		
6 Func2=NOP	NOP		
7 Inpt2A=0	0		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
8 Inpt2B=0	0		
9 Inpt2C=0	0		
10 Outp2=+0	+0		
11 Func3=NOP	NOP		
12 Inpt3A=0	0		
13 Inpt3B=0	0		
14 Inpt3C=0	0		
15 Outp3=+0	+0		
16 Func4=NOP	NOP		
17 Inpt4A=0	0		
18 Inpt4B=0	0		
19 Inpt4C=0	0		
20 Outp4=+0	+0		
21 Func5=NOP	NOP		
22 Inpt5A=0	0		
23 Inpt5B=0	0		
24 Inpt5C=0	0		
25 Outp5=+0	+0		
26 Func6=NOP	NOP		
27 Inpt6A=0	0		
28 Inpt6B=0	0		
29 Inpt6C=0	0		
30 Outp6=+0	+0		
31 Func7=NOP	NOP		
32 Inpt7A=0	0		
33 Inpt7B=0	0		
34 Inpt7C=0	0		
35 Outp7=+0	+0		
36 Func8=NOP	NOP		
37 Inpt8A=0	0		
38 Inpt8B=0	0		
39 Inpt8C=0	0		
40 Outp8=+0	+0		
41 Func9=NOP	NOP		

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PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
42 Inpt9A=0	0		
43 Inpt9B=0	0		
44 Inpt9C=0	0		
45 Outp9=+0	+0		
46 Func10=NOP	NOP		
47 Inpt10A=0	0		
48 Inpt10B=0	0		
49 Inpt10C=0	0		
50 Outp10=+0	+0		
51 Func11=NOP	NOP		
52 Inpt11A=0	0		
53 Inpt11B=0	0		
54 Inpt11C=0	0		
55 Outp11=+0	+0		
56 Func12=NOP	NOP		
57 Inpt12A=0	0		
58 Inpt12B=0	0		
59 Inpt12C=0	0		
60 Outp12=+0	+0		
61 Func13=NOP	NOP		
62 Inpt13A=0	0		
63 Inpt13B=0	0		
64 Inpt13C=0	0		
65 Outp13=+0	+0		
66 Func14=NOP	NOP		
67 Inpt14A=0	0		
68 Inpt14B=0	0		
69 Inpt14C=0	0		
70 Outp14=+0	+0		
71 Func15=NOP	NOP		
72 Inpt15A=0	0		
73 Inpt15B=0	0		
74 Inpt15C=0	0		
75 Outp15=+0	+0		

PARAMETER	FACTORY SETTING	SETTING 1	SETTING 2
76 Func16=NOP	NOP		
77 Inpt16A=0	0		
78 Inpt16B=0	0		
79 Inpt16C=0	0		
80 Outp16=+0	+0		
81 Func17=NOP	NOP		
82 Inpt17A=0	0		
83 Inpt17B=0	0		
84 Inpt17C=0	0		
85 Outp17=+0	+0		
86 Func18=NOP	NOP		
87 Inpt18A=0	0		
88 Inpt18B=0	0		
89 Inpt18C=0	0		
90 Outp18=+0	+0		

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