SD500 Series

ACCESSORIES

Profibus Communication

Communication Network

POWER ELECTRONICS®

SD500 Series

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Communication Network

Profibus Communication

Edition: March 2011

SD50BC01AI Rev. A

SAFETY SYMBOLS

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

	This symbol means improper operation may results in serious personal injury or death.
	Identifies shock hazards under certain conditions. Particular attention should be given because dangerous voltage may be present. Maintenance operation should be done by qualified personnel.
	Identifies potential hazards under certain conditions. Read the message and follow the instructions carefully.

Edition of March 2011

This publication could present technical imprecision or misprints. The information here included will be periodically modified and updated, and all those modifications will be incorporated in later editions.
To consult the most updated information of this product you might access through our website www.power-electronics.com where the latest version of this manual can be downloaded.

Revisions

Date	Revision	Description
7 / 03 / 2011	A	First edition.

INDEX

SAFETY INSTRUCTIONS

¡IMPORTANT!

- Safety instructions showed in this manual are useful to teach user how to use the product in a correct and safety way with the purpose of preventing possible personal injuries or property damages.
- Safety messages included here are classified as it follows:

WARNING

Be sure to take ESD (Electrostatic Discharge) protection measures when you touch the board.
Otherwise, the optional board may get damaged due to static charges.

Implement wiring change on the optional board after checking that the power supply is off.
Otherwise, there is a danger of connecting error and damage to the board.

Be sure to connect correctly the optional board to the inverter.
Otherwise, there is a danger of connecting error and damage to the board.

Be sure to install termination resistors (390Ω, 220Ω, 390Ω) in the optional board connected to the last equipment integrated into the network.

Do not remove the cover while the power is applied or the unit is in operation.
Otherwise, electric shock could occur.

Do not run the inverter with the front cover removed.
Otherwise, you may get an electric shock due to the high voltage terminals or exposure of charged capacitors.

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

Wiring and periodic inspections should be performed at least 10 minutes after disconnecting the input power and after checking the DC Link voltage is discharged with a meter (below 30VDC).
Otherwise, you may get an electric shock.

Operate the switches 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 the abrasions, excessive stress, heavy loads or pinching.
Otherwise, you may get an electric shock.

CAUTION

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

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

After the input power is applied or removed, the inverter will remain hot for a couple of minutes.
Touching hot parts may result in skin burns.

Do not apply power to a damaged inverter or to an inverter with parts missing even if the installation is complete.
Otherwise, fire or accident could occur.

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

WARNINGS

RECEPTION

- Material of Power Electronics is carefully tested and perfectly packed before leaving the factory.
- In the even of transport damage, please ensure that you notify the transport agency and POWER ELECTRONICS: 902 40 20 70 (International +34 96 136 65 57) or your nearest agent, within 24hrs from receipt of the goods.

UNPACKING

- Make sure received merchandise corresponds with delivery note, models and serial numbers.
- Each optional board is supplied with a technical manual.

SAFETY

- A Before operating the inverter, read this manual thoroughly to gain and understanding of the unit. If any doubt exists then please contact POWER ELECTRONICS, (902 40 20 70 / +34 96 136 65 57) or your nearest agent.
- Wear safety glasses when operating the inverter with power applied and the front cover is removed.
- Handle the inverter with care according to its weight.
- Install the inverter according to the instructions within this manual.
- Do not place heavy objects on the inverter.
- Ensure that the mounting orientation is correct.
- Do not drop the inverter or subject it to impact.
- The SD500 inverters contain static sensitive printed circuits boards. Use static safety procedures when handling these boards.

CONNECTION PRECAUTIONS

- To ensure correct operation of the inverter it is recommended to use a SCREENED CABLE for the control wiring.
- For EMERGENCY STOP, make sure supply circuitry is open.
- Do not disconnect motor cables if input power supply remains connected. The internal circuits of the SD450 Series will be damaged if the incoming power is connected and applied to output terminals (U, V, W).
- It is not recommended to use a 3-wire cable for long distances. Due to increased leakage capacitance between conductors, over-current protective feature may operate malfunction.
- Do not use power factor correction capacitors, surge suppressors, or RFI filters on the output side of the inverter. Doing so may damage these components.
- Always check whether the DC Link LED is OFF before wiring terminals. The charge capacitors may hold high-voltage even after the input power is disconnected. Use caution to prevent the possibility of personal injury.

TRIAL RUN

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

EARTH CONNECTION

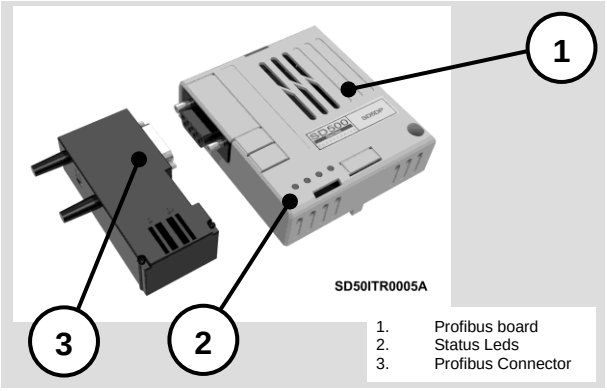
- The inverter is a high frequency switching device, and leakage current may flow. Ground the inverter to avoid electrical shock. Use caution to prevent the possibility of personal injury.
- Connect only to the dedicated ground terminal of the inverter. Do not use the case or the chassis screw for grounding.
- When installing, grounding wire should be connected first and removed last.
- The earth cable must have a minimal cross sectional area that meets local country electrical regulations.
- Motor ground must be connected to the drive ground terminal and not to the installation's ground. We recommend that the section of the ground connection cable should be equal or higher than the active conductor.
- Installation ground must be connected to the inverter ground terminal.

1. INTRODUCTION

1.1. Description of Profibus Optional Board

The optional board for Profibus communication allows SD450 drive to connect it to a Profibus network. Thanks to this optional board:

- Inverter can be controlled and monitored by PLC sequence program or any master module.
- Multiple inverters can be connected to one communication cable with simple and easy installation, saving wiring, maintenance cost and time.
- Compatible with PC System, PLC and any controllers is available, making Factory Automation more easily.



2. TECHNICAL CHARACTERISTICS

2.1. General Information

2.1.1. Contents of Profibus Optional Board Kit

The Profibus optional board kit consists on:

- 1 Profibus optional board.
- 1 Connector SUB-D 9 pin.
- 3 mounting poles.
- 1 Technical Manual.
- 1 GSD file (see section *'4.1. GSD File'*).

2.1.2. Specifications of Profibus Optional Board

- Device Type: Profibus DP Slave.
- Auto Baud Rate Detect: Supported.
- Sync Mode: Supported.
- Freeze Mode: Supported.
- Maximum Input Length: 8 words.
- Maximum Output Length: 8 words.
- Maximum Data Length: 16 words.
- Baud Rate Supported: 9.6K, 19.2K, 93.75K, 187.5K, 500K, 1.5M, 3M, 6M, 12M.
- Modular Station: Supported.
- Max Module: 2.

2.1.3. Communication cable length

Communication cable length depends on the baud rate (set in parameter 'I/O ➔ Baud Rate') as the following table shows:

Baud Rate (kbps)	Maximum Length (1 Segment)	Maximum Extension Length
9.60	1000m	10000m
19.20	1000m	10000m
93.75	1000m	10000m
187.50	1000m	10000m
500.00	400m	4000m
1500.00	200m	2000m
3000.00	100m	1000m
6000.00	100m	1000m
12000.00	100m	1000m

2.1.4. Local indications

The Profibus optional board has 3 leds (DAT_EX, ERR y CPU) that are providing information about the device and Profibus communication status. See section *'6. FAULT DIAGNOSIS'* to obtain more detailed information about these leds.

3. INSTALLATION AND CONNECTION

3.1. Installation of Profibus Optional Board

The Profibus optional board is connected to the SD500 Series inverters of Power Electronics directly (through a connector) to integrate the equipment into a Profibus communications network. Therefore, it is necessary to use one Profibus optional board for any equipment to connect it to the network.

CAUTION

Motor controllers of Power Electronics operate with a high electric energy.
Make sure the power supply has been disconnected and wait for at least 10 minutes to guarantee that DC Link voltage is discharged, before installing the Profibus optional board. Otherwise, you may get personal injuries or an accident could occur.

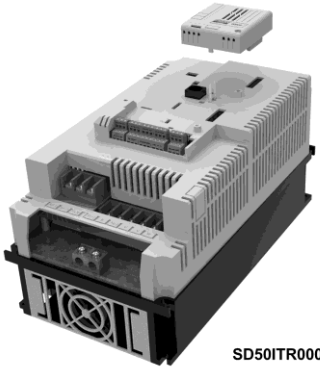


Figure 3.1 Installation of Profibus optional board to the inverter

3.2. Connections of Profibus Optional Board

3.2.1. Description of Terminals and Leds

In the Profibus optional board there are two connectors and three leds. One connector is used to connect the board to the SD500 inverter; in the other connector, Profibus specific signals are connected. On the other hand, leds provide with information about the status of the device and the communications.

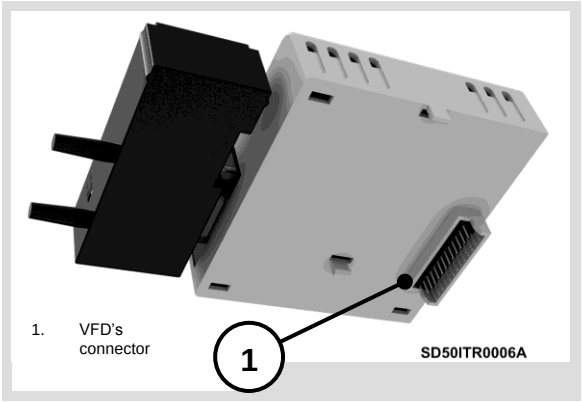


Figure 3.2 Location of the VFD connector

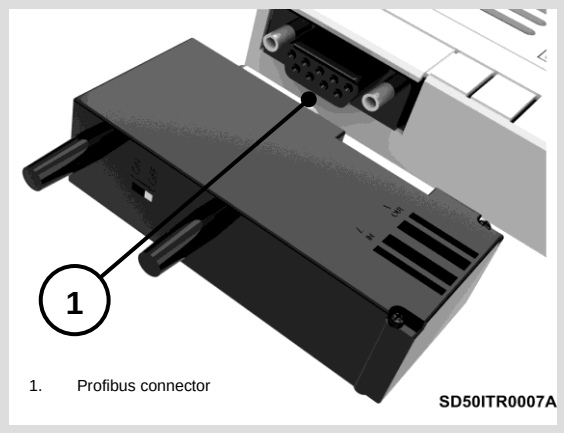


Figure 3.3 Location of the connector on the Profibus board

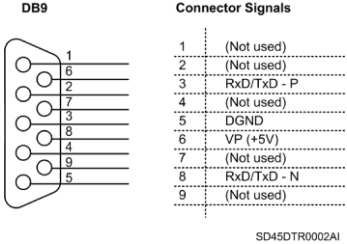
<table>
<tr><th>CONNECTOR / LED</th><th>DESCRIPTION</th></tr>
<tr><td>Profibus Connector (P1)</td><td>
Connector SUB-D 9 pin for the connections of the specific signals of the Profibus network.
<table>
<tr><th>Terminal</th><th>Signal</th><th>Description</th></tr>
<tr><td>1</td><td>Shield (Not used)</td><td>Protective Ground</td></tr>
<tr><td>2</td><td>M24 (Not used)</td><td>24V Output GND</td></tr>
<tr><td>3</td><td>RxD/TxD-P</td><td>Receive / Transmit Data – Positive</td></tr>
<tr><td>4</td><td>CTRL-P (Not used)</td><td>Control Signal for Repeater</td></tr>
<tr><td>5</td><td>DGND</td><td>Signal GND</td></tr>
<tr><td>6</td><td>VP</td><td>5V for Termination Resistor</td></tr>
<tr><td>7</td><td>P24 (Not used)</td><td>24V Output +</td></tr>
<tr><td>8</td><td>RxD/TxD-N</td><td>Receive / Transmit Data – Negative</td></tr>
<tr><td>9</td><td>CTRL-N (Not used)</td><td>Control Signal for Repeater</td></tr>
</table>
Signals of terminals 3, 5, 6 and 8 are only used.


Figure 3.4 Connections of the connector SUB-D 9 Pin

Note: If more detailed information about Profibus connection is required, refer to “Installation Guide of PROFIBUS DP/FMS” of the Profibus users group.
</td></tr>
</table>

CONNECTOR / LED	DESCRIPTION
Inverter connector	By using it, Profibus board is connected to the inverter.
Interface with Inverter Led (DAT_EX)	Active when the communication between the inverter and Profibus optional board is operating correctly. See section '*6.1. Led D1 (Interface with Inverter)*' to obtain more detailed information.
Status Led (CPU)	Active when Profibus optional board self-diagnostic without any fault. See section '*6.2. Led D2 (Status)*' to obtain more detailed information.
Error Led (ERR)	Active when Profibus optional board is in a fault status. See section '*6.3. Led D3 (Error)*' to obtain more detailed information.

Note: Be sure to install termination resistors (390Ω, 220Ω, 390Ω) in the optional board connected to the last equipment integrated into the network, as the following figure shows:

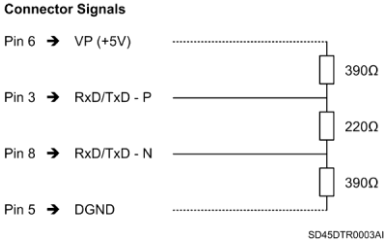


Figure 3.5 Connection of the termination resistors

4. CONFIGURATION OF PROFIBUS OPTIONAL BOARD

Once the board has been connected to the inverter, this one can be configured by using the software PE v1.1 and upper versions.

Board configuration can be divided in two parts. First, installation of the GSD file by using configuration software of Profibus Master; then, parameter setting of the group [G20.2 Profibus] related to Profibus network from the inverter itself.

4.1. GSD File

One GSD file is supplied with the kit of Profibus optional board.

The GSD files are PROFIBUS DP “standard” text files that include the needed configuration of communications for a slave. These files supply all the information necessary for a configuration tool (software) of a standard Profibus Master, to access and modify the parameters of a slave device.

The GSD file contains information about the parameters of a device. Information about each parameter is contained in this file such as minimum, maximum and default parameter values, parameter data format and scaling, and the parameter name and units.

Install the GSD file for the SD500 inverter supplied with the kit, to control the inverter parameters. For this, use configuration software of Profibus Master.

4.2. Parameter setting of Profibus

4.2.1. Profibus ID Setting (G20.2.3 ➔ Profibus ID)

It allows assigning the equipment number (station address) to each inverter into a Profibus network. Therefore, this number is unique and for this reason is necessary to be sure that any equipment has a different address.

The setting of this parameter is available from the keypad. Default value is '1'. If any trouble in DPRAM communication between inverter control board and Profibus optional board appears, this parameter must be set to '127'.

4.2.2. Outputs Number Setting (G20.2.4➔Reading Address Nº)

It allows determining the number of outputs to communicate (up to 8 output addresses can be selected). Depending on the value set here, parameters related to the output addresses (from 'G20.2.5 ➔ Reading address 1' to 'G20.2.12 ➔ Reading address 8'). See section *'4.2.4 Output Addresses Setting'*.

4.2.3. Inputs Number Setting (G20.2.13 ➔ Writing Address Nº)

It allows determining the number of inputs to communicate (up to 8 input addresses can be selected). Depending on the value set here, parameters related to the input addresses (from 'G20.2.14 ➔ Writing address 1' to 'G20.2.21 ➔ Writing address 8'). See section *'4.2.5 Input Addresses Setting'*.

4.2.4. Output Addresses Setting (G20.2.5➔Reading address 1 – G20.2.12➔Reading address 8)

It allows addressing the outputs to communicate. As it is mentioned before, depending on the value set in 'G20.2.4 ➔ Reading address nº' parameters related to the outputs addresses will be accessible.

For example, if outputs number is set to '4' (G20.2.4 ➔ '4'), parameters from 'G20.2.5 ➔ Reading address 1' to 'G20.2.8 ➔ Reading address 8' will be accessible. From this moment on, we will access to these parameters to select an output address in each one of them. In this way, we will communicate with the inverter parameters, the addresses of which are the selected ones in parameters G20.2.5 to G20.2.8.

The value of the output addresses to communicate is set in Hexadecimal format. For additional information, see section *'7. GROUP COM (COMMUNICATIONS). PARAMETER LIST'*.

4.2.5. Input Addresses Setting (G20.2.14➔Writing address 1–G20.2.21➔Writing address 8)

It allows addressing the inputs to communicate. As it is mentioned before, depending on the value set in 'G20.2.13 ➔ Writing address nº' parameters related to the inputs addresses will be accessible.

For example, if input number is set to '5' (G20.2.13 ➔ '5'), parameters from 'G20.2.14 ➔ Writing address 1' to 'G20.2.18 ➔ Writing address 5' will be accessible. From this moment on, we will access to these parameters to select an input address in each one of them. In this way, we will communicate with the inverter parameters, the addresses of which are the selected ones in parameters G20.2.14 to G20.2.18.

The value of the input addresses to communicate is set in Hexadecimal format. See section *'7. GROUP COM (COMMUNICATIONS). PARAMETER LIST'* for additional information.

4.3. Input/Output Data

Output data, selected by setting their addresses from keypad, are transmitted to the Profibus Master Module (PLC or PC) through the Profibus optional board. On the other hand, input data, selected by setting their addresses from keypad, are received by the Profibus Master Module (PLC or PC) through the Profibus optional board.

5. OPERATION MODES

During the initialization or reset of the Profibus optional board:

1. After self-testing, Status Led (CPU) blinks when no fault occurs. If any fault is detected, Status Led (CPU) is off or Error Led (ERR) is turned on.
2. After configuring correctly the parameters related to Profibus (Station Address, Outputs Number, Inputs Number, Output Addresses, Input Addresses, all of them via keypad of inverter), configuring Profibus network and starting the communication, Interface Led (DAT_EX) blinks whenever communicating to the inverter.

6. FAULT DIAGNOSIS

6.1. Led DAT_EX (Interface with drive)

LED	Status	Cause	Diagnostic
Off	Interface error	Connection fault.	Check the power of drive. Check if the inverter is in a fault status. Check the inverter connector.
		Incorrect connector wiring.	Check wiring and the pin numeration, and also the connector termination resistor.
		No master in the current network.	Check Master status or Master existence.
		Wrong Address.	Check by keypad if address of Profibus optional board and address which has been assigned in the configuration tool of Profibus Master match. Additionally, this address value must be unique in the network, this is, any device integrated in the network must not have the same address.
		Network configuration problem.	Check the maximum length of segment. Check the number of nodes in the segment, including repeater. Number of nodes must be 32 or below in segment. Check the number of nodes in the network, including repeater. Number of nodes must be 126 or below in the network.
On	Normal	Operating correctly.	-

6.2. Led CPU (Status)

LED	Status	Cause	Diagnostic
Off	Power source error	The inverter is not correctly powered or there is a problem in the connection between the inverter and the Profibus board.	Check the power of drive. Check if the inverter is in a fault status. Check the inverter connector.
Blink about 1 sec period	Normal	Operating correctly.	-

6.3. Led ERR (Error)

LED	Status	Cause	Diagnostic
Off	Normal	Operating correctly.	-
Blink about 1 sec period	Communication error	There is an error in the communication between inverter and Profibus board.	Check if there is a connection.

7. GROUP G20.2 (PROFIBUS). PARAMETER LIST

When connecting the Profibus optional board to the inverter, a new group of parameters related to the communications is available. This one is the group 'G20.2 Profibus' and their parameters are described below.

Note: Changes realized in the parameters settings of this group will have any effect until communications are updated through parameter 'G20.2.1 ➔ Comm Update'.

Display / Default value	Name / Description	Range	Function	Set during Run
1 ComUpdate= NO **Comm Update**	**G20.2.1** / Communication setting update	NO YES	It allows the reconnection of the communications when a parameter is changed, for example the communication speed, etc…	YES
2 LEDStatus= XXXX **LEDs Status**	**G20.2.2** / Led status	0000 to XXXX	It displays the LED status of the communication board. Bit: LED X00: (DAT_EX) Inverter Interface 0X0: (ERR) Erorr 00X: (CPU) Status 0: Inactive; X: Active	NO
3 ProfibusID= 1 **Dir Com Profibus**	**G20.2.3 /** Profibus communications address	0 to 125	It allows identifying the equipment number into the network assigned to each device in a Profibus network. When the communication is between some equipment, the address of all of them must be different.	NO

Display / Default value	Name / Description	Range	Function	Set during Run
4 ParamRdNum= 3 **Para Read Num**	**G20.2.4** / Outputs number	0 to 8	It allows determining the number of outputs to communicate. Changing this value, parameters from [G20.2.5] to [G20.2.12], described below will be accessible.	YES
5 ParaRd1=0x000A[1] **Param Read 1**	**G20.2.5** / Reading address 1	0x0000 to 0xFFFF	It allows addressing the output 1.	YES
6 ParaRd2=0x000E[1] **Param Read 2**	**G20.2.6** / Reading address 2	0x0000 to 0xFFFF	It allows addressing the output 2.	YES
7 ParaRd3=0x000F[1] **Param Read 3**	**G20.2.7** / Reading address 3	0x0000 to 0xFFFF	It allows addressing the output 3.	YES
8 ParaRd4=0x0000[1] **Param Read 4**	**G20.2.8** / Reading address 4	0x0000 to 0xFFFF	It allows addressing the output 4.	YES
9 ParaRd5=0x0000[1] **Param Read 5**	**G20.2.9** / Reading address 5	0x0000 to 0xFFFF	It allows addressing the output 5.	YES
10 ParaRd6=0x0000[1] **Param Read 6**	**G20.2.10** / Reading address 6	0x0000 to 0xFFFF	It allows addressing the output 6.	YES
11 ParaRd7=0x0000[1] **Param Read 7**	**G20.2.11** / Reading address 7	0x0000 to 0xFFFF	It allows addressing the output 7.	YES
12 ParaRd8=0x0000[1] **Param Read 8**	**G20.2.12** / Reading address 8	0x0000 to 0xFFFF	It allows addressing the output 8.	YES

[1] These parameters will be available depending on the value set in [G20.2.4] ➔ Outputs Number'. As parameters as outputs number has been selected will appear available in ascendant order and in a consecutive way.

Display / Default value	Name / Description	Range	Function	Set during Run
13 ParaWrNum= 2 **Param Write Num**	**G20.2.13** / Number of inputs	0 to 8	It allows fixing the input communication number. Changing this value, parameters from [G20.2.14] to [G20.2.21] described below will be accessible.	YES
14 ParWr1=0x0005[2] **Param Write 1**	**G20.2.14** / Writing address 1	0x0000 to 0xFFFF	It allows addressing the input 1.	YES
15 ParWr2=0x0006[2] **Param Write 2**	**G20.2.15** / Writing address 2	0x0000 to 0xFFFF	It allows addressing the input 2.	YES
16 ParWr3=0x0000[2] **Param Write 3**	**G20.2.16** / Writing address 3	0x0000 to 0xFFFF	It allows addressing the input 3.	YES
17 ParWr4=0x0000[2] **Param Write 4**	**G20.2.17** / Writing address 4	0x0000 to 0xFFFF	It allows addressing the input 4.	YES
18 ParWr5=0x0000[2] **Param Write 5**	**G20.2.18** / Writing address 5	0x0000 to 0xFFFF	It allows addressing the input 5.	YES
19 ParWr6=0x0000[2] **Param Write 6**	**G20.2.19** / Writing address 6	0x0000 to 0xFFFF	It allows addressing the input 6.	YES
20 ParWr7=0x0000[2] **Param Write 7**	**G20.2.20** / Writing address 7	0x0000 to 0xFFFF	It allows addressing the input 7.	YES
21 ParWr8=0x0000[2] **Param Write 8**	**G20.2.21** / Writing address 8	0x0000 to 0xFFFF	It allows addressing the input 8.	YES

[2] These parameters will be available depending on the value set in [G20.2.13]➔ Inputs Number'. As parameters as inputs number has been selected will appear available in ascendant order and in a consecutive way.

8. ADDRESS LIST

8.1. Common Area

Address	Parameter	Scale	Units	R/W	Data value
0x0000	Inverter model			R	B: SD500
0x0001	Inverter capacity			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
0x0002	Inverter input voltage			R	0: 220VAC 1: 400VAC
0x0003	SW Version			R	(Ex) 0x0100: Version 1.0 (Ex) 0x0101: Version 1.1
0x0004	Reserved				
0x0005	Reference frequency	0.01	Hz	R/W	Start freq. to Max. freq.

Address	Parameter	Scale	Units	R/W	Data value
0x0006	Start / stop command			R/W	Bit 0: Stop
					Bit 1: Forward run
					Bit 2: Reverse run
					Bit 3: Fault reset
					Bit 4: Emergency stop
				-	Bit 5: Not used
				R	Bit 6 – 8: Reference 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: Analogue V1 23: Analogue I1 24: Analogue V2 25: Analogue I2 26: Reserved 27: RS485 28: Communication option 29: PLC option 30: Fix frequency 31: PID
					Bit 15: Network error

Address	Parameter	Scale	Units	R/W	Data value
0x0007	Acceleration time	0.1	sec	R/W	
0x0008	Deceleration time	0.1	sec	R/W	
0x0009	Output current	0.1	A	R	
0x000A	Output frequency	0.01	Hz	R	
0x000B	Output voltage	1	V	R	
0x000C	DC Bus voltage	1	V	R	
0x000D	Output power	0.1	kW	R	
0x000E	Inverter status			R	Bit 0: Stop
					Bit 1: Forward run
					Bit 2: Reverse run
					Bit 3: Fault
					Bit 4: Accelerating
					Bit 5: Decelerating
					Bit 6: Steady status
					Bit 7: DC braking
					Bit 8: Stopping
					Bit 9: Fixed frequency
					Bit 10: Brake open
					Bit 11: Forward run command
					Bit 12: Reverse run command
					Bit 13: Start / Stop by communication
					Bit 14: Reference Frec. by communication
					Bit 15: 0-Remote; 1-Local
0x0010	Digital input 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
0x0011	Digital output status			R	Bit 0: Relay 1
					Bit 1: Relay 2
					Bit 2: Digital output 1 (Q1)
					Bit 3: Relay 3 (I/O option)
					Bit 4: Relay 4 (I/O option)
					Bit 5: Relay 5 (I/O option)

Address	Parameter	Scale	Units	R/W	Data value
0x0012	V1			R	Voltage input V1
0x0013	V2			R	Voltage input V2 (I/O option)
0x0014	I			R	Current input I1
0x0015	RPM			R	Output speed
0x001A	Display unit			R	0: Hz 1: rpm
0x001B	Pole number			R	Visualization of the motor poles

Notes:

1. Start / stop command with communications (direction 0x0006)

   All bits are enabled when their status changes from 0 to 1. For example, if the VFD is stopped with a fault while it is started, it can't start newly since the fault is reseted and the order given newly.

2. Addresses of 0x0005 and 0x0006

The values of the directions shown before will be deleted if the VFD losses power supply. These addresses will maintain their values while the equipment is powered.

8.2. Programming parameters

Parameter	Screen	Description	Address	Range	Modbus Range
G1.1	1 LOCK PARMTRS=0	Parameters lock	-	0 to 2	-
G1.1b	PASSWORD= 0	Access password	-	OFF, 0000 to 9999	-
G1.1c	ERRPWD= XXXX	Unlock recovery clue	-	0000 to 9999	-
G.1.2	2 LOCK SCRENS= N	Screen lock	-	N Y	-
G1.2b	PASSWORD= 0	Password	-	OFF, 0000 to 9999	-
G1.2c	ERRORWD= XXXX	Unlock recovery password	-	0000 to 9999	-
G1.3	3 PROG= STANDARD	Program activation	-	STANDARD PID PUMP	-
G1.4	4 LANGUA= ENGLISH	Language display	-	ENGLISH	-
G1.5	5 INITIALIZE= NO	Default values initialization	-	NO YES	-
G1.6	6 UPLOAD= N	Save display parameters	-	N Y	-
G1.6b	Upload STS=	Uploading parameter status	-	0 to 100%	-
G1.7	7 DOWNLOADM= N	Downloading parameters	-	N Y	-
G1.7b	Download Sta=	Downloading parameter status	-	0 to 100%	-
G1.8	8 Changed Para= N	Changed parameter display	-	N Y	-
G1.9	9 ADMIN PW= 0	Software Administration	-	0 to 65535	-
G1.10	10 LCDContra= 60	Set display contrast	-	0 to 63	-
G1.11	11 FAN= Run	Drive fan control	**44928**	DuringRun Always ON Temp Ctrl	0 1 2

Parameter	Screen	Description	Address	Range	Modbus Range
G2.1.1	ACi/pVolt= 380V	Input Voltage	**44366**	170 to 230V 320 to 480V	170 to 230V 320 to 480V
G2.1.2	2 I/P Freq= 50Hz	Input frequency	**44621**	60Hz 50Hz	0 1
G2.1.3	3 TrimPwr%= +100%	Power display setting	**44622**	70 to 130	70 to 130
G2.1.4	1 MTRPWR= 0.0kW	Motor rated Power	**44623**	0.2 to 185kW	0 to 21
G2.1.5	2 MTR CUR= 0.0A	Motor rated current	**44619**	1.0 to 200.0A	10 to 2000
G2.1.6	3 NOLOADC= 0.0A	No load current	**44925**	0.5 to 200A	5 to 2000
G2.1.7	4 MTR VOLT= 0V	Motor nominal voltage	**44624**	180 to 480V	180 to 480V
G2.1.8	5 POLE Number= 4	Motor Poles	**44370**	2 to 48	2 to 48
G2.1.9	6 ADJTSPD= 100.0%	Fine speed setting	**46953**	0.1 to 6000%	1 to 60000
G2.2.1	7 EFICIENC= +85%ı	Motor Efficiency	**44627**	70 to 100%	7 to 100
G2.2.2	8 MTR FRC = 50.00Hz	Motor frequency	**44618**	30 to 400Hz	3000 to 40000
G2.2.3	9 MTRCOOL=SELF	Motor cooling	**44626**	SELF FORCED	0 1
G3.1	1 REF1 SP= LOCAL	Speed Reference Source 1	**44359**	LOCAL AI1 AI2 AI3 AI4 MDBUS COMMS PLC	0 2 3 4 5 6 8 9
G3.2	2 REF2 SP= LOCAL	Speed Reference Source 2	**44613**	See [G3.1]	See [G3.1]
G3.3	3 LCLSP= 0.50Hz	Local Speed Reference	**44353**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G4.1.1	1 CONTROL MODE1= 1	Main Control Mode	**44358**	LOCAL REMOTE MODBUS COMMS PLC	0 1 3 4 5
G4.1.2	2 CONTROL MODE2= 1	Alternative Control Mode	**44612**	See [G4.1.1]	See [G4.1.1]

ENGLISH

Parameter	Screen	Description	Address	Range	Modbus Range
G4.1.3	3 DI1= START (+)	Multifunction Digital Input 1 Configuration	**45441**	None START (+) START (-) RESET EXT TRIP DIS START INCH 1 SPEED-L SPEED-M SPEED-H SPEED-X XCEL-L XCEL-M 3 WIRE CTR/REF 2 UP DOWN RESERVED POT CLEAR AnalogHLD PIDOPLoop RESERVED START/DC ThermalIn INCH (+) INCH (-)	0 1 2 3 4 5 6 7 8 9 10 11 12 14 15 17 18 20 21 23 34 39 46 47
G4.1.4	4 DI2= START(-)	Multifunction Digital Input 2 Configuration	**45442**	See [G4.1.3]	See [G4.1.3]
G4.1.5	5 DI3= DIS START	Multifunction Digital Input 3 Configuration	**45443**	See [G4.1.3]	See [G4.1.3]
G4.1.6	6 DI4= EXT TRIP	Multifunction Digital Input 4 Configuration	**45444**	See [G4.1.3]	See [G4.1.3]
G4.1.7	7 DI5= SPEED-L	Multifunction Digital Input 5 Configuration	**45445**	See [G4.1.3]	See [G4.1.3]
G4.1.8	8 DI6= SPEED-M	Multifunction Digital Input 6 Configuration	**45446**	See [G4.1.3]	See [G4.1.3]
G4.1.9	9 DI7= SPEED-H	Multifunction Digital Input 7 Configuration	**45447**	See [G4.1.3]	See [G4.1.3]
G4.1.10	10 DI8= INCH 1	Multifunction Digital Input 8 Configuration	**45448**	See [G4.1.3]	See [G4.1.3]

Parameter	Screen	Description	Address	Range	Modbus Range
G4.1.14	14 DIOnF= 10ms	Digital Input activation delay	**45461**	0 to 10000ms	0 to 10000
G4.1.15	15 DIOffF= 3ms	Digital Input deactivation delay	**45462**	0 to 10000ms	0 to 10000ms
G4.1.16	16 DCTy= 00000000	Digital input contact type selection	**45463**	00000000 to XXXXXXXX	0 to 65535
G4.1.17	17 DiScan= 1ms	Multireference delay time	**45465**	1 to 5000ms	1 to 5000ms
G4.1.18	18 SaveMot Frq= N	Save operating frequency motorised Potentiometer	**44929**	N Y	0 1
G4.2.1	1 An1PT= 0-10v	Analog Input Mode Selection	**45382**	0-10V -/+10V	0 1
G4.2.2	2 Ain1LPF= 10ms	Low Pass Filter for Analog Input 1	**45383**	0 to 10000ms	0 to 10000
G4.2.3	3 A1MnV= +0.00V	Analog Input 1 Minimum Range	**45384**	0 to 10V	0 a [G4.2.5]
G4.2.4	4 A1MnRf= +0.00%	Analog Input 1 Minimum Range Speed	**45385**	0 to 100%	0 a 10000
G4.2.5	5 A1MxV= +10.00V	Analog Input 1 Maximum Rage	**45386**	0 to 10V	[G4.2.3] to 1000
G4.2.6	6 A1MxR= +100.00%	Analog Input 1 Maximum Range Speed	**45387**	0 to 100%	0 to 10000
G4.2.7	7 An1NgMn=+0.00V	Analog Input 1 Negative Minimum Range	**45388**	-10 to 0V	[G4.2.9] to 0
G4.2.8	8 A1MnR= +0.00%	Analog Input 1 Minimum Negative Range	**45389**	-100 to 0%	-10000 to 0
G4.2.9	9 A1MxR= -10.00V	Analog Input 1 Maximum Negative Range	**45390**	-10 to 0V	-1000 to [G4.2.7]
G4.2.10	10 A1MxR= -100.00	Analog Input 1 Maximum Negative Range Speed	**45391**	-100 to 0%	-10000 to 0

Parameter	Screen	Description	Address	Range	Modbus Range
G4.2.11	11 A1DeLI= 0.04	Analog Input 1 Quantification Level	**45393**	0.04 to 10%	4 to 1000
G4.3.1	1 Ain2LPF= 10ms	Low Pass Filter for Analog Input 2	**45398**	0 to 10000ms	0 to 10000
G4.3.2	2 A2MnC= 4.00mA	Analog Input 2 Minimum Range	**45399**	0 to 20mA	0 to [G4.3.4]
G4.3.3	3 A2MnR= +0.00%	Analog Input 1 Minimum Range Speed	**45400**	0 to 100%	0 to 10000
G4.3.4	4 A2MxC= 20.00mA	Analog Input 2 Maximum Range	**45401**	4 to 20mA	[G4.3.2] to 20000
G4.3.5	5 A2MxR= +100.00%	Analog Input 2 Maximum Range Speed	**45402**	0 to 100%	0 to 10000
G4.3.6	6 A2DeLI= 0.04%	Analog Input 2 Quantification level	**45408**	0.04 to 10%	4 to 1000
G5.1	7 MxFqA=50.00Hz	Maximum frequency at analogue input	**44355**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G5.2	1 ACC1= 20.0s	Acceleration Ramp 1	**44356**	0 to 600.0s	0 a 6000
G5.4	2 DECEL1= 30.0s	Deceleration Ramp 1	**44616**	0 to 600.0s	0 a 6000
G5.5	4 RmpT= MaxFreq	Type of Acceleration Ramp	**44865**	MaxFreq FrqDelta	0 1
G5.6	5 AccPn= Linear	Acceleration Pattern	**44866**	LINEAR S CURVE	0 1
G5.7	6 DecPn= Linear	Deceleration Pattern	**44867**	LINEAR S CURVE	0 1
G5.8	7 AcSSrt= +40%	S Curve Acceleration Starting Ramp	**44868**	1 to 100%	1 to 100
G5.9	8 AccSEnd= +40%	S-Curve Acceleration Ending Ramp	**44869**	1 to 100	1 to 100
G5.10	9 DelSSrt= +40%	S- Curve Deceleration Starting Ramp	**44870**	1 to 100	1 to 100
G5.11	10 DecSEnd=+40%	S-Curve Decelerating Ending Ramp	**44884**	1 to 100	1 to 100
G5.12	11 AccDWF= 5.00Hz	Acceleration Frequency Pause	**44885**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G5.13	12 AccDWT= 0.0s	Acceleration Time Pause	**44886**	0 to 60s	0 to 600

Parameter	Screen	Description	Address	Range	Modbus Range
G5.14	14 DecDWT= 0.0s	Deceleration Time	**44887**	0 to 60.0s	0 to 600
G5.15	15 TDedFll= 3.0s	Fault Deceleration Time	**46919**	0 to 600.0s	0 to 6000
G5.16.1	1 ACC2= 20.0s	Alternative Acceleration Ramp 2	**44678**	0 to 600.0s	0 to 6000
G5.16.2	2 DEC2= 20.0s	Alternative Deceleration Ramp 2	**44679**	0 to 600.0s	0 to 6000
G5.16.3	3 ACC3= 30.0s	Alternative Acceleration Ramp 3	**44680**	0 to 600.0s	0 to 6000
G5.16.4	4 DEC3= 30.0s	Alternative Deceleration Ramp 3	**44681**	0 to 600.0s	0 to 6000
G5.16.5	5 ACC4= 40.0s	Alternative Acceleration Ramp 4	**44682**	0 to 600.0s	0 to 6000
G5.16.6	6 DEC4= 40.0s	Alternative Deceleration Ramp 4	**44683**	0 to 600.0s	0 to 6000
G6.1	1 SEL REF= MREF	Source Selection to introduce the set point	**46164**	MREF AI1 AI2 AI3 AI4 MODBUS COMMS PLC	0 1 2 3 4 5 7 8
G6.2	2 SEL FBK= AI1	Source Selection to Introduce the Feedback Signal	**46165**	MREF AI1 AI2 AI3 AI4 MODBUS COMMS PLC	0 1 2 3 4 6 7
G6.3	3 GainKp= +50.0%	PID Regulator Gain	**46166**	0 to 1000.0%	0 to 10000
G6.4	4 INTEGRL= 10.0s	PID Regulator Integrating Time	**46167**	0 to 200.0s	0 to 2000
G6.5	5 T Der= 0ms	PID Regulator Differential Time	**46168**	0 to 1000ms	0 to 1000
G6.6	6 MxSL= +50.00Hz	PID Upper Frequency Limit	**46173**	[G6.8] to 300Hz	[G6.8] to 30000
G6.7	7 MnSL= 0.00Hz	PID Lower Frequency Limit	**46174**	-300 to [G6.7]Hz	-30000 to [G6.7]

Parameter	Screen	Description	Address	Range	Modbus Range
G6.8	8 INVERT PID= N	PID Output Inverting	**46175**	N Y	0 1
G6.9	9 OutSc= +100.0%	PID Output Scale	**46176**	0.1 to 1000%	1 to 10000
G7.1	1 START= RAMP	Start Mode	**44871**	RAMP DCSTART	0 1
G7.2	2 StrDly= 0.00s	Start Delay Time	**45464**	0 to 100.0s	0 to 10000
G7.3	3 STOP= RAMP	Stop Mode 1	**44872**	RAMP DC BRAKE SPIN POW BRKE	0 1 2 4
G7.4	4 SAFE STOP=N	Safe Stop	**45197**	N Y	0 1
G7.5	5 SFSStr= 125.0%	Safe Stop Start	**45198**	110 to 140%	1100 to 1400
G7.6	6 SFSStp = 130.0%	Safe Stop Ending	**45199**	130 to 145%	[G7.5] to 1450
G7.7	7 SFSGain= 1000	Safe Stop Gain	**45200**	1 to 2000	1 to 20000
G7.10	10 Run Aft Rst= N	Start after Low Voltage Fault	**44874**	N Y	0 1
G7.11	11 Str Aft Rst= N	Start after reset due to fault	**46920**	N Y	0 1
G7.12	12 DCSt T= 0.00s	Dc Start Time	**44876**	0 to 60.00s	0 to 6000
G7.13	13 DC Curr= 50%I	DC Current Start	**44877**	0 to 200%	0 to 200
G7.14	14 PreDC T= 0.10s	Previous DC Brake lock -Time	**44878**	0 to 60.00s	0 to 6000
G7.15	15 DCBrk T= 1.00s	DC Brake Time	**44879**	0 to 60.00s	0 to 6000
G7.16	16 DCBk Cur= 50%I	DC Brake Level	**44880**	0 to 200%	0 to 200
G7.17	17 DCBk F= 5.00Hz	DC Brake Frequency	**44881**	0 to 60.00Hz	0 to 6000
G8.1.1	1 OP FLT RLY= 0X0	Relay Output due to Fault	**45662**	000 to XXX	0 to 7

Parameter	Screen	Description	Address	Range	Modbus Range
G8.1.2	2 RLY1= Trip	Relay 1 Control Source Selection	**45663**	NONE FDT-1 FDT-2 FDT-3 FDT-4 OVERLOAD IOL UNDRLOAD VENTWARN OVERVOLT LOWVOLT OVERHEAT RUN STOP STEADY SPD SRCH READY PUMP TRIP DBOVRLOAD COMPARAT BRCTRL	0 1 2 3 4 5 6 7 8 10 11 12 14 15 16 19 22 25 29 31 34 35
G8.1.3	3 RLE2= Run	Relay 2 Control Source Selection	**45664**	See [G8.1.2]	See [G8.1.2]
G8.1.4	4 DOP1= FDT-1	Digital Output 1 Control Source Selection	**45665**	See [G8.1.2]	See [G8.1.2]
G8.1.5	5 T RL ON= 0.00s	OP1 and Relays Connection Delay	**45682**	0 to 100.00s	0 to 10000
G8.1.6	6 T RL OF= 0.00	OP1 and Relays Disconnection delay	**45683**	0 to 100.00s	0 to 10000
G8.1.7	7 INV NA/NC= 000	Digital Output and Relay Contact Type Selection	**45684**	000 to XXX	0 to 65535
G8.2.1	1 A01= Frequency	Analog Output 1 Selection Mode	**45633**	Frequency O/ pCurr O/pVolt DCLinkV O/p Power TargetFq RampFreq PIDRefVal PIDFdbVal PIDO/p Constant	0 1 2 3 5 8 9 12 13 14 15

Parameter	Screen	Description	Address	Range	Modbus Range
G8.2.2	2 AO1Ga= +100.0%	Analog Output 1 Gain	**45634**	-1000 to 1000%	-10000 to 10000
G8.2.3	3 AO1Ofst= +0.0%	Analog Output 1Offset Level	**45635**	-100 to 100%	-1000 to 1000
G8.2.4	4 AO1OFil = 5ms	Analog Output 1 Filter Selection	**45636**	0 to 10000ms	0 to 10000
G8.2.5	5 AO1Con= 0.0%	Analog Output 1Constant Value	**45637**	0 to 1000%	0 to 1000
G8.2.6	6 AO2= Frequency	Analog Output 2 Mode Selection	**45639**	See [G8.2.1]	See [G8.2.1]
G8.2.7	7 OA2Ga= +100.0%	Analog Output 2 Gain	**45640**	-1000 to 1000%	-10000 to 10000
G8.2.8	8 AO2Ofst= +0.0%	Analog Output Offset Level	**45641**	-100 to 100%	-1000 to 1000
G8.2.9	9 AO2Fil= 5ms	Analog Output 2 Filter Selection	**45642**	0 to 10000ms	0 to 10000
G8.2.10	10 AO2Con= 0.0%	Analog Output 2 Constant Value	**45643**	0 to 1000%	0 to 1000
G9.1	1 FDTLvl= 30.00Hz	Transfer Function Level	**45689**	0 to [G10.1]Hz	0 to [G10.1]
G9.2	2 FDTBnd= 10.00Hz	Transfer Function Bandwidth	**45690**	0 to [G10.1]Hz	0 to [G10.1]
G9.3	3 SLCOM= None	Comparator Source Selection	**44930**	None AI1 AI2 AI3 AI4	0 1 2 3 4
G9.4	4 S C ON= +90.00%	Output Activation Level in Comparator Mode	**44931**	10 to 100%	[G9.5] to10000
G9.5	5 S C OF= +10.00%	Output Deactivation Level in Comparator Mode	**44932**	-100 to [G9.4]%	-10000 to [G9.4]
G10.1	1 MxSpL= 50.00Hz	Maximum Speed Limit	**44372**	40 to 400Hz	4000 to 40000
G10.2	2 FWR/RV= None	Speed Inverting Permission	**44873**	None FWDPrev RevPrev	0 1 2
G10.3	3 UseFrqLimit=Y	Frequency Limit	**44888**	N Y	0 1
G10.4	4FqLtLo= 0.50Hz	Lower Frequency Limit	**44889**	0 to [G10.5]	0 to [G10.5]
G10.5	5 FqLtHi= 50.00Hz	Upper Frequency Limit	**44890**	0.5 to [G10.1]	[G10.4] to [G10.1]

Parameter	Screen	Description	Address	Range	Modbus Range
G10.6	6 TORQUE LIMIT= N	Torque Limit Activation	**46962**	N Y	0 1
G10.7	7 LvTrqLt= 180%	Torque Limit Level	**46964**	30 to 250%	30 to 250
G11.1	1 RlRLs= None	Response in case of a Speed Reference Loss	**46917**	None FreeRun Dec Hold I/P Hold O/P LostPrst	0 1 2 3 4 5
G11.2	3 RfLsDly= 1.0s	Trip Delay Time Due to Speed Reference Loss	**46924**	0.1 to 120s	1 to 1200
G11.3	4 RefLRf= 0.00Hz	Speed in case of Reference Loss	**46925**	[G19.2.5] to [G10.1]Hz	[G19.2.5] to [G10.1]
G11.4	5 OLWarnSel= NO	Overload Warning	**46926**	NO YES	0 1
G11.5	6 OLWrnL= +150%	Overload Warning Level	**46929**	30 to 200%	30 to [G11.9]
G11.6	7 OLWrnT= 10.0s	Delay Time for Enabling the Overload Warning	**46930**	0 to 30.0s	0 to 300
G11.7	8 OLTS= FreeRun	Action Selection due to Overload Fault	**46931**	None FreeRun Dec	0 1 2
G11.8	9 OLLevel= 180%	Trip Level in case of Overload Fault	**46932**	30 to 200%	30 to 200
G11.9	10 TFIISC= 60.0s	Overload delay time	**46933**	0 to 60.0s	0 to 600
G11.10	11 SBC1min= +150%	Overcurrent level during 1 minute	**46934**	120 to 200%	[G11.12] to 200
G11.11	12 SBCCont= 120%	Continuous overcurrent level	**46954**	50 to 200%	50 to [G11.11]
G11.12	6 TORQUE LIMIT= N	Torque Limit Activation	**46955**	N Y	0 1

Parameter	Screen	Description	Address	Range	Modbus Range
G11.13	13 ThMM= None	Action Selection in case of Thermo-electronic Fault	**46952**	None FreeRun Dec	0 1 2
G11.14	14 EnableUL= NO	Enabling Underload Alarm	**46937**	NO YES	0 1
G11.15	15 ULWnDl= 10.0s	Delay Time Enabling Underload Warning	**46938**	0 to 600.0s	0 to 6000
G11.16	16 ULFM= None	Action Selection in case of Underload Fault	**46939**	None FreeRun Dec	0 1 2
G11.17	17 ULFltDl= 30.0s	Delay Time Enabling Underload Fault	**46940**	0 to 600.0s	0 to 6000
G11.18	18 UlMnL = +30%	Underload Detection Lower Level	**46941**	10 to [G11.18]	10 to [G11.18]
G11.19	19 ULMxL= +30%	Underload Detection Upper Level	**46942**	[G11.17] to 100%	[G11.17] to 100
G11.20	20 NoMD= None	Action Selection in case of No Motor Connection Detected Fault	**46943**	None FreeRun	0 1
G11.21	21 NoMtrLvl= +5%	Trip Level in case of No Motor Detection Fault	**46944**	1 to 100%	1 to 100
G11.22	22 NoMtrDl= 3.0s	Delay Time due to Lack of motor Fault	**46945**	0.1 to 10.0s	1 to 100
G11.23	23 OvHM= None	Selection in case of Motor Overheat Fault	**46946**	None FreeRun Dec	0 1 2
G11.24	24 OvrHtSen= None	Motor Overheat Detection Sensor Selection	**46947**	None AI1 AI2 AI3 AI4	0 1 2 3 4
G11.25	25 OvrHtL= +50.0%	Motor Overheat Detection Fault	**46948**	0 to 100%	0 to 1000
G11.26	26 OvrHtAr= Low	Trip Area Selection Due to Overheat.	**46949**	LOW HIGH	0 1

Parameter	Screen	Description	Address	Range	Modbus Range
G11.27	27 FANTrip=Trip	Action Selection in case of Fan Trip	**46991**	Trip Warn	0 1
G11.28	28 DBWarnED= +0%	Brake Unit Overload Warning Level	**46978**	0 to 30%	0 to 30
G12.1	29 LSS PH= NONE	Phase loss Detection	**46921**	NONE OUTPUT INPUT ALL	0 1 2 3
G12.2	30 Ripple V=40V	DC Bus Ripple voltage	**46922**	1 to 100V	1 a 100
G13.1	1 Retry NUm= 0	Delay Time before Auto Reset	**-**	0 to 10	0 to 10
G13.1.1	2 Retry Dly= 1.0s	Delay Time before Auto Reset	**-**	0 to 60.0s	0 to 600
G13.1.2	No Fault	Current Fault status visualization	**-**	-	-
G13.1.3	FAULT INFO 1	Fault History Register 1	**-**	-	-
G13.1.4	FAULT INFO 2	Fault History Register 2	**-**	-	-
G13.1.5	FAULT INFO 3	Fault History Register 3	**-**	-	-
G13.1.6	FAULT INFO 4	Fault History Register 4	**-**	-	-
G13.2.1	FAULT INFO 5	Fault History Register 5	**-**	-	-
G13.2.2	Clr FaultHist= N	Clear Fault History	**-**	N Y	-
G13.2.3	ENB/DIS LV Flt=D	Low Voltage fault register	**-**	-	-
G13.2.4	1 MREF 1= 10.00Hz	Multi-Reference 1	**-**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G13.2.5	2 MREF 2= 20.00Hz	Multi-Reference 2	**-**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.1	27 FANTrip=Trip	Action Selection in case of Fan Trip	**44658**	Trip Warn	0 1
G14.2	28 DBWarnED= +0%	Brake Unit Overload Warning Level	**44659**	0 to 30%	0 to 30

Parameter	Screen	Description	Address	Range	Modbus Range
G14.3	3 MREF 3= 30.00	Multi-Reference 3	**44660**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.4	4 MREF 4= 40.00H	Multi-Reference 4	**44661**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.5	5 MREF 5= 50.00Hz	Multi-Reference 5	**44662**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.6	6 MREF 6= 50.00Hz	Multi-Reference 6	**44663**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.7	7 MREF 7= 50.00Hz	Multi-Reference 7	**44664**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.8	8 MREF 8= 50.00Hz	Multi-Reference 8	**44665**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.9	9 MREF 9= 50.00Hz	Multi-Reference 9	**44666**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.10	10 MRF 10= 45.00Hz	Multi-Reference 10	**44667**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.11	11 MRF 11= 40.00Hz	Multi-Reference 11	**44668**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.12	12 MRF 12= 35.00Hz	Multi-Reference 12	**44669**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.13	13 MRF 13= 25.00Hz	Multi-Reference 13	**44670**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.14	14 MRF 14= 15.00Hz	Multi-Reference 14	**44671**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G14.15	15 MRF 15= 5.00Hz	Multi-Reference 15	**44672**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G15.1	1 InchFq= 10.00Hz	Inch Frequency	**44363**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G15.2	2 InchAcT= 20.0s	Inch Frequency Accelerating Time	**44364**	0 to 600.0s	0 to 6000
G15.3	3 InchDeT= 30.0s	Inch Frequency Decelerating Time	**44365**	0 to 600.0s	0 to 6000
G16.1	1 Jmp Freq= NO	Enabling Frequency Jumps	**44891**	NO YES	0 1
G16.2	2 Sal1 B= 10.00Hz	Frequency Jump 1 Lower Limit	**44892**	0 to [G16.3]	0 to [G16.3]
G16.3	3 Sal1 A= 15.00Hz	Frequency Jump 1 Upper Limit	**44893**	[G16.2] to [G10.1]	[G16.2] to [G10.1]
G16.4	4 Sal2 B= 20.00Hz	Frequency Jump 2 Lower Limit	**44894**	0 to [G16.5]	0 to [G16.5]
G16.5	5 Sal2 A= 25.00Hz	Frequency Jump 2 Upper Limit	**44895**	[G16.4] to [G10.1]	[G16.4] to [G10.1]
G16.6	6 Sal3 B= 30.00Hz	Frequency Jump 3 Lower Limit	**44896**	0 to [G16.7]	0 to [G16.7]

Parameter	Screen	Description	Address	Range	Modbus Range
G16.7	7 Sal3 A= 35.00Hz	Frequency Jump 3 Upper Limit	**44897**	[G16.6] to [G10.1]	[G16.6] to [G10.1]
G17.1	1 RlsCurr= 50.0%	Opening Brake Current	**44905**	0 to 180.0%	0 to 1800
G17.2	2 RlsDly= 1.00s	Opening Brake Delay	**44906**	0 to 10.0s	0 to 1000
G17.3	3 FwdFrq= 1.00Hz	Opening Brake Frequency (Foward)	**44908**	0 to 400.0Hz	0 to 40000
G17.4	4 RevFrq= 1.00Hz	Opening Brake Frequency (Reverse)	**44909**	0 to 400.0Hz	0 to 40000
G17.5	5 BrEngFr= 1.00s	Closed Brake Delay	**44910**	0 to 10.0s	0 to 1000
G17.6	6 BrEngFr= 2.00Hz	Closed Brake Frequency	**44911**	0 to 400.0Hz	0 to 40000
G19.1.1	1 CTRL T.= V/Hz	Control Type Selection	**44361**	V/Hz SlipCom S-less1	0 2 3
G19.1.2	2 FREQ= 2.0kHz	Modulation Frequency	**45124**	0.7 to 15kHz	7 to 150
G19.1.3	3 V/FPn= Linear	V/F Pattern	**44615**	Linear Square V/F Us	0 1 2
G19.1.4.1	1 UsFrq1= 15.00Hz	User Frequency 1	**44649**	0 to [G10.1]	0 to [G10.1]
G19.1.4.2	2 User V1= 25%	User Voltage 1	**44650**	0 to 100%	0 to 100
G19.1.4.3	3 UsFrq2= 30.00Hz	User Frequency 2	**44651**	0 to [G10.1]	0 to [G10.1]
G19.1.4.4	4 User V2= 50%	User Voltage 2	**44652**	0 to 100%	0 to 100
G19.1.4.5	5 Us Frq3= 45.00Hz	User Frequency 3	**44653**	0 to [G10.1]	0 to [G10.1]
G19.1.4.6	6 User V3= 75%	User Voltage 3	**44654**	0 to 100%	0 to 100
G19.1.4.7	7 Us Frq4= 60.00Hz	User Frequency 4	**44655**	0 to [G10.1]	0 to [G10.1]
G19.1.4.8	8 User V4= 100%	User Voltage 4	**44656**	0 to 100%	0 to 100
19.2.1	1 InertiaRate= 0	Inertia Range	**44625**	0 to 8	0 to 8
G19.2.2	2 T Boost= Manual	Initial Voltage	**44367**	MANUAL AUTO	0 1
G19.2.3	3 FWBoost= +20%	Starting Torque (Foward Direction)	**44368**	0 to 150%	0 to 150
G19.2.4	4 RVBoost= +20%	Starting Torque (Reverse Direction)	**44369**	0 to 150%	0 to 150
G19.2.5	5 STR FRQ= 0.50Hz	Starting Frequency	**44371**	0.01 to 10Hz	1 to 1000

Parameter	Screen	Description	Address	Range	Modbus Range
G19.2.6	6 RtSlip= 45rpm	Slip Compensation	**44620**	0 to 3000rpm	0 to 3000
G19.2.7	7 FLUX MIN= NONE	Minimum Flux	**44914**	NONE MANU AUTO	0 1 2
G19.2.8	8 FLUX LVEL= +0%	Manual Mode Minimum Flux Value	**44915**	0 to 30%	0 to 30
G19.2.9	9 Load Duty= Hevy	Load Type Definition	**46916**	NRML HEVY	0 1
G19.3.1	1 Rs=	Stator Resistor (Rs)	**44629**	-	-
G19.3.2	2 LSigma=	Leak Inductor	**44630**	-	-
G19.3.3	3 Ls=	Stator Inductor	**44631**	-	-
G19.3.4	4 Tr=	Rotor Time Constant	**44632**	25 to 5000ms	25 to 5000
G20.1.1	1ComUpdate= NO	Communication Update	**45982**	NO YES	0 1
G20.1.2	2 Slave Addr= 1	Communication Address	**45889**	1 to 250	1 to 250
G20.1.3	3 Prot= ModBus	Int485 Communication Protocol	**45890**	MODBUS	0
G20.1.4	4 BaudR= 9600 bps	Communication Speed	**45891**	1200 2400 4800 9600 19200 38400	0 1 2 3 4 5
G20.1.5	5 Mode= D8/PN/S1	Communication Frame Definition	**45892**	D8/PN/S1 D8/PN/S2 D8/PE/S1 D8/PO/S1	0 1 2 3
G20.1.6	6 RespDly= 5ms	Transfer Delay After Reception	**45893**	0 to 1000ms	0 to 1000
G20.1.7	7 ParamSave= NO	Saving Communication Parameters	**40992**	NO YES	0 1
G25.1.1	1 MREF1= 10.00%	PID Local Reference 1	**44658**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G25.1.2	2 MREF2= +20.00%	PID Local Reference 2	**44659**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G25.1.3	3 MREF3= +30.00%	PID Local Reference 3	**44660**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G25.1.4	4 MREF4= +40.00%	PID Local Reference 4	**44661**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G25.1.5	5 MREF5= +50.00%	PID Local Reference 5	**44662**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]

Parameter	Screen	Description	Address	Range	Modbus Range
G25.1.6	6 MREF6= +50.00%	PID Local Reference 6	**44663**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G25.1.7	7 MREF7= +50.00%	PID Local Reference 7	**44664**	[G19.2.5] to [G10.1]	[G19.2.5] to [G10.1]
G25.2.1	1 PIDSetp= MREF	PID Setpoint Source	**46164**	MREF AI1 AI2 AI3 AI4 MODBUS COMMS PLC	0 1 2 3 4 5 7 8
G25.2.2	2 PID Fbk= AI2	PID Feedback Source	**46165**	MREF AI1 AI2 AI3 AI4 MODBUS COMMS PLC	0 1 2 3 4 6 7
G25.2.3	3 PID Kc= +50.0%	PID Regulator Proportional Gain	**46166**	0 to 1000%	0 to 10000
G25.2.4	4 PID It= 10.0s	PID Regulator Integrating Time	**46167**	0 to 200s	0 to 2000
G25.2.5	5 PID Dt= 0.0s	Pid Regulator Differential Time	**46168**	0.0 to 1000ms	0 to 1000
G25.2.6	6 MxSL= +50.00Hz	PID Frequency Upper Limit	**46173**	[G25.2.7] to 300Hz	[G25.2.7] to 30000
G25.2.7	7 MnSL= 0.00Hz	PID Frequency Lower Limit	**46174**	-300 to [G25.2.6] Hz	-30000 to [G25.2.6]
G25.2.8	8 InvertPID= N	PID Output Inverting	**46175**	NO SI	0 1
G25.2.9	9 Out Sc= +100.0%	PID Output Scale	**46176**	0.1 to 1000%	1 to 10000
G25.3.1	1 LP Pon= 35%	Awakening Level	**46183**	0 to 100%	0 to 100
G25.3.2	2 FP1 Son= 49.99Hz	Fix Pump 1 Starting Speed	**46679**	0 to [G10.1]Hz	0 to [G10.1]
G25.3.3	3 FP2 Son = 49.99Hz	Fix Pump 2 Starting Speed	**46680**	0 to [G10.1]Hz	0 to [G10.1]
G25.3.4	4 FP3 Son = 49.99Hz	Fix Pump 3 Starting Speed	**46681**	0 to [G10.1]Hz	0 to [G10.1]

Parameter	Screen	Description	Address	Range	Modbus Range
G25.3.5	5 FP4 Son = 49.99Hz	Fix Pump 4 Starting Speed	**46682**	0 to [G10.1]Hz	0 to [G10.1]
G25.3.6	6 FP Ton= 60.0s	Fix Pumps Starting Delay	**46687**	0 to 3600s	0 to 36000
G25.4.1	1 LP T Slpr= 60.0s	Delay Before Enabling Sleep Mode	**46181**	0 to 999.0s	0 to 9999
G25.4.2	2 Slp Spd= 0.00Hz	Enabling Sleep Mode Speed	**46182**	0 to [G10.1]	0 to [G10.1]
G25.4.3	3 SPD1of= 15.0H	Fix Pump 1 Stopping Speed	**46683**	0 to [G10.1]Hz	0 to [G10.1]
G25.4.4	4 SPD2of = 15.0Hz	Fix Pump 2 Stopping Speed	**46684**	0 to [G10.1]Hz	0 to [G10.1]
G25.4.5	5 SPD3of = 15.0Hz	Fix Pump 3 Stopping Speed	**46685**	0 to [G10.1]Hz	0 to [G10.1]
G25.4.6	6 SPD4of = 15.0Hz	Fix Pump 4 Stopping Speed	**46686**	0 to [G10.1]Hz	0 to [G10.1]
G25.4.7	7 Fp Tof= 60.0s	Stopping Fix Pump Delay	**46688**	0 to 3600s	0 to 36000
G25.4.8	8 FP Error= 2%	PID Maximum Error Stopping Fix Pumps	**46696**	0 to 100%	0 to 100
G25.5.1	1 AccTime= 2.0s	Main Motor Accelerating Time after Fix Pump Stop	**46697**	0 to 600s	0 to 6000
G25.5.2	2 Dec Timel= 2.0s	Main Motor Accelerating Time after Fix Pump Activation	**46698**	0 to 600s	0 to 6000
G25.7.1	1 Fill Sp= 0.00Hz	Filling Pipes Speed	**46178**	0 to [G10.1]	0 to [G10.1]
G25.7.2	2 Fill P= 0.0%	Filling Pipes Pressure	**46179**	0 to 100%	0 to 1000
G25.7.3	3 Fill Tim= 600s	Filling Pipes Delay	**46180**	0 to 9999s	0 to 9999
G25.9.1	1 First FP= 1	First Fixed Pump Selection	**46677**	1 to 4	1 to 4
G25.9.2	2 FP number= 0	Number of Fixed Pumps Selection	**46689**	0 to 4	0 to 4

8.3. Visualization parameters

Parameter	Screen	Description	Address	Modbus Range
STATUS LINE	**OFF** 0.0A +0.0Hz	Present drive status.	**40014**	0 to 201

Modbus value for the status of the drive and for the fault and warning messages.

Modbus Value → STATUS MESSAGE			
0 →	FLT	4 →	ACL
1 →	DCB	5 →	RUN
2 →	STP	6 →	RDY
3 →	DCL		

Note: See status messages description in section 'Status Messages'.

STATUS LINE	OFF **0.0A** +0.0Hz	Motor output current (Corresponds to SV1.1)	**40784**	Real Value = (Modbus Value / 10)
STATUS LINE	OFF 0.0A **+0.0Hz**	Motor output speed (in %). (Corresponds to SV1.2)	**40785**	Real Value = (Modbus Value / 100)

Parameter	Screen	Description	Address	Modbus Range
SV1.1	Mtr I out=0.0	Shows the current running through the motor, corresponding to the second field of the status line → **OFF 0.0A +0.0Hz**	**40784**	Real Value = (Modbus Value / 10)
SV1.2	Mtr Freq= 0.00Hz	Shows the motor frequency	**40785**	Real Value = (Modbus Value / 100)
SV1.3	Mtr Sp= 0rpm	Shows the motor speed in rpm	**40786**	Real Value = Modbus Value
SV1.4	Mtr FBSp=+0rpm	Motor feedback speed	**40787**	Real Value = Modbus Value
SV1.5	Mtr Vout=0V	Shows the motor voltage.	**40788**	Real Value = Modbus Value

Parameter	Screen	Description	Address	Modbus Range
SV1.6	Mtr Pow = 0.00kW	Shows the motor instantaneous power consumption	**40790**	Real Value = (Modbus Value / 10)
SV1.7	Mtr Torqe = 0.0%	Shows the torque applied to the motor.	**40791**	Real Value = (Modbus Value / 10)
SV2.1	Bus vol= 528V	Shows the DC voltage measured in the driver bus.	**40789**	Real Value = Modbus Value
SV3.1	ANLG IN1 = +0.0V	Shows the Analogue Input 1 mean value	**45381**	Real Value = Modbus Value
SV3.2	ANLG IN2 = +0.0mA	Shows the Analogue Input 2 mean value	**45396**	Real Value = (Modbus Value / 100)
SV3.3	Digl= 00000000	Shows the activation or rest status of the Digital Inputs, from left to right ED8 to ED1.	**40016**	Real Value = (Modbus Value / 100)
SV3.4	ANL OUT1 = 0.0%	Shows the value of the Analogue Output 1	**45638**	Real Value = Modbus Value
SV3.5	ANLG IN2 = +0.0mA	Shows the Analogue Input 2 mean value.	**45644**	Real Value = (Modbus Value / 10)
SV3.6	DOstatus= 0-00	Shows the status of the digital outputs in the following order: SD1-Relay2 Relay1	**45673**	Real Value = (Modbus Value / 10)
SV4.1	Inv.Power=	Shows the drive capacity in kW	**40769**	Real Value = Modbus Value
SV4.2	Inv. S/W	Shows the last software version installed	**40771**	Real Value = Modbus Value
SV4.3	SW Disp=	Last software version installed in the display.	**-**	Real Value = Modbus Value
SV5.1	S=0.0% F=0.0%	Shows PID Setpoint and Feedback.	**40792-40793**	-
SV5.2	PID Out=+0.00%	Shows the t PID Output	**46160**	Real Value = (Modbus Value / 10)
SV8.1	S=0.0% F=0.0%	Shows PID Setpoint and Feedback.	**40792-40793**	Real Value = (Modbus Value / 100)
SV8.2	Sal PID=+0.00%	Shows the PID output	**46160**	Real Value = (Modbus Value / 10)
SV8.3	No Bmb Ma=0	Shows the number of pumps running	**46676**	Real Value = (Modbus Value / 100)
SV8.4.1	1 MREF1= +10.00%	PID Local Reference 1	**44658**	Real Value = Modbus Value

Parameter	Screen	Description	Address	Modbus Range
SV8.4.2	2 MREF2= +20.00%	PID Local Reference 2	**44659**	[G19.2.5] to [G10.1]
SV8.4.3	3 MREF3= +30.00%	PID Local Reference 3	**44660**	[G19.2.5] to [G10.1]
SV8.4.4	4 MREF4= + 40.00%	PID Local Reference 4	**44661**	[G19.2.5] to [G10.1]
SV8.4.5	5 MREF5= +50.00%	PID Local Reference 5	**44662**	[G19.2.5] to [G10.1]
SV8.4.6	6 MREF6= +50.00%	PID Local Reference 6	**44663**	[G19.2.5] to [G10.1]
SV8.4.7	7 MREF7= +50.00%	PID Local Reference 7	**44664**	[G19.2.5] to [G10.1]

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