

# SD500 Series

ACCESSORIES



I/O Expansion board

## Getting Started Manual



# SD500

Series

A C C E S S O R I E S

## Getting Started Manual I/O Expansion board

**Edition: February 2011**

SD50IM01AI Rev. A



## SAFETY SYMBOLS

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



This symbol means improper operation may result 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.

### Edition of February 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](http://www.power-electronics.com) where the latest version of this manual can be downloaded.

### Revisions

Date	Revision	Description
15 / 02 / 2011	A	First edition.



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# 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

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**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.

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**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.

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**Do not remove the cover while the power is applied or the unit is in operation.**

Otherwise, electric shock could occur.

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**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.

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**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.

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**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.

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**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.

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**Do not subject the cables to the abrasions, excessive stress, heavy loads or pinching.**

Otherwise, you may get an electric shock.

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## CAUTION

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**Install the inverter on a non-flammable surface. Do not place flammable material nearby.**

Otherwise, fire could occur.

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**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.

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**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.

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**Do not allow lint, paper, wood chips, dust, metallic chips or other foreign matter into the drive.**

Otherwise, fire or accident could occur.

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## WARNINGS

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### 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.
- 

### RECYCLING

- Equipment package must be recycled. For that, it is necessary to separate the different materials that it contains (plastics, paper, cardboard, wood, ...) and put them in suitable containers.
  - Waste electrical and electronic equipment must be collected selectively for proper environmental management.
- 

### SAFETY

- 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.
-

**SEGURIDAD**

- 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.
-

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## HANDLING PRECAUTIONS

- When the automatic restart function is selected, respect the necessary safety measures to avoid damage if suddenly the motor restarts after an emergency stop.
- The keyboard key “STOP / RESET” of the inverter will be always enabled when this option is selected. That’s why it is required to install an emergency mushroom out of the equipment and which can be used by users from their workstation.
- If an alarm is reseted, and the reference signal continues and the equipment is set to start after the signal reset, it is possible that the equipment restarts automatically. Check that the system can be set like this, to avoid accidents.
- Do not modify or change anything inside the inverter.
- Before begin the parameter setting, restart all the parameters to make them coincide with the default value.

---

## 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 the I/O expansion board

The input and output optional board (from this moment I/O expansion board) offers the possibility to increase the analogue and digital inputs and outputs number for the inverters of the SD500 series. This board includes:

- 3 Digital configurable inputs.
- 2 Analogue configurable inputs.
- 3 Digital configurable outputs.
- 2 Analogue configurable outputs.

With the installation of this board, the SD500 VFD will have up to 11 digital inputs and 6 digital outputs, and 4 analogue inputs and outputs, every one configurable. All this gives the SD500 great versatility and flexibility.



SD50ITC0015A

Figure 1.1 I/O expansion board for the SD500 inverter

## 2. TECHNICAL CHARACTERISTICS

### 2.1. General Information

#### 2.1.1. Contents of the I/O expansion board kit

The I/O expansion board kit consists on:

- 1 I/O Expansion Board.
- 1 Setscrew.
- 1 Getting started manual.

#### 2.1.2. Specifications of the I/O expansion board

The inputs and outputs integrated in the I/O expansion board have the same characteristics than the inputs and outputs of the inverter.

- Digital inputs: Configurable. (NPN/PNP) Selectable working mode. In the case of the PNP mode, use the (24Vdc) internal power source. Optically isolated.
- Analogue inputs: Configurable. One of voltage and one of current.

Working ranges

- Current signal: 0 – 20mA, 4 – 20mA.
- Voltage signal: 0 – 10Vdc,  $\pm 10$ Vdc.
- Digital outputs: 3 multifunction configurable output relays. (Normally opened contacts, 250Vac, 5A or 30Vdc, 5A).
- Analogue outputs. Configurable. One of voltage and one of current.

Working ranges

- Voltage: 0 – 10Vdc,  $\pm 10$ Vdc (10mA).
- Current: 0 – 20mA, 4 – 20mA.

## 3. INSTALLATION AND CONNECTION

### 3.1. Installation of the I/O expansion board

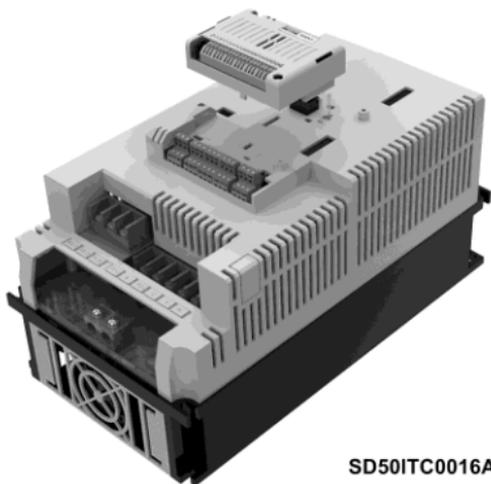
The I/O expansion board is connected to the SD500 Series inverters of Power Electronics directly (through a connector). Once the board is connected to the inverter, the new inputs and outputs will be enabled. These can be set as the I/O of the serial inverter.



#### 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.



SD50ITC0016A

Figure 3.1 Installation of the I/O expansion board in the inverter

## 3.2. Connection of the I/O expansion board

### 3.2.1. Description of terminals

In the I/O expansion board there are two connectors. One of them is used to connect the board to the SD500 inverter. The other one is for user's use for the control signals connection (Wiring of the analogue and digital inputs and outputs).

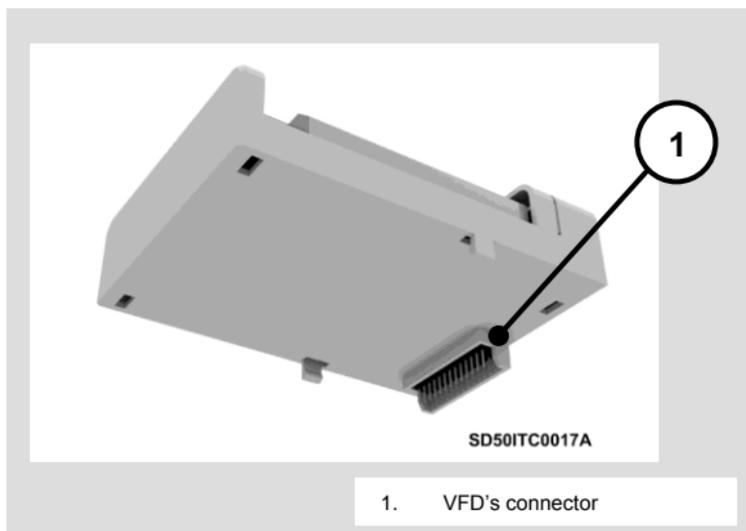


Figure 3.2 Location of the VFD connector

CONNECTOR	DESCRIPTION
VFD's Connector	Connector of the I/O expansion board that must be connected to the VFD control board.

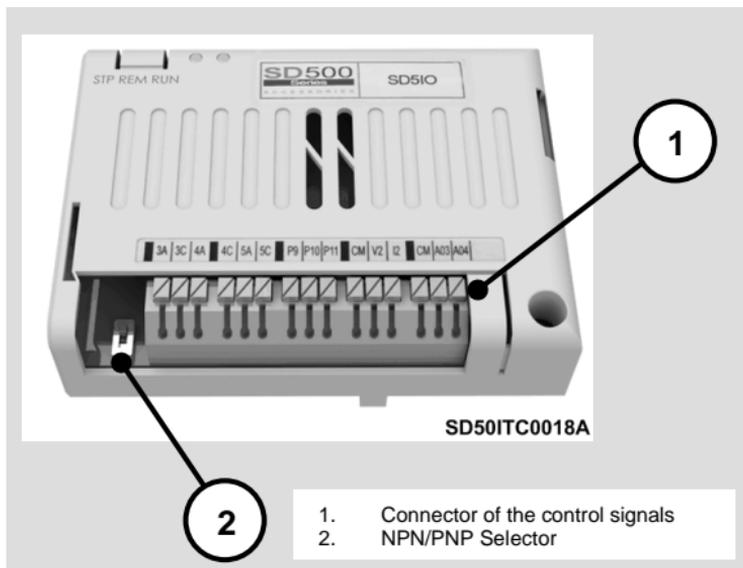


Figure 3.3 Location of the control signal connector in the I/O expansion board

CONNECTOR	DESCRIPTION																						
Control Signal Connector	In this connector are made the control connections, that means, the inputs and outputs wiring, in accordance with the attached information:																						
	<table border="1"> <thead> <tr> <th>PIN</th> <th>Signal</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="6">DIGITAL OUTPUTS</td> <td>3A</td> <td>RELAY 3 NO</td> <td>Digital Output 3. Programmable relay (NO). Potential free (Max: 250Vac, 5A; 30Vdc, 5A).</td> </tr> <tr> <td>3C</td> <td>RELAY 3 NC</td> <td>Common for the Digital Output 3.</td> </tr> <tr> <td>4A</td> <td>RELAY 4 NO</td> <td>Digital Output 4. See relay 3.</td> </tr> <tr> <td>4C</td> <td>RELAY 4 NC</td> <td>Common for the Digital Output 4.</td> </tr> <tr> <td>5A</td> <td>RELAY 5 NO</td> <td>Digital Output 5. See relay 3.</td> </tr> <tr> <td>5C</td> <td>RELAY 5 NC</td> <td>Common for the Digital Output 5.</td> </tr> </tbody> </table>	PIN	Signal	Description	DIGITAL OUTPUTS	3A	RELAY 3 NO	Digital Output 3. Programmable relay (NO). Potential free (Max: 250Vac, 5A; 30Vdc, 5A).	3C	RELAY 3 NC	Common for the Digital Output 3.	4A	RELAY 4 NO	Digital Output 4. See relay 3.	4C	RELAY 4 NC	Common for the Digital Output 4.	5A	RELAY 5 NO	Digital Output 5. See relay 3.	5C	RELAY 5 NC	Common for the Digital Output 5.
	PIN	Signal	Description																				
	DIGITAL OUTPUTS	3A	RELAY 3 NO	Digital Output 3. Programmable relay (NO). Potential free (Max: 250Vac, 5A; 30Vdc, 5A).																			
		3C	RELAY 3 NC	Common for the Digital Output 3.																			
		4A	RELAY 4 NO	Digital Output 4. See relay 3.																			
		4C	RELAY 4 NC	Common for the Digital Output 4.																			
5A		RELAY 5 NO	Digital Output 5. See relay 3.																				
5C		RELAY 5 NC	Common for the Digital Output 5.																				
<b>Note:</b> Continues in the next page.																							

CONNECTOR	DESCRIPTION			
Control signal connector	<b>Note:</b> Comes from the previous page.			
		<b>PIN</b>	<b>Signal</b>	<b>Description</b>
		P9	DI9	Programmable Digital Input 9. Powered from the (NPN) CM terminal or through an external 24Vdc power source whose common terminal must be connected to the (PNP) CM terminal.
		P10	DI10	Programmable Digital Input 10. See ED9.
		P11	DI11	Programmable Digital Input 11. See ED9.
		CM	Common	Common for the digital inputs.
	ANALOGUE INPUTS	V2	AI3	Analogue Input 3 of voltage (V).
		I2	AI4	Analogue Input 4 of current (mA).
		CM	Common	Common for the analogue inputs.
	ANALOGUE OUTPUTS	AO3	AO3	Programmable Analogue Output 3 of voltage (V).
		AO4	AO4	Programmable Analogue Output 4 of current (mA).
		CM	Common	Common for the analogue outputs.

### 3.2.2. NPN / PNP Selector Configuration

SD500 series brings two working modes for the input signals connection: NPN or PNP. The corresponding connection modes are showed below:

#### a) NPN Mode

The inverter is set in this mode when the selector is in mode NPN (top position). In this case, the input terminals will be enabled using the internal power supply of the VFD. The terminal CM (24VDC GND) will be the common terminal for the contacts of the input signals.

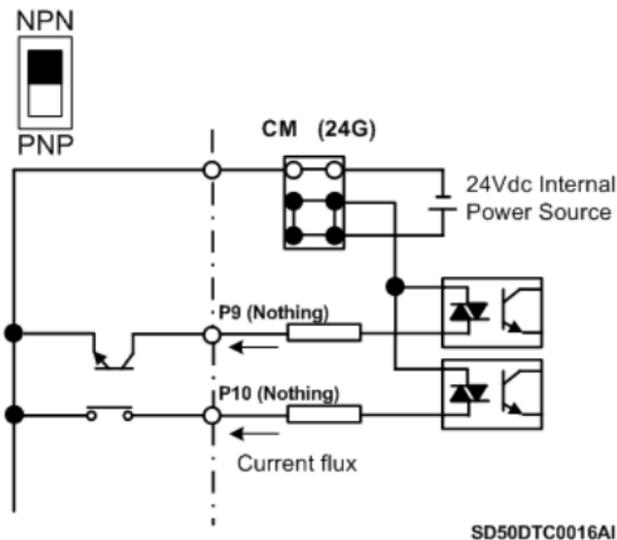


Figure 3.4 Control Terminals in NPN configuration and internal power source

### b) PNP Mode (external power supply)

The inverter is set in this mode when the selector is in mode PNP (bottom position). In this case, the input terminals will be enabled using a 24VDC external power source with the reference terminal relied to the CM terminal of the VFD. The terminal 24 (24VDC) of this power source will be the common terminal for the input signal contacts.

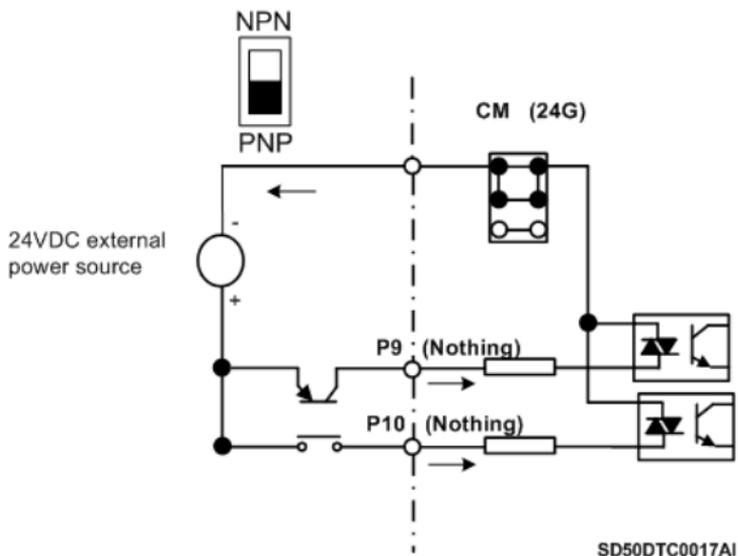
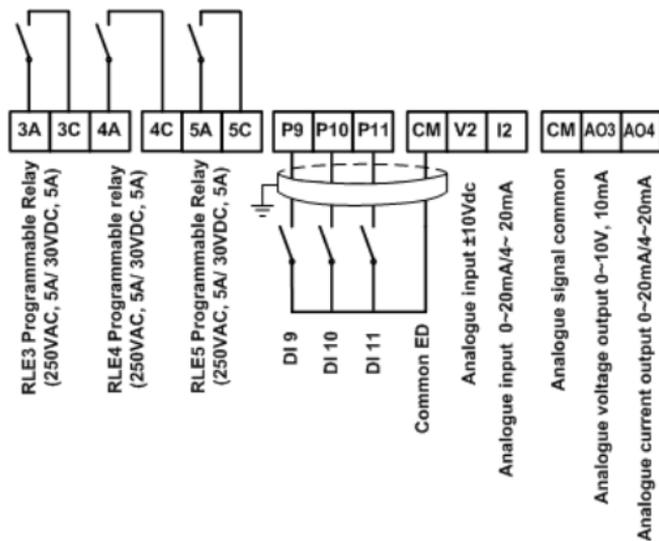


Figure 3.5 Control Terminals in PNP configuration and external power source

### 3.2.3. Control connections scheme

The following figure shows the basic wiring of the control signals terminal.



SD50DTC0018AI

Figure 3.6 Example of the basic wiring of the control terminals in the I/O Expansion Board

## 4. PARAMETER SETTING

Once the optional board has been connected to the control board of the VFD and the equipment is powered, this equipment software will recognize this board and the corresponding setting parameters will be available with the display. These parameters setting allow the definition of use and configuration of the new inputs and outputs.

In addition of the new parameters, the installation of the I/O expansion board affects to some parameters existing in the VFD.

Next will be exposed all the programming and visualization parameters affected by the I/O expansion board, and also the new available parameters, all of them grouped in the corresponding parameter groups, as it is shown in the display.

**Note:** In the description of some parameters explained in this point there is a reference to other directly or indirectly interrelated parameters. Take a look at the “SD500 Programming and software manual” to obtain more information about the parameters that are not described in this manual.

### 4.1. Group 3 – G3: References

Parameter	Name / Description	Range	Default value	Function	Set during run	
1 REF1 SP=LOCAL	G3.1 / Speed reference source 1	LOCAL AI1 AI2 AI3 AI4 MDBUS COMMS PLC	LOCAL	Allows selecting the speed reference source 1 or 2.	YES	
				<table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>AI3</td> <td>The reference will be introduced through the Analogue Input 3</td> </tr> <tr> <td>AI4</td> <td>The reference will be introduced through the Analogue Input 4.</td> </tr> </tbody> </table>		OPT.
OPT.	FUNCTION					
AI3	The reference will be introduced through the Analogue Input 3					
AI4	The reference will be introduced through the Analogue Input 4.					
2 REF2 SP=LOCAL	G3.2 / Speed reference source 2			<b>Note:</b> The other configuration options can be seen in the “SD500 Programming and Software manual”.	YES	

## 4.2. Group 4 – G4: Inputs

### 4.2.1. Subgroup 4.1 – S4.1: Digital inputs

The pumps program selection requires the following considerations:

There are some configuration options when the pump program is enabled that can be set like the standard program.

However, when the pump program is enabled the VFD will change the default values set in the digital inputs, setting them to 0 “NONE” except the digital inputs DI6, DI7 and DI8 that are set as speed multi reference for the pumps program commands.

That means that user can set the pumps program as his requirements selecting the functionality and the protections needed.

Parameter	Name / Description	Range	Default value	Function	Set during run
11 DI9=None Digital I/p9	G4.1.11 / Multifunction Digital Input 9 Configuration	0 to 47	0	Configuration of the digital inputs for individual use.  <b>Note:</b> See all the configuration options in the parameter G4.1.3 'Multifunction Digital Input 1 configuration' in the 'SD500 Programming and Software manual'.	NO
12 DI10=None Digital I/p 10	G4.1.12 / Multifunction Digital Input 10 Configuration	0 to 47	0		NO
13 DI11=None Digital I/p 11	G4.1.13 / Multifunction Digital Input 11 Configuration	0 to 47	0		NO

Parameter	Name / Description	Range	Default value	Function	Set during run						
14 DIOnF= 10ms DI On Filter	G4.1.14 / Digital Input activation delay	0 to 10000ms	10ms	In order to set the delay time when activating the digital input. In case any variation occurs within a smaller time gap, the input will remain disabled.	YES						
15 DIOffF= 3ms DI Off Filter	G4.1.15 / Digital input deactivation delay	0 to 10000ms	3ms	In order to set the delay time when disabling a digital input. In case any variations occur within a smaller time gap, the input will remain enabled.	YES						
16 DCTy= 00000000 DiContactType <sup>[1]</sup>	G4.1.16 / Digital Input contact type selection	00000000 to XXXXXXXX	00000000	<p>Allows defining the digital inputs as usually opened contactors (NO) or usually closed (NC).</p> <table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Contact NO</td> </tr> <tr> <td>X</td> <td>Contact NC</td> </tr> </tbody> </table> <p>The assignment order is DI1, DI2, ..., DI8 starting from the bit placed farthest to the right.</p> <p><sup>[1]</sup> This screen is only shown when the I/O expansion board is not connected.</p>	OPT.	FUNCTION	0	Contact NO	X	Contact NC	NO
OPT.	FUNCTION										
0	Contact NO										
X	Contact NC										
DCTy= 000000000000 DiContactType <sup>[2]</sup>	G4.1.16 / Digital Input contact type selection	000000000000 to XXXXXXXXXX XX	000000000000	<p>Allows defining the digital inputs as usually opened contactors (NO) or usually closed (NC).</p> <table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Contact NO</td> </tr> <tr> <td>X</td> <td>Contact NC</td> </tr> </tbody> </table> <p>The assignment order is DI1, DI2, ..., DI11 starting from the bit placed farthest to the right.</p> <p><sup>[2]</sup> This screen is only shown when the I/O expansion board is connected.</p>	OPT.	FUNCTION	0	Contact NO	X	Contact NC	NO
OPT.	FUNCTION										
0	Contact NO										
X	Contact NC										
17 DiScan= 1ms DI Scan Time	G4.1.17 / Multireference delay time	1 to 5000ms	1ms	In order to set how much time must pass to refresh the digital inputs configured as multireference.	NO						

## 4.2.2. Subgroup 4.4 – S4.4: Analogue input 3

Parameter	Name / Description	Range	Default value	Function	Set during run						
1 An3PT= 0-10v Ain1PolarityType	G4.4.1 / Analogue input mode selection	0 to 1	0	<p>Allows the user to select the input mode of the analogue input between single-pole and bipolar.</p> <table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Single-pole of 0-10V</td> </tr> <tr> <td>1</td> <td>Bipolar of +/-10V</td> </tr> </tbody> </table> <p>In addition of changing this parameter, users have to make sure that the wiring of the analogue input is correct following the indications of the "Installation and hardware manual".</p>	OPT.	FUNCTION	0	Single-pole of 0-10V	1	Bipolar of +/-10V	NO
OPT.	FUNCTION										
0	Single-pole of 0-10V										
1	Bipolar of +/-10V										
2 An3LPF= 10ms Ain3LPF	G4.4.2 / Low pass filter for the analogue input 3	0 to 1000.0ms	10ms	Allows setting the response time with a speed reference change, reducing the speed fluctuations due to unstable signals or noise. This situation produces that the response is slower.	YES						
3 A3MnV= +0.00V Ain3 Min V	G4.4.3 / Minimum range of the analogue input 3	0 to [G4.4.5]	+0.00V	Defines the minimum value of voltage for the analogue input 3 according to the characteristics of the sensor that will be connected.	YES						
4 A3MnRf= +0.00% Ain3 Min. Ref	G4.4.4 / Speed for the minimum range of the analogue input 3	0 to 100.0%	+0.00%	Allows setting the speed reference corresponding to the minimum range of the analogue input 3, corresponding to the minimum voltage level set in [G4.4.3 'Minimum range of the analogue input 3']. It is set to introduce the speed reference with an analogue input. The value is a percentage of the motor's rated speed.	YES						

Parameter	Name / Description	Range	Default value	Function	Set during run
5 An3MxV= +10.00V Ain3 Max V.	G4.4.5 / Maximum range of the analogue input 3	[G4.4.3] to 10.0V	+10.00V	Defines the maximum voltage value for the analogue input 3 according to the characteristics of the sensor that will be connected.	YES
6 An3MxR= +100.00% Ain3 Max Ref	G4.4.6 / Speed for the maximum range of the analogue input 3	0 to 100.00%	+100.00 %	Allows setting the speed reference corresponding to the maximum range of the analogue input 3, corresponding to the maximum voltage level set in [G4.4.5 'Maximum range of the analogue input 3']. It is set to introduce the speed reference with an analogue input. The value is a percentage of the motor's rated speed.	YES
7 An3NgMn=+0.00V <sup>[1]</sup> Ain3 Neg Min V	G4.4.7 / Minimum negative range of the analogue input 3	-10.00 to 0V	+0.00V	Defines the minimum negative value of voltage for the analogue input 3 according to the characteristics of the sensor that will be connected.	YES
8 A3MnR= +0.00% <sup>[1]</sup> Ain3 Neg Min Ref	G4.4.8 / Speed for the minimum negative range of the analogue input 3	-100.00 to 0%	+0.00%	Allows setting the speed reference corresponding to the minimum negative range of the analogue input 3, corresponding to the minimum voltage level set in [G4.4.7 'Minimum negative range of the analogue input 3']. It is set to introduce the speed reference with an analogue input. The value is a percentage of the motor's rated speed.	YES
9 A3MxR= -10.00V <sup>[1]</sup> Ain3 Neg Max V	G4.4.9 / Maximum negative range of the analogue input 3	-10.0 to 0V	-10.00V	Defines the maximum negative value of voltage for the analogue input 3 according to the characteristics of the sensor that will be connected.	YES

<sup>[1]</sup> Available if G4.4.1=1 'Bipolar of -/+10V.

Parameter	Name / Description	Range	Default value	Function	Set during run
10 A3MxR= -100.00 <sup>[1]</sup> Ain3 Neg Max Ref	G4.4.10 / Speed for the maximum negative range of the analogue input 3	-100.00 to 0%	-100.00%	Allows setting the speed reference corresponding to the maximum negative range of the analogue input 3, corresponding to the maximum voltage level set in [G4.4.9 'Maximum negative range of the analogue input 3']. It is set to introduce the speed reference with an analogue input. The value is a percentage of the motor's rated speed.	SI
11 A3DeLI= 0.04% Ain3 Discre. Lvl	G4.4.11 / Quantification level of the analogue input 3	0.04 to 10%	0.04%	Allows setting the quantification level of the analogue input 3. It is used when there is a lot of noise in the input analogue signals. The quantification value is defined as a percentage of the maximum value in the analogue input. For example, if the maximum input value is 10V and the quantification level is defined in 1%, the frequency changes in 0.05Hz (when the maximum frequency is 50Hz), with an interval of 0.1V. When the input voltage increases and decreases, the output frequency differs producing the elimination of the fluctuation effect of the analogue input value.	NO

<sup>[1]</sup> Available if G4.4.1=1 'Bipolar of -/+10V.

E  
N  
G  
L  
I  
S  
H

### 4.2.3. Subgroup 4.5 – S4.5: Analogue input 4

Parameter	Name / Description	Range	Default value	Function	Set during run
1 A4 LPF= 10ms Ain4 LPF	G4.5.1 / Low pass filter for the analogue input 4	0 to 10000ms	10ms	Allows setting the response time with a speed reference change, reducing the speed fluctuations due to unstable signals or noise. This situation produces that the response is slower.	NO
2 A4MnC= 4.00mA Ain4 Min C	G4.5.2 / Minimum range of the analogue input 4	0 to 20.00mA	4.00mA	Defines the minimum value of current for the analogue input 4 according to the characteristics of the sensor that will be connected.	YES
3 A4MnR= +0.00% Ain4 Min Ref	G4.5.3 / Speed for the minimum range of the analogue input 4	0 to 100.00%	+0.00%	Allows setting the speed reference corresponding to the minimum range of the analogue input 4, corresponding to the minimum current level set in [G4.5.2 'Minimum range of the analogue input 4']. It is set to introduce the speed reference with an analogue input. The value is a percentage of the motor's rated speed.	YES
4 A4MxC= 20.00mA Ain4 Max Curr	G4.5.4 / Maximum range of the analogue input 4	4 to 20.00mA	20.00mA	Defines the maximum value of current for the analogue input 4 according to the characteristics of the sensor that will be connected.	YES

Parameter	Name / Description	Range	Default value	Function	Set during run
5 A4MxR= +100.00% Ain4 Max Ref.	G4.5.5 / Speed for the maximum negative range of the analogue input 4	0 to 100.00%	+100.00%	Allows setting the speed reference corresponding to the maximum range of the analogue input 4, corresponding to the maximum current level set in [G4.5.4 'Maximum range of the analogue input 4']. It is set to introduce the speed reference with an analogue input. The value is a percentage of the motor's rated speed.	YES
6 A4DeLI= 0.04% Ain4 Dze Level	G4.5.6 / Quantification level of the analogue input 4	0.04 to 10%	0.04%	The same quantification function explained in the parameter [G4.4.11 'Quantification level of the analogue input 3'].	NO

### 4.3. Group 6 – G6: PID Control

Parameter	Name / Description	Range	Default value	Function	Set during run						
1 SEL REF=MREF <b>Select Reference</b>	G6.1 / Source selection to introduce the set point	MREF AI1 AI2 AI3 AI4 MODBUS COMMS PLC	MREF	<p>The user is able to select the source to introduce the PID regulator reference.</p> <table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>AI3</td> <td>PID reference introduced through Analog Input 3.</td> </tr> <tr> <td>AI4</td> <td>PID reference introduced through Analog Input 4.</td> </tr> </tbody> </table> <p><b>Note:</b> The other configuration options can be seen in the "SD500 Programming and Software manual".</p>	OPT.	FUNCTION	AI3	PID reference introduced through Analog Input 3.	AI4	PID reference introduced through Analog Input 4.	NO
OPT.	FUNCTION										
AI3	PID reference introduced through Analog Input 3.										
AI4	PID reference introduced through Analog Input 4.										
2 SEL RLM=EA1 <b>Select Feedback</b>	G6.2 / Source Selection to Introduce the Feedback Signal	AI1 AI2 AI3 AI4 MODBUS COMMS PLC	AI1	<p>In order to select the source this will introduce the feedback to close the control loop.</p> <table border="1"> <thead> <tr> <th>OPC.</th> <th>FUNCION</th> </tr> </thead> <tbody> <tr> <td>AI3</td> <td>Feedback signal through the Analog Input 3.</td> </tr> <tr> <td>AI4</td> <td>Feedback signal through the Analog Input 4.</td> </tr> </tbody> </table> <p><b>Note:</b> The other configuration options can be seen in the "SD500 Programming and Software manual".</p>	OPC.	FUNCION	AI3	Feedback signal through the Analog Input 3.	AI4	Feedback signal through the Analog Input 4.	NO
OPC.	FUNCION										
AI3	Feedback signal through the Analog Input 3.										
AI4	Feedback signal through the Analog Input 4.										

## 4.4. Group 8 – G8: Outputs

### 4.4.1. Subgroup 8.1 – S8.1: Digital O/P

Parameter	Name / Description	Range	Default value	Function	Set during run						
5 T RL ON= 0.00s Delay Dig O/P On	G8.1.5 / DO1 and Relays Connection Delay	0.0 to 100s	0.00s	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 enable.	YES						
6 T RL OF= 0.00s Dely Dig I/P Off	G8.1.6 / DO1 and Relays Disconnection delay	0.0 to 100s	0.00s	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 disable.	YES						
7 INV NA/NC=000000 Logic NC/NO Rlys	G8.1.7 / Digital Output and Relay Contact Type Selection	000000 to XXXXXX	000000	Defines the type of contact following this order:., <b>Relay5, Relay4, Relay3</b> , Digital output 1, Relay2 and Relay1, from left to right according to the bit assignment: <table border="1"> <thead> <tr> <th>BIT</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Contact normally opened (NO)</td> </tr> <tr> <td>X</td> <td>Contact normally closed (NC)</td> </tr> </tbody> </table>	BIT	FUNCTION	0	Contact normally opened (NO)	X	Contact normally closed (NC)	NO
BIT	FUNCTION										
0	Contact normally opened (NO)										
X	Contact normally closed (NC)										
8 RLY3= FDT-2 Function Relay 3	G8.1.8 / Control source selection relay 3	0 to 35	FDT-2	Set the working mode of every relay according to some options. <b>Note:</b> See all the configuration options in the parameter G8.1.2 in 'SD500 Programming and software manual'.	NO						
9 RLY4= FDT-3 Function Relay 4	G8.1.9 / Control source selection relay 4	0 to 35	FDT-3		NO						
10 RLY5= FDT-4 Function Relay 5	G8.1.10 / Control source selection relay 5	0 to 35	FDT-4		NO						

#### 4.4.2. Subgroup 8.2 – S8.2: Analog O/P

Parameter	Name / Description	Range	Default value	Function	Set during run
11 AO3= Frequency <b>AO3 Mode</b>	G8.2.11 / Analogue Output 3 mode selection	0 to 15	FRE- QUENCY	Set the working mode of every relay according to some options. <b>Note:</b> See all the configuration options in the parameter G8.2.1 in 'SD500 Programming and software manual'.	NO
12 AO3Ga= +100.0% <b>AO3 Gain</b>	G8.2.12 / Analogue output 1 gain	-100.0 to 100.0%	+100.0%	Allows setting the gain of the analogue output 3.	YES
13 AO3Of= +0.0% <b>AO3 Bias</b>	G8.2.13 / Analogue output 3 offset	-100.0 to 100.0%	+0.0%	Allows setting the offset level of the analogue output 3.	YES
14 AO3FI= 5ms <b>AO3 Filter</b>	G8.2.14 / Filter selection for Analogue output 3	0 to 10000ms	5ms	Filter of the analogue output 3 value. In some cases, if the analogue signal is unstable, the response can be better selecting a filter value. <b>Note:</b> The use of the filter can add a light delay in the analogue output signal.	YES
15 AO3Con= 0.0% <b>AO3 Const Set</b>	G8.2.15 / Constant value of the analogue output 3	0 to 100.0%	0.0%	Allows setting the constant voltage value that will appear in the analogue output 3 when it is set as 'CONSTANT' in the parameter [G8.2.11 'AO3'].	YES

Parameter	Name / Description	Range	Default value	Function	Set during run
16 AO4= Frequency AO4 Mode	G8.2.16 / Analogue Output 4 mode selection	0 to 15	FRE- QUENCY	Set the working mode of every relay according to some options. <b>Note:</b> See all the configuration options in the parameter G8.2.1 in 'SD500 Programming and software manual'.	YES
17 AO4Ga= +100.0% AO4 Gain	G8.2.17 / Analogue output 2 gain	-100.0 to 100.0%	+100.0%	Allows setting the gain of the analogue output 4.	YES
18 AO4Of= +0.0% AO4 Bias	G8.2.18 / Analogue output 4 offset	-100.0 to 100.0%	+0.0%	Allows setting the offset level of the analogue output 4.	YES
19 AO4FI= 5ms AO4 Filter	G8.2.19 / Filter selection for Analogue output 4	0 to 10000ms	5ms	Filter of the analogue output 4 value. In some cases, if the analogue signal is unstable, the response can be better selecting a filter value. <b>Note:</b> The use of the filter can add a light delay in the analogue output signal.	YES
20 AO4Con= 0.0% AO4 Const Set	G8.2.20 / Constant value of the analogue output 4	0 to 100.0%	0.0%	Allows setting the constant voltage value that will appear in the analogue output 4 when it is set as 'CONSTANT' in the parameter [G8.2.16 'AO4'].	YES

## 4.5. Group 9 – G9: Comparator

Parameter	Name / Description	Range	Default value	Function	Set during run									
3 SLCOM= None Selec sourc comp	G9.3 / Comparator Source Selection	None AI1 AI2 AI3 AI4	00	<p>The comparator source can be set according to the following table:</p> <table border="1"> <thead> <tr> <th>OPT</th> <th>DESCRIP.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>AI3</td> <td>Analog input 3 will be used as source by the comparator.</td> </tr> <tr> <td>4</td> <td>AI4</td> <td>Analog input 4 will be used as source by the comparator.</td> </tr> </tbody> </table> <p><b>Note:</b> See all the configuration options in 'SD500 Programming and software manual'.</p>	OPT	DESCRIP.	FUNCTION	3	AI3	Analog input 3 will be used as source by the comparator.	4	AI4	Analog input 4 will be used as source by the comparator.	YES
OPT	DESCRIP.	FUNCTION												
3	AI3	Analog input 3 will be used as source by the comparator.												
4	AI4	Analog input 4 will be used as source by the comparator.												

## 4.6. Group 11 – G11: Protections

Parameter	Name / Description	Range	Default value	Function	Set during run									
24 OvrHtSen= None Overheat Sensor	G11.24 / Motor Overheat Detection Sensor Selection	None AI1 AI2 AI3 AI4	NONE	The user is able to select the type of analog input which will be used to connect the PTC thermistor. For further information related to the PTC thermistor read SD500 Hardware and Installation Manual.	NO									
				<table border="1"> <thead> <tr> <th>OPT</th> <th>DESCRIP.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>AI3</td> <td>Analog input 3 is used, setting the PTC thermistor by voltage.</td> </tr> <tr> <td>4</td> <td>AI4</td> <td>Analog input 4 is used, setting the PTC thermistor by current.</td> </tr> </tbody> </table>		OPT	DESCRIP.	FUNCTION	3	AI3	Analog input 3 is used, setting the PTC thermistor by voltage.	4	AI4	Analog input 4 is used, setting the PTC thermistor by current.
				OPT		DESCRIP.	FUNCTION							
3	AI3	Analog input 3 is used, setting the PTC thermistor by voltage.												
4	AI4	Analog input 4 is used, setting the PTC thermistor by current.												
<b>Note:</b> See all the configuration options in 'SD500 Programming and software manual'.														

## 4.7. Group 25 – G25: Pump Control

### 4.7.1. Subgroup 25.2 – S25.2: PID

Parameter	Name / Description	Range	Default value	Function	Set during run						
1 PIDSetp= MREF PID Setpoint	G25.2.1 / PID Setpoint Source	MREF AI1 AI2 AI3 AI4 MODBUS COMMS PLC	MREF	<p>The user can select the source to introduce the PID regulator set point.</p> <table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>AI3</td> <td>PID set point introduced by the analog input 3.</td> </tr> <tr> <td>AI4</td> <td>PID set point introduced by the analog input 4.</td> </tr> </tbody> </table> <p><b>Note:</b> See all the configuration options in 'SD500 Programming and software manual'.</p>	OPT.	FUNCTION	AI3	PID set point introduced by the analog input 3.	AI4	PID set point introduced by the analog input 4.	YES
OPT.	FUNCTION										
AI3	PID set point introduced by the analog input 3.										
AI4	PID set point introduced by the analog input 4.										
2 PID RLM= AI1 PID Feedback	G25.2.2 / PID Feedback Source	AI1 AI2 AI3 AI4 MODBUS COMMS PLC	AI1	<p>Selecting the source through which the feedback signal will be introduced to close the control loop.</p> <table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>AI3</td> <td>Feedback from the analogue input 3.</td> </tr> <tr> <td>AI4</td> <td>Feedback from the analogue input 4.</td> </tr> </tbody> </table> <p><b>Note:</b> See all the configuration options in 'SD500 Programming and software manual'.</p>	OPT.	FUNCTION	AI3	Feedback from the analogue input 3.	AI4	Feedback from the analogue input 4.	YES
OPT.	FUNCTION										
AI3	Feedback from the analogue input 3.										
AI4	Feedback from the analogue input 4.										

## 4.8. Screens SV.3 – External Visualization

Screen	Units	Description
ANLG IN1 = +0.00V	V	Shows the Analogue Input 1 mean value.
ANLG IN2 = +0.00mA	mA	Shows the Analogue Input 2 mean value.
ANLG IN3 = +0.00V <sup>[1]</sup>	V	Shows the Analogue Input 3 mean value. <sup>[1]</sup> This screen is shown only if the I/O expansion board is connected.
ANLG IN4 = +0.00mA <sup>[2]</sup>	mA	Shows the Analogue Input 4 mean value. <sup>[2]</sup> This screen is shown only if the I/O expansion board is connected.
DigI= 00000000 <sup>[3]</sup>	-	Shows the activation or rest status of the Digital Inputs, from left to right ED8 to ED1. X: Active / 0: No Active <sup>[3]</sup> This screen is shown only if the I/O expansion board is not connected.
DigI= 0000000000 <sup>[4]</sup>	-	Shows the activation or rest status of the Digital Inputs, from left to right ED8 to ED1. Then will appear other 3 digital inputs showing the activation or rest status of the Digital Inputs, from right to left ED9 to ED11. X: Active / 0: No Active <sup>[4]</sup> This screen is shown only if the I/O expansion board is connected.
ANL OUT1 = 0.0%	%	Shows the value of the Analogue Output 1.
ANL OUT2 = 0.0%	%	Shows the value of the Analogue Output 2.
ANL OUT3 = 0.0% <sup>[5]</sup>	%	Shows the value of the Analogue Output 3. <sup>[5]</sup> This screen is shown only if the I/O expansion board is connected.
ANL OUT4 = 0.0% <sup>[6]</sup>	%	Shows the value of the Analogue Output 4. <sup>[6]</sup> This screen is shown only if the I/O expansion board is connected.

Screen	Units	Description
DOStatus= 0-00 <sup>[1]</sup>	-	Shows the status of the digital outputs in the following order: SD1-Relay2 Relay1. X: Active / 0: Rest  <sup>[1]</sup> This screen is shown only if the I/O expansion board is not connected.
DOStatus=000000 <sup>[2]</sup>	-	Shows the activation or rest status of the output relays and the digital output from left to right: Relay5, Relay4, Relay3, DO1, Relay2 y Relay1 X: Active / 0: Rest  <sup>[2]</sup> This screen is shown only if the I/O expansion board is connected.

# 5. MODBUS ADDRESSES LIST

## Programming Parameters

Param.	Screen	Description	Address	Range	Modbus Range
G3.1	1 REF1 SP=LOCAL	Speed Reference Source 1	44359	LOCAL	0
				EA1	2
				EA2	3
				EA3	4
				EA4	5
				MDBUS	6
				COMMS	8
				PLC	9
G3.2	2 REF2 SP=LOCAL	Speed Reference Source 2	44613	See G3.1	0 to 9
G4.1.11	11 DI9=None	Multifunction Digital Input 9 Configuration	45449	None	0
				START (+)	1
				START (-)	2
				RESET	3
				EXT TRIP	4
				DIS START	5
				INCH1	6
				XCEL-L	11
				XCEL-M	12
				3-WIRE	14
				CTR/REF 2	15
				UP	17
				DOWN	18
				RESERVED	19
				POT CLEAR	20
				AnalogHLD	21
				PIDOPLoop	23
RESERVED	33				
START/DC	34				
ThermalIn	39				
INCH (+)	46				
INCH (-)	47				
G4.1.12	12 D10=None	Multifunction Digital Input 10 Configuration	45450	See G4.1.11	0 to 47

Param.	Screen	Description	Address	Range	Modbus Range
G4.1.13	13 D11=None	Multifunction Digital Input 11 Configuration	45451	See G4.1.11	0 to 47
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 10000
G4.1.16	16 DCTy= 00000000	Digital input contact type selection	45463	00000000 to XXXXXXXX	0 to 255
G4.1.16 <sup>[1]</sup>	DCTy= 000000000000	Digital input contact type selection	45463	000000000000 to XXXXXXXXXXXX	0 to 2047
G4.1.17	17 DiScan= 1ms	Multireference delay time	45465	1 to 5000ms	1 to 5000
G4.4.1	1 An3PT= 0-10v	Analogue input mode selection	45412	Single-pole of 0-10V Bipolar of +/-10V	0 1
G4.4.2	2 An3LPF= 10ms	Low pass filter for the analogue input 3	45413	0 to 1000.0ms	0 to 10000
G4.4.3	3 A3MnV= +0.00V	Minimum range of the analogue input 3	45414	0 to [G4.4.5]	0 to [G4.4.5]
G4.4.4	4 A3MnRf= +0.00%	Speed for the minimum range of the analogue input 3	45415	0 to 100.00%	0 to 10000
G4.4.5	5 An3MxV= +10.00V	Maximum range of the analogue input 3	45416	[G4.4.3] to 10.00V	[G4.4.3] to 1000
G4.4.6	6 A3MxR= +100.00%	Speed for the maximum range of the analogue input 3	45417	0 to 100.00%	0 to 10000

<sup>[1]</sup> This screen is only shown when the I/O expansion board is connected.

Param.	Screen	Description	Address	Range	Modbus Range
G4.4.7	7 A3NgMn=+0.00V	Minimum negative range of the analogue input 3	45418	[G4.4.9] to 0V	[G4.4.9] to 0
G4.4.8	8 A3MnR= +0.00%	Speed for the minimum negative range of the analogue input 3	45419	-100.00 to 0%	-10000 to 0
G4.4.9	9 A3MxR= -10.00V	Maximum negative range of the analogue input 3	45420	-10.00 to [G4.4.7]V	-1000 to [G4.4.7]
G4.4.10	10 A3MxR= -100.00	Speed for the maximum negative range of the analogue input 3	45421	-100.00 to 0%	-10000 to 0
G4.4.11	11 A3DeLI= 0.04%	Quantification level of the analogue input 3	45423	0.04 to 10.00%	4 to 1000
G4.5.1	1 A4 LPF= 10ms	Low pass filter for the analogue input 4	45428	0 to 10000ms	0 to 10000
G4.5.2	2 A4MnC= 4.00mA	Minimum range of the analogue input 4	45429	0 to [G4.5.4]mA	0 to [G4.5.4]
G4.5.3	3 A4MnR= +0.00%	Speed for the minimum range of the analogue input 4	45430	0 to 100.00%	0 to 10000
G4.5.4	4 A4MxC= 20.00mA	Maximum range of the analogue input 4	45431	[G4.5.2] to 20.00mA	[G4.5.2] to 2000
G4.5.5	5 A4MxR= +100.00%	Speed for the maximum negative range of the analogue input 4	45432	0 to 100.00%	0 to 10000

Param.	Screen	Description	Address	Range	Modbus Range
G4.5.6	6 A4DeLI= 0.04%	Quantification level of the analogue input 4	45438	0.04 to 10%	4 to 1000
G6.1	1 SEL REF=MREF	Source selection to introduce the set point	46164	MREF	0
				AI1	1
				AI2	2
				AI3	3
				AI4	4
				MODBUS	5
				COMMS	7
				PLC	8
G6.2	2 SEL RLM=EA1	Source Selection to Introduce the Feedback Signal	46165	AI1	0
				AI2	1
				AI3	2
				AI4	3
				MODBUS	4
				COMMS	6
				PLC	7
G8.1.5	5 T RL ON= 0.00s	DO1 and Relays Connection Delay	45682	0 to 100.00s	0 to 10000
G8.1.6	6 T RL OF= 0.00s	DO1 and Relays Disconnection delay	45683	0.0 to 100.00s	0 to 10000
G8.1.7	7 INV NANC= 000000	Digital Output and Relay Contact Type Selection	45684	000000 to XXXXXX	0 to 63

Param.	Screen	Description	Address	Range	Modbus Range
G8.1.8	8 RLY3= FDT-2	Control source selection relay 3	45666	None	0
				FDT-1	1
				FDT-2	2
				FDT-3	3
				FDT-4	4
				OverLoad	5
				IOL	6
				UndrLoad	7
				VentWarn	8
				OverVolt	10
				LowVolt	11
				OverHeat	12
				Run	14
				Stop	15
				Steady	16
				Spd Srch	19
Ready	22				
PUMP	25				
Trip	29				
COMPARAT	34				
BRCtrl	35				
G8.1.9	9 RLY4= FDT-3	Control source selection relay 4	45667	See [G8.1.8]	0 to 35
G8.1.10	10 RLY5= FDT-4	Control source selection relay 5	45668	See [G8.1.8]	0 to 35
G8.2.11	11 AO3= Frequency	Analogue Output 3 mode selection	45646	FREQUENCY	0
				O/pCurr	1
				O/pVolt	2
				DCLinkV	3
				O/pPower	5
				TargetFq	8
				RAMP FREQ	9
				PIDRefVal	12
				PIDFdbVal	13
				PIDO/p	14
				Constant	15
Alogl/p0	16				
G8.2.12	12 AO3Ga= +100.0%	Analogue output 1 gain	45647	-1000.0 to 1000.0%	-10000 to 10000
G8.2.13	13 AO3Of= +0.0%	Analogue output 3 offset	45648	-100.0 to 100.0%	-1000 to 1000
G8.2.14	14 AO3FI= 5ms	Filter selection for Analogue output 3	45649	0 to 10000ms	0 to 10000

Param.	Screen	Description	Address	Range	Modbus Range
G8.2.15	15 AO3Con= 0.0%	Constant value of the analogue output 3	45650	0 to 100.0%	0 to 1000
G8.2.16	16 AO4= Frequency	Analogue Output 4 mode selection	45652	See [G8.2.11]	0 to 15
G8.2.17	17 AO4Ga=+100.0%	Analogue output 2 gain	45653	-1000.0 to 1000.0%	-10000 to 10000
G8.2.18	18 AO4Of= +0.0%	Analogue output 4 offset	45654	-100.0 to 100.0%	-1000 to 1000
G8.2.19	19 AO4FI= 5ms	Filter selection for Analogue output 4	45655	0 to 10000ms	0 to 10000
G8.2.20	20 AO4Con= 0.0%	Constant value of the analogue output 4	45656	0 to 100.0%	0 to 1000
G9.3	3 SLCOM= None	Comparator Source Selection	44930	None	0
				AI1	1
				AI2	2
				AI3	3
				AI4	4
G11.24	24 SeAITemp= None	Motor Overheat Detection Sensor Selection	46947	None	0
				AI1	1
				AI2	2
				AI3	3
				AI4	4
G25.2.1	1 PIDSetp= MREF	PID Setpoint Source	46164	MREF	0
				AI1	1
				AI2	2
				AI3	3
				AI4	4
				MODBUS	5
				COMMS	7
				PLC	8
G25.2.2	2 PID RLM= AI1	PID Feedback Source	46165	EA1	0
				EA2	1
				EA3	2
				EA4	3
				MODBUS	4
				COMMS	6
				PLC	7

## Visualization Parameters

Param.	Screen	Description	Address	Modbus Range
SV3.1	ANLG IN1 = +0.00V	Shows the Analogue Input 1 mean value.	45381	Real Value = (Modbus Value / 100)
SV3.2	ALG IN2 = +0.00mA	Shows the Analogue Input 2 mean value.	45396	Real Value = (Modbus Value / 100)
SV3.3	ANLG IN3 = +0.00V <sup>[1]</sup>	Shows the Analogue Input 3 mean value.	45411	Real Value = (Modbus Value / 100) <sup>[1]</sup> This screen is only shown if the I/O expansion board is connected.
SV3.4	ANLG IN4 = +0.00mA <sup>[2]</sup>	Shows the Analogue Input 4 mean value.	45426	Real Value = (Modbus Value / 100) <sup>[2]</sup> This screen is only shown if the I/O expansion board is connected.
SV3.5 <sup>[1]</sup>	DigI=. 000000	Shows the activation or rest status of the Digital Inputs, from left to right ED8 to ED1.	40016	Bit 0 = ED1 – Bit 7 = ED8 / Range: 0 to 1 <sup>[1]</sup> This screen is only shown if the I/O expansion board is not connected.
SV3.5 <sup>[2]</sup>	DigI=. 0000000000	Shows the activation or rest status of the Digital Inputs, from left to right ED8 to ED1. Then will appear other 3 digital inputs showing the activation or rest status of the Digital Inputs, from right to left ED9 to ED11.	40016	Bit 0 = ED1 – Bit 5 = ED6 / Range: 0 to 1 Bit 8 = ED9 / Range: 0 to 1 Bit 9 = ED10 / Range: 0 to 1 Bit 10 = ED11 / Range: 0 to 1 <sup>[2]</sup> This screen is only shown if the I/O expansion board is connected.
SV3.6	ANL OUT1 = 0.0%	Shows the value of the Analogue Output 1.	45638	Real Value = (Modbus value/10)
SV3.7	ANL OUT2 = 0.0%	Shows the value of the Analogue Output 2.	45644	Real Value = (Modbus value/10)
SV3.8 <sup>[3]</sup>	ANL OUT3 = 0.0%	Shows the value of the Analogue Output 3.	45651	Real Value = (Modbus value/10) <sup>[3]</sup> This screen is only shown if the I/O expansion board is connected.

Param.	Screen	Description	Address	Modbus Range
SV3.9 <sup>[4]</sup>	ANL OUT4 = 0.0%	Shows the value of the Analogue Output 4.	45657	Real Value = (Modbus value/10) <sup>[4]</sup> This screen is only shown if the I/O expansion board is connected.
SV3.10	DOSStatus=0-00	Shows the status of the digital outputs in the following order: SD1-Relay2 Relay1.	20020→SD 1 45673→R1 -R2	Bit 0 = R1 / Range: 0 to 1 Bit 1 = R2 / Range: 0 to 1 Bit 2 = SD1 / Range: 0 to 1
SV3.10 <sup>[1]</sup>	DOSStatus=000000	Shows the activation or rest status of the output relays and the digital output from left to right: Relay5, Relay4, Relay3, DO1, Relay2 y Relay1.	40017→R1 -R5	Bit 0 = R1 / Range: 0 to 1 Bit 1 = R2 / Range: 0 to 1 Bit 2 = SD1 / Range: 0 to 1 Bit 3 = R3 / Range: 0 to 1 Bit 4 = R4 / Range: 0 to 1 Bit 5 = R5 / Range: 0 to 1 <sup>[1]</sup> This screen is only shown if the I/O expansion board is connected.

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