**POWER ELECTRONICS**

SD750

# ACCESSORIES MANUAL

## ANALOG I/O EXPANSION BOARD



LOW VOLTAGE VARIABLE SPEED DRIVE

# SD750

## *LOW VOLTAGE VARIABLE SPEED DRIVE*

# Accessories Manual
## Analog I/O expansion board

## ABOUT THIS MANUAL

### PURPOSE

This manual contains important instructions for the installation, configuration and use of **the optional analogue input/output (I/O) expansion board** for Power Electronics' SD750 variable speed drives.

### TARGET AUDIENCE

This manual is intended for qualified customers who will install, operate and maintain Power Electronics SD750 variable speed drives.

Only trained electricians may install and commission the drives.

### REFERENCE MANUALS

The following reference documents are available for SD750 variable speed drives:

- Hardware and Installation Manual.

- Programming and Software Manual.

- Maintenance Manual.

- Pumps Application Manual.

### POWER ELECTRONICS CONTACT INFORMATION

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# TABLE OF CONTENTS

# SAFETY SYMBOLS

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

In this manual, safety messages are classified as follows:

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

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

| | |
|---|---|
| ⚠ | Hot surface. Be careful and follow the instructions to avoid burns and personal injuries. |
| ⚠ | Risk of fire. Be careful and follow the instructions to prevent causing an unintentional fire. |
| ⚠ | Caution, risk of electric shock. Energy storage timed discharge. Wait for the indicated time to avoid electrical hazards. |
| 🎧 | Caution, risk of hearing damage. Wear hearing protection. |

**EN**

# SAFETY INSTRUCTIONS

## IMPORTANT!

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

In order to appropriately use the drive, please, follow all instructions described in the *Hardware and Installation Manual* which refer to transportation, installation, electrical connection and commissioning of the equipment.

For maintenance operations, follow the instructions from the *Maintenance Manual.*

Power Electronics accepts no responsibility for any damages resulting from incorrect use of equipment.

## ⚠ CAUTION

Read carefully the *Hardware and Installation Manual,* the *Maintenance Manual* and all documentation related to the drive to guarantee its safe use and avoid the risk of personal injuries and damages to the equipment.

Ensure compliance with local and national regulations of the installation site.

## 🛈 NOTICE

**CAUTION IN CONNECTIONS**

**Use conductive paste between plates in every electrical connection.** Otherwise, resistance will increase and an overheat in the contact zone of the conductors may occur.

# INTRODUCTION

SD750 drives are compatible with several optional boards:

- Communication boards (Ethernet/IP, Profinet, CANopen…).

- Encoder board.

- Digital and analog I/O expansion boards.

- Optical fiberboard

…among others. Up to three optional boards can be connected, maximum two of the same type.

**This manual focuses on the optional analogue input/output (I/O) expansion board.** This board allows to increase the number of analog inputs and outputs compared to those of the SD750.

This board allows the drive to increase its inputs and outputs as follows:

- increases two analog inputs, configurable with the same behavior as the standard analog input.

- Increases two analog outputs, with the same behavior as the serial analog output.

The front of the analog I/O expansion board is shown below:

# Analog I/O expansion board specifications

- Device type: I/O expansion

- Form factor: Insert card.

- Type of wiring: Preferably shielded hose

# LED indicators

The analog I/O board expansion board includes 1 led indicator (status) that provides information about the operation of the card. See section "Connectors description and led indicators" for more information. It is green and its frequency changes according to the operating state of the system. Its operation is explained in the following table:

| LED | COLOR / FREQUENCY | DESCRIPTION |
|---|---|---|
| *STATUS* | Green / slow blinking | The system is operating correctly [1]. |
| | Green / fast blinking | Test mode. The user has put the board in test mode, it is useful to locate the board when there are several identical boards. |
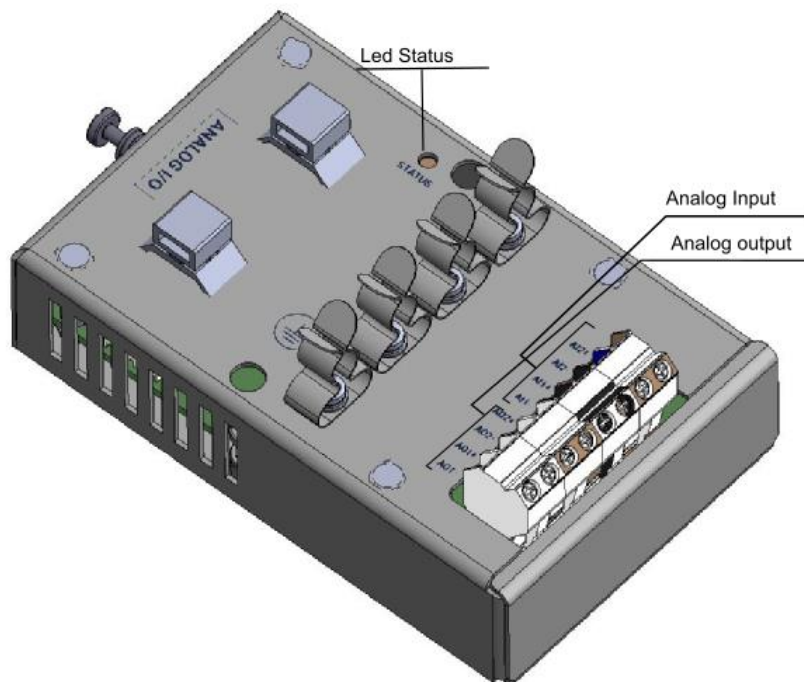


SD75DTR006AI

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[1] When we state that the system operates correctly, it means that the communication between the expansion board, the network controller and the central SD750 microcontroller is correct. This does not mean, however, that the communication with the PLC is correct.

# CONNECTION TO THE DRIVE

**2**

The analog expansion board can be connected directly, through the connector on its back side, to any of the three expansion connectors of the SD750 drive central control board. Once connected, it allows the drive to be equipped with more analog input and output options and to display new parameter groups. Up to two cards of this type can be connected to each drive.

Part Back of the board.



CONNECTOR TO SD750 CONTROL BOARD

SD75DTR005AI

EXPANSION CONNECTORS

SD75DTG003AI

EN
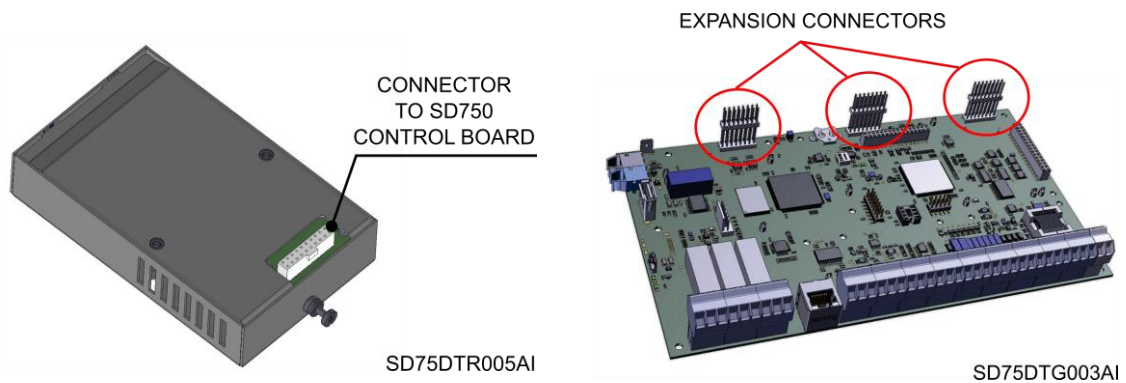
## ⚠ CAUTION

**Power Electronics' SD750 drives operate with high electric energy.**

Make sure that the power has been disconnected and allow at least 10 minutes to ensure that the DC bus has been discharged. Make sure with a multimeter that there is no voltage at the input, output or DC bus before installing the expansion card. Otherwise, there is a risk of personal injury or accident

## Connectors description



SD75DTR006AI
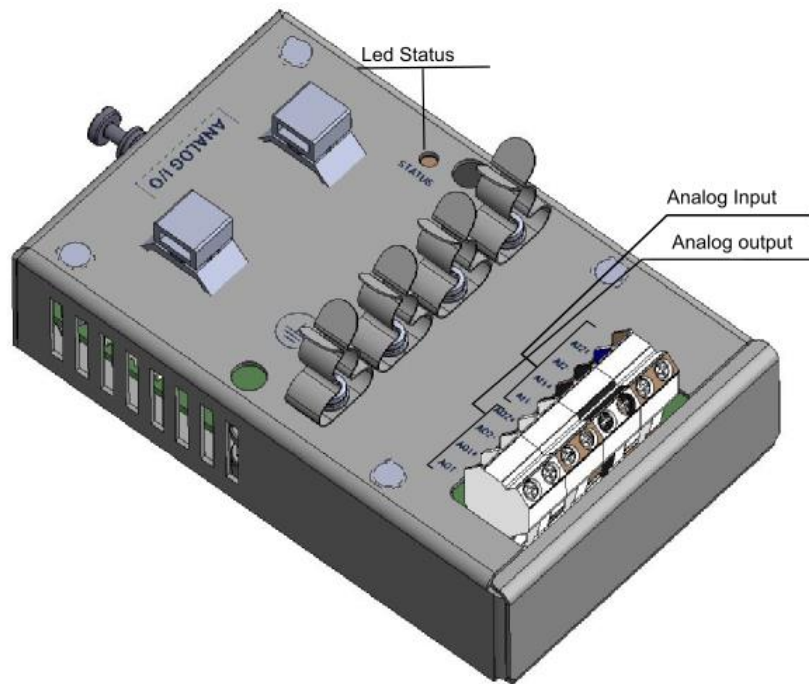
The I/O expansion board has a terminal block on the front, it will be for the analog inputs and outputs.

It has four analog input connectors, two for each analog input (AI1, AI1+, AI2, AI2+).

There are four output connectors, two for each analog output (A01, A01+, A02, A02+).

On the back side, there is a sixteen-pin ID connector to connect to the SD750 central board.

# Connections Schema

The following figure shows a detailed distribution of the components of the optional input/output card.
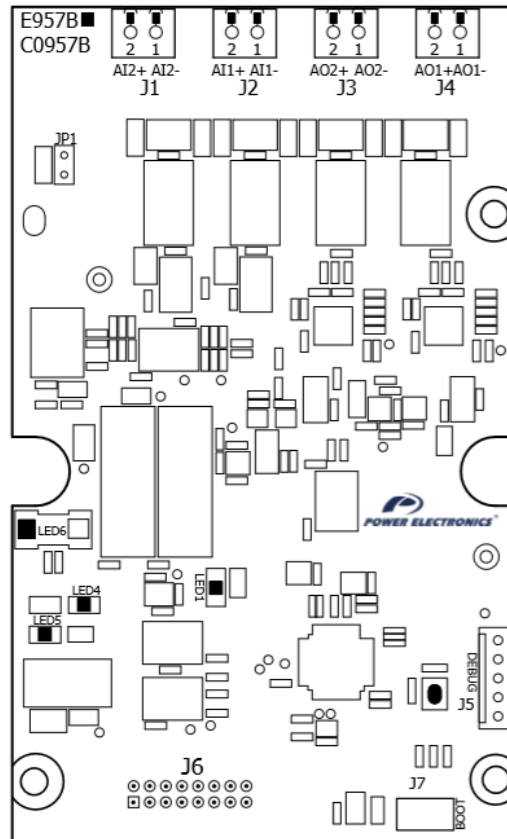


In the current printing the analog inputs 4 and 5 appear as AI1, AI2 and the analog outputs 3 and 4 appear as A01, AO2 as shown in the figure above.

The following table shows the connection signals of analog cards as a function of the supply voltage and the type of output.

In case a second card is added, analog inputs 6 and 7 and outputs 5 and 6 will be enabled.

| | SIGNAL | DESCRIPTION |
|---|---|---|
| **ANALOG INPUTS** | AI2+ (Input 5) | Analog input 2 programmable in voltage, current (V or mA) Configurable for 0 - 20mA, 4 - 20mA, 0 - 10Vdc, ±10Vdc . The value of the input resistance in voltage mode is Ri=20kΩ. The value of the input resistance in current mode is Ri=250Ω. |
| | AI2- (Input 5) | Common to Analog Input 2. |
| | AI1+-( Input 4) | Analog input 1 programmable in voltage, current (V or mA) Configurable for 0 - 20mA, 4 - 20mA, 0 - 10Vdc, ±10Vdc. The value of the input resistance in voltage mode is Ri=20kΩ. The value of the input resistance in current mode is Ri=250Ω. |
| | AI1- (Input 4) | Common to Analog Input 1. |
| **ANALOG OUTPUTS** | AO2+(Output 4) | Analogue Output 2 programmable in voltage, current (V or mA). Configurable for ±10VDC, 0-20mA (selectable ranges) . |
| | AO2-(Output 4) | Common to Analog Output 2. |
| | AO1+(Output 3) | Analogue Output 1 programmable in voltage, current (V or mA). Configurable for ±10VDC, 0-20mA (selectable ranges). |
| | AO1-(Output 3) | Common to Analog Output 1. |

# COMMISSIONING

The analog I/O expansion card allows you to increase the number of inputs and outputs compared to the standard SD750.

The following steps must be followed:

1.  After stopping and de-energizing the drive, connect the expansion card to the connector of the equipment prepared for the expansion cards that are free.

2.  Check that the communication with the SD750 is correct (by displaying group G23.2). See that the analog expansion board (A/B) status is activated (G23.2.5). Reference is made to a card A if only one card is connected and B if there is a second card. In this case, new parameter groups will be visible that will allow the adjustment and display of the expansion board status.

3.  Set the inputs/outputs according to the desired behavior (G4.5, G4.6 or G8.5).

To see the measurement status of the analog input or output, see group SV3 (External display), values belonging to EA4/EA5 for analog input and AO3/AO4 for the new analog outputs.

- Group SV3.13, SV3.16: Analog input status (format configurable in G4.5.3, G4.6.3, G4.7.3, G4.8.3)

- Group SV3.26, SV3.28: Analog output status (format configurable in G8.4.2, G8.5.2, G8.6.2, G8.7.2)

## Parameters setting

Up next, the relevant parameters are summarized.

## ❶ NOTICE

**For details about the range of values and Modbus addresses, refer to the *Software and Programming Manual f*or SD750 drives**

### Subgroup G23.2: Input / Output

Sub-group G23.2 of the SD750 drive enables the status of the input and output boards to be configured

Check that the corresponding board is activated at start-up and is not in test mode. As it is possible to connect up to two analog I/O expansion cards, the following parameters will be displayed:

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G23.2.5 IO analog A status = Off** | Off<br>On | Shows the status of the analog inputs and outputs expansion board A.<br><br>| OPT. | FUNCTION |<br>\| Off \| The board is not connected. \|<br>\| On \| The board is connected \| | NO |
| **G23.2.6 IO analog A test = No** | No<br>Yes | Enables led fast blinking. This is useful to help locate the board when several boards of the same type are connected.<br>**Note:** this parameter only appears if the I/O expansion board A has been connected. | NO |
| **G23.2.7 IO analog B status = Off** | Off<br>On | Shows the status of the analog inputs and outputs expansion board B.<br><br>| OPT. | FUNCTION |<br>\| Off \| The board is not connected. \|<br>\| On \| The board is connected \| | NO |
| **G23.2.8 IO analog B test = No** | No<br>Yes | Enables led fast blinking. This is useful to help locate the board when several boards of the same type are connected.<br>**Note:** this parameter only appears if the I/O expansion board B has been connected. | NO |

### Analog Inputs

Groups G4.2 to G4.4 of the SD750 drive are used to configure the analog inputs.

Connecting an expansion board to the drive enables new groups of analog input parameters in group G4.

They will be enabled from G4.5 to G4.8:

## Subgroup 4.5: Analogue input 4

**Note**: This group will only be shown if an expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.5.1 Enable sensor = No** | No<br>Yes | Allows user to configure analogue input 4 and activates the parameters which are necessary to set it up. See [G4.5.2] to [G4.5.7].<br><br>| OPTION | FUNCTION |<br>|---|---|<br>| No | The sensor connected to this input can be used to introduce the speed reference and as open loop sensor. |<br>| Yes | Analogue input enabled as feedback in closed loop control. | | NO |
| **G4.5.2 Sensor unit = l/s** | %<br>l/s<br>m3/s<br>l/m<br>m3/m<br>l/h<br>m3/h<br>m/s<br>m/m<br>m/h<br>bar<br>kPa<br>psi<br>m<br>ºC<br>ºF<br>K<br>Hz<br>rpm | Allows choosing different measure units for the analogue input 4 depending on the function of the sensor to be used. Changing this parameter implies that the minimum and maximum values of the sensor range will be affected by the corresponding conversion. Thus, it is necessary to verify the values adjusted in:<br>[G4.5.5 Sensor low level =+0.0l/s] ➔ Sensor minimum level.<br>[G4.5.7 Sensor high level =+10.0l/s] ➔ Sensor maximum level.<br><br>**Available if [G4.5.1 = YES].** | NO |
| **G4.5.3 AI4 Format = V** | V<br>mA | Allows configuring the format of the analogue input 4 to connect a voltage or current signal, depending on the sensor to be used to introduce the reference. | NO |
| **G4.5.4 AI4 low level = 0.0 V** | -10.0V to G4.5.6<br>+0.0mA to G4.5.6 | Defines the minimum value of voltage or current for analogue input 4 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.5.5 Sensor low level = 0.0 l/s** | -3200.0 to G4.5.7<br>Engineering units | Adjusts the minimum unit value of the sensor connected to the analogue input 4, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.5.4]. **Available if [G4.5.1 = YES].**<br>**Note**: This value must be revised if the units are changed in [G4.5.2]. It must be adjusted for operation in open and closed loop. | YES |
| **G4.5.6 AI4 high level = 10.0 V** | G4.5.4 to +20.0V<br>G4.5.4 to +20mA | Defines the maximum value of voltage or current for analogue input 4 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.5.7 Sensor high level = 10.0 l/s** | G4.5.5 to 3200.0<br>Engineering units | Adjusts the maximum unit value of the sensor connected to the analogue input 4, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.5.6]. **Available if [G4.5.1 = YES].**<br>**Note**: This value must be revised if the units are changed in [G4.5.2]. It must be adjusted for operation in open and closed loop. | YES |
| **G4.5.8 AI4 Ref speed min = 0.0 %** | -250.0 to G4.5.9 | Allows adjusting the speed reference for the minimum range of analogue input 4, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.5.4]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.5.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.5.9 AI4 Ref speed max = 100.0 %** | G4.5.8 to 250.0% | Allows adjusting the speed reference for the maximum range of analogue input 4, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.5.6]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.5.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.5.10 Sensor min value = 0.0 l/s** | -3200.0 to G4.5.12<br>Engineering units | Adjust the minimum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.5.4. It must be configured to work with the sensor in open loop. **Available if [G4.5.1 = SI].** | YES |
| **G4.5.11 Open loop min speed = 0.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.5.10, when the sensor is going to be used in open loop.<br>The value is a percentage of motor nominal speed. **Available if [G4.5.1 = SI].** | YES |
| **G4.5.12 Sensor max value = 10.0 l/s** | G4.5.10 to 3200.0<br>Engineering units | Adjust the maximum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.5.6. It must be configured to work with the sensor in open loop. **Available if [G4.5.1 = SI].** | YES |
| **G4.5.13 Open loop max speed = 100.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.5.12, when the sensor is going to be used in open loop.<br>The value is a percentage of motor nominal speed. **Available if [G4.5.1 = SI].** | YES |

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.5.14 AI4 loss protection = No** | No Yes | Adjusts stop mode of the drive in case the signal from analogue input 4 is lost.<br><br>| OPTION | FUNCTION |<br>|---|---|<br>| No | Function is disabled. |<br>| Yes | Whenever a sudden drop on the analogue input level is detected, terminating in zero, it indicates the sensor is damaged and the drive will stop, triggering a fault F42. | | YES |
| **G4.5.15 AI4 zero band filter = Off** | Off = 0.0; 0.1% to 2.0% | Analogue input 4 signal filtering. By adjusting this value, the analogue signal is filtered to eliminate possible electrical noise that prevents reading a zero value when it should. | YES |
| **G4.5.16 AI4 stabilizer filter = Off** | Off = 0.0; 0.1 to 20.0s | Allows adjusting a filtering to the analogue input 4 signal. By adjusting the value of this time constant, it is possible to eliminate possible instabilities in the signal caused by noise, wiring faults, etc.<br>**Note:** The application of a low pass filter to any analogue signal produces a delay of approximately the value of the configured time constant. | YES |

## Subgroup 4.6: Analogue input 5

**Note**: This group will only be shown if an expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.6.1 Enable sensor = No** | No Yes | Allows user to configure analogue input 5 and activates the parameters which are necessary to set it up. See [G4.6.2] to [G4.6.7].<br><br>| OPTION | FUNCTION |<br>|---|---|<br>| No | The sensor connected to this input can be used to introduce the speed reference and as open loop sensor. |<br>| Yes | Analogue input enabled as feedback in closed loop control. | | NO |
| **G4.6.2 Sensor unit = l/s** | % l/s m3/s l/m m3/m l/h m3/h m/s m/m m/h bar kPa psi m °C °F K Hz rpm | Allows choosing different measure units for the analogue input 5 depending on the function of the sensor to be used.<br><br>Changing this parameter implies that the minimum and maximum values of the sensor range will be affected by the corresponding conversion. Thus, it is necessary to verify the values adjusted in:<br>[G4.6.5 Sensor low level =+0.0l/s] ➔ Sensor minimum level.<br>[G4.6.7 Sensor high level =+10.0l/s] ➔ Sensor maximum level.<br><br>**Available if [G4.6.1 =YES].** | NO |
| **G4.6.3 AI5 Format = V** | V mA | Allows configuring the format of the analogue input 5 to connect a voltage or current signal, depending on the sensor to be used to introduce the reference. | NO |
| **G4.6.4 AI5 low level = 0.0 V** | -10.0V to G4.6.6 +0.0mA to G4.6.6 | Defines the minimum value of voltage or current for analogue input 5 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.6.5 Sensor low level = 0.0 l/s** | -3200.0 to G4.6.7 Engineering Units | Adjusts the minimum unit value of the sensor connected to the analogue input 5, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.6.4].<br>**Available if [G4.6.1 = YES].**<br>**Note**: This value must be revised if the units are changed in [G4.6.2]. It must be adjusted for operation in open and closed loop. | YES |
| **G4.6.6 AI5 high level = 10.0 V** | G4.6.4 to +10V G4.6.4 to +20mA | Defines the maximum value of voltage or current for analogue input 5 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.6.7 Sensor high level = 10.0 l/s** | G4.6.5 to 3200.0 Engineering Units | Adjusts the maximum unit value of the sensor connected to the analogue input 5, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.6.6].<br>**Available if [G4.6.1 = YES].**<br>**Note**: This value must be revised if the units are changed in [G4.6.2]. It must be adjusted for operation in open and closed loop. | YES |

**EN**

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.6.8 AI5 Ref speed min = 0.0 %** | -250.0 to G4.6.9 | Allows adjusting the speed reference for the minimum range of analogue input 5, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.6.4]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.6.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.6.9 AI5 Ref speed max = 100.0 %** | G4.6.8 to 250.0% | Allows adjusting the speed reference for the maximum range of analogue input 5, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.6.6]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.6.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.6.10 Sensor min value = 0.0 l/s** | -3200.0 to G4.6.12 Engineering Units | Adjust the minimum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.6.4. It must be configured to work with the sensor in open loop. **Available if [G4.6.1 = SI].** | YES |
| **G4.6.11 Open loop min speed = 0.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.6.10, when the sensor is going to be used in open loop. The value is a percentage of motor nominal speed. **Available if [G4.6.1 = SI].** | YES |
| **G4.6.12 Sensor max value = 10.0 l/s** | G4.6.10 to 3200.0 Engineering Units | Adjust the maximum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.6.6. It must be configured to work with the sensor in open loop. **Available if [G4.6.1 = SI].** | YES |
| **G4.6.13 Open loop max speed = 100.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.6.12, when the sensor is going to be used in open loop. The value is a percentage of motor nominal speed. **Available if [G4.6.1 = SI].** | YES |
| **G4.6.14 AI5 loss protection = No** | No Yes | Adjusts stop mode of the drive in case the signal from analogue input 5 is lost.<table><tr><td>**OPTION**</td><td>**FUNCTION**</td></tr><tr><td>No</td><td>Function is disabled.</td></tr><tr><td>Yes</td><td>Whenever a sudden drop on the analogue input level is detected, terminating in zero, it indicates the sensor is damaged and the drive will stop, triggering a fault F42.</td></tr></table> | YES |
| **G4.6.15 AI5 zero band filter = Off** | Off = 0.0; 0.1% to 2.0% | Analogue input 5 signal filtering. By adjusting this value, the analogue signal is filtered to eliminate possible electrical noise that prevents reading a zero value when it should. | YES |
| **G4.6.16 AI5 stabilizer filter = Off** | Off = 0.0; 0.1 to 20.0s | Allows adjusting a filtering to the analogue input 5 signal. By adjusting the value of this time constant, it is possible to eliminate possible instabilities in the signal caused by noise, wiring faults, etc. **Note:** The application of a low pass filter to any analogue signal produces a delay of approximately the value of the configured time constant. | YES |

## Subgroup 4.7: Analogue input 6

**Note**: This group will only be shown if a second expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.7.1 Enable sensor = No** | No Yes | Allows user to configure analogue input 6 and activates the parameters which are necessary to set it up. See [G4.7.2] to [G4.7.7].<table><tr><td>**OPTION**</td><td>**FUNCTION**</td></tr><tr><td>No</td><td>The sensor connected to this input can be used to introduce the speed reference and as open loop sensor.</td></tr><tr><td>Yes</td><td>Analogue input enabled as feedback in closed loop control.</td></tr></table> | NO |

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.7.2 Sensor unit = l/s** | % <br> l/s <br> m3/s <br> l/m <br> m3/m <br> l/h <br> m3/h <br> m/s <br> m/m <br> m/h <br> bar <br> kPa <br> psi <br> m <br> °C <br> °F <br> K <br> Hz <br> rpm | Allows choosing different measure units for the analogue input 6 depending on the function of the sensor to be used. <br> Changing this parameter implies that the minimum and maximum values of the sensor range will be affected by the corresponding conversion. Thus, it is necessary to verify the values adjusted in: <br> [G4.7.5 Sensor low level =+0.0l/s] ➔ Sensor minimum level. <br> [G4.7.7 Sensor high level =+10.0l/s] ➔ Sensor maximum level. <br><br> **Available if [G4.7.1 = YES].** | NO |
| **G4.7.3 AI6 Format = V** | V <br> mA | Allows configuring the format of the analogue input 6 to connect a voltage or current signal, depending on the sensor to be used to introduce the reference. | NO |
| **G4.7.4 AI6 low level = 0.0 V** | -10.0V to G4.7.6 <br> +0.0mA to G4.7.6 | Defines the minimum value of voltage or current for analogue input 6 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.7.5 Sensor low level = 0.0 l/s** | -3200.0 to G4.7.7 <br> Engineering Units | Adjusts the minimum unit value of the sensor connected to the analogue input 6, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.7.4]. **Available if [G4.7.1 = YES].** <br> **Note**: This value must be revised if the units are changed in [G4.7.2]. It must be adjusted for operation in open and closed loop. | YES |
| **G4.7.6 AI6 high level = 10.0 V** | G4.7.4 to +10V <br> G4.7.4 to +20mA | Defines the maximum value of voltage or current for analogue input 6 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.7.7 Sensor high level = 10.0 l/s** | G4.7.5 to 3200.0 <br> Engineering Units | Adjusts the maximum unit value of the sensor connected to the analogue input 6, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.7.6]. **Available if [G4.7.1 = YES].** <br> **Note**: This value must be revised if the units are changed in [G4.7.2]. It must be adjusted for operation in open and closed loop. | YES |
| **G4.7.8 AI6 Ref speed min = 0.0 %** | -250.0 to G4.7.9 | Allows adjusting the speed reference for the minimum range of analogue input 6, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.7.4]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.7.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.7.9 AI6 Ref speed max = 100.0 %** | G4.7.8 to 250.0% | Allows adjusting the speed reference for the maximum range of analogue input 6, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.7.6]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.7.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.7.10 Sensor min value = 0.0 l/s** | -3200.0 to G4.7.12 <br> Engineering Units | Adjust the minimum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.7.4. It must be configured to work with the sensor in open loop. **Available if [G4.7.1 = SI].** | YES |
| **G4.7.11 Open loop min speed = 0.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.7.10, when the sensor is going to be used in open loop. <br> The value is a percentage of motor nominal speed. **Available if [G4.7.1 = SI].** | YES |
| **G4.7.12 Sensor max value = 10.0 l/s** | G4.7.10 to 3200.0 <br> Engineering Units | Adjust the maximum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.7.6. It must be configured to work with the sensor in open loop. **Available if [G4.7.1 = SI].** | YES |
| **G4.7.13 Open loop max speed = 100.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.7.12, when the sensor is going to be used in open loop. <br> The value is a percentage of motor nominal speed. **Available if [G4.7.1 = SI].** | YES |
| **G4.7.14 AI6 loss protection = No** | No <br> Yes | Adjusts stop mode of the drive in case the signal from analogue input 6 is lost. <br><br> **OPTION / FUNCTION:** <br> No — Function is disabled. <br> Yes — Whenever a sudden drop on the analogue input level is detected, terminating in zero, it indicates the sensor is damaged and the drive will stop, triggering a fault F42. | YES |
| **G4.7.15 AI6 zero band filter = Off** | Off = 0.0; 0.1% to 2.0% | Analogue input 6 signal filtering. By adjusting this value, the analogue signal is filtered to eliminate possible electrical noise that prevents reading a zero value when it should. | YES |

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.7.16 AI6 stabilizer filter = Off** | Off = 0.0; 0.1 to 20.0s | Allows adjusting a filtering to the analogue input 6 signal. By adjusting the value of this time constant, it is possible to eliminate possible instabilities in the signal caused by noise, wiring faults, etc.<br>**Note:** The application of a low pass filter to any analogue signal produces a delay of approximately the value of the configured time constant. | YES |

## Subgroup 4.8: Analogue input 7

**Note**: This group will only be shown if a second expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.8.1 Enable sensor = No** | No<br>Yes | Allows user to configure analogue input 7 and activates the parameters which are necessary to set it up. See [G4.8.2] to [G4.8.7].<br><br>**OPTION / FUNCTION**<br>No — The sensor connected to this input can be used to introduce the speed reference and as open loop sensor.<br>Yes — Analogue input enabled as feedback in closed loop control. | NO |
| **G4.8.2 Sensor unit = l/s** | %<br>l/s<br>m3/s<br>l/m<br>m3/m<br>l/h<br>m3/h<br>m/s<br>m/m<br>m/h<br>bar<br>kPa<br>psi<br>m<br>ºC<br>ºF<br>K<br>Hz<br>rpm | Allows choosing different measure units for the analogue input 7 depending on the function of the sensor to be used.<br><br>Changing this parameter implies that the minimum and maximum values of the sensor range will be affected by the corresponding conversion. Thus, it is necessary to verify the values adjusted in:<br>[G4.8.5 Sensor low level =+0.0l/s] ➔ Sensor minimum level.<br>[G4.8.7 Sensor high level =+10.0l/s] ➔ Sensor maximum level.<br><br>**Available if [G4.8.1 = YES].** | NO |
| **G4.8.3 AI7 Format = V** | V<br>mA | Allows configuring the format of the analogue input 7 to connect a voltage or current signal, depending on the sensor to be used to introduce the reference. | NO |
| **G4.8.4 AI7 low level = 0.0 V** | -10.0V to G4.8.6<br>+0.0mA to G4.8.6 | Defines the minimum value of voltage or current for analogue input 7 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.8.5 Sensor low level = 0.0 l/s** | -3200.0 to G4.8.7<br>Engineering Units | Adjusts the minimum unit value of the sensor connected to the analogue input 7, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.8.4].<br>**Available if [G4.8.1 = YES].**<br>**Note**: This value must be revised if the units are changed in [G4.8.2]. It must be adjusted for operation in open and closed loop. | YES |
| **G4.8.6 AI7 high level = 10.0 V** | G4.8.4 to +10V<br>G4.8.4 to +20mA | Defines the maximum value of voltage or current for analogue input 7 according to the characteristics of the sensor that is going to be connected. | YES |
| **G4.8.7 Sensor high level = 10.0 l/s** | G4.8.5 to 3200.0<br>Engineering Units | Adjusts the maximum unit value of the sensor connected to the analogue input 7, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.8.6].<br>**Available if [G4.8.1 = YES].**<br>**Note**: This value must be revised if the units are changed in [G4.8.2]. It must be adjusted for operation in open and closed loop. | YES |
| **G4.8.8 AI7 Ref speed min = 0.0 %** | -250.0 to G4.8.9 | Allows adjusting the speed reference for the minimum range of analogue input 7, which corresponds with the minimum level of voltage or current of the sensor configured in [G4.8.4]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.8.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.8.9 AI7 Ref speed max = 100.0 %** | G4.8.8 to 250.0% | Allows adjusting the speed reference for the maximum range of analogue input 7, which corresponds with the maximum level of voltage or current of the sensor configured in [G4.8.6]. It is configured to introduce the speed reference through the analogue input. Adjust parameter 'G4.8.1 Enable sensor = N'. The value is a percentage of motor nominal speed. | YES |
| **G4.8.10 Sensor min value = 0.0 l/s** | -3200.0 to G4.8.12<br>Engineering Units | Adjust the minimum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.8.4. It must be configured to work with the sensor in open loop. **Available if [G4.8.1 = SI].** | YES |

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G4.8.11 Open loop min speed = 0.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.8.10, when the sensor is going to be used in open loop.<br>The value is a percentage of motor nominal speed. **Available if [G4.8.1 = SI].** | YES |
| **G4.8.12 Sensor max value = 10.0 l/s** | G4.8.10 to 3200.0 Engineering Units | Adjust the maximum working range, if the real working range is different than the one covered by the sensor that is going to be used as sensor in open loop. Corresponds with the level of voltage or current set in G4.8.6. It must be configured to work with the sensor in open loop. **Available if [G4.8.1 = SI].** | YES |
| **G4.8.13 Open loop max speed = 100.0 %** | -250.0 to 250.0% | Allows adjusting the minimum speed range which corresponds to the minimum sensor range set in G4.8.12, when the sensor is going to be used in open loop.<br>The value is a percentage of motor nominal speed. **Available if [G4.8.1 = SI].** | YES |
| **G4.8.14 AI7 loss protection = No** | NO<br>YES | Adjusts stop mode of the drive in case the signal from analogue input 7 is lost.<br><br>| OPTION | FUNCTION |<br>| No | Function is disabled. |<br>| Yes | Whenever a sudden drop on the analogue input level is detected, terminating in zero, it indicates the sensor is damaged and the drive will stop, triggering a fault F42. | | YES |
| **G4.8.15 AI7 zero band filter = Off** | Off = 0.0; 0.1% to 2.0% | Analogue input 7 signal filtering. By adjusting this value, the analogue signal is filtered to eliminate possible electrical noise that prevents reading a zero value when it should. | YES |
| **G4.8.16 AI7 stabilizer filter = Off** | Off = 0.0; 0.1 to 20.0s | Allows adjusting a filtering to the analogue input 7 signal. By adjusting the value of this time constant, it is possible to eliminate possible instabilities in the signal caused by noise, wiring faults, etc.<br>**Note:** The application of a low pass filter to any analogue signal produces a delay of approximately the value of the configured time constant. | YES |

# ⓘ NOTICE

Each input can be configured with multiple options, refer to the *SD750 Drive Software & Programming Manual* for more information on the functions of each input.

**EN**

## Analog Outputs

Sub-groups G8.2 to G8.7 of the SD750 drive are used to configure the analog outputs.

When an expansion card is connected to the drive, new parameter subgroups for analog outputs are enabled in group G8.

## Subgroup 8.4: Analogue output 3

**Note:** This group will be shown if an analog I/O expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G8.4.1 AO3 source selection = Motor speed** | 00 to 32 | Analogue output 3 is programmable in the same way as analogue output 1. See configuration options in G8.2.1. | NO |
| **G8.4.2 AO3 format = 4..20 mA** | 0-10V ±10V 0-20mA 4-20mA 10mA | Analogue output 3 is programmable in one of the five available formats according to the system requirements. | NO |
| **G8.4.3 AO3 low level = 0 %** | -250 to 250% | Minimum level of analogue output 3. Minimum level setting can be higher than the maximum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.4.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.4.4 AO3 high level = 100 %** | -250 to 250% | Maximum level of analogue output 3. Maximum level setting can be lower than the minimum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.4.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.4.5 AO3 filter = Off** | Off=0 0 to 20.0 s | Filter for analogue input 3 value. If the analogue signal appears slightly unstable, improved stability and response can be achieved with the addition of a suitable filter value. **Note:** Filter use can add a slight delay to the analogue output signal. | YES |

## Subgroup 8.5: Analogue output 4

**Note:** This group will be shown if an analog I/O expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G8.5.1 AO4 source selection = Motor speed** | 00 to 32 | Analogue output 4 is programmable in the same way as analogue output 1. See configuration options in G8.2.1. | NO |
| **G8.5.2 AO4 format = 4..20 mA** | 0-10V ±10V 0-20mA 4-20mA 10mA | Analogue output 4 is programmable in one of the five available formats according to the system requirements. | NO |
| **G8.5.3 AO4 low level = 0 %** | -250 to 250% | Minimum level of analogue output 4. Minimum level setting can be higher than the maximum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.5.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.5.4 AO4 high level = 100 %** | -250 to 250% | Maximum level of analogue output 4. Maximum level setting can be lower than the minimum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.5.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.5.5 AO4 filter = Off** | Off=0 0,1 to 20,0 s | Filter for analogue input 4 value. If the analogue signal appears slightly unstable, improved stability and response can be achieved with the addition of a suitable filter value. **Note:** Filter use can add a slight delay to the analogue output signal. | YES |

## Subgroup 8.6: Analogue output 5

**Note:** This group will be shown if a second analog I/O expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G8.6.1 AO5 source selection = Motor speed** | 00 to 32 | Analogue output 5 is programmable in the same way as analogue output 1. See configuration options in G8.2.1. | NO |
| **G8.6.2 AO5 format = 4..20 mA** | 0-10V<br>±10V<br>0-20mA<br>4-20mA<br>10mA | Analogue output 5 is programmable in one of the five available formats according to the system requirements. | NO |
| **G8.6.3 AO5 low level = 0 %** | -250 to 250% | Minimum level of analogue output 5.<br>Minimum level setting can be higher than the maximum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.6.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.6.4 AO5 high level = 100 %** | -250 to 250% | Maximum level of analogue output 5.<br>Maximum level setting can be lower than the minimum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.6.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.6.5 AO5 filter = Off** | Off=0<br>0 to 20,0 s | Filter for analogue input 5 value.<br>If the analogue signal appears slightly unstable, improved stability and response can be achieved with the addition of a suitable filter value.<br>**Note:** Filter use can add a slight delay to the analogue output signal. | YES |

## Subgroup 8.7: Analogue output 6

**Note:** This group will be shown if a second analog I/O expansion board has been connected.

| Screen | Range | Function | Set on RUN |
|---|---|---|---|
| **G8.7.1 AO6 source selection = Motor speed** | 00 to 32 | Analogue output 6 is programmable in the same way as analogue output 1. See configuration options in G8.2.1. | NO |
| **G8.7.2 AO6 format = 4.20 mA** | 0-10V<br>±10V<br>0-20mA<br>4-20mA<br>10mA | Analogue output 6 is programmable in one of the five available formats according to the system requirements. | NO |
| **G8.7.3 AO6 low level = 0 %** | -250 to 250% | Minimum level of analogue output 6.<br>Minimum level setting can be higher than the maximum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.7.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.7.4 AO6 high level = 100 %** | -250 to 250% | Maximum level of analogue output 6.<br>Maximum level setting can be lower than the minimum level setting. This allows the user to achieve inverse scaling; as the reference magnitude set in [G8.7.1] increases, the output frequency will decrease and vice versa. | YES |
| **G8.7.5 AO6 filter = Off** | Off=0<br>0 to 20,0 s | Filter for analogue input 6 value.<br>If the analogue signal appears slightly unstable, improved stability and response can be achieved with the addition of a suitable filter value.<br>**Note:** Filter use can add a slight delay to the analogue output signal. | YES |

# 🛈 NOTICE

Each SA source selection can be configured with multiple options, refer to the *SD750 Drive Software & Programming Manual* for more information.

# Visualization parameters

Up next, the relevant visualization parameters are summarized. **For details about the range of values and Modbus addresses, refer to the Software and Programming Manual for SD750 drives.**

## Group SV3: Visualización externa:

The parameters associated with analogue inputs 4 to 7 and analogue outputs 3 to 6 will only be displayed if an inputs and outputs expansion board has been connected.

| Screen | Units | Description |
|---|---|---|
| **SV3.10 AI4 value = 0.00 V** | See units G4.5.3 | Shows the value of the Analogue Input 4 (AI4). |
| **SV3.11 AI4 percentage = 100.0 %** | % | Shows the value of the PID reference proportional to the Analogue Input 4 signal. |
| **SV3.12 AI4 sensor value = 0.0 l/s** | See units G4.5.2 | Shows the value of sensor 4 associated to the Analogue Input 4. **Visible if [G4.5.1 = YES].** |
| **SV3.13 AI5 value = 0.00 V** | See units G4.6.3 | Shows the value of the Analogue Input 5. |
| **SV3.14 AI5 percentage = 100.0 %** | % | Shows the value of the PID reference proportional to the Analogue Input 5 signal. |
| **SV3.15 AI5 sensor value = 0.0 l/s** | See units G4.6.2 | Shows the value of sensor 5 associated to the Analogue Input 5. **Visible if [G4.6.1 = YES].** |
| **SV3.16 AI6 value = 0.00 V** | See units G4.7.3 | Shows the value of the Analogue Input 6. |
| **SV3.17 AI6 percentage = 100.0 %** | % | Shows the value of the PID reference proportional to the Analogue Input 6 signal. |
| **SV3.18 AI6 sensor value = 0.0 l/s** | See units G4.7.2 | Shows the value of sensor 6 associated to the Analogue Input 6.. **Visible if [G4.7.1 = YES].** |
| **SV3.19 AI7 value = 0.00 V** | See units G4.8.3 | Shows the value of the Analogue Input 7. |
| **SV3.20 AI7 percentage = 100.0 %** | % | Shows the value of the PID reference proportional to the Analogue Input 7 signal. |
| **SV3.21 AI7 sensor value = 0.0 l/s** | See units G4.8.2 | Shows the value of sensor 7 associated to the Analogue Input 7. **Visible if [G4.8.1 = YES].** |
| **SV3.28 AO4 value = 0.00 V** | See units G8.5.2 | Shows the value of the Analogue output 4. |
| **SV3.29 AO4 percentage = 0.0 %** | % | Shows the magnitude value associated to the Analogue Output 4. |
| **SV3.30 AO5 value = 0.00 V** | See units G8.6.2 | Shows the value of the Analogue output 5. |
| **SV3.31 AO5 percentage = 0.0 %** | % | Shows the magnitude value associated to the Analogue Output 5. |
| **SV3.32 AO6 value = 0.00 V** | See units G8.7.2 | Shows the value of the Analogue output 6. |
| **SV3.33 AO6 percentage = 0.0 %** | % | Shows the magnitude value associated to the Analogue Output 6. |

## Group SV9.3: External Registers:

These registers show the conditions that were present at the moment when the last fault occurred.

They are divided into the following subgroups:

| Screen | Units | Description |
|---|---|---|
| **SV9.3.10 AI4 value = 0.00 V** | See units G4.5.3 | Shows the average value of the analogue input 4. |
| **SV9.3.11 AI4 percentage = 100.0 %** | % | Shows the speed reference or the PID proportional setting for the analogue input 4. |
| **SV9.3.12 AI4 sensor value = 0.0 l/s** | See units G4.5.2 | Shows the value of sensor 1 associated with analogue input 4. |
| **SV9.3.13 AI5 value = 0.00 V** | See units G4.6.3 | Shows the average value of the analogue input 5. |
| **SV9.3.14 AI5 percentage = 100.0 %** | % | Shows the speed reference or the PID proportional setting for the analogue input 5. |
| **SV9.3.15 AI5 sensor value = 0.0 l/s** | See units G4.6.2 | Shows the value of sensor 1 associated with analogue input 5. |
| **SV9.3.16 AI6 value = 0.00 V** | See units G4.7.3 | Shows the average value of the analogue input 6. |
| **SV9.3.17 AI6 percentage = 100.0 %** | % | Shows the speed reference or the PID proportional setting for the analogue input 6. |
| **SV9.3.18 AI6 sensor value = 0.0 l/s** | See units G4.7.2 | Shows the value of sensor 1 associated with analogue input 6. |
| **SV9.3.19 AI7 value = 0.00 V** | See units G4.8.3 | Shows the average value of the analogue input 7. |
| **SV9.3.20 AI7 percentage = 100.0 %** | % | Shows the speed reference or the PID proportional setting for the analogue input 7. |
| **SV9.3.21 AI7 sensor value = 0.0 l/s** | See units G4.8.2 | Shows the value of sensor 1 associated with analogue input 7. |
| **SV9.3.28 AO4 value = 0.00 V** | See units G8.5.2 | Shows the value of analogue output 4. |
| **SV9.3.29 AO4 percentage = 0.0 %** | % | Shows the value of sensor 1 associated with analogue output 4. |
| **SV9.3.30 AO5 value = 0.00 V** | See units G8.6.2 | Shows the value of analogue output 5. |
| **SV9.3.31 AO5 percentage = 0.0 %** | % | Shows the value of sensor 1 associated with analogue output 5. |
| **SV9.3.32 AO6 value = 0.00 V** | See units G8.7.2 | Shows the value of analogue output 6. |
| **SV9.3.33 AO6 percentage = 0.0 %** | % | Shows the value of sensor 1 associated with analogue output 6. |

# Summary of MODBUS addresses

## Visualization Parameters

| Parameter | Screen | Description | Address | Modbus Range |
|---|---|---|---|---|
| SV3.10 | **AI4 value = 0.00 V** | Value of the AI4 (AI4). | **41261** | Real Value = (Modbus Value / 1000) |
| SV3.11 | **AI4 percentage = 100.0 %** | Shows the value or the PID reference proportional to the AI 4 signal. | **41262** | Real Value = (Modbus Value / 100) |
| SV3.12 | **AI4 sensor value = 0.0 l/s** | Shows the value of sensor 4 associated to the Analogue Input 4. | **41263** | Real Value = (Modbus Value / 10) |
| SV3.13 | **AI5 value = 0.00 V** | Shows the value of the Analogue Input 5. | **40469** | Real Value = (Modbus Value / 1000) |
| SV3.14 | **AI5 percentage = 100.0 %** | Shows the value or the PID reference proportional to the AI5 signal. | **40470** | Real Value = (Modbus Value / 100) |
| SV3.15 | **AI5 sensor value = 0.0 l/s** | Value of sensor 5 associated to the AI5. | **40471** | Real Value = (Modbus Value / 10) |
| SV3.16 | **AI6 value = 0.00 V** | Value of the AI6. | **40578** | Real Value = (Modbus Value / 1000) |
| SV3.17 | **AI6 percentage = 100.0 %** | Value or the PID reference proportional to the AI 6 signal. | **40579** | Real Value = (Modbus Value / 100) |
| SV3.18 | **AI6 sensor value = 0.0 l/s** | Value of sensor 6 associated to the AI6.. | **40580** | Real Value = (Modbus Value / 10) |
| SV3.19 | **AI7 value = 0.00 V** | Value of the AI7. | **40591** | Real Value = (Modbus Value / 1000) |
| SV3.20 | **AI7 percentage = 100.0 %** | Value or the PID reference proportional to the AI 7 signal. | **40589** | Real Value = (Modbus Value / 100) |
| SV3.21 | **AI7 sensor value = 0.0 l/s** | Value of sensor 7 associated to the AI7. | **40590** | Real Value = (Modbus Value / 10) |
| SV3.28 | **AO4 value = 0.00 V** | Value of the Analogue output 4. | **41264** | Real Value = (Modbus Value / 1000) |
| SV3.29 | **AO4 percentage = 0.0 %** | Magnitude value associated to the AO4. | **41265** | Real Value = (Modbus Value / 100) |
| SV3.30 | **AO5 value = 0.00 V** | Value of the Analogue output 5. | **40619** | Real Value = (Modbus Value / 1000) |
| SV3.31 | **AO5 percentage = 0.0 %** | Magnitude value associated to the AO5. | **40620** | Real Value = (Modbus Value / 100) |
| SV3.32 | **AO6 value = 0.00 V** | Value of the Analogue output 6. | **40629** | Real Value = (Modbus Value / 1000) |
| SV3.33 | **AO6 percentage = 0.0 %** | Magnitude value associated to the AO6. | **40630** | Real Value = (Modbus Value / 100) |
| SV9.3.10 | **AI4 value = 0.00 V** | Average value of the analogue input 4. | **41268** | Real Value = (Modbus Value / 1000) |
| SV9.3.11 | **AI4 percentage = 100.0 %** | Shows the speed reference or the PID proportional setting for the AI4. | **41269** | Real Value = (Modbus Value / 100) |
| SV9.3.12 | **AI4 sensor value = 0.0 l/s** | Value of sensor 1 associated to AI4. | **41270** | Real Value = (Modbus Value / 10) |
| SV9.3.13 | **AI5 value = 0.00 V** | Average value of the analogue input 5. | **41228** | Real Value = (Modbus Value / 1000) |
| SV9.3.14 | **AI5 percentage = 100.0 %** | Shows the speed reference or the PID proportional setting for the AI5. | **41229** | Real Value = (Modbus Value / 100) |
| SV9.3.15 | **AI5 sensor value = 0.0 l/s** | Value of sensor 1 associated to AI5. | **41230** | Real Value = (Modbus Value / 10) |
| SV9.3.16 | **AI6 value = 0.00 V** | Average value of the analogue input 6. | **40754** | Real Value = (Modbus Value / 1000) |
| SV9.3.17 | **AI6 percentage = 100.0 %** | Shows the speed reference or the PID proportional setting for the AI6. | **40755** | Real Value = (Modbus Value / 100) |
| SV9.3.18 | **AI6 sensor value = 0.0 l/s** | Value of sensor 1 associated to AI6. | **40756** | Real Value = (Modbus Value / 10) |
| SV9.3.19 | **AI7 value = 0.00 V** | Average value of the analogue input 7. | **40858** | Real Value = (Modbus Value / 1000) |
| SV9.3.20 | **AI7 percentage = 100.0 %** | Shows the speed reference or the PID proportional setting for the AI7. | **40859** | Real Value = (Modbus Value / 100) |
| SV9.3.21 | **AI7 sensor value = 0.0 l/s** | Value of sensor 1 associated to AI7. | **40860** | Real Value = (Modbus Value / 10) |
| SV9.3.28 | **AO4 value = 0.00 V** | Valueof analogue output 4. | **41271** | Real Value = (Modbus Value / 1000) |

| Parameter | Screen | Description | Address | Modbus Range |
|---|---|---|---|---|
| SV9.3.29 | **AO4 percentage = 0.0 %** | Valueof sensor 1 associated to AO4. | **41272** | Real Value = (Modbus Value / 100) |
| SV9.3.30 | **AO5 value = 0.00 V** | Valueof analogue output 5. | **40965** | Real Value = (Modbus Value / 1000) |
| SV9.3.31 | **AO5 percentage = 0.0 %** | Valueof sensor 1 associated to AO5. | **40966** | Real Value = (Modbus Value / 100) |
| SV9.3.32 | **AO6 value = 0.00 V** | Valueof analogue output 6. | **40967** | Real Value = (Modbus Value / 1000) |
| SV9.3.33 | **AO6 percentage = 0.0 %** | Valueof sensor 1 associated to AO6. | **40968** | Real Value = (Modbus Value / 1000) |

EN

## Programming Parameters

| Parameter | Screen | Address | Range | Modbus Range | Access [1] |
|---|---|---|---|---|---|
| G23.2.5 | **IO analog A status = Off** | **41125** | Off<br>On | 0 to 1 | RO |
| G23.2.6 | **IO analog A test = No** | **41126** | No<br>Yes | 0 to 1 | RW |
| G23.2.7 | **IO analog B status = Off** | **41127** | Off<br>On | 0 to 1 | RO |
| G23.2.8 | **IO analog B test = No** | **41128** | No<br>Yes | 0 to 1 | RW |
| G4.6.1 | **Enable sensor = No** | **40864** | No<br>Yes | 0 to 1 | RW |
| G4.6.2 | **Sensor unit = l/s** | **40865** | See G4.3.2 | 0 to 18 | RW |
| G4.6.3 | **AI5 Format = V** | **40866** | V = 0<br>mA = 1 | 0 to 1 | RW |
| G4.6.4 | **AI5 low level = 0.0 V** | **40867** | -10.0 V to G4.6.6 | -10000 to G4.6.6 | RW |
| G4.6.5 | **Sensor low level = 0.0 l/s** | **40868** | -3200.0 l/s to G4.6.7 | -32000 to G4.6.7 | RW |
| G4.6.6 | **AI5 high level = 10.0 V** | **40869** | G4.6.4 to 20.0 V | G4.6.4 to 20000 | RW |
| G4.6.7 | **Sensor high level = 10.0 l/s** | **40870** | G4.6.5 to 3200.0 l/s | G4.6.5 to 32000 | RW |
| G4.6.8 | **AI5 Ref speed min = 0.0 %** | **40871** | -250.0 % to G4.6.9 | -25000 to G4.6.9 | RW |
| G4.6.9 | **AI5 Ref speed max = 100.0 %** | **40872** | G4.6.8 to 250.0 % | G4.6.8 to 25000 | RW |
| G4.6.10 | **Sensor min value = 0.0 l/s** | **40873** | -3200.0 l/s to G4.6.12 | -32000 to G4.6.12 | RW |
| G4.6.11 | **Open loop min speed = 0.0 %** | **40874** | -250.0 % to 250.0 % | -25000 to 25000 | RW |
| G4.6.12 | **Sensor max value = 10.0 l/s** | **40875** | G4.6.10 to 3200.0 l/s | G4.6.10 to 32000 | RW |
| G4.6.13 | **Open loop max speed = 100.0 %** | **40876** | -250.0 % to 250.0 % | -25000 to 25000 | RW |
| G4.6.14 | **AI5 loss protection = No** | **40877** | No<br>Yes | 0 to 1 | RW |
| G4.6.15 | **AI5 zero band filter = Off** | **40878** | Off = 0.0<br>0.1 to 2.00 % | 0 to 200 | RW |
| G4.6.16 | **AI5 stabilizer filter = Off** | **40879** | Off = 0.0<br>0.1 to 20.0 s | 0 to 200 | RW |
| G4.7.1 | **Enable sensor = No** | **40524** | No<br>Yes | 0 to 1 | RW |
| G4.7.2 | **Sensor unit = l/s** | **40525** | See G4.3.2 | 0 to 18 | RW |
| G4.7.3 | **AI6 Format = V** | **40526** | V = 0<br>mA = 1 | 0 to 1 | RW |
| G4.7.4 | **AI6 low level = 0.0 V** | **40527** | -10.0 V to G4.7.6 | -10000 to G4.7.6 | RW |
| G4.7.5 | **Sensor low level = 0.0 l/s** | **40528** | -3200.0 l/s to G4.7.7 | -32000 to G4.7.7 | RW |
| G4.7.6 | **AI6 high level = 10.0 V** | **40529** | G4.7.4 to 20.0 V | G4.7.4 to 20000 | RW |
| G4.7.7 | **Sensor high level = 10.0 l/s** | **40530** | G4.7.5 to 3200.0 l/s | G4.7.5 to 32000 | RW |
| G4.7.8 | **AI6 Ref speed min = 0.0 %** | **40531** | -250.0 % to G4.7.9 | -25000 to G4.7.9 | RW |
| G4.7.9 | **AI6 Ref speed max = 100.0 %** | **40532** | G4.7.8 to 250.0 % | G4.7.8 to 25000 | RW |
| G4.7.10 | **Sensor min value = 0.0 l/s** | **40533** | -3200.0 l/s to G4.7.12 | -32000 to G4.7.12 | RW |
| G4.7.11 | **Open loop min speed = 0.0 %** | **40534** | -250.0 % to 250.0 % | -25000 to 25000 | RW |
| G4.7.12 | **Sensor max value = 10.0 l/s** | **40535** | G4.7.10 to 3200.0 l/s | G4.7.10 to 32000 | RW |
| G4.7.13 | **Open loop max speed = 100.0 %** | **40536** | -250.0 % to 250.0 % | -25000 to 25000 | RW |
| G4.7.14 | **AI6 loss protection = No** | **40537** | No<br>Yes | 0 to 1 | RW |
| G4.7.15 | **AI6 zero band filter = Off** | **40538** | Off = 0.0<br>0.1 to 2.00 % | 0 to 200 | RW |
| G4.7.16 | **AI6 stabilizer filter = Off** | **40539** | Off = 0.0<br>0.1 to 20.0 s | 0 to 200 | RW |
| G4.8.1 | **Enable sensor = No** | **41405** | No<br>Yes | 0 to 1 | RW |
| G4.8.2 | **Sensor unit = l/s** | **41406** | See G4.3.2 | 0 to 18 | RW |
| G4.8.3 | **AI7 Format = V** | **41407** | V = 0<br>mA = 1 | 0 to 1 | RW |

| Parameter | Screen | Address | Range | Modbus Range | Access [1] |
|-----------|--------|---------|-------|--------------|--------|
| G4.8.4 | AI7 low level = 0.0 V | 41408 | -10.0 V to G4.8.6 | -10000 to G4.8.6 | RW |
| G4.8.5 | Sensor low level = 0.0 l/s | 41409 | -3200.0 l/s to G4.8.7 | -32000 to G4.8.7 | RW |
| G4.8.6 | AI7 high level = 10.0 V | 41410 | G4.8.4-a 20.0 V | G4.8.4 to 20000 | RW |
| G4.8.7 | Sensor high level = 10.0 l/s | 41411 | G4.8.5 to 3200.0 l/s | G4.8.5 to 32000 | RW |
| G4.8.8 | AI7 Ref speed min = 0.0 % | 41412 | -250.0 % to G4.8.9 | -25000 to G4.8.9 | RW |
| G4.8.9 | AI7 Ref speed max = 100.0 % | 41413 | G4.8.8 to 250.0 % | G4.8.8 to 25000 | RW |
| G4.8.10 | Sensor min value = 0.0 l/s | 41414 | -3200.0 l/s to G4.8.12 | -32000 to G4.8.12 | RW |
| G4.8.11 | Open loop min speed = 0.0 % | 41415 | -250.0 % to 250.0 % | -25000 to 25000 | RW |
| G4.8.12 | Sensor max value = 10.0 l/s | 41416 | G4.8.10 to 3200.0 l/s | G4.8.10 to 32000 | RW |
| G4.8.13 | Open loop max speed = 100.0 % | 41417 | -250.0 % to 250.0 % | -25000 to 25000 | RW |
| G4.8.14 | AI7 loss protection = No | 41418 | No Yes | 0 to 1 | RW |
| G4.8.15 | AI7 zero band filter = Off | 41419 | Off = 0.0 0.1 to 2.00 % | 0 to 200 | RW |
| G4.8.16 | AI7 stabilizer filter = Off | 41420 | Off = 0.0 0.1 to 20.0 s | 0 to 200 | RW |

**EN**

# FAULTS AND WARNINGS LIST

**4**

This section shows new faults and warnings that will only be available if the analog I/O expansion boards are connected.

Please, consult the full list of fault and warning messages in the *Software and Programming Manual* for SD750 drives.

## Description of Fault list

| DISPLAY | DESCRIPTION |
|---|---|
| F89:Analog input 4 missing | The SD750 has stopped receiving a signal through the analog input 4 while [G4.5.14 AI4 loss protection] is set to "YES". The device has lost the signal entered through this input. |
| F101:I/O exp version mismatch | The software version of the I/O expansion board does not match the software version of the drive. |
| F102:Exp analog I/O A comm | Failure in communication with analog I/O expansion board A. |
| F103:Exp analog I/O B comm | Failure in communication with analog I/O expansion board B. |
| F104:Analog input 5 missing | The SD750 has stopped receiving a signal through the analog input 5 while [G4.6.14 AI5 loss protection] is set to "YES". The device has lost the signal entered through this input. |
| F105:Analog input 6 missing | The SD750 has stopped receiving a signal through the analog input 6 while [G4.7.14 AI6 loss protection] is set to "YES". The device has lost the signal entered through this input. |
| F106:Analog input 7 missing | The SD750 has stopped receiving a signal through the analog input 7 while [G4.8.14 AI7 loss protection] is set to "YES". The device has lost the signal entered through this input. |

## Troubleshooting

| DISPLAY | POSSIBLE CAUSE | ACTIONS |
|---|---|---|
| F89:Analog input 4 missing | Analogue input 4 missing | Check wiring and the equipment that provides the analogue signal. |
| F101:I/O exp version mismatch | The version of software loaded in the expansion board does not match the current software version of the drive. | Contact Power Electronics |
| F102:Exp analog I/O A comm | Communication with the analog I/O expansion board A is not correct. | Check wiring<br>Check the equipment that provides the analog signal.<br>Consult with Power Electronics. |
| F103:Exp analog I/O B comm | Communication with the analog I/O expansion board B is not correct. | |
| F104:Analog input 5 missing | Analogue input 5 missing | |
| F105:Analog input 6 missing | Analogue input 6 missing | |
| F106:Analog input 7 missing | Analogue input 7 missing | |

## List of Warning Messages

| Warning | Acronym | Name | Description |
|---|---|---|---|
| W46 | AE_A | Analog A expansion | There is a communications problem with the analogue I/O expansion board A. |
| W47 | AE_B | Analog B expansion | There is a communications problem with the analogue I/O expansion board B. |

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