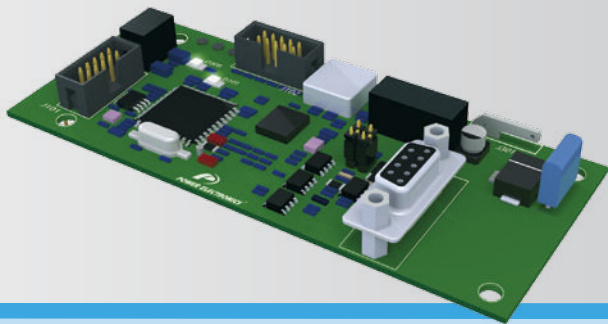


SD 700 Series

ACCESSORIES



Communication Network
Profibus Communication

SD 700

Series

VARIABLE SPEED DRIVE

Communication Network

Profibus Communication

Edition: April 2015

SD70BC03EI Rev. E

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 December 2012

This publication could present technical imprecision or misprints. The information here included will be periodically modified and updated, and all those modifications will be incorporated in later editions.

To consult the most updated information of this product you might access through our website www.power-electronics.com where the latest version of this manual can be downloaded.

Revisions

Date	Revision	Description
03/04/2008	A	First edition
31/03/2011	B	Software Version Update SW 2026
30/01/2012	C	Board update
20/12/2012	D	Profipower SD700 Type 5
29/04/2015	E	Modbus address and range in pre-defined register tables

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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

Be sure to take ESD (Electrostatic Discharge) protection measures when you touch the board.

Otherwise, the optional board may get damaged due to static charges.

Implement wiring change on the optional board after checking that the power supply is off.

Otherwise, there is a danger of connecting error and damage to the board.

Be sure to connect correctly the optional board to the inverter.

Otherwise, there is a danger of connecting error and damage to the board.

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

Otherwise, electric shock could occur.

Do not run the inverter with the front cover removed.

Otherwise, you may get an electric shock due to the high voltage terminals or exposure of charged capacitors.

Do not remove the cover except for periodic inspections or wiring, even if the input power is not applied.

Otherwise, you may access the charged circuits and get an electric shock.

Wiring and periodic inspections should be performed at least 10 minutes after disconnecting the input power and after checking the DC Link voltage is discharged with a meter (below 30VDC).

Otherwise, you may get an electric shock.

Operate the switches with dry hands.

Otherwise, you may get an electric shock.

Do not use cables with damaged insulation.

Otherwise, you may get an electric shock.

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

Otherwise, you may get an electric shock.



CAUTION

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

Otherwise, fire could occur.

Disconnect the input power if the inverter gets damaged.

Otherwise, it could result in a secondary accident or fire.

After the input power is applied or removed, the inverter will remain hot for a couple of minutes.

Touching hot parts may result in skin burns.

Do not apply power to a damaged inverter or to an inverter with parts missing even if the installation is complete.

Otherwise, fire or accident could occur.

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

Otherwise, fire or accident could occur.



WARNINGS

RECEPTION

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

UNPACKING

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

RECYCLING

- The packing of the drives must be recycled. For this reason it is necessary to separate different materials (plastics, paper, cardboard, wood,) and settle them in corresponding containers.
- The residual parts of electrical devices must be collected in a selective manner in order to warranty the correct environmental treatment.

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.
- Ensure that the mounting orientation is correct.
- Do not drop the inverter or subject it to impact.
- The SD700 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 drive 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.
-

COMMISSIONING

- Follow the steps described in this manual.
 - 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.
-

OPERATION PRECAUTIONS

- When the Auto Restart function is enabled, keep clear of driven equipment, as the motor will restart suddenly after a fault is reset.
- The “STOP / RESET” key on the keypad is active only if the appropriate function setting has been made. For this reason, install a separate EMERGENCY STOP push button that can be operated at the equipment.
- If a fault reset is made with the reference signal still present then a restart will occur. Verify that it is permissible for this to happen, otherwise an accident may occur.
- Do not modify or alter anything within the drive.
- Before programming or operating the SD700 Series, initialise all parameters back to factory default values.

EARTH CONNECTION

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

1. INTRODUCTION

1.1. Description of Profibus Board

The Profibus Board for SD700 allows integrating these drives of Power Electronics into Profibus networks easily and comfortably.

Its useful design will allow you to know the operating status of the board all the time.

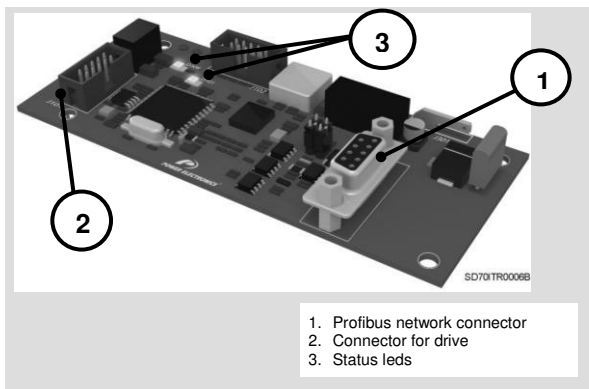


Figure 1.1 Description for Profibus Board

2. TECHNICAL CHARACTERISTICS

2.1. General Information

2.1.1. Contents of Profibus Board Kit

The kit of the Profibus board contents:

- 1 Profibus board.
- 1 Technical manual.

2.1.2. Interfaces

- Profibus – DP 9 Pin D-SUB / F Connector.

2.1.3. Local Indications

Profibus board includes 2 leds (D308 and D101) that supplies information about the power supply of the board, network detection and communication status. To obtain more detailed information about leds, please, see section '3.2.1. *Description of Connectors and Leds*'.

2.1.4. Profibus-DP Interface

Profibus – DP Interface.

Transmission speed Auto-detected at 12Mb.

Diagnosis data length of 13 Bytes (maximum).

Data length of Set up of 176 Bytes (maximum).

Configuration data length of 8 Byte (maximum).

Polling length of 120 Bytes (maximum).

File GSD PWE_06DD.GSD.

3. INSTALLATION AND CONNECTION

3.1. Installation of Profibus Board

Profibus board is directly connected to the drive of the SD700 Series from Power Electronics (through two connectors) with the purpose of integrating the equipment in a Profibus network. Therefore, it will be necessary one Profibus board for any equipment which is going to be connected to this network.



CAUTION

Motor controllers of Power Electronics operate with a high electric energy.

Make sure the power supply has been disconnected and wait for at least 10 minutes to guarantee that DC Link voltage is discharged, before installing the Ethernet board. Otherwise, you may get personal injuries or an accident could occur.

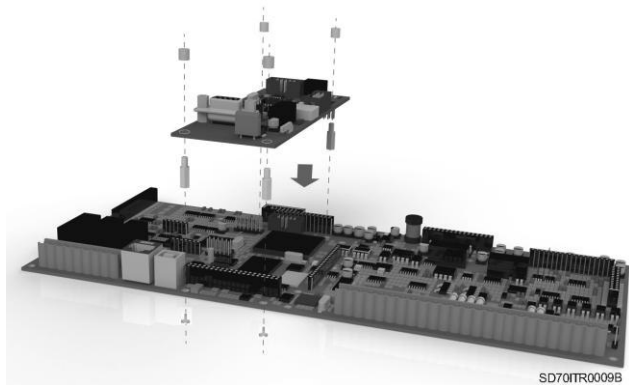
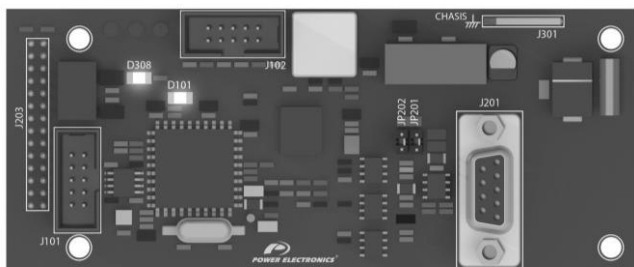


Figure 3.1 Installation of Profibus board in the drive

3.2. Connections for Profibus Board

3.2.1. Description of Connectors and Leds

In the Profibus board there are two connectors used to connect the board to the SD700 drive. The other connector (9 Pin D-SUB / F) is used for the connection to the Profibus network. On the other hand, the leds supply information about the input power of the board, network detection and communication status.



SD70ITR0012B

Figure 3.2 Location of connectors and leds on Profibus board

TERMINALS	DESCRIPTION
J201 (PROFIBUS)	Connector SUB-D 9 pins to connect the signals of the Profibus network.
J301 (Earth)	Connector available to provide the connection of the board to the Earth system.
JP201, JP202 (Jumpers)	To connect the ending resistors of the network. If it is not necessary to enable the ending resistor of the network, the jumper will be not connected. Otherwise, the jumper will be connected and so these resistors will be enabled.
D308 (Led)	Green. "ON" led. If it is lit indicates that the board is power supplied.

TERMINALS	DESCRIPTION												
D101 (Led)	Red. It provides information depending on the number of blinking.												
	<table border="1"> <thead> <tr> <th>Number of blinks</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CAN communication error</td> </tr> <tr> <td>2</td> <td>Profibus Configuration error</td> </tr> <tr> <td>3</td> <td>VPC3 fault</td> </tr> <tr> <td>4</td> <td>Profibus not yet configured</td> </tr> <tr> <td>5</td> <td>Device in data exchange mode</td> </tr> </tbody> </table>	Number of blinks	Description	1	CAN communication error	2	Profibus Configuration error	3	VPC3 fault	4	Profibus not yet configured	5	Device in data exchange mode
	Number of blinks	Description											
	1	CAN communication error											
	2	Profibus Configuration error											
	3	VPC3 fault											
4	Profibus not yet configured												
5	Device in data exchange mode												

3.2.2. Profibus Connections

For Profibus connection, a standard connector SUB-D 9 pins is used according to the definition of the standard EN 50170. The wiring for the connector of nine pins is shown in the attached figure.

If additionally, more information is required, refer to “Installation Guide of PROFIBUS DP/FMS” of the Profibus users group, where you can find more detailed information about the connection.

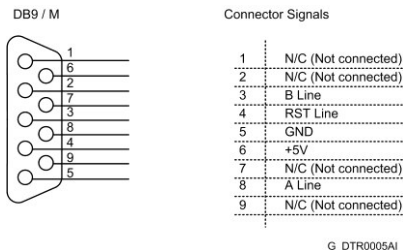


Figure 3.3 Connections of the connector SUB-D 9 pins

3.3. Parameter Setting

There are some parameter groups used to configure the operation in a communication network:

[G4 Inputs → G4.1 Digital Inputs]

[G20 Communication Buses → G20.0 Comms Control,
→ G20.2 Profibus].

3.3.1. Subgroup 4.1 – G4.1: Digital Inputs

Drive control modes need to be defined in order to cede the control to the communication network.

Display	Name / Description	Range	Function	Set on RUN															
1 CTRL MODE1=1	G4.1.1 / Main Control Mode	0-3	It allows user to set the control mode for the drive commands (Start/Stop, Reset, ...).	NO															
			<table border="1"> <thead> <tr> <th>OPT.</th> <th>DESCRIPTION</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>NONE</td> <td>Ctrl mode 1 is not operative</td> </tr> <tr> <td>1</td> <td>LOCAL</td> <td>Drive is controlled by keypad.</td> </tr> <tr> <td>2</td> <td>REMOTE</td> <td>Drive controlled through control terminals.</td> </tr> <tr> <td>3</td> <td>SERIAL COMMS</td> <td>Drive controlled through communication bus.</td> </tr> </tbody> </table>		OPT.	DESCRIPTION	FUNCTION	0	NONE	Ctrl mode 1 is not operative	1	LOCAL	Drive is controlled by keypad.	2	REMOTE	Drive controlled through control terminals.	3	SERIAL COMMS	Drive controlled through communication bus.
			OPT.		DESCRIPTION	FUNCTION													
			0		NONE	Ctrl mode 1 is not operative													
			1		LOCAL	Drive is controlled by keypad.													
2	REMOTE	Drive controlled through control terminals.																	
3	SERIAL COMMS	Drive controlled through communication bus.																	

Display	Name / Description	Range	Function	Set on RUN															
2 CNTRL MODE2=2	G4.1.2 / Alternative Control Mode	0-3	It allows user to set the control mode for the drive commands (Start/Stop, Reset, ...).	NO															
			<table border="1"> <thead> <tr> <th>OPT.</th> <th>DESCRIPTION</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>NONE</td> <td>Ctrl mode 2 is not operative</td> </tr> <tr> <td>1</td> <td>LOCAL</td> <td>Drive controlled by keypad.</td> </tr> <tr> <td>2</td> <td>REMOTE</td> <td>Drive controlled through control terminals.</td> </tr> <tr> <td>3</td> <td>SERIAL COMMS</td> <td>Drive controlled through communication bus.</td> </tr> </tbody> </table>		OPT.	DESCRIPTION	FUNCTION	0	NONE	Ctrl mode 2 is not operative	1	LOCAL	Drive controlled by keypad.	2	REMOTE	Drive controlled through control terminals.	3	SERIAL COMMS	Drive controlled through communication bus.
			OPT.		DESCRIPTION	FUNCTION													
			0		NONE	Ctrl mode 2 is not operative													
			1		LOCAL	Drive controlled by keypad.													
2	REMOTE	Drive controlled through control terminals.																	
3	SERIAL COMMS	Drive controlled through communication bus.																	
Note: Control mode 2 will be activated through digital inputs exclusively. To use this set one of the digital inputs to '17 → CONTROL 2'. When this input is activated, auxiliary control mode will be activated.																			

3.3.2. Subgroup 20.0 – G20.0: Communications Control

This subgroup specifies the communication module to be used. Once previous parameters are set, the subgroup [20.0] will specify the particular communication bus to use.

Display	Name / Description	Range	Function	Set on RUN														
1 COM. CONTROL=0	G 20.0.1 / Communication Module	0-5	Set the value according to communications network controlling the drive	SI														
			<table border="1"> <thead> <tr> <th>OPT.</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Modbus</td> </tr> <tr> <td>1</td> <td>Profibus</td> </tr> <tr> <td>2</td> <td>Modbus TCP</td> </tr> <tr> <td>3</td> <td>Ethernet_IP</td> </tr> <tr> <td>4</td> <td>Can Open</td> </tr> <tr> <td>5</td> <td>Devicenet</td> </tr> </tbody> </table>		OPT.	FUNCTION	0	Modbus	1	Profibus	2	Modbus TCP	3	Ethernet_IP	4	Can Open	5	Devicenet
			OPT.		FUNCTION													
			0		Modbus													
			1		Profibus													
			2		Modbus TCP													
3	Ethernet_IP																	
4	Can Open																	
5	Devicenet																	
Note: This parameter is only functional after the boot up.																		

3.4. Setting of Profibus Network Parameters

To set the Profibus address of the SD700 it is necessary to access to G20.2 PROFIBUS. Please, push “*” key to go into this group.

Changing the value in parameter G20.2.1 we will set the address for the slave, the address range is from 1 to 255, both included.

As soon as the optional board is connected to the drive the software will recognize it and the following parameters will be available:

Parameter	Description	Range	Function	Set to Run	Modbus Address
1 NODE ADDR=10 NODE ADDRESS	G20.2.1 / Profibus address	OFF=01 – 255	Setting of the Profibus address assigned to the equipment in the network of the user. This address must be provided by the network administrator of the own user.	YES	40852

4. TRIAL RUN

4.1. Introduction

Profibus board is a Profibus-DP slave with the following characteristics:

- Modular station with 4 modules.
- Diagnosis with status message.

Before beginning the information exchange between the slave and the Profibus network, the slave should be configured by the master. There are several main services that are described below.

4.1.1. Diagnosis

Between the standard continuous cycles of communication and in the beginning stage of the network, the master sends continuous diagnosis messages. These messages allow the master to know if a new slave has been configured by reading the status in the network of the drive.

The master supplies the required parameters and configurations that still have not been installed.

Once the slave is into the network, diagnosis data exchange is only used by the slave to notify the master a change in the operation status. The use of these messages is extensive to notify errors in the communication board.

4.1.2. Set up

The set up messages are frames (up to 244 bytes of length) that contain all of the configuration parameters of the Profibus board. The board uses this information to configure the Modbus communication before entering in data exchange mode.

4.1.3. Configuration

Configuration message indicates the size of the I/O transference messages to the slave.

The modules that can be configured are the following ones:

ProfiPower SD700 Type 1

Specific module for Variable Speed Drive SD700.

5 output registers, 5 input registers.

ProfiPower SD700 Type 2

Specific module for Variable Speed Drive SD700.

60 output registers, 60 input registers.

ProfiPower SD700 Type 3

Pre-defined module for SD700 Series.

5 output registers, 2 input registers.

ProfiPower SD700 Type 4

Pre-defined module for SD700 Series.

27 output registers, 23 input registers.

ProfiPower SD700 Type 5

Specific module for Variable Speed Drive SD700.

10 output registers, 10 input registers.

The Profibus board reports the Profibus Master the possible errors that can be produced in it. For that, it uses the frames of diagnosis notification that can be visualized by any Profibus Master Software.

The errors that can be notified are the following ones:

4.1.4. Errors referred to the configuration

The user diagnostics area starts at the offset byte 6. Bytes 0 through 5 are reserved for the standard diagnostics information as follows:

Byte 0 – Station Status_1

Byte 1 – Station Status_2

Byte 2 – Station Status_3

Byte 3 – Diag.Master_Add

Byte 4 – Ident_Number_High

Byte 5 – Ident_Number_Low

The extended diagnostics information is 12 bytes long (including the size field) and starts at Byte offset 6.

Byte 6: Length of the Buffer

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	0	0	1	1	0	0

Size of the extended diagnostics information including this byte. Fixed at 0x0C (12).

Byte 7 - Bit encoded for several errors.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
SYS_SCE N_READ	SYS_SCEN_ WRITE	CONFIG _FRAME	MODBU_ DEVICE	SCEN_ NUM	PARM _LEN	RD_REG _NUM	WR_RE G_NUM

The bits are set if the corresponding error prevails.

- BIT 0 = Err. WR REG. NUMBER

This BIT can be set for the following error conditions:

- a) The number of the registers configured for writing operation in the write scenarios exceeds the limit specified by the configuration type.

- b) Any of the MODBUS addresses configured in writing scenarios is not within the valid MODBUS address range.

- o BIT 1 = Err. RD REG. NUMBER

Number of reading registers is not valid.

This BIT can be set for the following error conditions:

- a) The number of the registers configured for reading operation in the read scenarios exceeds the limit specified by the configuration type.
- b) Any of the MODBUS addresses configured in reading scenarios is not within the valid MODBUS address range.

- o BIT 2 = Err. PARAM. LENGTH

Parameters length is not valid.

- o BIT 3 = Err. SCEN. NUMBER

Number of scenarios is not valid.

- a) The number of registers configured for reading operation in reading scenarios exceeds the limit specified by the configuration type.
- b) The number of the registers configured for writing operation in writing scenarios exceeds the limit specified by the configuration type.
- c) The number of valid MODBUS address-length pairs provided with the parameter data exceeds the limit.

- o BIT 4 = Err. MODBUS DEVICE

This BIT is set if the drive fails responding over CAN interface.

- o BIT 5 = Err. CONFIG. FRAME

This BIT is set if the configuration data is not valid.

- BIT 6 = Err. SYS SCEN. MODBUS WRITE

This BIT is set if some errors occur when trying to write in the internal system defined MODBUS address.

- BIT 7 = Err. SYS SCEN. MODBUS READ

This BIT is set if some error occurs when trying to read from the internal system defined MODBUS address (like the Profibus slave address)

4.1.5. Scenarios Status

Byte 8

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write Scenario 2 Status				Write Scenario 1 Status			

Byte 9

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write Scenario 4 Status				Write Scenario 3 Status			

Byte 10

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write Scenario 6 Status				Write Scenario 5 Status			

Byte 11

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write Scenario 8 Status				Write Scenario 7 Status			

Byte 12

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write Scenario 10 Status				Write Scenario 9 Status			

Byte 13

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Read Scenario 2 Status				Read Scenario 1 Status			

Byte 14

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Read Scenario 4 Status				Read Scenario 3 Status			

Byte 15

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Read Scenario 6 Status				Read Scenario 5 Status			

Byte 16

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Read Scenario 8 Status				Read Scenario 7 Status			

Byte 17

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Read Scenario 10 Status				Read Scenario 9 Status			

Each Scenario is accessed as a MODBUS frame. Hence the following error codes are defined.

STATUS VALUE	DESCRIPTION
0	1. Scenario is successfully read / written. 2. The Scenario is not configured at all.
1	MODBUS Error: Illegal function.
2	MODBUS Error: Illegal Data address.
3	MODBUS Error: Illegal Data value.
4	MODBUS Error: Slave device failure.
5	MODBUS Error: Acknowledge.
6	MODBUS Error: Slave device busy.
7	Reserved
8	MODBUS Error: Memory Parity error.
9	Reserved
10	MODBUS Error: Gateway path unavailable.
11	MODBUS Error: Gateway Target device failed to respond.
12	Reserved
13	MODBUS CRC failure.
14	Unsupported MODBUS function.
15	MODBUS communication timeout.

4.1.6. Data Exchange

Once the Set up and Configuration telegrams have been accepted, the Profibus board goes into the information exchange mode with the Profibus master.

4.2. Trial Run with Siemens (Step 7 Set-up)

4.2.1. Installation of GSD File

Install GSD file with the hardware configuration tool of the SIMATIC administrator.

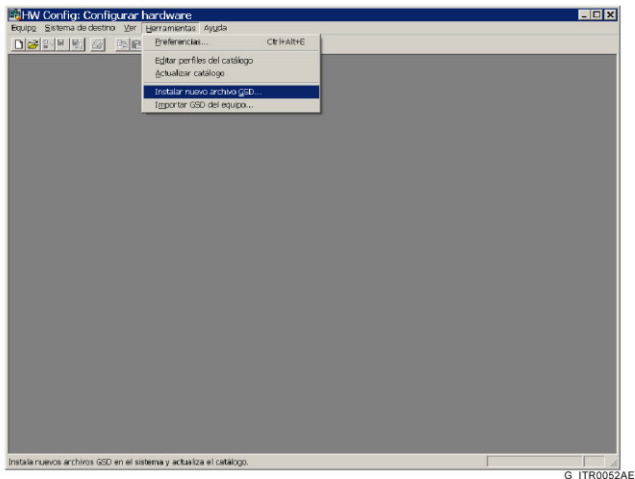


Figure 4.1 Screen 1 of GSD file installation

Select **PWE_05DD.GSD** file.

Then, create a new project and insert a master and a slave.

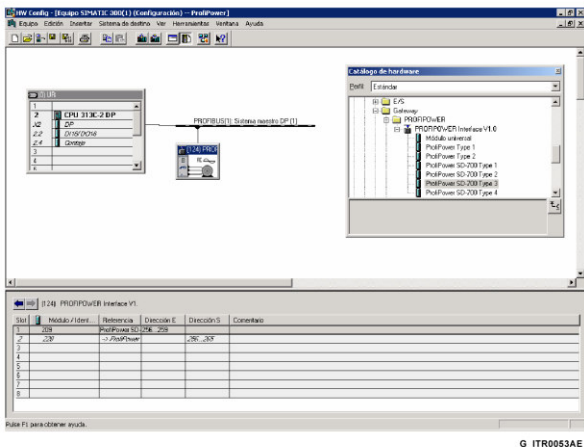


Figure 4.2 Screen 2 of GSD file installation

Once inserted the slave, a module should be assigned to this slave, and should be configured correctly. For that reason, it is fundamental to know how many registers are going to be written and how many registers are going to be read.

All of the modules available in the Profibus board are described in the following section.

4.3. Configuration and Set up.

4.3.1. Profipower SD700 Type 1 Module

For this module it can be defined up to 10 Scenarios, 5 for the write command and the other 5 for the read command. This module is specific for the SD700 drive, therefore, the Profibus board will be set up with the valid Modbus address for the SD700. User only must select the available Modbus registers.

The defined frames for this module are: 10 bytes of Data-Output and 10 bytes of Data-Input.

Therefore, the maximum number of selected Modbus registers will be 5 for the writing Scenarios and 5 for the reading Scenarios. That is, all the registers selected for the configured writing Scenarios do not exceed 5. And in the same way, all the registers selected for the configured reading Scenarios do not exceed 5.

The description of the Profibus frame will be determined by the realized set up of the scenarios.

The following figure shows an example of Scenarios set up for the Profipower SD700 Type 1 Module.

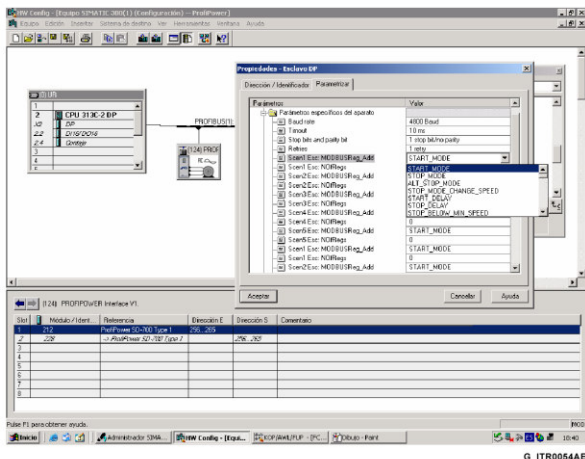


Figure 4.3 Configuration screen of Profipower SD700 type 1 Module

Once selected this module, it will not be necessary to introduce the memory addresses, but rather it will be possible to work with the name of the variables directly, such as the previous figure shows.

4.3.2. Profipower SD700 Type 2 Module

For this module it can be defined up to 20 Scenarios, 10 for the write command and the other 10 for the read command. This module is specific for the SD700 drive, and it will operate in the same way that the module described previously. The Profibus board will be set up with the valid Modbus address for the SD700. User only must to select the available Modbus registers.

The defined frames for this module are: 120 bytes of Data-Output and 120 bytes of Data-Input.

Therefore, the maximum number of selected Modbus registers will be 60 for the writing Scenarios and 60 for the reading Scenarios. That is, all the registers selected for the configured writing Scenarios do not exceed 60. And in the same way, all the registers selected for the configured reading Scenarios do not exceed 60.

The description of the Profibus frame will be determined by the realized set up of the scenarios.

4.3.3. Profipower SD700 Type 3 Module

This module and the next one are modules for the SD700 that already have the Modbus registers for reading and writing defined. User only must write the value of the registers.

Pre-defined registers for these modules are shown in the attached table.

The Profibus board receives 10 bytes of output data of the Profibus-DP Master.

Output Data (Word)	Param.	Modbus Address	Variables	Range	Modbus Range
0	G3.3	40124	LOCAL_SPEED_REF	-250 to +250%	-20480 to +20480
1	-	40562	HOST_START_CONTROL	0 to 1	0 to 1
2	-	40563	HOST_STOP_CONTROL	0 to 1	0 to 1
3	-	40564	HOST_RESET_CONTROL	0 to 1	0 to 1
4	-	40565	HOST_TRIP_CONTROL	0 to 1	0 to 1

The Profibus board sends 4 bytes of input data to the Profibus-DP Master.

Output Data (Word)	Param.	Modbus Address	Variables	Modbus Range
0	SV1.1	40162	ACTUAL_SPEED_REFERENCE	8192 = 100% of motor rated speed
1	STATUS LINE	40219	GENERAL_STATUS	0 to 201

4.3.4. Profipower SD700 Type 4 Module

This is also a pre-defined module, although broader than the previous one. A high number of Modbus registers for reading and writing has been defined. User only must write the value of the registers.

Pre-defined registers for these modules are shown in the attached table.

The Profibus board receives 54 bytes of output data of the Profibus-DP Master.

Output Data (Word)	Param.	Modbus Address	Variables	Range	Modbus Range
0	G3.3	40124	LOCAL_SPEED_REF	-250 to +250%	-20480 to +20480
1	-	40562	HOST_START_CONTROL	0 to 1	0 to 1
2	-	40563	HOST_STOP_CONTROL	0 to 1	0 to 1
3	-	40564	HOST_RESET_CONTROL	0 to 1	0 to 1
4	-	40565	HOST_TRIP_CONTROL	0 to 1	0 to 1
5	G10.1	40102	LIMIT1_MIN_SPEED	-250 to Max Speed 1	-20480 to G10.2
6	G10.3	40103	LIMIT2_MIN_SPEED	-250 to Max Speed 2	-20480 to G10.4
7	G10.2	40104	LIMIT1_MAX_SPEED	Min. Speed 1 to +250%	G10.1 to 20480
8	G10.4	40105	LIMIT2_MAX_SPEED	Min. Speed 2 to +250%	G10.3 to 20480
9	G10.5	40106	CURRENT_LIMIT	0.25 to 1.50In, OFF	2048 to 12291
10	G10.9	40107	TORQUE_LIMIT	0% to +250%	0 to +20480
11	G10.11	40108	INVERTED_SPEED_ENABLED	Y/N	0 to 1
12	G2.1	40282	NAMEPLATE_MOTOR_CURRENT	1 to 9999A	1638 to 12288
13	G2.3	40285	NAMEPLATE_MOTOR_POWER	0 to 6500kW	0 to 65000
14	G5.1	40392	ACCELERATION_RATE	0.01 to 650% / sec	1 to 65000
15	G5.3	40393	ALT_ACCELERATION_RATE	0.01 to 650% / sec	1 to 65000
16	G5.2	40394	DECELERATION_RATE	0.01 to 650% / sec	1 to 65000
17	G5.4	40395	ALT_DECELERATION_RATE	0.01 to 650% / sec	1 to 65000
18	G5.5	40396	ACC_BRAKE_SPEED	OFF; 0 to 250%	0 to 20480
19	G5.6	40397	DEC_BRAKE_SPEED	OFF; 0 to 250%	0 to 20480
20	G10.6	40453	CURRENT_LIMIT_TIMEOUT	0 to 60s, OFF	0 to 600; 610
21	G11.2	40454	STOP_TIMEOUT	OFF=0.0 to 999s	0 to 9999
22	G10.10	40455	TORQUE_LIMIT_TIMEOUT	0 to 60s, OFF	0 to 600; 610
23	G11.4	40457	SUPPLY_UNDER_VOLTAGE	323 to 425V 586 to 621V	400V→3230 to 4250V 690V→5860 to 6210V
24	G11.6	40459	SUPPLY_OVE_VOLTAGE	418 to 587V 726 to 759V	400V→4180 to 5870V 690V→7260 to 7590V
25	G10.7	40109	CURRENT_LIMIT	0.25 to 1.50In, OFF	2048 to 12291
26	G10.15	41866	TORQUE_LIMIT	0% to +250%	0 to +20480

The Profibus board sends 46 bytes of input data to the Profibus-DP Master.

Output Data (Word)	Param.	Modbus Address	Variables	Modbus Range
0	SV1.1	40162	ACTUAL_SPEED_REFERENCE	8192 = 100% of motor rated speed
1	STATUS LINE	40219	GENERAL_STATUS	0 to 201
2	SV1.7	40163	OUTPUT_MOTOR_CURRENT	Real value = (Modbus value / 10)
3	SV1.8	40164	OUTPUT_MOTOR_TORQUE	8192 = 100% of motor rated torque
4	SV1.10	40165	OUTPUT_MOTOR_POWER	Real value = (Modbus value / 10)
5	SV1.6	40166	OUTPUT_MOTOR_VOLTAGE	Real value = Modbus value
6	SV1.5	40167	OUTPUT_MOTOR_FREQUENCY	Real value = Modbus value
7	SV1.9	40168	MOTOR_COS_PHI	Real value = (Modbus value / 10)
8	SV1.3	40169	MOTOR_SPEED_RPM	Real value = Modbus value
9	SV1.4	40170	MOTOR_SPEED_PERCENTAGE	8192 = 100% of motor rated speed
10	SV2.4	40171	DC_BUS_VOLTAGE	Real value = Modbus value
11	SV2.1	40183→RS 40184→ST 40185→RT	INPUT_VOLTAGE	Real value = Modbus value
12	SV3.1	40183	ANALOG_INPUT_1_VALUE	Real value = (Modbus value / 1000)
13	SV3.4	40187	ANALOG_INPUT_2_VALUE	Real value = (Modbus value / 1000)
14	SV3.7	40192	ANALOG_OUTPUT_1_VALUE	Real value = (Modbus value / 1000)
15	SV3.9	40193	ANALOG_OUTPUT_2_VALUE	Real value = (Modbus value / 1000)
16	SV3.11	40196	DIGITAL_INPUT_STATUS	LSB → BIT0 → MF1 BIT6 → PTC 0 to 1
17	SV3.12	40197	DIGITAL_OUTPUT_STATUS	BIT 0 → R1; Range from 0 to 1 BIT 1 → R2; Range from 0 to 1 BIT 2 → R3; Range from 0 to 1
18		40232	COMPARATOR1_STATUS	0 to 1
19	SV4.9	40233	COMPARATOR2_STATUS	0 to 1
20		40234	COMPARATOR3_STATUS	0 to 1
21		SV4.6	40204	ACTUAL_CTRL_SETPOINT
22	SV4.7	40205	ACTUAL_FEEDBACK	8192 = 100% maximum range of AI

4.3.5. Profipower SD700 Type 5 Module

For this module it can be defined up to 10 Scenarios, 5 for the write command and the other 5 for the read command. This module is specific for the SD700 drive; therefore, the Profibus board will be set up with the valid Modbus address for the SD700. User only must select the available Modbus registers.

The defined frames for this module are: 20 bytes of Data-Output and 20 bytes of Data-Input.

Therefore, the maximum number of selected Modbus registers will be 10 for the writing Scenarios and 10 for the reading Scenarios. That is, all the registers selected for the configured writing Scenarios do not exceed 10. And in the same way, all the registers selected for the configured reading Scenarios do not exceed 10.

The description of the Profibus frame will be determined by the realized set up of the scenarios.

The following figure shows an example of Scenarios set up for the Profipower SD700 Type 5 Module.

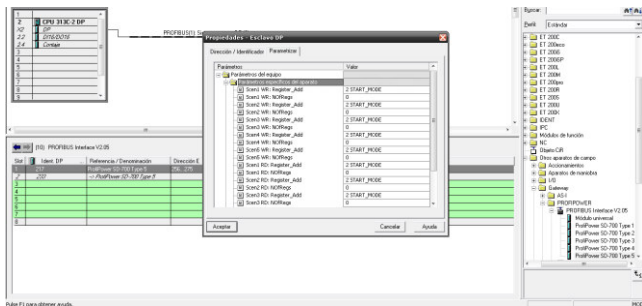


Figure 4.4 Configuration screen of Profipower SD700 type 5 Module

Once selected this module, it will not be necessary to introduce the memory addresses, but rather it will be possible to work with the name of the variables directly, such as the previous figure shows.

5. PROGRAMMING FOR STEP 7

The controller of the device that is going to be connected to the Profibus board will be realized by using the PDOs (Process Data Objects) defined as modules of different length, in the board configuration. These PDOs can be mapped in the data area of a PLC, in case of using this one like Master Profibus.

Since all of the modules (or PDOs) defined for the Profibus board have more than 3 or 4 bytes of length, the SFCs (special system functions) SFC14 DPRD_DAT and SFC 15 DPWR_DAT will be used for data transmission and reception.

The following table shows the SFCs that will be used according to the modules selected for the Profibus board.

Profibus Board	Access path for Step 7
Profipower SD700 type 1	SFC14 (10 bytes) SFC15 (10 bytes)
Profipower SD700 type 2	SFC14 (32 + 32 + 32 + 24 bytes) SFC15 (32 + 32 + 32 + 24 bytes)
Profipower SD700 type 3	SFC14 (4 bytes) SFC15 (15 bytes)
Profipower SD700 type 4	SFC14 (32 + 14 bytes) SFC15 (32 + 22 bytes)
Profipower SD700 type 5	SFC14 (20 bytes) SFC15 (20 bytes)

5.1. Example of program for Step 7

In the following example, the Profibus board is configured with the Profipower SD700 Type 3 Module.

Two Data Blocks are created: DB1 (Data Block 1) with 5 registers and DB2 (Data Block 2) with 2 registers.

Input data are copied to the DB2 by calling SFC14. Output data are copied from DB1 by calling SFC15.

Verify the length in bytes for the RECORD field must be the same as the configured module.

For additional information about the SFCs, consult the STEP 7 aid.

```
// Data Input
CALL "DPRD_DAT"
  LADDR :=W#16#100
  RET_VAL:=MW1
  RECORD :=P#DB2.DBX0.0 BYTE 4

// Data Output
CALL "DPWR_DAT"
  LADDR :=W#16#100
  RECORD :=P#DB1.DBX0.0 BYTE 10
  RET_VAL:=MW2
```

5.2. Monitoring and Modification of Modbus Registers

The following figure shows a value table created with Step7 for monitoring and modifying Modbus registers. This table corresponds to a Profibus board configuration with the Profipower SD700 Type 3 Module.

	Operando	Símbolo	Form	Valor de estado	Valor de forzado
1	//PROFIBUS FRAME PROFIPOWVER SD-700 Type 3				
2	//Output Data				
3	DB1.DBW 0		DEC 200		200
4	DB1.DBW 2		DEC 0		
5	DB1.DBW 4		DEC 0		
6	DB1.DBW 6		DEC 0		
7	DB1.DBW 8		DEC 0		
8	//Input Data				
9	DB2.DBW 0		DEC 0		
10	DB2.DBW 2		DEC -28547		
11					

Profipower\Equipo SIMATIC 300(1)... [Programa 57(1) RUN] G_ITR0055AE

Figure 5.1 Monitoring and modification of Modbus registers

6. DIAGNOSIS

The Profibus board is able to send diagnosis messages.

The following figure shows an example of board diagnosis notification. Concretely, it notifies a Modbus communication error due to TimeOut.

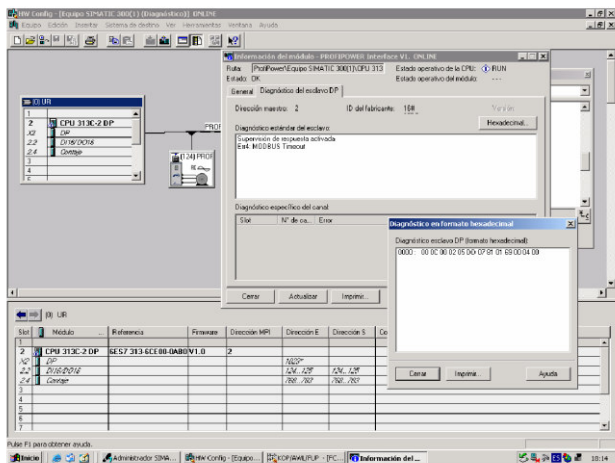


Figure 6.1 Sending of diagnosis messages

G ITR0056AE

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