

User Manual

Revision 1.100
English

PROFIBUS Slave / Modbus Master - Converter

(Order Code: HD67561)

for Website information:

www.adfweb.com?Product=HD67561

for Price information:

www.adfweb.com?Price=HD67561

Benefits and Main Features:

- ▶ Very easy to configure
- ▶ Low cost
- ▶ Industrial temperature range:
-40°C / +85°C (-40°F / 185°F)



HD67561

For others Gateways / Bridges:

CANopen to Modbus

See also the following links:

- www.adfweb.com?Product=HD67001 (Modbus RTU Master)
- www.adfweb.com?Product=HD67502 (Modbus RTU Slave)
- www.adfweb.com?Product=HD67004 (Modbus TCP Master)
- www.adfweb.com?Product=HD67505 (Modbus TCP Slave)

For others Gateways / Bridges:

For **CAN bus 2.0A** and/or **CAN bus 2.0B to Modbus**

See also the following links:

- www.adfweb.com?Product=HD67011 (Modbus RTU Slave)
- www.adfweb.com?Product=HD67012 (Modbus RTU Master)
- www.adfweb.com?Product=HD67014 (Modbus TCP Slave)
- www.adfweb.com?Product=HD67515 (Modbus TCP Master)

Do you have an your customer protocol?

See the following links:

www.adfweb.com?Product=HD67003

Do you need to choose a device? do you want help?

Ask it to the following link:

www.adfweb.com?Cmd=helpme

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UPDATED DOCUMENTATION:

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:

- Updated
- Related to the product you own

To obtain the most recently updated document, note the “document code” that appears at the top right-hand corner of each page of this document.

With this “Document Code” go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper “Document Code” and download the updates.

To obtain the updated documentation for the product that you own, note the “Document Code” (Abbreviated written “Doc. Code” on the label on the product) and download the updated from our web site www.adfweb.com/download/

REVISION LIST:

Revision	Date	Author	Chapter	Description
1.003	15/07/2010	FT	All	Revision
1.004	03/11/2010	Dp	All	Add new features
1.005	15/01/2013	FI	All	Added new chapters
1.100	26/09/2013	Dp	All	Added new Chapters

WARNING:

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TRADEMARKS:

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SECURITY ALERT:**GENERAL INFORMATION**

To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device are required for each individual application, legal and safety regulation. The same applies also when using accessories.

INTENDED USE

Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).


QUALIFIED PERSONNEL

The device can be used only by qualified personnel, strictly in accordance with the specifications.

Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.

RESIDUAL RISKS

The device is state of the art and is safe. The instrument can represent a potential hazard if they are inappropriately installed and operated by personnel untrained. These instructions refer to residual risks with the following symbol:

 This symbol indicates that non-observance of the safety instructions is danger for people to serious injury or death and / or the possibility of damage.

CE CONFORMITY

The declaration is made by us. You can send an email to support@adfweb.com or give us a call if you need it.

CONNECTION SCHEME:

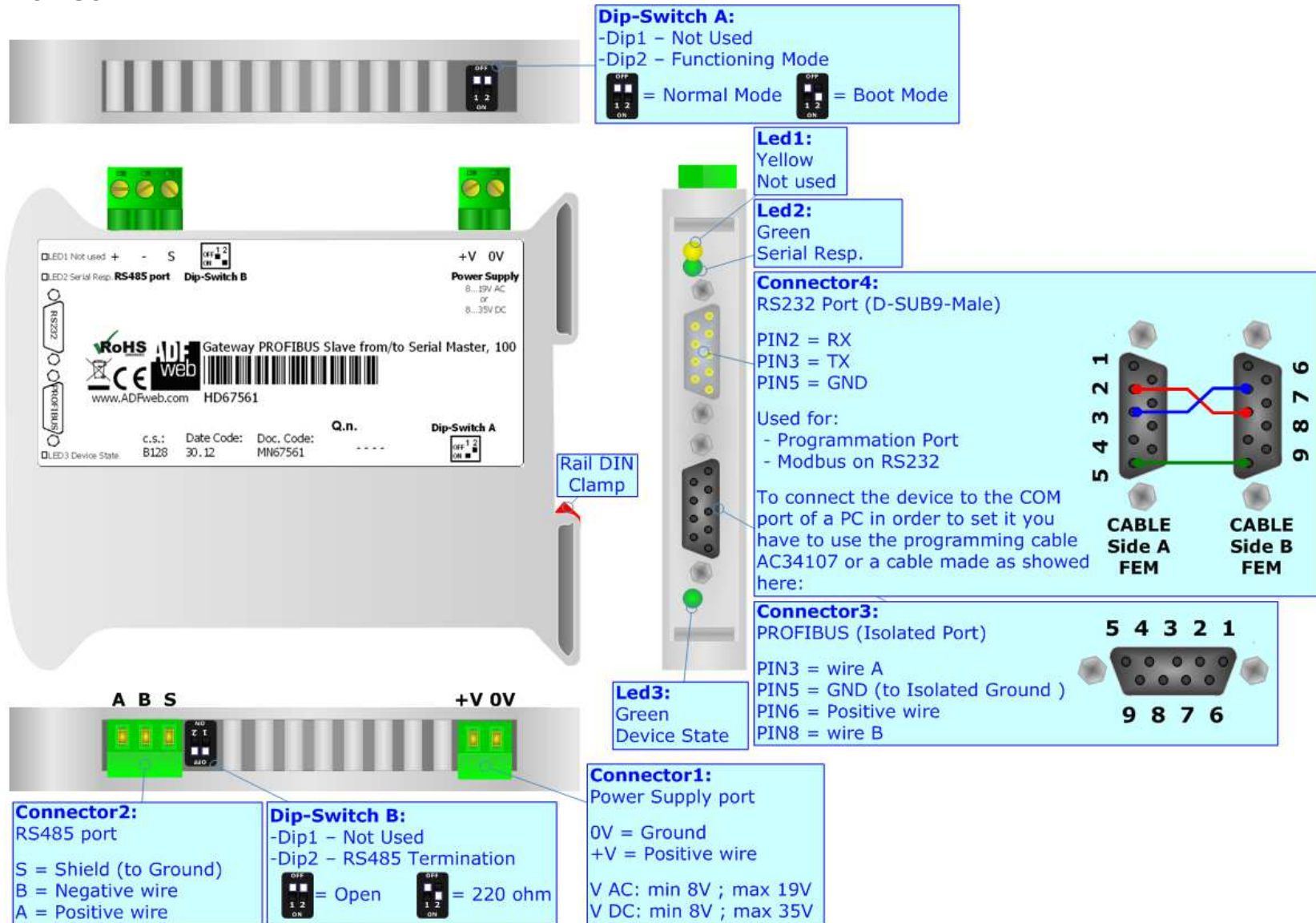


Figure 1: Connection scheme for HD67561

CHARACTERISTICS:

The Configurable ProfiBus Slave to Serial Communication Master Gateway allows the following characteristics:

- Baud Rate and Parity changeable with software;
- Mountable on 35mm Rail DIN;
- Power Supply 8...19V AC or 8...35V DC;
- Temperature range -40°C to 85°C;
- Serials Protocols supported:
 - Simple ASCII Protocol;
 - Simple Binary Protocol;
 - Modbus;
 - JBUS.

CONFIGURATION:

You need Compositor SW67561 software on your PC in order to perform the following:

- Define the parameter of the PROFIBUS;
- Define the parameter of the Modbus line;
- Define the frames to read or write.

POWER SUPPLY:

The devices can be powered between a wide range of tensions. For more details see the two tables below.

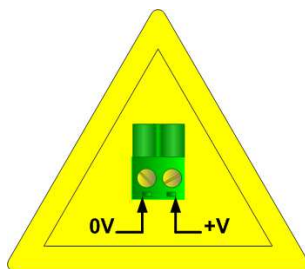
	VAC		VDC	
	Vmin	Vmax	Vmin	Vmax
HD67561	8V	19V	8V	35V

Consumption at 24V DC:

Device	W/VA
HD67561	4



Caution: Not reverse the polarity power



HD67561

Connector1:
 Power Supply port
 0V = Ground
 +V = Positive wire
 V AC: min 8V ; max 19V
 V DC: min 8V ; max 35V



FUNCTION MODES:

The device has got two functions mode depending of the position of the Dip2 of 'Dip-Switch A':

- The first, with Dip2 in Off position (factory setting), is used for the normal working of the device.
- The second, with Dip2 in On position, is used for upload the Project/Firmware.

For the operations to follow for the updating see 'UPDATE DEVICE' section.

According to the functioning mode, the LEDs will have specifics functions see 'LEDS' section.



LEDS:

The device has got three LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: Not used (yellow)	OFF	OFF
4: Serial Resp. (green)	Blinks quickly when there is PROFIBUS communication	OFF
3: Device State (green)	Blinks slowly (~1Hz)	Blinks quickly: Boot state Blinks very slowly (~0.5Hz): update in progress

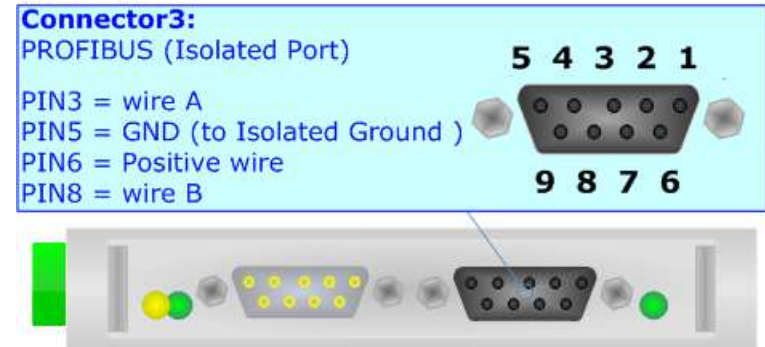


PROFIBUS:

The PROFIBUS uses a 9-pin D-SUB connector. The pin assignment is defined like in the right figure.

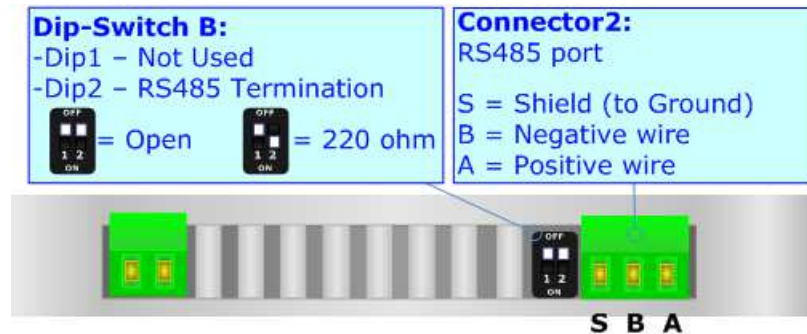
Here some codes of cables:

- Belden: p/n 183079A - Continuous Armor DataBus® ISA/SP-50 PROFIBUS Cable.



RS485:

For terminate the RS485 line with a 220Ω resistor it is necessary to put ON dip 2, like in figure.



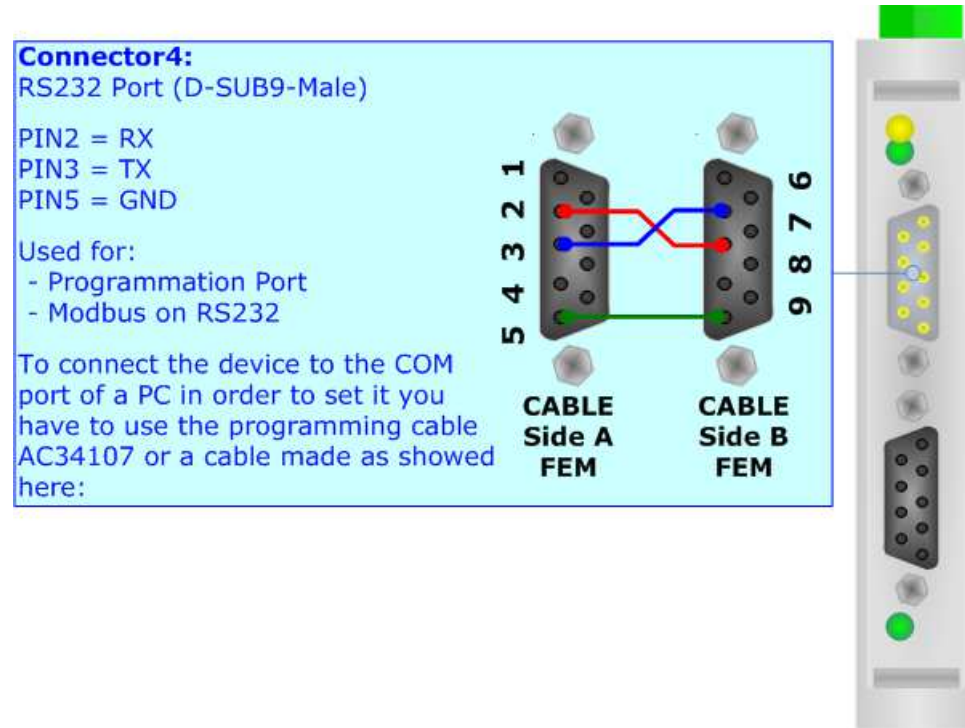
The maximum length of the cable should be 1200m (4000 feet).

Here some codes of cables:

- Belden: p/n 8132 - 2x 28AWG stranded twisted pairs conductor + foil shield + braid shield;
- Belden p/n 82842 - 2x 24AWG stranded twisted pairs conductor + foil shield + braid shield;
- Tasker: p/n C521 - 1x 24AWG twisted pair conductor + foil shield + braid shield;
- Tasker: p/n C522 - 2x 24AWG twisted pairs conductor + foil shield + braid shield.

RS232:

The connection from RS232 socket to a serial port (example one from a personal computer), must be made with a Null Modem cable (a serial cable where the pins 2 and 3 are crossed). It is recommended that the RS232C Cable not exceed 15 meters. The serial port is used for programming the device and for the Modbus communication.



USE OF COMPOSITOR SW67561:

To configure the Gateway, use the available software that runs with Windows, called SW67561. It is downloadable on the site www.adfweb.com and its operation is described in this document. (This manual is referenced to the last version of the software present on our web site). The software works with MSWindows (MS 2000, XP, Vista, Seven, 8).

When launching the SW67561 the right window appears (Fig. 2).

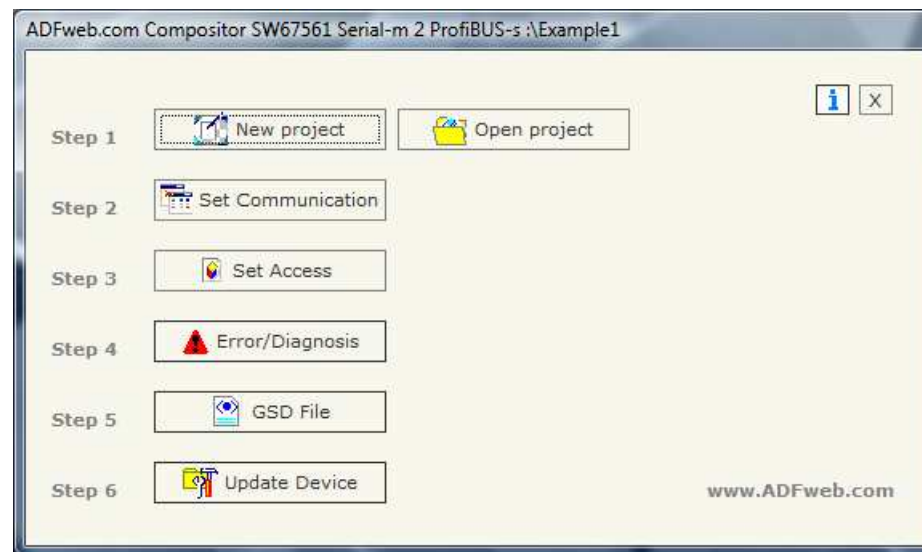
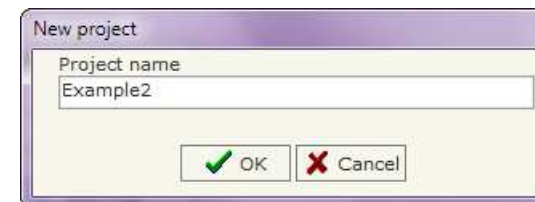


Figure 2: Main window for SW67561

NEW PROJECT / OPEN PROJECT:

The **“New Project”** button creates the folder which contains the entire device configuration.



A device configuration can also be imported or exported:

- To clone the configurations of a Programmable “PROFIBUS Slave / Modbus Master - Converter” in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button **“Open Project”**.

SET COMMUNICATION:

This section defines the fundamental communication parameter of two Buses, Serial and ProfiBus.

By pressing the "Set Communication" button from the main window for SW67561 (Fig. 2), the window "Set Communication" appears (Fig. 3).

The Window is divided in two sections, one for the ProfiBus and the other for the Serial.

The means of the fields for "Serial" are:

- If the field "RS232" is checked, the serial line in use is the RS232, otherwise if the field "RS485" is checked, the serial line in use is the RS485;
- In the field "Baud Rate" the baudrate for the serial line is defined;
- In the field "Parity" the parity of the serial line is defined;
- In the field "Stop Bits" the Stop Bits of the RS485 is defined;
- In the field "TimeOut" there is the maximum time that the device attends for the answer from the Slave interrogated;
- In the field "Cyclic Delay" the delay between two requests is defined;
- In the subsection "Protocol" it is possible to select the protocol that you wish to use between the following:
 - "Modbus RTU";
 - "Modbus ASCII";
 - "JBUS";
 - Simple "Binary" Protocol;
 - Simple "ASCII" Protocol.
- If the field "Write on Change Data" is checked, only when data change the value in PROFIBUS the data are written in serial.
- If the field "Cyclic Write" is checked, the data are written every time by gateway.

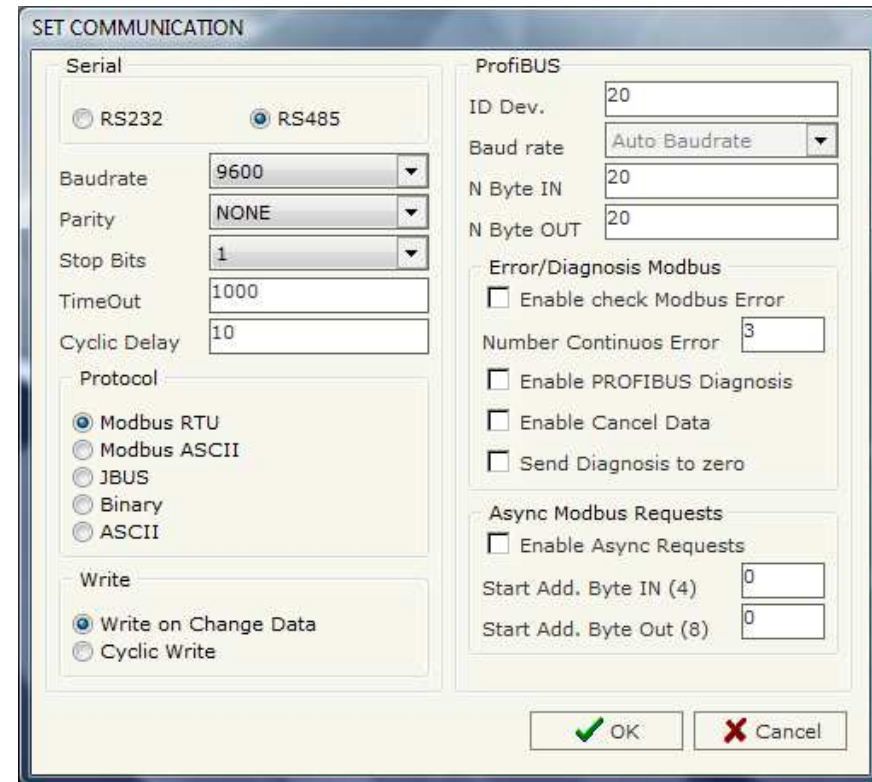


Figure 3: "Set Communication" window

The means of the fields for "ProfiBUS" are:

- In the field "ID Dev." the address of the ProfiBus side is defined;
- In the field "Baud Rate" the baudrate for the ProfiBus is defined;
- In the field "N Byte IN" the number of byte from the slave ProfiBus to the gateway is defined;
- In the field "N Byte OUT" the number of byte from the gateway to the slave ProfiBus is defined.

- If the field "Enable check Modbus Error" is checked, the gateway can advice a problem with one or more devices in Modbus network.
- In the field "Number Continuos Error" the number of continue errors to the same Modbus device before signed the error/diagnostic.
- If the field "Enable PROFIBUS Diagosis" is checked, the gateway use the Diagnosis to show an error of one or more Modbus device. (The "Enable check Modbus Error" must be selected for enable this option).
- If the field "Enable Cancel Data" is checked, the gateway set to zero all the data of that modbus devices. (The "Enable check Modbus Error" must be selected for enable this option).
- If the field "Enable Async Requests" is checked, is possible to send a Modbus Request using some bytes of the PROFIBUS to controll the requests.
- In the field "Start Add. Byte IN (4)" the starting address where the gateway send to the PROFIBUS master the state of Modbus request (for more info see the chapter "Async Remote Request"). Remember, there are 4 bytes of state of the modbus request.
- In the field "Start Add. Byte OUT (8)" the starting address where the PROFIBUS master send to the gateway the parameters of the Modbus Request (for more info see the chapter "Async Remote Request"). Remember, there are 8 bytes of parameters for the modbus request.

SET ACCESS:

By pressing the "Set Access" button from the main window for SW67561 (Fig. 2) the window "Set SDO Access" appears.

This window is divided in two parts, the "ProfiBus IN --> Serial Read" (Fig. 4) and the "Serial Write --> ProfiBus OUT" (Fig. 5). The first part ("ProfiBus IN --> Serial Read") is used to read the data that arrived from the Slave ProfiBus. The second part ("Serial Write --> ProfiBus OUT") is used to write the data that will be sent to the Slave ProfiBus.

ProfiBus IN --> Serial Read

The means of the fields are:

- In the field "Slave ID" the address of the Modbus device you have to read is defined;
- In the field "Type" insert the data type of the Register you would like to read. You can choose between the following:
 - Coil Status;
 - Input Status
 - Holding Register;
 - Input Register.
- In the field "Address Register" the start address of the register to be read is defined;
- In the field "NPoint" insert the number of consecutive registers to be read;
- If the field "SWAP" is checked, the data read is swapped
- In the field "Address ProfiBUS" the address for the ProfiBus is defined;
- In the field "Mnemonic" the description for the request is defined.

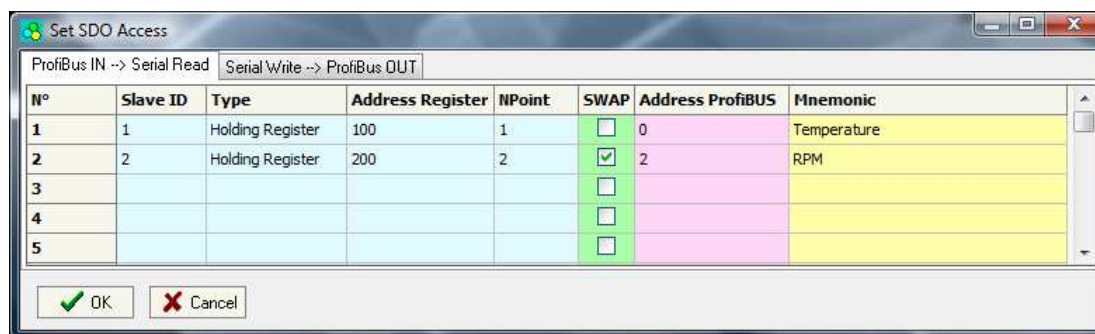


Figure 4: "Set SDO Access / ProfiBus IN --> Serial Read" window

Serial Write --> ProfiBus OUT

The means of the fields are:

- In the field "Slave ID" the address of the Modbus device that you must write is defined;
- In the field "Address Register" the start address of the register to be written is defined;
- In the field "NPoint" insert the number of consecutive registers to be written;
- If the field "SWAP" is checked, the data written is swapped
- In the field "Address ProfiBus" the address for the ProfiBus is defined;
- In the field "Mnemonic" the description for the request is defined.

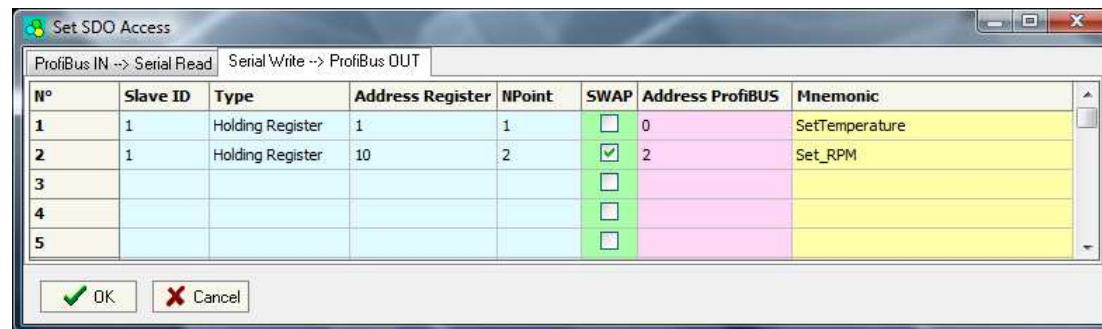


Figure 5: "Set SDO Access / Serial Write --> ProfiBus OUT" window

ERROR/DIAGNOSIS

By pressing the "Set Access" button from the main window for SW67561 (Fig. 2) the window "Error/Diagnosis" appears.

In this window is possible to insert all the Modbus devices checked by the gateway.

The table give the position of the bit that are set if the device is in error in the Diagnosis array in PROFIBUS.

The Diagnosis has always 6 byte fixed, then if there is some problem with some Modbus devices it increase the number of byte.

If there a problem in Modbus side, after the first 6 byte, there is a byte with a fix part (0x40) plus the number of follow bytes plus 1. For example if you want to monitor 10 Modbus devices you fond the first byte to the value 0x43 followed from 2 other byte that contain the status of each devices. If the bit is to 1 there is a problem on it device. Each byte can contain at maximum 8 Modbus devices.

For enable this feature you have to checked the "Enable check Modbus Error" option in the Set Communication section.

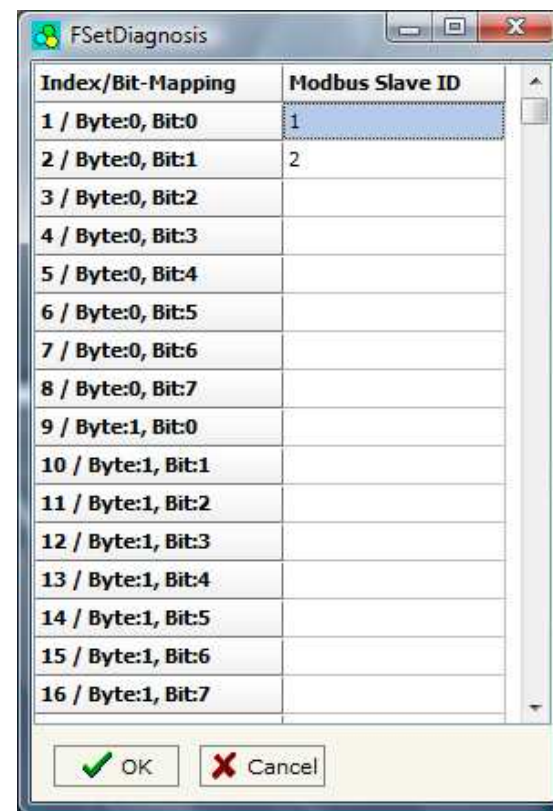


Figure 6: "Error/Diagnosis" window

GSD FILE:

By pressing the "GSD File" button it is possible to save the GSD file for the PROFIBUS side.

With this feature you can save the configuration of the gateway of the PROFIBUS side.



Note:

When you import the .gsd file on your Master PROFIBUS you have to add all the modules that are present inside it.

ASYNCR MODBUS REQUEST:

With the Async Modbus Request is possible to send an Asynchronous Modbus Request form the PROFIBUS to the Modbus network. To use this feature there are 8 bytes in write where the master PROFIBUS can send the parameters of the request and 4 bytes in read where the result of the Modbus communication is saved.

The parameter in write are:

BYTE	NAME	DESCRIPTION
1	Control_TX	It is the Control byte used to send the request
2	Spare	Not used/ Reserved
3	ID_Device	The ID of the Modbus Slave where to send the request
4	Function_Code	The Function Code of the request
5, 6	Address	Address of the Status/Register to read/write
7, 8	W_Value	Value to write (only if it is a Write request)

The Status in Read are:

BYTE	NAME	DESCRIPTION
1	Control_RX	It is the Control Byte used to send the status of the request modbus
2	Status_Request	It is the result of the Modbus request
3, 4	R_Value	Read value (only if it is a Read request)

The permits values for the "Function Code" are:

- 1 → Read one Coil Status
- 2 → Read one Input Status
- 3 → Read one Holding Register
- 4 → Read one Input Register
- 5 → Write one Coil Status
- 6 → Write one Holding Register
- 15 → Write one Coil Status
- 16 → Write one Holding Register

The permits values for the "Status_Request" are:

- 0 → Performing Request
- 1 → Answer OK
- 2 → Answer with Exception
- 3 → Wrong Answer (CRC)
- 4 → Answer not Arrived (TimeOut Error)
- 5 → Wrong Request

Step to follow to send a Async Modbus Request

1. Check the value of the "Control_RX" byte. It must be 1 to accept a new Asynchronous request.
2. Insert the values of the request in "ID_Device", "Function_Code", "Address" and "W_Value" (if needed).
3. Put the "Control_TX" byte to 1 (it is necessary to leave this byte to 1 till the end of the request).
4. The "Control_RX" byte pass to the value 2, that mean the Converter waiting an answer from the Modbus Salve.
5. The "Control_RX" byte pass to the value 3, the request command is finish. In the "Status_Request" is possible to read the result of the request and in the R_Value the value of the Status/Register is saved (if it is a Read request)
6. When you read the answer you can put the "Control_TX" byte to 0 and the "Control_RX" byte will pass to 1 (now is possible to do a new Request).



Note:

When write a Coil Status using the Function Code 5 the admitted value in the W_Value are 0xFF00 for set the Status, 0x0000 for clear the Status.



Note:

When write a Coil Status using the Function Code 15 the admitted value in the W_Value are 0x0100 for set the Status, 0x0000 for clear the Status.



Note:

When read a Status the value will be available in the high part of the "R_Value". The admitted value are 0x01 or 0x00.



Note:

When the request exit with an exception (Status_Request == 2) is possible to read the Exception code in the high part of the "R_Value"

UPDATE DEVICE:

Section "Update Device" (Fig. 7):

In order to load the parameters or update the firmware in the gateway, follow these instructions:

- Turn OFF the device;
- Connect the Null Modem cable from your PC to the Gateway;
- Insert the Boot Jumper (For more info see the "Connection scheme");
- Turn ON the device;
- Check the "BOOT Led". It must blink quickly (For more info see the "Connection scheme");
- Select the COM port and press the "Connect" button;
- Press the "Next" button;
- Select the operations you want to do. You can select only "Firmware", only "Project" or both of them;
- Press the "Execute update firmware" button to start the upload;
- When all the operations are "OK" turn OFF the device;
- Disconnect the Boot Jumper;
- Disconnect the RS232 Cable;
- Turn ON the device.

At this point the configuration/firmware on the device is correctly update.

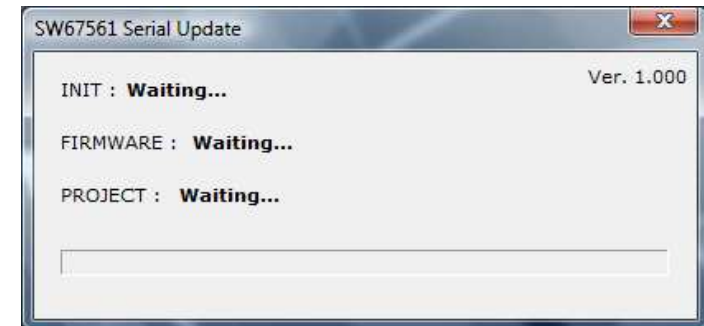
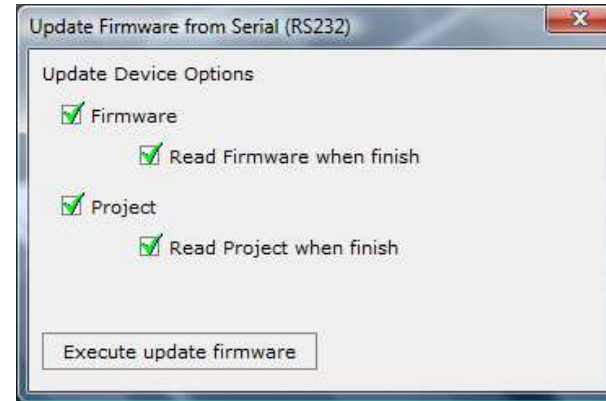
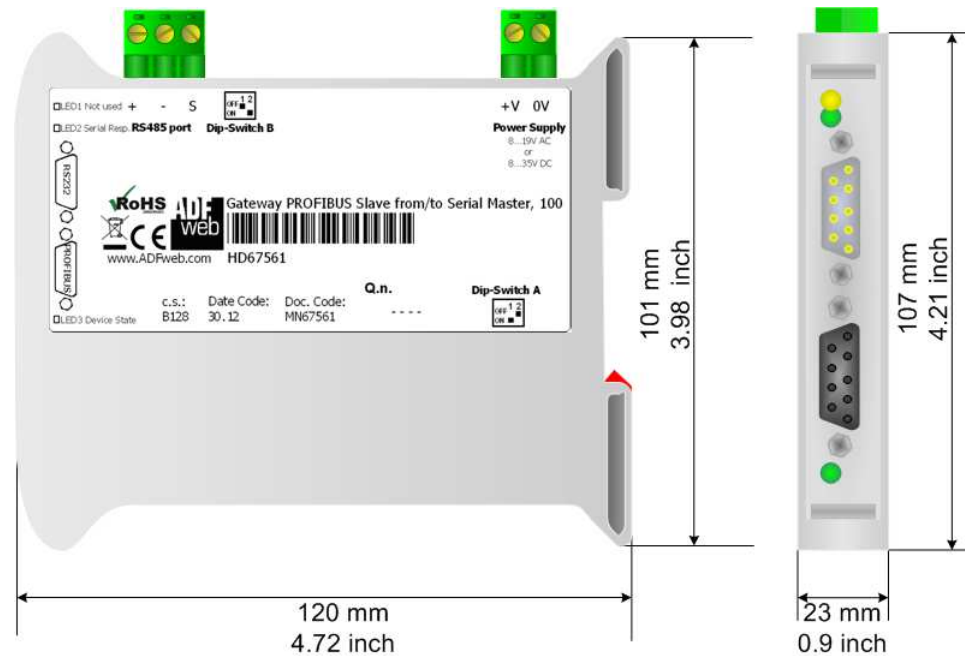


Figure 7: "Update Device" windows

MECHANICAL DIMENSIONS:



Housing: PVC
Weight: 200g (Approx)

Figure 9: Mechanical dimensions scheme

ORDER CODE:

Order Code: **HD67561** - PROFIBUS Slave / Modbus Master / Converter

ACCESSORIES:

- Order Code: **AC34107** - Null Modem Cable Fem/Fem DSub 9 Pin 1,5 m
- Order Code: **AC34114** - Null Modem Cable Fem/Fem DSub 9 Pin 5 m
- Order Code: **AC34001** - Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V AC
- Order Code: **AC34002** - Rail DIN - Power Supply 110V AC 50/60Hz – 12 V AC

DISCLAIMER

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OTHER REGULATIONS AND STANDARDS

WEEE INFORMATION



Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).

— This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE



The device respects the 2002/95/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (commonly referred to as Restriction of Hazardous Substances Directive or RoHS).

CE MARKING



The product conforms with the essential requirements of the applicable EC directives.

WARRANTIES AND TECHNICAL SUPPORT:

For fast and easy technical support for your ADFweb.com SRL products, consult our internet support at www.adfweb.com. Otherwise contact us at the address support@adfweb.com

RETURN POLICY:

If while using your product you have any problem and you wish to exchange or repair it, please do the following:

- 1) Obtain a Product Return Number (PRN) from our internet support at www.adfweb.com. Together with the request, you need to provide detailed information about the problem.
- 2) Send the product to the address provided with the PRN, having prepaid the shipping costs (shipment costs billed to us will not be accepted).

If the product is within the warranty of twelve months, it will be repaired or exchanged and returned within three weeks. If the product is no longer under warranty, you will receive a repair estimate.

PRODUCTS AND RELATED DOCUMENTS:

Part	Description	URL
HD67121	Gateway CANopen / Canopen	www.adfweb.com?product=HD67121
HD67502	Gateway CANopen / Modbus - RTU	www.adfweb.com?product=HD67502
HD67505	Gateway CANopen / Modbus – Ethernet TCP	www.adfweb.com?product=HD67505
HD67134	Gateway CANopen / DeviceNet	www.adfweb.com?product=HD67134
HD67117	CAN bus Repeater	www.adfweb.com?product=HD67117
HD67216	CAN bus Analyzer	www.adfweb.com?product=HD67216