

User Manual

Revision 1.102
English

Gateway / Bridge Modbus TCP Server to Modbus RTU Master

(Order Code: HD67507 – HD67507M)

for Website information:

www.adfweb.com?Product=HD67507

for Price information:

www.adfweb.com?Price=HD67507

Benefits and Main Features:

- ▶ Very easy to configure
- ▶ Low Cost
- ▶ Rail mountable
- ▶ Wide supply input range
- ▶ Galvanic Isolation
- ▶ Industrial temperature range:
-30°C / 70 °C (-22°F / 158°F)



HD67507



HD67507M

For others products for Modbus:

Converters / Adapters

See also the following links:

- www.adfweb.com?Product=HD67118 (Modbus RTU Slave)
- www.adfweb.com?Product=HD67119 (Modbus TCP Master)
- www.adfweb.com?Product=HD67120 (Modbus TCP Slave)

For others Gateways / Bridges:

Modbus RTU Master / Slave

See also the following links:

- www.adfweb.com?Product=HD67001 (CANopen)
- www.adfweb.com?Product=HD67502 (CANopen)
- www.adfweb.com?Product=HD67011 (CAN bus)
- www.adfweb.com?Product=HD67012 (CAN bus)

Modbus TCP Client to Modbus RTU Slave

See also the following link:

www.adfweb.com?Product=HD67510

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
1.000	31/10/2008	FI	All	First release version
1.100	17/11/2008	FI	All	Enclosure Small
1.101	19/01/2009	FI	All	Revision
1.102	03/07/2009	MI	All	Revision

WARNING:

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CHARACTERISTICS:

The Modbus TCP to Modbus RTU Gateway allows the following characteristics:

- Power supply 12...18 VAC or 12...24 VDC;
- Opto-isolation RS485;
- Choice possibility between RS232 or RS485;
- Mountable on Rail DIN;
- Temperature range -30°C to 70°C;
- EMS EN 61000-6-2.

This device is able to manage a maximum of ten simultaneous connections from Ethernet side.

To configure the Gateway, use the available software that runs with Windows, called SW67507. It is downloadable on the site www.adfweb.com and its operation is described in this document.

It can be used in two operative ways: routing and natting. In the "Routing Mode" the command Modbus is forwarded on the serial line using the same requested addresses. In the "Natting Mode" the device addresses and data are altered through a translation table of the addresses.

CONNECTION SCHEME:

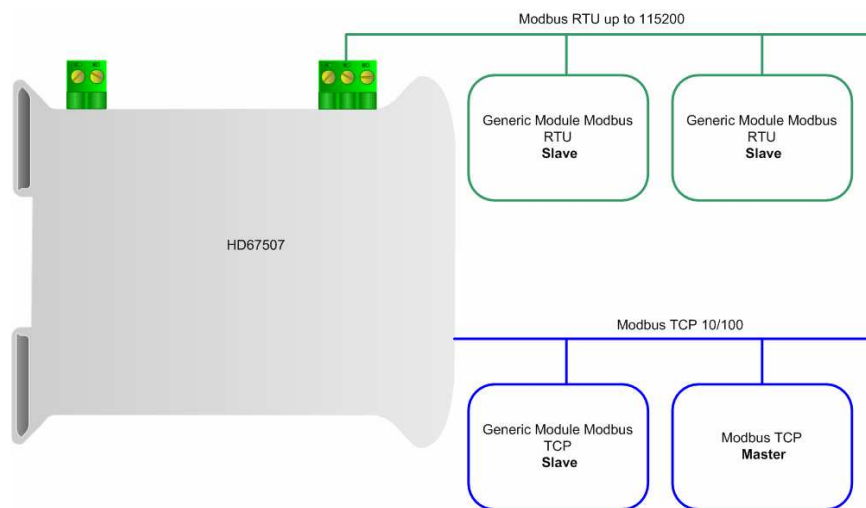


Figure 1: Connection scheme of HD67507 between Modbus TCP and Modbus RTU (communication RS485)

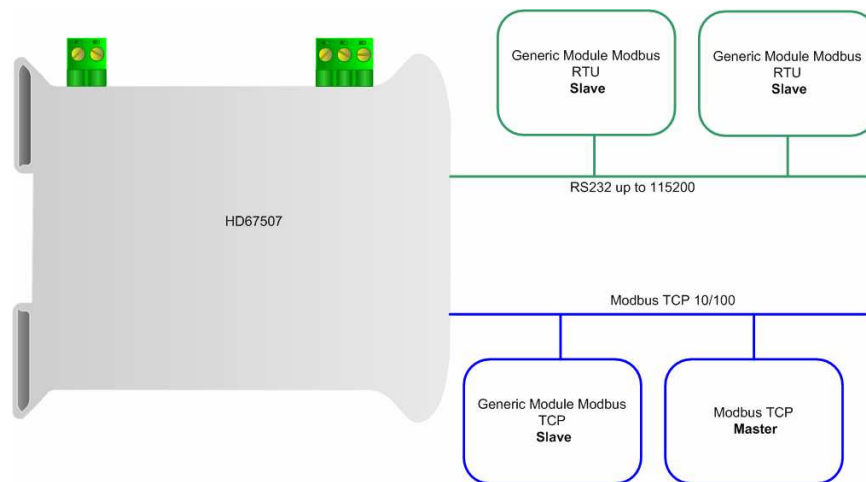


Figure 2: Connection scheme of HD67507 between Modbus TCP and Modbus RTU (communication RS232)

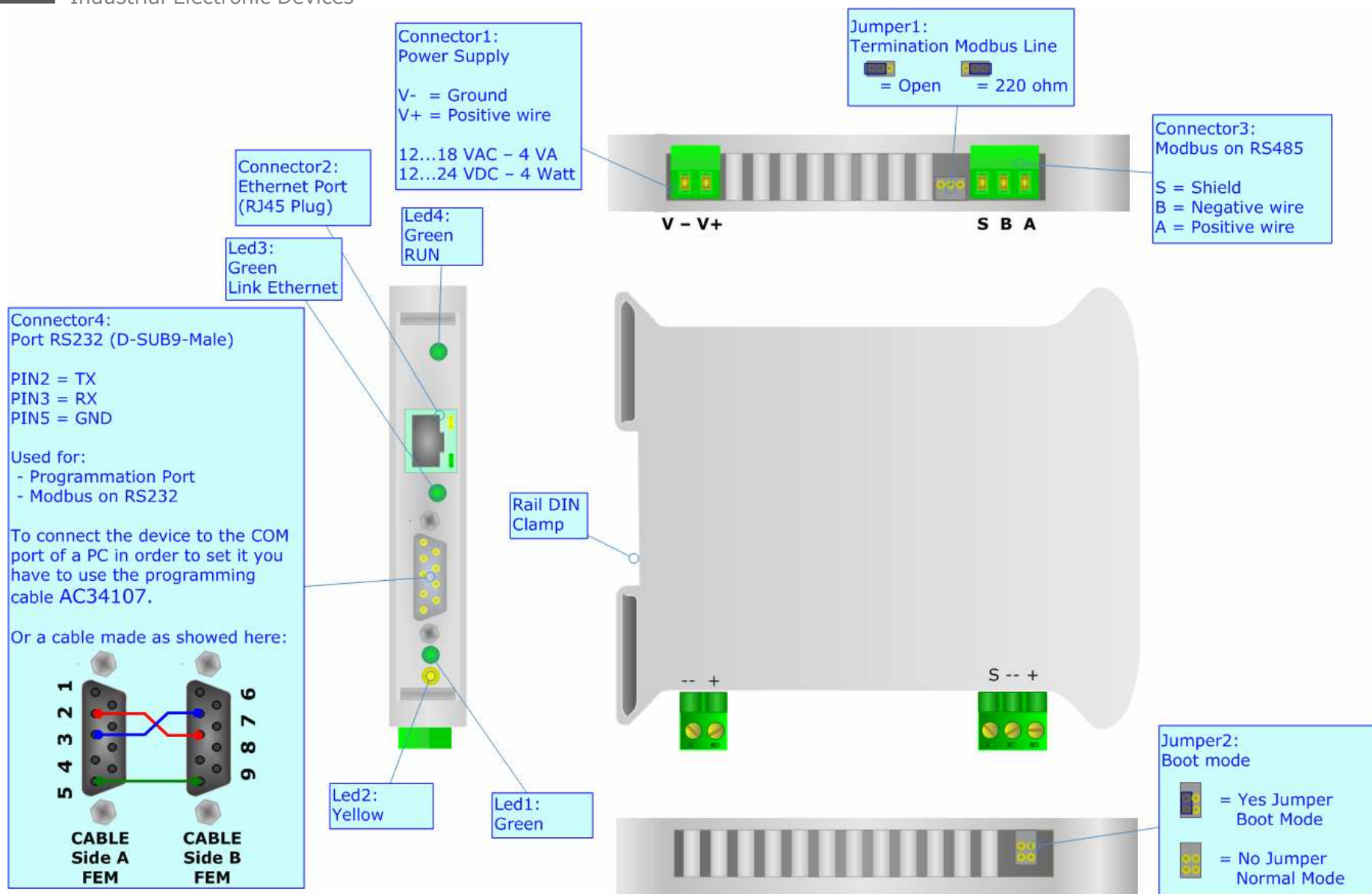


Figure 3: Connection Scheme for HD67507

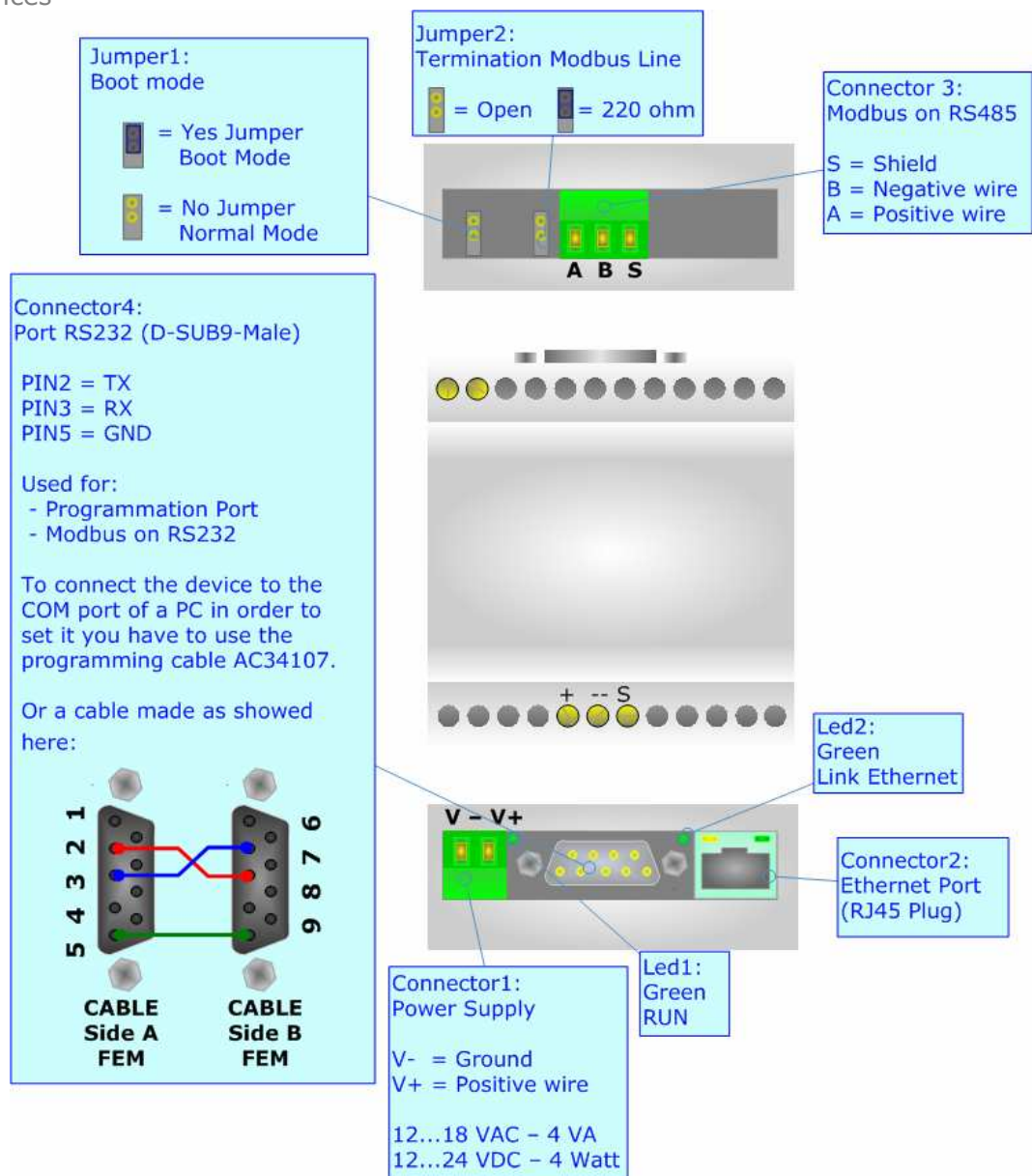


Figure 4: Connection Scheme for HD67507M

USE OF COMPOSITOR SW67507:

The software allows the device parameters to be defined.

When launching the SW67507, the following window appears.

(The SW67507 is downloadable on the site
<http://www.adfweb.com/home/download/download.asp>

This manual is referenced to the last version of the software present on our web site)

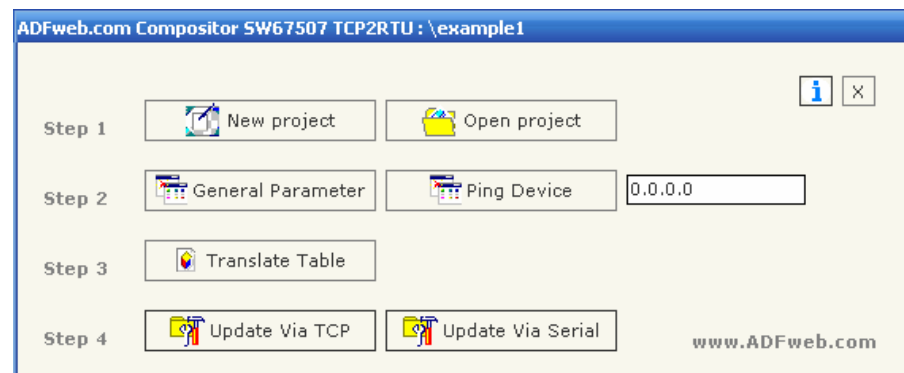


Figure 5: Main window for SW67507

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 ModBus RTU into Modbus TCP Gateway 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";
- When a new project is created or an existent project is open, it will be possible to access the various configuration sections of the Software:
 - **"General Parameter";**
 - **"Translate Table".**

GENERAL PARAMETER:

This section defines the fundamental communication parameters of two Buses, Modbus TCP and Modbus RTU.

By pressing the "General Parameter" button from the main window for SW67507 (Fig. 5) the window "General Parameter" appears (Fig. 6).

- The field "Operation Mode" defines the operation of the Gateway in Routing or NAT modes (see the description in the following page);
- In the field "IP Address" insert the IP address that you want to give to the slave Modbus TCP;
- In the field "Subnet Mask" insert the Subnet Mask;
- In the field "Port" insert the number of port;
- If the field "RS232" is checked the serial line in use is the RS232, otherwise is the RS485;
- In the field "Baud rate" the velocity of the Modbus RTU is defined;
- In the field "Parity" the Modbus RTU parity is defined;
- "Timeout" is the maximum time that the device attends for the answer from the Slave interrogated;
- Checking "Enable UDP Port" field it is possible to make a Broadcast request. This request must be made at Port 64223 (\$FADF) with these six byte of data: \$53, \$45, \$41, \$52, \$43, \$48. Each device in response sends a total of 10 Bytes. These bytes are four for the IP and the other for the MAC address (Example of response: 0xC0, 0xA8, 0x01, 0x2A, 0x11, 0x22, 0x33, 0x44, 0x55, 0x58. So the IP is: 192.168.1.42; and the MAC Address: 11-22-33-44-55-58).
- If the field "Enable Special Command" is checked, it is possible to send a no-Modbus request through the gateway. i.e. a TCP frame with the first two characters 0x55 and 0xAA is sent in the Modbus RTU line as is. If you don't want to send the first two bytes (0x55, 0xAA) in the RTU line it is possible to check the field "Cancel the first two bytes".

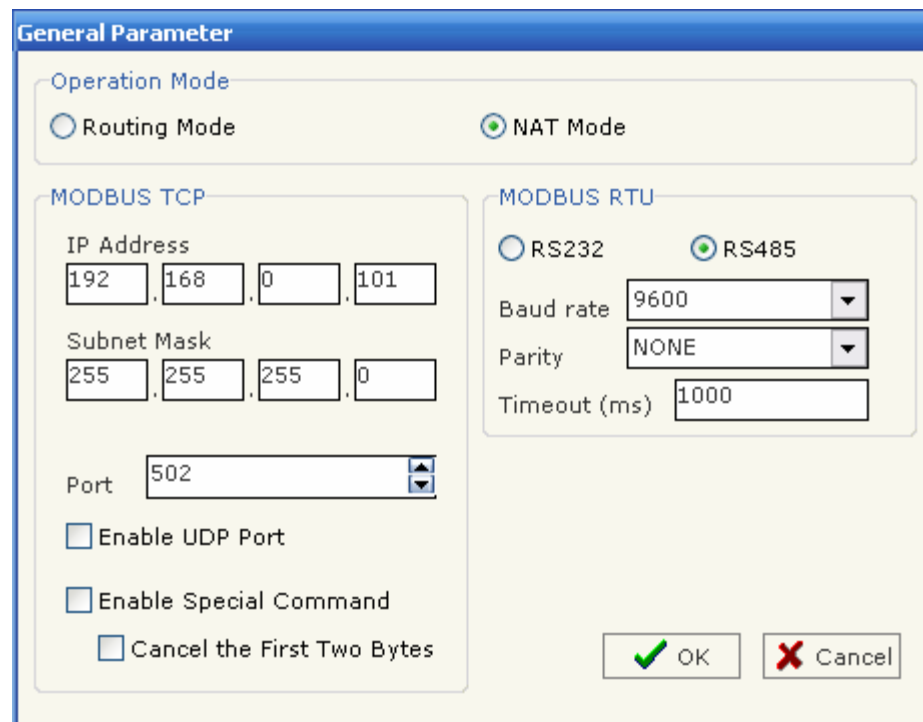


Figure 6: "General Parameter" window

PING DEVICE:

If it is necessary to do a Ping on the net, before pressing the "Ping Device" button insert a value in the field on the right and then press the button. In order to do this, the gateway must be in RUN mode.

OPERATIONAL MODE:**ROUTING:**

A few characteristics of the Modbus RTU package have been modified in the standard of the Modbus TCP protocol. Two bytes of the final CRC were eliminated (no longer necessary for the information to reach its already corrected destination). The first byte of the slave identification was changed, leaving the one that is called PDU. A frame denominated as MBAP header with dimensions of 7 bytes was added to the head of the PDU.

It is composed by the following:

- Word transaction identifier (recopied from the slave in the response phase);
- Word protocol identifier (0=Modbus protocol);
- Word length (number of successive bytes);
- Byte unit identifier (used for the routing operation).

By using the last byte of the MBAP header, it is possible to carry out the routing from a requested Modbus TCP toward a serial line using the address from the slave which is specified by the byte unit identifier.

Example:

A requested Modbus TCP made in the device as the address 192.168.0.200 for the holding register address \$2000, which is MBAP unit identifier has the value of 2. It will be followed by the request on the serial for the device with the address 2 at the word \$2000.

After the request is made, the RTU will respond. The master TCP will be given the same response which will be reconstructed according to the specifications of the Modbus TCP.

If the RTU slave responds with an exception, that exception code will be transmitted again to the TCP master. If the RTU slave does not respond in the estimated time defined by the Timeout parameter, an exception response will be given: error code \$0B.

NATTING:

When using the operation mode, Natting, the requested data will be processed through a table of translations of the Modbus network addresses.

TRANSLATE TABLE:

Within the section "Translate Table" you can define the variables that can be read or written by the TCP bus on the RTU bus when the device is in NAT mode.

By pressing the "Translate Table" button from the main window for SW67507 (Fig. 5) the window "Set Translate Table" appears (Fig. 7).

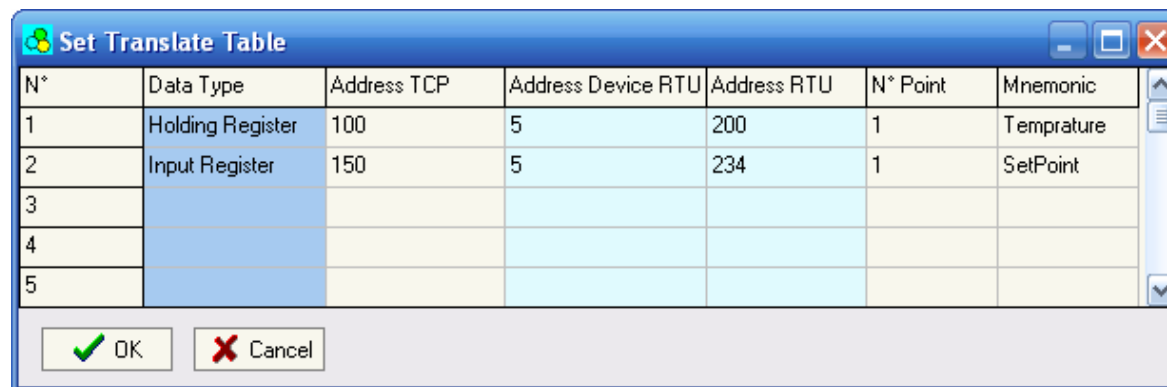


Figure 7: "Set Translate Table" window

The data of the columns have the following meanings:

- In the field "Data Type" insert the type of data that is being considered;
- In the field "Address TCP" insert the virtual address of the present data in a device in the TCP Modbus;
- In the field "Address Device RTU" insert the address of the device on the RTU Modbus that contains the data;
- In the field "Address RTU" insert the address of the data on the RTU device;
- In the field "N° Point" insert the number of consecutive data that you want to configure. For example, you create Address TCP=1000, Address RTU=100 and N° point = 5, the following gets set-up automatically: addresses TCP 1001, 1002, 1003, 1004 and the variables RTU 101, 102, 103, 104;
- In the field "Mnemonic" you can insert a brief description.

Example 1:

If you want, from TCP network, write a data it the RTU network on the device at:

- Address 5;
- Through Gateway WORD 100 (Address RTU);
- Address TCP 1000.

In the above scenario:

Specify the type of data between:

- Holding Register (word in read and write);
- Input Register (word in read).

From the side of the MODBUS TCP:

- Address of data to read.

From the side of the MODBUS RTU:

- Address of the device to interrogate;
- Address of data to read on device.

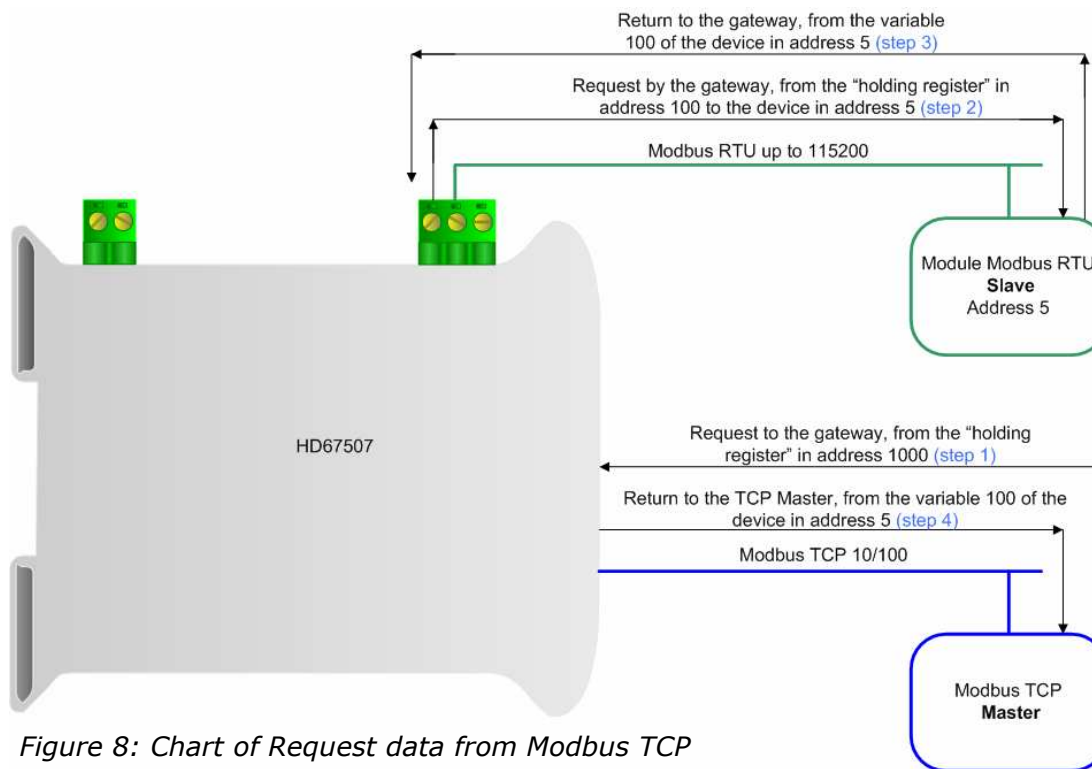


Figure 8: Chart of Request data from Modbus TCP

If the RTU slave responds with an exception, that exception code will be transmitted to the TCP Master. If the RTU slave does not respond within the estimated time defined by the Timeout parameter, an exception response will be given: error code \$0B.

UPDATE VIA TCP:

Section "Update Via TCP" (Fig. 9):

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

- Connect the Ethernet cable to the Gateway;
- Insert the IP address of the Web Server;
- Press the "Ping" button for check the connection of the Gateway;
- 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" the configuration/firmware on the device is correctly updated.

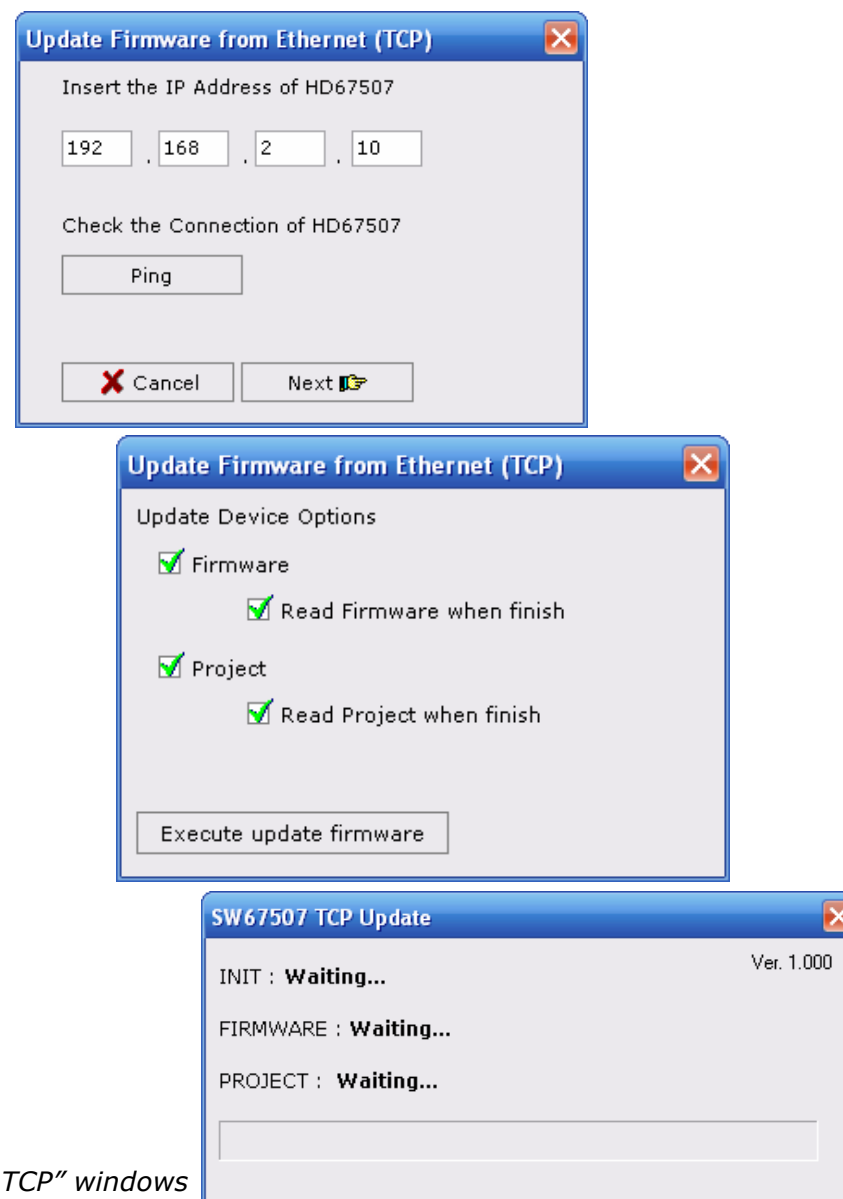


Figure 9: "Update Via TCP" windows

UPDATE VIA SERIAL

Section "Update Via Serial" (Fig. 10):

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" of the Gateway);
- Turn ON the device;
- Check the "BOOT Led". It must blink quickly (more info see the "Connection scheme" of the Gateway);
- 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;
- Turn ON the device.

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

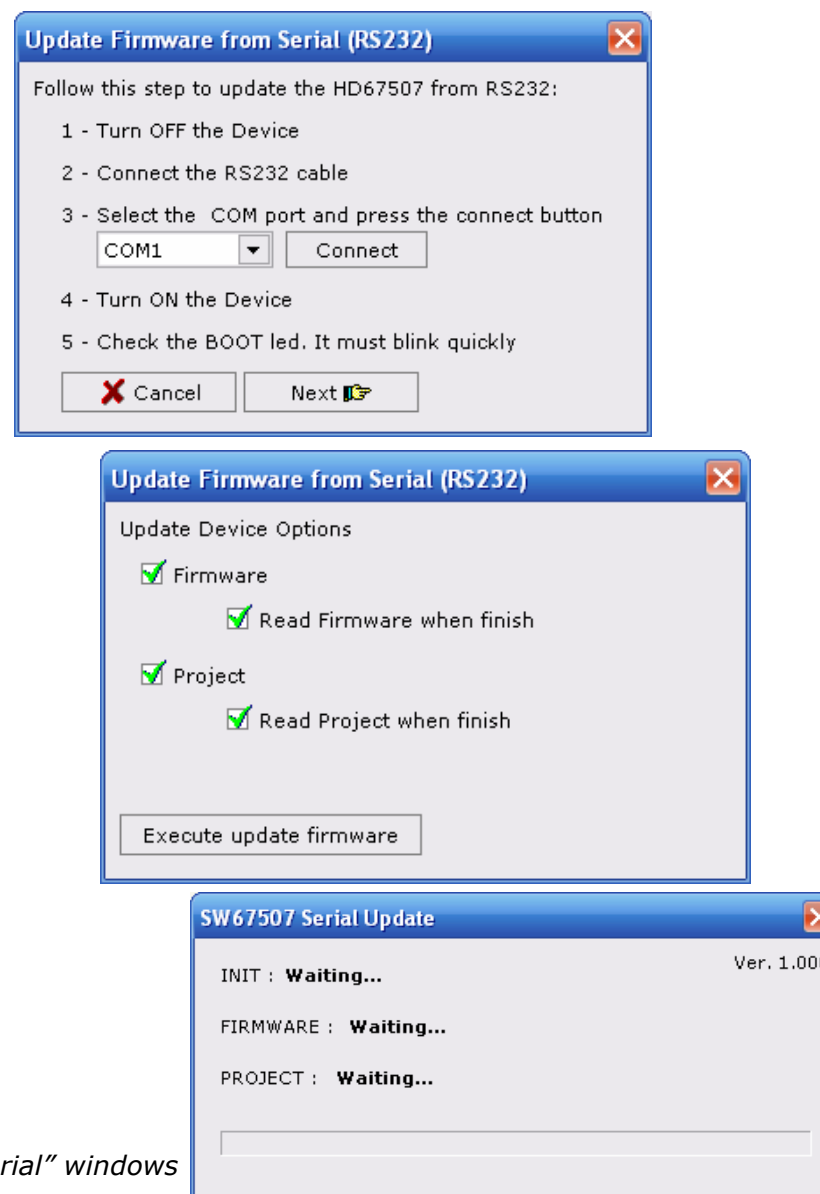


Figure 10: "Update Via Serial" windows

CHARACTERISTICS OF THE CABLES:

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.

DETAILS ABOUT THE ETHERNET CABLE:

Linking of Ethernet connector to a HUB must be carried out by a Category 5E cable. The cable has to conform to the T568 norms relative to connections in cat.5 up to 100 Mbps. The length cannot go beyond 100 meters.

MECHANICAL DIMENSIONS:

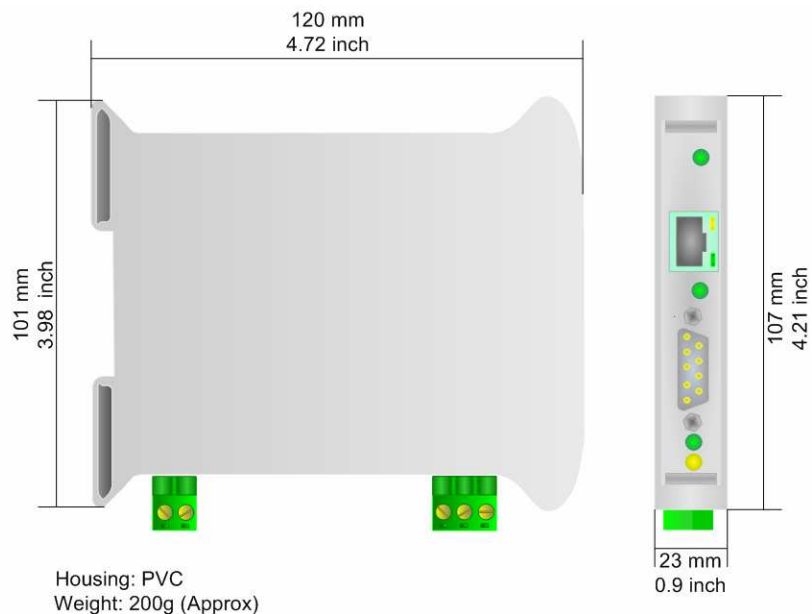


Figure 11: Mechanical dimensions scheme for HD67507

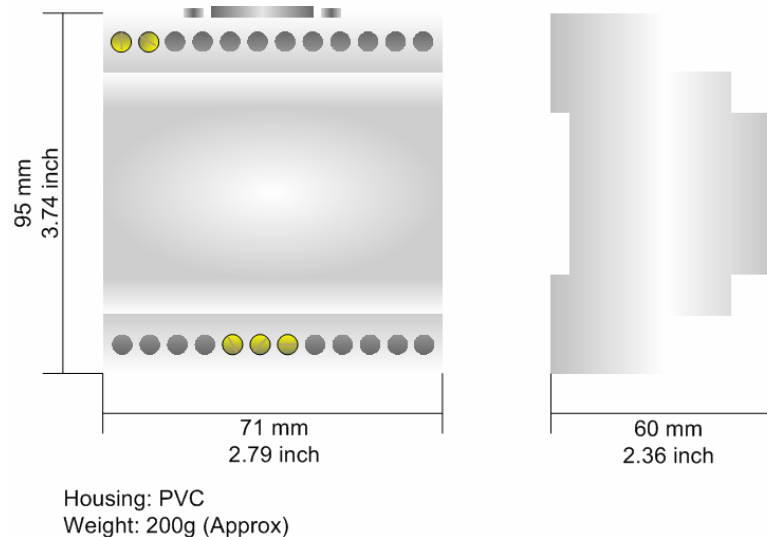


Figure 12: Mechanical dimensions scheme for HD67507M

ORDER CODE:

- Order Code: **HD67507** - Gateway – Modbus TCP Server to Modbus RTU Master
- Order Code: **HD67507M** - Gateway – Modbus TCP Server to Modbus RTU Master (Different enclosure)

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

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
HD67118	Converter RS232 to RS485 Isolated	www.adfweb.com?Product=HD67118
HD67119	Converter USB 2.0 to RS485 Isolated	www.adfweb.com?Product=HD67119
HD67507	Gateway Modbus TCP Server to RTU Master	www.adfweb.com?Product=HD67507
HD67510	Gateway Modbus TCP Client to RTU Slave	www.adfweb.com?Product=HD67510