

# User Manual

Revision 2.002  
English

## Gateway / Bridge Modbus TCP Server to Modbus RTU Master

(Order Code: HD67007)

for Website information:

[www.adfweb.com?Product=HD67007](http://www.adfweb.com?Product=HD67007)

for Price information:

[www.adfweb.com?Price=HD67007](http://www.adfweb.com?Price=HD67007)

### 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)



HD67007

For others products for Modbus:

#### Converters / Adapters

See also the following links:

- [www.adfweb.com?Product=HD67118](http://www.adfweb.com?Product=HD67118) (Modbus RTU Slave)
- [www.adfweb.com?Product=HD67119](http://www.adfweb.com?Product=HD67119) (Modbus TCP Master)
- [www.adfweb.com?Product=HD67120](http://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](http://www.adfweb.com?Product=HD67001) (CANopen)
- [www.adfweb.com?Product=HD67502](http://www.adfweb.com?Product=HD67502) (CANopen)
- [www.adfweb.com?Product=HD67011](http://www.adfweb.com?Product=HD67011) (CAN bus)
- [www.adfweb.com?Product=HD67012](http://www.adfweb.com?Product=HD67012) (CAN bus)

#### Modbus TCP Client to Modbus RTU Slave

See also the following link:

[www.adfweb.com?Product=HD67510](http://www.adfweb.com?Product=HD67510)

Do you have an your customer protocol?

See the following links:

[www.adfweb.com?Product=HD67003](http://www.adfweb.com?Product=HD67003)

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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.

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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/](http://www.adfweb.com/download/)

**REVISION LIST:**

Revision	Date	Author	Chapter	Description
1.005	19/06/2005	Ddt	All	documentation code changed
1.006	22/06/2007	Av	All	Revision
1.007	26/06/2007	Av	All	Revision
2.000	17/06/2008	Av	All	New document format
2.001	15/01/2009	FI	All	Change figure 3
2.002	24/06/2009	MI	All	Revision

**WARNING:**

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ADFweb.com is not responsible for any error this manual may contain.

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**CHARACTERISTICS:**

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

- Power supply 12...24 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.

To configure the Gateway, use the available software that runs with Windows, called SW67007. It is downloadable on the site [www.adfweb.com](http://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:**

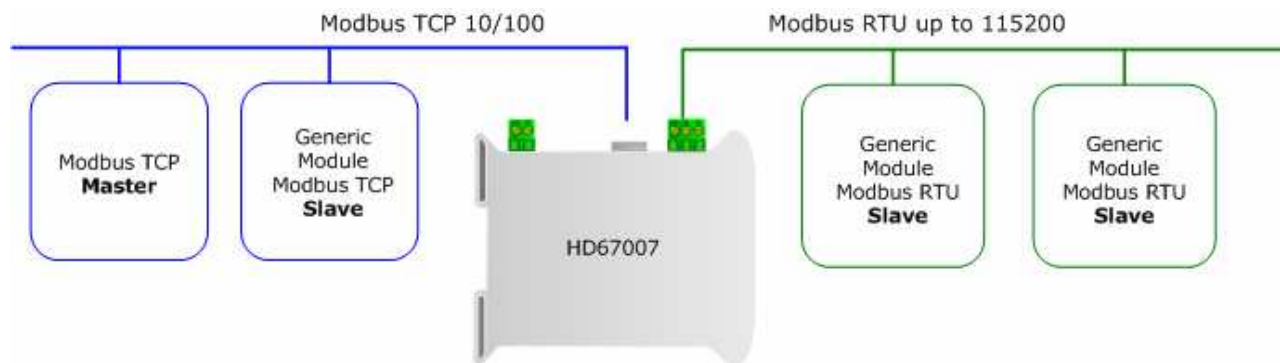


Figure 1: Connection scheme of HD67007 between Modbus TCP and Modbus RTU (communication RS 485)

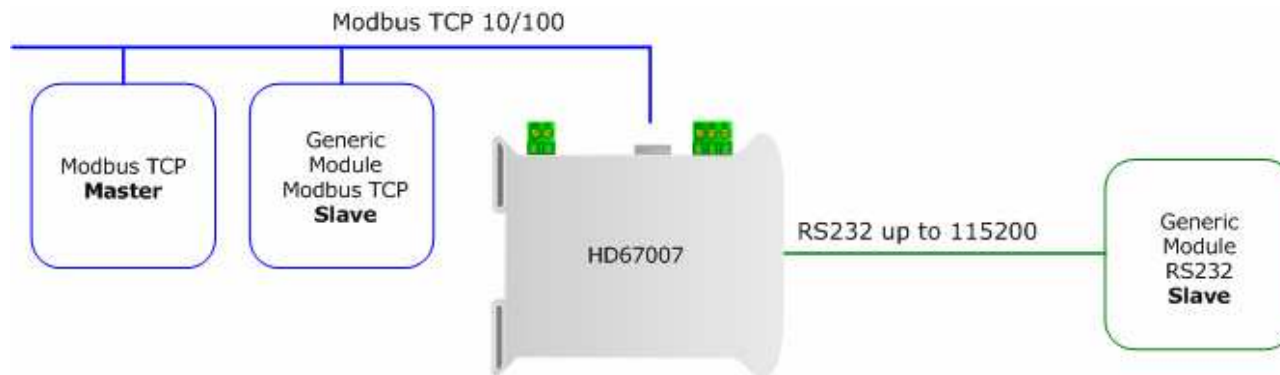


Figure 2: Connection scheme of HD67007 between Modbus TCP and Modbus RTU (communication RS 232)

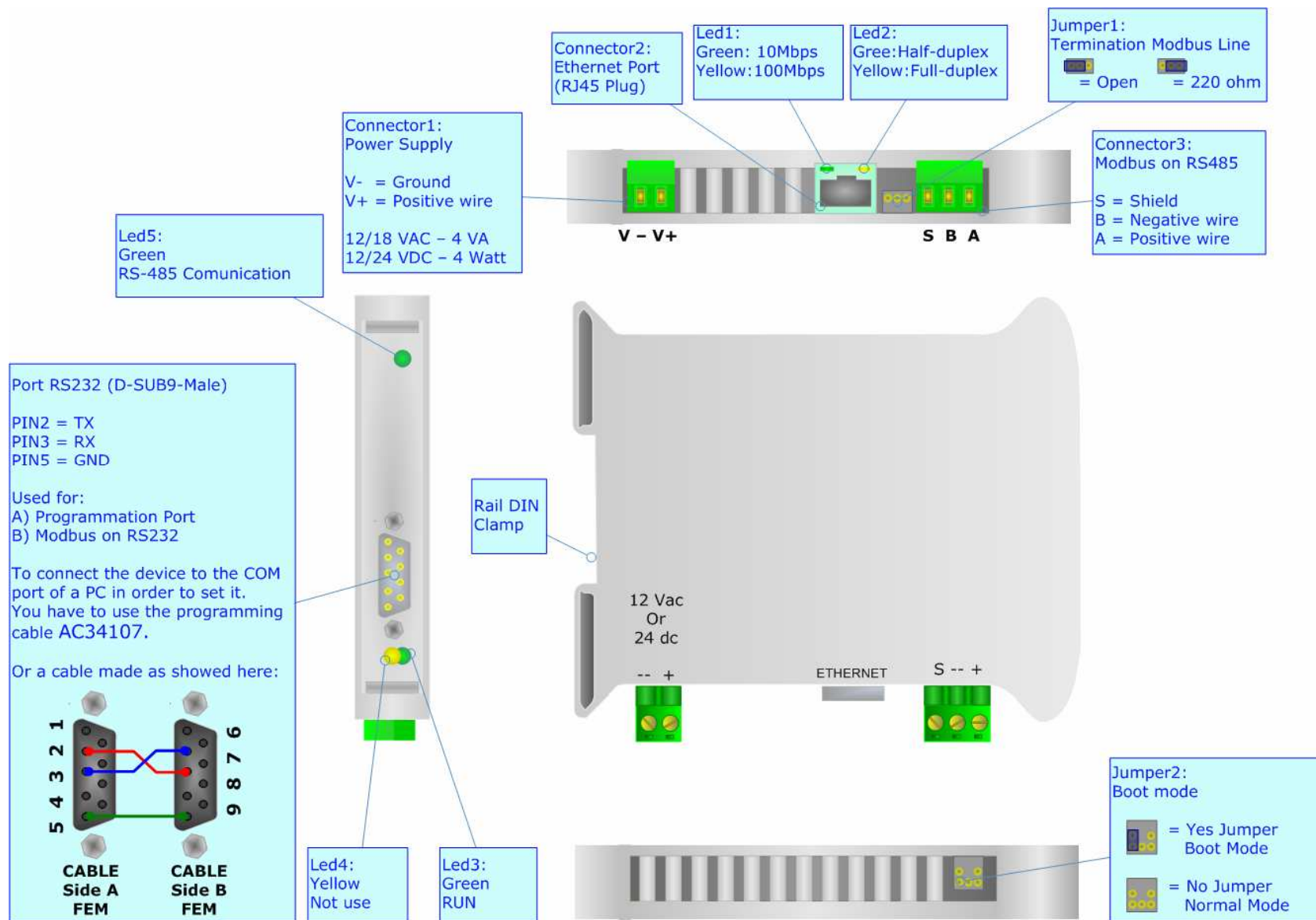


Figure 3: Connection Scheme for HD67007

### USE OF COMPOSITOR SOFTWARE SW67007:

The software allows the device parameters to be defined.

Launching the SW67007, the following window appears  
(The SW67007 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).

### The following explains the function of the buttons:

#### NEW PROJECT / OPEN PROJECT:

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

A device configuration can also be imported and exported:

- To clone the configurations of the Gateway in order to configure another Gateway 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 the project is created or an existent project is open, it will be possible to access the various configuration section of the software:

- **“General Parameter”**
- **“Translate Table”**

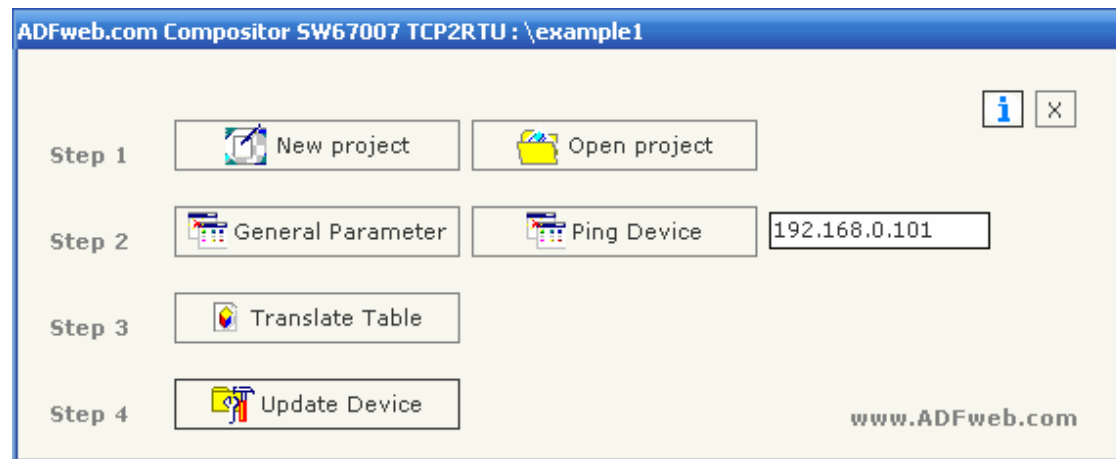


Figure 4: Main window for SW67007

### 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 SW67007 (Fig. 4) the window "General Parameter" appears (Fig. 5):

- The field "Operation Mode" defines the operation of the Gateway in Routing or NAT modes (see the next description);
- In the field "IP Address" insert the IP address that you want to give to slave Modbus TCP;
- In the field "Subnet Mask" insert the Subnet Mask;
- If the field "Enable Gateway" is checked, in the field under it is possible to insert the IP Address of the gateway used for going out to the net;
- In the field "Port" insert the number of port;
- 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;
- "System Data Offset" is the system variable offset.

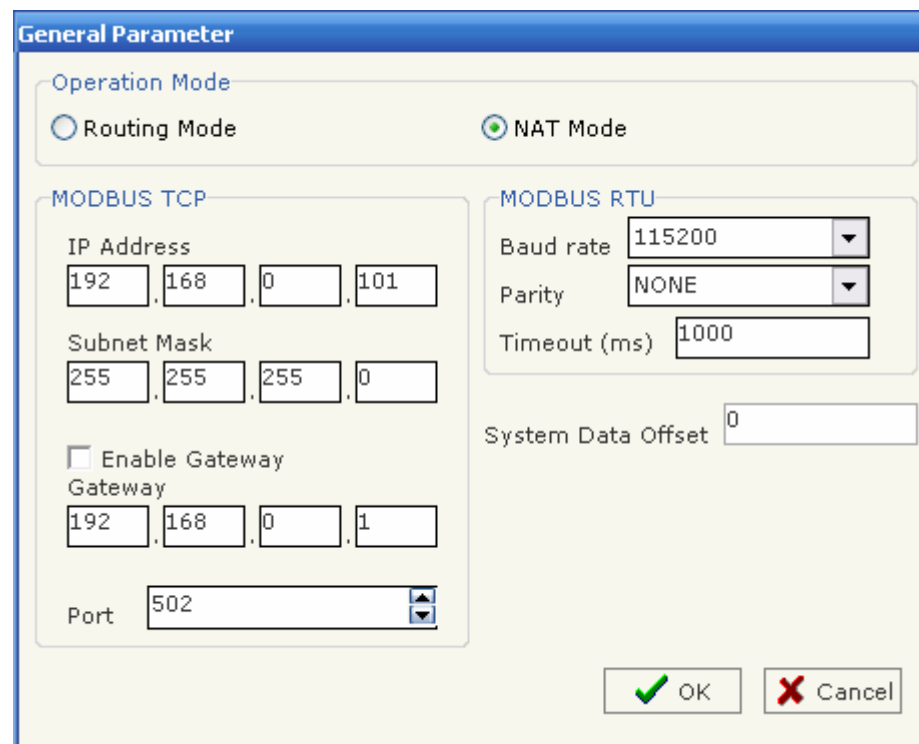


Figure 5: "General Parameter" window

### PING DEVICE:

If is necessary to do a Ping on the net, before pressing the "Ping Device" button insert a value in the right field 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 SW67007 (Fig. 4) the window "Set Translate Table" appears (Fig. 6).

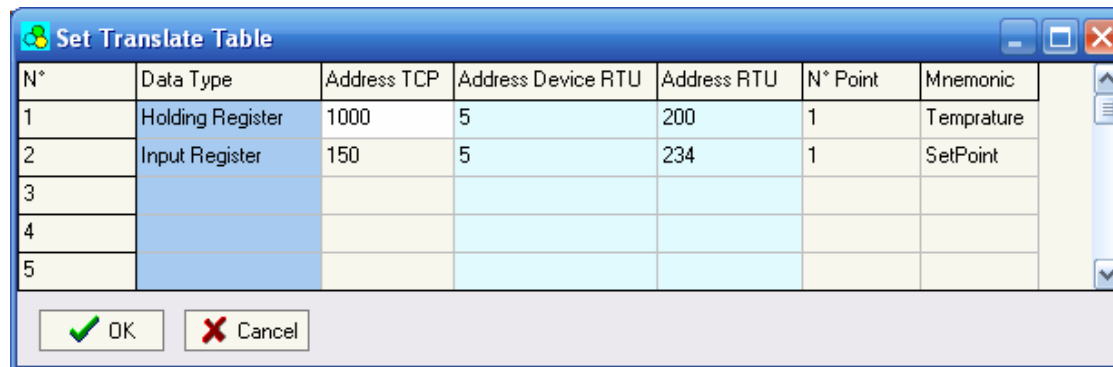


Figure 6: "Set Translate Table" window

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 in 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.

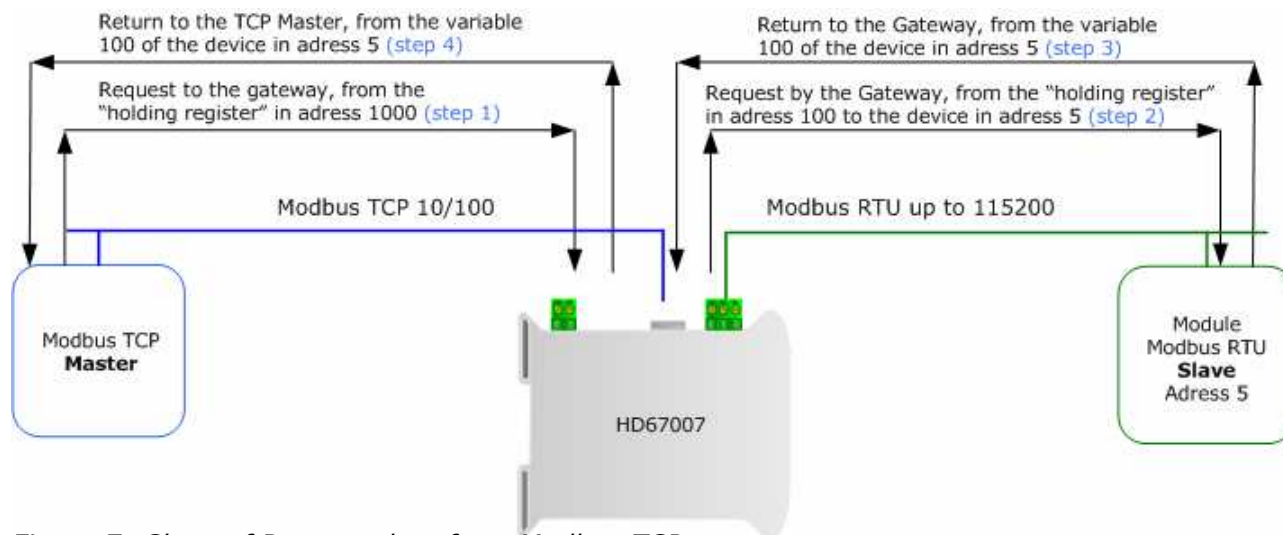


Figure 7: Chart of Request data from Modbus TCP

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 DEVICE:**

Section "Update Device":

Insert the boot jumper (see figure 3).

In order to load the parameters after they are set, set the Com port you used for update, then you must click the button "Execute update firmware" on the principal window.

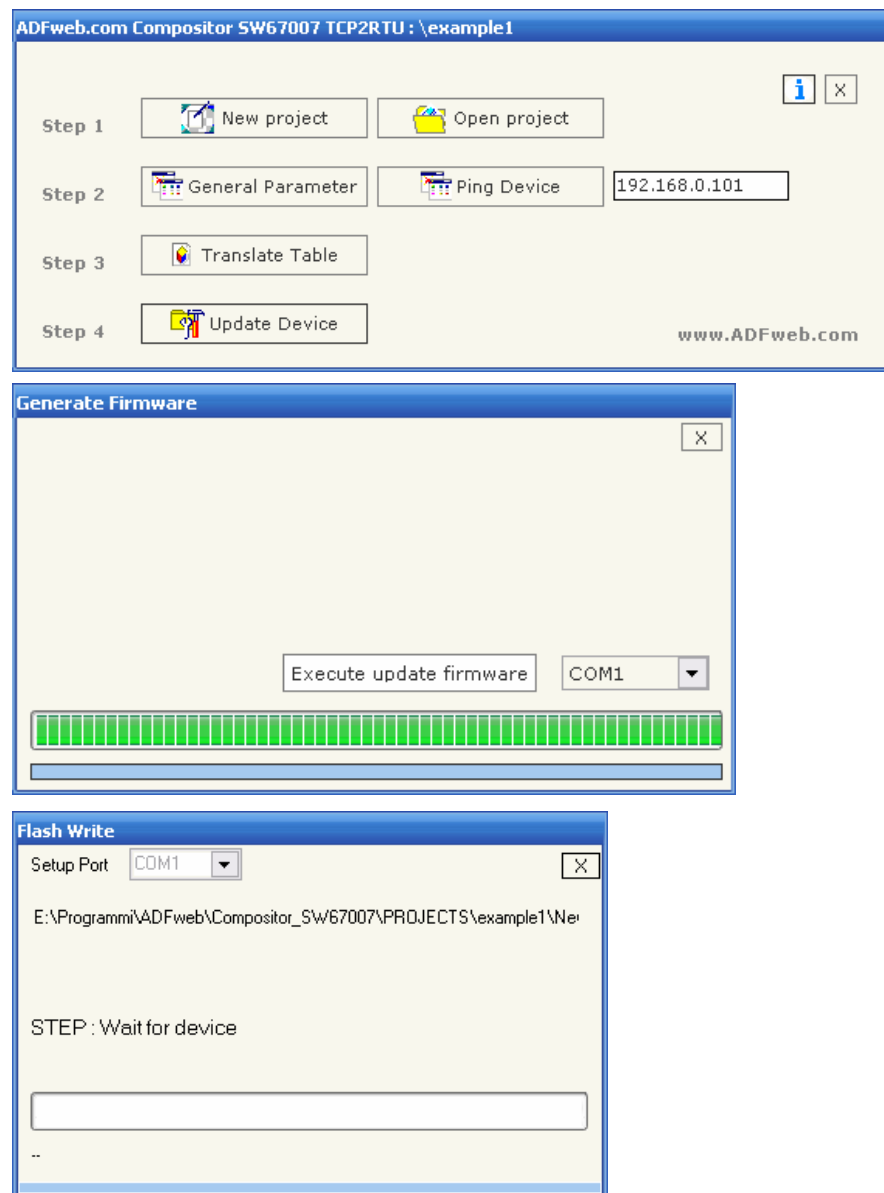


Figure 8: Update device procedure

**TABLE OF SYSTEM'S VARIABLE:**

Based on the address specified by the offset parameter, some system's variables are shown. They are readable from the TCP Modbus through the function 03, when specifying the appropriate address.

offsettab	descrizione	Read/write
0	Baud rate	R
1	Parity	R
2	Timeout	R
3		
4	Mode operation (0=routing 1=natting)	R
7	Counter RTU request	R
8	Counter RTU Correct response	R
10	Firmware version	R

The address corresponds to offset variable system + offsettab

**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:**

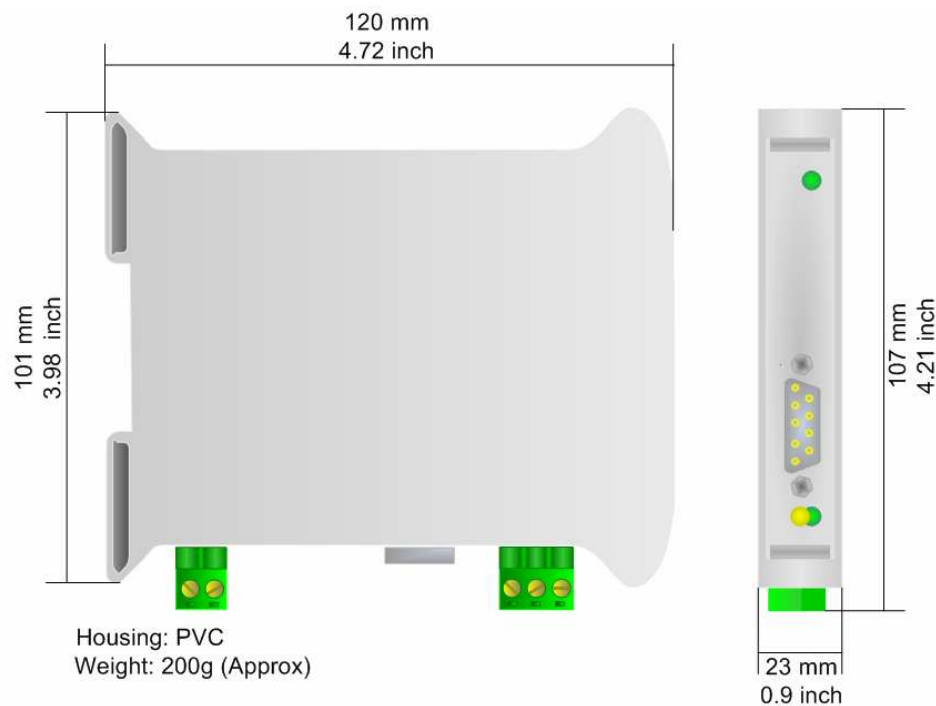


Figure 9: Mechanical dimensions scheme

**ORDER CODE:**

Order Code: **HD67007** - Gateway – Modbus TCP Server to Modbus RTU Master

**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](http://www.adfweb.com). Otherwise contact us at the address [support@adfweb.com](mailto: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](http://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	<a href="http://www.adfweb.com?Product=HD67118">www.adfweb.com?Product=HD67118</a>
HD67119	Converter USB 2.0 to RS485 Isolated	<a href="http://www.adfweb.com?Product=HD67119">www.adfweb.com?Product=HD67119</a>
HD67507	Gateway Modbus TCP Server to RTU Master	<a href="http://www.adfweb.com?Product=HD67507">www.adfweb.com?Product=HD67507</a>
HD67510	Gateway Modbus TCP Client to RTU Slave	<a href="http://www.adfweb.com?Product=HD67510">www.adfweb.com?Product=HD67510</a>