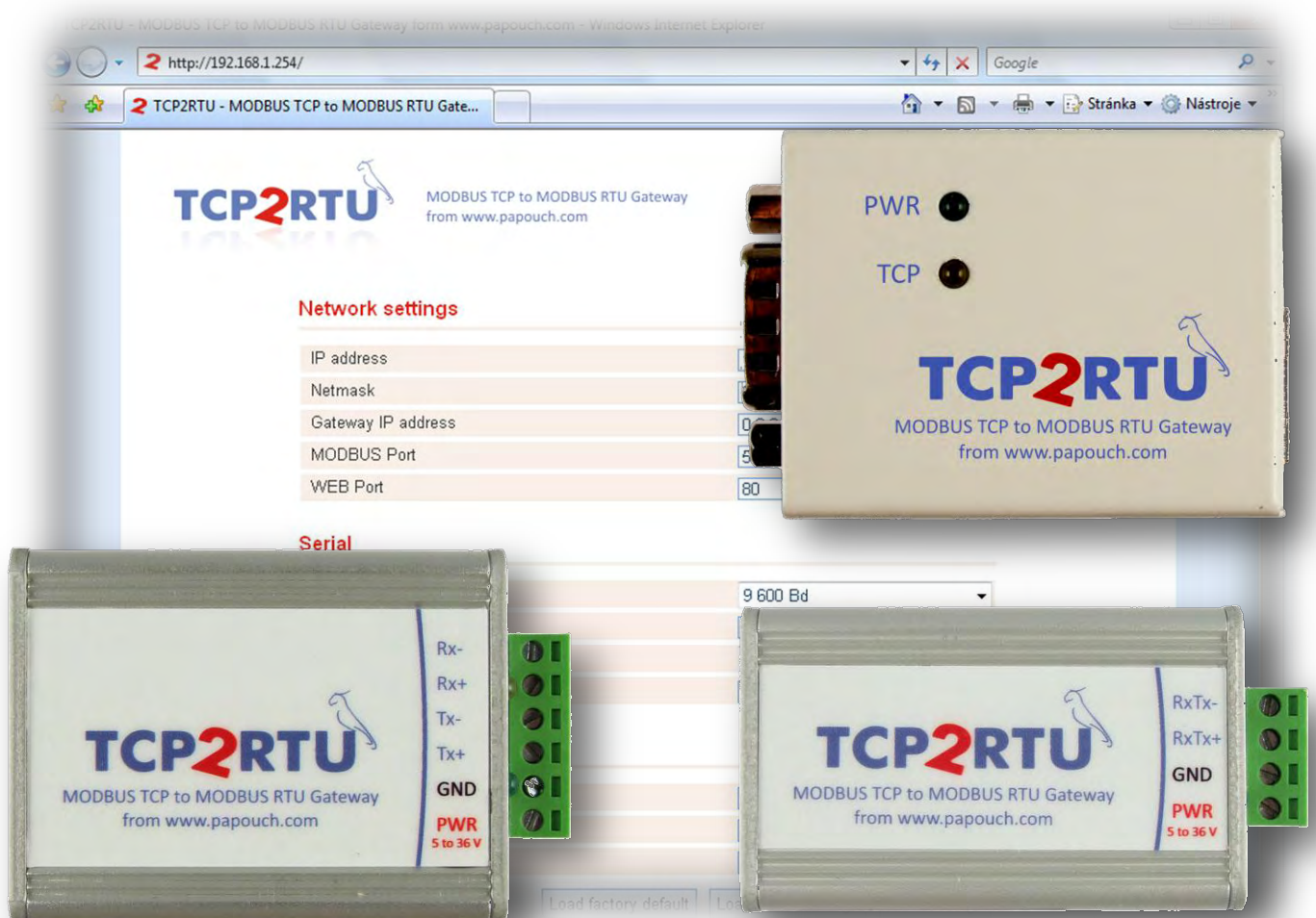




# TCP2RTU

MODBUS TCP to MODBUS RTU Gateway  
MODBUS RTU on RS232, RS485 or RS422



# TCP2RTU

## Datasheet

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## FIRST CONNECTION

1. Make all connections as described in chapter “Connection” on page 14.
2. If the initial IP address 192.168.1.254 does not comply with your computer network, you can change it using one of the methods described in chapter IP s Change on page 7.
3. Enter the address of TCP2RTU into your web browser. For the initial address it is <http://192.168.1.254/> .
4. The configuration WEB page in TCP2RTU opens up enabling you to change all the device parameters.

**DESCRIPTION**

TCP2RTU is a transparent converter of the MODBUS TCP protocol, running over Ethernet, into the MODBUS RTU protocol, running over RS232, RS485 and RS422 lines. TCP2RTU is suitable for systems where a device communicating via the MODBUS TCP protocol is the Master and devices using the MODBUS RTU protocol are of the Slave type.

TCP2RTU has been produced in three versions according to the type of the communication line for MODBUS RTU. Configuration can be made over the internal WEB interface.

The following picture shows an example of a system communication the MODBUS TCP and RTU protocols.

**MODBUS RTU (SLAVE)**



**MODBUS RTU (SLAVE)**

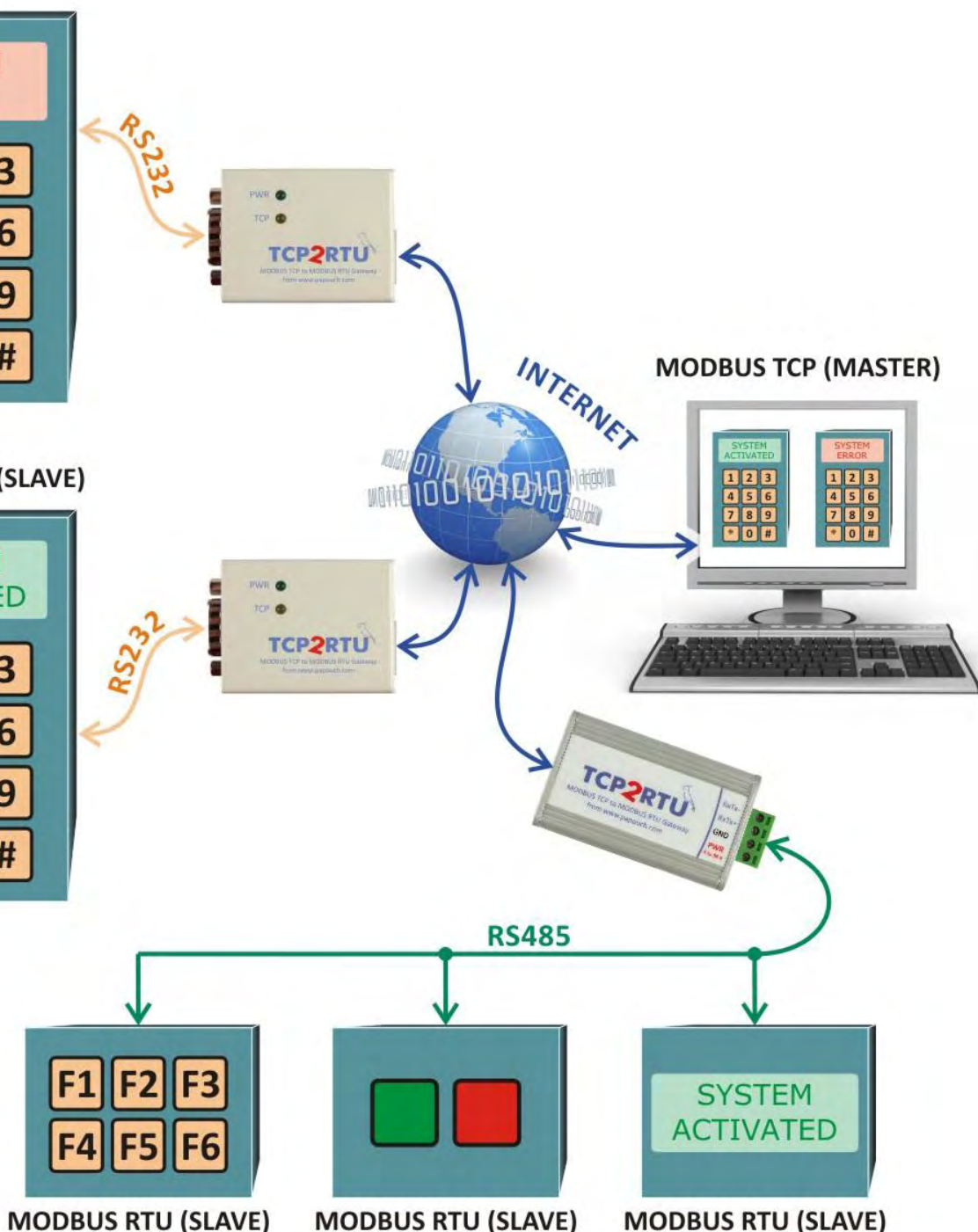


fig. 1 – example of a system communicating over TCP2RTU via MODBUS TCP and RTU protocols

## CONFIGURATION

TCP2RTU can be configured over the internal WEB page. The page is accessible on the device IP address (the default initial address is 192.168.1.254).<sup>1,2</sup>

The WEB page is protected by a “login” name and a password. No password has been set by the producer.

fig. 2 – WEB Interface example

It is possible to configure the following items:

### IP address

IP address of the device.

### Netmask

The mask of the network the device is connected to.

<sup>1</sup> If it is necessary to connect TCP2RTU to a network whose content is not compatible with the initial IP address, the IP address can be changed using the method described on page 5.

<sup>2</sup> The interface has been optimized for the minimum resolution of 1024x768 pixels and for the Windows Explorer 7.0 (former Internet Explorer) and Firefox 2.0 Internet browsers.

**Gateway IP address**

The IP address of the PC or router which ensures the communication between the local network and the wide area network.

**MODBUS Port**

The number of the port for MODBUS TCP.

**WEB Port**

The number of the port providing an access to the WEB interface.

**Baudrate**

The communication speed of the serial line. Options: 1200 Bd, 2400 Bd, 4800 Bd, 9600 Bd, 19 200Bd, 38 400 Bd, 57 600 Bd, 115 200 Bd.

**Parity**

The parity of the data word on the serial line. Options: none, even, odd.

**Old password**

If you wish to change your password, enter the previous password into this field.

**New password**

If you wish to change your password, enter a new password into this field.

**Retype new password**

If you wish to change your password, re-enter the new password into this field. (Protection against typing errors)

The items of *Data bits* and *Stopbits* cannot be configured – they are preset to the fixed values of 8 and 1.<sup>3</sup>

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<sup>3</sup> If you need a different number of data bits or stopbits, we will provide you with a device modified upon your request.

## IP ADDRESS CHANGE

The IP address can be changed by one of the following methods:

- over the WEB interface
- using a universal software<sup>4</sup>
- via the ARP protocol and Telnet

The WEB interface can be unavailable during the first connection if the initial IP address is not compatible with the network the TCP2RTU device is connected to. In this case, the IP address can be set using the Universal Software or via the ARP protocol and Telnet.

The setup via the ARP protocol and Telnet is described in the following chapter on page 7.

### Universal Software

This software can be used for the setup of basic network parameters. After running the software click on the “Set IP” button.

This command enables you allocate a new IP address to the device. After clicking the button, the window shown in Figure 3 displays. Enter the MAC address of the Battery monitor and click “Next”.

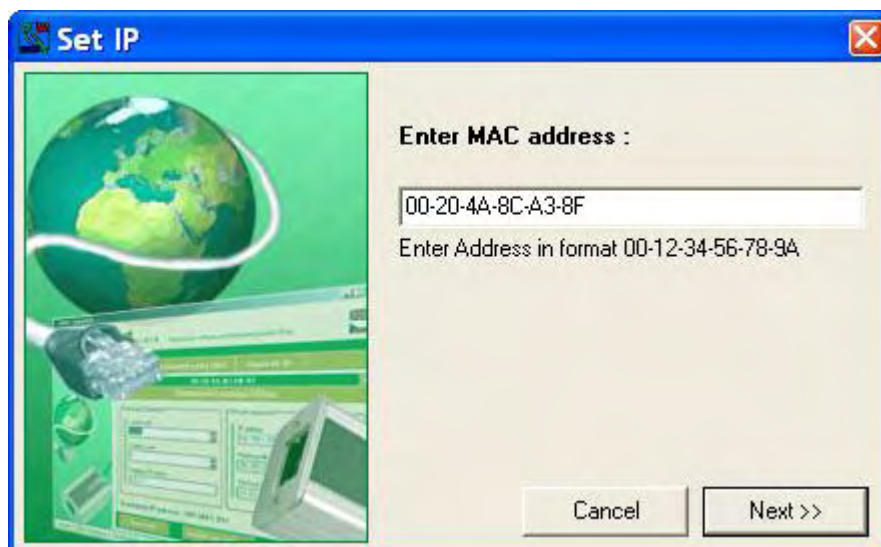


Fig. 3 – the first window of the guide for a new IP setup

Now the relevant MAC address is searched. If it is found, the window shown in Figure 5 displays. If it is not found, the warning shown in Figure 4 displays.



fig. 4 – the entered address has not been found

<sup>4</sup> This software can be downloaded from [www.papouch.com/en](http://www.papouch.com/en).

Choose “**Abort**” here, which will enable you to continue with the guide even though the MAC address has not been found.

Enter all parameters complying with your network into the window shown in Figure 5. If you are not sure which values need to be filled in, contact your network administrator, who will allocate you the required values. The parameters will be changed by clicking the “Set up” button.

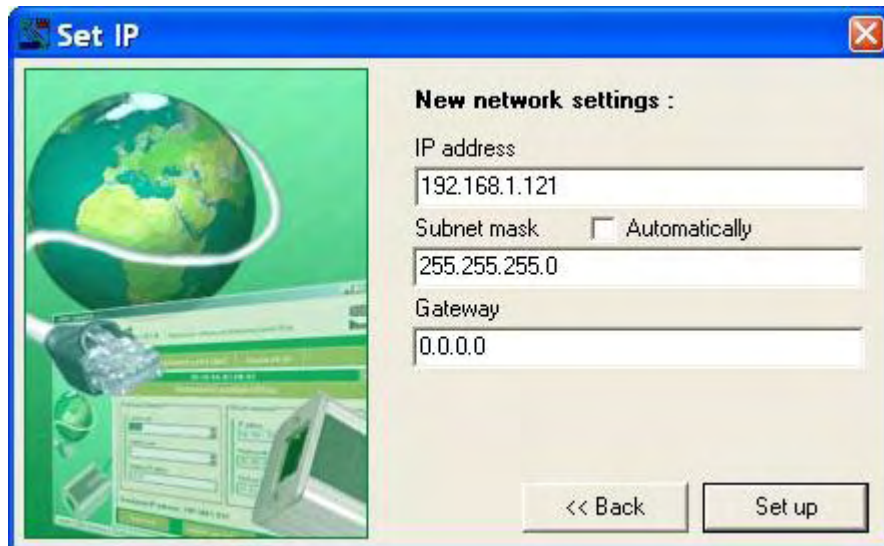


Fig. 5 – IP setup guide > setting of IP, mask and gateway

If the MAC address has not been found in the network, the dialogue shown in Figure 6 displays.

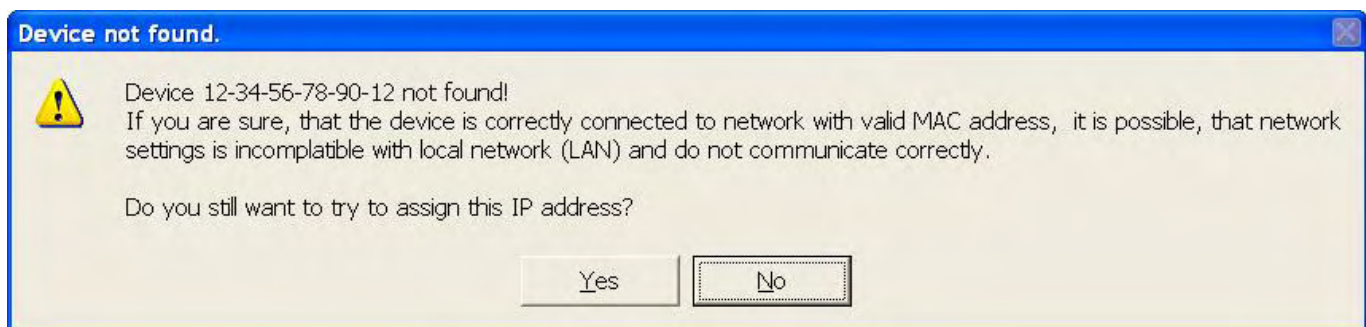


fig. 6 – MAC address has not been found

If you are sure the device is property connected to the network and the MAC address has been entered correctly, click “Yes”. The program will try to send a command for network parameters reconfiguration to the entered MAC address. A window informing the user whether the setting has been made successfully or not, will appear in a little while.

If yes, the network parameters are now set as required and it is possible to make a connection via the WEB browser.

## BASIC SETUP VIA TELNET

### Connection

#### IP address is not known

- 1) Open the window of the cmd. command (In OS Windows choose Start/Run, enter `cmd` into the provided line and press Enter.)
- 2) Make the following entry into the ARP chart:
  - a. Enter `arp -d` and confirm by Enter. This will delete the current ARP table.
  - b. Use the following command to allocate an IP address to the module MAC address:  
`arp -s [new_ip_address] [MAC_address_TCP2RTU]`  
example: `arp -s 192.168.1.254 00-20-4a-80-65-6e`
- 3) Now open Telnet. (By typing in `telnet` and pressing Enter.<sup>5</sup>)
- 4) Type `open [new_ip_address] 1` and confirm.
- 5) The terminal will display an error message informing the user that no connection has been established. Still it is necessary to carry out the aforesaid in order to enable the module to enter the required IP address into the ARP table.
- 6) Connect to the module IP address. (Enter `open [IP address in the dotted format] 9999` and press Enter.)
- 7) So far you only managed to enter the module configuration. The IP address has not been set yet. It must be set using the relevant item in the Server Configuration > IP Address menu. If the configuration is closed without saving the setup and IP address configuration, it is necessary to repeat the whole process!
- 8) If the IP address is valid, the device will display introductory information ending with the following text:  

**Press Enter for Setup Mode**

Now it is necessary to press Enter within three seconds, otherwise the configuration will be closed.
- 9) The device will display its complete setup.
- 10) At the end of the list there is a section called "Change setup:" providing a list of parameter groups which can be set. Changes to network parameters can be made through the "Server" section.

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<sup>5</sup> In OS Windows Vista, the client for Telnet is not a standard part of the system. Install it using the following procedure:

- a) Open the "Control Panels/Programs and Features" menu.
- b) On the left, click "Enable or disable features of Windows system " (this option requires the administrator to log in).
- c) The "Features of Windows system" window displays. Here tick the "Telnet service Client" field and click Ok. The client for Telnet will be installed.

## IP address is known

- 1) In OS Windows choose Start/Run, enter `telnet` in the provided line and press Enter.<sup>5</sup>
- 2) Connect to the module IP address. (Enter `open [IP address in the dotted format] 9999` and press Enter.)
- 3) If the IP address is valid, the device will display introductory information ending with the following text:
 

```
Press Enter for Setup Mode
```

Now it is necessary to press Enter within three seconds, otherwise the configuration will be closed.
- 4) The device will display its complete setup.
- 5) At the end of the list there is a section called "Change setup:" providing a list of parameter groups which can be set. Changes to network parameters can be made through the "Server" section.

## Main Menu

Individual menu items can be chosen using the numbers written in front of them. Choose the required number and press Enter.

The menu structure is as follows:

```
Change Setup:
  0 Server
  ...
  7 Defaults
  8 Exit without save
  9 Save and exit          Your choice ?
```

## Server

Basic Ethernet setups.

The following items can be found in this part:

```
IP Address : (192) . (168) . (001) . (122)
Set Gateway IP Address (N) ?
Netmask: Number of Bits for Host Part (0=default) (16)
Change telnet config password (N) ?
```

### IP Address

IP address of the module. The numbers of the IP address shall be entered individually and separated by Enter.

Default value: 192.168.1.254

### Set Gateway IP Address

#### Gateway IP address

In the "Set Gateway IP Address" item enter "Y" to change the Gateway IP address. The system then invites you to change the Gateway IP address. The numbers of the IP address shall be entered individually and separated by Enter.

**Netmask**

Here you can set the number of bits of the IP address constituting the network part.

The Netmask is set as a number of bits determining the range of possible local network IP addresses. For example, if the value 2 is entered, the Netmask has the following structure 255.255.255.252. The entered value specifies the number of bits from the right. The maximum is 32.

Default value: 8

Example:

The mask 255.255.255.0 (binary 11111111 11111111 11111111 00000000) corresponds to number 8.

The mask 255.255.255.252 (binary 11111111 11111111 11111111 11111100) corresponds to number 2.

**Change telnet config password****Enter new Password**

This item can be used to set a new password which is required before any configuration is made via telnet or WEB interface.

In item "Change telnet config password" enter "Y" to change the password. The system then invites you to change the password.

**Factory Defaults**

By pressing number 7 the device restores the default setting.

Default setting means that the IP address is set to 192.168.1.254, all passwords are cancelled, names and parameters are deleted.

**Exit without save**

Closing the setting mode without saving the changed parameters.

**Save and exit**

This option saves the changes. If any parameter has been changed, the device is then restarted. The restart takes several tens of seconds.

**TECHNICAL PARAMETERS****Ethernet:**

Ethernet connection .....	RJ45 Ethernet 10/100BASE-T
Interface compatibility .....	Ethernet version 2.0/IEEE 802.3
Initial IP address .....	192.168.1.254
Initial netmask .....	255.255.255.0
Login name .....	<i>login</i>
Login password .....	4 characters max, disabled by default

**Serial line**

Communication speed [Bd] .....	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Default communication speed .....	9600 Bd
Number of data bits .....	8
Parity .....	none, even, odd
Number of stopbits .....	1

**Version with RS232:**

Connector .....	CAN 9 M (CAN 9 F upon request)
Used signals .....	RXD, TXD, DTR, GND (in memory positions see RS232)
Weight .....	85 g
Degree of protection .....	IP30
Operating temperature .....	-25 to +75 °C
Dimensions .....	57 mm x 25 mm x 42 mm

**Version with RS485:**

Connector .....	terminal unit
Used signals .....	RxTx+ (A), RxTx- (B)
Weight .....	60 g
Degree of protection .....	IP30
Operating temperature .....	-25 to +75 °C
Dimensions .....	54 (63) mm x 24 mm x 33 mm

**Version with RS422:**

Connector .....	terminal unit
Used signals .....	Tx+, Tx-, Rx+, Rx-
Weight .....	70 g
Degree of protection .....	IP30

Operating temperature.....-25 to +75 °C

Dimensions (incl. the clamp).....54 (63) mm x 24 mm x 41 mm

### Power supply:

Supply voltage .....5 to 36 V

Current consumption – at 12 V .....normally 80 mA

### Available versions

#### Communication line over MODBUS RTU:

- RS485
- RS422
- RS232

#### Mounting:

- Without a holder (*standard version*)
- With a DIN 35 mm rail mount

#### Connector for RS232 version:

- D-SUB 9M (*standard version*)

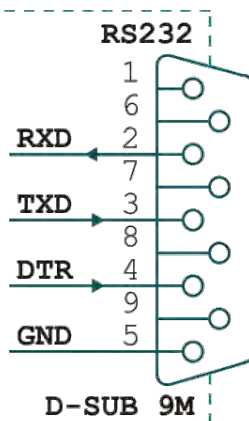


fig. 7 – D-SUB 9M connection (plug)

- D-SUB 9F for direct connection to a PC

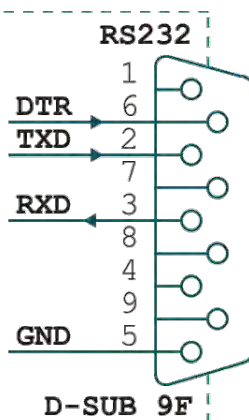


fig. 8 – D-SUB 9F connection (socket)

If you have any other specific requirements concerning the design and functionality of the TCP2RTU module, do not hesitate to contact us.

## CONNECTION

### Version with RS232



Fig. 9 – RS232 Connector

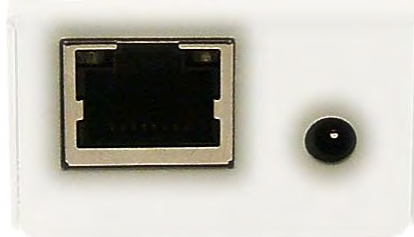


Fig. 10 – Ethernet and power supply connectors



Fig. 11

The **Ethernet** interface is connected via the RJ45 connector by a standard (no-patch) cable to the HUB or Switch. The Ethernet connects directly to a PC via a patch cable.

The **power supply** connector is a coaxial connector 3,8 x 1,3 mm. The positive terminal (+) is inside.

**RS232** connects via the CAN 9 connector – F version as a standard (plug; see Figure 9). It is possible to order the M version (socket). (RS232 connection is shown on the previous page.)

### Version with RS485

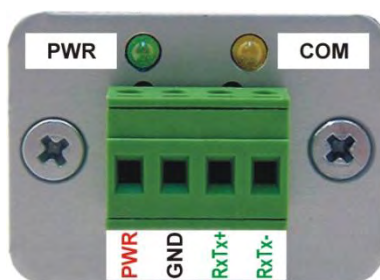


Fig. 12 – Supply and RS485 connectors

The **Ethernet** interface is connected via the RJ45 connector by a standard (no-patch) cable to the HUB or Switch.

On the side you can find clamps for power supply (PWR +; GND) and RS485 communication line (RxTx+; RxTx-) connection, illustrated in Figure 12.

### Version with RS422

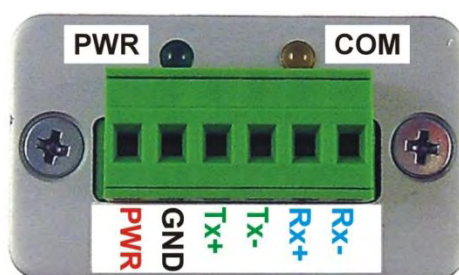


Fig. 13 – Supply and RS422 connectors

The **Ethernet** interface is connected via the RJ45 connector by a standard (no-patch) cable to the HUB or Switch.

On the side you can find clamps for **power supply** (PWR; GND) and **RS422** communication line (Tx+; Tx-, Rx+; Rx-) connection, illustrated in Figure 13.

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**Connection – related products**

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Besides converters, it is possible to order the following additional products:

- Switching 12V source (intermediate adaptor).
- 12V source (for DIN rail).
- TP cable for Ethernet connection.
- *For version with RS232:* 2 m cable terminated with a coaxial connector 3.8 x 1.3 mm. On the other end there are only loose conductors for power supply connection.

**INDICATIONS****Green LED (PWR)**

Supply voltage connection indication.

**Yellow LED (TCP)**

On when a connection is made on the data port.

**Link LED**

(Left LED on the Ethernet connector)

Not on ..... not connected

Yellow ..... connected at the speed of 10Mbps

Green..... connected at the speed of 100Mbps

**Connection type LED**

(Right LED on the Ethernet connector)

Not on ..... no communication running

Yellow ..... Half-Duplex communication

Green..... Full-Duplex communication

**RESET SWITCH**

Below the Ethernet connector is a small hole for reset button. This can be activated with a pencil or any pointed object.

Resetting the device by this button causes:

- all parameters set to default values
- IP address 192.168.1.254
- all passwords cancelled

How to reset the device:

- 1) Turn the device off
- 2) Push and hold the button below the Ethernet connector
- 3) Turn the device on - the yellow indicator lights up
- 4) Wait for app. 5 seconds until the yellow indicator blinks
- 5) Release the button
- 6) Resetting finished

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