



Ethernet to RS485 converter **GNOME485**

Easy to use

Security features

Virtual serial port



GNOME485

Brief Datasheet

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Papouch s.r.o.

Address:

**Strasnicka 3164/1a
102 00 Praha 10
Czech Republic**

Telefon:

**+420 267 314 267-8
+420 602 379 954**

Fax:

+420 267 314 269

Internet:

www.papouch.com

E-mail:

info@papouch.com



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BASIC INFORMATION

Description

GNOME485 is a simple and inexpensive converter between a 10/100 Ethernet interface and an RS485 line. It enables users to simply connect devices with the RS485 interface to an Ethernet line or to extend a serial line to the other end of the world via the Internet. This solution includes a "virtual serial port" – software that creates a new serial port in the Windows operating system, and this port is directed to the GNOME485 module via the Ethernet interface. Configuration with the aid of intuitive control software is easy.

Applications

- A remote RS485 line as another COM port in your Windows system
- Connection to the Ethernet environment of devices communicating via an RS485 line
- Extension of an RS485 serial line via Ethernet
- Virtual port – controlling the remote line with the aid of its original software
- Internet communication with remote devices
- Connection of two RS485 lines via Ethernet

Features

- Converting a serial line to Ethernet
- Connecting via an RJ45 connector to a 10/100Base-T Ethernet network
- Miniature dimensions – easy to integrate into the existing devices
- Easy configuration using the included software
- Configuration with the aid of Windows software, Telnet Protocol, or a WEB interface
- TCP and UDP protocols
- The RS485 line is connected to a plug connector
- Transmission speed from 300 Bd to 460 kBd
- Signals used: RxTx+, RxTx- (A, B)
- Power supply: 5 to 36 V
- Indication of power supply, data transmission, network connection and activity
- Dimensions 54 × 24 × 33 mm

Types of communication

The GNOME485 converter uses two ports for communication: data and setup. The data port (for the standard data transmission) is optional and its standard setting is 10001. The setup port is 9999.

TCP server/client

Upon switching on, the GNOME485 module expects data from the serial line and also connection request from the Ethernet interface.

If the data comes from the serial line, the TCP client mode is activated (cf. below). If a connection request comes, the module is switched over to the TCP sever mode (cf. below).

The module may remain in the activated mode, or – after a time lag – cancel the mode and wait for data from the serial line or Ethernet interface.

TCP server

Upon switching on, the GNOME485 module listens on the slected port and waits for the client connection.

As soon as a client is connected, data from the Ethernet is immediately sent to the serial line and vice versa. If the client is not connected and data from the serial line is coming, it is stored in a cache and sent immediately upon the client connecting to the server.

If the client is silent or terminates the connection incorrectly, GNOME485 terminates its connection after a preset time lag.

TCP client

When idle, the GNOME485 module waits for data from the serial line. As soon as data is received, the GNOME485 module tries to connect to the server at a given IP address. If the connection cannot be established, the data is stored in a cache memory. Upon establishing the connection, the data is sent out and data from Ethernet is transmitted to the RS485 serial line.

UDP

The Ethernet data is expected on a preset port. When data comes from the RS485 serial line, it is sent to the preset IP address. Within a UDP transmission, response of the opposite side is not tested; the application should be independently protected from a data loss.

Technical Parameters

Connection to Ethernet.....	TBase 10/100 RJ45
RS485 connector.....	slip-on terminal
RS485 signals used.....	RxTx+, RxTx-
Cache memory	2 kB for transmission, 2 kB for receipt
Power supply voltage	5 to 36 V
Current consumption – at 12 V	typically 80 mA
Weight	60 g

Installing options

Communication encrypting:

- No encrypting (*standard version*)
- 128-bit encrypting, Rijndael algorithm

Please do not hesitate to contact us if you have specific requirements for the GNOME485 module's workmanship and functionality.

Connection of module

The GNOME485 module is equipped with two connectors. The Ethernet interface is connected to the front RJ45 connector. It goes via a standard (uncrossed) cable to a HUB or Switch.

On the rear side of the module is situated 4-pole slip-on terminal for power supply (PWR+; GND) and RS485 (RxTx+; RxTx-). The connection shows Fig. 1.

The following optional accessories of the converter can be ordered:

- Power supply (230 V adaptor).
- A cable length of 2 m with a 3.8 × 1.3 mm connector on one end. Free wires for connection to a power source are provided on the other end of the cable length.

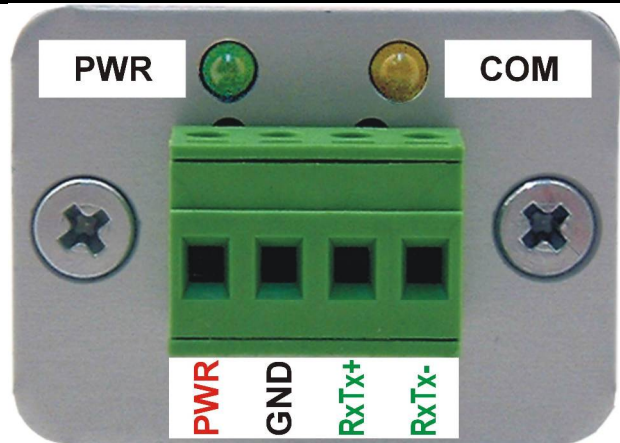


Fig. 1 – RS485 and power supply connector

Indicators

ON indicator

Green. Left LED in Fig. 1.
Function: Indicator of power supply voltage.

COM indicator

Yellow. Right LED in Fig. 1.
Function: It is on when connection is established.

Indicators on the Ethernet connector

Link LED (Left Side)		Activity LED (Right Side)	
Color	Meaning	Color	Meaning
Off	No Link	Off	No Activity
Yellow	10 Mbps	Yellow	Half-Duplex
Green	100 Mbps	Green	Full-Duplex

BASIC NETWORK INFORMATION

IP address

Within a network, GNOME485 must have the following settings: subnet mask, gateway IP address, and the unique IP address. The subnet mask is set as 255.255.255.0¹ by the manufacturer; and the IP address as 192.168.1.254.

Default IP address: **192 . 168 . 1 . 254**

Default gateway IP address: **0 . 0 . 0 . 0**

Default subnet mask: **255 . 255 . 255 . 0**

If you change any of these IP settings, we recommend you to put down the new values:

IP address: _____ . _____ . _____ . _____

Gateway IP address: _____ . _____ . _____ . _____

Subnet mask: _____ . _____ . _____ . _____

MAC address

The unique address shown on the GNOME485 module's label (on the bottom or side). It is a unique address of the module. It consists of six hexadecimal numbers separated with dashes – in a format such as 00-20-4A-xx-xx-xx (where xx are the unique numbers shown on the label).

MAC address: **00-20-4A-** _____ - _____ - _____

¹ This subnet mask is also referred to as a "type C" mask..

HOW TO EASILY SET UP YOUR GNOME485

This chapter gives examples of quick and easy setup of the GNOME485 converter for typical examples of use. Select the example that is the closest to your application. (The examples are given for the basic setting of the converter.)

An Ethernet – RS485 converter (basic setting)

This setting is meant for equipment which requires permanent connection to RS485.

- 1) Connect the converter to your network and ask your network administrator for the basic network parameters to be assigned to the converter (cf. the preceding page: the IP address, gateway IP address, and the subnet mask).
- 2) Activate the supplied configuration program² and click on "IP setting." A wizard is thus opened, in which you first enter the MAC address of the converter (written on the label on the module's side) and then the basic network parameters. (Cf. the description of this wizard under the heading "Set the IP settings" on page 12, and also Fig. 6 and Fig. 7.)
- 3) The GNOME485 module is now set as an Ethernet/RS485 converter with the selected IP address and the following parameters of the serial line: speed 9,600 Bd, 8 data bits, parity – none, and one stop-bit. If you need to change the parameters of the serial line, click on the "Data channel setting" in the main window of the program; at the top central area there is a frame with the serial line parameters (cf. Fig. 2).

The image shows a window titled "Serial line settings" with a light yellow background. It contains five vertically stacked dropdown menus, each with a label and a value:

- Line speed: 9600
- Character size: 8 bits
- Parity: None
- Stop bit: 1
- Response: No answer

Fig. 2 – serial line parameters

- 4) Save the changed settings in the converter by clicking on the "Settings" button in the bottom area of the window. The GNOME485 module is thus set as an Ethernet/RS485 converter. This setting is suitable for the basic function of the converter, without additional options for data flow control, timing, or packet creation.

² The program can be downloaded, at any time and free of charge, at www.papouch.com/en/products.asp?dir=ethernet.

Connecting an RS485 device via Ethernet to a "local" COM port

Extension of an RS485 serial line via Ethernet

The following setting is suitable for equipment which requires permanent connection to RS485.

- 1) Connect GNOME485 to an Ethernet network.
- 2) Install the "Virtual Serial Port"³
- 3) Connect your RS485 device to the module's serial line GNOME485.
- 4) On a computer connected to an Ethernet network (which must be interconnected with the network in which the GNOME485 module is connected), activate the application which communicates with your device on the RS485 line, and select from the ports' list the COM port set by the Virtual Serial Port..
- 5) The program now works as if via the RS485 line, which is in fact connected via the GNOME485 module and an Ethernet interface.

³ A detailed description of the installation is [here](#) .

METHODS OF SETTING THE PARAMETERS

- 1) Windows configuration software (via Ethernet)
- 2) Using a Web browser (via Ethernet)⁴

CONFIGURATION SOFTWARE

The configuration software can be used for easy settings of the converter parameters. The main window of the program is shown in Fig. 3. (By clicking on the flag icons in the top right corner you can switch between Czech and English.)



Fig. 3 – main window of configuration program

If you need to configure the converter after the first connection in your network, we recommend you to follow the instructions given under the heading "Set the IP" on page 12.

⁴ The GNOME provide its own WEB pages. It could be browsed by entering the Gnome's IP address to address field of your Internet browser. The Internet browser has to have installed a plug-in for Java applet support.

Search by IP address

This command enables you to find the GNOME485 module in the network according to its IP address. When you click on this button, the window shown in Fig. 4 is displayed. Write the IP address in the line and push "OK."



Fig. 4 – entering the IP address to look for

If the converter can be found at the given IP address, its settings are displayed in the settings window.

Not found?

- 1) Check whether the converter is connected and is active (indicators on its Ethernet connector are on or flashing).
- 2) Check the correct IP address (it is set to 192.168.1.254 by the manufacturer).
- 3) The converter's IP address may not be compatible with your network. Change the IP address using the "Set the IP" command (page 12).

I don't know the converter's IP address

Search the GNOME485 by MAC address (written on the label on the modules' side) using the "Find by MAC" command (page 12) or assign to your converter an IP address suitable for your network. You can set the IP address using the "Set the IP" procedure (page 12).

Search by MAC address

You can use this command if you need to find the converter according to its unique MAC address (it is written on the label on the module's side). When you click on this button, the window shown in Fig. 5 is displayed. Write the MAC address⁵ and push "OK."

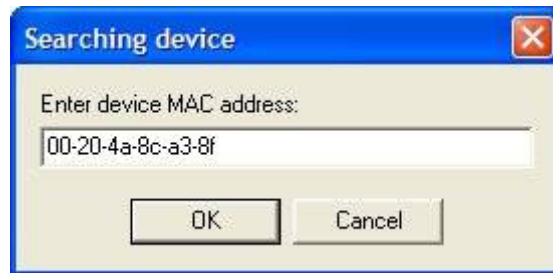


Fig. 5 – entering the MAC address to look for

If the converter with the given address can be found, its settings are displayed in the settings window.

Not found?

- 1) Check whether the converter is connected and is active (indicators on its Ethernet connector are on or flashing).
- 2) Check the correct MAC address on the label placed on the converter.
- 3) The converter's IP address may not be compatible with your network. Change the IP address using the "Set the IP" command (page 12).

Set the IP address

Using this command, you can assign a new IP address to the converter. This procedure is specifically suitable for connecting converters in production, because the basic parameters can be adapted for a new network. When you click on this button, the window shown in Fig. 6 is displayed. Write the MAC address to look for⁵ and push "OK."

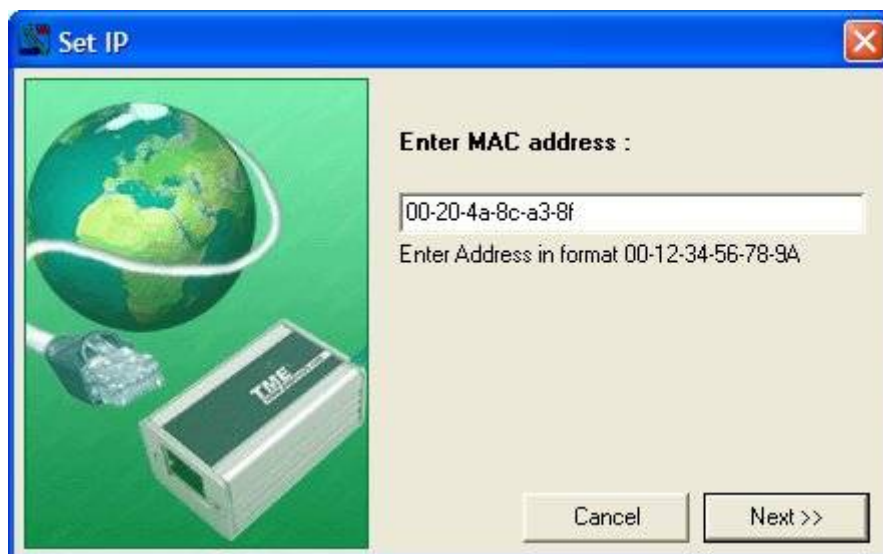


Fig. 6 – the first screen of the new IP setting wizard

⁵ The address is written on the label placed on the converter. It can be entered in the format AB-CD-EF-GH-IJ-KL or ABCDEFGHIJKL. It is not case sensitive (you can enter lower-case or capital letters).

The entered MAC address is looked for. When it is found, the screen shown in Fig. 7 is displayed.

Set parameters suitable for your network in the screen shown in Fig. 7. If you are not sure what parameters you should choose, contact your network administration, who will give you the required data.

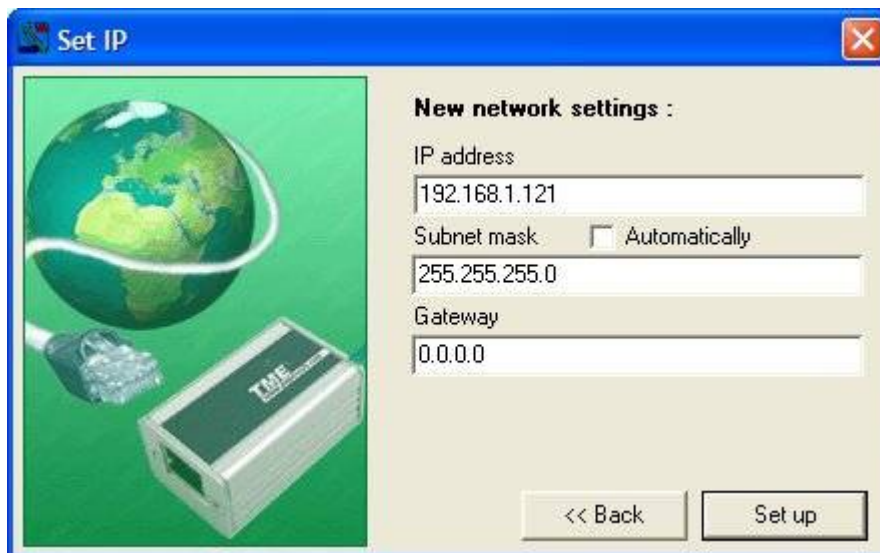


Fig. 7 – IP settings wizard > setting the IP address, subnet mask and gateway

The parameters are changed upon clicking on "Set up".

The module is now set as an Ethernet/RS485 converter, with the IP address, subnet mask and gateway you chose, and the other parameters set by the manufacturer. No more settings are necessary for the basic functions of an Ethernet/RS485 converter⁶.

A small window will be displayed, asking if you wish to "set the device." If you click "Yes," the program activates the procedure for setting additional parameters of the converter. The "Data channel settings" section of the main window will be displayed (cf. chapter "Data channel settings" on page 14).

⁶ Within the initial setting, the RS485 line of the converter has the following parameters: speed: 9,600 Bd, number of bits: 8, parity: none, number of stop-bits: 1.

Data channel settings

When you click on the "data channel settings" tab after connecting the converter, the setting window (Fig. 8) is displayed.

Fig. 8 – Data channel settings

Local port

Data channel options > Ethernet settings > Local port

Default value: 10001

Recommended references: Fig. 8

Number of the port on which the converter expects connection from Ethernet.

This item is only meaningful if the "Incoming connection" option (cf. page 15) is set to "Allowed" (the so-called TCP Server mode).

Remote port

Data channel options > Ethernet settings > Remote port

Default value: 0

Recommended references: Fig. 8

The remote port to which the converter is connected (for the TCP Client mode).

Remote IP address

Data channel options > Ethernet settings > Remote IP address

Default value: 0.0.0.0

Recommended references: Fig. 8; "Types of communication" (page 5)

The IP address to which the converter is connected (for the TCP Client mode).

UDP Datagram mode

Data channel options > Ethernet settings > UDP Datagram mode

Default value: False (not checked)

Recommended references: Fig. 8; "Types of communication" (page 5)

By checking this field you will activate the UDP mode.

Incoming connection

Data channel options > Ethernet settings > Incoming connection

Default value: Allowed

Recommended references: Fig. 8; "Types of communication" (page 5)

This setting determines the converter's response to connection coming from Ethernet.

Allowed:

The converter will always accept a connection request coming from Ethernet.

Forbidden:

The converter will ignore all connection requests coming from Ethernet.

Active connection start-up

Data channel options > Ethernet settings > Active connection start-up

Default value: Forbidden

Recommended references: Fig. 8; "Types of communication" (page 5)

This setting determines whether the converter will establish connection to Ethernet upon occurrence of different events. If established, the connection will be with the "Remote IP address" and the "Remote port."

Disabled:

The converter will never establish connection automatically.

Establish connection after any character on serial line:

The converter will establish the connection if any character comes from the serial line.

Establish connection after CR character is received:

The converter will establish the connection if the CR character is received (carriage return; Enter; Decimal: 13; Hexadecimal: 10) from the serial line.

Manual setting (C + address):

The converter will try to establish the connection if it receives from the serial line a command in the following format: C[IP address]/[port]

Example of a command received from the RS485 serial line to establish connection with IP 192.168.1.105, port 4567: C192.168.1.105/4567

If the subnet mask restricts the range of the network's IP addresses, for example to 8 bits (the "C type" mask – 255.255.255.0), the command can have an abridged format as follows:
C105/4567

Autostart outbound connection:

The converter will establish the connection immediately upon activation.

Modem mode:

This option activates modem emulation by the GNOME485 module. All communication is then controlled by AT commands from the serial line. The following item, "Module actions within the Modem mode", is directly related to this mode.

Function with MODEM MODE option

Data channel options > Ethernet settings > Function with MODEM MODE option

Default value: Echo off

Recommended references: Fig. 8; "Modem mode:" (page 16)

(This item is only available if the "Modem mode" is activated as the "Active connection start-up" option. Cf. the heading above.)

This setting specifies the converter's actions within the modem emulation mode.

Without echo:

No information is written locally (to the serial line).

With echo:

The "echo" is sent locally (to the serial line) with the connection status info.

Numeric modem result codes:

The modem response is expressed as one character.

Port password

Data channel options > Ethernet settings > Port password

Default value: no password (not checked)

Recommended references: Fig. 8

Immediately upon receiving a connection request from Ethernet, password is required. If the wrong password is given, the converter will disconnect the line. The maximum length of the password is 15 characters. Enter the selected password in the text field below the checkbox.

Idle timer

Data channel options > Ethernet settings > Idle timer

Default value: 0:0 (off)

Recommended references: Fig. 8

If Ethernet connection has been established and no communication occurs in either direction for a preset time interval, the connection is cancelled. Minutes and seconds are entered separately. If the time is entered as 0:0, this function is switched off.

Line speed

Data channel options > Serial line settings > Serial line speed

Default value: 9,600 Bd

Options [Bd]: 300; 600; 1,200; 2,400; 4,800; 9,600; 19,200; 38,400; 57,600; 115,200; and 230,400

Recommended references: Fig. 8

This option enables the user to set the communication speed of the serial line in Bauds.

Character size

Data channel options > Serial line settings > Character size

Default value: 8 bits

Options [bits]: 8, 7

Recommended references: Fig. 8

Setting of the number of data bits on the serial line.

Parity

Data channel options > Serial line settings > Parity

Default value: none

Options: none, even, odd

Recommended references: Fig. 8

Setting of the parity for data on the serial line.

Stop bit

Data channel options > Serial line settings > Stop bit

Default value: 1

Options: 1, 2

Recommended references: Fig. 8

Setting of the number of the stop bits for data on the serial line.

Response

Data channel options > Serial line settings > Response

Default value: No answer

Options: No answer, Character response

Recommended references: Fig. 8

If "Character response" is selected, the converter sends to the serial line a character depending on the Ethernet connection status:

- C.....connected
- D.....disconnected
- N.....the server is unavailable

Packing algorithm

Data channel options > Serial line packeting > Packeting

Default value: Disable

Options: Disable, Enable

Recommended references: Fig. 8

Control of packet creation of data coming from the serial line. The "Enable" setting will make available two more options for specification of packeting.

Idle time

Data channel options > Serial line packeting > Idle time

Default value: 12 ms

Options: 12 ms; 52 ms; 250 ms; 5,000 ms

Recommended references: Fig. 8

(This option is only available if "Packeting" is set to "Enable".)

This setting determines the idle time interval (of no data from RS485) after which the received data is packed and sent to Ethernet.

Trailing characters

Data channel options > Serial line packeting > Trailing characters

Default value: none

Options: none, one, two

Recommended references: Fig. 8

(This option is only available if "Packeting" is set to "Enable".)

This option determines the number of characters that are deemed a signal for packet preparation to be sent. As soon as the character(s) is/are received, the packet is prepared and subsequently sent as soon as another character is received (any). (This option can be used for recognising characters, e.g., preceding the checksum. The character that is always received

before a checksum is set here. As soon as such a character is received, the converter will wait for another byte, which is then incorporated into the packet and the packet is sent.)

Characters 01, 02

Data channel options > Serial line packeting > Characters 01, 02

Default value: none

Recommended references: Fig. 8

(This option is only available if "Packeting" is set to "Enable".)

The last but one characters in a packet are saved here (cf. the explanation of the preceding option).

With active connection

Data channel options > Erasing cache memory > Input > With active connection

Data channel options > Erasing cache memory > Output > With active connection

Default value: Disable

Options: Disable, Enable

Recommended references: Fig. 8

This option can be set separately for the input (from RS485 to Ethernet) and output (from Ethernet to RS485) cache memories.

As soon as the converter establishes connection with Ethernet, the cache is deleted (input and/or output, according to the settings).

As soon as the converter receives connection established from Ethernet, the cache is deleted (input and/or output, according to the settings).

With passive connection

Data channel options > Erasing cache memory > Input > With passive connection

Data channel options > Erasing cache memory > Output > With passive connection

Default value: Disable

Options: Disable, Enable

Recommended references: Fig. 8

This option can be set separately for the input (from RS485 to Ethernet) and output (from Ethernet to RS485) cache memories.

As soon as the converter establishes connection with Ethernet, the cache is deleted (input and/or output, according to the settings).

As soon as the converter receives connection established from Ethernet, the cache is deleted (input and/or output, according to the settings).

When disconnected

Data channel options > Deleting cache memory > Input > When disconnected

Data channel options > Deleting cache memory > Output > When disconnected

Default value: Disable

Options: Disable, Enable

Recommended references: Fig. 8

This option can be set separately for the input (from RS485 to Ethernet) and output (from Ethernet to RS485) cache memories.

The cache is deleted (input and/or output, according to the settings) when the connection is broken.

Network settings

When you click on the "Network settings" after connecting the converter, the setting window (Fig. 9) is displayed.

The screenshot shows a web-based configuration interface for a device. The window title is '00-20-4A-8C-A3-8F'. The main content area is titled 'Device network settings' and contains the following fields:

- IP address: 192.168.1.254
- Subnet mask: 255.255.255.0 (with an unchecked 'Automatically' checkbox)
- Gateway: 0.0.0.0
- Telnet password: (empty field)

At the bottom of the window, there are three buttons: 'Set up', 'Load from device', and 'Default values'. Below the input fields, the text 'Current IP address : 192.168.1.121' is displayed.

Fig. 9 – Network settings

IP address

Network settings > Device network settings > IP address

Default value: 192.168.1.254

Recommended references: Fig. 9

Setting of the IP address for the GNOME485 module. It uniquely identifies the module within the respective network.

Subnet mask

Network settings > Device network settings > Subnet mask

Default value: 255.255.255.0 (C type mask)

Recommended references: Fig. 9

It sets the subnet mask (a range of IP addresses used within the network segment) of the GNOME485 module. Letter codes are sometimes used for masks. (A stands for 255.0.0.0; B for 255.255.0.0; and C represents 255.255.255.0)

If the "Automatically" field is checked, the subnet mask is set as 0.0.0.0.

Gateway

Network settings > Device network settings > Gateway

Default value: 0.0.0.0

Recommended references: Fig. 9

The default gateway stands for the IP address of the computer through which the GNOME485 module is connected to the higher-level networks (possibly the Internet as well).

Telnet password

Network settings > Device network settings > Telnet password

Default value: none

Recommended references: Fig. 9

The password for connection via Telnet or a web interface. Maximum length is four characters (letters and/or numerals).

Set up

When you push this button at the bottom of the window, the changed settings are saved.

Read from device

When you click here, the actual settings are read from the converter. (The same reading of actual settings is carried out when the converter is connected.)

Default values

This option will return all settings to their initial values as set by the manufacturer.

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Address:

**Strasnicka 3164/1a
102 00 Praha 10
Czech Republic**

Telefon:

**+420 267 314 267-8
+420 602 379 954**

Fax:

+420 267 314 269

Internet:

www.papouch.com

E-mail:

info@papouch.com

