



# RS485-ETHERNET Interface

v.1.1

CODE: **INTRE**

EN\*

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### PSU features:

- Operation in the ETHERNET network via the RJ45 connector
- Permission of the Scientific and Research Centre for Fire Protection - National Research Institute for use with power supplies of the EN54 series in fire alarm systems
- compliant with the IEEE 802.3 standard
- transmission speed 10/100Mbps
- full duplex or half-duplex mode (auto-negotiation)
- assigning a static or dynamic IP address (DHCP server)
- galvanic isolation between the Ethernet interface and the RS485 bus
- configured with the PowerConfig program
- 10 ÷ 30 V DC power supply
- Cooperation with PowerSecurity software
- optical indication
- hermetic enclosure IP65
- warranty - 5 years from the production date

### 1. General description.

The RS485-ETHERNET network interface is a device used to convert signals between the RS485 bus and the Ethernet network and is designed to operate with power supplies of the PSBEN or EN54 series in the LAN/WAN network. For proper operation, the unit requires an external power supply in the range of 10÷30 V DC e.g. drawn from a PSU of the PSBEN or EN54 series. The physical connection of the interface takes place under galvanic isolation. The unit is mounted in a hermetic enclosure protecting against adverse environmental conditions.

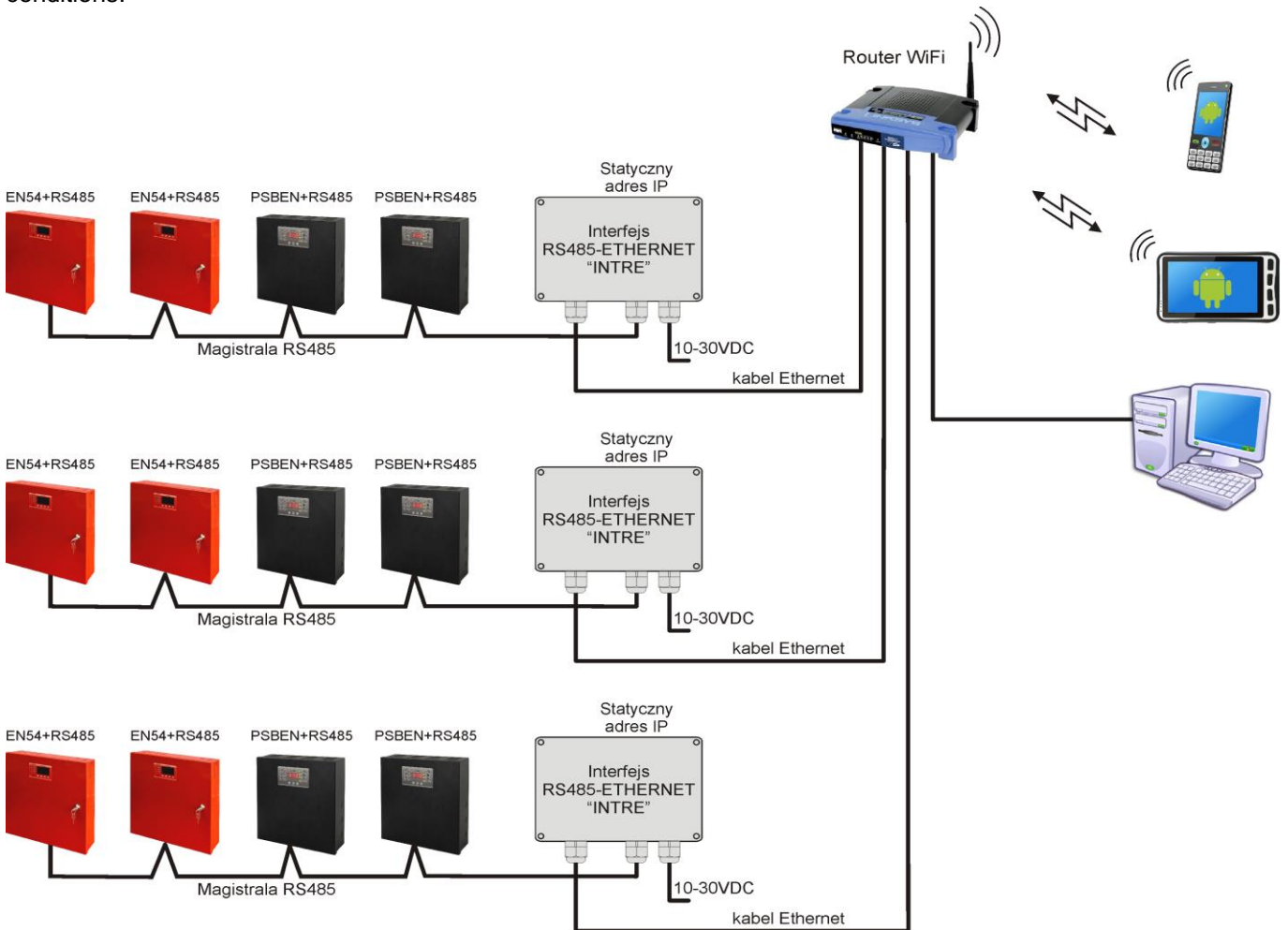


Fig.1. Schematic diagram of Ethernet network communication.

The topology of the network is based on an Ethernet switch (e.g. switch, router) connected to another PSU segments (connected in the RS485 bus) via the RS485-Ethernet interface. Each interface has a static IP address. The communication between the PC and the final PSU requires the IP address of the interface, the address of the PSU in the RS485 bus and the number of the port responsible for the communication.

## 2. Components arrangement.

The figure below shows the distribution of the major components and connectors of the RS485-ETHERNET interface.

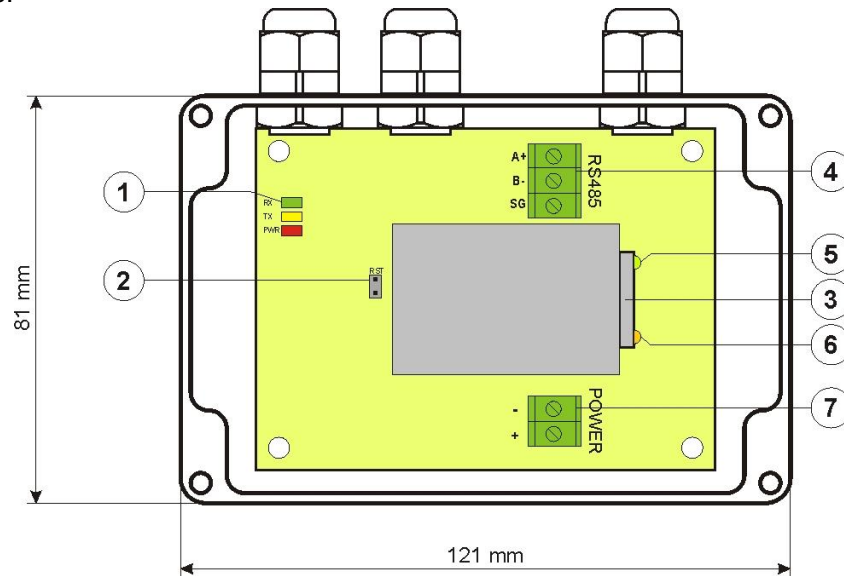


Fig. 2. The interface view.

Table 1. Description of the components.

Component No.	Description
[1]	<b>Diody LED</b> – optical indication: <b>PWR</b> – supply voltage <b>TX</b> – transmitting data <b>RX</b> – receiving data
[2]	<b>RST jumper</b> – resetting the interface settings
[3]	<b>RJ45 ETHERNET interface socket</b> (see Table 2)
[4]	<b>RS485 bus connector</b> <b>A+, B-</b> - RS485 data transmission <b>SG</b> - signal ground
[5]	<b>Green LED</b> – Ethernet connection indication
[6]	<b>Yellow LED</b> – signaling the operating status
[7]	<b>10÷30 V DC power supply connector</b>

### 3. Installation.

#### 3.1 Basic guidelines.

When installing the RS485-ETHERNET interface, please follow the general rules that will help to avoid electromagnetic interferences and incorrect operation of the device:

- supply the interface with the power source of low ripple voltage
- the power cable should be as short as possible
- signal beams should be led at a minimum distance of 50 cm from each other, while the intersections between them should be done at an angle of 90 °
- interface installation site should be located at a considerable distance from the equipment generating large impulse disturbances, such as inverters, contactors, relays.

#### 3.2 Connection to the RS485 bus.

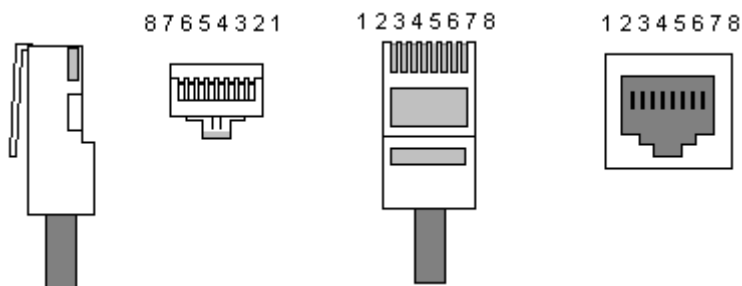
The RS485-ETHERNET interface is connected to the RS485 bus via the „RS485” connector. Connect the wires of the RS485 bus to the A+, B- terminals of the connector. They are marked and connected the same way as the rest of devices (A+ to A+, B- to B-).

Use a twisted-pair cable as a transmission wire of the RS485 bus. The "point-to-point" topology is recommended, while the "star" topology should be avoided. If the wires are long enough, it is recommended to use shielded cables to avoid errors during the communication and to lower the susceptibility to noise and radio interference. It is recommended to mount the terminal resistors at the ends of the bus with a resistance close to the impedance of the used cable, which is 120 Ohm.

#### 3.3 Connection to the Ethernet network.

The connection of the RS485-ETHERNET interface to the Ethernet network should to be made with a U/UTP twisted-pair cable, of min. 5 category, ending with RJ45 plugs, connected according to colour and accordingly to the EIA/TIA 568B standard. If the dedicated location shows a high level of electromagnetic interference, use a F/UTP or S/UTP shielded cable, thereby substantially reducing penetration of electromagnetic interference.

The connection of the interface to the Ethernet network uses a cable with RJ45 plugs, non-interlaced.



**Table 2. Description of pins in the RJ45 socket.**

Pin 1	TXD+	Transmitting +	white-orange
Pin 2	TXD-	Transmitting -	orange
Pin 3	RXD+	Receiving +	white-green
Pin 4	EPWR+	---	blue
Pin 5	EPWR+	---	white-blue
Pin 6	RXD-	Receiving -	green
Pin 7	EPWR-	---	white-brown
Pin 8	EPWR-	---	brown

### 3.4 Installation of the interface.

1. Lead the cable of the RS485 bus through the cable gland and the appropriate hole in the enclosure and then connect to the RS485 connector of the interface. The A+, B- cables should be connected the same way as the rest of devices (A+ to A+, B- to B-) In the case of shielded wires, the shield should be connected to the SG signal ground terminal.
2. Optionally, mount the 120 Ohm terminal resistors at the end of the RS485 bus.
3. Lead the Ethernet cable through the cable gland and the appropriate hole in the enclosure and then clamp the RJ45 plug. Next, plug the cable in the RJ45 socket of the interface. Plug the other end of the twisted pair in the RJ45 socket of the router, usually marked as 'LAN'.
4. Lead the power supply cable through the cable duct and the appropriate hole in the enclosure and then connect it to the 'Power' power supply connector. The power source should supply a voltage in the range of 10÷30 V D e.g. drawn from a PSU of the PSBEN or EN54 series. The best solution is to use a PSU that is plugged into the RS485 bus and located close to the interface.

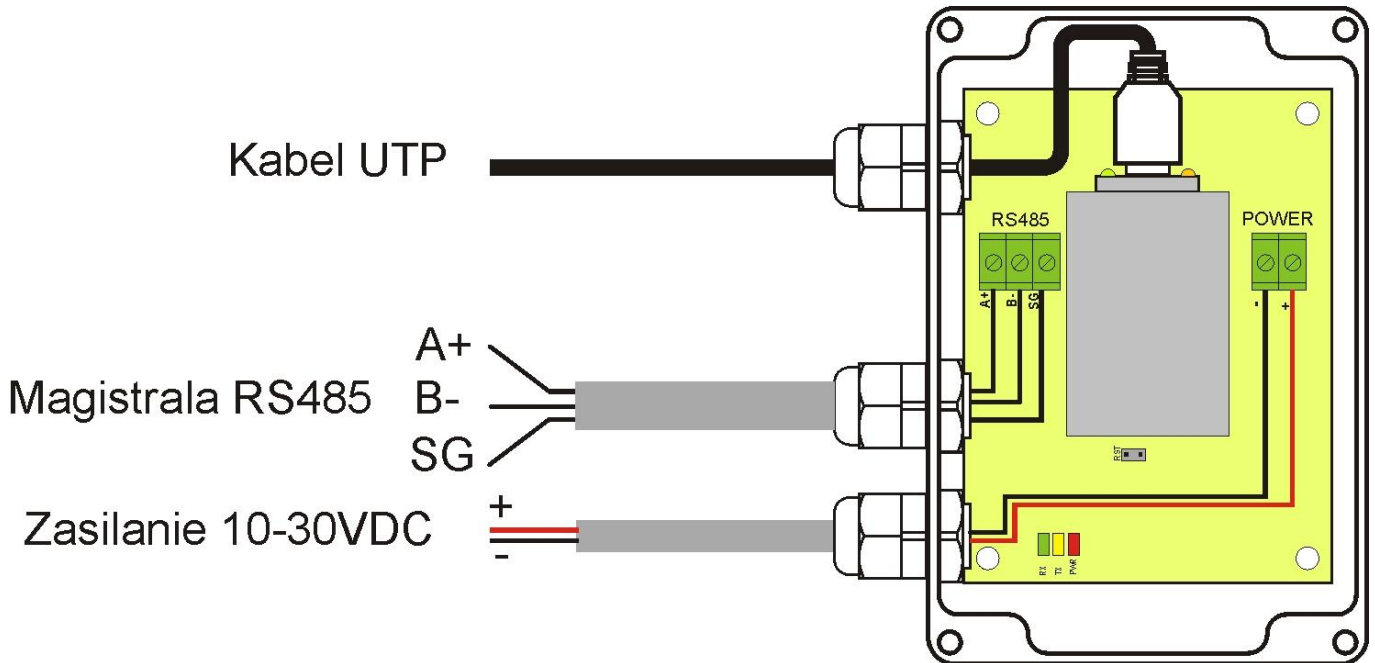


Fig. 3. The interface view with wiring description.

## 4. Configuration of the RS485-Ethernet interface.

### 4.1 Introductory information.

Ethernet interface parameters can be configured to adjust them to the intended operation mode. The configuration is done with „PowerConfig” program.

Download and install the „PowerConfig” program available on:

<http://www.pulsar.pl/pliki/PowerConfig.exe>

The configuration of the RS485-Ethernet interface requires a minimum version of the connection, which is shown below.

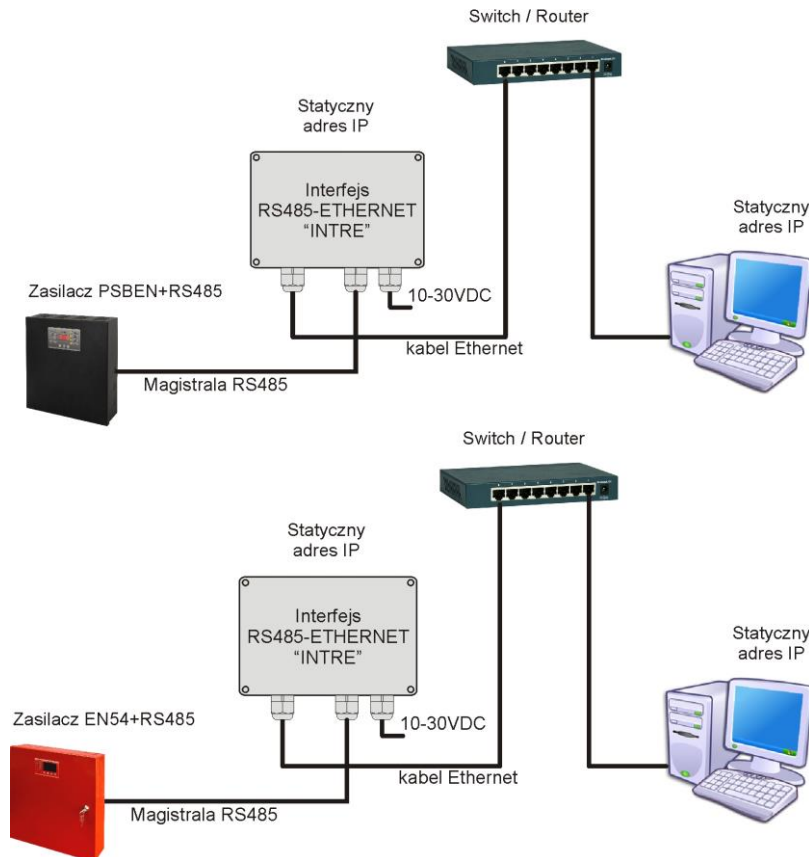


Fig. 4. The wiring diagram between the interface and the PC that enables performing the configuration.

The RS485-ETHERNET interface is supplied in basic configuration (factory settings) which is not adapted for correct operation of the system.

Since the communication with the interface uses a network cable, there is a need for proper configuration of the router in order to establish a connection with the interface. When using a switch, no configuration is required. When using a router, ask the administrator about the current configuration of the router or restore the factory settings accordingly to the information included in the further part of this manual.

### 4.2 STEP 1 - Restoring the factory settings.

#### Router:

To restore the factory settings of the router, check the manual of the device and perform appropriate actions according to the manufacturer's instructions. In most cases it is enough to find the reset button on the rear side of the enclosure and hold it for approximately 5 seconds. After releasing the reset button, wait about 1 minute for the correct initialization of the router.

#### RS485-Ethernet interface:

In order to restore the factory settings of the interface, turn off the power, put the "RST" jumper on and turn on the power again. The factory settings will be restored after approximately 3 seconds. Remove the jumper before continuing.

### 4.3 STEP 2 – Interface network search.



For proper IP address change, it is recommended to turn off the firewall of the antivirus program for the time of configuration process.

Run the „PowerConfig” program. Make sure that the Ethernet-RS485 INTRE module is powered and connected to the router with a network cable.

In the "Module type" field choose the "Ethernet" and the search method.

When the "UDP broadcast" is selected, the program will search for all the interfaces on the subnet. If, in turn, the "TCP unicast" is selected, the program will search for interface with the address from the "IP Address" field.

If the interface is configured with an identification code, then it must be entered in the "Code" field.

After selecting the search method, press the "Search" button.

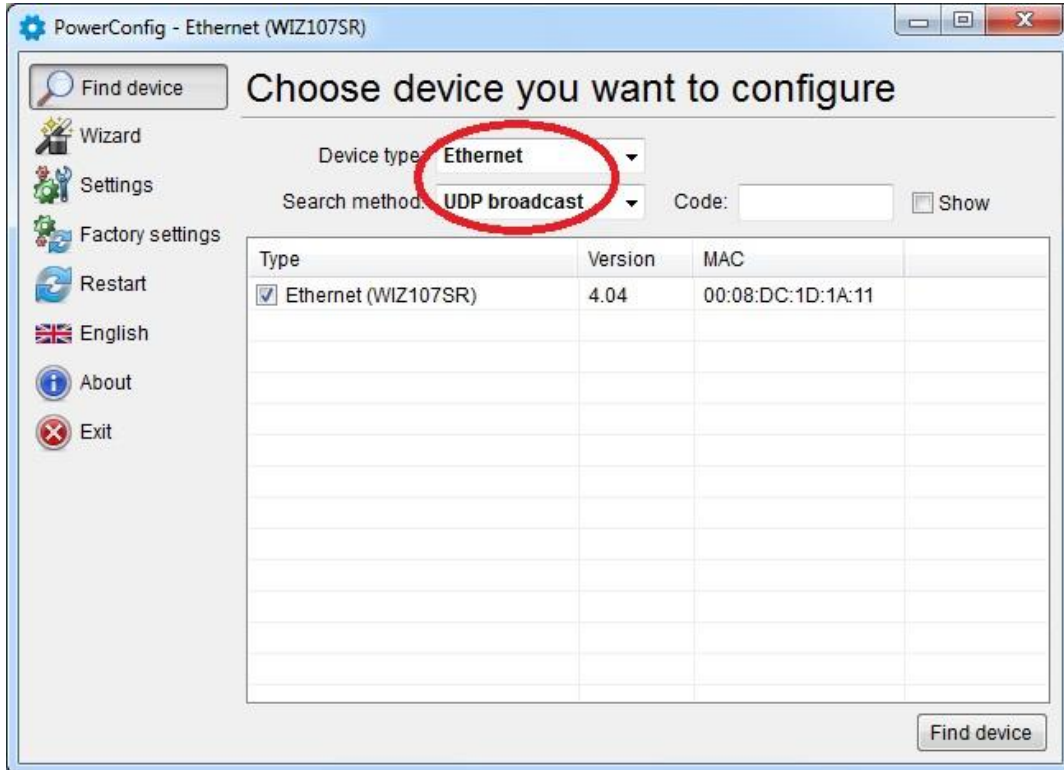


Fig. 5. Window of the „PowerConfig” program – network interface search.

Once the search process is finished, all the NTE interfaces available on the network will be displayed in the program window. Identification of the interface that should be configured is done by comparing the MAC address from the list with the address placed on the INTE interface.

The MAC address of the Ethernet INTE interface is located on a sticker below the bar code as a 12 digit number.



Fig. 6. The MAC address located on the INTRE module.

To access the module configuration, check the field under "Type"  Ethernet (WIZ107SR). The menu buttons on the left side will be activated.



#### 4.4 STEP 3 – The TCP/IP Network settings.

Press the 'Settings' button from the menu on the left side of the PowerConfig program window. A window will be displayed in the right part of the screen. Choose the "Network TCP / IP" from the top tab menu. This window allows setting the IP address for Ethernet communication.

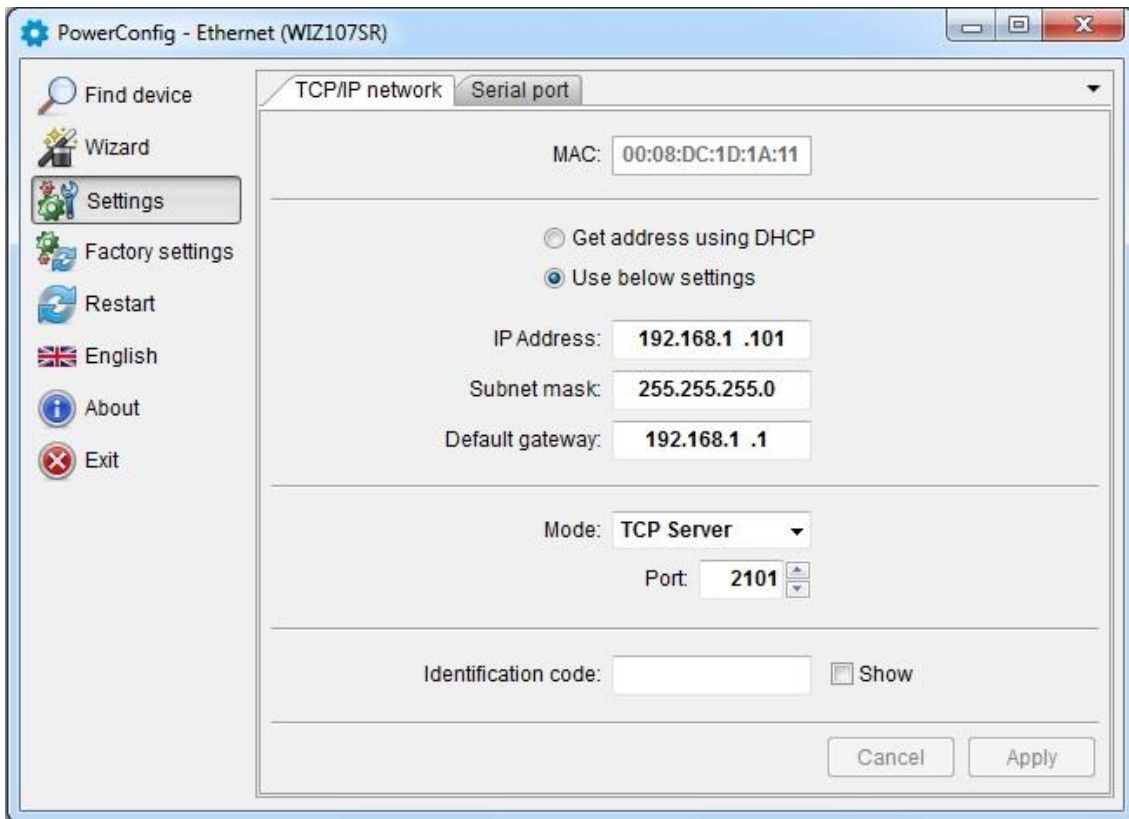


Fig. 7. The TCP/IP Network settings.

There are two options:

"Get an address using DHCP" - automatic IP address assignment (setting is not recommended);  
After selecting this option, the IP address will be automatically assigned by a router each time the interface module is turned on.

„Use the settings below "" – assign a static IP address (**recommended setting**);  
When selecting this option, type the available network address for interface identification.  
In the next fields, enter the port number and subnet mask if required.



Before setting the network IP address, make sure it is not used by any device on the network.

The next parameters to be set in the "TCP/IP Network" tab are the "TCP Server" operation mode and the port number – 2101 by default.

To increase security, the INTE interface module offers the possibility to assign an identification code to use when searching for network modules. If the code is assigned, it then must be entered in the „Code" field each time the search is performed.

Once the settings are entered, press the **“Apply”** button”.

#### 4.5 STEP 4 – Setting the serial port parameters – the “Serial port” tab.

In the "Serial port" tab, set the parameters responsible for the communication between Ethernet interface and the PSU as shown in the picture below.

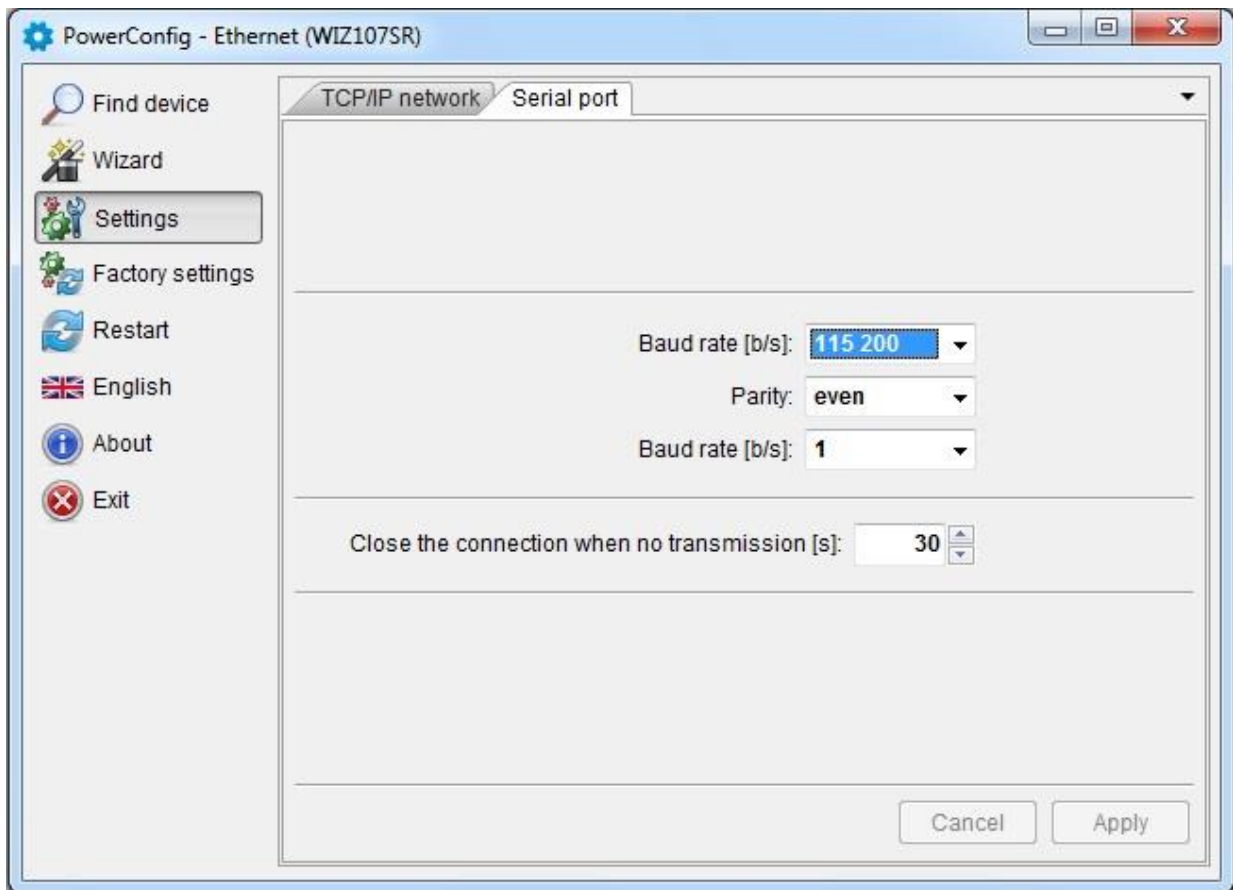


Fig. 8. Setting the serial port communication parameters.

If the PSU does not support the 115 200 baud communication speed or other communication parameters are set, enter the parameters in the „COM port settings” window so that they match the parameters set in the power supply.



The maximum available communication speed supported by a given power supply unit and other communication parameters should be checked in the PSU menu, see Chapter 5.

Once set, press the “**Apply**” button.

**Once all the above settings (steps 1-4) are entered, restart the module by pressing the "Restart" in the PowerConfig or disconnect the power supply.**

### 5. Configuration of power supplies.

#### 5.1 Configuration of power supplies of the PSBEN series with LCD display

The PSU fitted with LCD display enables setting the communication parameters of the serial port from the LCD panel. To enter the setup mode, press the „SET” button from the main screen.

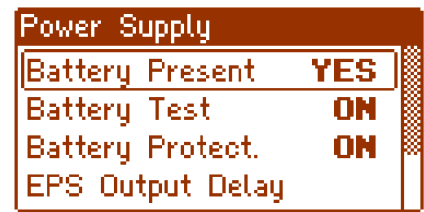
- use the „>” or „<” buttons to display the **PSU** menu



- press the „SET” button



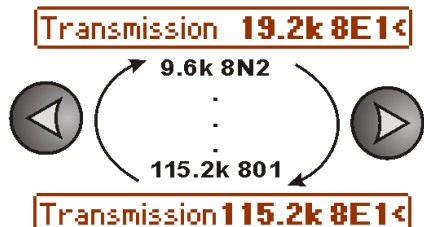
- use the „<” or „>” buttons to display the **Transmission** menu (The **Transmission** menu is at the bottom of the screen)



- press the „SET” button, the prompt will appear at the end of the line



- use the „>” or „<” buttons to set the **115.2k 8E1** (if the PSU does not support this speed, choose other maximum speed available)



- confirm by pressing the „SET” button



### 5.2 Configuration of power supplies of the PSBEN series with LED display.

The PSU fitted with LED display enables setting the communication parameters of the serial port from the LED panel. To enter the setup mode, simultaneously press the „<,>” rightmost and leftmost buttons on the LED panel.

- simultaneously press the „<,>” rightmost and leftmost

- the „tSt” parameter will be displayed

- press the right arrow „>”

- the „tSt” parameter will be displayed

- press „OK.”

- The information about the transmission speed will be displayed

- use the „<” or „>” buttons in order to set the required transmission speed,

- confirm by pressing „OK”

- the „trS” parameter will be displayed

- press the right arrow „>”

- na the „trP” parameter will be displayed

- press „OK.”

- The information about the parity of the transmission will be displayed

- use the „<” or „>” buttons in order to set the „8E1” parameter

- confirm by pressing „OK.”

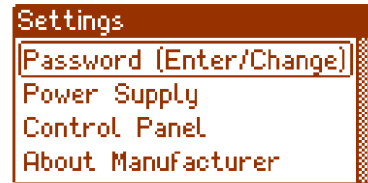
- Simultaneously press the „<,>” rightmost and leftmost buttons to complete the configuration procedure



### 5.3 Configuration of power supplies of the EN54 series with LCD display

The PSU fitted with LED display enables setting the communication parameters of the serial port from the LED panel. To enter the setup mode, simultaneously press the „<,>” rightmost and leftmost buttons on the LED panel.

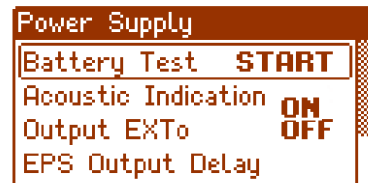
- use the „>” or „<” buttons to display the **PSU** menu



- press the „SET” button



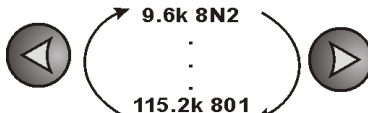
- use the „>” or „<” buttons to display the **Transmission** menu (The **Transmission** menu is at the bottom of the screen)



- press the „SET” button, the prompt will appear at the end of the line



- use the „>” or „<” buttons to set the **115.2k 8E1** (if the PSU does not support this speed, choose other maximum speed available)



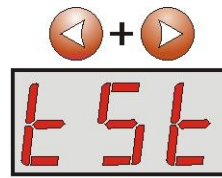
- confirm by pressing the „SET” button



#### 5.4 Configuration of power supplies of the EN54 series with LED display.

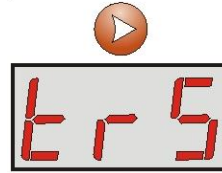
The PSU fitted with LED display enables setting the communication parameters of the serial port from the LED panel. To enter the setup mode, simultaneously press the „<,>” rightmost and leftmost buttons on the LED panel.

- simultaneously press the „<,>” rightmost and leftmost buttons



- The „tst” parameter will be displayed

- press the right arrow „>”



- The „trS” parameter will be displayed

- press „OK”



- The information about the selected transmission speed will be displayed

- use the „<” or „>” buttons in order to set the required transmission speed,



- confirm by pressing „OK”

- The „trS” parameter will be displayed again



- press the right arrow „>”



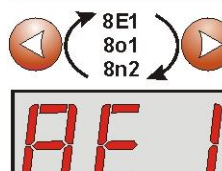
- The „trP” parameter will be displayed

- press „OK.”



- The information about the selected parity of the transmission will be displayed

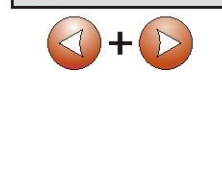
- use the „<” or „>” buttons in order to set the „8E1” parameter



- confirm by pressing „OK.”



- Simultaneously press the „<,>” rightmost and leftmost buttons to complete the configuration procedure



## 6. Configuring the connection in PowerSecurity program.

For further configuration, the PowerSecurity program is required. The program is available on: <http://www.pulsar.pl/pliki/PowerSecurity.exe>


It is an executable file, which does not require installation.

- 1) Save to disk and start the downloaded PowerSecurity.exe.
- 2) Choose the Power Supplies > New Power Supply option from the menu bar. The “Configuration of connection” window, that allows configuring the settings, will be displayed.

Fig. 9. The connection configuration window.

PSU	Description
<b>Name</b>	<b>PSU's name</b> The name that should be assigned individually to each PSU.
<b>Address</b>	<b>1 ÷ 247;</b> Address of another PSU, depending on the type of interface.
<b>Refresh period of the preview [ms]</b>	<b>100 ÷ 60 000ms;</b> Refresh period of the parameters in the preview window.

CONNECTION	Description
<b>Type</b>	<b>Modbus RTU – TCP/IP</b> - connection type depending on the type of interface.
<b>TCP Address</b>	<b>e.g. 192.168.1.101</b> PSU Ethernet network address. <i>Each Ethernet interface in the network has a unique address.</i>
<b>TCP port</b>	<b>e.g. 2101</b>
<b>Response time [ms]</b>	<b>100 ÷ 60 000ms;</b> - The response time from the power supply interface.
<b>The interval between the transmissions [ms]</b>	<b>0</b> - the minimal interval between transmissions.
<b>The number of retransmissions</b>	<b>3</b> - the number of retransmissions after which the program reports a connection error.

- 3) Once the connection configuration is loaded, the window with a „preview” tab is displayed. Press the  icon in the upper left corner to connect with the PSU. As a result, the window will display current parameters of the PSU, automatically updated on the basis of a preset refresh cycle.

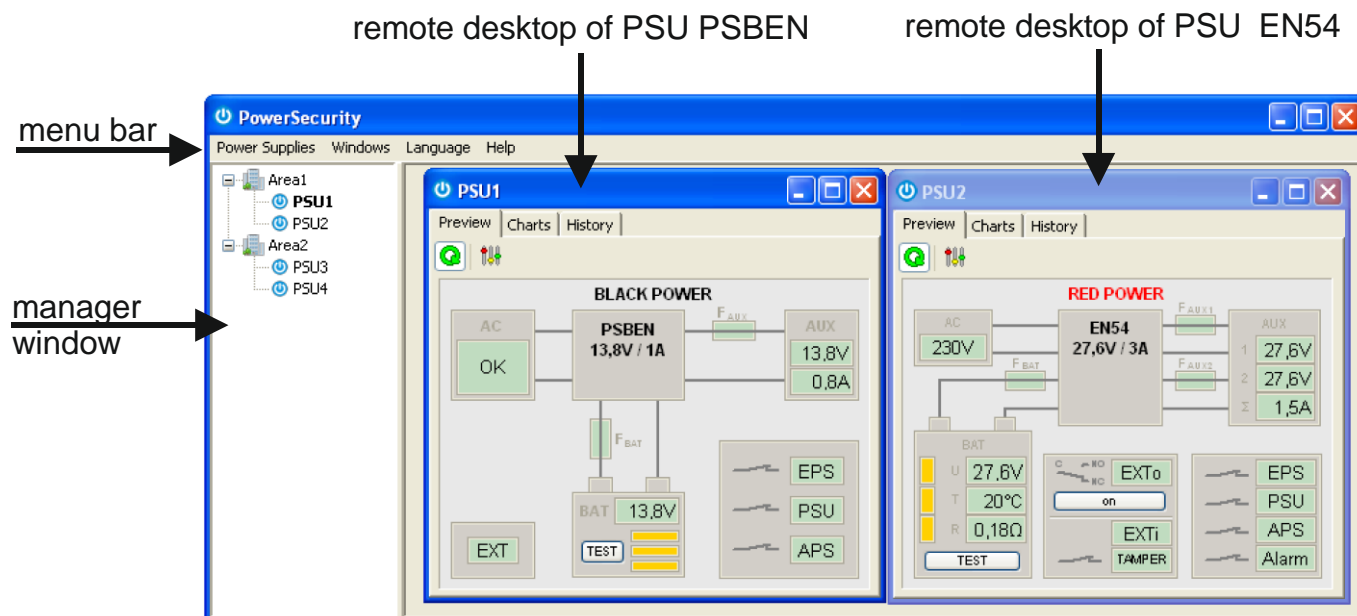


Fig. 10. Windows of the remote displays of the power supplies of the PSBEN (left) and EN54 series (right).

More information on the "PowerSecurity" program can be found in the manual which can be downloaded at: <http://www.pulsar.pl/pl/opisy/PowerSecurity.pdf>

## 7. Technical parameters.

<b>Power supply</b>	10 ÷ 30 V DC
<b>Current consumption</b>	max 0,95 W
<b>TTL transmission speed</b>	max 115200 bauds, parity check
<b>LAN Transmission speed</b>	10/100Mbps (auto-negotiation)
<b>Indication (LED lights)</b>	Tx, Rx, PWR
<b>Operating conditions</b>	humidity -10 °C ÷ 40 °C relative humidity 20%...90% no condensation
<b>Dimensions (LxWxH)</b>	121 x 81 x 60 [mm]
<b>Net / gross weight</b>	0,22kg / 0,26kg
<b>Protection class</b>	IP65
<b>Storage temperature</b>	-20°C...+60°C
<b>Others</b>	Permission of the Scientific and Research Centre for Fire Protection - National Research Institute for use with power supplies of the EN54 series in fire alarm systems.

### WEEE LABEL

Waste electrical and electronic equipment must not be disposed of with normal household waste. According to the European Union WEEE Directive, waste electrical and electronic equipment should be disposed of separately from normal household waste.

### Pulsar sp. j.

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