



Interface RS485-WiFi

v.1.1

CODE: **INTRW**

EN*

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Features:

- wireless connection via Wi-Fi
- 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
- communication in the 2.4GHz band compliant with the IEEE 802.11b/g/n
- data encryption: WEP, WPA, WPA2
- assigning a static or dynamic IP address (DHCP server)
- configured with the PowerConfig program
- power supply 10 ÷ 30 V DC
- Supports up to 31 devices on the bus in compliance with the EIA RS-485
- cooperation with the PowerSecurity software
- optical indication
- hermetic enclosure IP65
- warranty - 5 years from the production date

1. General description.

The RS485-WiFi is designed for converting signals between the RS485 bus and the WiFi network and is designed to work with power supply units of the PSBEN or EN54 series in the WLAN/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 unit is mounted in a hermetic enclosure protecting against adverse environmental conditions.



The transmission range of Wi-Fi network is approximately 30m inside buildings largely depends on its structure.

Before using a Wi-Fi communication system, make sure that the technical aspects of the site ensure sufficient stability of the connection.

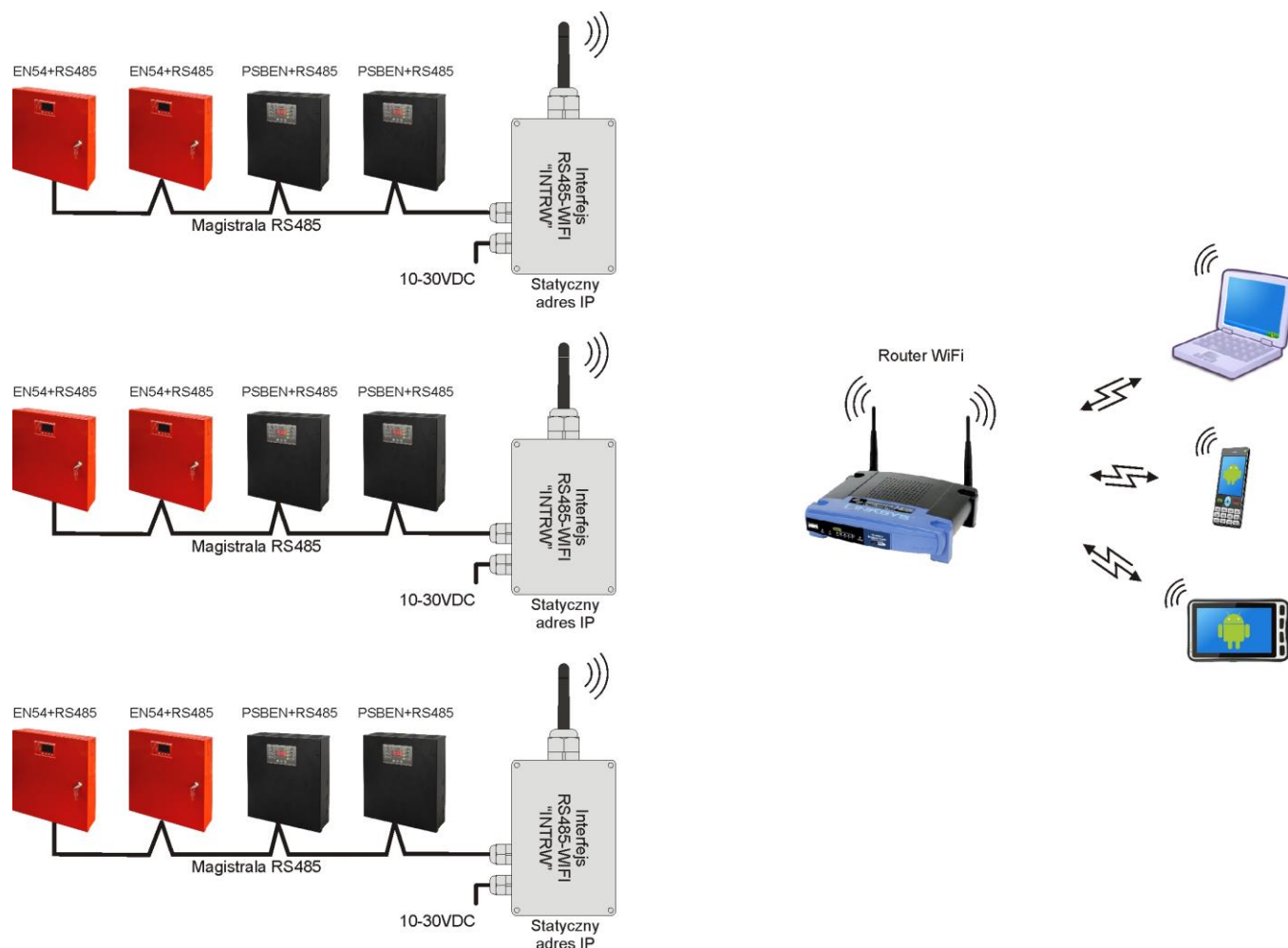


Fig. 1. Schematic diagram of WLAN network communication.

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 picture below shows the arrangement of the most important components and connectors of the RS485-WiFi interface.

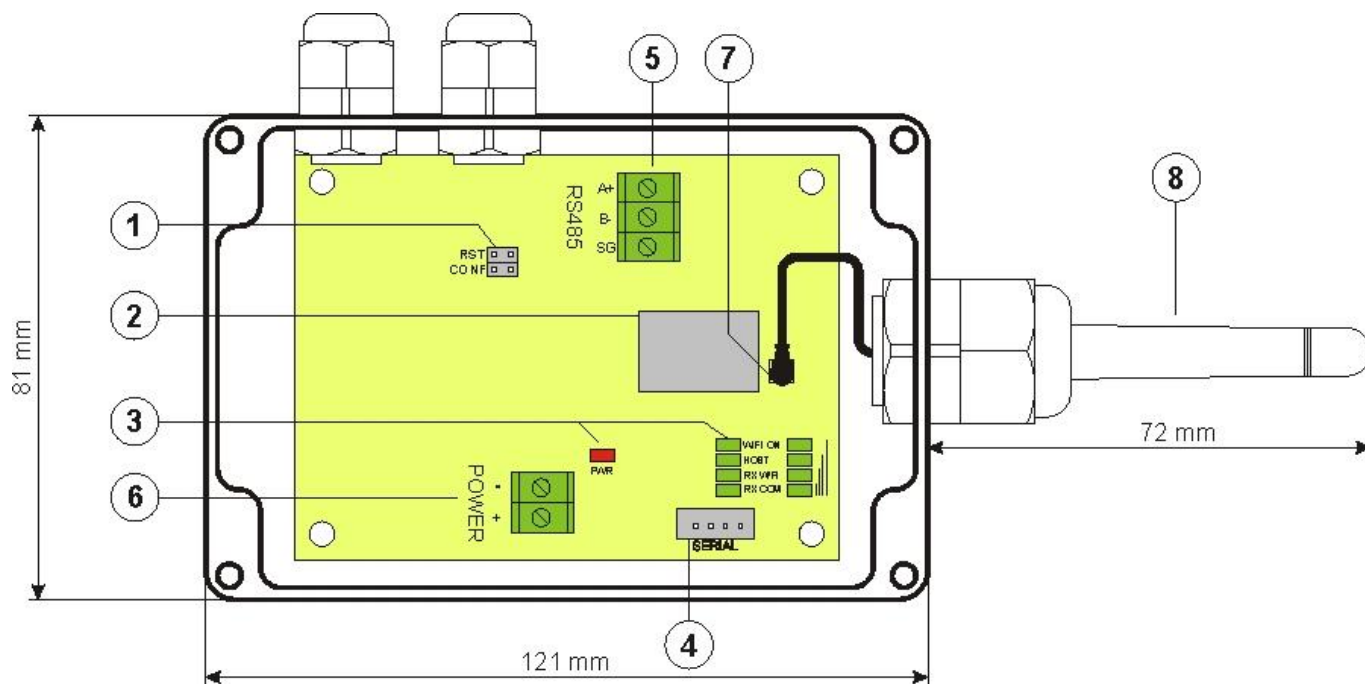


Fig. 2. The view of the interface.

Table 1. Description of the components.

Component No.	Description
①	Jumpers RST – restarts the interface CONF – interface configuration mode
②	Wi-Fi Radio Module
③	LEDs – optical indication: PWR – supply's voltage WiFi ON – indication of turning on the radio system HOST – indication of link establishment RX WiFi – indication of receiving data via Wi-Fi RX COM – indication of receiving data from the power supply ... – radio signal level
④	SERIAL socket for interface configuration
⑤	RS485 hub connector A+, B- - RS485 data transmission SG - signal ground
⑥	Power supply connector 10÷30 V DC
⑦	U.FL antenna socket
⑧	Wi-Fi antenna

3. Installation.

3.1 Main 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-WiFi 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-). According to the EIA RS-485 standard, the interface supports up to 31 devices on the bus.

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 Installation of the interface.

1. In the enclosure, mount the WiFi antenna bushing
2. Lead the antenna through the bushing and carefully screw into the module connector. Screw the bushing nut tight to ensure proper sealing of the housing.
3. 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, i.e. A+ to A+, B- to B-. In case of shielded wires, the shield should be connected to the SG signal ground terminal.
4. Optionally, mount the 120 Ohm terminal resistors at the end of the RS485 bus.
5. Lead the power supply cable through the cable gland and the appropriate hole in the enclosure and then connect it to the "Power" power connector. The power source should supply a voltage in the range of 10÷30 V DC 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.

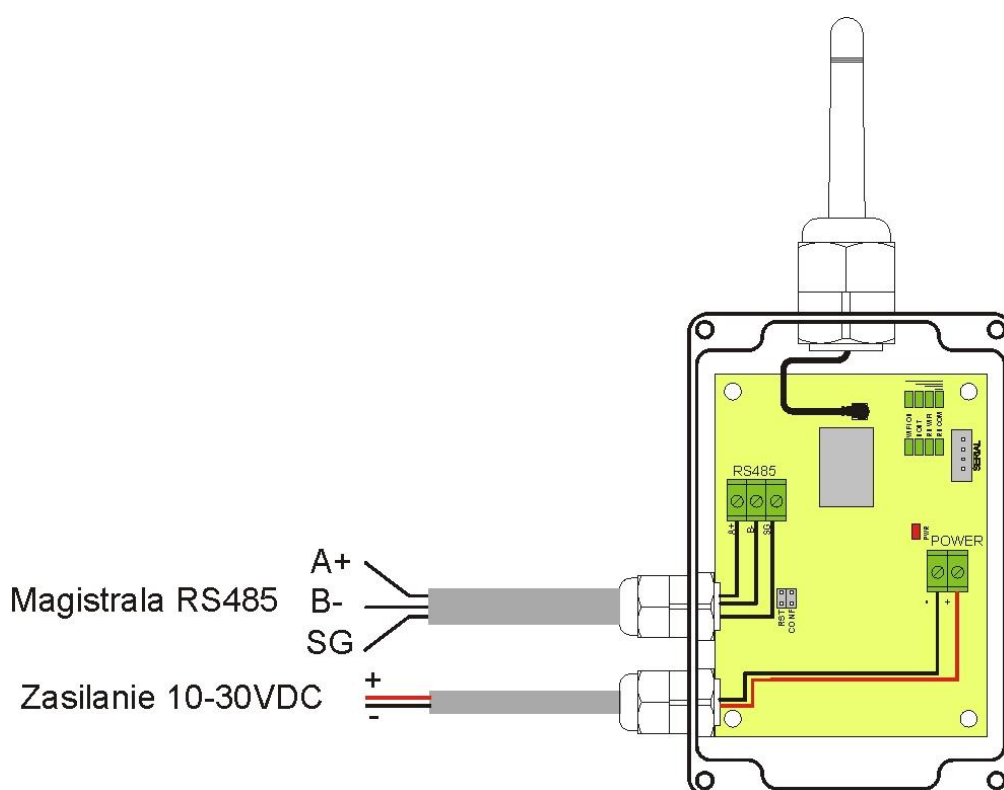


Fig. 3. The view of the interface with a description of the wires.

4. Configuration of the RS485- WiFi interface.

4.1 Introductory information.

The RS485-WiFi interface parameters can be configured to adjust them to the intended operation mode. The configuration is done with „PowerConfig” program.

The „PowerConfig” is available on:

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

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

The information in the following sections describe "step by step" how to configure the Wi-Fi interface.

4.2 STEP 1 – The interface installation.

To configure the RS485-WiFi interface, make a connection between the interface and the dedicated "INTC" PC Programmer.

The connections are shown in the figure below.

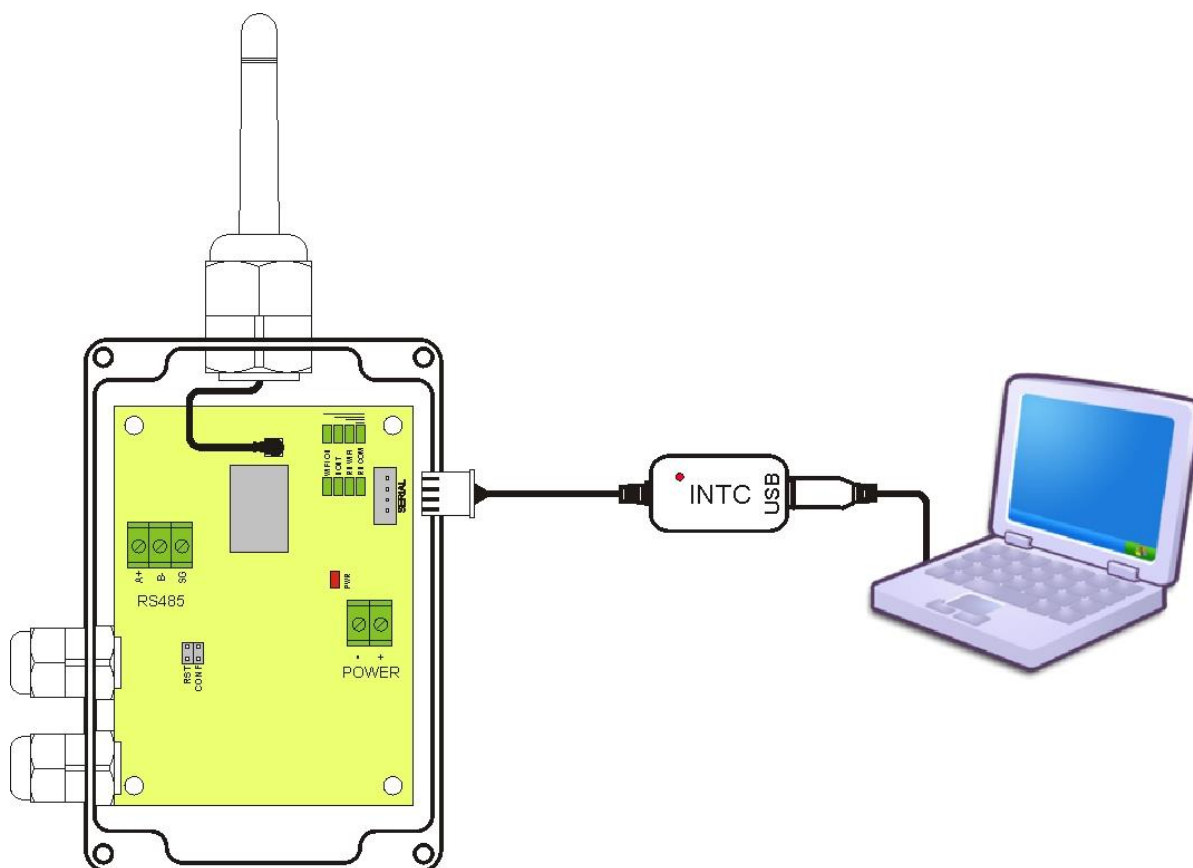


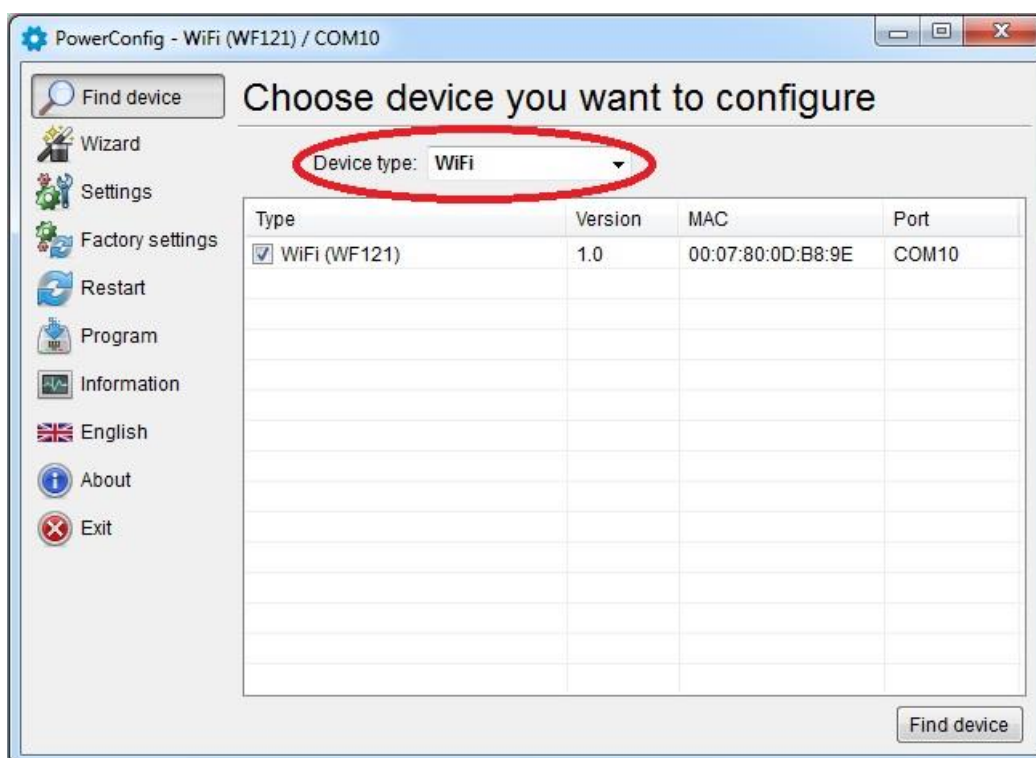
Fig.4. Connecting Wi-Fi interface to the PC.



To work properly, the "INTC" Programmer requires installing the appropriate drivers in the operating system of the computer. Once connected to computer USB port, the interface will be automatically detected by the operating system and the driver installation will follow. If the drivers are not detected by the system, it is suggested to download them from PULSAR website at: <http://www.pulsar.pl/pliki/CDM v2.12.00 WHQL Certified.exe> or from the chipset manufacturer's web site at: <http://www.ftdichip.com/FTDrivers.htm>

After installing the RS485-WiFi interface to the PC, the PWR LED should go on to indicate voltage supply. Then, put the "CONF" jumper on to enter the interface configuration mode. The RX WiFi and RX COM LEDs will blink alternately.

Run the configuration program "powerconfig" which enables the connection of the interface and its appropriate configuration. After starting the program, choose the "WiFi" in the "Module type" and then press the "Search" button.

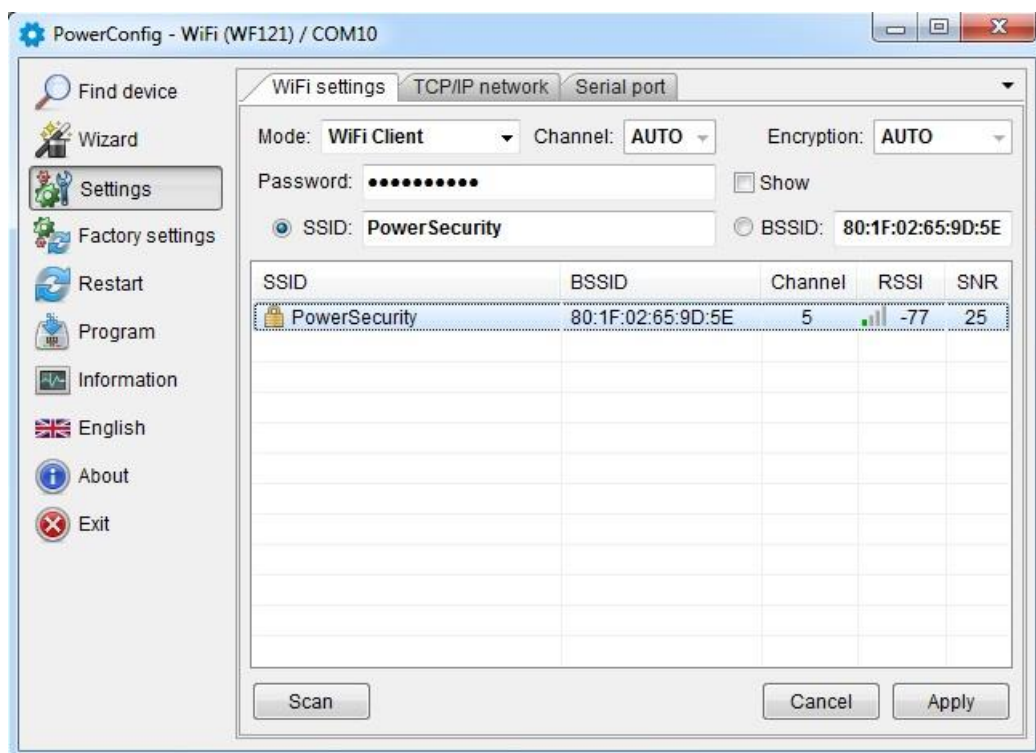


The connected module will be displayed in the window. To access the module configuration, check the field under "Type". ☒ WiFi (WF121).

The menu buttons on the left side will be activated.

4.3 STEP 2 – The Wi-Fi 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 "WiFi interface Settings" from the top tab menu. This window allows to enter the parameters of Wi-Fi network for interface connection.



Select the 485-WiFi operation mode of the interface by setting the "WiFi client" option. In the "SSID" field, enter the network ID (name) and a password in the "Password" field if the network is password protected.

Once the settings are entered, press the **"Apply"** button.

If the network is within range, it can be selected for interface connection after the scan. To do this, press the "Scan" button at the bottom of the window. After pressing the button, the scan is performed and all networks within range are displayed. When choosing a network for interface connection, enter the password if required.

Once the settings are entered, press the **"Apply"** button.

4.4 STEP 3 – The TCP/IP Network settings.

In the "Network TCP / IP" tab, set the IP address for the Wi-Fi communication.

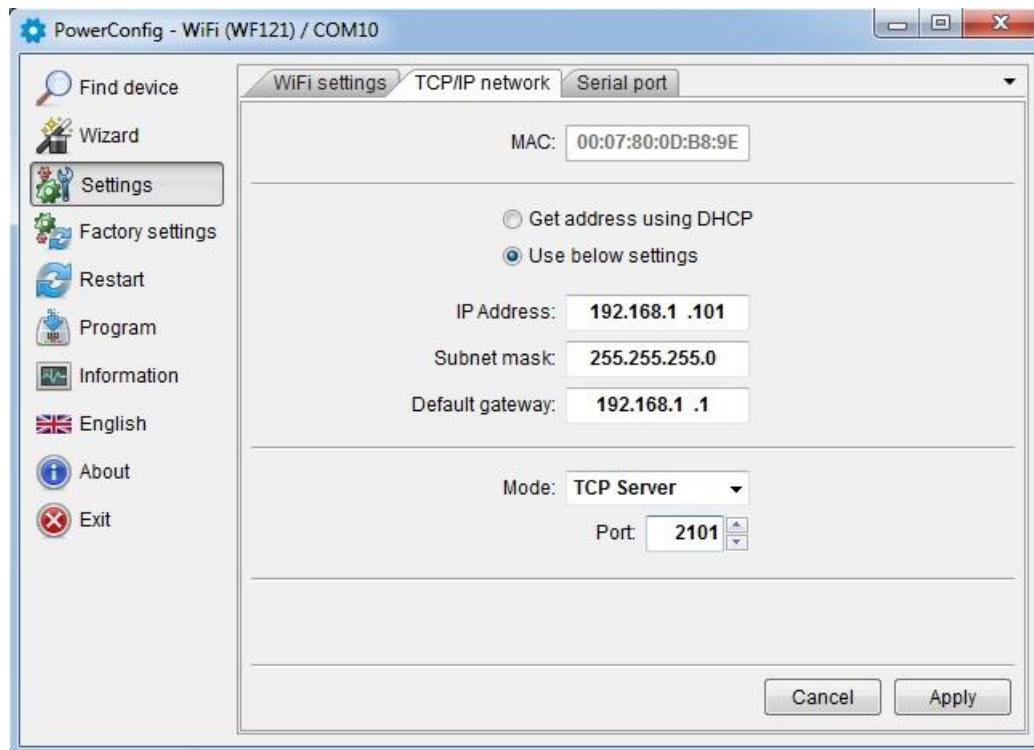


Fig.5. The TCP/IP Network settings.

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.



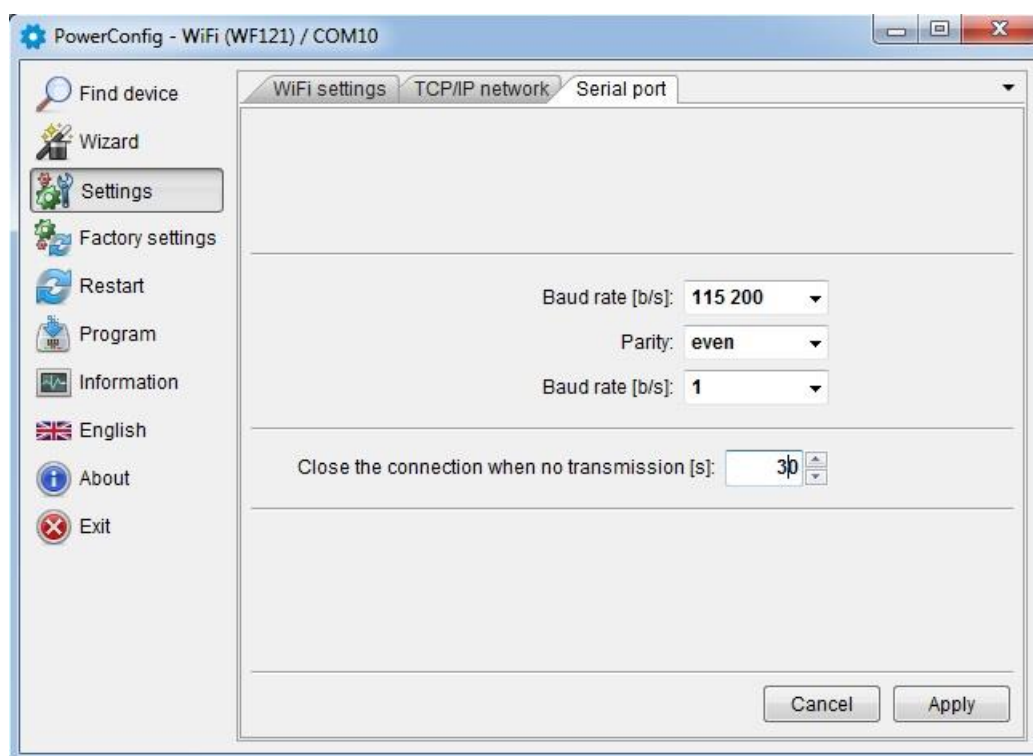
Before setting the network IP address, make sure it is not used by any device on the network.

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.

Once the settings are entered, press the **"Apply"** button.

4.5 STEP 4 – Setting the serial port parameters.

In the „Serial port” tab, set the parameters responsible for the communication between RS485-WiFi Ethernet interface and the PSU as shown in the picture below.



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.

Remove the „CONF” jumper before connecting to the WiFi interface.

5. Configuration of power supplies.

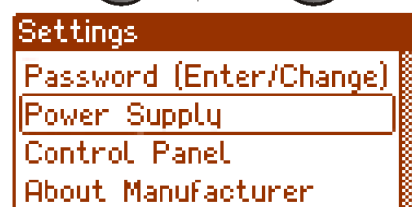
5.1 Configuration of power supplies of the PSBEN series with LCD display.

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.

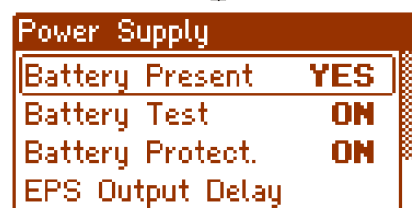
- use the „<” or „>” buttons to display the **PSU** menu



- press the „SET” button



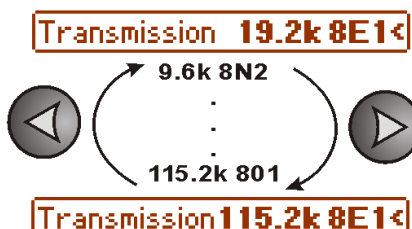
- use the „<” or „>” buttons to display the **Transmission** menu
(The **Transmission** menu is at the bottom of the screen)



- 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 is fitted with LED display, which 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 the „OK” button
- The information about the selected transmission speed will be displayed
- use the „<” or „>” buttons in order to set the transmission speed,
- confirm by pressing the „OK” button
- The „trS” parameter will be displayed again
- press the right arrow „>”
- The „trP” parameter will be displayed
- press the „OK” button
- use the „>” or „<” buttons to set the transmission speed
- use the „<” or „>” buttons in order to set the „8E1” parameter
- confirm by pressing the „OK” button
- 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 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”.

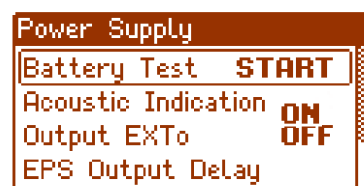
- use the „<” or „>” buttons to display the **PSU** menu



- press the „SET” button



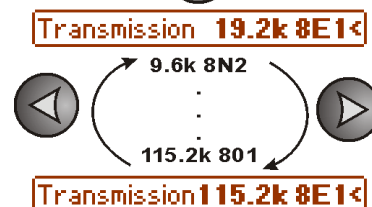
- use the „>” or „<” buttons to display the **Transmission** menu
(The **Transmission** menu is at the bottom of the screen)



- 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



5.4 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 transmission speed will be displayed

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

- confirm by pressing „OK”

- The „trS” parameter will be displayed

- press the right arrow „>”

- The „trS” 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”

- in order to return to the main menu, simultaneously press the „<,>” rightmost and leftmost buttons



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>

After installing and starting the program, create the power supply in the manager window.

To do this, select the main group "Main group" with the mouse and then press the "Add" button and select the "New device" item. The configuration window will be displayed in the right part of the program window. The configuration must be carried out in accordance with the connection parameters and the interface used.

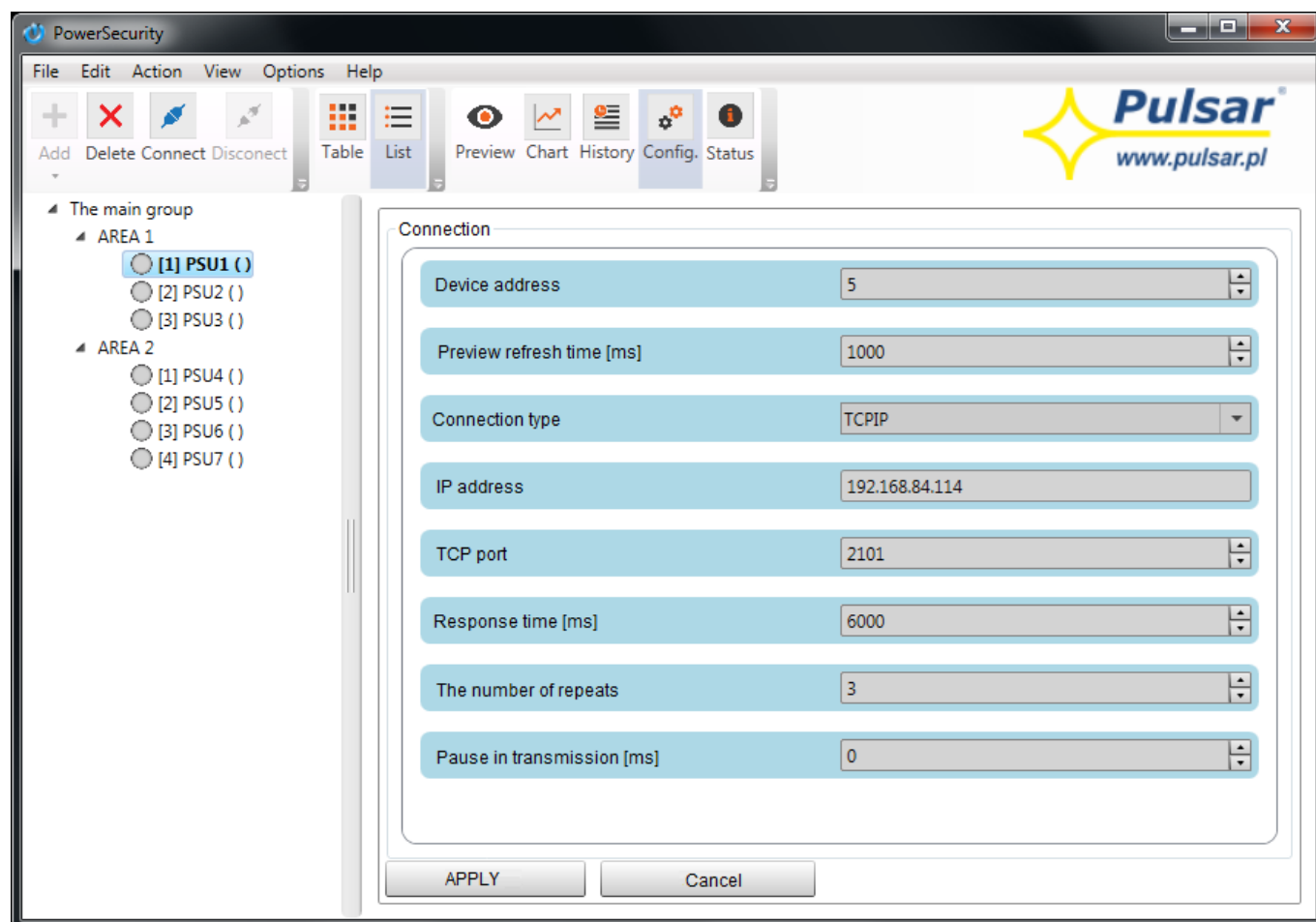


Fig. 6. Exemplary configuration of connection with the power supply.

PARAMETER	DESCRIPTION
Device address	1-247 ; address of the power supply in the RS485 bus.
Preview refresh rate [ms]	100 – 60 000ms ; refresh period of the parameters in the preview window. In the case of a larger number of supported power supplies, use longer times to reduce traffic on the bus.
Connection type	TCPIP ; communication Ethernet
IP address	Ethernet address of the PSU with which we want to connect
TCP Port	The port number on which communication takes place
Response time [ms]	100 – 60 000ms ; time after which the command will be retransmitted. The parameter should be included in the case of Wi-Fi or Ethernet communication where additional delays may occur.
The number of repeats	0-100 ; the number of messages sent back to the power supply in case of communication problems. After the specified number of messages, the program will report an error.
Pause in transmission [ms]	0-100ms ; break between frames.

Once the connection is properly configured, open the preview window ("Preview" button) and then press the "Connect" button. After a few seconds, the preview window will display the parameters of the power supply, which will be refreshed according to the refresh rate defined in the connection configuration - "Refresh rate of the preview".

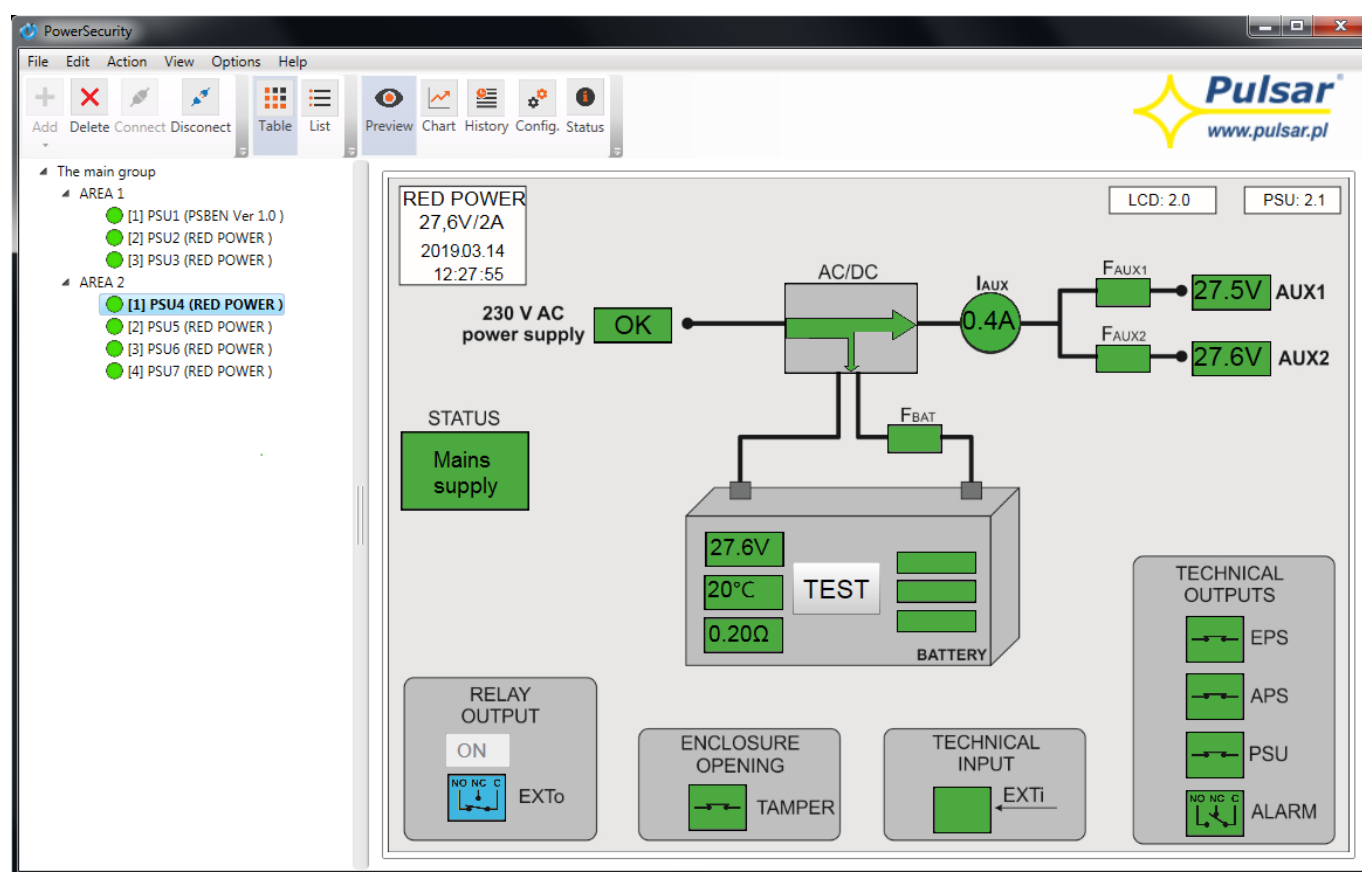


Fig. 7. Preview of the EN54 power supply.

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.

Power supply	10 ÷ 30 V DC
Current consumption	20 ÷ 80mA
Frequency	2,4GHz IEEE 802.11 b/g/n
The receiver sensitivity	-97dBm
Transmitter power	17dBm
TTL transmission speed	max 115200 bauds, with parity check
Wi-Fi Transmission speed	max 11Mbps
Encoding	WEP, WPA, WPA2
Indication (LED lights):	WiFi_ON, HOST, RX_WiFi, RX_COM, the signal level
Operating conditions	temperature -10 °C ÷ 40 °C relative humidity 20%...90% no condensation
Dimensions (LxWxH)	121 (+72 antenna) x 81 x 60 [mm]
Net / gross weight	0,20kg / 0,25kg
Protection class	IP65
Storage temperatur	-20°C...+60°C
Others	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.

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