meternet
PRO

INSTALLATION MANUAL

AND PRACTICAL ADVICES

180423EN

www.fif.com.pl

IMPLEMENTATION OF RS-485 COMMUNICATION NETWORK

Preliminary information can be found in a special presentation on our website fif.com.pl -> DOWNLOAD -> PRESENTATIONS -> FF_modbus ...

Download the presentation!

Detailed documentation available for download at www.modbus.org or search for information in the internet.

MODBUS ADDRESS

Before mounting devices (meters, measuring transducers, multimeters, etc.) and connecting them to the communication network, first give them individual modbus addresses (Slave ID) in range of 1-247.

By assigning or selecting modbus addresses, label the meters so as not to confuse them during assembly and configuration. Create a table in which meters will unambiguously identify itself, e.g.

1. Meter factory number	2. Modbus address	3. Place of assembly / user

Lebel each programmed meter with its modbus address - with a marker or a sticker.

Sticker with Modbus address

Factory number

For addressing, you need an RS-485 / USB converter that connects your device to your PC. Use our WE-1800-BT or analog converter.
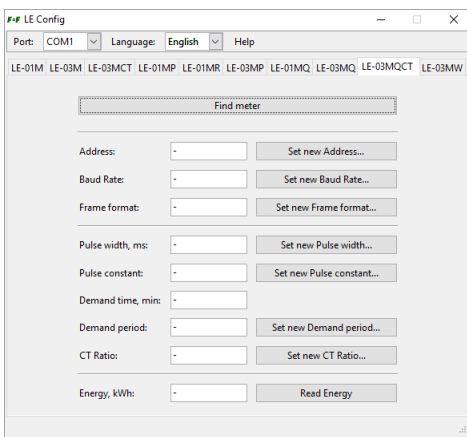

To set the address and configuration, use any free program for operating Modbus RTU, eg Modbus Poll, Modbus Test, BitBoy, Chipkin modbus, etc. Programs are freely available in the Internet.
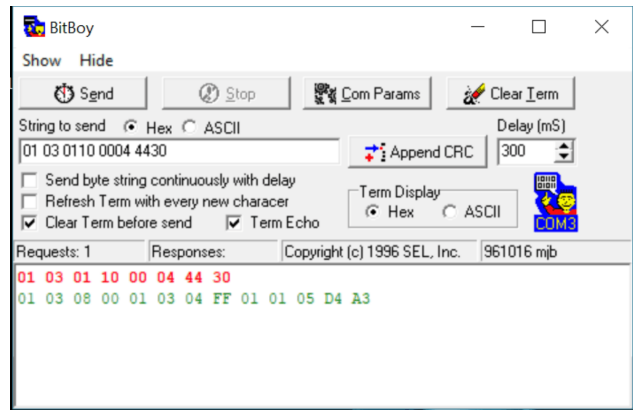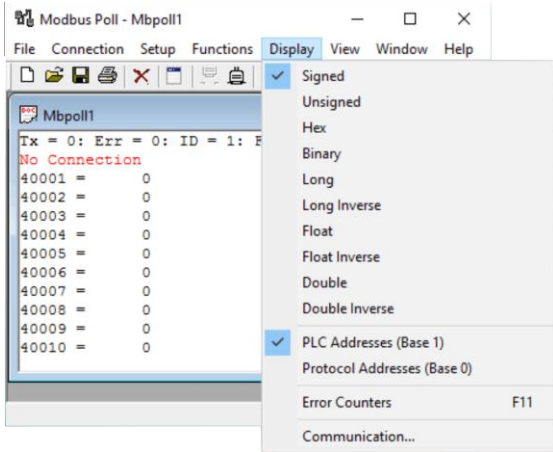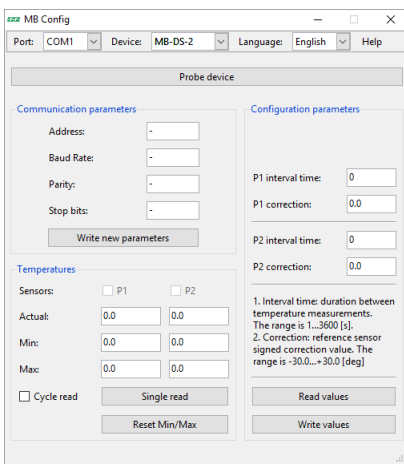
For devices from our offer you can use our dedicated configuration programs:
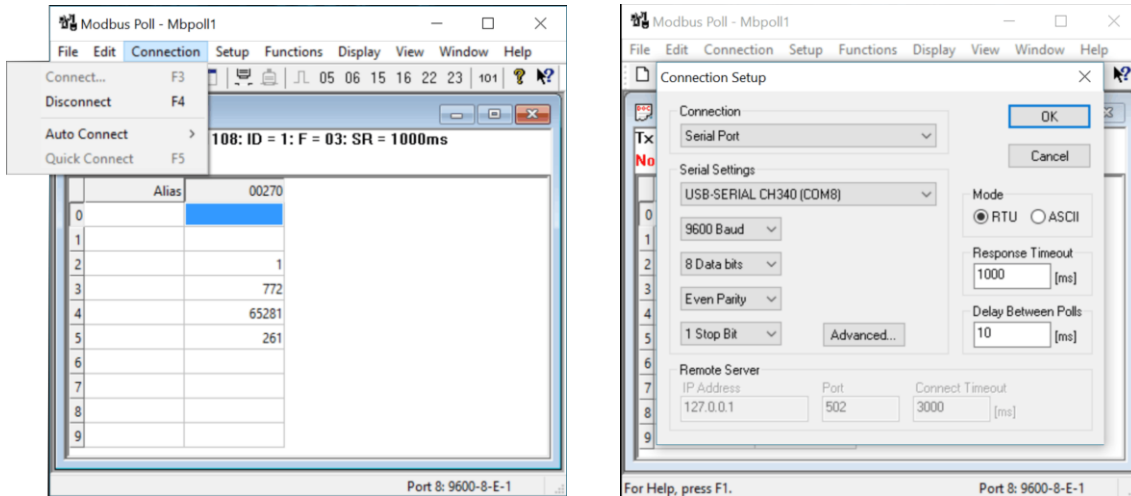
LE Config - for LE energy meters. Download!

MB Config - for MB- measuring transducers and MR-expansion modules. Download!

Other programs

An example of how to use the Modbus Poll program to read values and set device parameters:

READING

Enter the Connection->Connect... parameter settings. Set the connection type of the Serial Port and the correct COM serial port on which the converter works as well as parameters compatible with the communication parameters of the supported device.
The COM port number can be found in the Device Manager -> COM and LPT ports ...
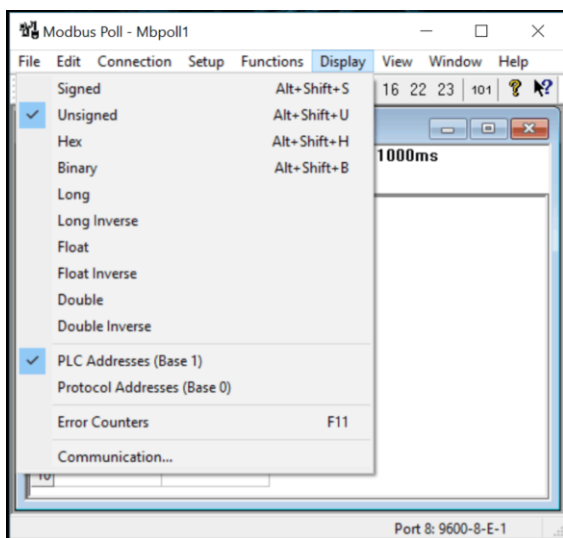Mode: RTU
Baud - speed
Data bits - data bits
Parity - Parity
Stop Bits - stop bits
Confirm with OK.

Enter Display and set the type of register type and addressing mode.
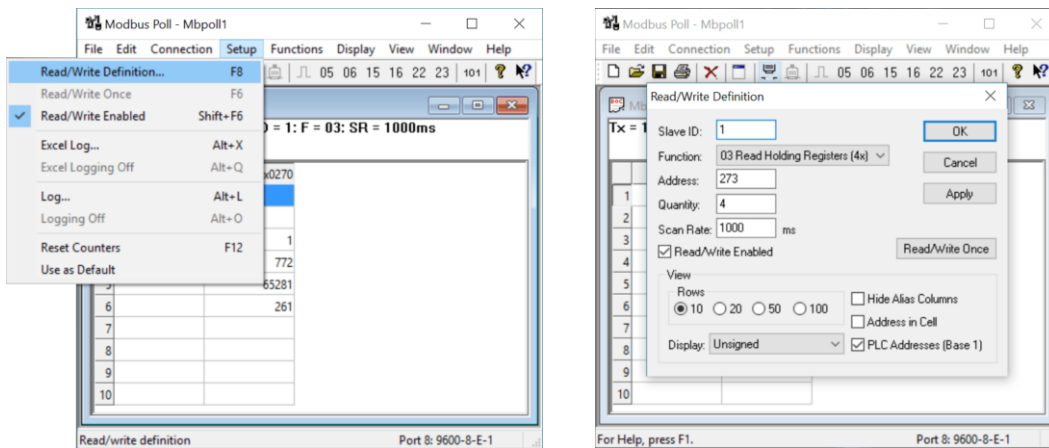

The register type
The register value is a 16-bit number (sixteen characters in a binary system, e.g. 1001011000101001). The type of register clearly specifies the manner of conversion and presenting the value of the one or more registers in the form of the number of the decimal system. The register type is determined by the device manufacturer.

SIGNED - integer with a sign - an integer with a +/- sign
UNSIGNED - unsigned integer - positive integer
HEX - integer in the form of a hexadecimal system, e.g. 06FF
BIN - integer in the form of a binary system, e.g. 1001011000101001
LONG - an integer consisting of two registers (32 bits). Register order is as registerHi-registerLo
LONG INVERS - a integer consisting of two inverted registers (32 bits). Register order is as registerLo-registerHi
FLOAT - floating point number (eg 123.45) consisting of two registers (32 bits).
FLOAT INVERS - floating point number (eg 123.45) consisting of two inverted registers (32 bits).
DOUBLE - floating point number (eg 123.45) consisting of four registers (64 bits).
DOUBLE INVERS - floating point number (eg 123.45) consisting of four inverted registers (64 bits).

Addressing mode
Base 1 - when the group of registers starts from address 1. In the case of address 0, the address should be increased by +1.
Base 0 - when the register group starts from address 0.

Enter Setup -> Read/Write Definition… and set the device's query values parameters.

Slave ID - the device's modbus address.
Function - a function (command code) which is required for reading a given values (determined in the device's instructions manual).
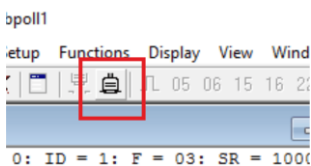Address - address of the register from which to start the reading/writing of values.
Quantity - number of subsequent registers starting from the given in the Address parameter field
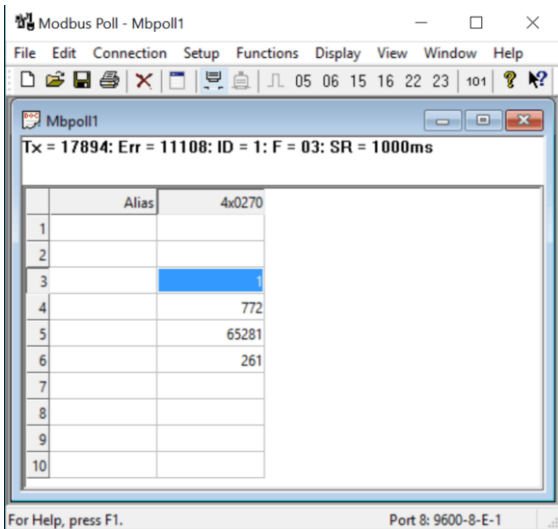Scan Rate - frequency of queries in the loop.
Read/Write Enabled - activating the work in the loop.

Turn on the communication with the Quick connection button

The results will appear in the register window

WRITING (values change)

Go to the Functions menu. Select the write function according to the device specification (functions 05, 06, 15, 16). The Writing window will open. You can also double-click on a given register in the register window. This is a quick transition to the Writing window for one register that was triggered by a click.

Function 05 window for a single bit register (which is read by function 01).
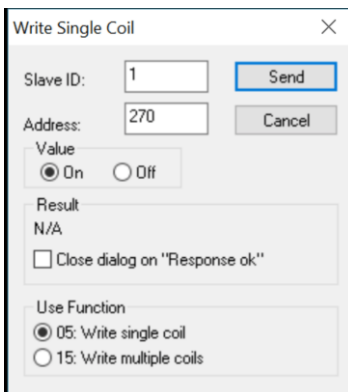
Set the device's modbus address (SlaveID), write register index (Address) and write function code according to the register specification (Use Function). In the Value field, select On (1) or Off (0). Send the value with Send button.

Function 15 window for a group of subsequent bit registers (which are read by function 01).
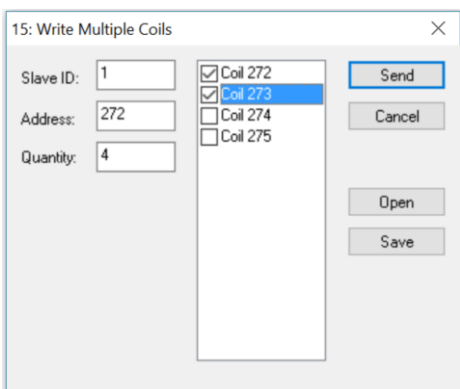
Set the device's modbus address (SlaveID), start write register index (Address) and the number of subsequent registers to write from the designated address (Quantity). In the Value field, select 1 (☑) or 0 (□). Send the value with Send button.

Function 06 window for a single register (which is read by function 03).
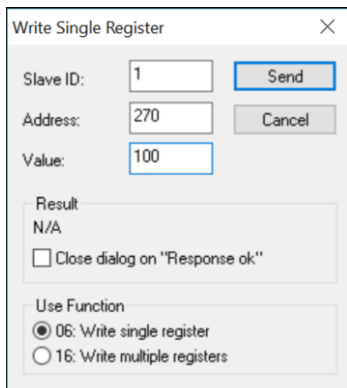
Set the device's modbus address (SlaveID), write register index (Address) and write function code according to the register's (Use function) specification. In the Value field, set the value to write. Send the value with Send button.

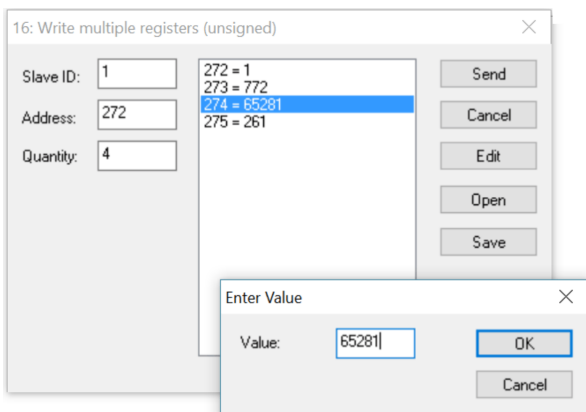Function 06 window for a group of subsequent registers (which are read by function 03).

Set the device's modbus address (SlaveID), start write register index (Address) and the number of subsequent registers to write from the designated address (Quantity). Double-click the given register in the register window. an additional window will open to change the registry value for the registry that was triggered by a click. Send the value with Send button.

ASSEMBLY

MT-CPU-1 SERVER

WARNING!
Mount the server in a <u>separate switch box</u>. Avoid installation in switchgear boxes with devices carrying heavy loads and generating strong electromagnetic fields.

WARNING!
In case of strong interference caused by high loads, operation of induction machines (engines), operation of inverters and a large number of loads with capacitive load character (led), it is recommended to install the server in a <u>metal box with earthing</u>.
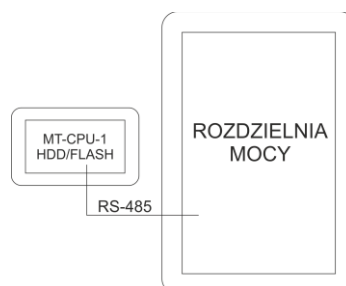
WARNING!
Recommended use of server back-up power supply. It may take up to 5-7 minutes for the system to restart.
During this time, no data from the system will be recorded. Also in the event of a sudden loss of voltage there is risk of damage to the recorded data in the external memory. Use UPS power or back-up power supply system based on the ECH-06 module.
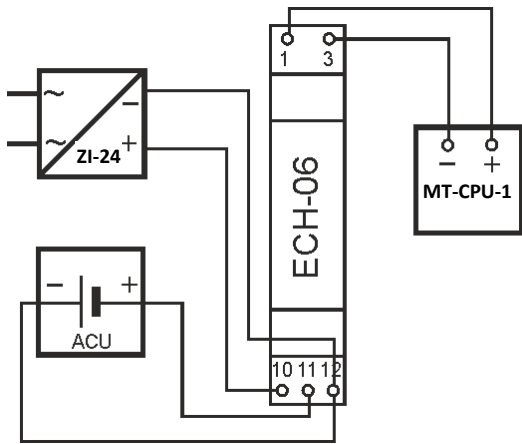
ECH-06   back-up power supply module
AKU   gel battery 12V 1,3Ah
ZI-24   stabilized power supply 24V 30W

The module constantly monitors the state of charge of the battery and recharges it automatically when the main power supply is present. In the case of disappearance of main voltage or decreasing its voltage value below the value of the battery the receiver is powered from the battery.

WARNING!
Do not connect any devices to the USB ports when the server power is on. This may cause a server hang or an automatic restart of the server. Connect only when the power is off.

COMMUNICATION NETWORK

Wires:
one twisted pair (UTP)
120Ω impedance
22AWG cross-section (about 0.06 mm / 0.3 mm²)

example wires:
- BITNER BiTsensor PE-PVC Blue
alternatively:
- shielded communication cable (FTP / SFTP)
- Profibus cable 150 Ohm

- addressed meters with compatible communication parameters connect with a serial bus
- use one pair of twisted pair for connection

YES	NO	NO
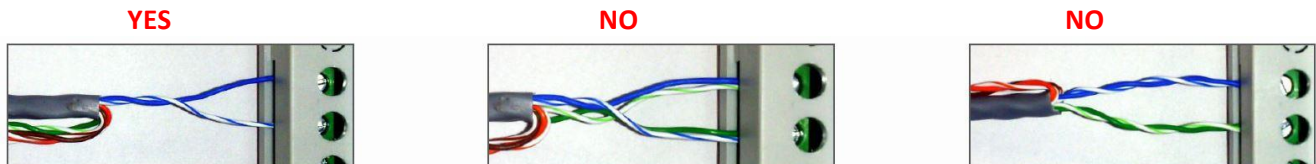
- check communication in stages with the help of the converter and the Modbus Poll program. Check each group and branch separately.
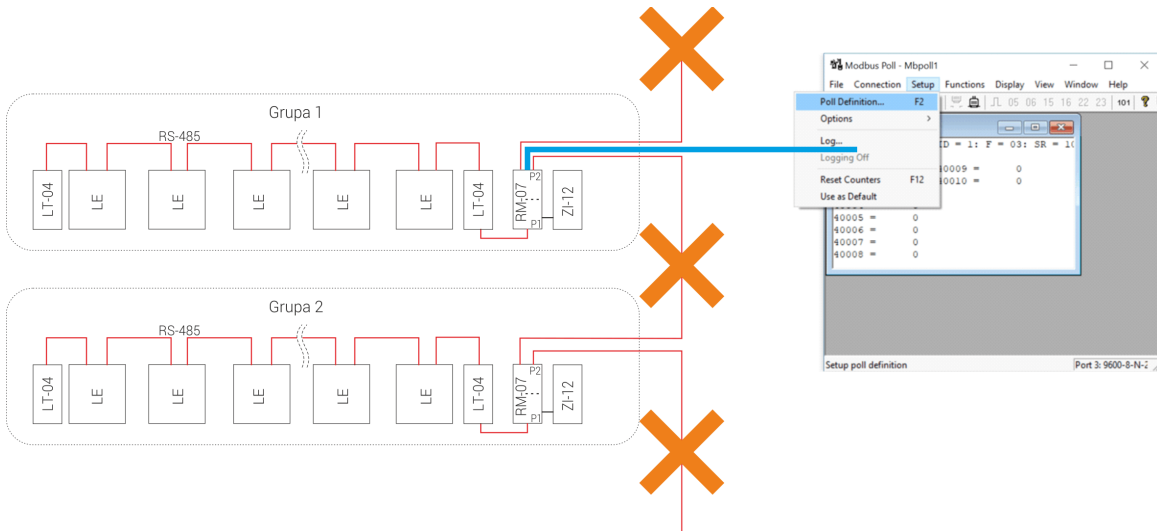
CONVERTER AND SERVER CONFIGURATION

LAN CONVERTER
Download the manual!

MT-CPU-1 SERVER

1. Disconnect the main power supply.
2. Connect the power supply cables to the MT-CPU-1 server.
3. **If using a USB memory stick (pendrive / ssd), connect the memory to the server's USB port.**
   CAUTION! Necessarily in this order!
4. **Perform formatting of the memory at the first system startup or connecting new memory to the server. The option is available in Configuration -> Settings -> Format memory. Warning! Formatting memory with the archive may result in its loss.**
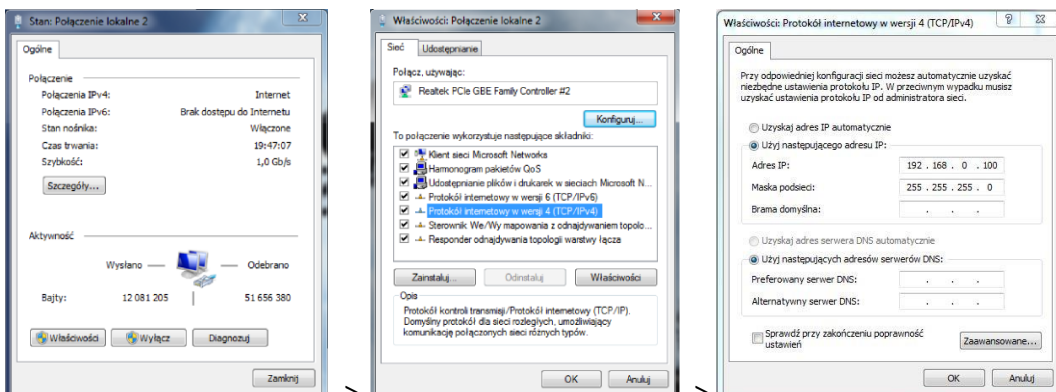5. Connect the server with RJ45 patch cable to the LAN or directly to the PC.
6. Switch on the power supply.
7. Set the local PC connection to the server's subnet.
   Factory settings for MT-CPU-1:
   IP address: 192.168.0.98
   Subnet mask: 255.255.255.0
   Port: 80
8. PC settings:
   IP address: 192.168.0.xxx (select the last IP address part for the PC in the range of 2-97/99-254)
   Subnet mask: 255.255.255.0

9. Open the web browser and enter the server address http://192.168.0.98, accept by ENTER.
10. The login panel will open:

Enter the default username and password:

User: admin@meternet.pl
Password: admin

11. The application interface will open in the browser window. Go to the Configuration tab and make the appropriate network parameter settings.

RESTART AND FACTORY SETTINGS - FUNCTIONS OF F1 AND F2 BUTTONS

Functions of F1 and F2 buttons
Function description:
- **restart of the MeternetPRO application** (rebooting may take several minutes) - Eth LED;
- restoring the server's **default IP address** - Tx LED;
- **system reboot** (causes restarting the server's operating system) - Rx LED;
- **switching off the system**. After this operation, you can safely disconnect the power supply. The device will turn on after reconnection power supply - Err LED;
Key function selection:
Hold F1 and F2 simultaneously for more than 10 seconds, then release. The blue (Eth) LED will flash. Press F1 to switch the desired function. Each of the Eth, Tx, Rx and Err LEDs indicates the corresponding function. By means of the F2 button confirm the selected function.
Entering the key function selection mode stops the MeternetPRO program.