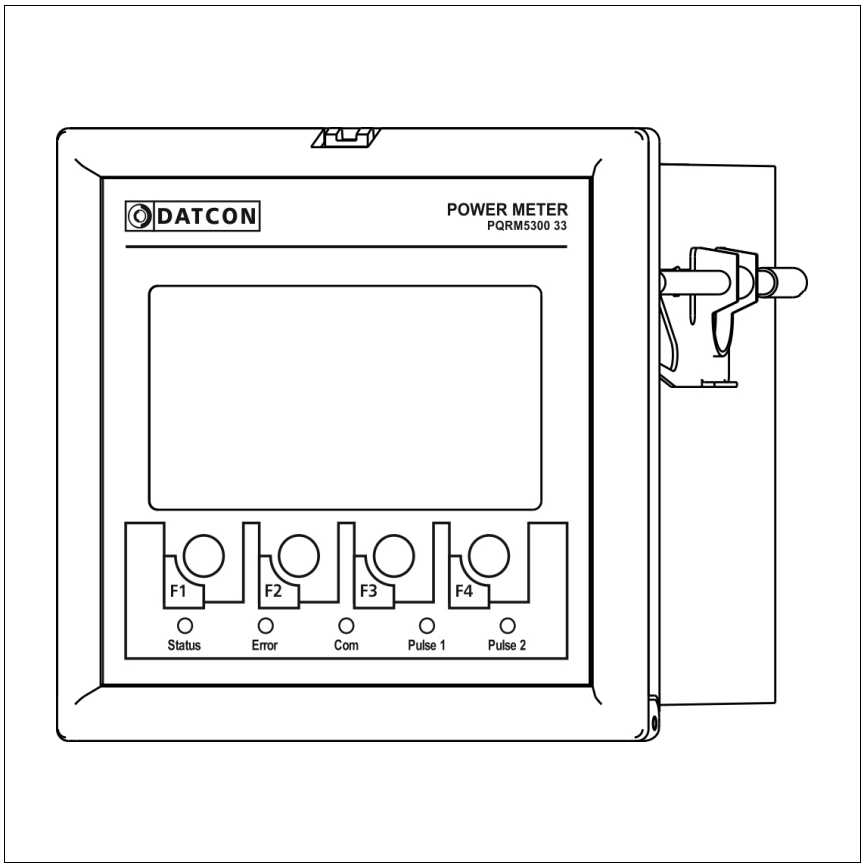
DATCON
INDUSTRIAL MEASUREMENT

PQRM5300 33 Ux Ix xx xx (PS)

Three-phase Power Meter

Instruction manual



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1. About this document

1.1. Function

This operating instructions manual has all the information you need for quick set-up and safe operation of PQRM5300 33 Ux Ix xx xx (PS).
Please read this manual before you start setup.

1.2. Target group

This operating instructions manual is directed to trained personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3. Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

Caution, warning, danger
This symbol informs you of a dangerous situation that could occur. Ignoring this cautionary note can impair the person and/or the instrument.

List

• The dot set in front indicates a list with no implied sequence.

Action

→ This arrow indicates a single action.

Sequence

1 Numbers set in front indicate successive steps in a procedure.

2. For your safety

2.1. Authorized personnel

All operations described in this operating instructions manual must be carried out only by trained and authorized specialist personnel. For safety and warranty reasons, any internal work on the instruments must be carried out only by DATCON personnel.

2.2. Appropriate use

The PQRM5300 33 Ux Ix xx xx (PS) is a Three-phase Power Meter. Detailed information on the application range is available in chapter **3. Product description**.

2.3. Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, or damage to system components through incorrect mounting or adjustment.

2.4. General safety instructions

The PQRM5300 33 Ux Ix xx xx (PS) is a high-tech instrument requiring the strict observance of standard regulations and guidelines.
The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

2.5. CE conformity

The PQRM5300 33 Ux Ix xx xx (PS) is in conformity with the provisions of the following standards:
MSZ EN 61010-1 (safety)
MSZ EN 61326-1 (EMC)

2.6. Environmental instructions

Protection of the environment is one of our most important duties.
Please take note of the instructions written in the following chapters:

- Chapter **3.5. Storage and transport**
- Chapter **9.2. Disposal**

3. Product description

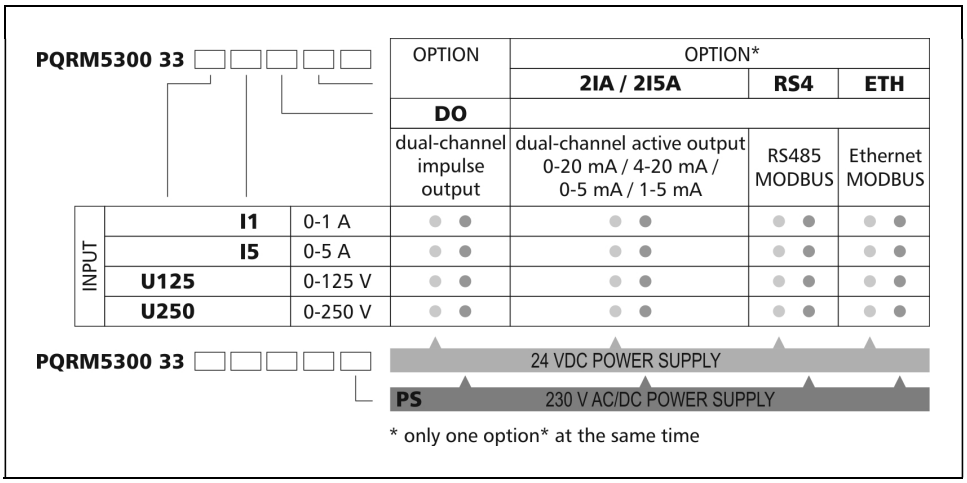
3.1. Delivery configuration

Delivered items

The scope of delivery encompasses:

- PQRM5300 33 Ux Ix xx xx (PS)
- documentation:
  - this operating instructions
  - certification
  - warranty

3.2. Type designation



3.3. Operating principle

Area of application

A PQRM5300 33 Ux Ix xx xx (PS) Three-phase Power Meter measure the characteristic for three-phase network system. The measured values are displayed on a graphic display, and they are forward for processing units. Programming and adjustment are performed via the front panel membrane keypad.

The current inputs of the instrument are isolated from the network with wideband current transformers. The voltage inputs of the instrument are galvanic connection in the network. The PQRM5300 33 Ux Ix xx xx (PS) Three-phase Power Meter has many measurement configurations.

Options:

- Two (4-20 mA / 0-20 mA) or (0-5 mA / 1-5 mA) galvanic isolated, configurable, scalable analog output.
- RS485 galvanic isolated communication output with MODBUS RTU / ASCII slave protocol. 32 instruments can be connected to the PLC or to the computer.
- ETHERNET galvanic isolated communication output with MODBUS TCP protocol.

One options can be installed (dual analog output or communication output) at the same time.

Operating principle

The signals of voltage divider output and of current-transformer output through the signal conditioner and protection circuits are led to the 16 bit A/D converter inputs. The digitalized signals are processed by the instruments microcontroller. The calculated energy values (+E, -E, +RE, -RE) and the settings are stored an EEPROM for an unlimited period of time. The switched-mode power supply of the instrument produces two galvanic isolated output voltages: one for the instrument circuitry and one for the installed options.

Power supply

The instrument has two power supply version:

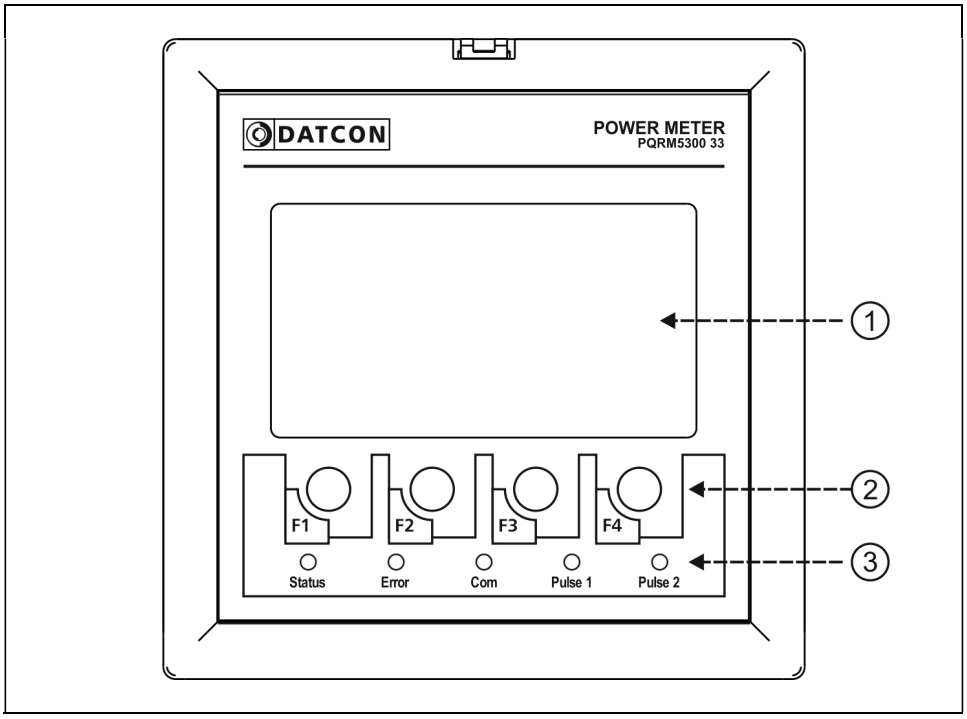
PQRM5300 33 Ux Ix xx xx	24 VDC
PQRM5300 33 Ux Ix xx xx PS:	230 V AC/DC

Measuring parameters: Per phase:

- U_{eff} : Measured voltage of L1, L2, L3 phase [V]
- I_{eff} : Measured current of L1, L2, L3 phase [A]
- P: Measured active power of L1, L2, L3 phase [W]
- Q: Measured reactive power of L1, L2, L3 phase [VAr]
- S: Measured apparent power of L1, L2, L3 phase [VA]
- PF: Calculated power factor of L1, L2, L3 phase
- f: Measured network freuqvency [Hz]
- THDU: Calculated total harmonic distortion of phase voltage (up to 19. harmonic) [%]
- THDI: Calculated total harmonic distortion of phase current (up to 19. harmonic) [%]
- +E: Measured values of consument active energy [Wh]
- -E: Measured values of produced active energy [Wh]
- +RE: Measured values of inductiv reactive energy [VArh]
- -RE: Measured values of capacitiv reactive energy [VArh]
- ΣP: Active power of three phase network [W]
- ΣQ: Reactive power of three phase network [Var]
- ΣS: Apparent power of three phase network [VA]
- ΣPF:Calculated power factor of three phase network
- Σ+E: Measured consument active energy of three phase netwrok [Wh]
- Σ-E: Measured produced active energy of three phase netwrok [Wh]
- +RE: Measured inductive reactive energy of three phase netwrok [VArh]
- -RE: Measured capacitiv reactive energy of three phase netwrok [VArh]
- U_{12}, U_{23}, U_{31}, : Messaured voltage between phase to phase
- ρ_{12}: Meassured phase angle between of L1 and L2 phase
- ρ_{13}: Meassured phase angle between of L1 and L3 phase

3.4. Display, Indicators, keyboard

The following figure shows the instruments front:



1. Monochrome graphic LCD to displaying the measured value, menu points and the error messages.
2. Membrane keypad for navigation in the menu system, selection for the menu items and entering numeric values (F1-F4)
3. Indicators:
„Status" green indicator for indicating that device is ready.
„Error" red indicator for indicating that a kind of error occurred.
„Com" yellow indicator for indicating that a successful data exchange has granted through the communication output (MODBUS),
„Pulse x" yellow indicator for indicating that pulse output is in "on-state" (lights = output is close).

3.5. Storage and transport

This instrument should be stored and transport in places whose climatic conditions are in accordance with chapter **10.1. Technical specification** as described under the title: Environmental conditions.

The packaging of instrument consist of environment-friendly, recyclable cardboard is used to protect the instrument against the impacts of normal stresses occurring during transportation. The corrugated cardboard box is made from environment-friendly, recyclable paper. The inner protective material is nylon, which should be disposed of via specialized recycling companies.

4. Mounting

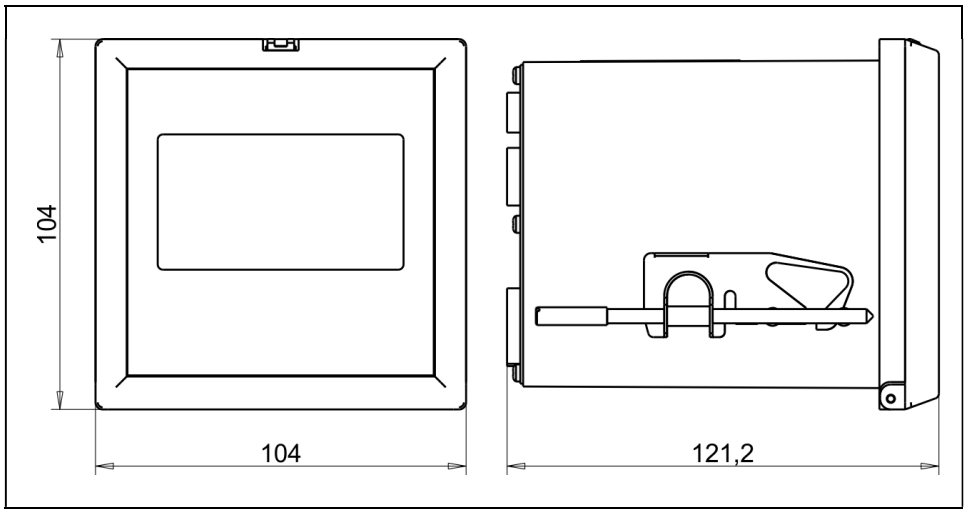
4.1. General instructions

Use the enclosed seal between the instrument and the panel when mounting the instrument to assure IP 54 from the front. The instrument should be installed in a cabinet with sufficient IP protection, where the operating conditions are in accordance with chapter **10.1. Technical specification**, as described under the title: Operating conditions.

Mounting position

Select a mounting position you can easily read the display reach for mounting and connecting the instrument and that minimizes the hazard of water, dust or dump getting into the instrument.

4.2. Main dimensions of the instrument

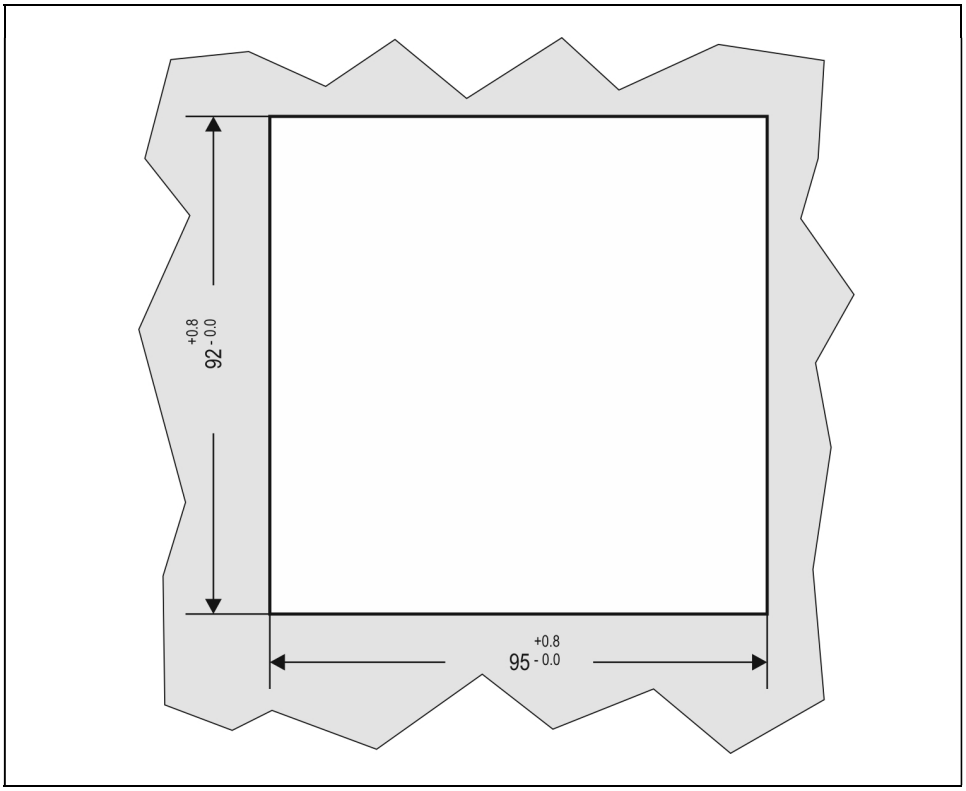


4.3. Mounting

Preparatory steps

The following figure shows the dimensions of panel cut-out:
(thickness: 2 - 5 mm)

Dimensions of panel cutout

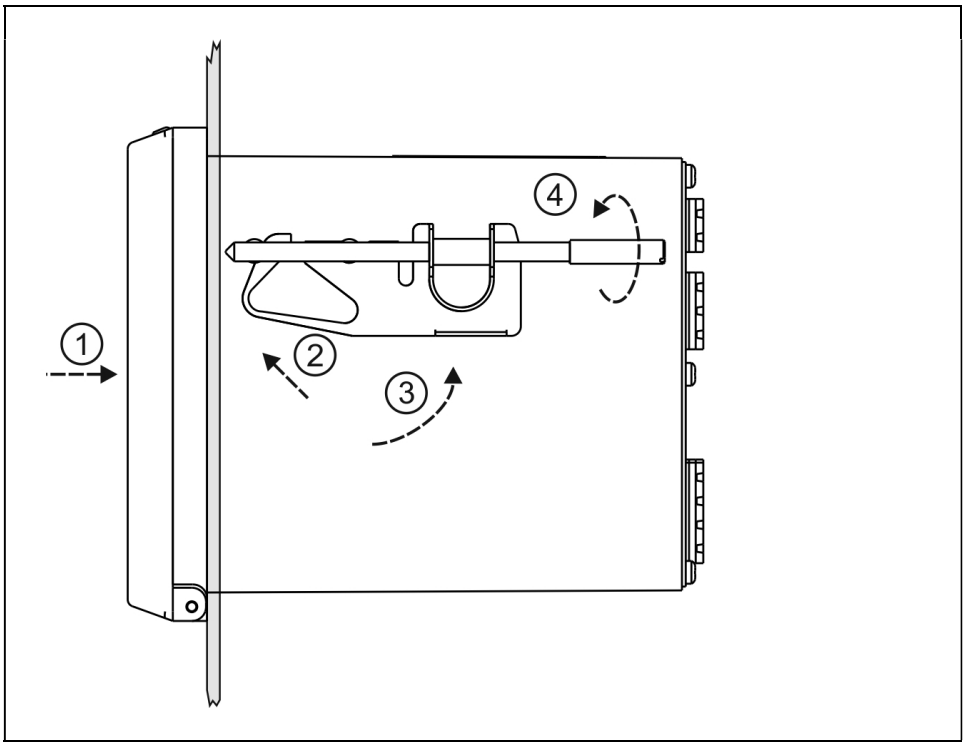


1. Cut-out the panel according to the figure shows above.

The cut-out needs special tools, it must be carried out by trained specialist personnel.

Before fitting the instrument into the panel cut-out it is recommended to exercise the using of mounting clamps. Put the instrument onto a table and follow the steps (from step 2.) written under the figure:

Mounting with the mounting clamps



Please do not exercise forces higher than necessary, as it may cause damages to the clamp.

1. Pulsh in the instrument to the panel.
2. Insert the mounting clamp into the front rivet. (according the figure **Step (2)**)
3. Rotate the mounting clamp in the direction of the arrow until it snaps into the groove in the rear mounting rivet. (according the figure **Step (3**)
4. Screwing the fixing screw (clockwise) according the figure **Step (4)**.
5. Do the above procedure with the other mounting clamp also (**Step (1)** - **Step (4)**).

Check the hold of the instrument in the panel cut-out by moving on it firmly.

5. Connecting

5.1. Preparing the connection

Always observe the following safety instructions:
• The connection must be carried out by trained and authorized personnel only
• Connect only in the complete absence of supply voltage
• Take note the data concerning on the overcurrent protection in installation
• Use only a screwdriver with appropriate head

Select and prepare connection cable

Take note the suitability of the connecting cable (wire cross-section, insulation, etc.).

The cross-section of the connecting wires specified in the following table

connector	wire cross-section
Main inputs	0,75–1,5 mm^2
Voltage and current measurement inputs	2,5–4,5 mm^2
Analogue outputs	0,25–0,5 mm^2
Communication outputs	0,35–0,5 mm^2
Pulse outputs	0,35–0,5 mm^2

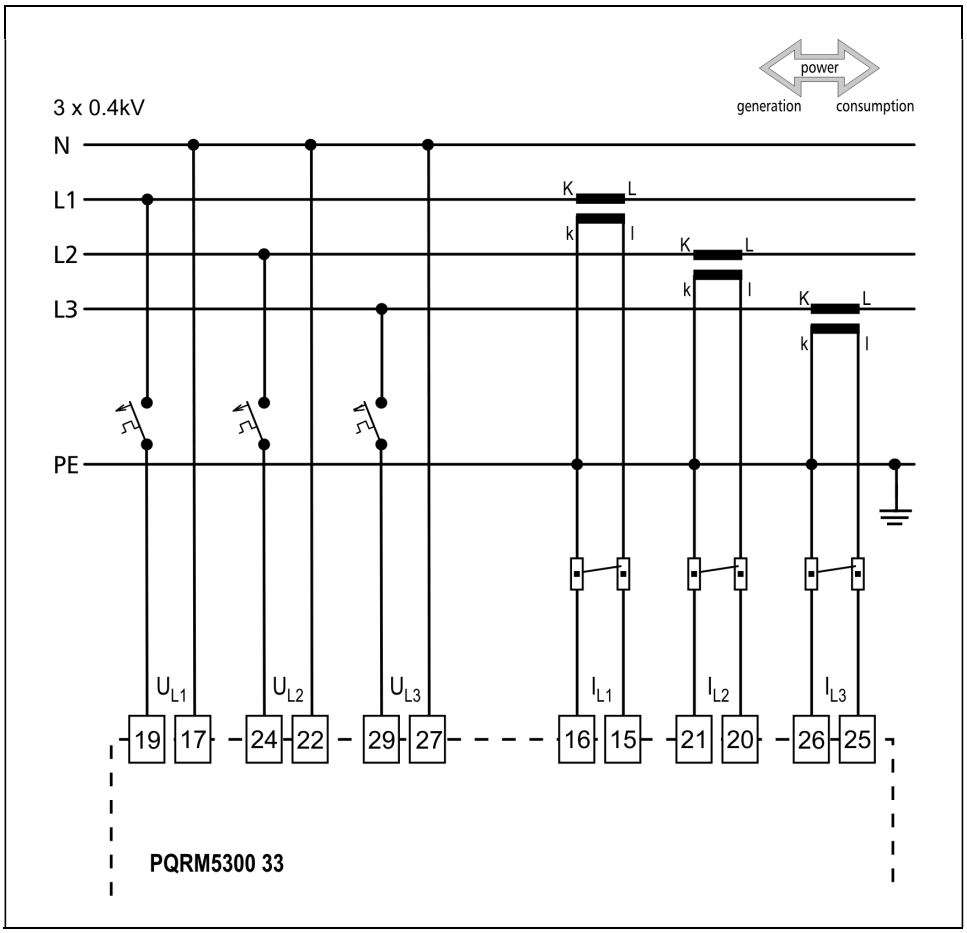
You may use either solid conductor or flexible conductor. In case of using flexible conductor use crimped wire end. Strip approx. 8 mm insulation.

It’s an important rule that the power cables and signal cables should lead on a separate way.

5.2. Connecting the measuring inputs to power network. Three phase measurement with neutral conductor. (3 phase, 4 wire, 3 measuring)

The following figure shows the wiring plan, connecting the instrument to low voltage power network with neutral conductor.

Wiring plan, connecting the voltage and current inputs to power network.



The terminal “k” of CT you have to connecting to earth!

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

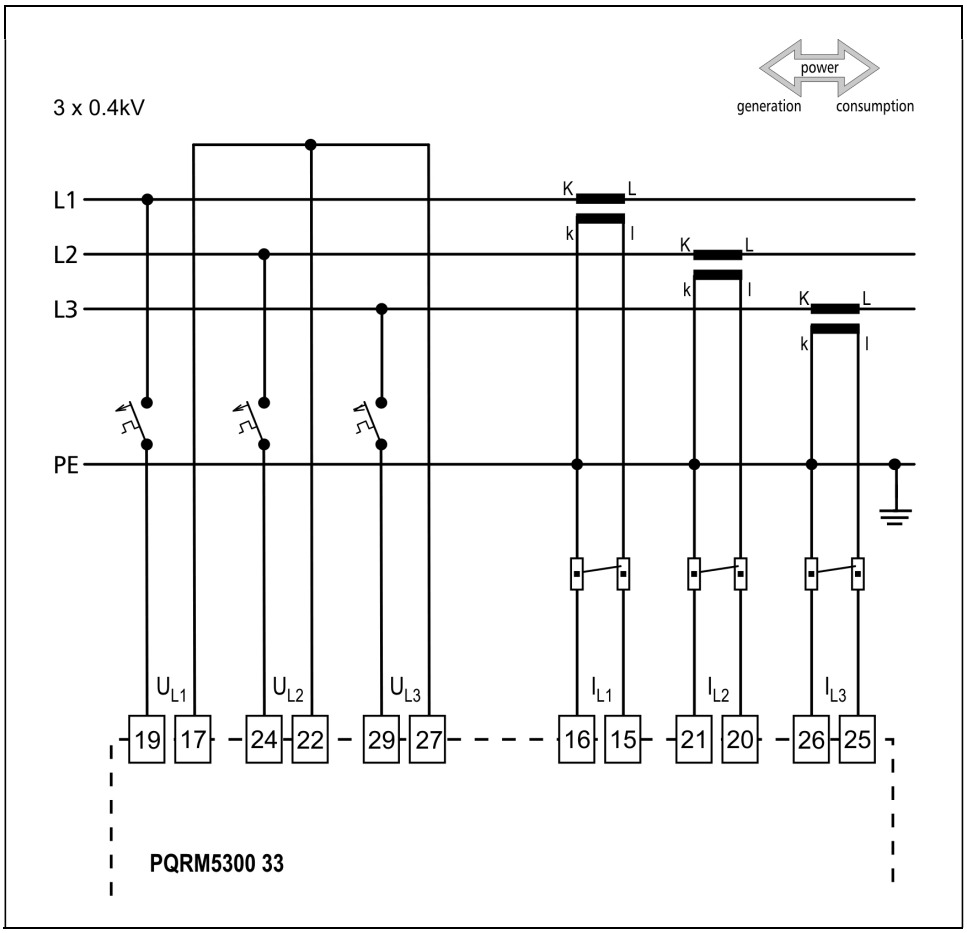
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.3. Connecting the measuring inputs to power network. Three phase measurement without neutral conductor. (3 phase, 3 wire, 3 measuring)

The following figure shows the wiring plan, connecting the instrument to low voltage power network without neutral conductor.

Wiring plan, connecting the voltage and current inputs to power network.



The terminal “k” of CT you have to connecting to earth!

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

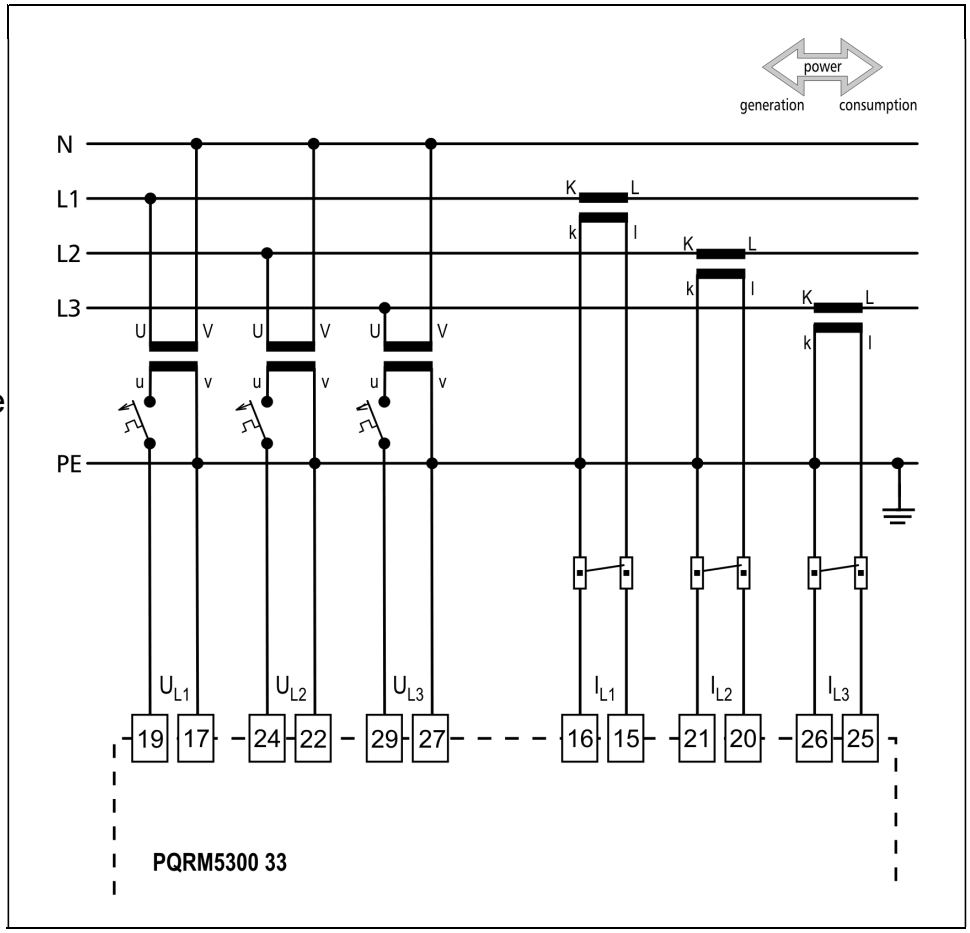
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.4. Connecting the measuring inputs trough transformer to power network. Three phase measurement with neutral conductor. (3 phase, 4 wire, 3 measuring)

The following figure shows the wiring plan, connecting the instrument to medium voltage power network with neutral conductor.

Wiring plan, connecting the voltage and current inputs to power network.



The terminal “k” of CT and terminal “v” of VT you have to connecting to earth!

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

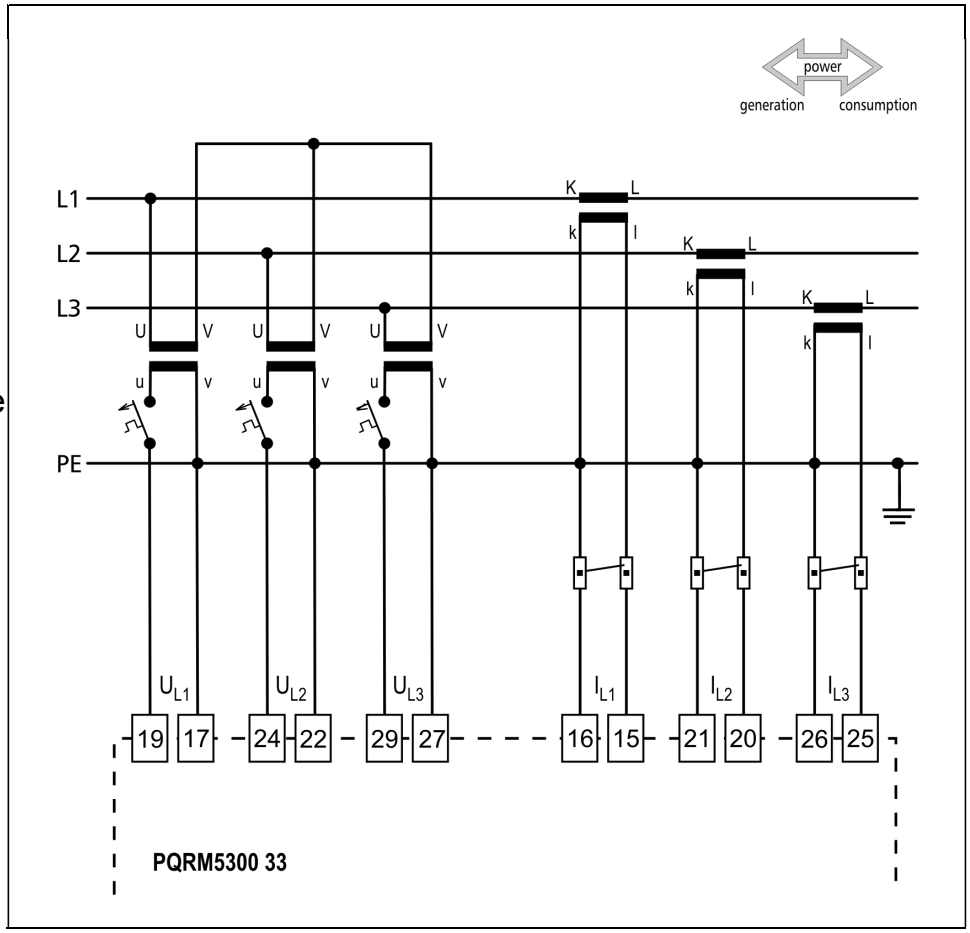
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.5. Connecting the measuring inputs to medium voltage power network. Three phase measurement without neutral conductor. (3 phase, 3 wire, 3 measuring)

The following figure shows the wiring plan, connecting the instrument to medium voltage power network without neutral conductor

Wiring plan, connecting the voltage and current inputs to power network.



The terminal “k” of CT and terminal “v” of VT you have to connecting to earth!

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

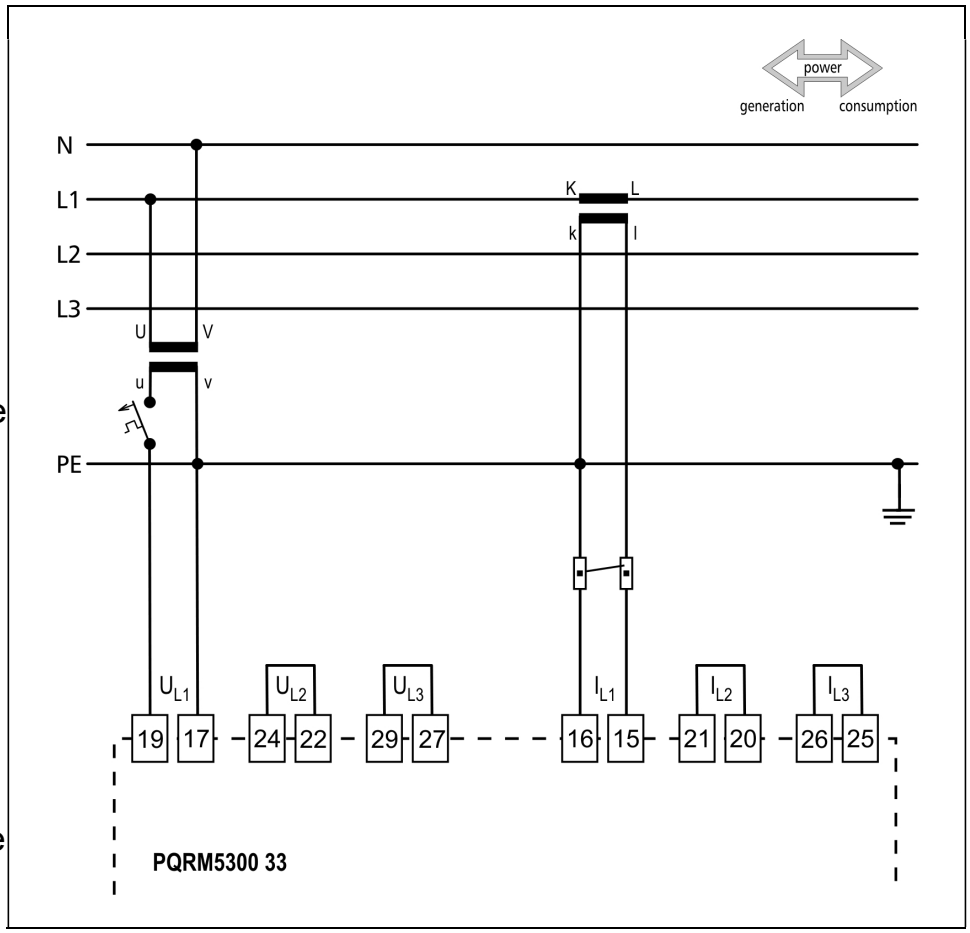
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.6. Connecting the measuring inputs to symmetrical three-phase power network with neutral conductor. (3 phase, 4 wire, 1 measuring)

The following figure shows the wiring plan to symmetrical three-phase network. Measuring only one phase. The three phase outputs are calculated values. The measuring arrangement use for the measurement of rotating machinery!

Wiring plan, connecting the voltage and current inputs to power network.



The application of:
The vectorsum of all phase voltages is always zero!

The terminal “k” of CT and terminal “v” of VT you have to connecting to earth!

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

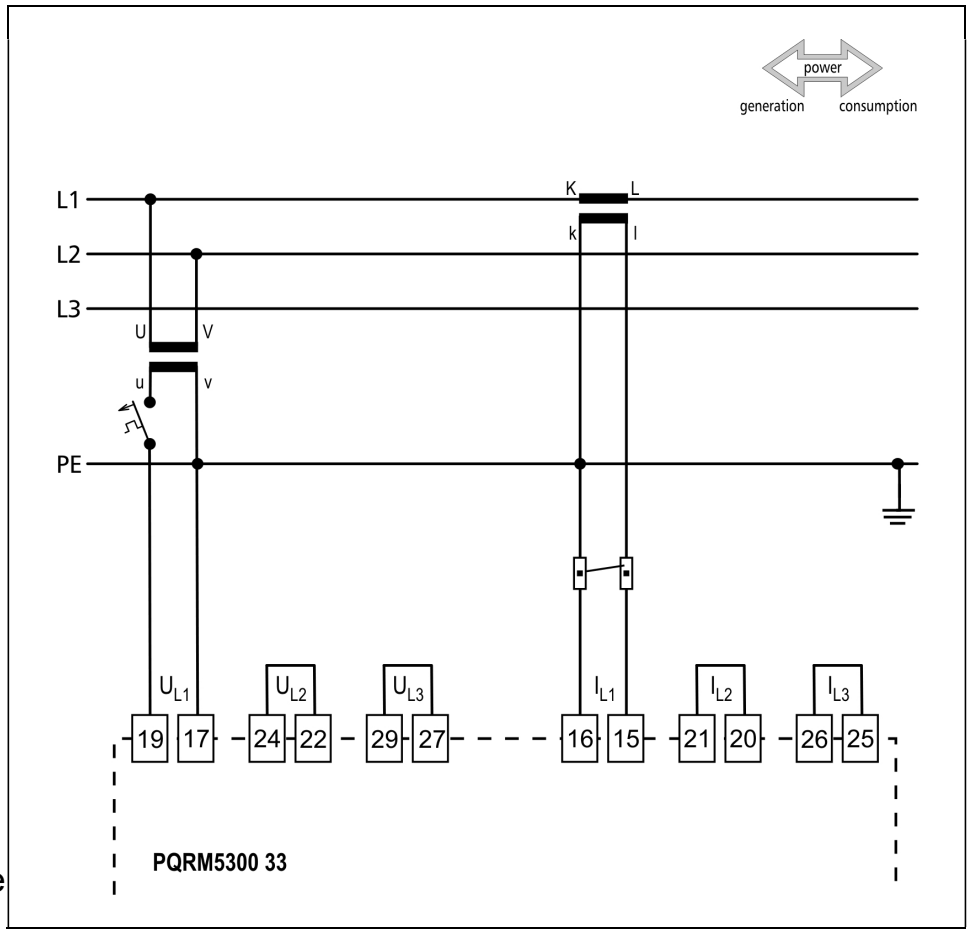
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.7. Connecting the measuring inputs to symmetrical three-phase power network without neutral conductor. (3 phase, 3 wire, 1 measuring)

The following figure shows the wiring plan to symmetrical three-phase network without neutral conductor. Measuring only one phase. The three phase outputs are calculated values. The measuring arrangement use for the measurement of rotating machinery!

Wiring plan, connecting the voltage and current inputs to power network.



The application of:
The vector sum of all phase voltages is always zero!

The terminal “k” of CT and terminal “v” of VT you have to connecting to earth!

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

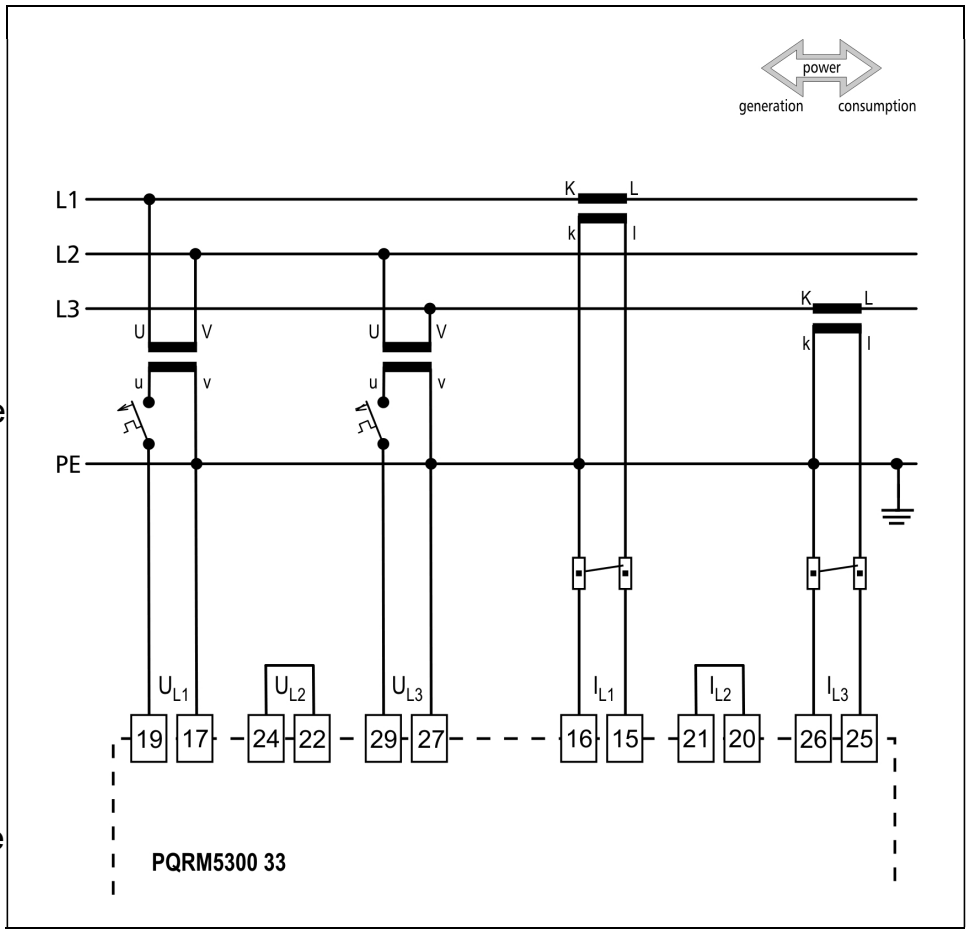
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.8. Aron mode (3 phase, 3 wire, 2 measuring)

The following figure shows the wiring plan to three-phase network without neutral conductor with two measuring input. The three phase outputs are calculated values.

Wiring plan, connecting the voltage and current inputs to power network.



The application of:
The vectorsum of all phase voltages is always zero!

The terminal “k” of CT and terminal “v” of VT you have to connecting to earth!

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

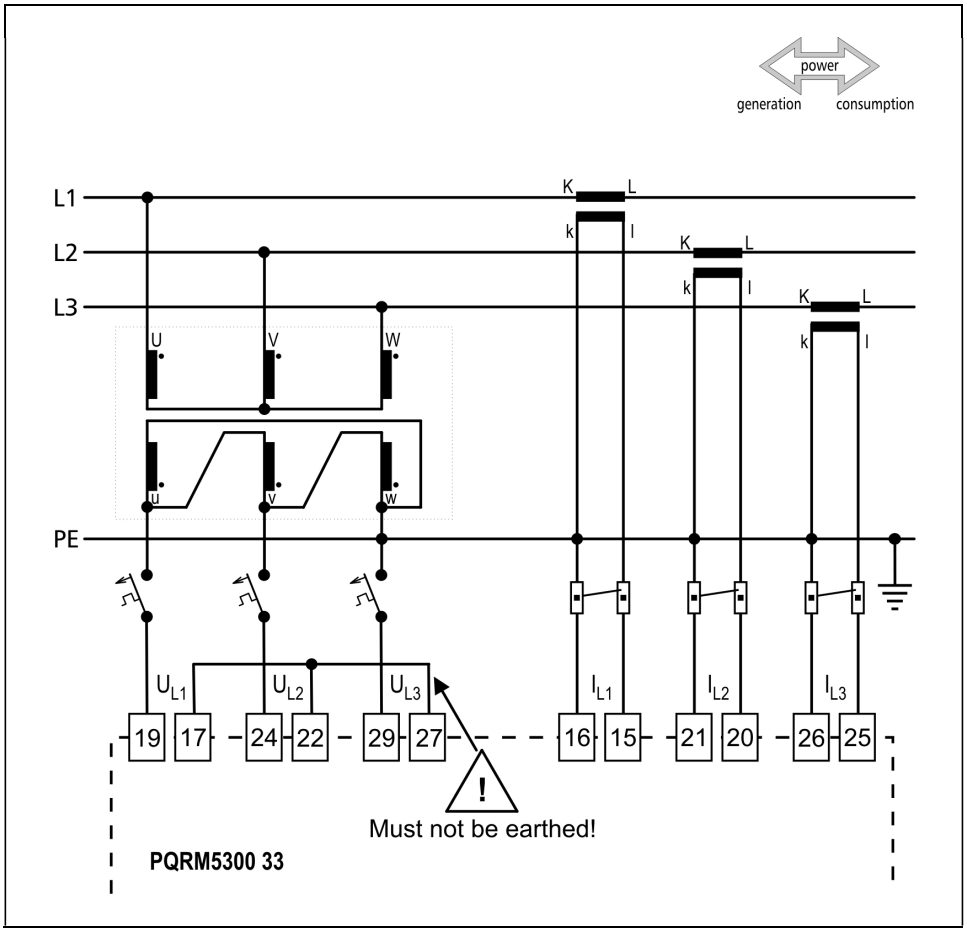
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.9. Connecting the measuring inputs to three-phase power network trough three-phase voltage transformers without common connection point (3 phase, 3 wire, 3 measuring, 3fmv)

The following figure shows the wiring plan to three-phase network without neutral conductor. The voltage inputs are connecting trough one three-phase transformers to power network. One secondary phase of the three-phase transformers is connecting to earth.

Wiring plan, connecting the voltage and current inputs to power network.



The terminal “k” of CT you have to connecting to earth!

One phase of three-phase transformer you have to connecting to earth!

The 17, 22, 27 input of devices shall not connect to earth!

The VT you must mull √3

1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

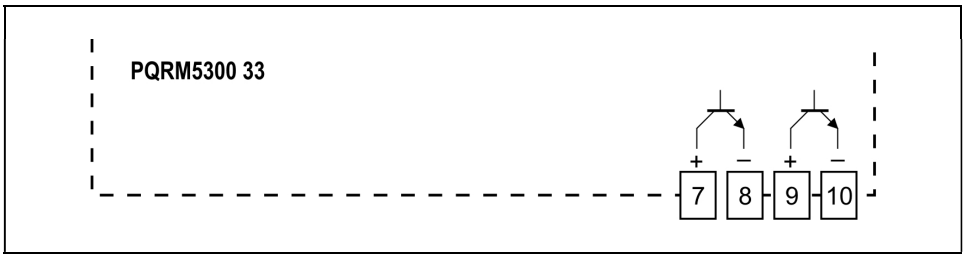
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.10. Connecting the digital outputs

The digital outputs of the device are passive switch transistor. The external power supply is required for operation. The figure shows the outputs terminal of the switching transistor

Output terminal of the digital outputs

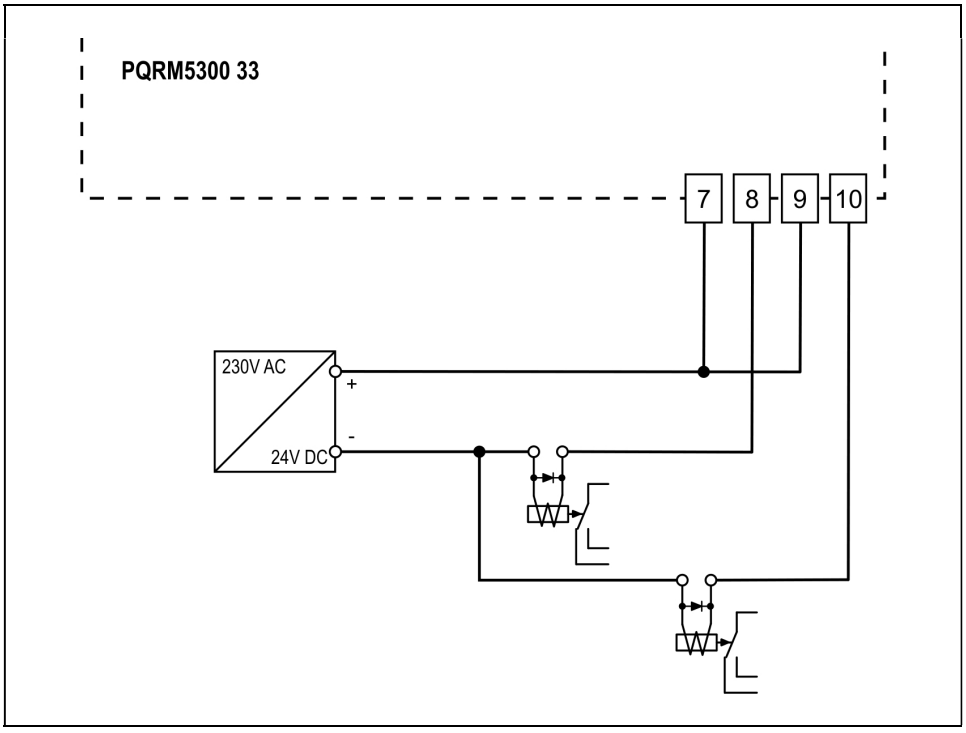


The technical parameters of the digital outputs refer to the **10.1. Technical specification** chapter.

Example: Connect the digital output for processing unit.

Wiring plan, connecting to processing unit.

Be careful the polarity of the cables!



1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

9 -10 : digital output 1
7 – 8 : digital output 2

Checking the connections

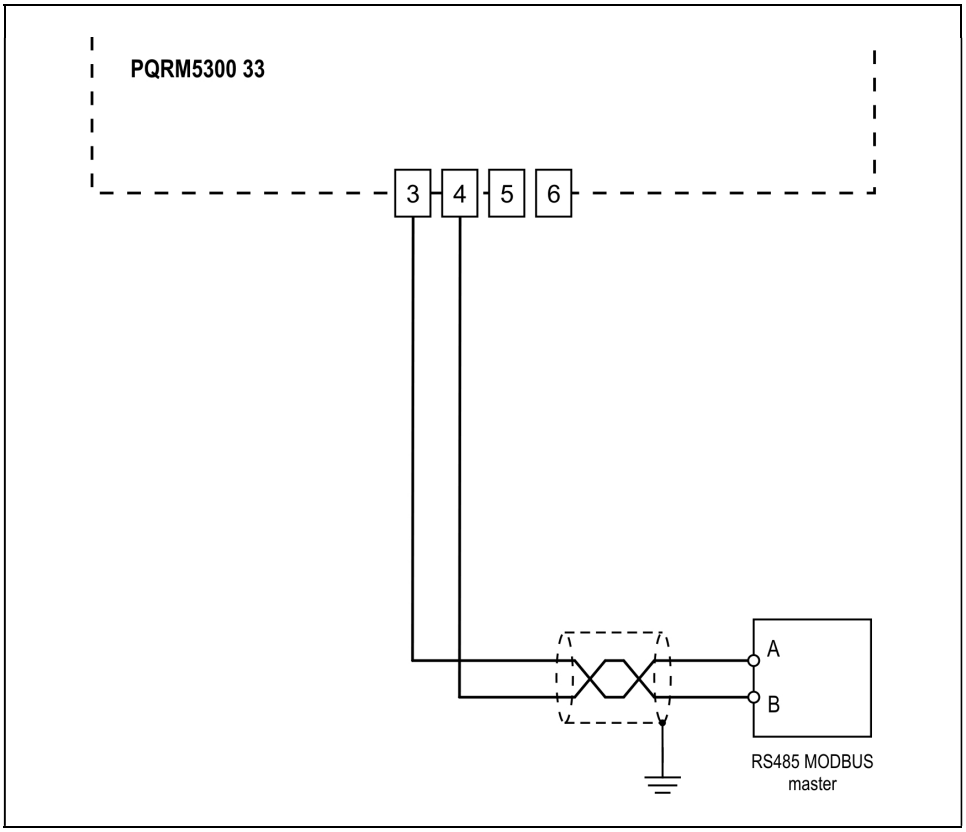
Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.11. Connecting to MODBUS RS485 network

The following figure shows the wiring plan, connecting the devices with MODBUS RS485 option to processing unit.

Wiring plan, connecting to processing unit.

Be careful the polarity of the cables!



1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

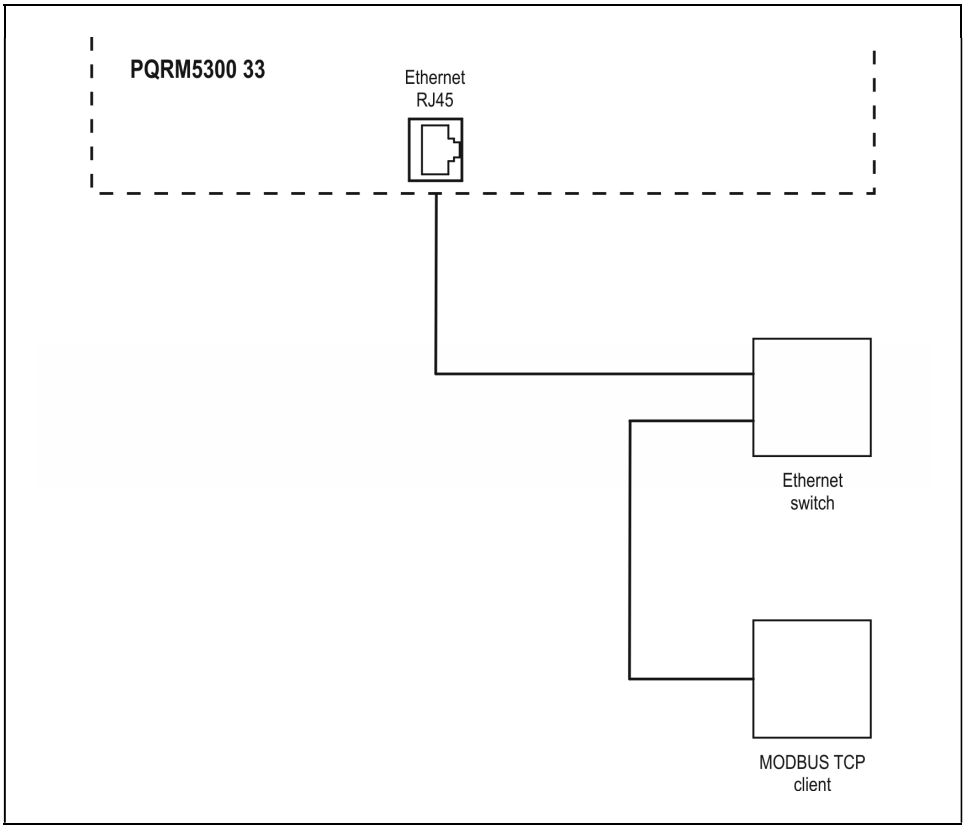
Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.12. Connecting to ETHERNET network

The following figure shows the wiring plan, connecting the devices with ETHERNET option to processing unit.

Wiring plan, connecting to processing unit.



1. Connect the ETHERNET cable to RJ45 socket, which located on the backplane of the device.
2. Check the hold of the wires in connector by pulling on them firmly.

Checking the connections

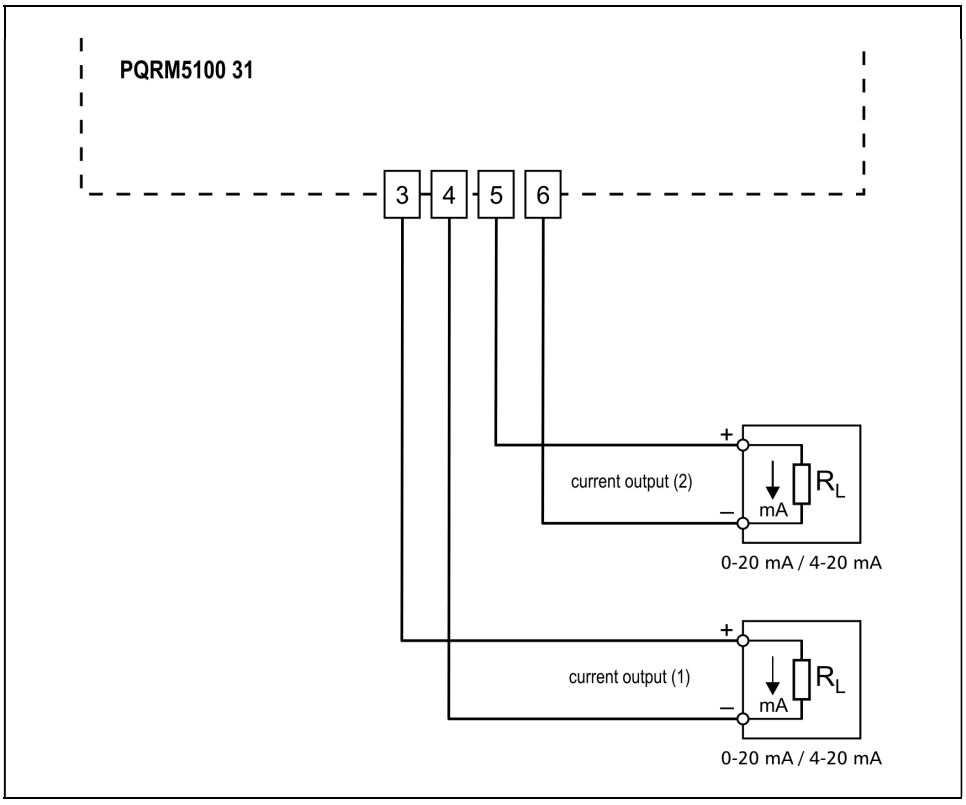
Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.13. Connecting the analog output to signal processing unit

The following figure shows the wiring plan, connecting the devices with Analog output option to processing unit.

Wiring plan, connecting the analog output to the signal processing unit

Be careful the polarity of the cables!



1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

Checking the connections

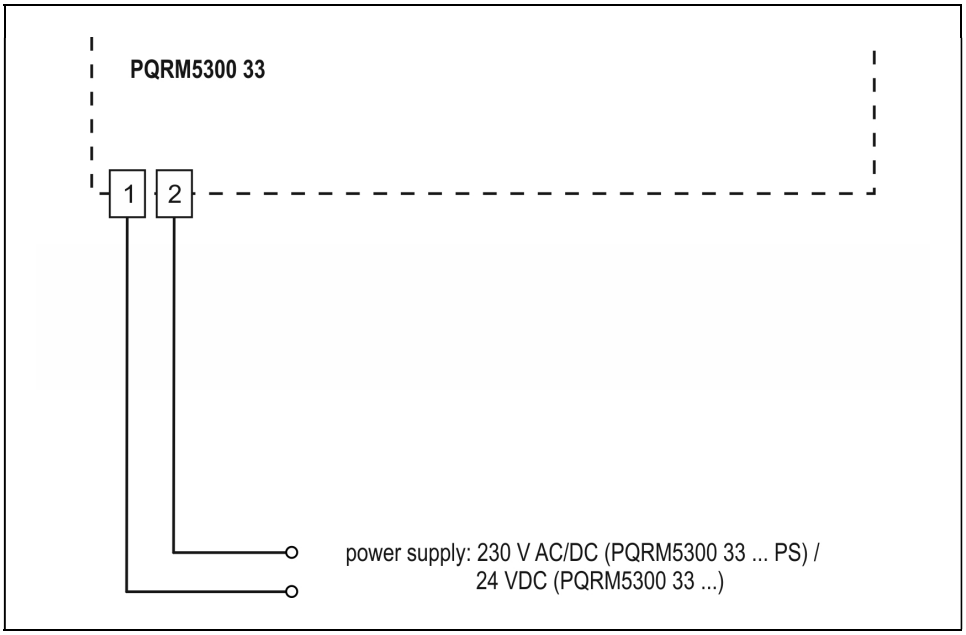
Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

5.14. Connecting the power supply

The following figure shows the wiring plan, connecting the PQRM5300 33 Ux Ix xx xx to the power supply:

Wiring plan, connecting the power supply

In case of DC supply the polarity is indifferent



1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

Checking the connections

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

Put the instrument under supply voltage

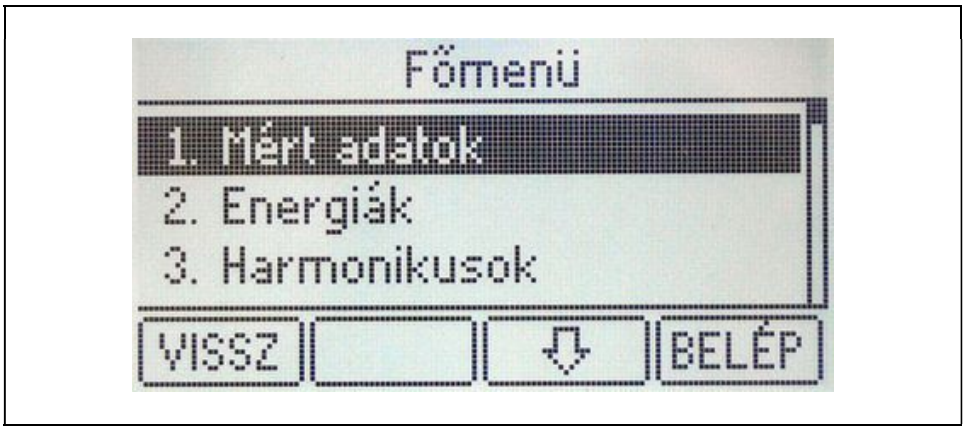
After you have completed all the connections, put the instrument under supply voltage. If the connections are correct the green indicator gives light and you can detect an output signal according to the measured value by the instrument.

6. Setting – up

6.1. First steps

If you turned on the devices, you can see on display the Main menu. The bottom line of the display you can read the function of F1, F2, F3, F4 buttons. This line shows always the current functions the buttons.

I



Submenus for Main menu:

- **1. Measured data**
- **2. Energy**
- **3. Harmonics**
- **4. Power limit**
- **5. Errors**
- **6. User settings**
- **7. Configuration**

If the power supply restore, the display will show that menu point, which was displaying when powered off.

You can moving in menu with a ⇩ and ⇧ buttons.

You can entering in menu with ENTER button. You can exit the menu with BACK button.

Language settings are in 6. Kezelői beállítások / 6. User settings menu, 6.1 Magyar / English / 6.1 English / Magyar submenu.

6.2. Main menu, Measured data

Here you can select to display the measured values.

1.1. L1 phase
1.2. L2 phase
1.3. L3 phase
1.4. L1 L2 L3 phases
1.5. User display 1
1.6. User display 2

The following measured values are displayed in menu L1 phase, L2 phase, L3 phase

- U (RMS Voltage of phase),
- I (RMS Current of phase),
- f (Measured network freuqvency),
- P (Measured active power),
- Q (Measured reactive power),
- S (Measured apparent power)
- PF (Calculated power factor),

• THD U (Calculated total harmonic distortion of phase voltage (up to 19. harmonic) [%]
• THD I (Calculated total harmonic distortion of phase current (up to 19. harmonic) [%]

The device desplayed the following network data in the L1 L2 L3 phases submenu:

- U12 (phase voltage between L1and L2 phase),
- U13 (phase voltage between L1 and L3 phase),
- U23 (phase voltage between L2 and L3 phase),
- φ 12 (Measured phase angle between of L1 and L2 phase),
- φ 13 (Measured phase angle between of L1 and L3 phase),
- ΣP (Active power of three phase network),
- ΣQ (Reaactive power of three phase network),
- ΣS (Apparent power of three phase network),
- ΣPF (Power factor of three phase network),
- f (network frequency),

The 1.5. User dispaly 1 and 1.6. User display 2 submenus are displayed as specified by the user-measured values (You can set this display on 6. User settings menu, 6.3. Edit user display 1 and 6.4. Edit user display 2).

You can set with the ZOOM button the characterize of displayed measured values. You can move with ⇩ and ⇧ buttons in the menu.

6.3. Main menu, Energy menu

Menu items and their meaning:
2.1. L1 energy
2.2. L2 energy
2.3. L3 energy
2.4. Energy sum

The individual menu items are displayed as a measured value:

- +E (Measured values of consument active energy),
- -E (Measured values of produced active energy),
- +RE (Measured values of inductiv reactive energy),
- -RE (Measured values of capacitiv reactive energy),

You can choose the units with k/M/G button.

The energy registers are clearing from submenu 7.7. Clear enregy of 7. Configurations menu.

6.4. Main menu, Harmonics menu

The device can calculate voltage and current content for 18 harmonic. Here you find the meassurement results. You need to enable harmonic analysis option. If you enable this function, the measurement update time greatly increases.

6.5. Main menu, Errors menu

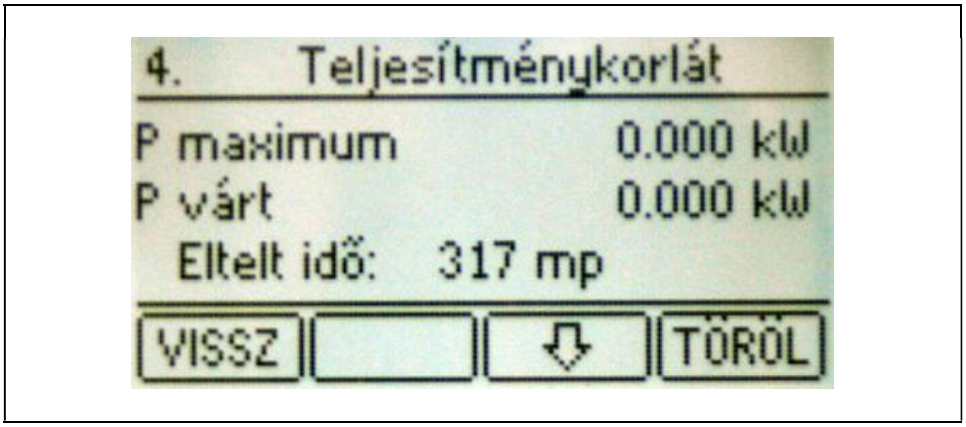
The device stores the error events of network (overvoltage, overcurrent, voltage dip and interruption), synchronizing signal errors (if demand function is enabled) and communication errors.
The log can you clear from 7.6. Clear errors submenu of 7. Configurations menu.

Press the BACK button to return to the menu.

6.6. Main menu, Power limit

The device calculates the expected average performance (15 min) from actual power. If this value is greater than the setting limit, the device set to active state the digital1 output.
If the value is lower than the limit at the next sampling, the device turn back the digital1 output. If the value is greater than the setting limit, the device holds the digital1 output to active state, and the digital2 output sets to active state. At the next sampling the value of expeted average power is lower the settings limit, the device set the digital2 output to inactive state.
These outputs states are repeated within a 15 minute period.

You can setting this function on 7.2. Modul #1 settings and 7.4. Power limiting of 7. Configurations menu.



P maximum: Adjustet demand limit (The value is equal 1.Tariff / 2.Tariff / 3.Tariff / 4.).
P expected: Expected power demand value for end of 15. minutes
P current: Current power demand value
Elapsed Time: time after the last sync pulse

If the sync pulse is out, the following massage are readable on display:

“Syncronpulse out!”
“Unexpected syncronpulse!”
Press the BACK button to return to the menu.

6.7. Main menu, User settings menu

In this menu, you can set parameters for display. Here you can edit the custom display images, and can you set display brightness and backlight intensity.

Non password-protected area

6.8. Main menu, Configurations menu

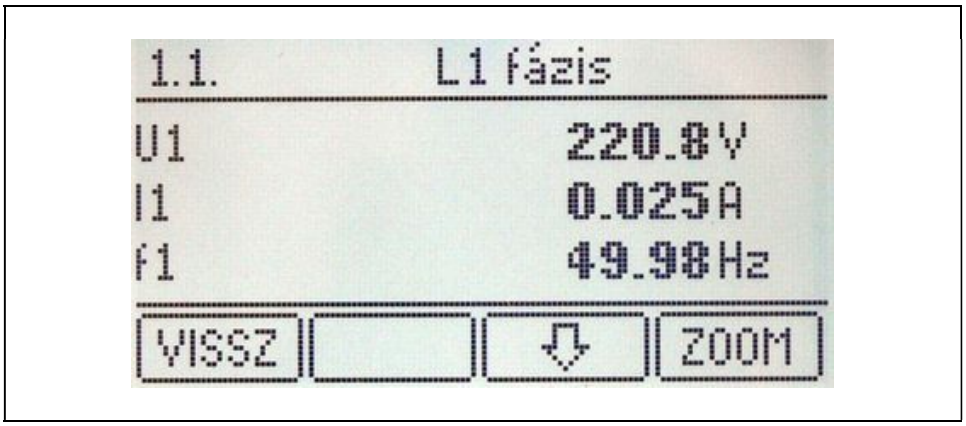
Here you can configure the devices. Here you can enable/disable the errors, clearing the energy registers and test the analog/digital outputs.

Password-protected area.

7. Settings

7.1. General information

After you turn on the device, you can see in the display the Main menu or the last selected menu. In last line of display show the function of soft buttons (F1, F2, F3, F4).



First step change please the display backlight intensity in 6.2. Screen settings menu. If you don't press the soft buttons for 30 seconded, the display goes to standby mode. (Backlight reduces the brightness). If you press any buttons, first wake up the display backlight. In this case you must press the button again, if you want moving in the Menu.

7.1.1. Required settings

After first power up the device is in working condition. In this case the device working in factory settings.
For proper operation, the following settings may be required:

- 7.1.1. Measure configuration

Here you can set the measuring arrangement.

- 7.1.2. Transformations

If you connect the device trough the transformers to the network, here you can set the ratio of the transformers.

- 7.1.3. CT phase shift

If you know the phase shift (50Hz) of the current transformer, you can specify the value here. The device to compensate the measurement results.

- 7.1.4. Sampling time

The device sampling the necessary data for the calculation. If the sampling time goes out (minimum 80 ms) the MCU of device makes the calculations and updates the outputs. You can increase the sampling time. It is possible to reduce the fluctuation of measured values. The sampling time modification change refresh time of the instrument.

- 7.1.5. Current threshold

When the current threshold function is used on the current input, the instrument eliminates the input signal under x% of the input range.
This function may be useful when the power network is noisy either in voltage off state or in unloaded state and this effect may cause an error in energy measurement.
[Default: 0.0%]

- 7.2. Modul #1 settings

Here you can set the Digital input/output options.

- 7.3. Modul #2 settings

Here you can set the analogue output option or RS485 communication option.

- 7.4 Power limiting

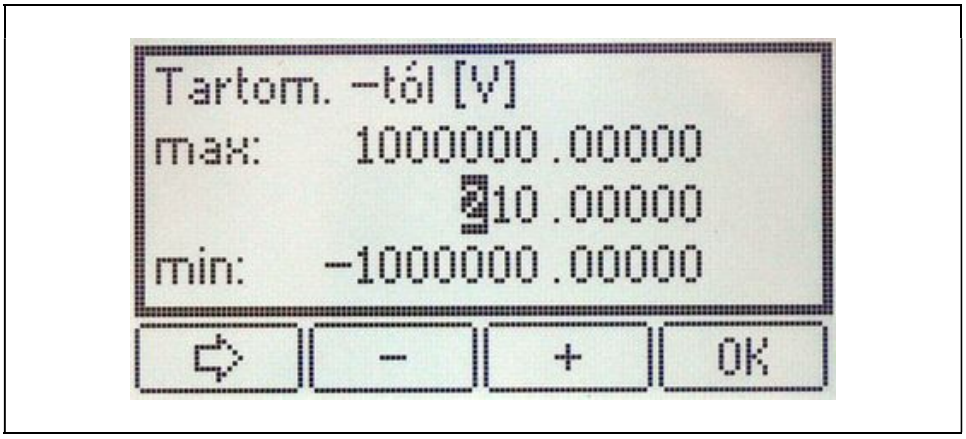
Here you can set the tariff registers for demand function.

- 7.5. Clear errors

Here you can delete the errors registers

7.1.2. Entering numbers (Editing numbers)

When you would like editing the number, you can see the following window:



The editing number name and his unit are in the first line. The number is in the third line. The cursor marks the current local value. The value can edit with [+] and [-] buttons. The cursor can moves with [⇨] button.
Press the [OK] button to accept the value.

7.2. Enter to User settings menu

Entering to submenu

Move with the ⇧ / ⇩ buttons in the Main menu, and select the 6. User setting menu. Press the ENTE switch.

Submenu of User settings menu

Submenu of 6. User settings menu:

- 6.1. English / Magyar
- 6.2. Screen settings
- 6.3. Edit user display 1
- 6.4. Edit user display 2

7.2.1 Language selection

Function

In 6.1 English / Magyar menu you can select the language of the device.
Default language is Magyar.

Sequence of operations

1. Log in the 6. User settings menu
2. Choose the 6.1 English / Magyar menu of the 6. User settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Select the languae in the 6.1.English / Magyar submenu with ⇧ / ⇩ buttons, end press the SEL button.
4. Press the OK button.

If the language was Hungary:

1. Log in the 6. Kezelői beállítások menu
2. Choose the 6.1 Magyar / Angol menu of the 6. Kezelői beállítások menu with ⇧ / ⇩ buttons, and press the BELÉP switch.
3. Select the languae in the 6.1. Magyar / English submenu with ⇧ / ⇩ buttons, end press the JELÖL button.
4. Press the OK button.

7.2.2. Setting the brightness of displaybacklight

Function

In the 6.2. Screen settings menu can you set the brightness of display. Here you can set again the backlight active time and the standby light level. The brightness of display is 100% in active mode.

Sequence of operations

1. Log in the 6. User settings menu
2. Choose the 6.2 Screen settings menu of the 6. User settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the Standby light level menu of the 6.2 Screen settings menu with ⇧ / ⇩ buttons, and press the Edit switch.
4. Please type the value with help ⇨, -, + switches, and press the OK switch to accept the value.
5. Choose the Screen active time menu of the 6.2 Screen settings menu with ⇧ / ⇩ buttons, and press the Edit switch.
6. Please type the value with help ⇨, -, + switches, and press the OK switch to accept the value.
7. Choose the Contrast value menu of the 6.2 Screen settings menu with ⇧ / ⇩ buttons, and press the Edit switch.
8. Please type the value with help ⇨, -, + switches, and press the OK switch to accept the value.
9. Press the BACK switch to exit from 6.2 Screen settings submenu.

7.2.3. Editing the user displays

Function

The device has two special displays. These displays are editable from user. This displays show just the measure result of the network. You can edit these displays in the menu 6.3. Edit user display 1 and 6.4. Edit user display 2.

Sequence of operations

1. Log in the 6. User settings menu
2. Choose the 6.3 Edit user display 1 or 6.4 Edit user display 2 menu of the 6. User settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Select the line with ⇩ switch, and then select the measured value of network witch ⇦ / ⇨ switches.
   If it is necessary make this operation in the other lines.
4. Press the BACK switch to exit from 6.3. Edit user display 1 or 6.4. Edit user display 2 submenu.

7.3. Configurations menu

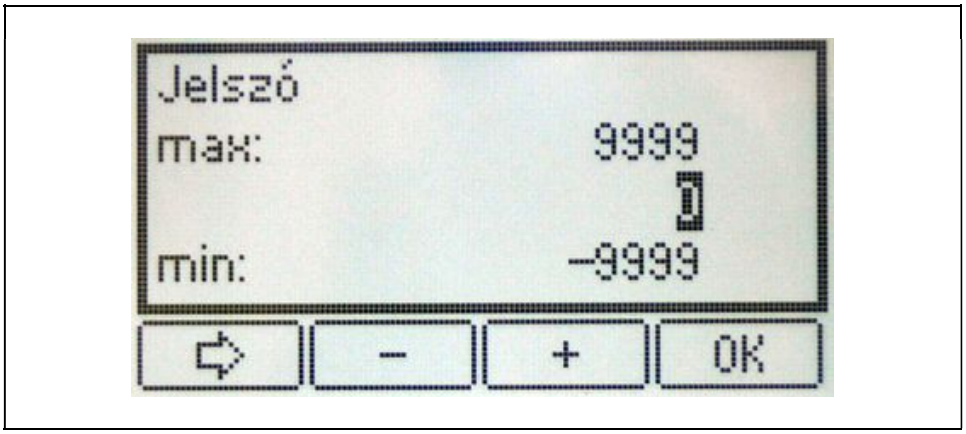
Entering in the menu

1. Choose the 7 Configurations menu of the Main menu with ⇧ / ⇩ buttons, and press the ENTE switch.

2. Please type the password with help ⇨, -, + switches, and press the OK switch to accept the value.

The default password is 0.

The password is modifying in the 7.8 User password submenus of 7. Configurations menu.



Submenus of Configurations menu

If the password was correct, the submenus of 7. Configurations menu are visible.

- 7.1. Measure settings
  - 7.1.1. Measure configuration
  - 7.1.2. Transformation
  - 7.1.3. CT phase shift
  - 7.1.4. Sampling time
  - 7.1.5. Current threshold
- 7.2. Modul #1 settings
- 7.3. Modul #2 settings
- 7.4. Power limiting
- 7.5. Error LED setting
- 7.6. Clear errors
- 7.7. Clear energy
- 7.8. User password
- 7.9. Device to default state
- 7.8. Program version, Ser.Nr.

7.3.1 Measure input settings

Function

In the 7.1 Measure configurations menu you can set the how connect the device to network. Here you can set the voltage and currents transformers for inputs (if they are usable) and other special parameters of the measurement.

7.3.1.1. Measure configuration

Function

The device can operate several types of measurement setup. In the **7.1 Measure configurations** menus you can set the measuring arrangement. Possible measuring modes:

3 phase, 4 wire, 3 meter:
Three phase measurement with neutral conductor

3 phase, 3 wire, 3 meter:
Three phase measurement without neutral conductor

3 phase, 3 wire, 2 measure:
Three phase measurement without neutral conductor. Using 2 meter configuration. (Aron mode)

3 phase, 4 wire, 1 meter:
Three phase measurement with neutral conductor. Using 1 meter configuration. It is assumed symmetric load system, so you can use the measurement of rotating electrical machines.

3 phase, 3 wire, 1 meter:
Three phase measurement without neutral conductor. Using 1 meter configuration. It is assumed symmetric load system, so you can use the measurement of rotating electrical machines.

3 phase, 3 wire, 3 meter, 3fmv:
Three phase measurement without neutral conductor, and threephase voltage transformers with delta secondary winding. The secondary winding of the transformer is connecting to earth. The Voltage transformers ratio is multiplied √3!

You can find the electrical wiring diagrams for each measurement arrangement on **5. Connecting** chapter.

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.1. Measure settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.1.1. Measure configurations menu of the 7.1 Measure settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Select the the measuring arrangement with ⇩ switch, and then Press the SEL switch.
5. Press the OK switch to save and to exit from 7.1.1. Measure configuration submenu.

7.3.1.2. Voltage Transformers (VT) and Current Transformers (CT) ratio settings

Function

In the 7.1.2. Transformations menu can you set the ratio of Voltage and Currents transformers

The voltage inputs of the instrument may connect directly to the power network (Vin < 250 Vrms [nominal]), or through voltage transformers (Vin > 250 Vrms [nominal]).
When you connect the inputs directly you should set VT=1.
When you connect the inputs through voltage transformers you should set the VT ratio of the applied transformers, so the instrument able to calculate with the primary voltage.
(e.g. 1000/100 V/V, VT=10)
[VT Factory default: 1.]

The current input of the instrument may connect directly to the power network (Iin < 5 Arms [nominal]), or through a current transformer (Iin > 5 Arms [nominal]).
When you connect the input directly you should set CT=1.
When you connect the input through a current transformer you should set the CT ratio of the applied transformer, so the instrument able to compute with the primary current.
(e.g. 100/5 A/A, CT=20)
[CT Factory default: 1.]

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.1. Measure settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.1.2. Transformation menu of the 7.1 Measure settings menu with ⇧ / ⇩ buttons, and press the ENTE switch
4. Select the the VT or CT transform with ⇩ switch, and then Press the EDIT switch.
5. Please type the VT/CT value with help ⇨, -, + switches, and press the OK switch to accept the value.
6. Repeat please the 4. step and 5. step with other CT/VT transformers.
7. Press the OK switch to save and to exit from 7.1.2. Transformations submenu

7.3.1.3. Phase lag of CT settings

Function

If you know the phase shift (50Hz) of the current transformer, you can specify the value here. The device to compensate the measurement results.
[Default: 0.]

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.1. Measure settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.1.3. CT phase shift menu of the 7.1 Measure settings menu with ⇧ / ⇩ buttons, and press the ENTE switch
4. Select the I1 Phase shift menu with ⇩ switch, and then Press the EDIT switch.
5. Please type the phase value with help ⇨, -, + switches, and press the OK switch to accept the value.
6. Repeat please the 4. step and 5. step with other currents transformers.
7. Press the OK switch to save and to exit from 7.1.3. CT phase shift submenu

7.3.1.4. Sampling time setting

Function

The device sampling the necessary data for the calculation. If the sampling time goes out (minimum 80 ms) the MCU of device makes the calculations and updates the outputs. You can increase the sampling time. It is possible to reduce the fluctuation of measured values.
The sampling time modification change refresh time of the instrument.
[Default: 80 ms]

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.1. Measure settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.1.4. Sampling time menu of the 7.1 Measure settings menu with ⇧ / ⇩ buttons, and press the ENTE switch
4. Select the sampling time with ⇩ switch, and then Press the SEW switch.
5. Press the OK switch to save and to exit from 7.1.4.Sampling time submenu

7.3.1.5. Current threshold

Function

When the current threshold function is used on the current input, the instrument eliminates the input signal under x% of the input range.
This function may be useful when the power network is noisy either in voltage off state or in unloaded state and this effect may cause an error in energy measurement.
[Default: 0.0%]

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.1. Measure settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.1.5. Current threshold menu of the 7.1 Measure settings menu with ⇧ / ⇩ buttons, and press the ENTE switch
4. Press the EDIT switch.
5. Type the current threshold value with help ⇨, -, + switches, and press the OK switch to accept the value.
6. Press the BACK switch to save and to exit from 7.1.5. Current threshold submenu

7.4. Setting the optional modules

Function

You can set here the modules (analogue output, communication output, digital inputs and digital outputs) The modules are available in 7.2. Modul #1 settings and 7.3. Modul #2 settings submenus.

Warning! If you can not enter to the submenu, the module is unaviable.

7.4.1. Digital inputs and outputs settings

Function

The digital outputs have much function.

- Energy pulse function
- Energy sign function
- Limit output function
- Alarm output function
- Demand function

The next option are available for device (just one in same time):

- Two digital outputs
- Two digital outputs and three digital inputs.

The digital outputs (DO1, DO2) can you set in 7.2. Modul #1 settings menu. In the following page explan the digital outputs settings via D01.

The demand function use the digital inputs, therefore you can set this inputs in 7.4 Power limiting menu,

7.4.1.1. Digital output, Energy pulse output settings

Function

The instrument has two open collector transistor pulse outputs for transmitting export-import energy values for data acquisition purposes. The frequency of the pulse outputs is proportional to the measured energy.
Here you can set all parameters of the pulse outputs

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #1 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.2.1 D1 digital output menu of the 7.2. Modul #1 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch
4. Select the the Energy pulse with ⇩ switch, and then Press the SEL switch.
5. Press the OK switch.
6. Select from the menu with ⇩ switch the measured quantity what you are going to transmit.
7. Press the SEL switch.
8. Press the OK switch.
9. Select from the menu with ⇩ switch the D1 pulse menu
10. Type the Pulse equivalent value with help ⇨, -, + switches, and press the OK switch to accept the value.
11. Select from the menu with ⇩ switch the D1 lenght menu.
12. Type the Pulse the pulse width in milliseconds value with help ⇨, -, + switches, and press the OK switch to accept the value.
13. Select from the menu with ⇩ switch the D1 gap menu.
14. Type the the minimum time value (between the pulses) in milliseconds with help ⇨, -, + switches, and press the OK switch to accept the value.
15. Press the OK switch.

16. Select from the menu with ⇩ switch the output polarity.

When you select the “NO (Normally open)” state then the output transistor is in off state when there is no pulse on the output. When you select the “NC (Normally closed” state then the output transistor is in on state when there is no pulse on the output.

17. Press the SEL switch.

18. Press the OK switch.

19. Press the BACK switch to exit from Modul #1 settings submenu

7.4.1.2. Digital output, Energy sign output settings

Function

The instrument can transmit the energy sign on the Pulse outputs.
+ sign: energy export
- sign: energy import
Here you can select the output for transmitting sign, the energy (E_P, E_Q) and the polarity of the output.

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #1 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.2.1 D1 digital output menu of the 7.2. Modul #1 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch
4. Select the the Energy sign with ⇩ switch, and then Press the SEL switch.
5. Press the OK switch.
6. Select from the menu with ⇩ switch the measured quantity what you are going to sign on outputs.
7. Press the SEL switch.
8. Press the OK switch.
9. Select from the menu with ⇩ switch the output polarity.

When you select the “NO (Normally open)” state then the output transistor is in off state when there is no pulse on the output. When you select the “NC (Normally closed” state then the output transistor is in on state when there is no pulse on the output.

10. Press the SEL switch.
11. Press the OK switch.
12. Press the BACK switch to exit from Modul #1 settings submenu

7.4.1.3. Digital output, Limit output settings

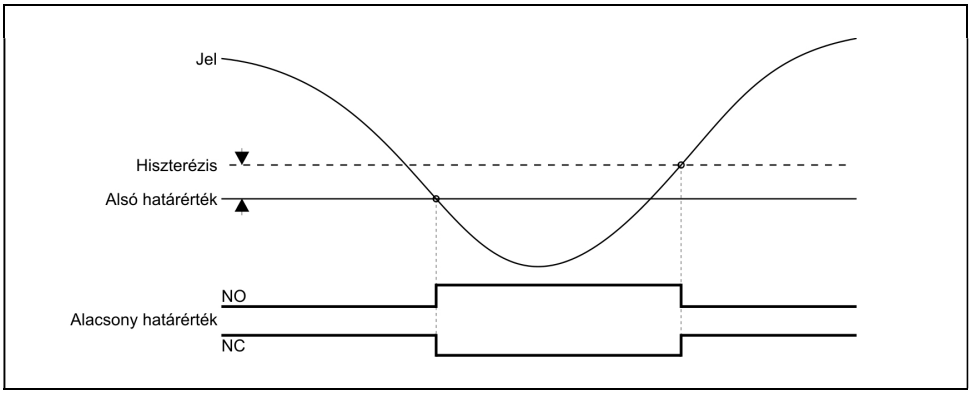
Function

Here you can set low limit-, high limit values and hysteresis and assign them to any measured quantity. The instrument compares continuously this quantity to the measured value and activates digital output(s) according the output settings.

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #1 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.2.1 D1 digital output menu of the 7.2. Modul #1 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Select the the Limit signal with ⇩ switch, and then Press the SEL switch.
5. Press the OK switch.
6. Select from the menu with ⇩ switch the measured quantity what you are going to apply the limit function.
7. Press the SEL switch.
8. Press the OK switch.
9. Select from the menu with ⇩ switch the limit mode

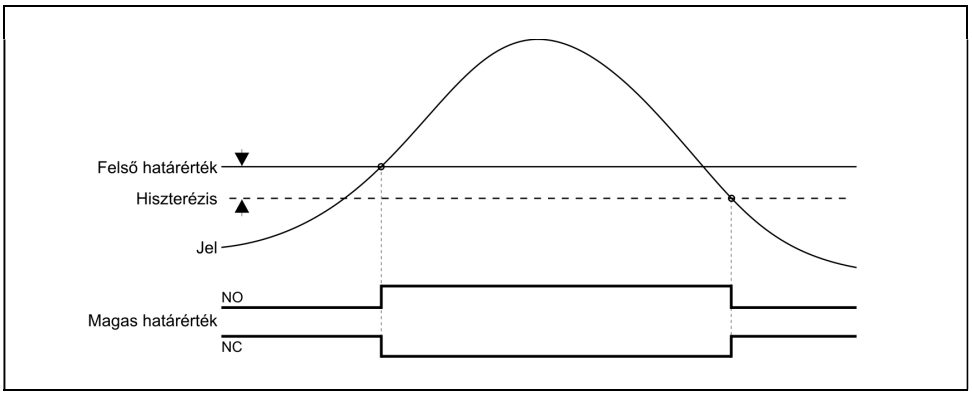
Signal low limit”
The output changes into active state when measured value becomes lower as the monitored value.
The output changes into inactive state when measured value become higher as the monitored value and hysteresis



“Signal high limit”

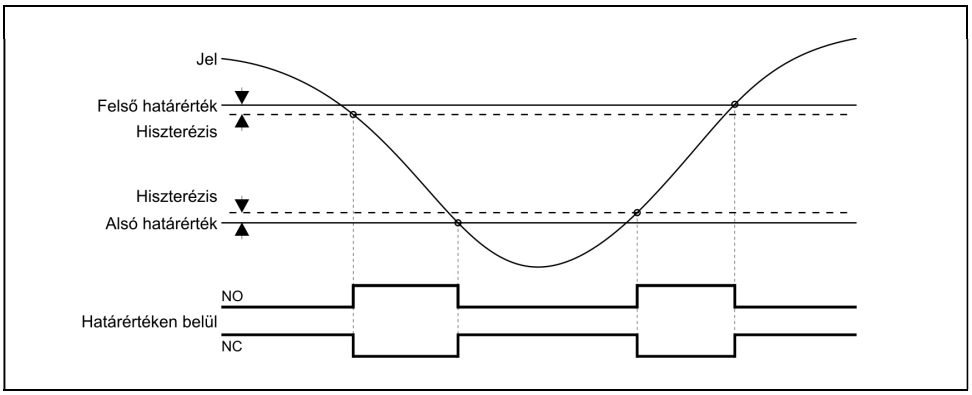
The output changes into active state when measured value becomes higher as the monitored value.
The output changes into inactive state when measured value become lower as the monitored value and hysteresis

.



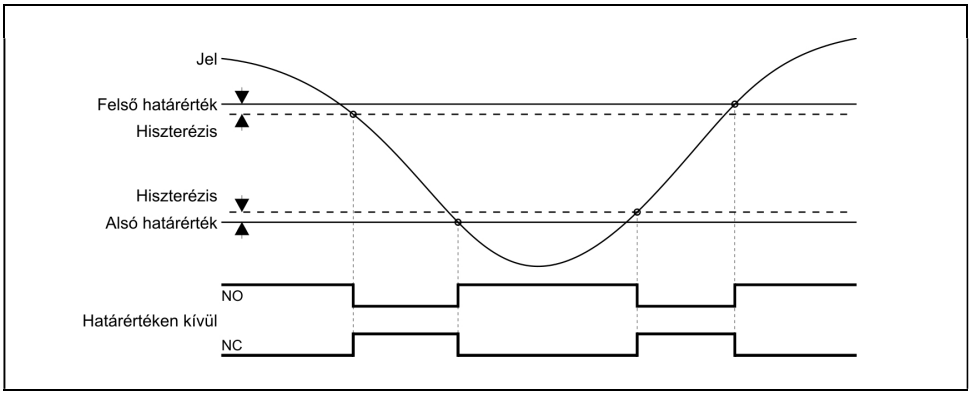
“Signal inside limit”

The output changes into active state when measured value is between of range upper and lower limit as the monitored value. The output changes into inactive state when measured value is out of range as the monitored value. The hysteresis is like the high and low limit functions can use it.



“Signal outside limit”

The output changes into active state when measured value is out upper and lower limit as the monitored value. The output changes into inactive state when measured value is between of range upper and lower limit as the monitored value. The hysteresis is like the high and low limit functions can use it.



10. Press the SEL switch.
11. Press the OK switch.
12. Type the High limit value with help ⇨, -, + switches, and press the OK switch to accept the value
13. Type the Low limit value with help ⇨, -, + switches, and press the OK switch to accept the value.
14. Type the High limit value with help ⇨, -, + switches, and press the OK switch to accept the value
15. Select from the menu with ⇩ switch the output polarity.

When you select the “NO (Normally open)” state then the output transistor is in off state when there is no pulse on the output. When you select the “NC (Normally closed” state then the output transistor is in on state when there is no pulse on the output.

16. Press the SEL switch.
17. Press the OK switch.
18. Press the BACK switch to exit from Modul #1 settings submenu

7.4.1.4. Digital output, Alarm output settings

Function

The instrument can generate alarm signaling in a case of one or more errors. It can be select which errors generate the alarm signaling. The alarm state activates the digital outputs.

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #1 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.2.1 D1 digital output menu of the 7.2. Modul #1 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Select the the Error signal with ⇩ switch, and then Press the SEL switch.
5. Press the OK switch.
6. Select from the menu with ⇩ switch the measured quantity what you are going to apply the error function.
7. Press the SEL switch.

Warning! You can selet same errors!

8. Press the OK switch.
9. Select from the menu with ⇩ switch the output polarity.

When you select the “NO (Normally open)” state then the output transistor is in off state when there is no pulse on the output. When you select the “NC (Normally closed” state then the output transistor is in on state when there is no pulse on the output.

10. Press the SEL switch.
11. Press the OK switch.
12. Press the BACK switch to exit from Modul #1 settings submenu

7.4.1.5. Digital output, Demand control function setting

Function

The device calculates the expected average performance (15 min) from actual power. If this value is greater than the setting limit, the device set to active state the digital1 output. If the value is lower than the limit at the next sampling, the device turn back the digital1 output. If the value is greater than the setting limit, the device holds the digital1 output to active state, and the digital2 output sets to active state. At the next sampling the value of expeted average power is lower the settings limit, the device set the digital2 output to inactive state.
These outputs states are repeated within a 15 minute period.

The device uses this function the DI1, DI2, DI3 digital inputs. All inputs have dedicated function. The DI1 input is the syncron pulse input. The DI2, DI3 inputs are tariff input and combination of they the device uses 4 tariff.

DI2		DI3		Demand
NO	NC	NO	NC	
L/N	H/Z	L/N	H/Z	Tariff 1
L/N	H/Z	H/Z	L/N	Tariff 2
H/Z	L/N	L/N	H/Z	Tariff 3
H/Z	L/N	H/Z	L/N	Tariff 4

L/N = Logic 0 / Open

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #1 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.2.1 D1 digital output menu of the 7.2. Modul #1 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Select the the Energy 1 limit with ⇩ switch, and then Press the SEL switch.
5. Press the OK switch.
6. Select from the menu with ⇩ switch the output polarity.

When you select the “NO (Normally open)” state then the output transistor is in off state when there is no pulse on the output. When you select the “NC (Normally closed” state then the output transistor is in on state when there is no pulse on the output.

7. Select the the Energy 2 limit with ⇩ switch, and then Press the SEL switch.
8. Press the OK switch.
9. Select from the menu with ⇩ switch the output polarity.
10. Press the SEL switch.
11. Press the OK switch.
12. Press the BACK switch to exit from Modul #1 settings submenu

7.4.1.6. Digital output, digital output test

Function

Digital outputs can be tested regardless of their function, This function you can easier to detect the connections, cables, and fault I / O modules.

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #1 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.2.3 Digital output test menu of the 7.2. Modul #1 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Select the the 1.output or 2.output with ⇩ switch, and then Press the EDIT switch.
5. Press the BACK switch to exit from Modul #1 settings submenu

7.4.2. Analogue output settings

Function

There can be two optional dual independent analog outputs of the instrument. Any of the measured quantities can be transmit in a 0 / 4-20 mA current form.
Here you can set all of the parameters of the outputs.

Measured quantities are:
U_{12}, U_{23}, U_{31}, U_{L1}, U_{L2}, U_{L3}, I_{L1}, I_{L2}, I_{L3},
P_{L1}, P_{L1}, P_{L3}, Q_{L1}, Q_{L2}, Q_{L3}, S_{L1}, S_{L2}, S_{L3},
PF_{L1}, PF_{L2}, PF_{L3}, φ_{L1}, φ_{L2}, φ_{L3},
ΣP, ΣQ, ΣS, ΣPF, $\Sigma\varphi$, f_1, f_2, f_3; ρ_{12}, ρ_{13}

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #2 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Choose the 7.3.1 A1 analog output menu of the 7.3. Modul #2 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Press the ENTE switch.
5. Choose the assign menu with ⇧ / ⇩ buttons, and press the EDIT switch.
6. Select from the menu with ⇩ switch the measured quantity what you are going to transmit.
7. Press the SEL switch.
8. Press the OK switch.
9. Choose the Range from menu with ⇧ / ⇩ buttons, and press the EDIT switch.
10. Type the low value of the output scale with help ⇨, -, + switches, and press the OK switch to accept the value.
11. Choose the Range to menu with ⇧ / ⇩ buttons, and press the ENTE switch.
12. Type the high value of the output scale with help ⇨, -, +, switches, and press the OK switch to accept the value.

7.4.2.1. Analogue output testing

Function

You can here testing the analouge outputs.

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #2 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
Contents this menu depends on device construct!

3. Choose the 7.3.1 A1 analog output menu of the 7.3. Modul #2 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Press the ENTE switch.
5. Choose the assign menu with ⇧ / ⇩ buttons, and press the EDIT switch.
6. Select from the menu with ⇩ switch the Test value.
7. Press the OK switch.
8. Choose the 7.3.3. Analogue outputs test menu of the 7.3. Modul #2 settings menu with ⇧ / ⇩ buttons, and press the ENTE switch.
9. Press the EDIT switch.
10. Type the test value with help ⇨, -, + switches, and press the OK switch to accept the value.
The testvalue displayed on the analogue output.
11. Press the BACK switch to exit from Modul #2 settings submenu.

Attention! If "Test value" position leaves the 'Select' window, the analog output will not change the current output.

Example:

Setting analog output

Type	4–20mA	
Mode	Error mode	
Min.	3.800 mA	
Max.	20.100 mA	
Error	20.500 mA	
Select	Test value	
Range form	0.000	
Range to	1000.000	

Signal of analog output

Test value	0.000	analogue out = 4 mA
Test value	500.000	analogue out = 12 mA
Test value	1000.000	analogue out = 20 mA
Test value	-6.250	analogue out = 3.9 mA
Test value	1006.250	analogue out = 20.1 mA
Test value	-15.000	analogue out = 20.5 mA
Test value	1010.000	analogue out = 20.5 mA

7.4.3. Communication interface

7.4.3.1. MODBUS RS485 interface setting

Function

It can be read out through the communication output all of the measured quantities. The optional communication option have two operating mode:

- MODBUS RTU Slave RS485
- MODBUS ASCII Slave RS485

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.2. Modul #2 settings menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.

Contents this menu depends on device construct.

3. Choose the Protocol menu with ⇧ / ⇩ buttons, and press the ENTE switch.
4. Select the protocol, and press OK switch to accept the new value.
4. Choose the Address menu with ⇧ / ⇩ buttons, and press the ENTE switch.
5. Type the MODBUS address of instrument with help ⇨, -, + switches, and press the OK switch to accept the value.
6. Choose the Baud rate menu with ⇧ / ⇩ buttons, and press the ENTE switch.
7. Select from the menu with ⇩ switch the Baud rate value.
8. Press the SEL switch.
9. Press the OK switch.
10. Choose the Parity menu with ⇧ / ⇩ buttons, and press the ENTE switch.
11. Select from the menu with ⇩ switch the Parity value.
12. Press the SEL switch.
13. Press the OK switch.
14. Choose the Stop bits menu with ⇧ / ⇩ buttons, and press the ENTE switch.
15. Select from the menu with ⇩ switch the Stop bit value.
16. Press the SEL switch.
17. Press the OK switch.

18. Choose the Time out menu with ⇧ / ⇩ buttons, and press the ENTE switch.
19. Type the response timeout of instrument value with help ⇨, -, + switches, and press the OK switch to accept the value.
20. Press the BACK switch to exit from Modul #2 settings submenu.

7.4.3.2. MODBUS TCP Ethernet interface setting

Function

Using of standard ETHERNET interface readable all measured value from device to futher processing. The device can have only one communication interface at same time.
The settings of modul are in 7.3.Modul #2 settings menu.

Sequence of operations

1. Log in the 7. Configuration menu.
2. Choose the 7.3. Modul #2 settings menu with the ⇧ / ⇩ buttons, and press the ENTER button.

IP address

3. Choose the 7.3.1. IP-address menu with the ⇧ / ⇩ buttons, and press ENTER button.
4. In the apperaring menu set the IP address with the ⇨, -, + buttons, and press the OK button.

Subnetwork mask

5. Choose the 7.3.2. Subnetwork mask menu with the ⇧ / ⇩ buttons, and press ENTER button.
6. In the apperaring menu set the Subnetwork mask with the ⇨, -, + buttons, and press the OK button.

Default gateway

7. Choose the 7.3.3. Default gateway menu with the ⇧ / ⇩ buttons, and press ENTER button..
8. In the apperaring menu set the Default gateway address with the ⇨, -, + buttons, and press the OK button.
9. Escape from the 7.3. Modul #2 settings menu press the BACK button.
10. Escape from the 7. Configuration menu press the BACK button.

7.4.3.3 MODBUS registers format

The range of measured vale is 1000-7531 address, and they are readable with 3 Modbus command.

- The 1000–1067, 1132–1143, 1304–1327, 2000–2015, 2034–2037, 3000–3015, 3034–3037, 4000–4015, 4034–4037, 4096–4155, 4162–4167, 5000–5009, 6000–6015 of the measured quantities are in 32 bit “Single Precision” floating point format according to IEEE754 standard. This means that all of the measured quantities are stored in 2 MODBUS register.
On the lower address is the upper 16 bit and on the higher address is the lower 16 bit.
- The 1068–1131, 2016–2031, 3016–3031, 4016–4031, 5010–5025, 7000–7063, 7100–7163, 7200–7263 of the measured quantities are in 64 bit unsigned integer format. The bits are stored in 4 MODBUS register.
- The Az 1144–1145, 2032–2033, 3032–3033, 4032–4033, 4160–4161, 5026–5027 of the measured quantities are in 32 bit binary word format. They are the Errors bit. Each error has a bit, and the bit location is specified the errors. The errors bit are stored in 2 MODBUS register. On the lower address is the error 17–32 and on the higher address is the error 1–16.
The description of error numbers (error bits) is in the capture **7.5. Error LED settings**.
- The 1302, 1303, 2038–2077, 3038–3077, 4038–4077 of the measured quantities are in 16 bit unsigned integer format. The bits are stored in 1 MODBUS register.
- The 1200 register is writable with command 16, this value define to unit of the energy registers: 0 – kWh, 1 – MWh, 2 – GWh (Default value and value after reset: 0)
- The 4156–4159, 7300–7331, 7400–7431, 7500–7531 of the measured quantities are in 32 bit unsigned integer format. The bits are stored in 2 MODBUS register.
- The 6016–6079 of the measured quantities are in 64 bit unsigned integer format, but this registers are readable in two pieces (higher 32 bit and lower 32 bit).

Attention! The highlights shows the coherent MODBUS registers in table below, which are readable together.

MODBUS address

All measured value

MB addr.	Content	MB addr.	Content
1000	$U_{eff\ 12}$ high 16 bit	1001	$U_{eff\ 12}$ low 16 bit
1002	$U_{eff\ 23}$ high 16 bit	1003	$U_{eff\ 23}$ low 16 bit
1004	$U_{eff\ 31}$ high 16 bit	1005	$U_{eff\ 31}$ low 16 bit
1006	$U_{eff\ 1}$ high 16 bit	1007	$U_{eff\ 1}$ low 16 bit
1008	$U_{eff\ 2}$ high 16 bit	1009	$U_{eff\ 2}$ low 16 bit
1010	$U_{eff\ 3}$ high 16 bit	1011	$U_{eff\ 3}$ low 16 bit
1012	$I_{eff\ 1}$ high 16 bit	1013	$I_{eff\ 1}$ low 16 bit
1014	$I_{eff\ 2}$ high 16 bit	1015	$I_{eff\ 2}$ low 16 bit
1016	$I_{eff\ 3}$ high 16 bit	1017	$I_{eff\ 3}$ low 16 bit
1018	P_1 high 16 bit	1019	P_1 low 16 bit
1020	P_2 high 16 bit	1021	P_2 low 16 bit
1022	P_3 high 16 bit	1023	P_3 low 16 bit
1024	Q_1 high 16 bit	1025	Q_1 low 16 bit
1026	Q_2 high 16 bit	1027	Q_2 low 16 bit
1028	Q_3 high 16 bit	1029	Q_3 low 16 bit
1030	S_1 high 16 bit	1031	S_1 low 16 bit
1032	S_2 high 16 bit	1033	S_2 low 16 bit
1034	S_3 high 16 bit	1035	S_3 low 16 bit
1036	PF_1 high 16 bit	1037	PF_1 low 16 bit
1038	PF_2 high 16 bit	1039	PF_2 low 16 bit
1040	PF_3 high 16 bit	1041	PF_3 low 16 bit
1042	Fi_1 high 16 bit	1043	Fi_1 low 16 bit
1044	Fi_2 high 16 bit	1045	Fi_2 low 16 bit
1046	Fi_3 high 16 bit	1047	Fi_3 low 16 bit
1048	$\sum P$ high 16 bit	1049	$\sum P$ low 16 bit
1050	$\sum Q$ high 16 bit	1051	$\sum Q$ low 16 bit
1052	$\sum S$ high 16 bit	1053	$\sum S$ low 16 bit
1054	$\sum PF$ high 16 bit	1055	$\sum PF$ low 16 bit
1056	$\sum Fi$ high 16 bit	1057	$\sum Fi$ low 16 bit
1058	f_1 high 16 bit	1059	f_1 low 16 bit
1060	f_2 high 16 bit	1061	f_2 low 16 bit
1062	f_3 high 16 bit	1063	f_3 low 16 bit
1064	ρ_{12} high 16 bit	1065	ρ_{12} low 16 bit
1066	ρ_{13} high 16 bit	1067	ρ_{13} low 16 bit
1068	$+E_1$ 63–48 bit	1069	$+E_1$ 47–32 bit
1070	$+E_1$ 31–16 bit	1071	$+E_1$ 15–0 bit

MB addr.	Content	MB addr.	Content
1072	$+E_2$ 63–48 bit	1073	$+E_2$ 47–32 bit
1074	$+E_2$ 31–16 bit	1075	$+E_2$ 15–0 bit
1076	$+E_3$ 63–48 bit	1077	$+E_3$ 47–32 bit
1078	$+E_3$ 31–16 bit	1079	$+E_3$ 15–0 bit
1080	$-E_1$ 63–48 bit	1081	$-E_1$ 47–32 bit
1082	$-E_1$ 31–16 bit	1083	$-E_1$ 15–0 bit
1084	$-E_2$ 63–48 bit	1085	$-E_2$ 47–32 bit
1086	$-E_2$ 31–16 bit	1087	$-E_2$ 15–0 bit
1088	$-E_3$ 63–48 bit	1089	$-E_3$ 47–32 bit
1090	$-E_3$ 31–16 bit	1091	$-E_3$ 15–0 bit
1092	$+RE_1$ 63–48 bit	1093	$+RE_1$ 47–32 bit
1094	$+RE_1$ 31–16 bit	1095	$+RE_1$ 15–0 bit
1096	$+RE_2$ 63–48 bit	1097	$+RE_2$ 47–32 bit
1098	$+RE_2$ 31–16 bit	1099	$+RE_2$ 15–0 bit
1100	$+RE_3$ 63–48 bit	1101	$+RE_3$ 47–32 bit
1102	$+RE_3$ 31–16 bit	1103	$+RE_3$ 15–0 bit
1104	$-RE_1$ 63–48 bit	1105	$-RE_1$ 47–32 bit
1106	$-RE_1$ 31–16 bit	1107	$-RE_1$ 15–0 bit
1108	$-RE_2$ 63–48 bit	1109	$-RE_2$ 47–32 bit
1110	$-RE_2$ 31–16 bit	1111	$-RE_2$ 15–0 bit
1112	$-RE_3$ 63–48 bit	1113	$-RE_3$ 47–32 bit
1114	$-RE_3$ 31–16 bit	1115	$-RE_3$ 15–0 bit
1116	∑+E 63–48 bit	1117	∑+E47–32 bit
1118	∑+E 31–16 bit	1119	∑+E 15–0 bit
1120	∑-E 63–48 bit	1121	∑-E 47–32 bit
1122	∑-E 31–16 bit	1123	∑-E 15–0 bit
1124	∑+RE 63–48 bit	1125	∑+RE 47–32 bit
1126	∑+RE 31–16 bit	1127	∑+RE 15–0 bit
1128	∑-RE 63–48 bit	1129	∑-RE 47–32 bit
1130	∑-RE 31–16 bit	1131	∑-RE 15–0 bit
1132	$\sum P_{15\_last}$ high 16 bit	1133	$\sum P_{15\_last}$ low 16 bit
1134	$\sum P_{15\_momentary}$ high 16 bit	1135	$\sum P_{15\_momentary}$ low 16 bit
1136	$\sum P_{15\_prog}$ high 16 bit	1137	$\sum P_{15\_prog}$ low 16 bit
1138	$\sum P_{15\_limit}$ high 16 bit	1139	$\sum P_{15\_limit}$ low 16 bit
1140	¼ time minut high 16 bit	1141	¼ time minut low 16 bit
1142	¼ time secundum high 16 bit	1143	¼ time secundum low 16 bit
1144	Errors high 16 bit	1145	Errors low 16 bit
1200	Energy registers unit: 0: Wh/VARh, 1: kWh/kVARh, 2: MWh/MVARh, 3: GWh/GVARh (Default: 0, Wh/VARh)		

Serial number, Nominal voltave, Nominal current, Voltage ratio, Current ratio

MB addr.	Content	MB addr.	Content
1300	Serial number high 16 bit	1301	Serial number low 16 bit
1302	Manufacturing year and month	1303	Installed options
1304	$U_{n\ L1}$ high 16 bit	1305	$U_{n\ L1}$ low 16 bit
1306	$U_{n\ L2}$ high 16 bit	1307	$U_{n\ L2}$ low 16 bit
1308	$U_{n\ L3}$ high 16 bit	1309	$U_{n\ L3}$ low 16 bit
1310	$I_{n\ L1}$ high 16 bit	1311	$I_{n\ L1}$ low 16 bit
1312	$I_{n\ L2}$ high 16 bit	1313	$I_{n\ L2}$ low 16 bit
1314	$I_{n\ L3}$ high 16 bit	1315	$I_{n\ L3}$ low 16 bit
1316	U/u_{L1} high 16 bit	1317	U/u_{L1} low 16 bit
1318	U/u_{L2} high 16 bit	1319	U/u_{L2} low 16 bit
1320	U/u_{L3} high 16 bit	1321	U/u_{L3} low 16 bit
1322	I/i_{L1} high 16 bit	1323	I/i_{L1} low 16 bit
1324	I/i_{L2} high 16 bit	1325	I/i_{L2} low 16 bit
1326	I/i_{L3} high 16 bit	1327	I/i_{L3} low 16 bit

L1 phase value

MB addr.	Content	MB addr.	Content
2000	$U_{eff\ 1}$ high 16 bit	2001	$U_{eff\ 1}$ low 16 bit
2002	$I_{eff\ 1}$ high 16 bit	2003	$I_{eff\ 1}$ low 16 bit
2004	P_1 high 16 bit	2005	P_1 low 16 bit
2006	Q_1 high 16 bit	2007	Q_1 low 16 bit
2008	S_1 high 16 bit	2009	S_1 low 16 bit
2010	PF_1 high 16 bit	2011	PF_1 low 16 bit
2012	Fi_1 high 16 bit	2013	Fi_1 low 16 bit
2014	f_1 high 16 bit	2015	f_1 low 16 bit
2016	$+E_1$ 63–48 bit	2017	$+E_1$ 47–32 bit
2018	$+E_1$ 31–16 bit	2019	$+E_1$ 15–0 bit
2020	$-E_1$ 63–48 bit	2021	$-E_1$ 47–32 bit
2022	$-E_1$ 31–16 bit	2023	$-E_1$ 15–0 bit
2024	$+RE_1$ 63–48 bit	2025	$+RE_1$ 47–32 bit
2026	$+RE_1$ 31–16 bit	2027	$+RE_1$ 15–0 bit
2028	$-RE_1$ 63–48 bit	2029	$-RE_1$ 47–32 bit
2030	$-RE_1$ 31–16 bit	2031	$-RE_1$ 15–0 bit
2032	Errors high 16 bit	2033	Errors low 16 bit
2034	THD U_1 high 16 bit	2035	THD U_1 low 16 bit
2036	THD I_1 high 16 bit	2037	THD I_1 low 16 bit
2038	U1 fundamental	2039	U1 1. harmonic
2040	U1 2. harmonic	2041	U1 3. harmonic
2042	U1 4. harmonic	2043	U1 5. harmonic
2044	U1 6. harmonic	2045	U1 7. harmonic
2046	U1 8. harmonic	2047	U1 9. harmonic
2048	U1 10. harmonic	2049	U1 11. harmonic
2050	U1 12. harmonic	2051	U1 13. harmonic
2052	U1 14. harmonic	2053	U1 15. harmonic
2054	U1 16. harmonic	2055	U1 17. harmonic
2056	U1 18. harmonic	2057	U1 19. harmonic
2058	I1 fundamental	2059	I1 1. harmonic
2060	I1 2. harmonic	2061	I1 3. harmonic
2062	I1 4. harmonic	2063	I1 5. harmonic
2064	I1 6. harmonic	2065	I1 7. harmonic
2066	I1 8. harmonic	2067	I1 9. harmonic
2068	I1 10. harmonic	2069	I1 11. harmonic
2070	I1 12. harmonic	2071	I1 13. harmonic
2072	I1 14. harmonic	2073	I1 15. harmonic
2074	I1 16. harmonic	2075	I1 17. harmonic
2076	I1 18. harmonic	2077	I1 19. harmonic

L2 phase value

MB addr.	Content	MB addr.	Content
3000	$U_{eff\,2}$ high 16 bit	3001	$U_{eff\,2}$ low 16 bit
3002	$I_{eff\,2}$ high 16 bit	3003	$I_{eff\,2}$ low 16 bit
3004	P_2 high 16 bit	3005	P_2 low 16 bit
3006	Q_2 high 16 bit	3007	Q_2 low 16 bit
3008	S_2 high 16 bit	3009	S_2 low 16 bit
3010	PF_2 high 16 bit	3011	PF_2 low 16 bit
3012	Fi_2 high 16 bit	3013	Fi_2 low 16 bit
3014	f_2 high 16 bit	3015	f_2 low 16 bit
3016	$+E_2$ 63–48 bit	3017	$+E_2$ 47–32 bit
3018	$+E_2$ 31–16 bit	3019	$+E_2$ 15–0 bit
3020	$-E_2$ 63–48 bit	3021	$-E_2$ 47–32 bit
3022	$-E_2$ 31–16 bit	3023	$-E_2$ 15–0 bit
3024	$+RE_2$ 63–48 bit	3025	$+RE_2$ 47–32 bit
3026	$+RE_2$ 31–16 bit	3027	$+RE_2$ 15–0 bit
3028	$-RE_2$ 63–48 bit	3029	$-RE_2$ 47–32 bit
3030	$-RE_2$ 31–16 bit	3031	$-RE_2$ 15–0 bit
3032	Errors high 16 bit	3033	Errors low 16 bit
3034	THD U_2 high 16 bit	3035	THD U_2 low 16 bit
3036	THD I_2 high 16 bit	3037	THD I_2 low 16 bit
3038	U2 fundamental	3039	U2 1. harmonic
3040	U2 2. harmonic	3041	U2 3. harmonic
3042	U2 4. harmonic	3043	U2 5. harmonic
3044	U2 6. harmonic	3045	U2 7. harmonic
3046	U2 8. harmonic	3047	U2 9. harmonic
3048	U2 10. harmonic	3049	U2 11. harmonic
3050	U2 12. harmonic	3051	U2 13. harmonic
3052	U2 14. harmonic	3053	U2 15. harmonic
3054	U2 16. harmonic	3055	U2 17. harmonic
3056	U2 18. harmonic	3057	U2 19. harmonic
3058	I2 fundamental	3059	I2 1. harmonic
3060	I2 2. harmonic	3061	I2 3. harmonic
3062	I2 4. harmonic	3063	I2 5. harmonic
3064	I2 6. harmonic	3065	I2 7. harmonic
3066	I2 8. harmonic	3067	I2 9. harmonic
3068	I2 10. harmonic	3069	I2 11. harmonic
3070	I2 12. harmonic	3071	I2 13. harmonic
3072	I2 14. harmonic	3073	I2 15. harmonic
3074	I2 16. harmonic	3075	I2 17. harmonic
3076	I2 18. harmonic	3077	I2 19. harmonic

L3 phase value

MB addr.	Content	MB addr.	Content
4000	$U_{eff\ 3}$ high 16 bit	4001	$U_{eff\ 3}$ low 16 bit
4002	$I_{eff\ 3}$ high 16 bit	4003	$I_{eff\ 3}$ low 16 bit
4004	P_3 high 16 bit	4005	P_3 low 16 bit
4006	Q_3 high 16 bit	4007	Q_3 low 16 bit
4008	S_3 high 16 bit	4009	S_3 low 16 bit
4010	PF_3 high 16 bit	4011	PF_3 low 16 bit
4012	Fi_3 high 16 bit	4013	Fi_3 low 16 bit
4014	f_3 high 16 bit	4015	f_3 low 16 bit
4016	$+E_3$ 63–48 bit	4017	$+E_3$ 47–32 bit
4018	$+E_3$ 31–16 bit	4019	$+E_3$ 15–0 bit
4020	$-E_3$ 63–48 bit	4021	$-E_3$ 47–32 bit
4022	$-E_3$ 31–16 bit	4023	$-E_3$ 15–0 bit
4024	$+RE_3$ 63–48 bit	4025	$+RE_3$ 47–32 bit
4026	$+RE_3$ 31–16 bit	4027	$+RE_3$ 15–0 bit
4028	$-RE_3$ 63–48 bit	4029	$-RE_3$ 47–32 bit
4030	$-RE_3$ 31–16 bit	4031	$-RE_3$ 15–0 bit
4032	Errors high 16 bit	4033	Errors low 16 bit
4034	THD U_3 high 16 bit	4035	THD U_3 low 16 bit
4036	THD I_3 high 16 bit	4037	THD I_3 low 16 bit
4038	U3 fundamental	4039	U3 1. harmonic
4040	U3 2. harmonic	4041	U3 3. harmonic
4042	U3 4. harmonic	4043	U3 5. harmonic
4044	U3 6. harmonic	4045	U3 7. harmonic
4046	U3 8. harmonic	4047	U3 9. harmonic
4048	U3 10. harmonic	4049	U3 11. harmonic
4050	U3 12. harmonic	4051	U3 13. harmonic
4052	U3 14. harmonic	4053	U3 15. harmonic
4054	U3 16. harmonic	4055	U3 17. harmonic
4056	U3 18. harmonic	4057	U3 19. harmonic
4058	I2 fundamental	4059	I2 1. harmonic
4060	I2 2. harmonic	4061	I2 3. harmonic
4062	I2 4. harmonic	4063	I2 5. harmonic
4064	I2 6. harmonic	4065	I2 7. harmonic
4066	I2 8. harmonic	4067	I2 9. harmonic
4068	I2 10. harmonic	4069	I2 11. harmonic
4070	I2 12. harmonic	4071	I2 13. harmonic
4072	I2 14. harmonic	4073	I2 15. harmonic
4074	I2 16. harmonic	4075	I2 17. harmonic
4076	I2 18. harmonic	4077	I2 19. harmonic

Custom register range

MB addr.	Content	MB addr.	Content
4096	$U_{eff\ average}$ high 16 bit	4097	$U_{eff\ average}$ low 16 bit
4098	$U_{eff\ 1}$ high 16 bit	4099	$U_{eff\ 1}$ low 16 bit
4100	$U_{eff\ 2}$ high 16 bit	4101	$U_{eff\ 2}$ low 16 bit
4102	$U_{eff\ 3}$ high 16 bit	4103	$U_{eff\ 3}$ low 16 bit
4104	$U_{eff\ 12}$ high 16 bit	4105	$U_{eff\ 12}$ low 16 bit
4106	$U_{eff\ 23}$ high 16 bit	4107	$U_{eff\ 23}$ low 16 bit
4108	$U_{eff\ 31}$ high 16 bit	4109	$U_{eff\ 31}$ low 16 bit
4110	$I_{eff\ average}$ high 16 bit	4111	$I_{eff\ average}$ low 16 bit
4112	$I_{eff\ 1}$ high 16 bit	4113	$I_{eff\ 1}$ low 16 bit
4114	$I_{eff\ 2}$ high 16 bit	4115	$I_{eff\ 2}$ low 16 bit
4116	$I_{eff\ 3}$ high 16 bit	4117	$I_{eff\ 3}$ low 16 bit
4118	∑PF high 16 bit	4119	∑PF low 16 bit
4120	PF_1 high 16 bit	4121	PF_1 low 16 bit
4122	PF_2 high 16 bit	4123	PF_2 low 16 bit
4124	PF_3 high 16 bit	4125	PF_3 low 16 bit
4126	THD U_1 high 16 bit	4127	THD U_1 low 16 bit
4128	THD U_2 high 16 bit	4129	THD U_2 low 16 bit
4130	THD U_3 high 16 bit	4131	THD U_3 low 16 bit
4132	THD I_1 high 16 bit	4133	THD I_1 low 16 bit
4134	THD I_2 high 16 bit	4135	THD I_2 low 16 bit
4136	THD I_3 high 16 bit	4137	THD I_3 low 16 bit
4138	∑Q high 16 bit	4139	∑Q low 16 bit
4140	∑S high 16 bit	4141	∑S low 16 bit
4142	∑P high 16 bit	4143	∑P low 16 bit
4144	P_1 high 16 bit	4145	P_1 low 16 bit
4146	P_2 high 16 bit	4147	P_2 low 16 bit
4148	P_3 high 16 bit	4149	P_3 low 16 bit
4150	ρ_{12} high 16 bit	4151	ρ_{12} low 16 bit
4152	ρ_{13} high 16 bit	4153	ρ_{13} low 16 bit
4154	$\sum P_{15\ mom}$ high 16 bit	4155	$\sum P_{15\ mom}$ low 16 bit
4156	∑–E high 16 bit	4157	∑–E low 16 bit
4158	∑+E high 16 bit	4159	∑+E low 16 bit
4160	Errors high 16 bit	4161	Errors low 16 bit
4162	f_1 high 16 bit	4163	f_1 low 16 bit
4164	f_2 high 16 bit	4165	f_2 low 16 bit
4166	f_3 high 16 bit	4167	f_3 low 16 bit

Three phase value

MB addr.	Content	MB addr.	Content
5000	∑P high 16 bit	5001	∑P low 16 bit
5002	∑Q high 16 bit	5003	∑Q low 16 bit
5004	∑S high 16 bit	5005	∑S low 16 bit
5006	∑PF high 16 bit	5007	∑PF low 16 bit
5008	∑Fi high 16 bit	5009	∑Fi low 16 bit
5010	∑+E 63–48 bit	5011	∑+E47–32 bit
5012	∑+E 31–16 bit	5013	∑+E 15–0 bit
5014	∑-E 63–48 bit	5015	∑-E 47–32 bit
5016	∑-E 31–16 bit	5017	∑-E 15–0 bit
5018	∑+RE 63–48 bit	5019	∑+RE 47–32 bit
5020	∑+RE 31–16 bit	5021	∑+RE 15–0 bit
5022	∑-RE 63–48 bit	5023	∑-RE 47–32 bit
5024	∑-RE 31–16 bit	5025	∑-RE 15–0 bit
5026	Errors high 16 bit	5027	Errors low 16 bit

Powers, Energies (readable as 32 bit value)

MB addr.	Content	MB addr.	Content
6000	P_1 high 16 bit	6001	P_1 low 16 bit
6002	Q_1 high 16 bit	6003	Q_1 low 16 bit
6004	P_2 high 16 bit	6005	P_2 low 16 bit
6006	Q_2 high 16 bit	6007	Q_2 low 16 bit
6008	P_3 high 16 bit	6009	P_3 low 16 bit
6010	Q_3 high 16 bit	6011	Q_3 low 16 bit
6012	∑P high 16 bit	6013	∑P low 16 bit
6014	∑Q high 16 bit	6015	∑Q low 16 bit
6016	$+E_1$ 63–48 bit	6017	$+E_1$ 47–32 bit
6018	$+E_1$ 31–16 bit	6019	$+E_1$ 15–0 bit
6020	$-E_1$ 63–48 bit	6021	$-E_1$ 47–32 bit
6022	$-E_1$ 31–16 bit	6023	$-E_1$ 15–0 bit
6024	$+RE_1$ 63–48 bit	6025	$+RE_1$ 47–32 bit
6026	$+RE_1$ 31–16 bit	6027	$+RE_1$ 15–0 bit
6028	$-RE_1$ 63–48 bit	6029	$-RE_1$ 47–32 bit
6030	$-RE_1$ 31–16 bit	6031	$-RE_1$ 15–0 bit
6032	$+E_2$ 63–48 bit	6033	$+E_2$ 47–32 bit
6034	$+E_2$ 31–16 bit	6035	$+E_2$ 15–0 bit
6036	$-E_2$ 63–48 bit	6037	$-E_2$ 47–32 bit
6038	$-E_2$ 31–16 bit	6039	$-E_2$ 15–0 bit
6040	$+RE_2$ 63–48 bit	6041	$+RE_2$ 47–32 bit
6042	$+RE_2$ 31–16 bit	6043	$+RE_2$ 15–0 bit
6044	$-RE_2$ 63–48 bit	6045	$-RE_2$ 47–32 bit
6046	$-RE_2$ 31–16 bit	6047	$-RE_2$ 15–0 bit
6048	$+E_3$ 63–48 bit	6049	$+E_3$ 47–32 bit
6050	$+E_3$ 31–16 bit	6051	$+E_3$ 15–0 bit
6052	$-E_3$ 63–48 bit	6053	$-E_3$ 47–32 bit
6054	$-E_3$ 31–16 bit	6055	$-E_3$ 15–0 bit
6056	$+RE_3$ 63–48 bit	6057	$+RE_3$ 47–32 bit
6058	$+RE_3$ 31–16 bit	6059	$+RE_3$ 15–0 bit
6060	$-RE_3$ 63–48 bit	6061	$-RE_3$ 47–32 bit
6062	$-RE_3$ 31–16 bit	6063	$-RE_3$ 15–0 bit
6064	∑+E 63–48 bit	6065	∑+E47–32 bit
6066	∑+E 31–16 bit	6067	∑+E 15–0 bit
6068	∑-E 63–48 bit	6069	∑-E 47–32 bit
6070	∑-E 31–16 bit	6071	∑-E 15–0 bit
6072	∑+RE 63–48 bit	6073	∑+RE 47–32 bit
6074	∑+RE 31–16 bit	6075	∑+RE 15–0 bit
6076	∑-RE 63–48 bit	6077	∑-RE 47–32 bit
6078	∑-RE 31–16 bit	6079	∑-RE 15–0 bit

Energies (kWh, kVARh)

MB addr.	Content	MB addr.	Content
7000	$+E_1$ 63–48 bit	7001	$+E_1$ 47–32 bit
7002	$+E_1$ 31–16 bit	7003	$+E_1$ 15–0 bit
7004	$+E_2$ 63–48 bit	7005	$+E_2$ 47–32 bit
7006	$+E_2$ 31–16 bit	7007	$+E_2$ 15–0 bit
7008	$+E_3$ 63–48 bit	7009	$+E_3$ 47–32 bit
7010	$+E_3$ 31–16 bit	7011	$+E_3$ 15–0 bit
7012	$-E_1$ 63–48 bit	7013	$-E_1$ 47–32 bit
7014	$-E_1$ 31–16 bit	7015	$-E_1$ 15–0 bit
7016	$-E_2$ 63–48 bit	7017	$-E_2$ 47–32 bit
7018	$-E_2$ 31–16 bit	7019	$-E_2$ 15–0 bit
7020	$-E_3$ 63–48 bit	7021	$-E_3$ 47–32 bit
7022	$-E_3$ 31–16 bit	7023	$-E_3$ 15–0 bit
7024	$+RE_1$ 63–48 bit	7025	$+RE_1$ 47–32 bit
7026	$+RE_1$ 31–16 bit	7027	$+RE_1$ 15–0 bit
7028	$+RE_2$ 63–48 bit	7029	$+RE_2$ 47–32 bit
7030	$+RE_2$ 31–16 bit	7031	$+RE_2$ 15–0 bit
7032	$+RE_3$ 63–48 bit	7033	$+RE_3$ 47–32 bit
7034	$+RE_3$ 31–16 bit	7035	$+RE_3$ 15–0 bit
7036	$-RE_1$ 63–48 bit	7037	$-RE_1$ 47–32 bit
7038	$-RE_1$ 31–16 bit	7039	$-RE_1$ 15–0 bit
7040	$-RE_2$ 63–48 bit	7041	$-RE_2$ 47–32 bit
7042	$-RE_2$ 31–16 bit	7043	$-RE_2$ 15–0 bit
7044	$-RE_3$ 63–48 bit	7045	$-RE_3$ 47–32 bit
7046	$-RE_3$ 31–16 bit	7047	$-RE_3$ 15–0 bit
7048	∑+E 63–48 bit	7049	∑+E47–32 bit
7050	∑+E 31–16 bit	7051	∑+E 15–0 bit
7052	∑-E 63–48 bit	7053	∑-E 47–32 bit
7054	∑-E 31–16 bit	7055	∑-E 15–0 bit
7056	∑+RE 63–48 bit	7057	∑+RE 47–32 bit
7058	∑+RE 31–16 bit	7059	∑+RE 15–0 bit
7060	∑-RE 63–48 bit	7061	∑-RE 47–32 bit
7062	∑-RE 31–16 bit	7063	∑-RE 15–0 bit

Energies (MWh, MVARh)

MB addr.	Content	MB addr.	Content
7100	$+E_1$ 63–48 bit	7101	$+E_1$ 47–32 bit
7102	$+E_1$ 31–16 bit	7103	$+E_1$ 15–0 bit
7104	$+E_2$ 63–48 bit	7105	$+E_2$ 47–32 bit
7106	$+E_2$ 31–16 bit	7107	$+E_2$ 15–0 bit
7108	$+E_3$ 63–48 bit	7109	$+E_3$ 47–32 bit
7110	$+E_3$ 31–16 bit	7111	$+E_3$ 15–0 bit
7112	$-E_1$ 63–48 bit	7113	$-E_1$ 47–32 bit
7114	$-E_1$ 31–16 bit	7115	$-E_1$ 15–0 bit
7116	$-E_2$ 63–48 bit	7117	$-E_2$ 47–32 bit
7118	$-E_2$ 31–16 bit	7119	$-E_2$ 15–0 bit
7120	$-E_3$ 63–48 bit	7121	$-E_3$ 47–32 bit
7122	$-E_3$ 31–16 bit	7123	$-E_3$ 15–0 bit
7124	$+RE_1$ 63–48 bit	7125	$+RE_1$ 47–32 bit
7126	$+RE_1$ 31–16 bit	7127	$+RE_1$ 15–0 bit
7128	$+RE_2$ 63–48 bit	7129	$+RE_2$ 47–32 bit
7130	$+RE_2$ 31–16 bit	7131	$+RE_2$ 15–0 bit
7132	$+RE_3$ 63–48 bit	7133	$+RE_3$ 47–32 bit
7134	$+RE_3$ 31–16 bit	7135	$+RE_3$ 15–0 bit
7136	$-RE_1$ 63–48 bit	7137	$-RE_1$ 47–32 bit
7138	$-RE_1$ 31–16 bit	7139	$-RE_1$ 15–0 bit
7140	$-RE_2$ 63–48 bit	7141	$-RE_2$ 47–32 bit
7142	$-RE_2$ 31–16 bit	7143	$-RE_2$ 15–0 bit
7144	$-RE_3$ 63–48 bit	7145	$-RE_3$ 47–32 bit
7146	$-RE_3$ 31–16 bit	7147	$-RE_3$ 15–0 bit
7148	∑+E 63–48 bit	7149	∑+E47–32 bit
7150	∑+E 31–16 bit	7151	∑+E 15–0 bit
7152	∑-E 63–48 bit	7153	∑-E 47–32 bit
7154	∑-E 31–16 bit	7155	∑-E 15–0 bit
7156	∑+RE 63–48 bit	7157	∑+RE 47–32 bit
7158	∑+RE 31–16 bit	7159	∑+RE 15–0 bit
7160	∑-RE 63–48 bit	7161	∑-RE 47–32 bit
7162	∑-RE 31–16 bit	7163	∑-RE 15–0 bit

Energies (GWh, GVARh)

MB addr.	Content	MB addr.	Content
7200	$+E_1$ 63–48 bit	7201	$+E_1$ 47–32 bit
7202	$+E_1$ 31–16 bit	7203	$+E_1$ 15–0 bit
7204	$+E_2$ 63–48 bit	7205	$+E_2$ 47–32 bit
7206	$+E_2$ 31–16 bit	7207	$+E_2$ 15–0 bit
7208	$+E_3$ 63–48 bit	7209	$+E_3$ 47–32 bit
7210	$+E_3$ 31–16 bit	7211	$+E_3$ 15–0 bit
7212	$-RE_1$ 63–48 bit	7213	$-RE_1$ 47–32 bit
7214	$-RE_1$ 31–16 bit	7215	$-RE_1$ 15–0 bit
7216	$-RE_2$ 63–48 bit	7217	$-RE_2$ 47–32 bit
7218	$-RE_2$ 31–16 bit	7219	$-RE_2$ 15–0 bit
7220	$-RE_3$ 63–48 bit	7221	$-RE_3$ 47–32 bit
7222	$-RE_3$ 31–16 bit	7223	$-RE_3$ 15–0 bit
7224	$+RE_1$ 63–48 bit	7225	$+RE_1$ 47–32 bit
7226	$+RE_1$ 31–16 bit	7227	$+RE_1$ 15–0 bit
7228	$+RE_2$ 63–48 bit	7229	$+RE_2$ 47–32 bit
7230	$+RE_2$ 31–16 bit	7231	$+RE_2$ 15–0 bit
7232	$+RE_3$ 63–48 bit	7233	$+RE_3$ 47–32 bit
7234	$+RE_3$ 31–16 bit	7235	$+RE_3$ 15–0 bit
7236	$-RE_1$ 63–48 bit	7237	$-RE_1$ 47–32 bit
7238	$-RE_1$ 31–16 bit	7239	$-RE_1$ 15–0 bit
7240	$-RE_2$ 63–48 bit	7241	$-RE_2$ 47–32 bit
7242	$-RE_2$ 31–16 bit	7243	$-RE_2$ 15–0 bit
7244	$-RE_3$ 63–48 bit	7245	$-RE_3$ 47–32 bit
7246	$-RE_3$ 31–16 bit	7247	$-RE_3$ 15–0 bit
7248	∑+E 63–48 bit	7249	∑+E47–32 bit
7250	∑+E 31–16 bit	7251	∑+E 15–0 bit
7252	∑-E 63–48 bit	7253	∑-E 47–32 bit
7254	∑-E 31–16 bit	7255	∑-E 15–0 bit
7256	∑+RE 63–48 bit	7257	∑+RE 47–32 bit
7258	∑+RE 31–16 bit	7259	∑+RE 15–0 bit
7260	∑-RE 63–48 bit	7261	∑-RE 47–32 bit
7262	∑-RE 31–16 bit	7263	∑-RE 15–0 bit

Energies (kWh, kVARh) (32 bit!)

MB addr.	Content	MB addr.	Content
7300	$+E_1$ 31–16 bit	7301	$+E_1$ 15–0 bit
7302	$+E_2$ 31–16 bit	7303	$+E_2$ 15–0 bit
7304	$+E_3$ 31–16 bit	7305	$+E_3$ 15–0 bit
7306	$-E_1$ 31–16 bit	7307	$-E_1$ 15–0 bit
7308	$-E_2$ 31–16 bit	7309	$-E_2$ 15–0 bit
7310	$-E_3$ 31–16 bit	7311	$-E_3$ 15–0 bit
7312	$+RE_1$ 31–16 bit	7313	$+RE_1$ 15–0 bit
7314	$+RE_2$ 31–16 bit	7315	$+RE_2$ 15–0 bit
7316	$+RE_3$ 31–16 bit	7317	$+RE_3$ 15–0 bit
7318	$-RE_1$ 31–16 bit	7319	$-RE_1$ 15–0 bit
7320	$-RE_2$ 31–16 bit	7321	$-RE_2$ 15–0 bit
7322	$-RE_3$ 31–16 bit	7323	$-RE_3$ 15–0 bit
7324	∑+E 31–16 bit	7325	∑+E 15–0 bit
7326	∑-E 31–16 bit	7327	∑-E 15–0 bit
7328	∑+RE 31–16 bit	7329	∑+RE 15–0 bit
7330	∑-RE 31–16 bit	7331	∑-RE 15–0 bit

Energies (MWh, MVARh) (32 bit!)

MB addr.	Content	MB addr.	Content
7400	$+E_1$ 31–16 bit	7401	$+E_1$ 15–0 bit
7402	$+E_2$ 31–16 bit	7403	$+E_2$ 15–0 bit
7404	$+E_3$ 31–16 bit	7405	$+E_3$ 15–0 bit
7406	$-E_1$ 31–16 bit	7407	$-E_1$ 15–0 bit
7408	$-E_2$ 31–16 bit	7409	$-E_2$ 15–0 bit
7410	$-E_3$ 31–16 bit	7411	$-E_3$ 15–0 bit
7412	$+RE_1$ 31–16 bit	7413	$+RE_1$ 15–0 bit
7414	$+RE_2$ 31–16 bit	7415	$+RE_2$ 15–0 bit
7416	$+RE_3$ 31–16 bit	7417	$+RE_3$ 15–0 bit
7418	$-RE_1$ 31–16 bit	7419	$-RE_1$ 15–0 bit
7420	$-RE_2$ 31–16 bit	7421	$-RE_2$ 15–0 bit
7422	$-RE_3$ 31–16 bit	7423	$-RE_3$ 15–0 bit
7424	∑+E 31–16 bit	7425	∑+E 15–0 bit
7426	∑-E 31–16 bit	7427	∑-E 15–0 bit
7428	∑+E 31–16 bit	7429	∑+RE 15–0 bit
7430	∑-E 31–16 bit	7431	∑-RE 15–0 bit

Energies (GWh, GVARh) (32 bit!)

MB addr	Tartalom	MB addr	Tartalom
7500	$+E_1$ 31–16 bit	7501	$+E_1$ 15–0 bit
7502	$+E_2$ 31–16 bit	7503	$+E_2$ 15–0 bit
7504	$+E_3$ 31–16 bit	7505	$+E_3$ 15–0 bit
7506	$-E_1$ 31–16 bit	7507	$-E_1$ 15–0 bit
7508	$-E_2$ 31–16 bit	7509	$-E_2$ 15–0 bit
7510	$-E_3$ 31–16 bit	7511	$-E_3$ 15–0 bit
7512	$+RE_1$ 31–16 bit	7513	$+RE_1$ 15–0 bit
7514	$+RE_2$ 31–16 bit	7515	$+RE_2$ 15–0 bit
7516	$+RE_3$ 31–16 bit	7517	$+RE_3$ 15–0 bit
7518	$-RE_1$ 31–16 bit	7519	$-RE_1$ 15–0 bit
7520	$-RE_2$ 31–16 bit	7521	$-RE_2$ 15–0 bit
7522	$-RE_3$ 31–16 bit	7523	$-RE_3$ 15–0 bit
7524	$\sum$+E 31–16 bit	7525	$\sum$+E 15–0 bit
7526	$\sum$-E 31–16 bit	7527	$\sum$-E 15–0 bit
7528	$\sum$+RE 31–16 bit	7529	$\sum$+RE 15–0 bit
7530	$\sum$-RE 31–16 bit	7531	$\sum$-RE 15–0 bit

7.5. Error LED settings

Function

The error indicator LED is set when the error indication is enabled in 7.5 Error LED setting menu. The errors are stored in the memory, and can be viewed in 5. Errors menu.

In 5. Errors menu contain errors states (0 – not occured, 1 - occured). Errors are cleared after reset.

Sequence of operations

1. Log in the 7. Configuration menu.
2. Choose the 7.5. Error LED setting menu with the ⇧ / ⇩ buttons, and press ENTER button.
3. In the apperaring menu select and mark or unmark the error you want to observe, with the ⇧ / ⇩ / SEL button.

Attention! You can mark more then one error!

4. If you want to escape from this menu, press the OK button.
5. If you want to escape from 7. Configuration menu, press the BACK button.

Error messages

Error number:	Explanation:
1	L1 voltage dip
2	L2 voltage dip
3	L3 voltage dip
4	L1 voltage interrupt
5	L2 voltage interrupt
6	L3 voltage interrupt
7	L1 voltage swell
8	L2 voltage swell
9	L3 voltage swell
10	L1 overload
11	L2 overload
12	L3 overload
13	Phase sequence error
14	Frequency out of range
15	Q out of range
16	Modbus communication error
17	Analogue output error
18	Demand overrun
19	Unexpeted syncron signal
20	Missed syncron signal

Error messages

Error number:	Explanation:
21	Calibration values are demaged
22	User settings are demaged
23	Saved energies are demaged

Voltage dip:
The voltage value is less than 90% of nominal value. (Not used the EN50160 standart)

Voltage interrupt:
The voltage value is less than 10% of nominal value. (Not used the EN50160 standart)

Voltage swell:
The voltage value is more than 110% of nominal value. 110% t. (Not used the EN50160 standart)

Overload:
The measured current value is more than 120% of nominal current value.

Phase sequence error:
The L1 L2 L3 phases follow each other unlike the positive sequnce (-120°, -240°)

7.6. Clear errors

Function

Here can the Supervisor delete the errors.

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.6. Clear errors menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Press the CLEAR switch
4. Press the BACK switch to exit from 7.6. Clear errors submenu.

7.7. Clear the Energyregisters

Function

Here can the Supervisor delete the energy regesiters.

You can not write back the previous value!

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.7. Clear energy menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Select the Energy you want to delet with ⇧ / ⇩ buttons, and press the ENTE switch
4. Press the CLEAR switch
5. Press the YES switch confirm to delete.
6. Press the BACK switch to exit from 7.7 Clear energy submenu.

7.8. Change the password

Function

Here can the Supervisor change the password.
Default: 0

Sequence of operations

1. Log in the 7. Configurations menu
2. Choose the 7.8. User password menu of the 7. Configurations menu with ⇧ / ⇩ buttons, and press the ENTE switch.
3. Type the new password with help ⇨, -, + switches, and press the OK switch to accept the value.
4. The device has to exit from 7.8. User password submenu.

Warning! Do not forget your master password, because if it goes to 7. Configuration submenu, you can only enter with the new password

8. Fault rectification

8.1. Fault finding

The fault finding must be carried out by trained and authorized personnel only!

- The green indicator is dark ⟶ check the power supply.

If the supply voltage is OK: the instrument is defective.

- There is no output signal ⟶ check the device connected to the input.

When the result of fault finding is that the PQRM5300 33 Ux Ix xx xx (PS) is defective call the manufacturer service department.

8.2. Repairing

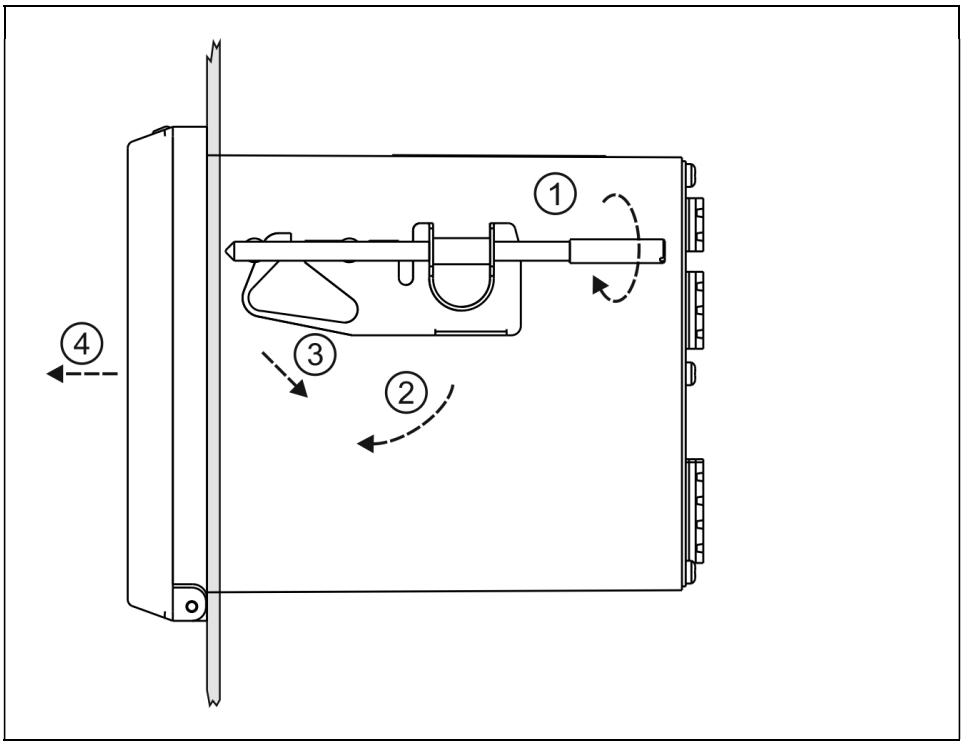
There is no user repairable part inside the instrument.
In accordance with Point **2.1.: For safety and warranty reasons, any internal work on the instrument must be carried out by DATCON personnel.**

9. Dismounting

9.1. Dismounting procedure

Before dismounting take note the warnings written in Chapter 5.1.
The following figure shows the dismounting procedures:

Dismounting from the rail



The dismounting procedure needs a screwdriver for slotted screws.

1. Switch off the power supply of the instrument.
2. Remove all cable.
3. Loosen the fixing screw (anticlockwise) according the figure. **Step (1)**.
4. Push the end of the mouting clamp screw forward, and then rotate it downward to release it from the rear retaining rivet. **Step (2)**..
5. Remove the mounting clamp from the front rivet according the figure **Step (3)**.
6. Do the above procedure with the other mounting clamp also (**Step (1)** - **Step (4)**).
7. Pull out the instrument from the panel.

9.2. Disposal

According with the concerning EU directive, the manufacturer undertakes the disposal of the instrument that are manufactured by it and intended to be destroyed. Please deliver it in contamination-free condition to the site of the Manufacturer or to a specialized recycling company.

10. Appendix

10.1. Technical specification

Safety data:

The connection terminals of the inputs, the outputs and the supply voltages are galvanic isolated from each other. The isolation of the measuring inputs and the power supply input are in accordance with the standard MSZ EN 61010-1, taking into consideration the following:

Pollution level:	2
Measurement category:	CAT III
Overcurrent protection in installation:	4 A

Input parameters:

Measured power network quantities: U_{12}, U_{23}, U_{31}, U_{L1}, U_{L2}, U_{L3}, I_{L1}, I_{L2}, I_{L3},
P_{L1}, P_{L1}, P_{L3}, Q_{L1}, Q_{L2}, Q_{L3}, S_{L1}, S_{L2}, S_{L3},
PF_{L1}, PF_{L2}, PF_{L3}, φ_{L1}, φ_{L2}, φ_{L3},
ΣP, ΣQ, ΣS, ΣPF, $\Sigma\varphi$, f_1, f_2, f_3; ρ_{12}, ρ_{13}
$+E_{L1}$, $+E_{L2}$, $+E_{L3}$, $-E_{L1}$, $-E_{L2}$, $-E_{L3}$,
$+RE_{L1}$, $+RE_{L2}$, $+RE_{L3}$, $-RE_{L1}$, $-RE_{L2}$, $-RE_{L3}$,
$\Sigma+E$, $\Sigma-E$, $\Sigma+RE$, $\Sigma-RE$,
THD U_{L1}, THD U_{L2}, THD U_{L3},
THD I_{L1}, THD I_{L2}, THD I_{L3},
$h_{UL1\ 0}$– $h_{UL1\ 19}$, $h_{UL2\ 0}$– $h_{UL2\ 19}$, $h_{UL3\ 0}$– $h_{UL3\ 19}$,
$h_{IL1\ 0}$– $h_{IL1\ 19}$, $h_{IL2\ 0}$– $h_{IL2\ 19}$, $h_{IL3\ 0}$– $h_{IL3\ 19}$

Input voltage ranges: 0–125 V AC / 0–250 V AC (none isolated)
(specified at ordering)

Input current ranges:

Type	I_{IN} [A]	I_{IN} max. [A]	I_{IN} max. (1s) [A]
I1	0–1	2 x I_{BE}	20
I5	0–5	2 x I_{BE}	100

Input current ranges: (specified at ordering)

Current measure input	Galvanic isolated , R < 20 mOhm
Voltage measure input	Resistordivider. R = 1.6 MOhm
Consumption of the input:	0.5 VA (max.)
Frequency range:	50 Hz (35Hz – 100Hz)
Response time:	Min. 100ms
Error (23 °C ± 2 °C):	0.2%
Temperature coefficient:	25 ppm / °C (max.)

Output parameters:

The device has one analogue option or one communication option at same time.

MODBUS communication interface (optional):

RS485

Interface type:	RS485, galvanic isolated
Baud rate:	300 / 600 / 1200 / 2400 / 4800 / 9600 / 14400 / 19200 / 32800 / 56000 / 57600 / 115200 Baud
Parity:	even / odd / none
Protocol:	MODBUS RTU / ASCII slave
Address:	1-240
Possible commands:	3 (register read) 16 (register write)
Termination:	External (not part of device)

Ethernet

Interface type:	Ethernet 10/100 Base-T, galvanic isolated
Protocol:	MODBUS TCP/IP, server
Device address:	1
Commands:	3 (register read) 16 (register write)
Settings:	IP address, Default gateway, Subnetwork mask Static IP address (DHCP not supported)

Analogue outputs (optional)

Output type:	2 galvanic isolated active current outputs (configurable, scalable)
Ranges:	0-20 mA / 4-20 mA or 0-5 mA / 1-5 mA
Burden:	500 ohm (max.)
Refreshing time:	same as the measuring time (100 ms)
Setting time: (10-90%)	Max. 60 ms
Overcurrent:	20.8 mA
Error:	<4 uA (23 °C ±2 °C), <40 uA (-20 - 60 °C)
Burden resistance effect:	practically zero

Pulse outputs (optional):

Output type:	2 galvanic isolated transistor
Rating:	30 V, 50 mA

Power supply:	
Supply voltage:	24 VDC ±10% PQRM5300 33 Ux Ix xx xx vagy 230 V AC/DC ±10% PQRM5300 33 Ux Ix xx xx PS
Power consumption:	1.5 VA / 1 W

Galvanic isolation:	
Operating isolation voltage:	250 Veff (between measuring inputs and power supply input)
Test /Type voltage:	4200 VDC (1 min.) (between measuring inputs and power supply input) 500 VDC (between output-power supply terminals)
Capacity:	20 pF (between input, output, power supply terminals)
Protection class:	II. reinforced insulation
Leakage current:	0,005 mA (between input, output, power supply terminals)

Ambient conditions:	
Operating temperature range:	0-60 °C
Storage temperature range:	0-70 °C
Relative humidity:	90 % (max., non condensing)
Place of installation:	cabinet

Electromagnetic compatibility (EMC)

In accordance with the standard MSZ EN 61326-1

Emission: In accordance with the standard MSZ EN 61326-1

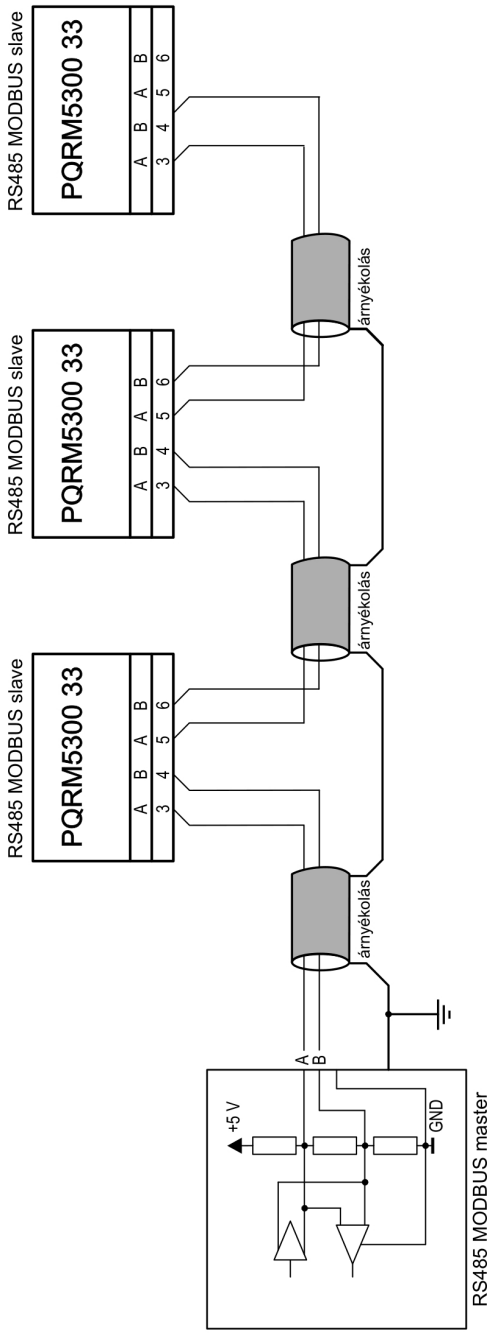
Conducted:	MSZ EN 55011 Limits for Class A equipments	
Radiated:	MSZ EN 55011 Limits for Class A equipments	
ESD:	4 kV/8 kV contact / air	-A- criteria
BURST:		
- Power measure input	4 kV (5/50 ns, 5KHz)	-A- criteria
- Main supply input (PS)	2 kV (5/50 ns, 5KHz)	-A- criteria
- Analogue outputs	1 kV (5/50 ns, 5KHz)	-A- criteria
- Digital outputs	1 kV (5/50 ns, 5KHz)	-A- criteria
SURGE:		
- Power measure input	4 kV (CATIII, 250V)	-B- criteria
- Main supply input (PS)	2 kV (line to ground)	-B- criteria
- Analogue outputs	1 kV (line to ground)	-B- criteria
- Digital outputs	1 kV (line to ground)	-B- criteria
Conducted RF immunity:	3 Veff	-A- criteria
Conducted RF emission:	1 group, Class B	
Radiated RF immunity:	E =10 V/m	A- criteria
Radiated RF emission:	1 group, Class B	

General data:

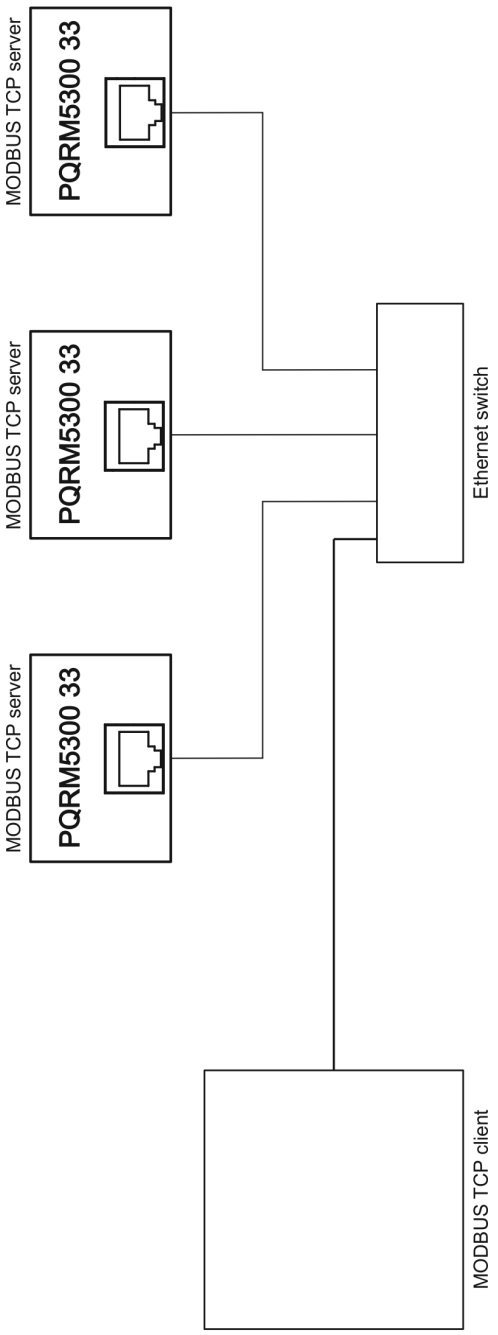
Housing:	panel instrument
Connection:	push-in direct connection
Connecting cable:	2.5 mm^2 (min.) 4.5 mm^2 (max.)
Dimensions:	104 x 104 x 120 mm (width x height x depth)
Weight:	0.5 kg maximum
Protection:	IP 50 (front), IP 20 (rear)

The Manufacturer maintains the right to change technical data.

10.2. MODBUS RS485 bus topology



10.3. Ethernet network topology



1148 Budapest, Fogarasi út 5. 27. ép. HUNGARY

Tel.: +(361) 460-1000 Fax: +(361) 460-1001 www.datcon.hu

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