MPR-2X Series

NETWORK ANALYZER USER MANUAL

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SAFETY AND WARNING

Attention

Failure to follow the instructions below may result in death or serious injury.

- The installation of the device must be performed by the qualified and trained personnel.
- Please, cut the whole power while installing the device. Please, use a suitable circuit breaker on the installation terminal.
- You must connect the power lead-ins of the device by using a current transformer. Do not apply direct current connection.
- Never, remove the front panel while the device is connected to the mains.
- Never, clean the device by any solvent or similar material. Only use dry cloth for cleaning it.
- Before, turning on the device, make sure that the connections are correct.
- Please, contact your authorized dealer in case of any problem with your device.
- The device is only for interior panel type assembly. Only the front panel of the device should be accessible from the switchboard.
- The fuse to be used must be CATIII and F type and the current limit value should be 1A.
- Current measurement inputs must be connected with auxiliary current transformers which have reinforced insulation.
- The power meter shall not be used for primary protection or applications where its failure can cause harm or death.
- Please de-energize the device before replacing RTC backup battery.

It must be Li / MnO2 battery.

The manufacturer firm cannot be held responsible in anyway for any circumstance which might arise if the aforementioned precautions are not implemented.

Safety

Please, read the entire operating manual before using the device.

- Connect a button or a circuit breaker between the mains and the supply inputs of the device.
- The button or circuit breaker to be connected should be close to the device.
- It should be labeled that the button or circuit breaker to be connected will be used for separating the device from the mains.
- This device is used for analyzing the electricity mains and it must not be used for main protection function.

Guarantee

The guarantee term of the device is 2 (two) years. In case of any problem, the repair of the device must be done only by the manufacturer firm; otherwise, the guarantee of the device becomes invalid.

OPERATING CONDITIONS

Operating Conditions	Value Range
Operating voltage	95-270 VAC/DC (±%10) (12-50 VDC (for MPR-2X-D)
Frequency Range	50/60 Hz (±%10)
Maximum Measured Current	6A, Measurement should not be done without current transformer.
Maximum Measured Voltage	300 VAC (VLN) / 480 VAC (VLL)
Operating Temperature Range	-10 ~ +70 ºC
Storage Temperature Range	-20 ~ +80 ºC
Maximum Ambient Humidity	95%
Communication Speed	2400 ~ 115200 bps

INTRODUCTION

General Specifications

- Wide supply voltage range (95-270 ± %10 VAC/DC)
- 3 voltage measurement input
- 3 current measurement input
- 4 different language options.
- 4 MB internal memory
- Real time clock
- Alarm
- Time counters (Operating time and overall time)
- Communication through RS-485 (MODBUS)
- Measured parameters:
    - o Current
    - o Neutral current
    - o Voltage (Phase to Phase, Phase to Neutral)
    - o Active, Reactive and Apparent power
    - o Frequency
    - o Active Power
    - o Reactive Power
    - o Apparent Power
    - o Cos φ
    - o Power Factor
    - o Total Active Power
    - o Total Reactive Power
    - o Total Apparent Power
    - o Total Cos φ
    - o Total Power Factor
    - o Total Harmonic Distortion of the Current (% THD-I)
    - o Total Harmonic Distortion of Phase - Phase Voltages (% THD-VLL)
    - o Total Harmonic Distortion of Phase - Neutral Voltages (% THD-VLN)

Instant minimum and maximum measured parameters:

- o Current
- o Phase to Phase Voltage
- o Phase Neutral Voltage
- o Active Power
- o Reactive Power
- o Apparent Power
- o Frequency
- o Total Harmonic Distortion of the Current
- o Total Harmonic Distortion of Phase - Phase Voltage (% THD-VLL)
- o Total Harmonic Distortion of Phase - Neutral Voltage (% THD-VLN)

Demand and Maximum Demand parameters measured by integration time:
    - Current
    - Active Power
    - Apparent Power
- Insulated digital input and output
- Saving 256 event logs
- DIN4 type rack assembly
- User password
- Changeable transformer settings
- Measurement by 5 different connections: 3-phase 4-wire, 3-phase 3-wire, 3-phase Aron, 3-phase 4-wire balanced, 3-phase 3-wire balanced
- Adjustable LCD display contrast
- Adjustable LCD backlight on/off time
- Adjustable demand and integration time
- Summer-Winter time application

Applications

This is a MPR-2 series 3-phase mains analyzer. It is a microprocessor based device which is designed for measuring all parameters of an electricity mains, calculate consumptions and monitor these values on the LCD display.

Thanks to its clock chip and flash memory of the device, the blackout logs and the processes performed by the operator such as the time and setting changes, resets and etc. are saved in real time. These logs can be read and followed by the Modbus RTU protocol through the RS-485 communication port.

Current connection is done according to the selected model through 5A direct connection to the current transformer with CT25 and RJ-45 connector and mV voltage output.

The connection control function which is described in detail in the 17th page should be used against open live ends due to possible fractures at terminals.

MPR-2 Product Family

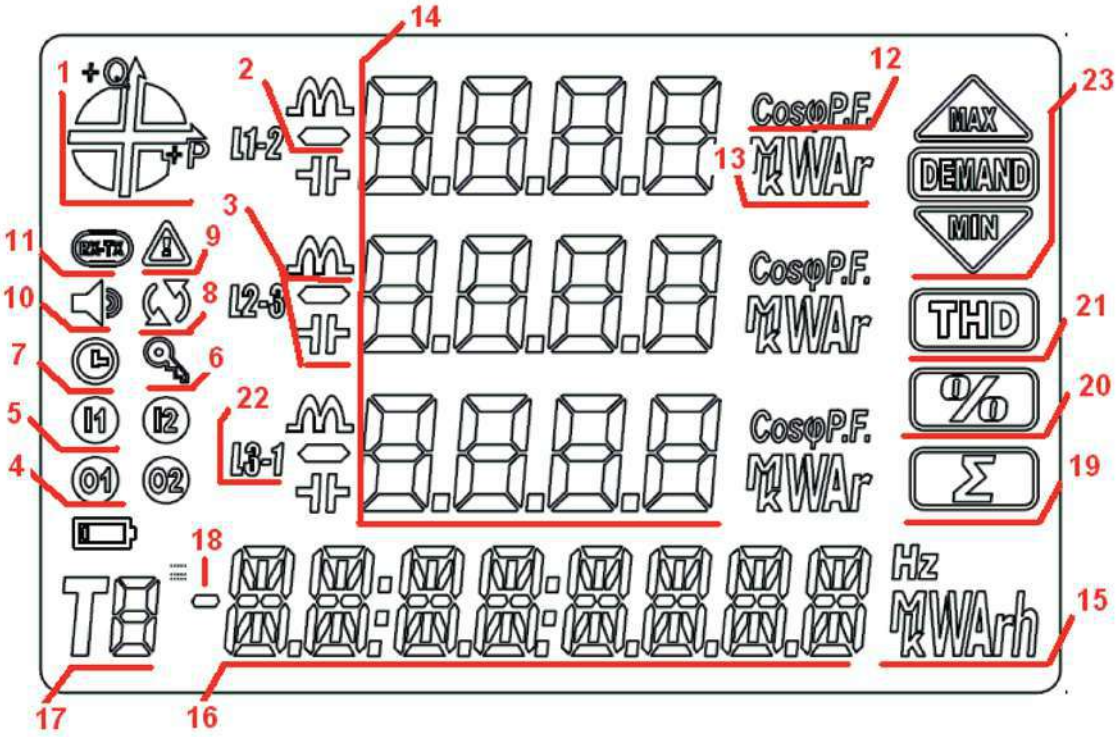
Product Model	Dimensions	Basic Parameters	% THD I	% THD V	Separately harmonic	RS-485	Digital Input	Digital Output	Analog Output	Relay Output (Alarm Contact)	Hour (RTC)	Sampling Per Period	Memory	Current / Voltage Unbalances	Pulse Meter	Alarm	Run Hour	Event Logs	Log Records	X/5, X/1	X/333mV	plug - meter	12-50VDC	95-270 VAC/DC
95-270 VAC/DC Auxiliary Supply																								
MPR-24	DIN4	●									●	128					●	●		●				●
MPR-24-PM	DIN4	●									●	128					●	●			●	●		●
MPR-25S-22	DIN4	●	●	●		●	2	2			●	128	4MB		●	●	●	●	●	●				●
MPR-26S-21	DIN4	●	●	●	51	●	2			1	●	128	4MB	●	●	●	●	●	●	●				●
MPR-26S-21-PM	DIN4	●	●	●	51	●	2			1	●	128	4MB	●	●	●	●	●	●		●	●		●
MPR-27S-23	DIN4	●	●	●	51	●	2	2	1		●	128	4MB	●	●	●	●	●	●	●	●	●		●
12-50 VDC Auxiliary Supply																								
MPR-24-D	DIN4	●									●	128					●	●		●			●	
MPR-24-D-PM	DIN4	●									●	128					●	●			●	●	●	
MPR-25S-22-D	DIN4	●	●	●		●	2	2			●	128	4MB		●	●	●	●	●	●			●	
MPR-26S-21-D	DIN4	●	●	●	51	●	2			1	●	128	4MB	●	●	●	●	●	●	●			●	
MPR-26S-21-D-PM	DIN4	●	●	●	51	●	2			1	●	128	4MB	●	●	●	●	●	●		●	●	●	
MPR-27S-23-D	DIN4	●	●	●	51	●	2	2	1		●	128	4MB	●	●	●	●	●	●	●			●	

Appearance and Interface

The front view of the device is as below:

LCD Symbols

In this section, it is described the terminal structures according to the models.



1. Displays the region where the main runs.
2. Indicates that the displayed value is negative.
3. Displays that the measurement is inductive or capacitive.
4. Displays that the digital output is active.
5. Displays that the pulse input is active.
6. Flashes if password is needed while entering the programming menu.
7. Flashes if RTC is reset and stays on until the RTC is set.
8. Indicates that there is a phase sequence fault.
9. Indicates that there is a warning.
10. Flashes when the alarm output is active.
11. Indicates that the communication is active.
12. Indicates that the measurement is Power Factor or Cos φ.
13. Displays the unit of the measurement value.(W, kVAr, MVA, v.s.)
14. Displays the measurement results of the related screen.
15. Displays the unit of the energy or the related setting.
16. Displays the energy value or time.
17. Indicates the tariff of the energy value.
18. Indicates that the energy value is negative.
19. Indicates that the related screen is the total screen. (For Example : Total powers)
20. Indicates that the related screen is the percentage screen. (For Example : Harmonic)
21. Indicates that the related screen is the Total Harmonic Distortion Screen.
22. Indicates the L1, L2, L3 ve L1-2, L2-3 and L3-1 measurements.
23. Indicates that the related screen is one of the Minimum, Maximum, Demand or Maximum Demand screens.

Button Functions

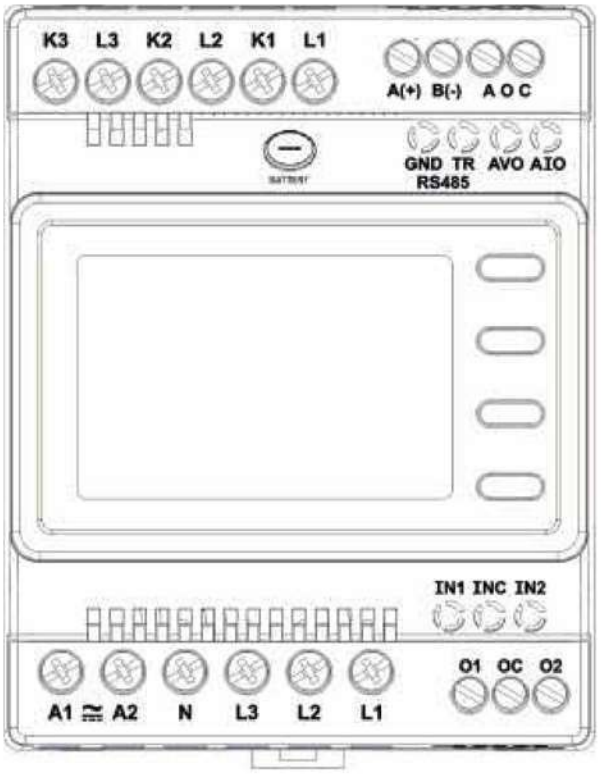
4 buttons are used on the front panel. All the buttons used here can be used for additional functions other than their main functions which can be accessed by pushing for 3 seconds. Button function descriptions are as below:

- **BACK button (24) :** has 3 basic functions:
  - Used for returning to an upper menu from any menu.
  - As it can be seen from the notation on the button (V I F), it is used for monitoring the Current, Voltage, Frequency and time counter values and switching between the related screens.
  - If, pushed for 3 seconds, it turns into device incident log monitoring mode
- **UP button (25) :** has 3 basic functions:
  - As it can be seen from the notation on the button (P PF), it is used for monitoring the Total, Active, Reactive, Apparent Power, Cos φ and the values measured related with the Power Factor.
  - While in the menu screens, it is used to move up in the menu and to increase the adjusted values.
  - If, pushed for 3 seconds, the device switches into the connection test mode.
- **DOWN button (26) :** has 2 basic functions:
  - As it can be seen from the notation on the button (E H), it is used for monitoring Harmonic measurements on the Voltage-Current screen and Energy measurements on the Power screen.
  - While, you are in a menu, it is used for moving downwards in a menu and decreasing the adjusted values.
- **SET button (27) :** has 3 basic functions:
  - As it can be seen from the notation on the button (Max/Min), it is used for monitoring the Maximum, Minimum, Demand and Max Demand measurements of the related screen while you are on the Voltage-Current and Power screens.
  - If, pushed 3 seconds, the settings screen is accessed. If, the PIN is active, PIN is requested to enter the Menu and the menu is accessed only if the correct **PIN** value is entered.
  - It is used to access the setting to be changed and save the changes, if it is required to make changes on the settings by using the menu steps. It is enough to push the button for a little while for this process.

Terminal Structures

The terminal structures according to the models are described in this section:

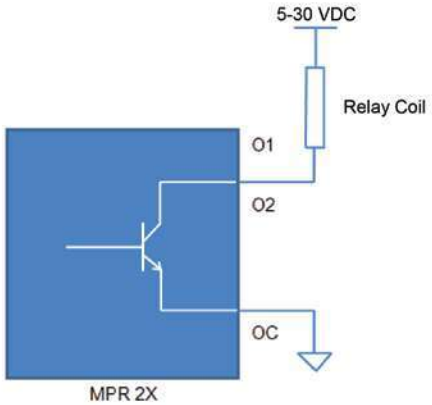
Structure of the MPR-27S-23 Terminal:



Analog Output Terminals: AOC, AVO, AIO
AOC terminal is the common point (reference), and analog current or voltage output is provided from the AIO and AVO terminals, respectively. Only one of the AVO and AIO terminals are used at the same time.

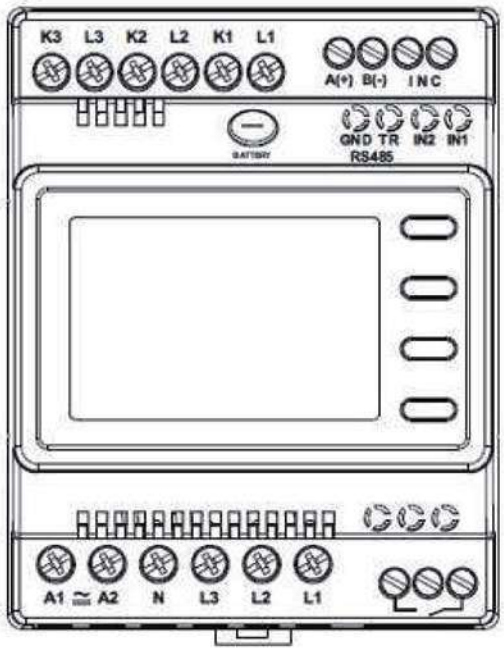
Digital Input Terminals: INC, IN1, IN2
The IN1 and IN2 inputs are used as digital inputs between 5-30V, with the INC terminal being the common point (reference). Inputs have 1 kV insulation level.

Digital Output Terminals : O1 OC O2
O1 and O2 terminals are used as isolated digital outputs, with the OC terminal being the common point (reference). In order for these outputs, which are Open Collectors, to work, they must be fed with an external supply as shown in the figure below.



Structure of the MPR-26S-21 Terminal::

Different from the MPR27S-23, these terminals which are used for relay output are the terminals next to the voltage terminals. They are indicated with the key symbol on the front view. The terminal structure of the MPR26S-21 model is as in the following:



Digital Input Terminals: INC, IN1, IN2

The IN1 and IN2 inputs are used as digital inputs between 5-30V, with the INC terminal being the common point (reference). Inputs have 1 kV insulation level.

Structure of the MPR-25S-22 Terminal:

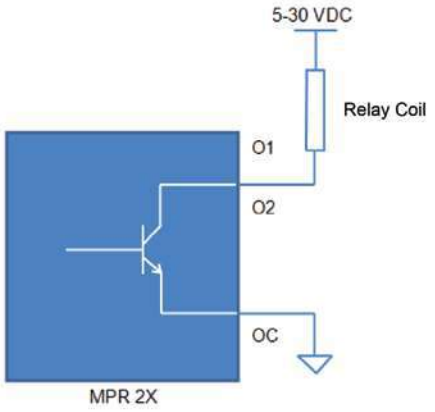
Different from the MPR27S-23, there is not any analogue output terminals on the MPR25S-22 model. The terminal structure of the MPR25S-22 model is as in the following:

Digital Input Terminals: INC, IN1, IN2

The IN1 and IN2 inputs are used as digital inputs between 5-30V, with the INC terminal being the common point (reference). Inputs have 1 kV insulation level.

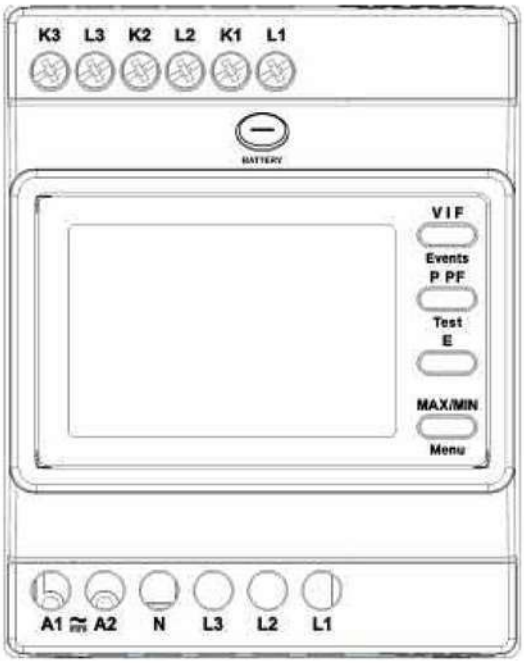
Digital Output Terminals: OC, O1, O2

O1 and O2 terminals are used as isolated digital outputs, with the OC terminal being the common point (reference). In order for these outputs, which are Open Collectors, to work, they must be fed with an external supply as shown in the figure below.



Structure of the MPR-24S Terminal:

Different from the other terminal models, MPR24S model dost not have any I/O terminal. This terminal has only supply and measurement terminals. The terminal structure of the MPR24S model is as in the following:



Current Terminals: K1, L1, K2, L2, K3, L3
An external current transformer must be used for the 3-phase system connection to these terminals where the current up to 5A can be input.

Supply Terminals: A1, A2
Make the 95-270 VAC / DC (12-50 VDC for MPR-2X-D) supply connection from these terminals.

Voltage Terminals: N L3 L2 L1
Please, apply 3-phase voltage connection through these terminals.

Communication Terminals: A(+), B(-), GND, TR
RS-485 communication terminals are used for Modbus RTU communication connection. A (+) and B (-) terminals are connected between devices in parallel. As the communication distance gets longer, communication instability may occur. In this case;
• A 120 Ohm line termination resistor from the device box is installed between the A (+) terminal and the B (-) terminal,
• Short circuit between TR terminal and A (+) terminal.
In this way, line balancing is done.

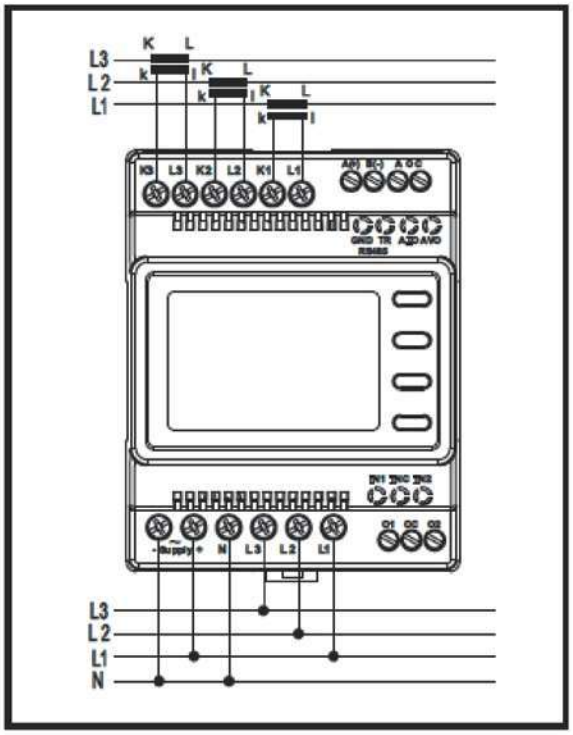
CONNECTION TYPES

As there are shunts at the current measurement inputs of the device, it is mandatory to use a current transformer for the connections of current inputs. If, the device will be used on the same current line by means of analyzers with other shunts, it is recommended that the device is located at the extreme point.
The device has 5 different connection types. These connection types are described in the following schemes:

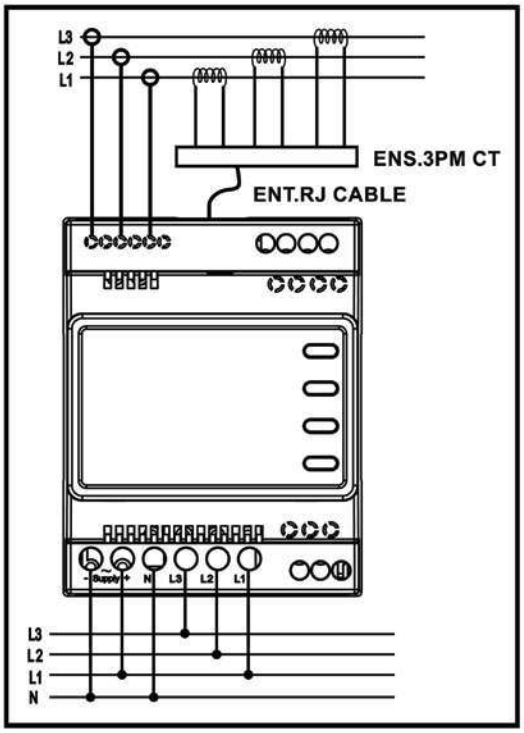
NOTE: Please, use 6 pin terminals or RJ45 input for current connections. Both connections are not working at the same time.

3P4W (Three-Phase Four-Wire) Connection

As it is seen below, four voltage and three current connections including the neutral line are established in this connection type.



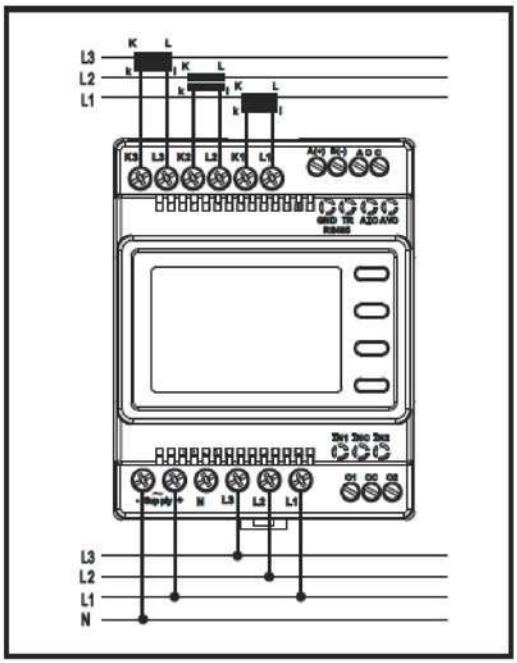
MPR-2X



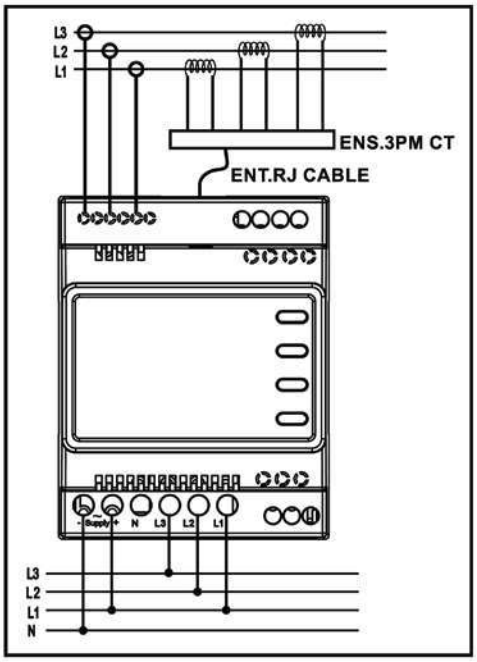
MPR-2X-PM

3P3W (Three-Phase Four-Wire) Connection

As it is seen below, three voltage and three current connections are established in this connection type.



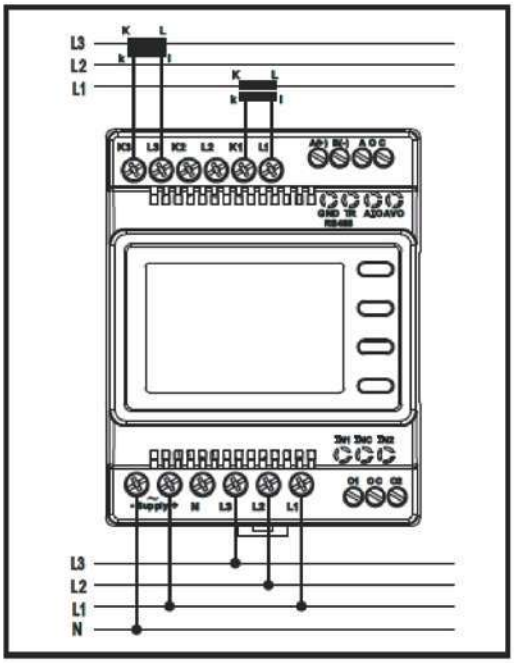
MPR-2X



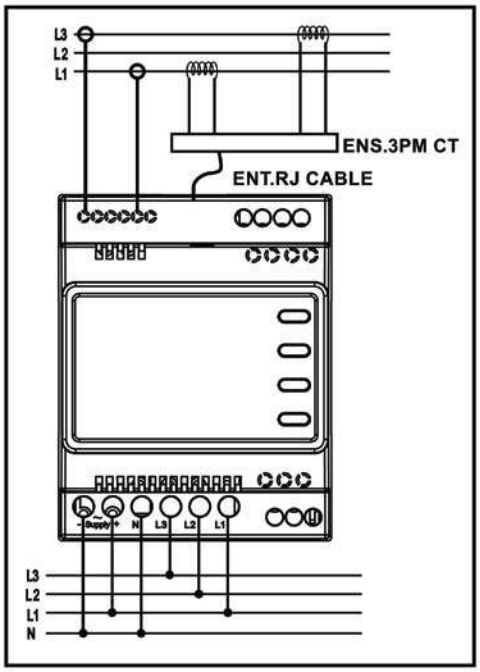
MPR-2X-PM

ARON Connection

Three voltage and two current connections are established in this connection type. As it is seen in the following figure, the current connections are established with the 1st and 3rd phases.



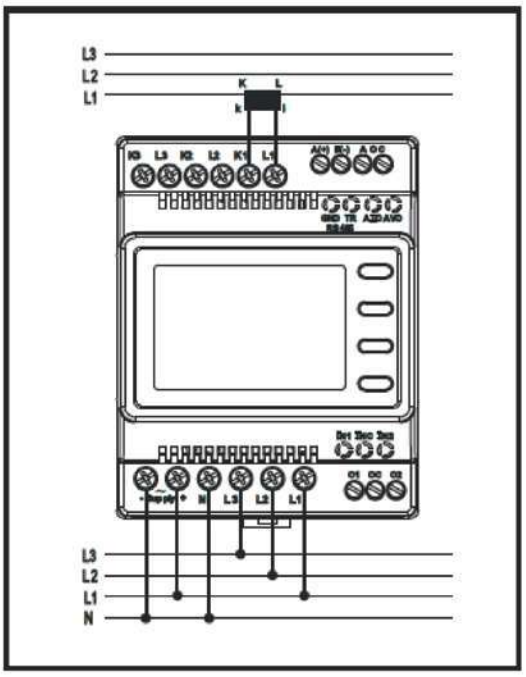
MPR-2X



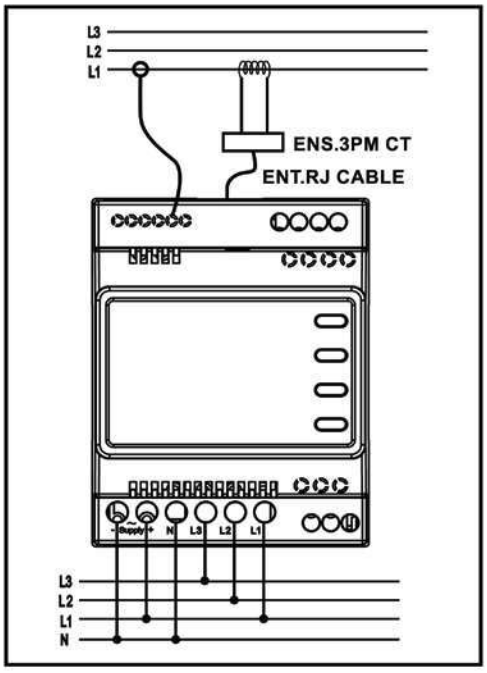
MPR-2X-PM

3P4W BLN (Three-Phase Three-Wire Balanced) Connection

Four voltages and one current connection are established in this connection type. The device displays the value measured at the current input connected to the first phase on its screen for other phases in the same value.



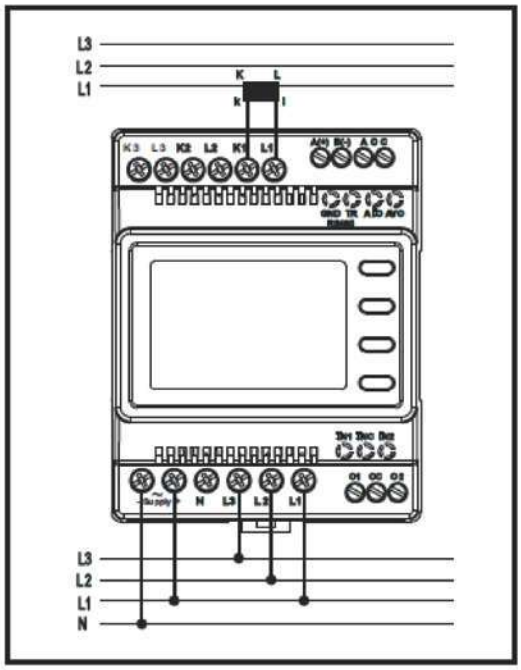
MPR-2X



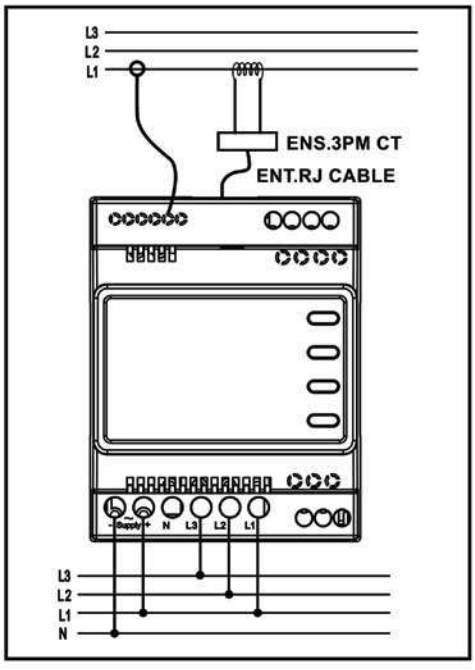
MPR-2X-PM

3P3W BLN (Three-Phase Three-Wire Balanced) Connection

Three voltage and one current connections are established in this connection type. As it is seen below, the device displays the value measured at the current input connected to the first phase on its screen for other phases in the same value.



MPR-2X



MPR-2X-PM

Connection Control

After, the connections of the device are completed, you can check the connection you established by using the test functionality.

The device switches into the connection test mode if the BACK button is pushed for 3 seconds.

- At least 20% of the nominal voltage must be applied to the voltage measurement inputs.
- At least 10% of the nominal current must be applied to the current measurement inputs.
- The angle difference between the current and voltage inputs should be less than 30 degrees (Cos φ value should be between 0.87 inductive and 0.87 capacitive.)

In this mode, the device can control the connections and if there is any fault through the current flow directions, it can correct such faults by software or leave it to be handled manually by the operator.

If, there is any connection fault between voltage inputs, this fault can only be corrected by changing the cable connection points.

If, you experience the fault number 12, please make sure that all connections are established and the aforementioned minimum current and voltage values are applied on the device.

The possible connection faults as a result of the connection test process and the codes displayed on the device screen for these faults are indicated in the following table:

Test Fault Code	Description
0	All connections are correct
1	Reverse Phase-1 current direction
2	Reverse Phase-2 current direction
3	Reverse Phase-3 current direction
4	Reverse Voltage connection of Phase-1 and Phase-2
5	Reverse Voltage connection of Phase-1 and Phase-3
6	Reverse Voltage connection of Phase-2 and Phase-3
7	The Phase sequence of voltage connection as L1, L2, L3 will be changed as L3, L1, L2.
8	The Phase sequence of voltage connection as L3, L2, L1 will be changed as L3, L1, L2.
9	CT-1, CT-2 will be changed.
10	CT-1, CT-3 will be changed.
11	CT-2, CT-3 will be changed.
12	The load value needed for minimum test conditions cannot be provided.

Communication Line Termination Resistance

RS-485 communication terminals are used for Modbus RTU communication connection. A (+) and B (-) terminals are connected between devices in parallel. As the communication distance gets longer, communication instability may occur. In this case;

- A 120 Ohm line termination resistor from the device box is installed between the A (+) terminal and the B (-) terminal,
- Short circuit between TR terminal and A (+) terminal.

In this way, line balancing is done.

OPERATING DEVICE

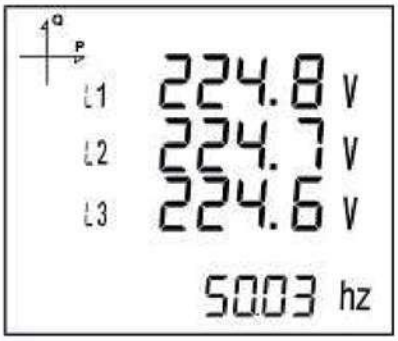
Instant Measurement Screens

In this section, the screens which will be displayed by the buttons of the device while the device is in the measurement mode are described.

Current, Voltage and Frequency Screens

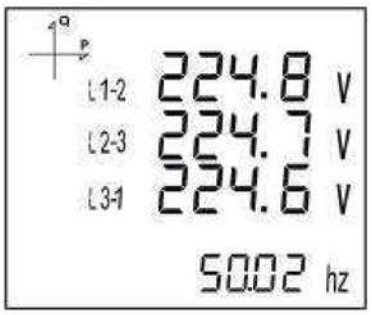
You can view the Phase-Neutral Voltage values measured for each phase on this screen. The bottom line contains the measured frequency value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	VOLTAGE (L-N)



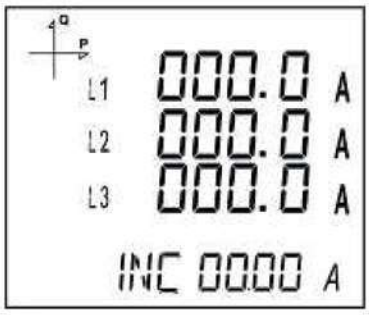
On this screen, you can view the measured Phase-Phase Neutral Voltage values. The bottom line contains the measured frequency value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	VOLTAGE (L-L)



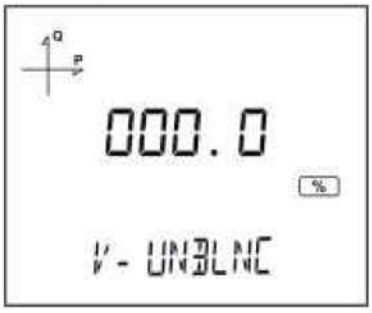
On this screen, you can view the Current values measured for each phase. The calculated neutral current value takes place in the bottom line.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	CURRENT



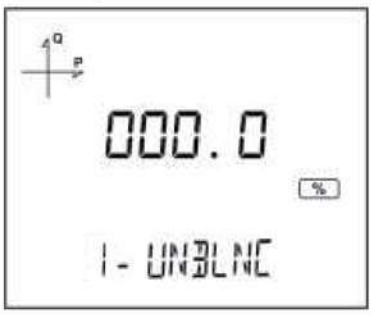
You can view the measured Voltage Unbalance value on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	VOLTAGE UNBALANCE



You can view the measured Current Unbalance value on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	CURRENT UNBALANCE

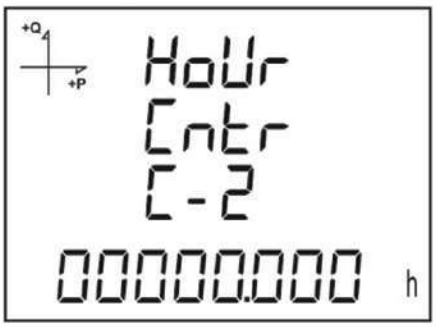


You can view the value of Hour Meter 1 on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	HOUR COUNTER 1

You can view the value of Hour Counter 2 on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	HOUR COUNTER 2

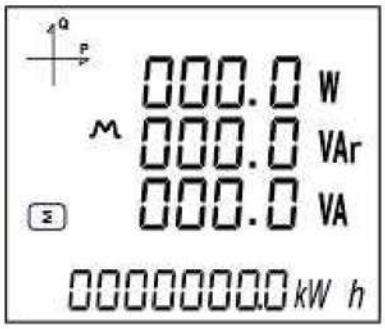


Power and Power Factor Screens

You can view the Power and Power Factor values in this menu.

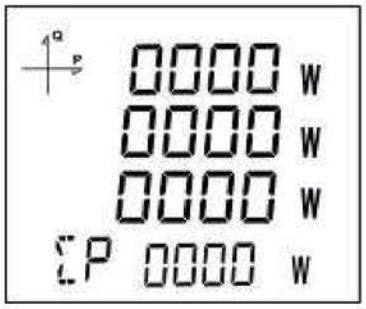
On this screen, you can view the Total Power values (active, reactive, apparent) measured on your device.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	TOTAL POWERS



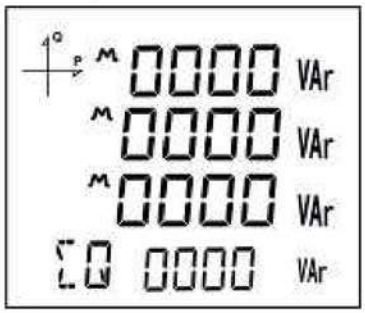
On this screen, you can view the Active Power values measured for each phase in your device. The bottom line contains the total active power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	ACTIVE POWER



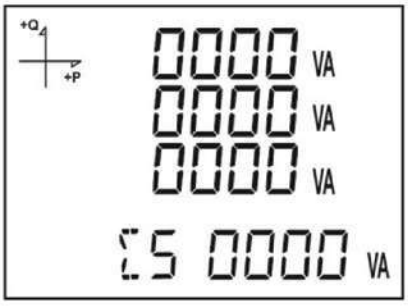
On this screen, you can view the Reactive Power(inductive / capacitive)values measured for each phase in your device. The bottom line contains the total reactive power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	REACTIVE POWER



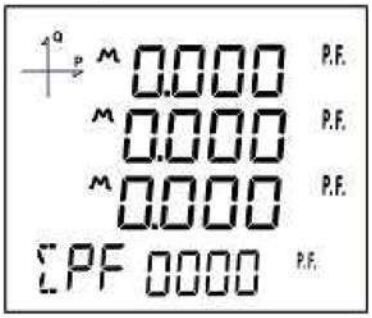
On this screen, you can view Apparent Power values measured for each phase on your device. The bottom line contains the total apparent power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	APPARENT POWER



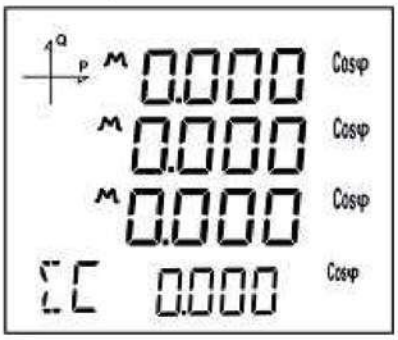
On this screen, you can view the Power Factor (inductive / capacitive) values measured for each phase on your device. The bottom line contains the total power factor value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	POWER FACTOR



You can view the Cos φ (inductive / capacitive) values measured for each phase on your device on this screen. The bottom line contains the total Cos φ value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	COSφ

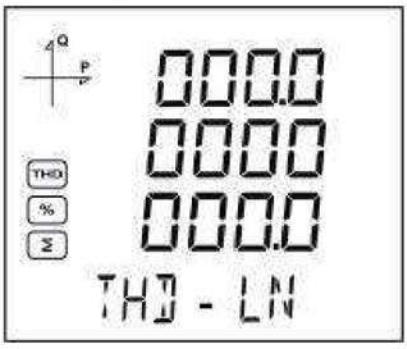


Energy and Harmonic Screens

In this menu, you can view the measured values on the Energy and Harmonic screens.

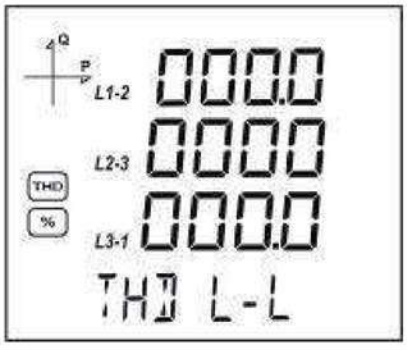
On this screen, you can view the Total Harmonic Distortion (Phase-Neutral) values measured for each phase on your device.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	THD L-N



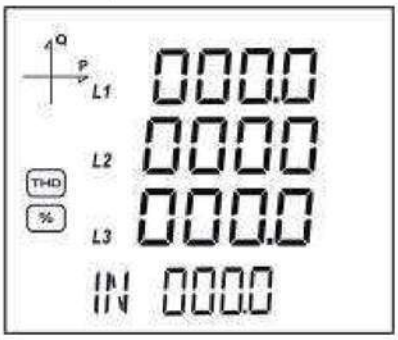
On this screen, you can view the Total Harmonic Distortion (Phase-Phase) values measured for each phase on your device.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	THD L-L



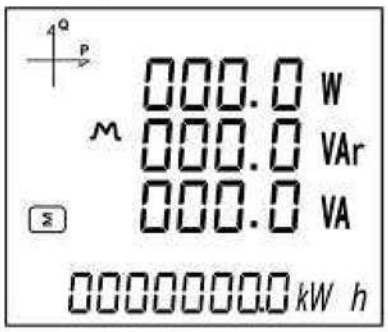
On this screen, you can view the Total Harmonic Distortion current values measured for each phase on your device.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
UP (E-H)	THD IN



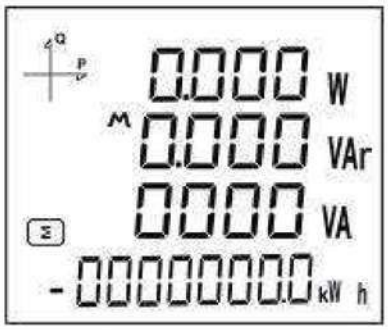
You can view the Import Active Energy values in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
UP (E-H)	IMPORT ACTIVE ENERGY



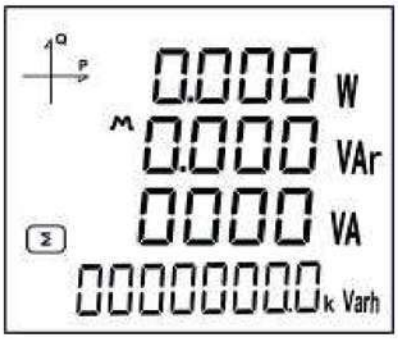
You can view the Export Active Energy values in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
UP (E-H)	EXPORT ACTIVE ENERGY



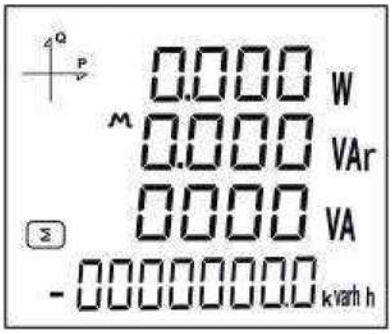
You can view the Import Reactive Energy values in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	IMPORT REACTIVE ENERGY



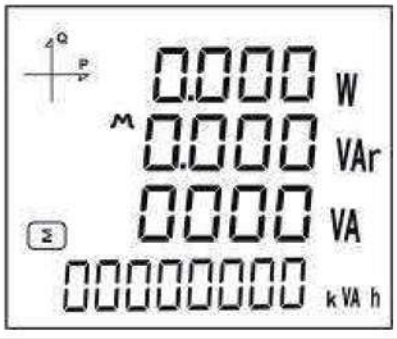
You can view the Export Reactive Energy values in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	EXPORT REACTIVE ENERGY



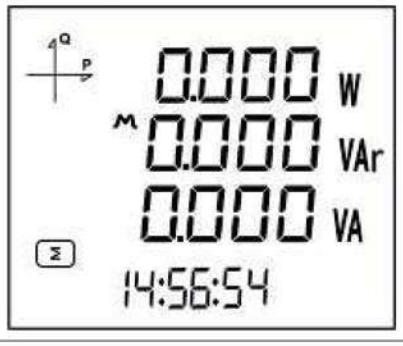
You can view the Apparent Energy values in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	APPARENT ENERGY



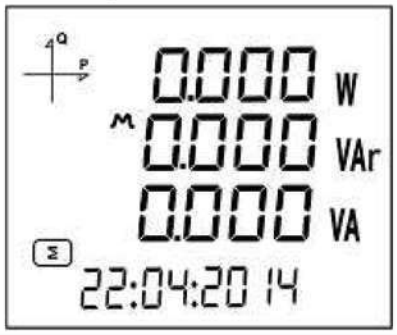
You can view the time information of your device in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	TIME



You can view the date information of your device in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
BACK (VIF)	DATE



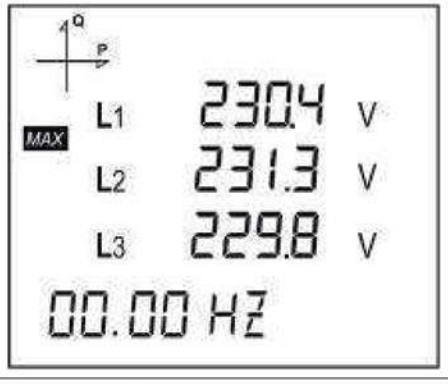
Minimum, Maximum and Demand Screens

Please, first select the related screen by V I F button in order to see the minimum and maximum values of current and voltage.

Then, push SET button and you can see the related screens of MAX/MIN DEMAND.

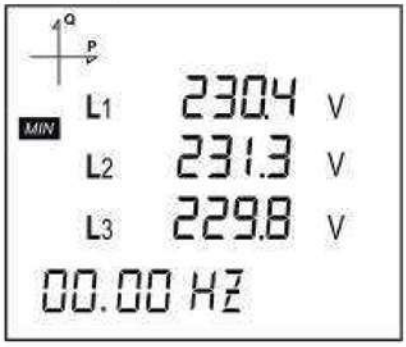
On this screen, you can view the Maximum (Phase-Neutral) Voltage values measured for each phase. The bottom line contains the measured maximum frequency value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MAX(PHASE-NEUTRAL VOLTAGE)



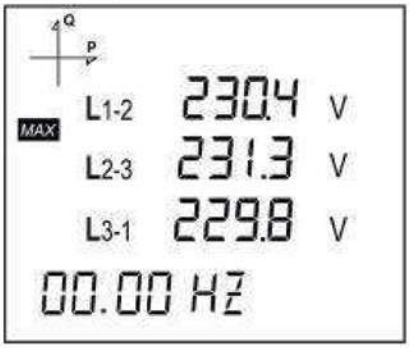
On this screen, you can view the Minimum (Phase-Neutral) Voltage values measured for each phase. The bottom line contains the measured minimum frequency value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MIN(PHASE-NEUTRAL VOLTAGE)



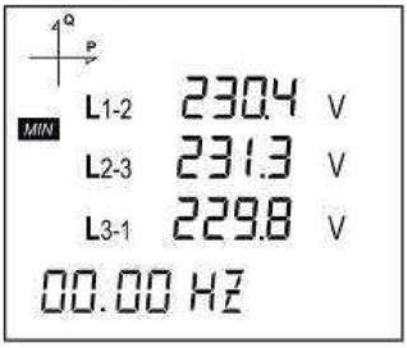
On this screen, you can view the Maximum (Phase-Phase) Voltage values measured for each phase. The bottom line contains the measured maximum frequency value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MAX(PHASE-PHASE VOLTAGE)



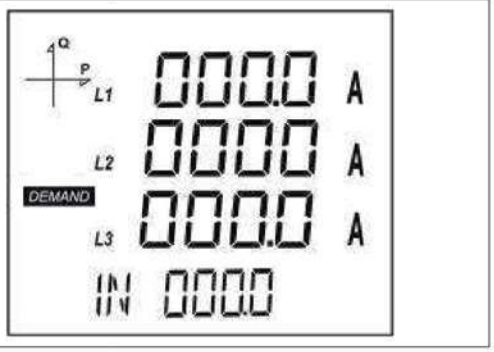
On this screen, you can view the Minimum (Phase-Phase) Voltage values measured for each phase. The bottom line contains the measured minimum frequency value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MIN(PHASE-PHASE VOLTAGE)



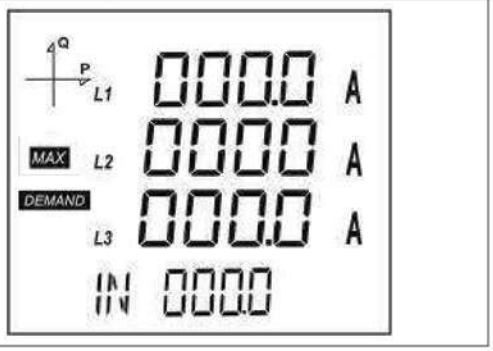
You can view the Current Demand values measured for each phase on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	CURRENT DEMAND



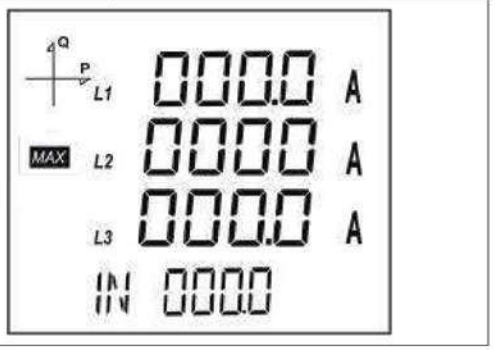
You can view the Current Maximum Demand values measured for each phase on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	CURRENT MAXIMUM DEMAND



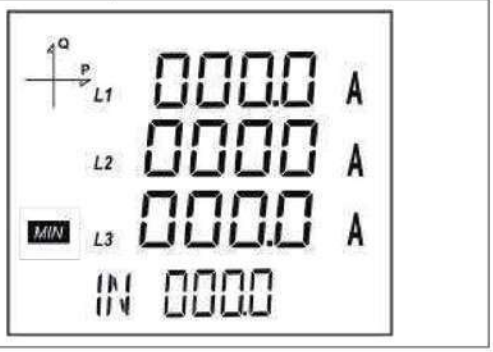
You can view the Maximum Current values measured for each phase on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MAXIMUM CURRENT



You can view the Minimum Current values measured for each phase on this screen.

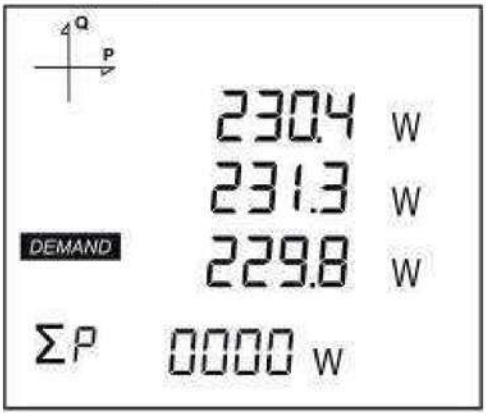
NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MINIMUM CURRENT



Please, first select the related screen by the P PF button in order to see the minimum, maximum and demand values of the power values.
Then, push SET button and you can access the related screens of MAX/MIN DEMAND.

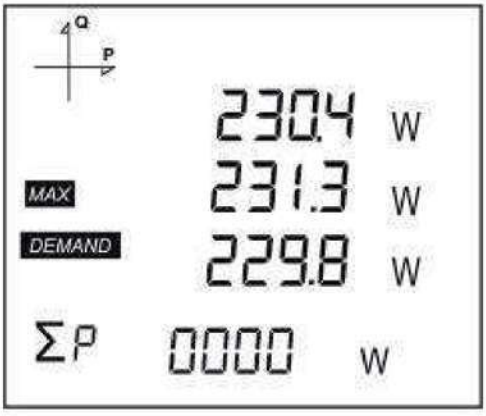
You can view the Active Power Demand values measured for each phase on this screen. The last line contains the total active power demand value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	ACTIVE POWER DEMAND



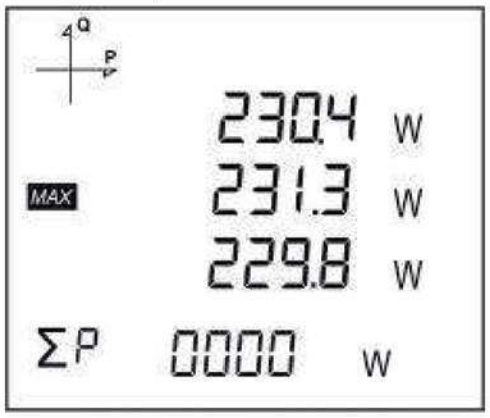
You can view the Active Power Maximum Demand values measured for each phase on this screen. The last line contains the total maximum active power demand value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	ACTIVE POWER MAXIMUM DEMAND



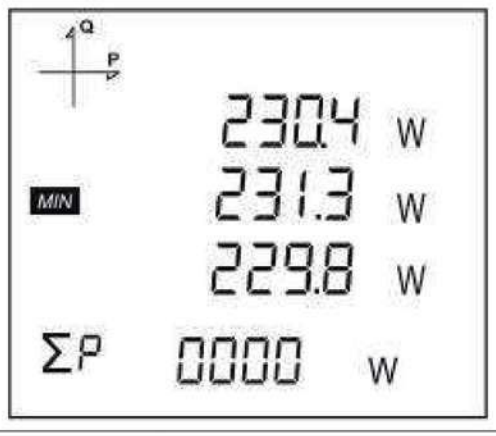
You can view the Maximum Active Power values measured for each phase on this screen. The last line contains the total maximum active power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MAXIMUM ACTIVE POWER



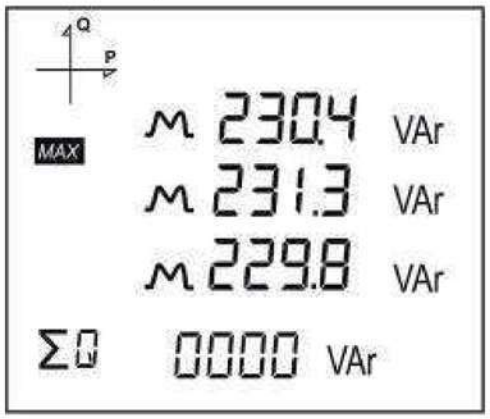
You can view the Minimum Active Power values measured for each phase on this screen. The last line contains the total minimum active power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MINIMUM ACTIVE POWER



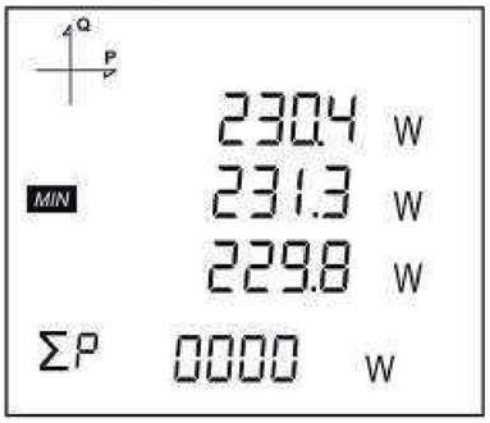
You can view the Maximum Reactive Power (inductive / capacitive) values measured for each phase on this screen. The last line contains the total maximum reactive power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MAXIMUM REACTIVE POWER



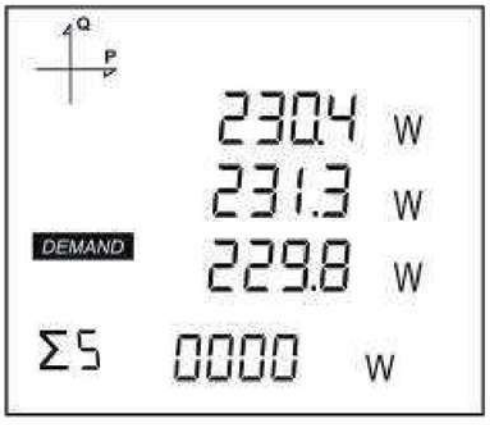
You can view the Minimum Reactive Power (inductive / capacitive) values measured for each phase on this screen. The last line contains the total minimum reactive power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MINIMUM REACTIVE POWER



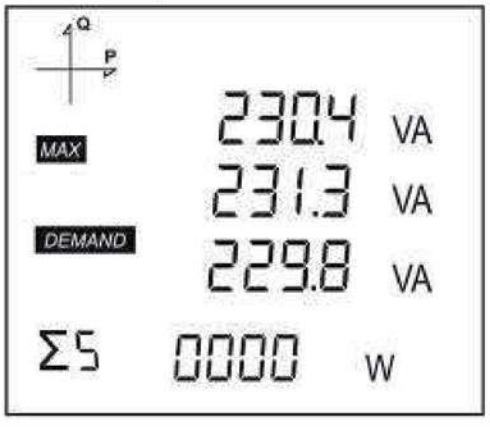
On this screen, you can view the Apparent Power Demand values measured for each phase. The last line contains the total apparent power demand value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	APPARENT POWER DEMAND



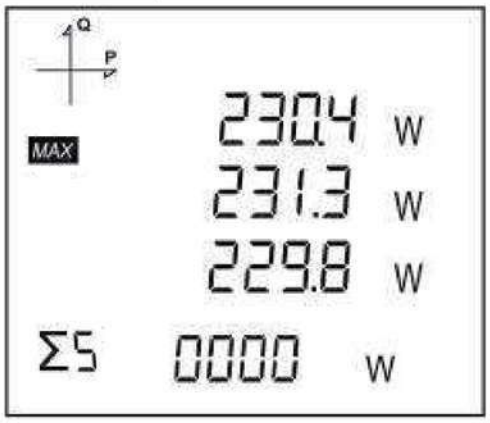
On this screen, you can view the Apparent Power Maximum Demand values measured for each phase. The last line contains the total apparent power maximum demand value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	APPARENT POWER MAXIMUM DEMAND



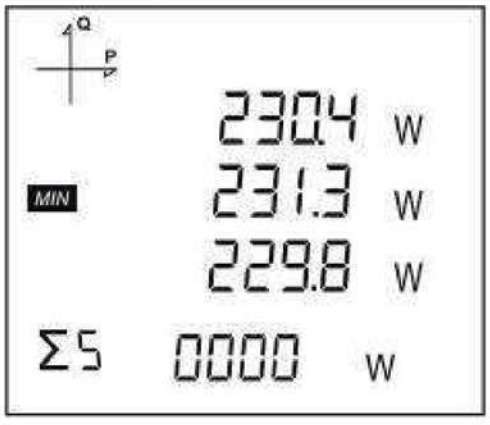
On this screen, you can view the Maximum Apparent Power values measured for each phase. The last line contains the total maximum apparent power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MAXIMUM APPARENT POWER



On this screen, you can view the Minimum Apparent Power values measured for each phase. The last line contains the total minimum apparent power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MINIMUM APPARENT POWER



Settings Screen

Access to the Programming Menu:

The password input screen is displayed if the SET button of the device is pushed for 3 seconds.

When, the correct programming menu password is entered, the programming menus are accessed.

Factory default device menu password is **1234**.

Installation Settings of the Device

The current transformer and voltage transformer rates of the device installed in the system should be programmed in order the device to become ready for use.

As factory default, the device is ready for applying these settings.

Please, use the SET button and down/up OK buttons and set the following values.

Language Setting

The messages indicated on the device screen can be displayed in four different languages. These are;

1. Turkish
2. English
3. German
4. French.

Apply the desired language setting by using the down and up OK buttons and switch the next setting by SET button

Mains Connection Type Setting

1. Select the system connection type as one of the following types with the help of the up and down OK buttons.
   - **a.** 3F4T (3 Phase 4 Wire, Star)
   - **b.** 3F4T (3 Phase 3 Wire, Triangle)
   - **c.** 3F4T ARON
   - **d.** 3F4T DNG (3 Phase 4 Wire Balanced, Star)
   - **e.** 3F3T DNG (3 Phase 4 Wire Balanced, Triangle)

2. 3F4T and 3F3T types should be preferred for unbalanced systems.

3. Switch to the next setting by the SET button.

Voltage Transformer Presence Setting

1. By means of the down and up OK buttons, determine whether there is any voltage transformer connected to the system by using Active and Passive options.

2. Switch to the next setting by the SET button.

Voltage Transformer Secondary Setting

1. Adjust the Secondary value of the Voltage transformer by using the SET, down and up OK buttons.
2. You can switch between the value digits by means of the SET button.
3. Switch to the next setting by the SET button after adjusting the desired value.

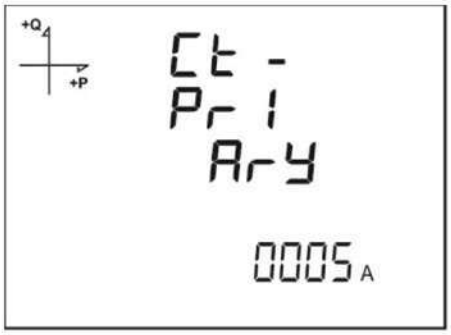
Voltage Transformer Primary Setting

1. Adjust the desired primary voltage value from 50 to 400.000 by using the down and up OK buttons.
2. You can use the SET button for switching between the digits.
3. Switch to the next setting by the SET button after adjusting the desired value.

Current Transformer Secondary Setting

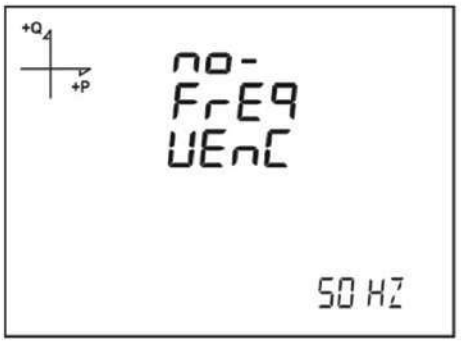
1. Select the secondary value of current transformer from 1A or 5A values by using the down and up OK buttons.
2. Switch to the next setting by the SET button after adjusting the desired value.

Current Transformer Primary Setting



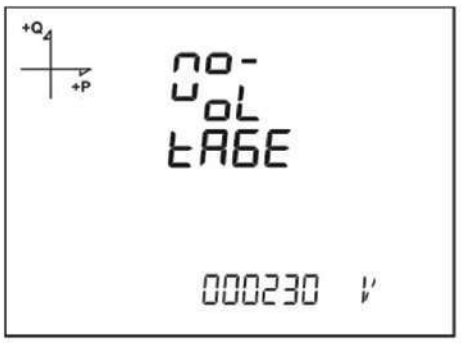
1. Adjust the desired current transformer primary value from 1~9999A value range by pushing the SET button.
2. You can use the SET button for switching between the digits.
3. Switch to the next setting by the SET button after adjusting the desired value.

Nominal Frequency Setting



1. Please, select the nominal operating frequency of the device as 50 Hz or 60 Hz.
2. Switch to the next setting by the SET button after adjusting the desired value.

Nominal Operating Voltage Setting



1. The nominal operating voltage of the device can be selected from 25V to 300V.
2. You can use the SET button for switching between the digits.
3. Switch to the next setting by the SET button after adjusting the desired value.

Time Zone Setting

1. You can select the regional time zone of the device in 30 minutes intervals in between -12:00 and +12:00 hours.
2. Switch to the next setting by the SET button after adjusting the desired value.

Date Setting

1. Please, use the SET, down and up OK buttons for setting the date.
2. You can use the SET button for switching between the digits.
3. Switch to the next setting by the SET button after adjusting the desired value.

Time Setting

1. Please, use the SET, down and up OK buttons for setting the time.
2. You can use the SET button for switching between the digits.
3. Switch to the next setting by the SET button after adjusting the desired value.

After, completing the factory settings, the device switches to the measurement screens. The settings which you desire to change later can be revised from the settings menu by pushing the SET button for 3 seconds.

Display Settings

There are the language selection, display contrast and backlight setting in the display settings section of the device.

Language Selection

The device can be set into four different languages. These are;
a) Turkish
b) English
c) German
d) French.
1. Push set button by selecting the Language tab in the Settings, Display menu.
2. The current language selection begins flashing. Select one of the options above and push SET button.
3. Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

Backlight Setting

There are three different options for the display backlight setting:
a) Always open,
b) Always closed,
c) Automatic

When, the automatic option is selected, the backlight turns off almost 3 minutes after any button is pushed.

1. Push set button by selecting the Backlight tab in the Settings, Display menu.
2. The current backlight selection begins flashing. Select one of the options above and push SET button.
3. Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

Display Contrast Setting

The display contrast of the device can be set in 16 different levels from 0 to 15.
The factory default value is 3.

1. Push set button by selecting the Contrast tab in the Settings, Display menu.
2. The current Contrast selection begins flashing. Please, select a value from 0-15 and push the SET button.
3. Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

Time Settings

Time Setting
The hour, minute and second adjustments of the RTC (Real Time Clock) module of the device can be applied by pushing the SET button.

The phases of this process:

1. Push the SET button while you are on the clock screen.
2. Push the SET button on the Time Settings screen which is the first displayed screen of the menu.
3. In this section, the clock section begins flashing.
4. Adjust the desired time value by using the down and up OK buttons.
5.Adjust the minute and second sections to the desired values by switching with the SET button.
6. The entered parameters will be automatically saved while you are leaving the menu by pushing the BACK button.

Date Setting

The date setting of the RTC module of the device can be adjusted by pushing the SET button.
The phases of this process:
1. Push the SET button while you are on the Date Settings screen.
2. Determine the calendar day by pushing the SET button and using the down and up OK buttons.
3. Determine the calendar month by pushing the SET button and using the down and up OK buttons.
4. Determine the calendar year by pushing the SET button and using the down and up OK buttons.
5. The entered date will be automatically saved while you are leaving the menu by pushing the BACK button.

Time Zone Setting

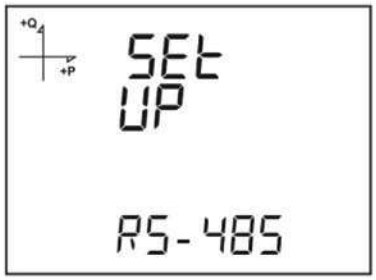
1. Push the SET button while you are on the Time Zone screen.
2. The chosen Time Zone is displayed on the screen.
3. Enter the menu by pushing the SET button.
4. You can determine the time zone of the desired region in half hours by using the down and up OK buttons.
5. Push the SET button after completing your selections.
6. Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

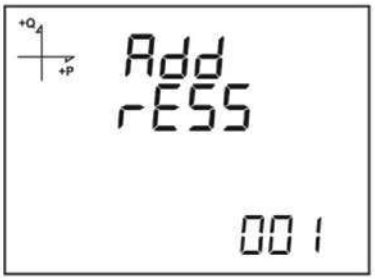
Summer Time Mode Setting

1- Push the SET button while you are on the Summer Time mode screen.
2- The Summer Time screen is displayed.
3- Select one of EUROPE, USA, Special Settings and Closed by pressing the SET button.
4-If you choose the Custom Setting mode, Daylight Saving Time is set by pressing the SET button, starting month, week, day and time respectively.
5- If, you choose the Special Setting mode, the beginning month, week, day and time of the Summer Time are adjusted by pushing the SET button.
6- After, the desired values are adjusted, please push the SET button and leave this menu.
7- Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

RS-485 Communication Settings

RS-485 Adress Setting





1- Come to the Address menu in RS-485 settings and push the SET button.
2 The current address flashes. The address where the device is located on the RS-485 network can be chosen in 1 to 247 range. You can adjust any value for each digit in the address menu by means of the SET button.
3- Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

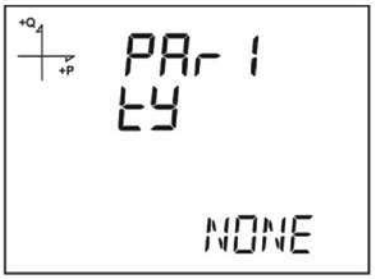
RS-485 Bit Rate Setting

The RS-485 communication rate of the device can be adjusted one of the following values:

1. 2400 baud
2. 4800 baud
3. 9600 baud
4 .19200 baud
5. 38400 baud
6. 57600 baud
7. 115200 baud

1. For this process, please push the SET button while you are in the RS-485 bit rate menu.
2. Switch to the selection phase by means of the SET button while you are on the displayed selection screen.
3. Adjust the desired value by using the down and up OK buttons.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

RS-485 Parity Setting



The RS-485 communication parity of the device can be set to one of the values as ODD or EVEN parity or without any parity.
The factory default value is NO Parity.
1. For this process, please push the SET button while you are in the Input menu.
2. Switch to the selection phase by means of the SET button while you are on the displayed selection screen.
3. Adjust the desired value by using the down and up arrow buttons.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Input Parameter Settings

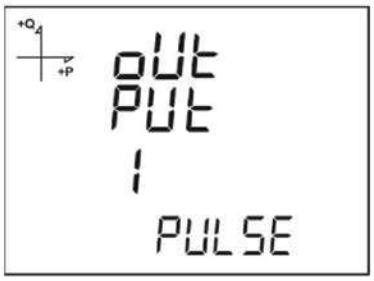
One of the following values can be selected for the input type of the device.
1. Digital input: If, this type is selected, the device senses the logic level of the input.

2. Generator input: If, this type is selected, the device can apply the energy registry to the generator registers according to the input data.

1. For this process, please push the SET button while you are in the Input menu.
2. Switch to the selection phase by means of the SET button while you are on the displayed selection screen.
3. Adjust the desired value by using the down and up OK buttons.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Output Parameter Settings

The digital output of the device can be used for one of the following values:
1. Output according to the pulse selection. In this option, the device generates output pulses according to the selected size of the active and reactive energy.



2. Output according to the alarm. In this option, if the parameter set as the alarm source exceeds the threshold level, the device output is automatically changed from logic-1 level to the logic-0 level.
When, the alarm condition disappears, the device turns into the logic-1 level.

3. Output according to the remote selection. In this option, the user can set the output of the device as logic-0 or logic-1 in accordance with the RS-485 protocol.
By this way, the user can remotely turn on/off any circuit.

1. For this process, please push the SET button while you are in the Output menu.
2. Switch to the selection phase by means of the SET button while you are on the displayed selection screen.
3. Adjust the desired value by using the down and up OK buttons.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Pulse Output Settings

Pulse output according to Active Energy

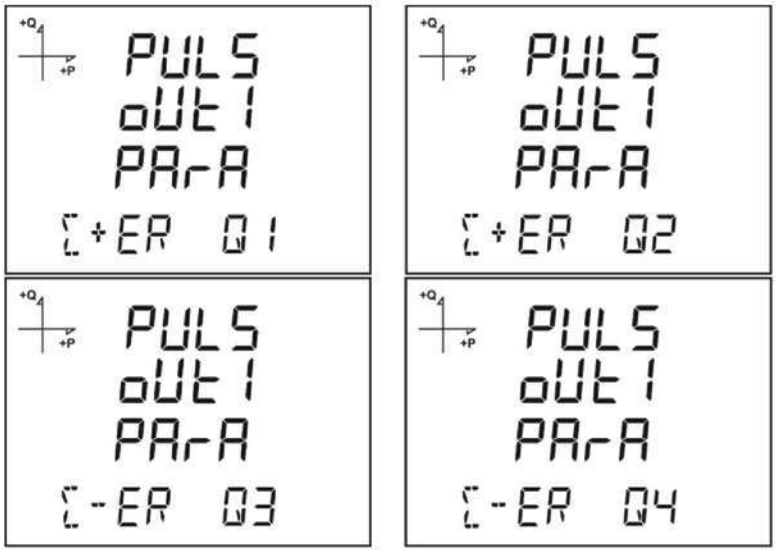
1. Push the up OK button while the PuLS O-1 PArA is selected on the screen.
2. Choose the energy value which the device generates an output pulse as indicated in the screens above. Choose the one on left for total import and the one on right for total export active energy.
3. Exit from the menu after completing your selection.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

After, the output according to the pulse selection is chosen from the parameter settings, the pulse output setting according to active energy can be adjusted.

The device can generate pulses as much as the following steps of the import or export active energy:

1. 1 Wh
2. 10 Wh
3. 100 Wh
4. 1 kWh
5. 10 kWh
6. 100 kWh
7. 1 MWh.

Pulse output according to Reactive Energy



1. Push the SET button while the PuLS O-1 PArA is selected on the screen.
2. Choose the energy value according to the desired section which the device generates an output pulse as indicated in the screens above.
3. Exit from the menu after completing your selection.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

As it is seen from the figures, the energy regions can be selected for different quadrant sections.

The device can generate pulses as much as the following steps of the import or export reactive energy:

1. 1 Varh
2. 10 Varh
3. 100 VArh
4. 1 kVArh
5. 10 kVArh
6. 100 kVArh.
7. 1 MVArh

Time Setting for Pulse Output
In this section, the time that the pulse will stay at the logic-0 level is set.

1. Push the SET button while the PulS dUrAtIon is selected on the screen.
2. Select the pulse width to be generated by the device in 0.01 second steps as shown in the screen above.
3. Exit from the menu after completing your selection.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Pulse Duty Factor Adjustment for Pulse Output
In this section, the time that the pulse will stay at the logic-1 level is set.

1. Push the SET button while the PULSE dUtY is selected on the screen.
2. Select the duty factor of the pulse to be generated by the device in 0.01 second steps as shown in the screen above.
3. Exit from the menu after completing your selection.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Operating Time Settings

In this section, it is described that the time passes where the device exceeds an adjusted value of a chosen parameter.

The parameter is selected from the Time counter screen of the programming menu. For example, if VLN is selected, the screen is displayed as below.

1. Push the SET button while the HoUr CoUn PArA is selected on the screen.
2. Select the parameter where the time counter will start.
3. Switch to the next setting by the SET button after making your choice.

Then, the level which this selected parameter will start the time counter is exceeded is determined.

1. As it is seen above, while the level screen of the selected parameter is chosen, push the SET button.
2. Enter the appropriate level value digit by digit. You can switch between the digits by means of the SET button.
3. Exit from the menu after completing your selection.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Alarm Settings

The parameters of 4 different alarms of the device can be adjusted separately.
The processes described for an alarm in the following section are the same for all 4 alarms.

Activating the Alarm

Follow the following steps for activating an alarm:
1. Push SET while your are in the Setup Alarm menu.
2. If, SET button is pushed while, you are in the Alarm Enable screen, you can select it as enable or disable by the down and up OK buttons.
3. Push the SET button after making your choice.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Selecting Alarm Parameters

Follow the steps below for selecting alarm parameters:
1. Push SET while your are in the Setup Alarm menu.
2. Switch to the Alarm parameters screen by pushing the down button.
3. Activate an alarm parameter by pushing the SET button.
4. Set the alarm parameter one of the following options by means of the down and up OK buttons:

- **a.** Phase currents
- **b.** Total current
- **c.** Current demand
- **d.** Total current demand
- **e.** Active Power
- **f.** Reactive Power
- **g.** Apparent Power
- **h.** Total Active Power
- **i.** Total Reactive Power
- **j.** Total Apparent Power
- **k.** Active power demand
- **l.** Apparent power demand

m. Total Active Power Demand
n. Total Apparent Power Demand
o. Cos φ
p. Total Cos φ
q. Frequency
r. THDV
s. THDU
t. THDI
u. Time counter
v. Digital input
w. Tariffs
x. Phase Neutral Voltage
y. Phase to Phase Voltage

5. Push the SET button after completing your selections.

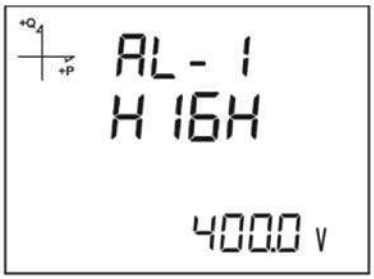
Alarm Operating Method Settings

1. Push the SET button for selecting the alarm operation method.
2. In this mode, select one of the following options:

    a. In the window
    b. Out of the window
    c. Greater than the value
    d. Smaller than the value

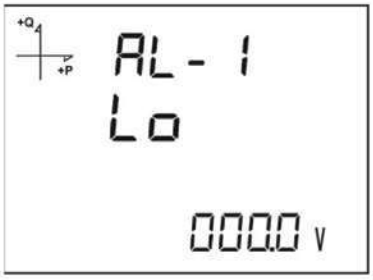
3. When, in and out of the window are selected, the low and high threshold levels are set.
4. The high threshold level is set for the greater than value option while the low threshold level is set for smaller than the value option is selected.
5. Do not forget to save your settings before leaving the menu by means of the BACK button.

Alarm High Level Setting
In this mode, the high level value required for defining an alarm is set.



1. While Alarm Enable is chosen, Alarm High screen can be seen by pushing the up OK button.
2. Set the desired high level value by using the SET button and the direction buttons.
3. Push the SET button after completing your selections.
4. You can save alarm parameters separately for 4 different alarms.
5. Do not forget to save your settings before leaving the menu by means of the BACK button.

Alarm Low Level Setting

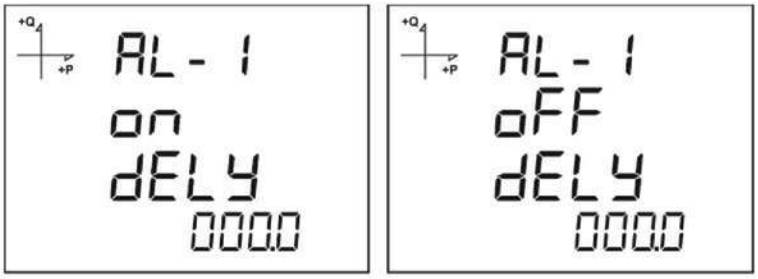


In this mode, the low level value required for defining an alarm is set.
1. While, the Alarm Enable is chosen, switch to the Alarm Low screen by pushing the up OK button.
2. Set the desired low level value by using the SET button and the direction buttons.
3. Push the SET button after completing your selections.
4. You can save alarm parameters separately for 4 different alarms.
5. Do not forget to save your settings before leaving the menu by means of the BACK button.

Hysteresis Setting of the Alarm

In this mode, the hysteresis value required for defining an alarm is set. This setting is done in order to prevent that the device does not continuously turns into alarm mode in little changes around the threshold level. As in the following example, when the 2% value is selected, the alarm parameter value should be changed at 2% in order to get out of the alarm mode.
1. While, the Alarm Enable is chosen, switch to the Alarm Hyst screen by pushing the up OK button.
2. Set the desired Hysteresis value in % by using the SET button and the direction buttons.
3. Push the SET button after completing your selections.
4. You can save alarm parameters separately for 4 different alarms.
5. Do not forget to save your settings before leaving the menu by means of the BACK button.

Alarm Delay Time Setting



1. After the alarm hysteresis screen, the alarm delay time for activation is determined by pushing the SET button.
2. The delay time in seconds is set by pushing the low and up OK buttons and switching between the digits through the SET button.
3. After, the Alarm source exceeds the limit, an ALARM is generated for the time adjusted at that phase if there is any border violation.
4. The alarm release time is determined in the following screen by pushing the down OK button.
5. The minimum time to pass for releasing an alarm is selected in the release time screen by pushing the SET button.
6. The alarm is not released for the time where the parameter value is set here unless it exceeds the threshold + hysteresis value.
7. Adjust the desired time value in seconds by using the down and up OK buttons.
8. Do not forget to save your settings before leaving the menu by means of the BACK button.

Reset Settings

It is possible for the users to reset the minimum, maximum, demand and incident logs saved in the device.

Resetting the maximum logs

1. Select the maximum logs from the Reset menu and push the SET button.
2. Select the “Yes” option for deleting by using the down and up OK buttons in the “Reset Maximum” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting the minimum logs

1. Select the minimum logs from the Reset menu and push the SET button.
2. Select the “Yes” option for reset by using the down and up OK buttons in the “Reset Minimum” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Reset Settings

It is possible for the users to reset the minimum, maximum, demand and incident logs saved in the device.

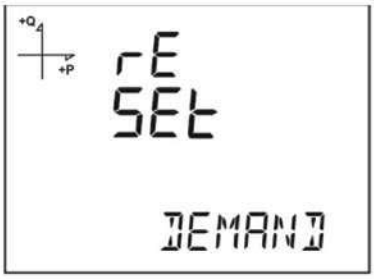
Resetting the maximum logs

1. Select the maximum logs from the Reset menu and push the SET button.
2. Select the “Yes” option for deleting by using the down and up OK buttons in the “Reset Maximum” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting the minimum logs

1. Select the minimum logs from the Reset menu and push the SET button.
2. Select the “Yes” option for reset by using the down and up OK buttons in the “Reset Minimum” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting the demand logs

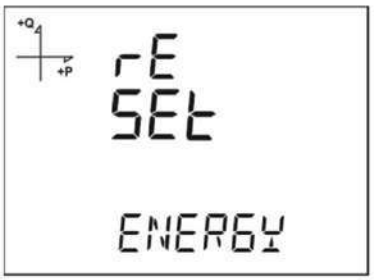


1. Select the demand logs from the Reset menu and push the SET button.
2. Select the “Yes” option for deleting by using the down and up OK buttons in the “Reset Demand” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting the Maximum Demand logs

1. Select the max demand logs from the Reset menu and push the SET button.
2. Select the “Yes” option for deleting by using the down and up OK buttons in the “Reset Max Demand” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting the energy loss



1. Select the energy logs from the Reset menu and push the SET button.
2. Select the “Yes” option for deleting by using the down and up OK buttons in the “Reset Energy” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting the generator energy loss

1. Select the Gen energy logs from the Reset menu and push the SET button.
2. Select the “Yes” option for deleting by using the down and up OK buttons in the “Reset Gen Energy” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting the time counter

1. Select “Time Counter” logs from the Reset menu and push the SET button.
2. Select the “Yes” option for deleting by using the down and up OK buttons in the “Reset Time Counter” section shown on the screen.
3. Finalize your input by the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

System Settings

Pin Code Activation

It is set whether a password is required for accessing the settings menu by the settings to be applied in that section.

1. Push the SET button in the “Pin Request” screen of the system menu.
2. If, the SET button is pushed in the “Request PinA” section displayed on the screen, the 4-digit PIN input screen is displayed.
3. Enter your set PIN code by using the down and up OK buttons.
4. You can switch between the digits by pushing the SET button.
5. When, you enter the correct Pin code, the “Active” and “Passive” options are displayed on the screen.
6. If, you save by exiting the menu after choosing the “active” option, the following menu access will be through a password authentication.
7. Do not forget to save your settings before leaving the menu by means of the BACK button.

Factory default device menu password is 1234.

Changing the Pin Code

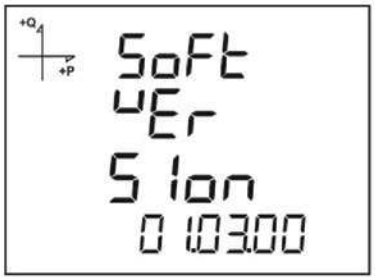
1. Push the SET button in the “Change Pin” screen of the system menu.
2. Enter the previous 4-digit PIN code by using the down and up OK buttons.
3. If, you enter the wrong code, the “WRONG” warning is displayed on the screen.
4. If, the WRONG warning is displayed, please reenter the pin code by pushing the SET button again.
5. If, you enter the Pin code correctly, the “Change Pin” notice is displayed.
6. In this case, determine the new 4-digit pin code and push the SET button.
7. Then, enter the same pin code for a second time and push the SET button.
8. After, you enter the pin code correctly twice, the “Pin is Changed” notice is displayed on the screen.
9. Do not forget to save your settings while leaving the menu by BACK button. From now on, you can use your new pin code.

Restoring the Factory Defaults

1. In order to restore the system to factory defaults, push the SET button in the “System “FBT RESET” screen.
2. If, the SET button is pushed while, the “SIStE FB RESET” is displayed on the screen, the pin code must be entered.
3. Enter your valid PIN code by using the down and up OK buttons.
4. If, you enter the pin code correctly, the No text appears on the lower line of the screen.
5. In this mode, push the SET button and switch that to “Yes” mode by using the low OK button and then push the SET button once again.
6. Do not forget to save your settings before leaving the menu by means of the BACK button.
7. “RESETING” message is displayed on the screen while exiting the menu.
8. 3 seconds after the software version of the device is displayed on the screen and factory defaults restore process starts.

   After the settings are completed, the voltage measurement screen of the device is displayed.

Displaying the Software and Hardware Versions



In order to learn the software and hardware versions of the system, please follow the steps below:

1. Push the SET button while you are on the “System Software) screen.
2. The software version of the system is displayed on the bottom line of the screen.
3. When, the SET button is pushed once again, the hardware version of the system is displayed on the screen with “SYSTEM HARDWARE” notice.

Cihazın Seri Numarasını İzleme

1. Push the SET button while you are on the “System Serial No screen.
2. The 8-digit serial number of the device is displayed on the screen with “Serial No” notice.

Reading Logs from the Modbus

There are two ways to access the logs through the Modbus:

Log Access Based on Time
In this method, the log date desired to be accessed by the Modbus addresses beginning from 21100 address is written in Unit Time format in the related address based on the log type desired to be accessed. The device searches and finds the closest log for the requested date and writes the index related with that log into the index register beginning from 21200 address.

When, the user writes this index to the lowermost index register of the tables at the 23000, 24000, 25000 and etc. addresses, he/she will be able to access the details of the related log through the same tables.

Log Access Based on Index
In this method, the user can write the log index number in the lowermost index register of the tables at 23000, 24000, 25000 and etc. address and access the details of the related log through the same tables.

Reporting Screen

If, you push the BACK button of the device for 3 seconds, the reports of saved incidents are displayed on the screen.
Totally 255 incidents can be saved in the device.
The logged incident types are: First energization, short blackout for the blackouts continued less than 3 seconds, long blackout for the blackouts continued more than 3 seconds, alarm, setting change, time change and reset.
You can switch between the saved incidents by means of the down and up OK buttons.

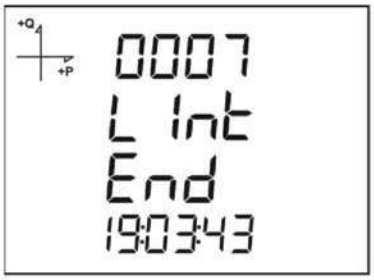
The incidents are listed in time sequence.

The first log is listed as the newest report while the 255th log is listed as the oldest one.

By pushing the SET button you can respectively display the log's;

1. Start date,
2. Start time,
3. End date,
4. End time,
5. Duration,
6. Parameter,
7. Source of the alarm,
8. Value of the alarm.

If, no button is pushed for 60 seconds, the system turns back to the measurement screens by leaving the incidents screen.



TECHNICAL INFORMATION AND ATTACHMENTS

Technical Information

Technical Properties	Value
Dimensions	DIN 4
Display	Segment LCD
Voltage measurement range	10~300 VAC(VLN) 10~480 VAC(VLL)
Measurement range with transfromer	10~999 kV
Accuracy	%0.5 +/- 1 digit
Input Impedance	1.8 MΩ
Burden(Input Load)	< 0.5 VA
Current measurement accuracy	%0.5 +/- 1 digit
Nominal Current	1A, 5A
Lowest current	5 mA
Current measurement range	50 mA ~ 5,5A
Measurement range with transformer	50 mA ~ 10 kA
Burden (Input Load)	< 1 VA
Active power accuracy	%1 +/- 1 digit
Reactive power accuracy	%1 +/- 1 digit
Active energy measurement accuracy	Class 1
Reactive energy measurement accuracy	Class 2
Active power measurement range	0 ~ 1 GW
Reactive power measurement range	0 ~ 1 GVAr
Apparent power measurement range	0 ~ 1 GVA
Power consumption	< 4VA
Active energy measurement ceiling	9 999 999.9 kWh
Reactive energy measurement ceiling	9 999 999.9 kVArh
Operating voltage	95 ~ 270 VAC/DC (rms) 12-50 VDC (for MPR-2X-D models)
Operating frequency	50 - 60 Hz.
Digital input processing voltage	5 ~ 30 VDC
Digital input switching current	Maximum 50 mA
Minimum pulse time	100 ms pulse period, 80 ms pulse width
Operating Temperature Range	-10 ~ +70 ºC
Storage Temperature Range	-20 ~ +80 ºC
Maximum operating humidity	95%
Assembly	It is mounted on the rail in accordance with DIN EN 50022.
Connection terminals	Screw terminal
Connection types	3 phase + neutral (3F4T), 3 phase neutral (3F3T), 3 phase without neutral (3F3T) balanced, 3 phase + neutral (3F4T) balanced, 3 phase Aron
Communication Protocol	RS-485 / MODBUS RTU
Communication Speed	2400 ~ 115200 bps

IEC 61557-12 Properties

CONFORMITY IEC 61557-12 Edition 2		
PMD SPECIFICATIONS		
Type of Specification	Examples of possible specification values	Other additional specifications
Supply quality evaluation function (option)	/	/
PMD Classification	SD	/
Setpoint	K55	/
Humidity + Altitude	/	/
Operationg performance class for active power or active energy (if function available)	0,5	/

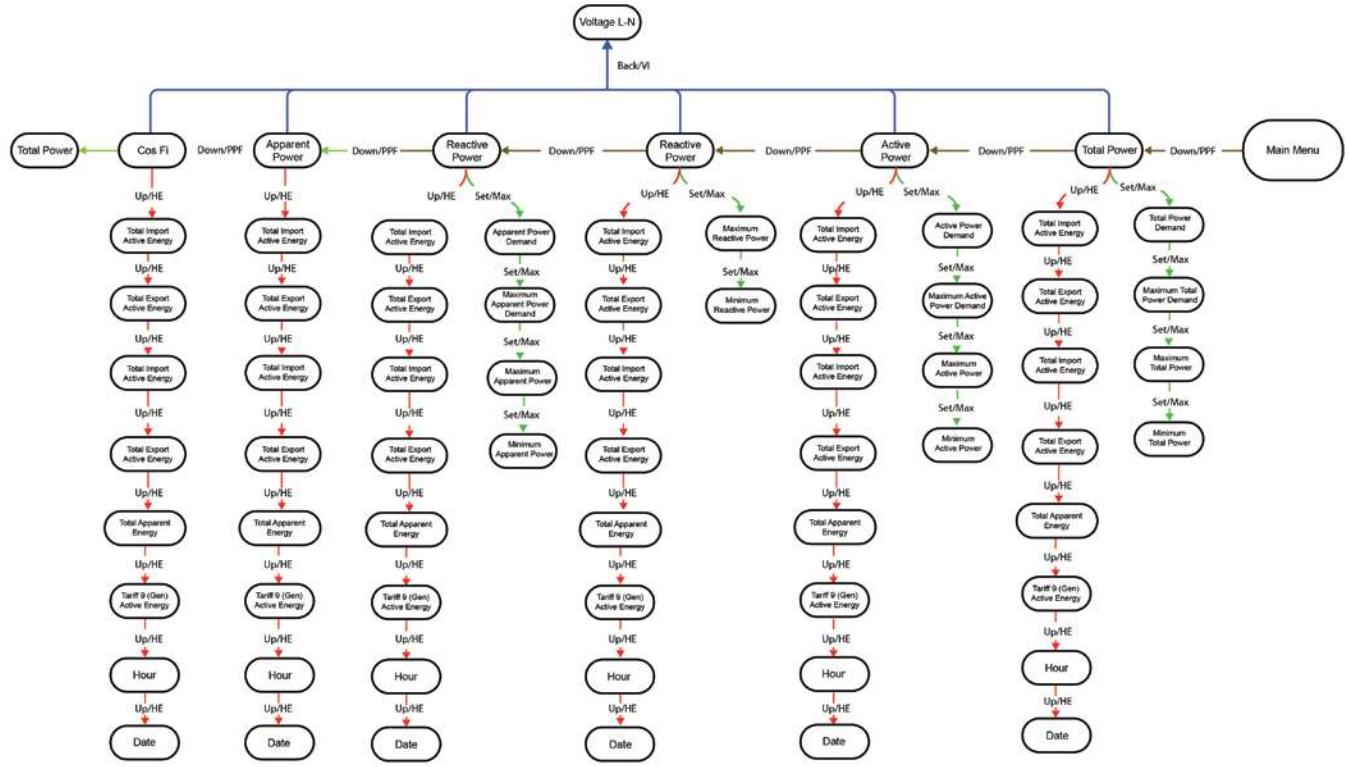
Symbol for functions	**Measurement range**	**Operating performance class, according to CEU 61557-12 according to KI**	**Other additional specifications**
P	10% to 120% In	0,5	
Qa, Qv	10% to 120% In	1	
Sa, Sv	10% to 120% In	1	
Ea	0 to 99999999 kW/h	0,5	
Era, Erv	0 to 99999999 kVar/h	1	
Eapa	0 to 99999999 kVA/h	0,5	
f	45 to 65 Hz	0,02	
I	10% to 120% In	0,2	
In, Inc	10% to 120% In	0,2	
U	10 to 520Vac ph/ph	0,2	
Pfa, Pfv	0,5 ind to 0,8 cap	0,5	
Udip, Uswl	Unavailable function		
Utr	Unavailable function		
Uint	Unavailable function		
Unba, Unb	Unavailable function		
Uh	Unavailable function		
THDu	Fn=50Hz - range 1 to 50 Fn=60Hz - range 1 to 50	1	
THD-Ru	Unavailable function		
Ih	Unavailable function		
THDi	Fn=50Hz - range 1 to 50 Fn=60Hz - range 1 to 50	1	
THD-Ri	Unavailable function		
Msv	Unavailable function		

Compliance with the Standards

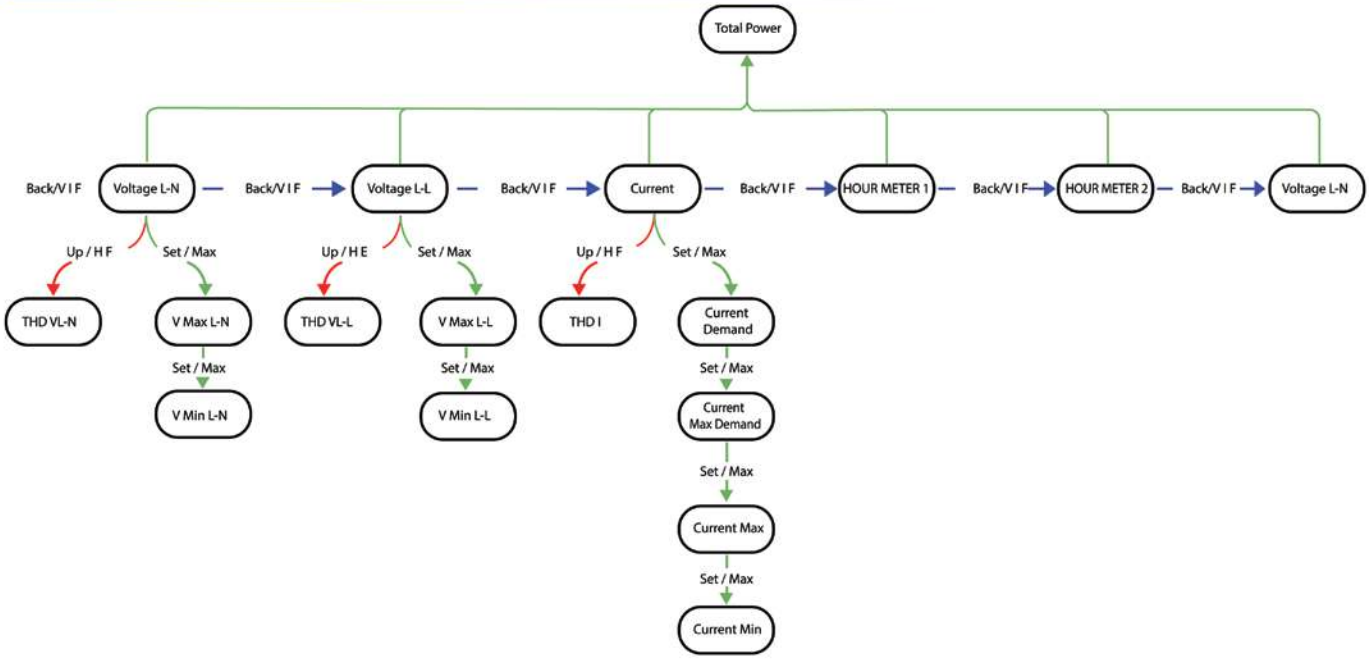
Standard	Year	Title
IEC 61557-12	2008	Electrical safety in low voltage distribution systems up to 1kV (a.a.) and 1,5kV DC(d.a.) – Equipment for testing, measuring or monitoring of protective measures - Part 10: Performance measuring and monitoring arrangements
IEC 61326-1	2005	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General conditions
EN 61000-6-2	2005	Electromagnetic compatibility (EMC) - Part 6-2: General standards - Immunity for industrial environments
IEC 60050(161)	2011	International Electro-technical Vocabulary Chapter 161- Electromagnetic Compatibility
EN 62053-21	2003	Electricity measurement equipment (a.a.) - Special rules - Chapter 21: Static meters for active energy (class 1 and class 2)
EN 62053-23	2003	Electricity measurement equipment (a.a.) - Special rules - Chapter 23: Static meters - Reactive energy (class 2 and class 3)
EN 61000-4-2	1995	Electromagnetic compatibility (EMC) - Part 4-2: Test and measurement techniques - Electrostatic discharge immunity test
EN 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3: Test and measurement techniques-Radiated, radio- frequency, electromagnetic field immunity test
EN 61000-4-4	2004	Electromagnetic compatibility (EMC) - Part 4-4: Test and measurement techniques - Electrical fast transient/burst immunity test
EN 61000-4-5	2006	Electromagnetic compatibility (EMC) - Part 4-5: Test and measurement techniques - Surge immunity test
EN 61000-4-6	2007	Electromagnetic compatibility (EMC) - Part 4-6: Test and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	2010	Electromagnetic compatibility (EMC) - Part 4-8: Test and measurement techniques-Power Frequency Magnetic Field Immunity Test
EN 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Test and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
EN 61000-6-3	2007	Electromagnetic compatibility (EMC) - Chapter 6-3: General standards - Emission Standard for residential, Commercial and light-industrial environments

EN 61000-3-2	2010	Electromagnetic compatibility (emc) - Part 3-2: Limit values - imits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3	2011	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage fluctuations and flicker in low- voltage supply systems for equipment with rated current 16 A.
EN 55016-2-1	2009	Specification for radio disturbance and immunity measuring apparatus and methods - Chapter 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements
EN 60068-2-2	2008	Basic environmental testing procedures Part 2:tests-Test B: Dry heat
EN 60068-2-6	2007	Environment test - Chapter 2-6: Tests - Fc tests: Vibration (sinus formed)
EN 60068-2-30	2008	Environmental testing -- Part 2-30: Tests - test db: Damp heat, cyclic (12 h + 12 h cycle)
EN 60068-2-31	2010	Environmental testing -- Part 2-31: Tests - test ec: Rough handling shocks, primarily for equipment-type specimens
EN 60068-2-75	1997	Basic Environmental Testing Procedures Part 2: Tests - test eh: Hammer tests
BS EN 61010-1	2010	Safety requirements for electrical equipment for measurement, control and laboratory use-Part 1:General requirements
EN 61010-2-030	2010	Safety requirements for electrical equipment for measurement, control and laboratory use-Part 2-030: Specific rules for test and measurement of circuits
EN 62262	2010	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) / Note: Includes Corrigendum of July 2002 (EN 50120 + A1 are renumbered as EN 62262:2002)

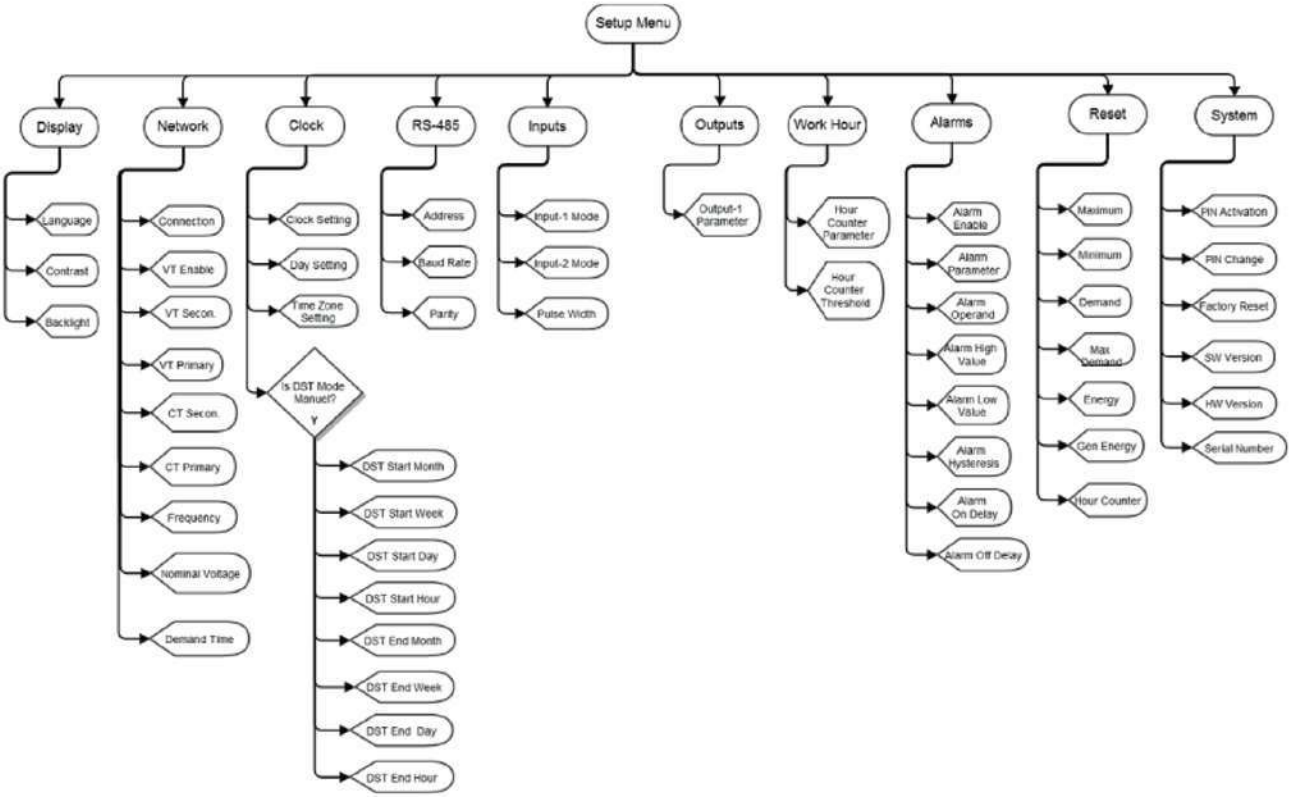
Measurement Menu Map 1



Measurement Menu Map 2



Measurement Menu Map 3



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