MPR-3 Series

Network Anayzer User Manual

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SAFETY AND WARNING

Attention

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

- Please, cut all power before connecting the device.
- Do not connect the current measurement inputs directly to the current source. Always connect the current source using a current transformer.
- Once the device is energized, do not remove the front panel.
- Do not attempt to clean the device with a solvent or another similar agent. Use only a dry piece of cloth.
- Check the correct connections before energizing the device.
- Contact your authorized seller in case of any problems with your device.
- Device is only for panel mounting.
- F Type fuse must be used and its current limit must be 1 A.
- 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. It must be Li / MnO2 battery.

The manufacturing company is not responsible for the consequences resulting from failure to comply with these precautions.

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 seperating the device from the mains.

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
Frequency Range	50 ~ 60 ± %10 Hz
Maximum Measured Current	5.5 A
Maximum Measured Voltage	300 VAC (L-N) / 480 VAC (L-L)
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 VAC/DC ± %10)
- Custom FSTN display with backlight
- 3 voltage measurement input
- 3 current measurement input
- 4 different language options
- 1 MB Internal Memory
- Real time clock
- Alarm
- Time counters (Operating time and overall tiime)
- Communication through RS-485 (Modbus)
- Measured parameters:
    - o Current
    - o Neutral Current
    - o Voltage (Phase-Phase, Phase-Neutral)
    - o Active, Reactive and Apparent Power
    - o Frequency
    - o Active Energy
    - o Reactive Energy
    - o Apparent Energy
    - 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 for Current (% THD-I)
    - o Total Harmonic Distortion for Phase-Phase Voltages (% THD-VLL)
    - o Total Harmonic Distortion for Phase-Neutral Voltages (% THD-VLN)

Instant minimum and maximum measured parameters:

- o Current
- o Phase-Phase Voltage
- o Phase-Neutral Voltage
- o Active Power
- o Reactive Power
- o Apparent Power
- o Frequency
- o Total Harmonic Distortion for Current (% THD-I)
- o Total Harmonic Distortion for Phase-Phase Voltages (% THD-VLL)
- o Total Harmonic Distortion for Phase-Neutral Voltages (% THD-VLN)

Demand and Maximum Demand parameters measured by integration time:

- o Current
- o Active Power
- o Apparent Power

- Isolated digital input and output
- 72 x 72 panel mounting
- User password
- Changable transformer transformers
- 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 Demand time
- Summer-Winter time application

Applications

MPR-3 series analyzers are 3 phase network analyzers. They are microprocessor-based devices designed to measure all parameters of an electrical network, calculate consumption and display them on the LCD screen.

Thanks to the RTC clock chip and flash memory on the device, the operations performed by the operator such as interruption records, time and setting changes, reset operations are recorded in real time. These records can be remotely read and monitored with Modbus RTU protocol over RS-485 communication line.

The current connection is made by connecting to a 1A or 5A secondary current transformer, depending on the selected model, or to a current transformer with mV voltage output with RJ-45 connector.

The connection control function should be used against the problem of exposed live ends that may occur due to possible rupture in the terminals.

MPR-3 Product Family

PRODUCT SELECTION TABLE Product Code	Dimensions / mm	3xV, 3xI, Frequency, W, VAr, VA, ΣP, ΣQ, ΣS, kWh, kVArh, kVAh Demand, Max., Min. Cosφ, I neutral	% THD-I	% THD-V	RS-485 Modbus	Digital Input	Digital Output	Clock (RTC)	Pulse Counter	Working Hours	Alarm	Event Recording	Log Recording	X/5, X/1 Current Tr.	X/ 333mV Current Tr.	plug& meter	95-270 VAC/DC	Pcs/Box
MPR-32	72x72	●						●		●		●		●			●	24
MPR-34-11	72x72	●	●	●		1	1	●	●	●	●	●		●			●	24
MPR-34S-11	72x72	●	●	●	●	1	1	●	●	●	●	●	●	●			●	24
MPR-34S-11-PM plug& meter	72x72	●	●	●	●	1	1	●	●	●	●	●	●	C	●	●	●	24
MPR-34-20	72x72	●	●	●		2		●	●	●		●		●			●	24
MPR-34S-20	72x72	●	●	●	●	2		●	●	●	●	●	●	●			●	24

C Can be used by X5PM converter

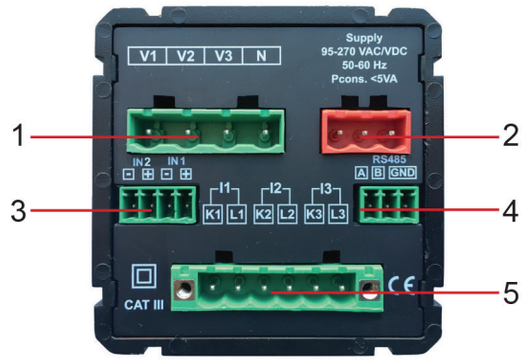
Appearance and Interface

The front view of the device is as follows:

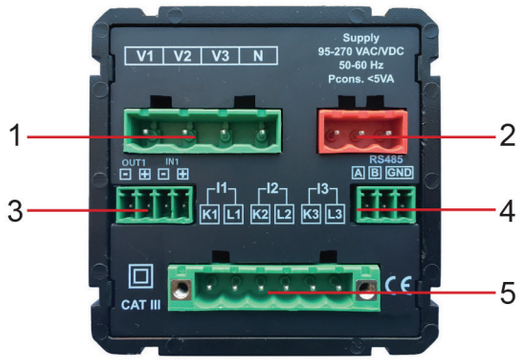
Terminal Structures

MPR-3X Series Rear Panel

Model with Two Inputs



Model with One Input and One Output



1. Voltage Measuring Input Terminal (4 pin) : L1 L2 L3 ve N
2. 95-270 VAC/DC Supply Input Triple Terminal (2 pin)
3. Digital Input / Output quad Terminal (4 pin)
4. RS-485 triple Terminal (2 pin)
5. Current Measuring Input Terminal (6 pin) : L1 L2 L3

1. Voltage Inputs
V1-> 1. Phase Voltage input
V2-> 2. Phase Voltage input
V3-> 3. Phase Voltage input
N-> Neutral input

2. Supply Input
Input A1
Input A2

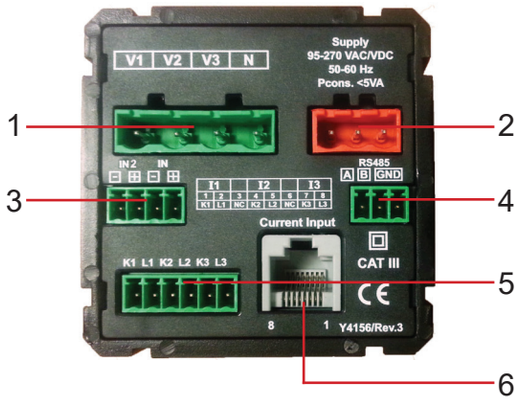
3. Digital Input / Output
The number of inputs / outputs varies according to the product model.

IN1 -> Digital Input
IN2 -> Digital Input
OUT1 ->Digital Output

4. RS-485 Input
Input A
Input B
Input GND

5. Current Terminals
K1-> Phase Current input
L1-> Phase Current output
K2-> Phase Current input
L2-> Phase Current output
K3-> Phase Current input
L3-> Phase Current output

MPR-3X-PM Series Rear Panel



1. Voltage Inputs
V1-> 1. Phase Voltage input
V2-> 2. Phase Voltage input
V3-> 3. Phase Voltage input
N-> Neutral input

2. Supply Input
Input A1
Input A2

3. Digital Input / Output
The number of inputs / outputs varies according to the product model.
IN1 -> Digital Input
IN2 -> Digital Input
OUT1 -> Digital Output

4. RS-485 Input
Input A
Input B
Input GND

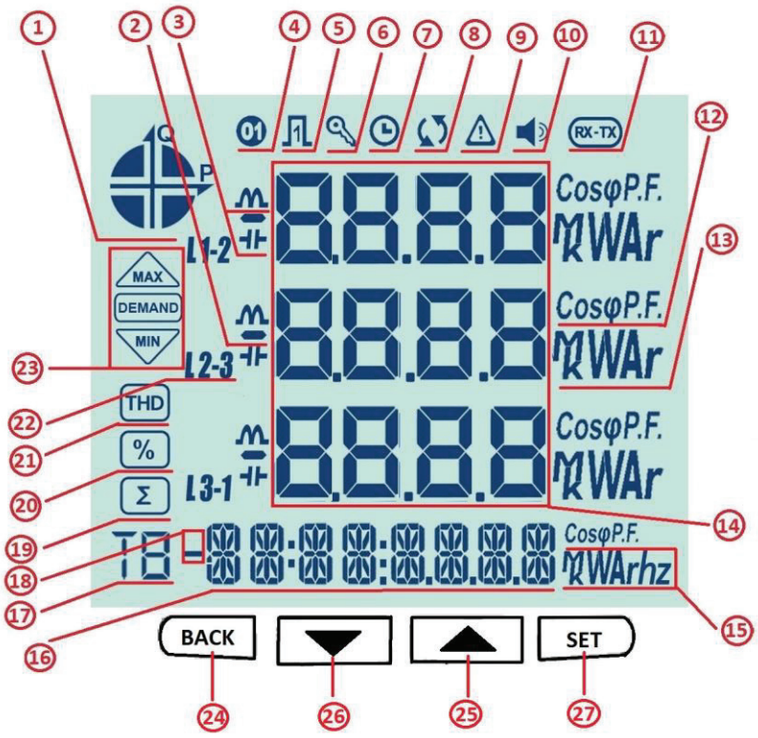
5. Current Terminals
K1-> Phase Current input
L1-> Phase Current output
K2-> Phase Current input
L2-> Phase Current output
K3-> Phase Current input
L3-> Phase Current output

6. Current Terminals 2
Compatible with plug & meter current transformers.

It should be used with a current transformer with 100-500 mV output. It is compatible with ENTES ENT.CCT type current transformers.

Please use the 6 pin terminal input or RJ45 input to measure current. These entries should not be used at the same time.

Front Panel



1 Indicates on which quadrant the network is operating.
2 Indicates that the displayed value is negative.
3 Indicates that the measurement is inductive or capacitive.
4 Indicates that the digital output is active.
5 Indicates that the pulse input is active.
6 Indicates that password is needed to enter the programming menu.
7 Indicates that the RTC is reset and stays on until RTC is adjusted.
8 Indicates that there is a phase sequence error.
9 Indicates that there is a warning
10 Indicates that the alarm output is active.
11 Indicates that the communication is active.
12 Indicates whether the value is CosØ or Power Factor.
13 Indicates the unit of the value (W, kVAr, MVA, etc.).
14 Indicates the measured values of the corresponding screen.
15 Indicates the unit of the energy or the corresponding setting.
16 Indicates energy value or time.
17 Indicates for which tariff the energy measurement is.
18 Indicates that the energy value is negative.
19 Indicates the total screen. (i.e. Total powers).
20 Indicates the percent values. (i.e. Harmonics)
21 Indicates that the displayed values are for Total Harmonic Distortion.
22 Indicates L1, L2, L3 and L1-2, L2-3 and L3-1 measurements.
23 Indicates that the corresponding screen is one of 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) :** It has 3 basic functions:
  - It is used to return to the upper menu from any menu.
  - While on measuring screen: As seen from the notation on the button (V I F), Current, Voltage, Frequency and Time counter is used to monitor values and switch between the related screens.
  - It provides access to event screen when pressed for 3 seconds (Event).

- **DOWN button (26) :** It has 3 basic functions:
  - While on measuring screen: As seen from the notation on the button (P PF), it is used for monitoring the Total, Active, Reactive, Apparent Power, Cosφ 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.
  - While on measuring screen: When pressed for 3 seconds, the device swicthes into the connection test mode (Test).
- **UP button (25) :** It has 2 basic functions:
  - While on measuring screen: As 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 in the menu screen, it is used for moving downyards in a menu and decreasing the adjusted values.
- **SET button (27) :** It has 3 basic functions:
  - While on measuring screen: As 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.
  - It provides access to setting screens when pressed for 3 seconds. When 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.

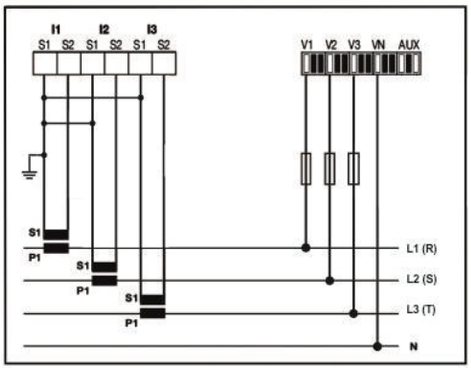
CONNECTION TYPES

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 with other analyzers on the same panel, it is recommended that the device is located at the last point on the current measurement line.

The device has 5 different connection types. These connection types are described in the following schemes:

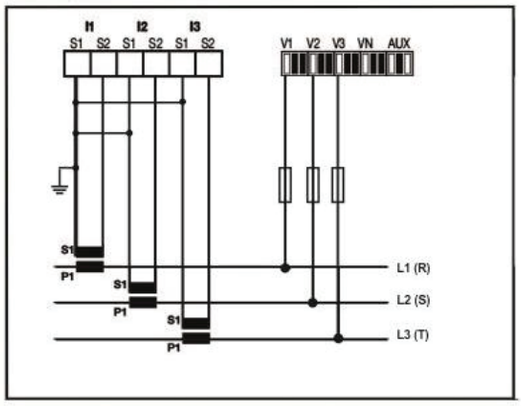
3P4W (Three-Phase Four-Wire) Connection

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



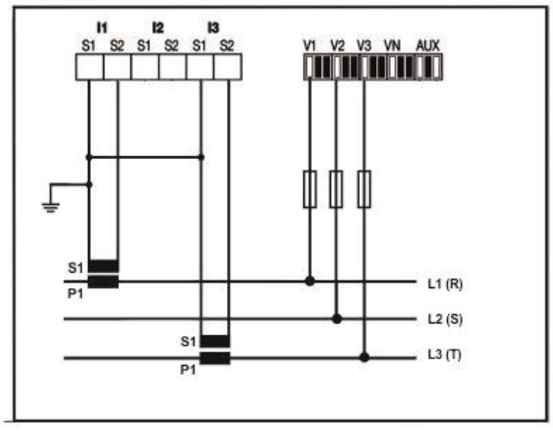
3P3W (Three-Phase Three-Wire) Connection

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



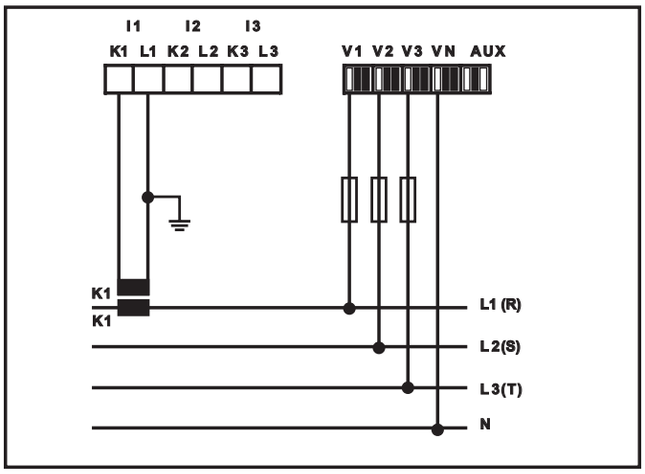
ARON Connection

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.



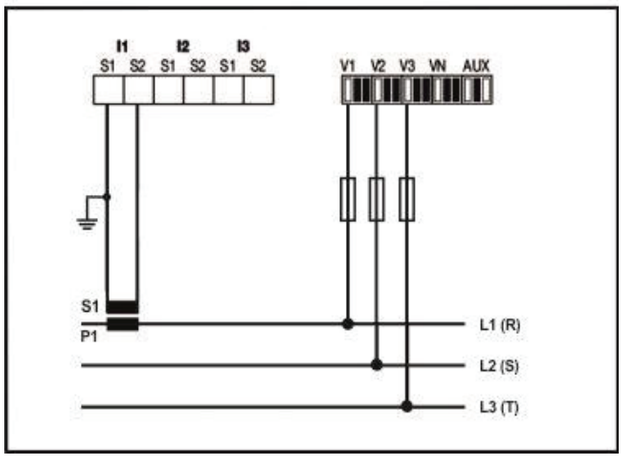
3P4W BLN (Three-Phase Four-Wire Balanced) Connection

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.



3P4W 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.



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	Minimum test conditions of 20% of the rated current and voltage are provided.

Communication Line Termination Resistance

On RS485 lines, when the communication distance exceeds 10 meters and there are more than one device on the line, a 120 Ω line termination resistor should be installed between the A and B ends of the device that is the farthest from the communication terminal.

OPERATING DEVICE

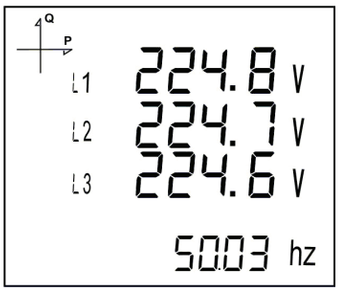
Measurement Screens

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

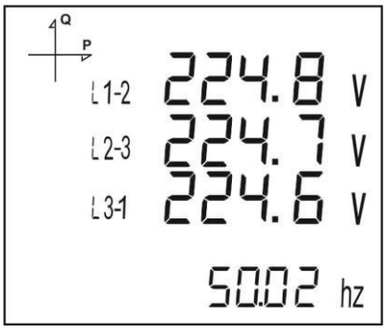
You can view the Phase-Neutral Voltage values measured for each phase on this screen. The bottom line contains the measured frequency value.

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



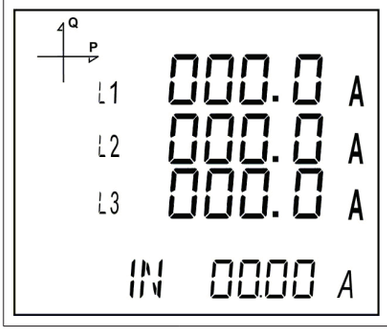
You can view the Phase-Phase Voltage values measured for each phase on this screen. The bottom line contains the measured frequency value.

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



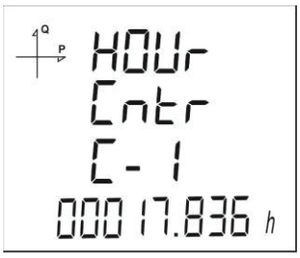
On this screen, you can view the Current values measured for each phase. The calculated neutral current value takes place in the bottom line.

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



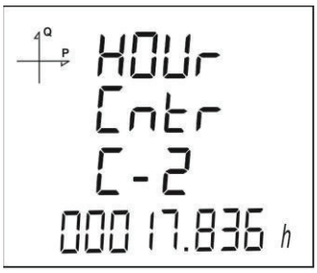
You can view the value of Hour Meter 1 on this screen.

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



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

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

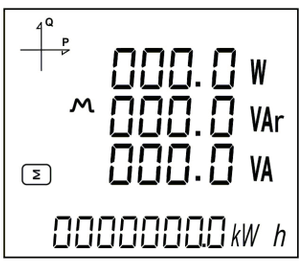


Power and Power Factor Screens

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

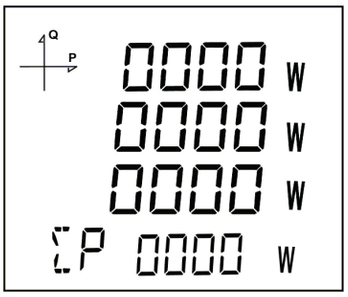
On this screen, you can view the Total Power values (active, reactive, apparent) measured on your device.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
DOWN (P PF)	TOTAL POWERS



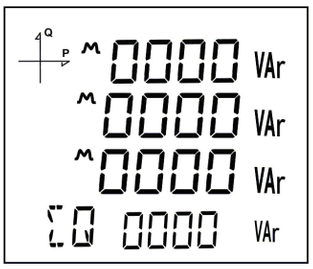
On this screen, you can view the Active Power values measured for each phase in your device. The bottom line contains the total active power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
DOWN (P PF)	ACTIVE POWER



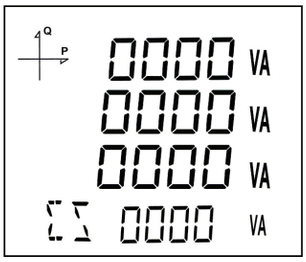
On this screen, you can view the Reactive Power (inductive / capacitive) values measured for each phase in your device. The bottom line contains the total reactive power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
DOWN (P PF)	REACTIVE POWER



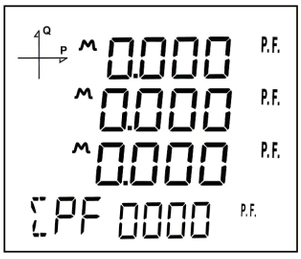
On this screen, you can view Apparent Power values measured for each phase on your device. The bottom line contains the total apparent power value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
DOWN (P PF)	APPARENT POWER



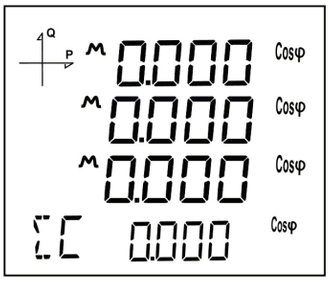
On this screen, you can view the Power Factor (inductive / capacitive) values measured for each phase on your device. The bottom line contains the total power factor value.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
DOWN (P PF)	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
DOWN (P PF)	COS φ

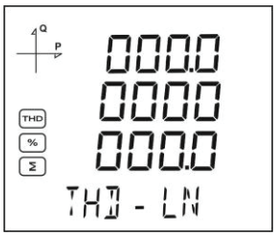


Energy and Harmonic Screens

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

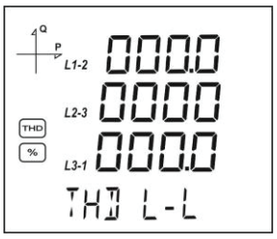
On this screen, you can view the Total Harmonic Distortion (Phase-Neutral) values measured for each phase on your device.

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



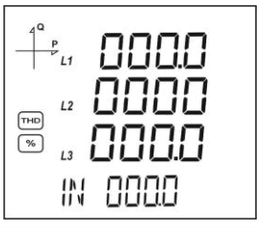
On this screen, you can view the Total Harmonic Distortion (Phase-Phase) values measured for each phase on your device.

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



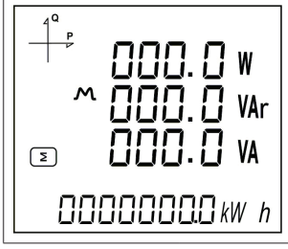
On this screen, you can view the Total Harmonic Distortion (Current) values measured for each phase on your device.

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



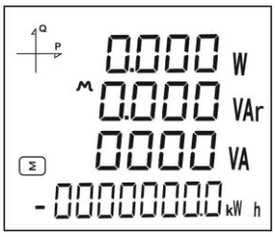
You can view the Import Active Energy values in the last line on this screen.

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



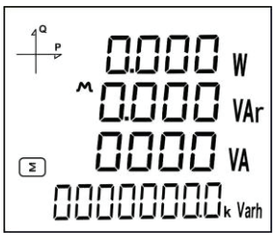
You can view the Export Active Energy values in the last line on this screen.

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



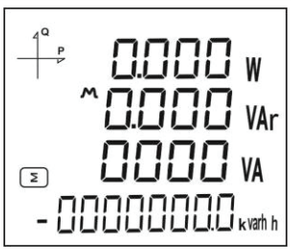
You can view the Import Reactive Energy values in the last line on this screen.

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



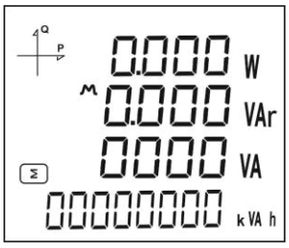
You can view the Export Reactive Energy values in the last line on this screen.

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



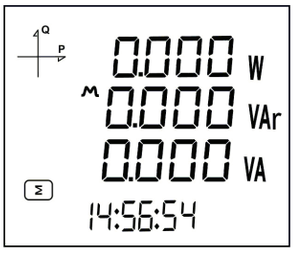
You can view the Apparent Energy values in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
UP (E H)	APPARENT ENERGY



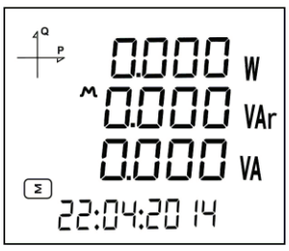
You can view the time information of your device in the last line on this screen.

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
UP (E H)	TIME



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

NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
UP (E H)	DATE

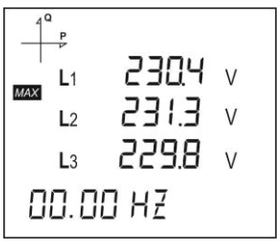


Minimum, Maximum and Demand Screens

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

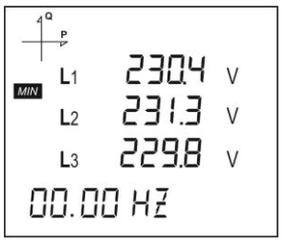
On this screen, you can view the Maximum (Phase-Neutral) Voltage values measured for each phase. The bottom line contains the measured maximum frequency value.

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



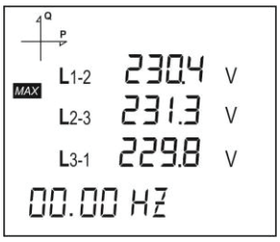
On this screen, you can view the Minimum (Phase-Neutral) Voltage values measured for each phase. The bottom line contains the measured minimum frequency value.

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



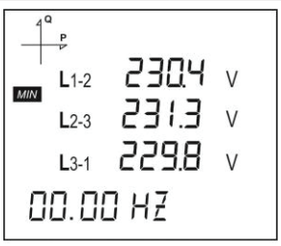
On this screen, you can view the Maximum (Phase-Phase) Voltage values measured for each phase. The bottom line contains the measured maximum frequency value.

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



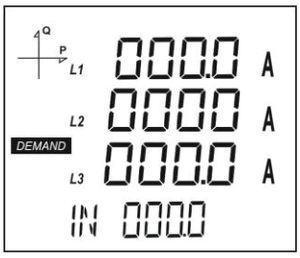
On this screen, you can view the Minimum (Phase-Phase) Voltage values measured for each phase. The bottom line contains the measured minimum frequency value.

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



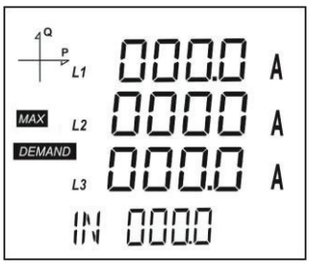
You can view the Current Demand values measured for each phase on this screen.

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



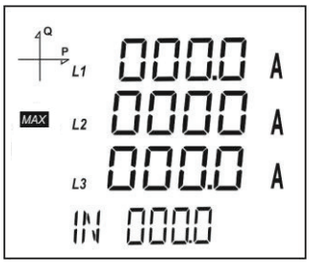
You can view the Current Maximum Demand values measured for each phase on this screen.

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



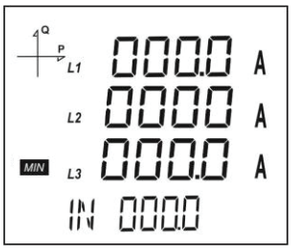
You can view the Maximum Current values measured for each phase on this screen.

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

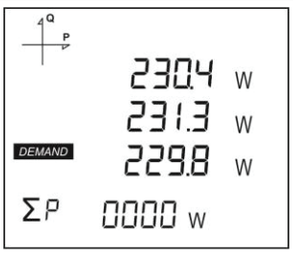


Please, first select the related screen by the P PF button in order to see the minimum, maximum and demand values of the power values.

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

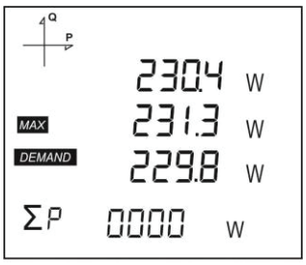
You can view the Active Power Demand values measured for each phase on this screen. The last line contains the total active power demand value.

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



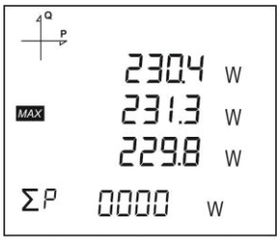
You can view the Active Power Maximum Demand values measured for each phase on this screen. The last line contains the total maximum active power demand value.

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



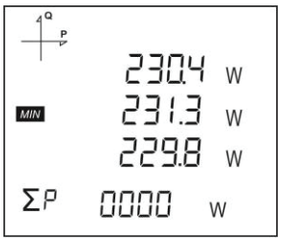
You can view the Maximum Active Power values measured for each phase on this screen. The last line contains the total maximum active power value.

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



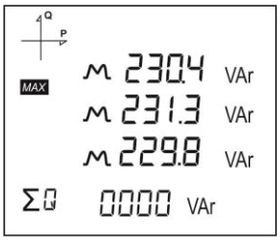
You can view the Minimum Active Power values measured for each phase on this screen. The last line contains the total minimum active power value.

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



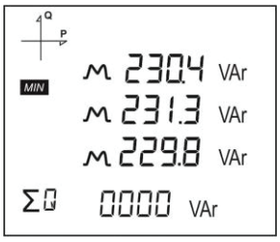
You can view the Maximum Reactive Power (inductive / capacitive) values measured for each phase on this screen. The last line contains the total maximum reactive power value.

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



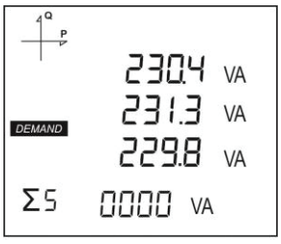
You can view the Minimum Reactive Power (inductive / capacitive) values measured for each phase on this screen. The last line contains the total minimum reactive power value.

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



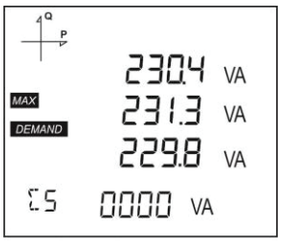
On this screen, you can view the Apparent Power Demand values measured for each phase. The last line contains the total apparent power demand value.

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



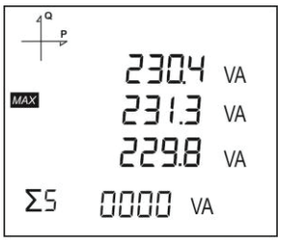
On this screen, you can view the Apparent Power Maximum Demand values measured for each phase. The last line contains the total apparent power maximum demand value.

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.

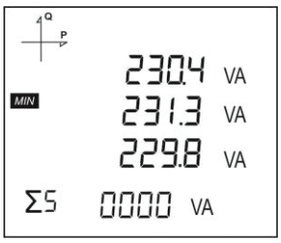
NAME OF THE BUTTON	DISPLAYED MEASUREMENT SCREEN
SET (MAX/MIN)	MAXIMUM APPARENT POWER



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



Screen Setting

Access to the Programming Menu:

The password input screen is displayed when 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 ratio 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 UP/DOWN buttons and set the following values.

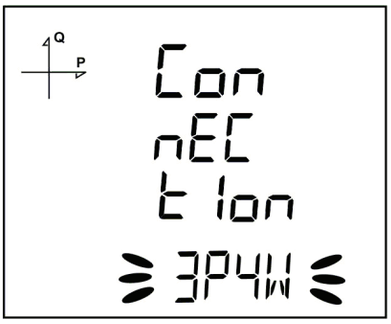
Language Setting

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

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

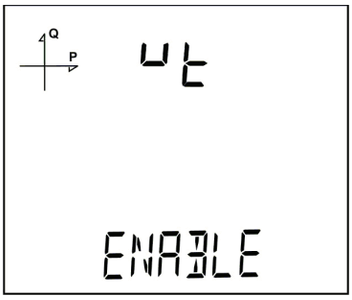
Apply the desired language setting by using UP/DOWN buttons and switch the next setting by SET button.

Connection Type Setting



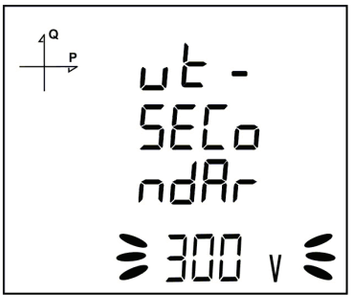
1. By using UP/DOWN buttons, select your network connection type as 3P4W, 3P3W, ARON, 3P4W Balanced or 3P3W Balanced.
2. 3P4W and 3P3W connection types should be preferred for unbalanced systems.
3.In balanced connections, current information of three phases is obtained from the current transformer connected to the 1st phase. These connection types are used in systems where 3 phases are balanced.
4. Switch to the next setting with the SET button.

Voltage Transformer Presence Setting



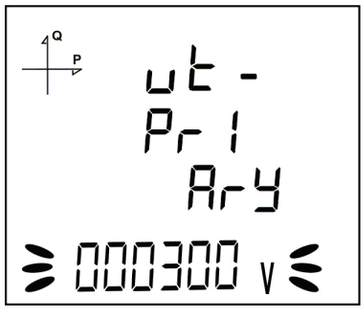
1. By means of UP/DOWN buttons, determine whether there is any voltage transformer connected to the system by using Enable and Disable options.
2. If Disable is selected, steps in which Secondary and Primary values are entered are skipped.
3. Switch to the next setting by the SET button.

Voltage Transformer Secondary Setting



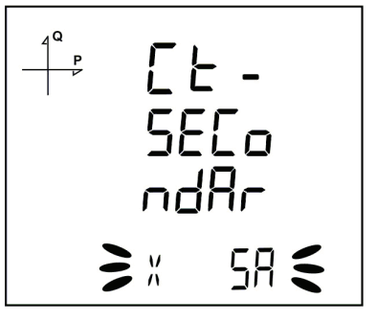
1. Adjust the Secondary value of the Voltage transformer by using the SET and UP / DOWN buttons.
2. You can switch between the value digits by means of the SET button.
3. Switch to the next setting by the SET button after adjusting the desired value.

Voltage Transformer Primary Setting



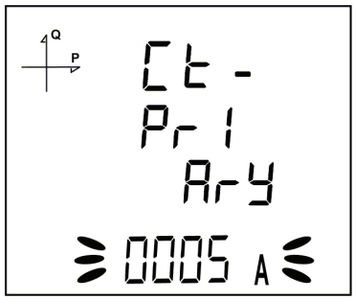
1. Adjust the desired primary voltage value from 50 to 400.000 by using UP/DOWN buttons.
2. You can use the SET button for switching between the digits.
3. Switch to the next setting by the SET button after adjusting the desired value.

Current Transformer Secondary Setting



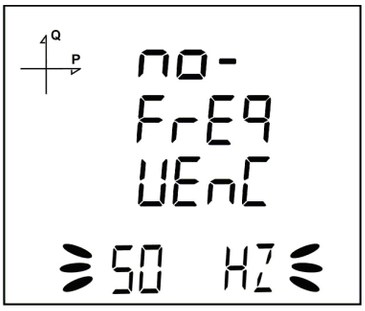
1. Select the secondary value of current transformer from 1A or 5A values by using UP/DOWN buttons.
2. Switch to the next setting by the SET button after adjusting the desired value.

Current Transformer Primary Setting



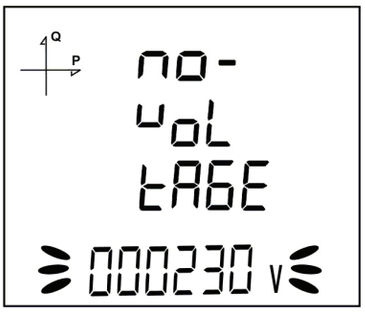
1. Adjust the desired current transformer primary value from 1~9999A value range by pushing the SET button.
2. You can use the SET button for switching between the digits.
3. Switch to the next setting by the SET button after adjusting the desired value

Nominal Frequency Setting



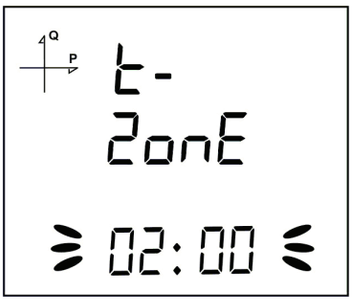
1. Select the nominal operating frequency of the device as 50 Hz or 60 Hz.
2. When the desired value is set, switch to the next setting with the SET button.

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

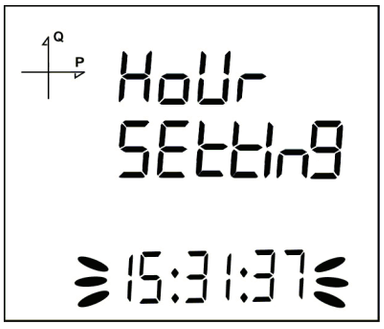


1. You can select the regional time zone of the device in 30 minutes intervals in between -12:00 and +12:00 hours.
2. Switch to the next setting by the SET button after adjusting the desired value.

Date Setting

1. Enter the date by using SET and UP/DOWN 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.

Hour Setting



1. Enter the time by using SET and UP/DOWN 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.

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

Display Settings

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

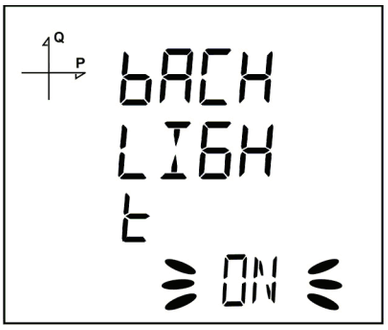
Language Setting

The device can be set into four different languages. These are;

a) Turkish
b) English
c) German
d) French.

1. Select Language option in Settings / Display menu and press SET button.
2. The current language option begins flashing. Select one of the options above and press SET button.
3. Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

Backlight Setting

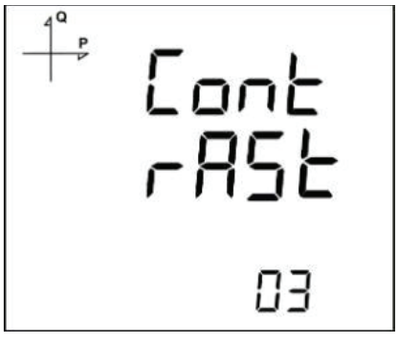


There are three different options for the display backlight setting:
a) Always ON,
b) Always OFF,
c) Automatic
When the automatic option is selected, the backlight turns off almost 3 minutes after any button is pressed.

1. Select Backlight option in Settings / Display menu and press SET button.
2. The current backlight option begins flashing. Select one of the options above and press 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.

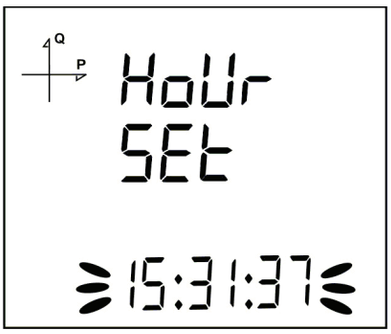


1. Select Contrast option in Settings / Display menu and press SET button.
2. The current contrast option begins flashing. Please, select a value from 0-15 and press the SET button.
3. Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

Time Settings

Hour Setting

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



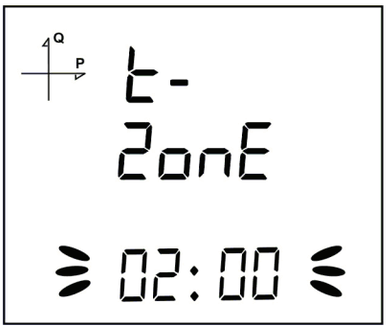
The phases of this process:
1. Press the SET button while on Setup Clock screen..
2. Press the SET button on the Hour Settings screen which is the first displayed screen of the menu.
3. In this section, hour value begins flashing.
4. Adjust the desired time value by using UP/DOWN buttons.
5.Adjust the 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 pressing the BACK button.

Date Setting

The date setting of the RTC module of the device can be adjusted by pressing the SET button. The phases of this process:

1. Press the SET button while you are on the Date Settings screen.
2. Press SET button. Adjust the day with UP/DOWN buttons.
3. Press SET button. Adjust the month with UP/DOWN buttons.
4. Press SET button. Adjust the year with UP/DOWN buttons.
5. The entered date will be automatically saved while you are leaving the menu by pushing the BACK button

Time Zone Setting



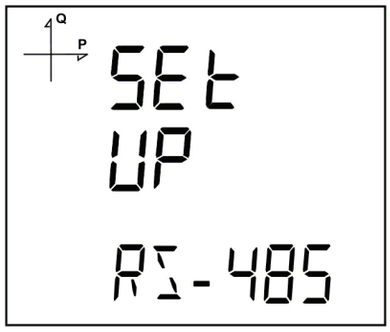
1. Press the SET button while you are on the Time Zone screen.
2. Selected Time Zone is displayed on the screen.
3. Enter the menu by pressing the SET button.
4. You can determine the time zone of the desired region in half hours by using UP/DOWN buttons.
5. Press the SET button after completing your selections.
6. Do not forget to save the adjusted settings before leaving the menu by means of the BACK button.

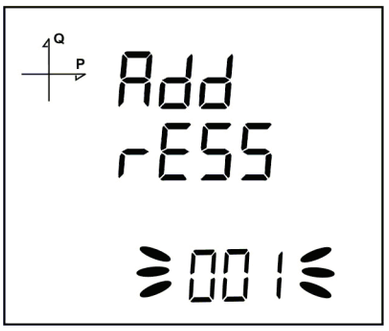
DST Time Mode Setting

1. Press the SET button while you are on Clock DST mode screen.
2. Daylight Save screen is displayed.
3. Press the SET button and select one of EUROPE, USA, MANUEL and DISABLE options.
4. If you select MANUEL option; you will have to enter month, week, day and hour for the start of DST in that order.
5. After finishing the DST Start settings; you will have to enter month, week, day and hour for the end of DST in that order.
6. After the desired values are adjusted, please press 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

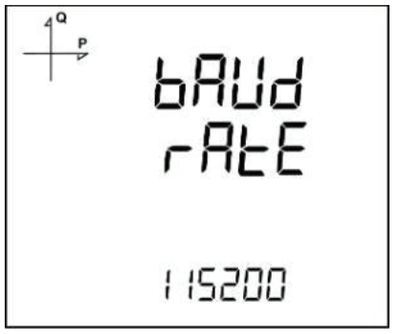
RS-485 Adress(NAD) Setting





1. Select Address option under Settings/RS-485 and press 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.

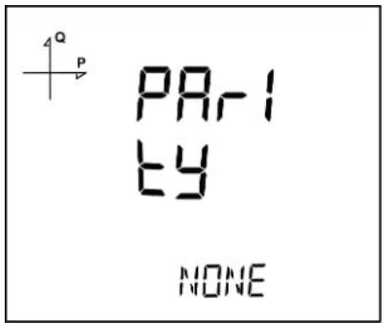
RS-485 Baudrate Setting



The RS-485 communication speed 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 press the SET button while you are on the RS-485 baud 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 UP/DOWN buttons.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

RS-485 Parity Setting



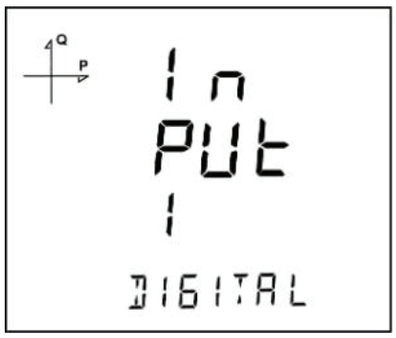
The RS-485 communication parity of the device can be set to one of the values as Odd, Even or None.

The factory default value is None.

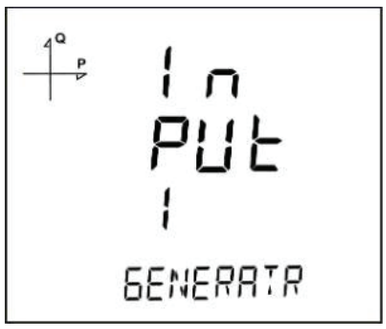
1. For this process, please press the SET button while you are on the RS-485 baud rate menu.
2. Switch to the selection phase by means of the SET button while you are on the displayed selection screen.
3. Adjust the desired value by using UP/DOWN buttons.
4. Do not forget to save your settings before 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: When this type is selected, the device detects the logic level of the input.



2. Generator input: When this type is selected, the device records the energy to the generator registers according to the input state.

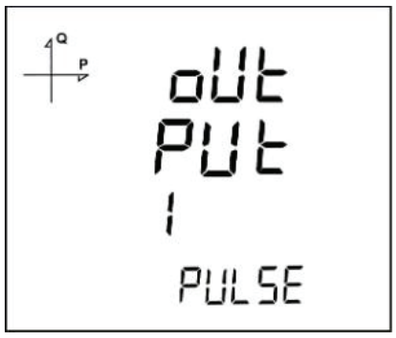


1. For this process, please press the SET button while you are in the Input menu.
2. Switch to the selection phase by means of the SET button while you are on the displayed selection screen.
3. Adjust the desired value by using UP/DOWN buttons.
4. Do not forget to save your settings before leaving the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

Output Parameter Settings

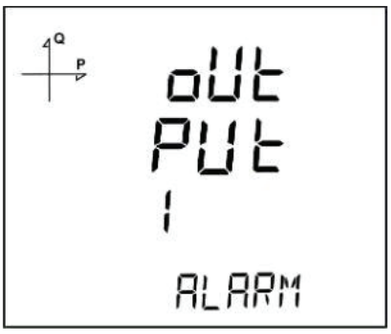
The digital output of the device can be used for one of the following values:

1. Output as Pulse: In this option, the device generates output pulses according to the selected size of the active and reactive energy.



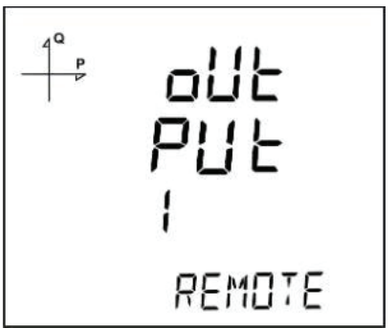
2. Output as Alarm: In this option, if the parameter set as the alarm source exceeds the threshold level, the device output is automatically changed from logic-1 level to the logic-0 level.

When the alarm condition resolved, the device turns into the logic-1 level.



3. Output as Remote Control: 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.

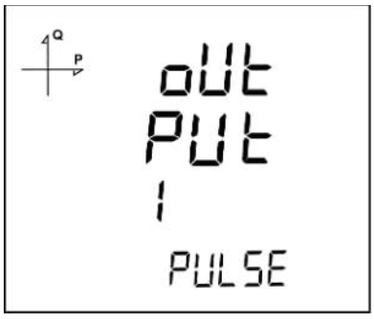
By this way, the user can remotely turn on/off any circuit.

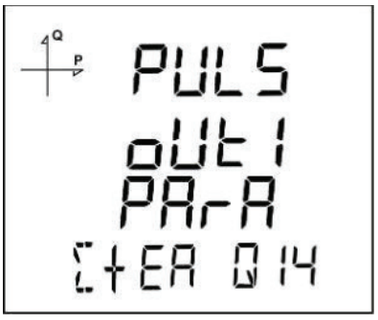


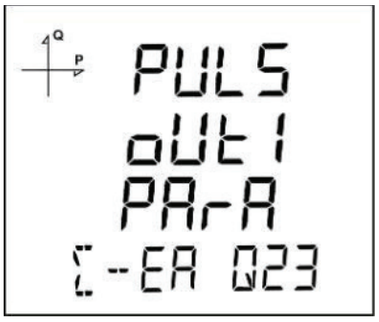
1. For this process, please press the SET button while you are in the Output menu.
2. Switch to the selection phase by means of the SET button while you are on the displayed selection screen.
3. Adjust the desired value by using the UP/DOWN buttons.
4. Do not forget to save your settings before leaving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

Pulse Output Settings

Pulse output according to Active Energy







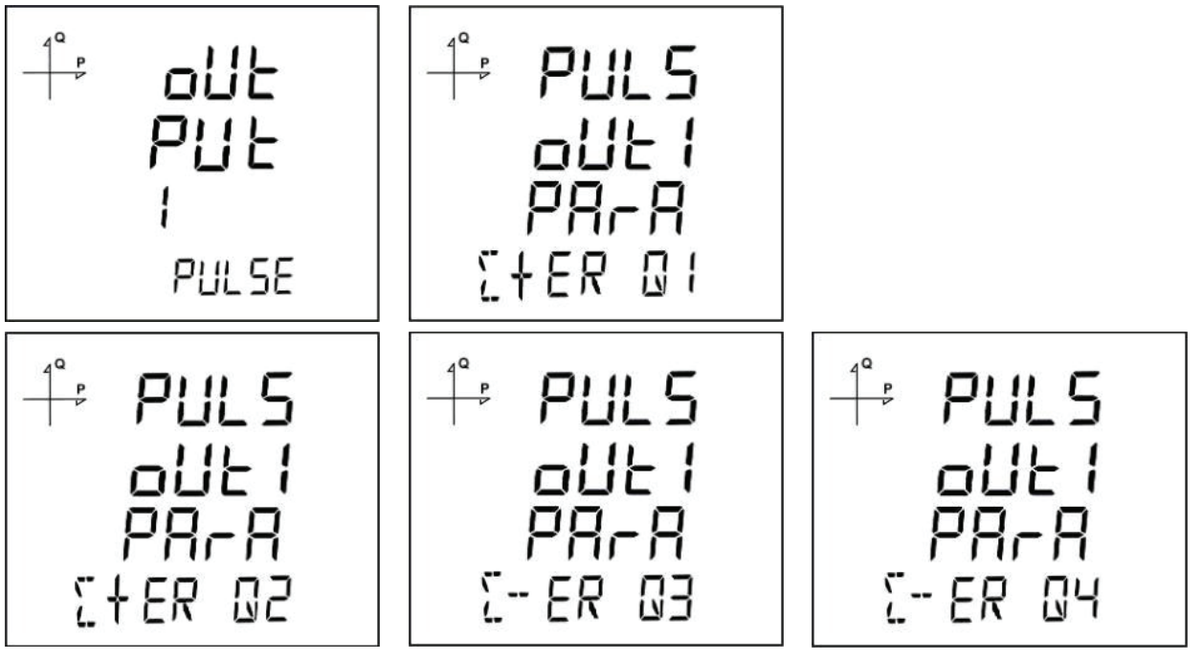
1. Press UP button while the OUTPUT 1 PULSE is selected on the screen.
2. Choose the energy value which the device generates an output pulse as indicated in the screens above. Choose the one on left for total import and the one on right for total export active energy.
3. Exit from the menu after completing 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. Press the SET button while the OUTPUT 1 PULSE 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.

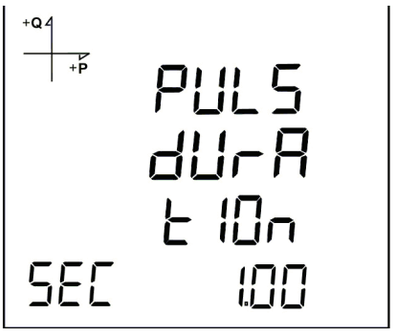
As it is seen from the figures, the energy regions can be selected for different quadrant sections (Q1, Q2, Q3 and Q4).

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

Pulse Output Duration Setting

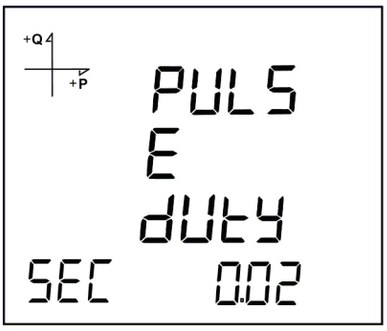
In this section, the duration that the pulse will stay at the logic-1 level is set.



1. Press the SET button while the PULS DURATION is selected on the screen.
2. Select the pulse duration 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 Output Inactive Time (Duty) Setting

In this section, the duration that the pulse will stay at the logic-0 level is set.



1. Press 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.

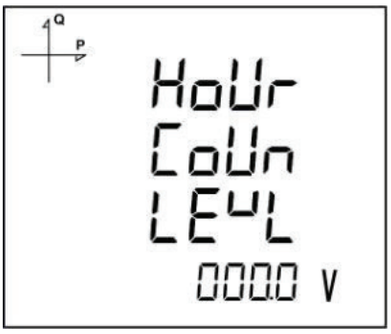
Operating Hours Settings

The device can count the time when a selected parameter exceeds an adjusted limit value. This feature is explained in this section.

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

1. Press 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 hour counter is exceeded is determined.

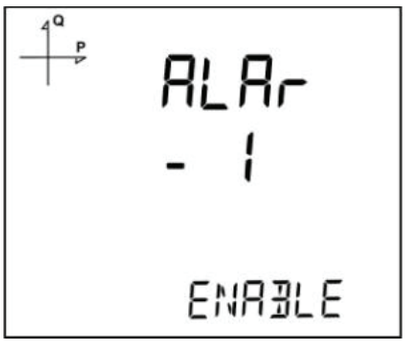


1. As it is seen above, while the level screen of the selected parameter is chosen, press the SET button.
2. Enter the appropriate level value digit by digit. You can switch between the digits by means of the SET button.
3. Exit from the menu after completing your selection.
4. Do not forget to save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

Alarm Settings

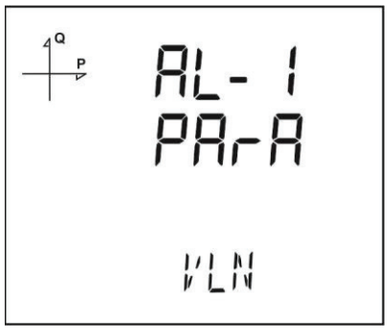
The parameters of 4 different alarms of the device can be adjusted separately.
The processes described for an alarm in the following section are the same for all 4 alarms.

Activating the Alarm



Follow the following steps for activating an alarm:
1. Press SET while your are in the Setup Alarm menu.
2. While Alarm Enable is displayed, Press the SET button and select ENABLE or DISABLE with UP/DOWN buttons.
3. Press 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. Press SET while your are in the Setup Alarm menu.
2. Switch to the Alarm parameters screen by pushing UP/DOWN buttons.
3. Activate an alarm parameter by pressing the SET button.
4. Set the alarm parameter one of the following options by means of UP/DOWN buttons:

    1. Phase currents
    2. Total current
    3. Current demand
    4. Total current demand
    5. Active Power
    6. Reactive Power
    7. Apparent Power

8. Total Active Power
9. Total Reactive Power
10. Total Apparent Power
11. Active power demand
12. Apparent power demand
13. Total Active Power Demand
14. Total Apparent Power Demand
15. Cos phi
16. Total Cos phi
17. Frequency
18. THDV
19. THDU
20. THDI
21. Hour counter
22. Digital input
23. Tariffs
24. Phase-Neutral Voltage
25. Phase-Phase Voltage

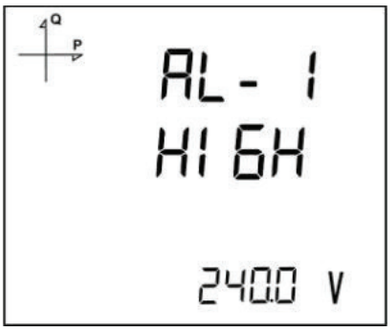
5. Press the SET button after completing your selections.

Alarm Operating Method Settings

1. Press the SET button for selecting the alarm operation method.
2. In this mode, select one of the following options:
   a. In window
   b. Out window
   c. Lower than
   d. Higher than
3. When "In window" and "Out window" are selected, the low and high threshold levels are set.
4. When “Higher than” option is selected, a high limit value is entered. When “Lower than” option is selected, a low limit value is entered.
5. Do not forget to save your settings before leaving the menu by means of the BACK button.

Alarm High Level Setting

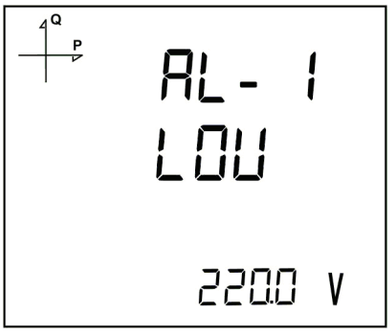
In this mode, the high level value required for defining an alarm is set.



1. While the Alarm Enable is chosen, switch to the Alarm High screen by preshing UP button.
2. Set the desired high level value by using the SET button and the direction buttons.
3. Press 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 preshing UP button.
2. Set the desired low level value by using the SET button and the direction buttons.
3. Press 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 preshing UP button.
2. Set the desired Hysteresis value in % by using the SET button and the direction buttons.
3. Press 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.

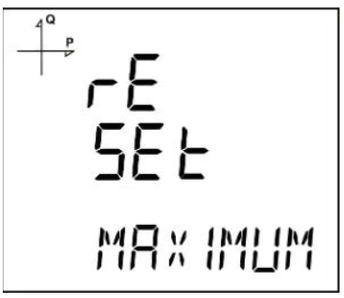
Alarm Delay Times Setting

1. After the alarm hysteresis screen, press the UP button to find the Alarm On Delay menu.
2. Alarm ON delay value in seconds is set by pressing UP/DOWN 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. Alarm OFF delay value is determined in the following screen by pressing DOWN button.
5. The alarm OFF delay value is selected in alarm Off Delay menu by pressing 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 UP/DOWN buttons.
8. Do not forget to save your settings before leaving the menu by means of the BACK button.

Reset Settings

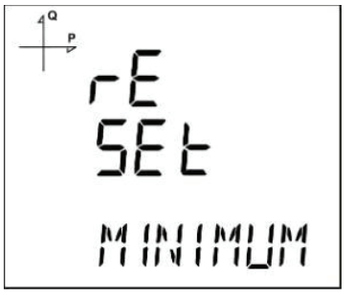
It is possible for the users to reset the minimum, maximum, demand and incident logs saved in the device.

Resetting Maximum Values



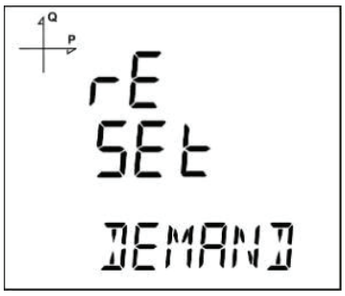
1. Select the maximum from the Reset menu and press the SET button.
2. Select the "Yes" option for deleting by using UP/DOWN buttons in the "Reset Maximum" section shown on the screen.
3. Press the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting Minimum Values



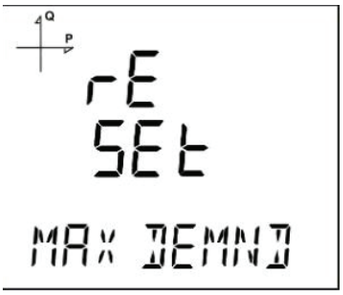
1. Select the minimum from the Reset menu and press the SET button.
2. Select the "Yes" option for reset by using UP/DOWN buttons in the "Reset Minimum" section shown on the screen.
3. Press the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting Demand Values



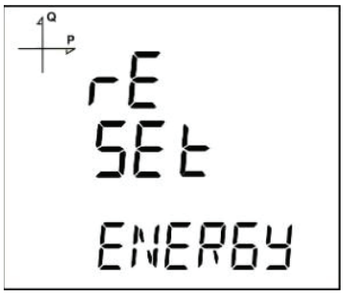
1. Select the demand from the Reset menu and press the SET button.
2. Select the "Yes" option for deleting by using tUP/DOWN buttons in the "Reset Demand" section shown on the screen.
3. Press the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting Maximum Demand Values



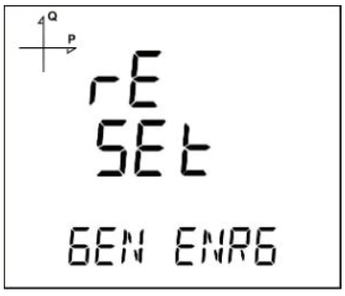
1. Select the max demand from the Reset menu and press the SET button.
2. Select the "Yes" option for deleting by using UP/DOWN buttons in the "Reset Max Demand" section shown on the screen.
3. Press the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting Energy Values



1. Select the energy from the Reset menu and press the SET button.
2. Select the "Yes" option for deleting by using UP/DOWN buttons in the "Reset Energy" section shown on the screen.
3. Press the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting Generator Energy Values



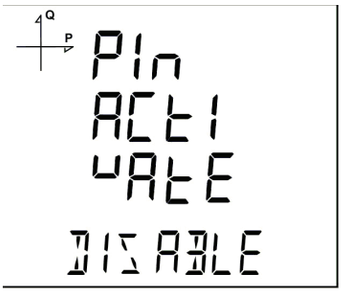
1. Select the Gen energy from the Reset menu and press the SET button.
2. Select the "Yes" option for deleting by using DOWN buttons in the "Reset Gen Energy" section shown on the screen.
3. Press the SET button.
4. Do not forget to save your settings before leaving the menu by means of the BACK button.

Resetting Hour Counter Value

1. Select hour counter from the Reset menu and press the SET button.
2. Select the "Yes" option for deleting by using UP/DOWN buttons in the "Reset Hour Counter" section shown on the screen.
3. Press 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

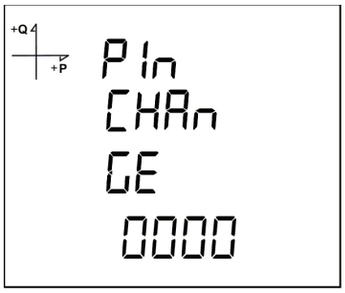


Preventing access to settings menu with a password can be accomplished from this menu.

1. Press the SET button in the "Pin Act" screen of the System Menu..
2. If the SET button is pressed in the "Pin Activation" section displayed on the screen, the 4-digit PIN screen is displayed.
3. Enter your set PIN code by using UP/DOWN buttons.
4. You can switch between the digits by pressing the SET button.
5. When you enter the correct Pin code, the "Enable" and "Disable" options are displayed on the screen.
6. If you save by exiting the menu after choosing the "Enable" 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.

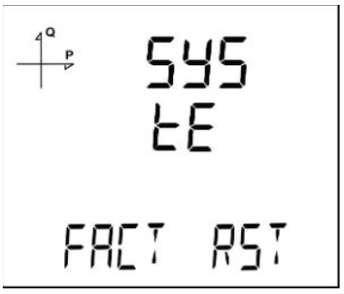
Factory default pin is 1234.

Changing the Pin Code



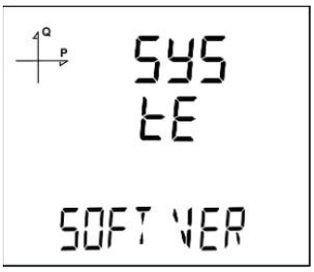
1. Press the SET button in the "Change Pin" screen of the System Menu.
2. Enter the previous 4-digit PIN code by using UP/DOWN buttons.
3. If you enter the wrong code, the "ERROR" warning is displayed on the screen.
4. If the ERROR warning is displayed, please reenter the pin code by pressing the SET button again.
5. If you enter the Pin code correctly, the "Pin Change" notice is displayed.
6. In this case, determine the new 4-digit pin code and press the SET button.
7. Then, enter the same pin code for a second time and press the SET button.
8. After you enter the pin code correctly twice, the "Pin 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.

Resetting to Factory Settings



1. In order to reset the system to factory settings, press the SET button in the "FACT RST" screen.
2. If the SET button is pressed while the "Factory Reset" is displayed on the screen, the pin code must be entered.
3. Enter your valid PIN code by using UP/DOWN buttons.
4. If you enter the pin code correctly, "No" appears on the bottom line of the screen.
5. In this mode, press the SET button and switch that to "Yes" mode by using UP/DOWN buttons and then press 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 device installation restore process starts.

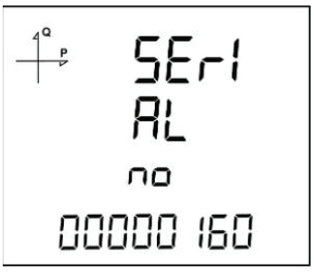
Displaying the Software and Hardware Versions



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

1. Press 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 pressed once again, the hardware version of the system is displayed on the screen with "System Hardware" notice.

Displaying the Serial Number of Device



1. Press 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 Records via Modbus

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

Record 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 record type desired to be accessed. The device searches and finds the closest record for the requested date and writes the index related with that record into the index register beginning from 21200 address.

When, the user can write this index to the index register of the tables at the 23000, 24000, 25000 and etc. addresses and access the details of the related record through the same tables.

A free software has been prepared to read the Record data inside the device and can be obtained from the web page.

Record Access Based on Index

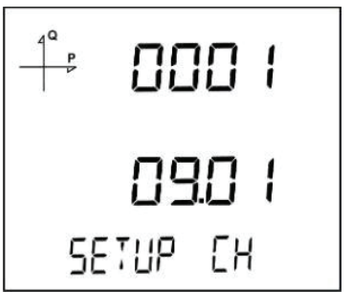
In this method, the user can write the record index number in the index register of the tables at 23000, 24000, 25000 and etc. address and access the details of the related record through the same tables.

Reporting Screen

If you press the BACK button of the device for 3 seconds, recorded event details are displayed on the screen.

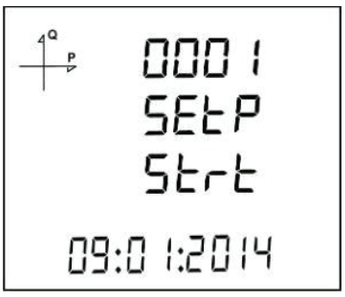
Totally 255 events can be saved in the device.
Recorded event types are: First commission, short interruption (<3 s), long interruption, alarm, settings change, time change and value reset.

You can switch between the recorded events by means of UP/DOWN buttons.



The events are listed in time sequence.

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



By pressing the SET button you can respectively display the event's;
1. Start date,
2. Start time,
3. End date,
4. End time,
5. Duration,
6. Parameter,
7. Source of the event,
8. Value of the event.

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

TECHNICAL INFORMATION AND ATTACHMENTS

Technical Information

Technical Properties	Value
Dimensions	72x72x70 mm.
Display	Custom 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
Minimum 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)
Operating frequency	45 - 65 Hz.
Digital input processing voltage	5 ~ 48 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 from the front to the panel.
Connection terminals	Socket type screw terminal
Connection types	3P4W, 3P3W, Aron, 3P4W balanced, 3P3W balanced
Communication Protocol	RS-485 / MODBUS RTU
Communication Speed	2400 ~ 115200 bps

IEC 61557-12 Properties

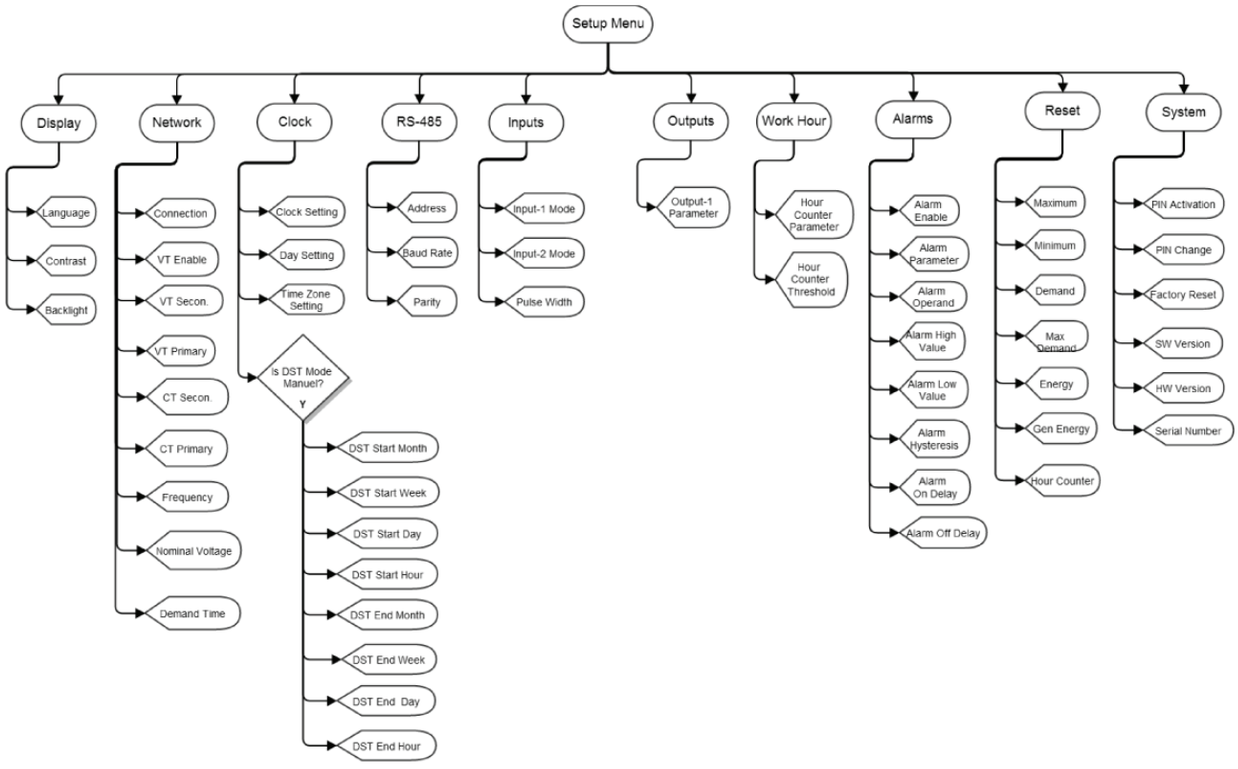
CONFORMITY IEC 61557-12 Ed.2		
PMD SPECIFICATIONS		
Supply quality evaluation function (option)	Examples of possible specification values	Other additional specifications
PMD Classification	/	/
Setpoint	SD	/
Humidity + Altitude	K55	/
Operating performance class for active power or active energy (if function available)	/	/
Operating 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 a	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	86 to 520 VAC ph/ph	0,2	
Pfa, Pfv	0,5 ind to 0,8	0,5	
Udip, Uswl	Unavailable function		
Utr	Unavailable function		
Uint	Unavailable function		
Unba, Unb	Unavailable function		
Uh	Unavailable function		
THDu	Fn=50Hz - 1 to 50 Fn=60Hz - 1 to 50	1	
THD-Ru	Unavailable function		
Ih	Unavailable function		
THDi	Fn=50Hz - 1 to 50 Fn=60Hz - 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 EN 61000-4-4	2006 2004	Electromagnetic compatibility (EMC) - Part 4-3: Test and measurement techniques-Radiated, radio- frequency, electromagnetic field immunity test 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

Program Menu Map



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