



MMW03-M22CH

Multimeter and energy analyzer



MMW03-M22CH

Designed to measure:

- **Voltage F-N and F-F;**
- Phase and neutral current;
- Frequency;
- $\cos\phi$ and power factor
- Active, reactive and apparent power,
- ✓ THD_v; THD_i;
- Voltage and current harmonics from the 1st to the 31st order,



MMW03-M22CH

Other functions:

- Indication of phase loss and wrong phase sequence;
- Identification and recording (memory) of maximum and minimum values of: current, voltage, frequency, $\cos\phi$, power factor, THDV, THDI, and active, reactive and apparent power;
- Measurement and recording (current, active, reactive and apparent power memory);



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Other functions:

- Alarm definition for current, voltage, frequency and power factor;
- 2 measurement parameters (tariffs) that allow measuring import and export active and reactive energy;
- Storage (recording) of running time, total measurement time and de-energized equipment time;
- RS485 communication, MODBUS RTU protocol;
- Digital inputs used to start the meter, 2nd tariff and running hour meter;



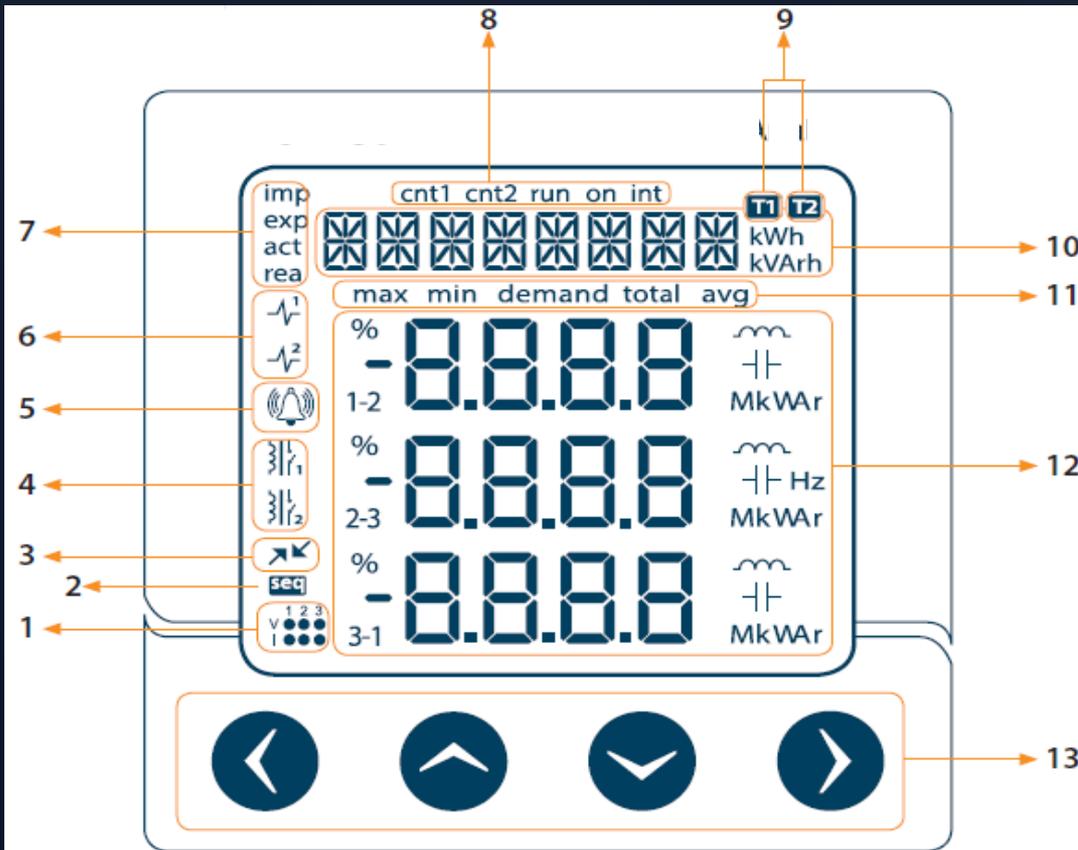
MMW03-M22CH

Other functions:

- Digital outputs;
- 2 alarm output relays;
- Access password

MMW03-M22CH

Front panel



1. Voltage and current status
2. Phase sequence error
3. RS485 communication active
4. Alarm output relays
5. Alarm
6. Digital outputs
7. Energy meters
8. Meters
9. Active tariffs
10. Menu bar and meters
11. Submenus
12. Indicators and units
13. Keys

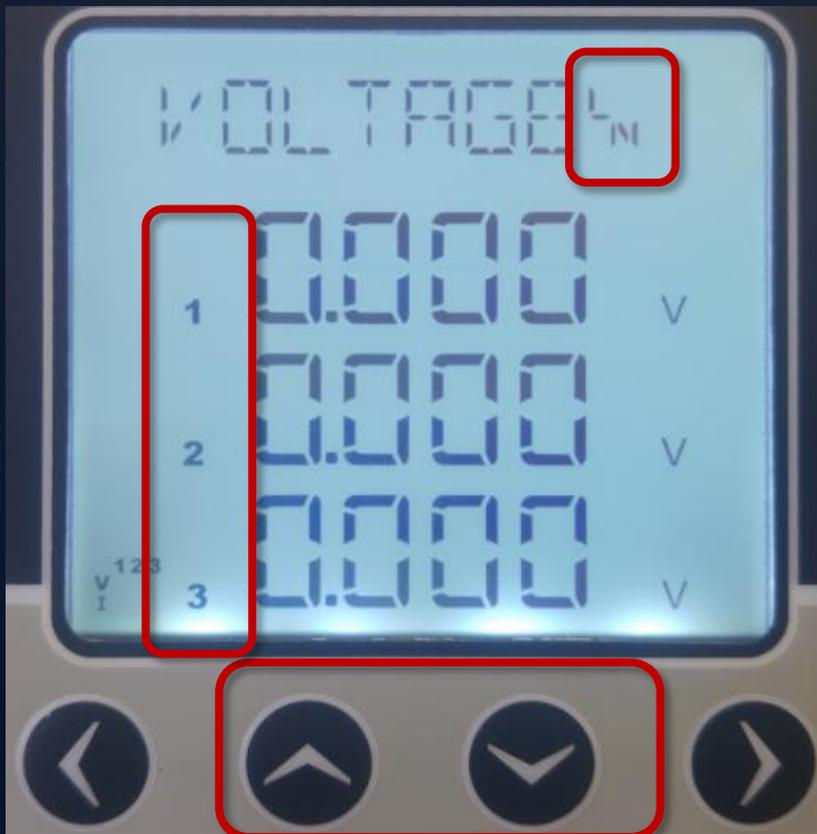


MMW03-M22CH

Menus

Measurement menus – V (L-N)

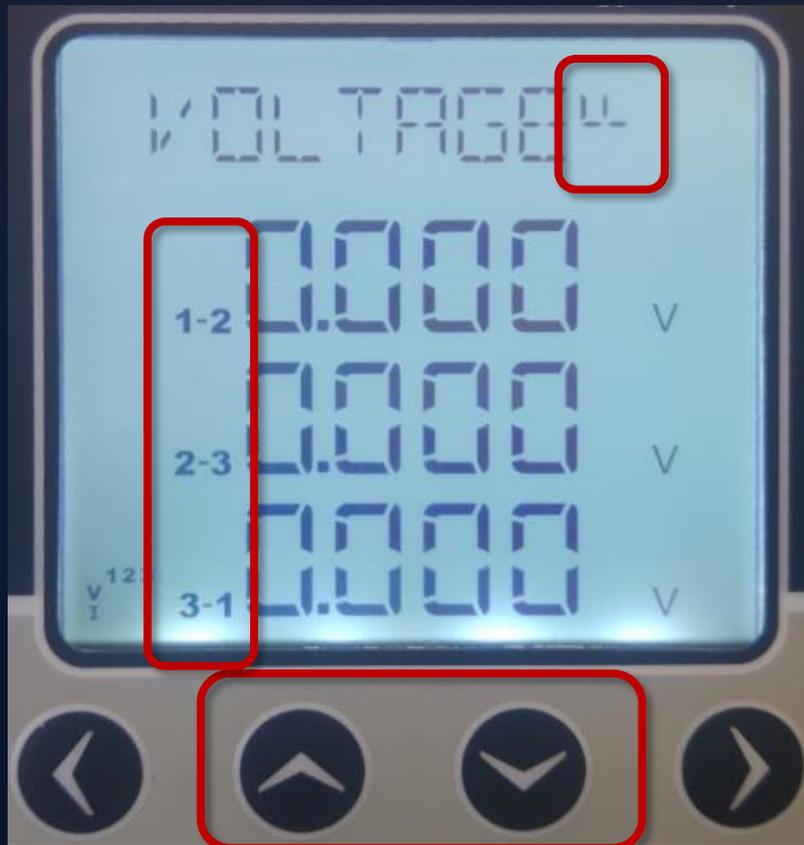
Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement menus – V (L-L)

Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

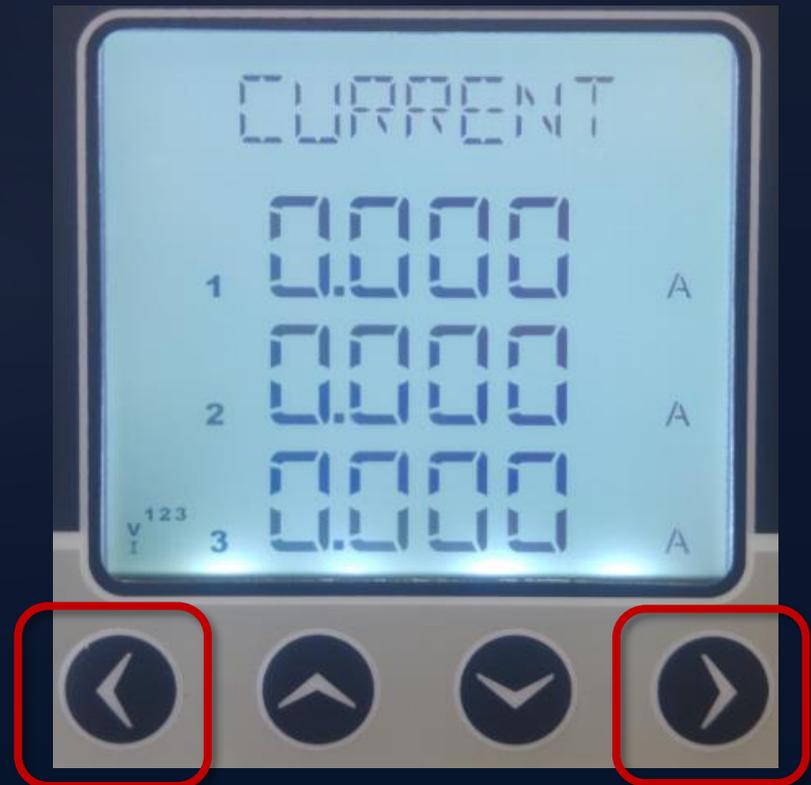
Measurement menus - Current

Maximum and minimum values menu

Maximum and minimum values and demand are calculated and stored in non-volatile memory for the following parameters:

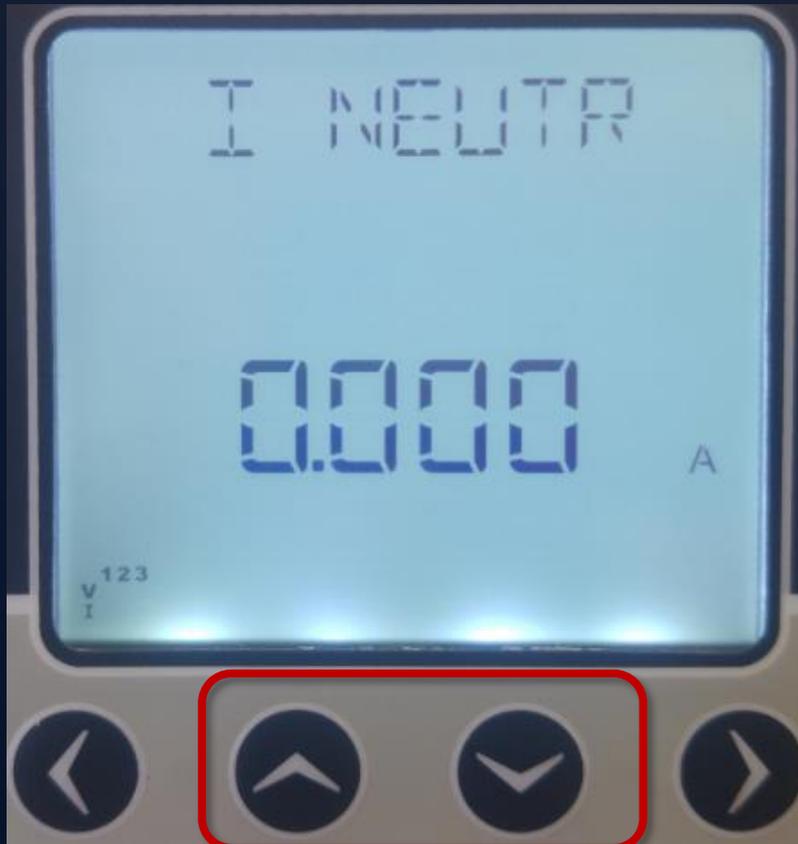
- Current
- Active power
- Reactive power
- Apparent power

To navigate across the menus and max. & min. parameters, use the right and left arrow keys.



Measurement menus - Current (N)

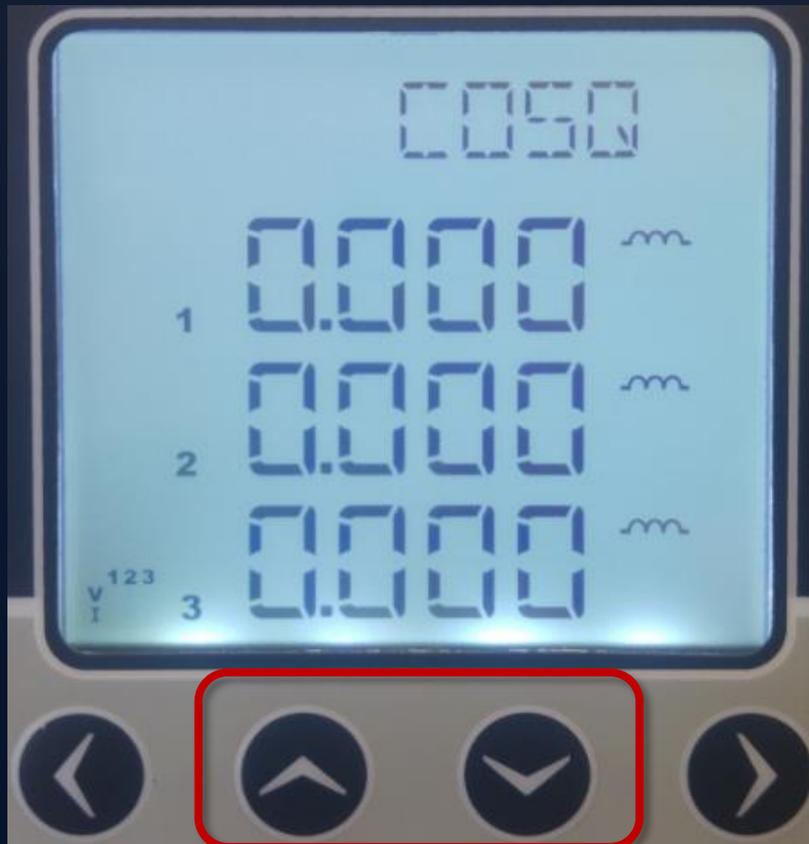
Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement menus - $\text{Cos}\varphi$

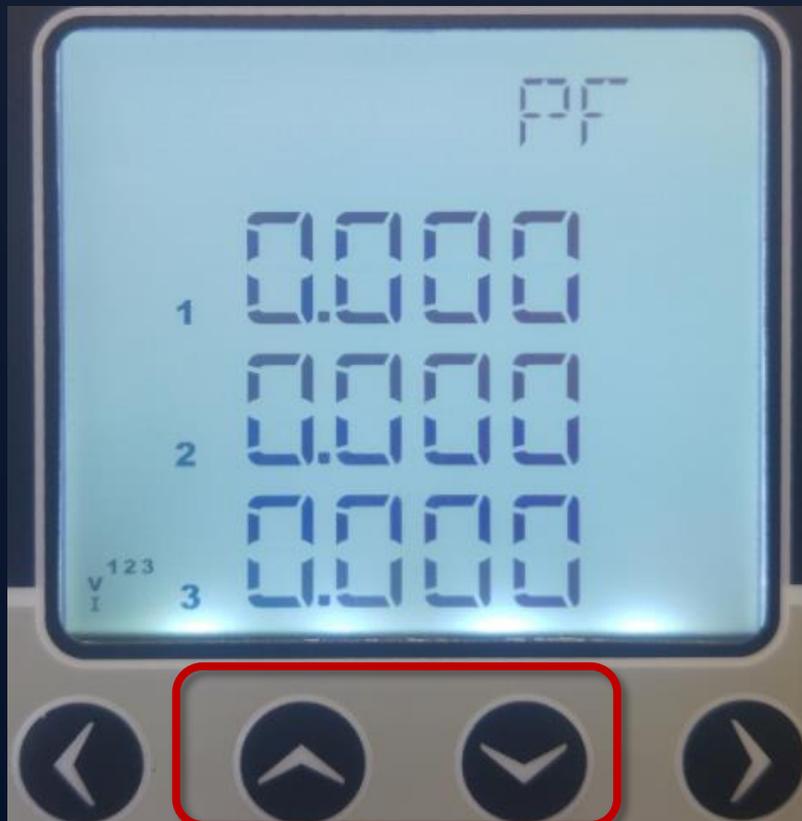
Voltage (L-N and L-L), Current, neutral current, $\text{cos}\varphi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement menus - Power factor

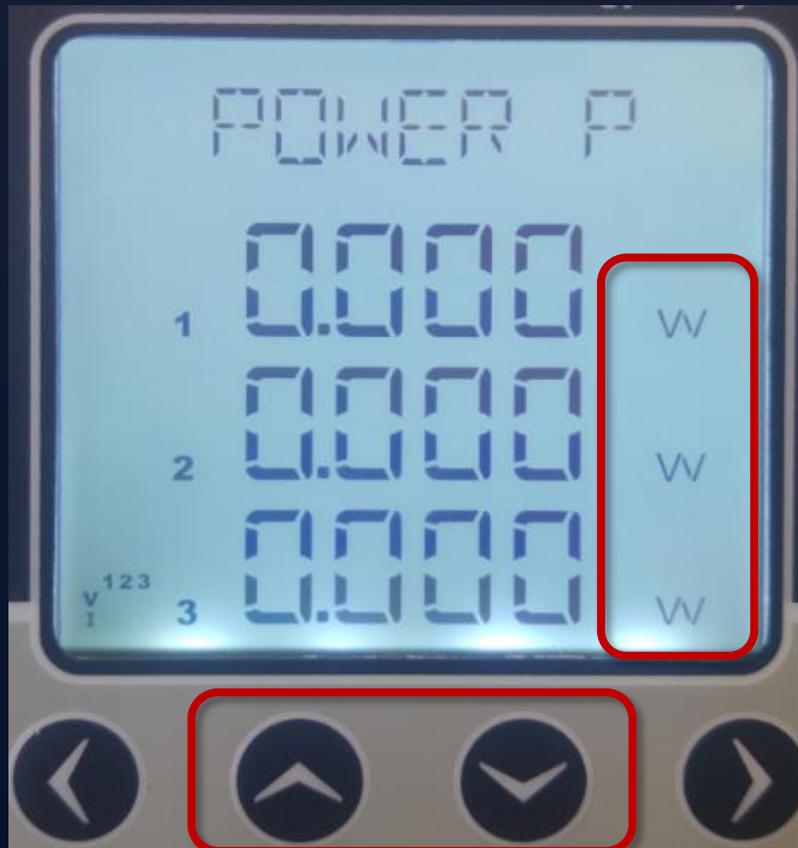
Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement menus - Active power

Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.

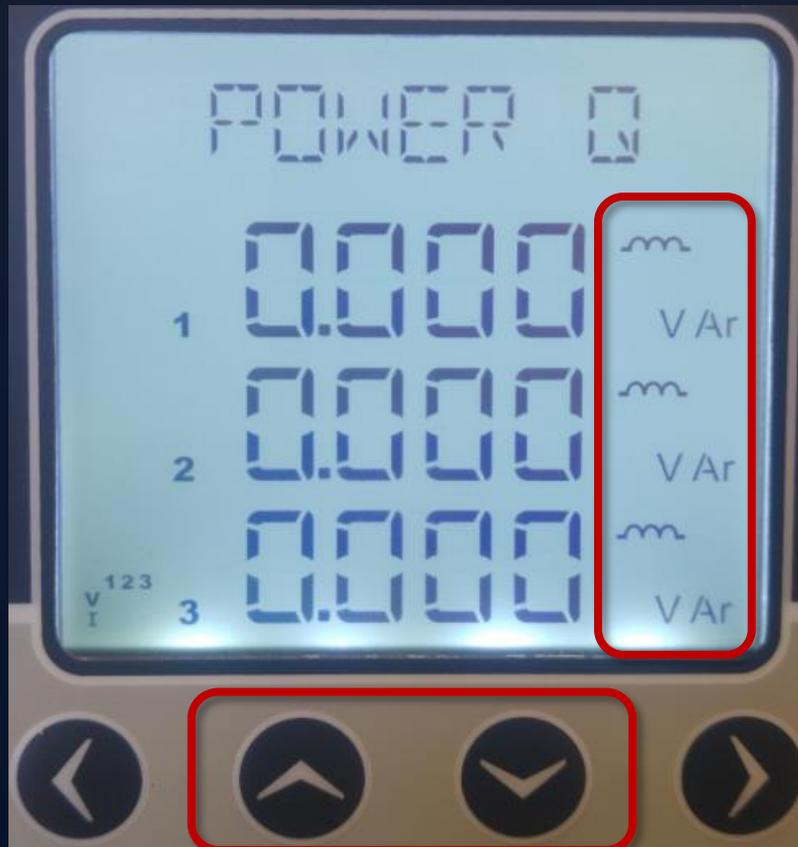


To navigate across the parameters, use the up and down arrow keys.

Note: If the system consumes active power, "P" must be positive. If it is negative, change the CT connection (connections k-l).

Measurement menus - Reactive power

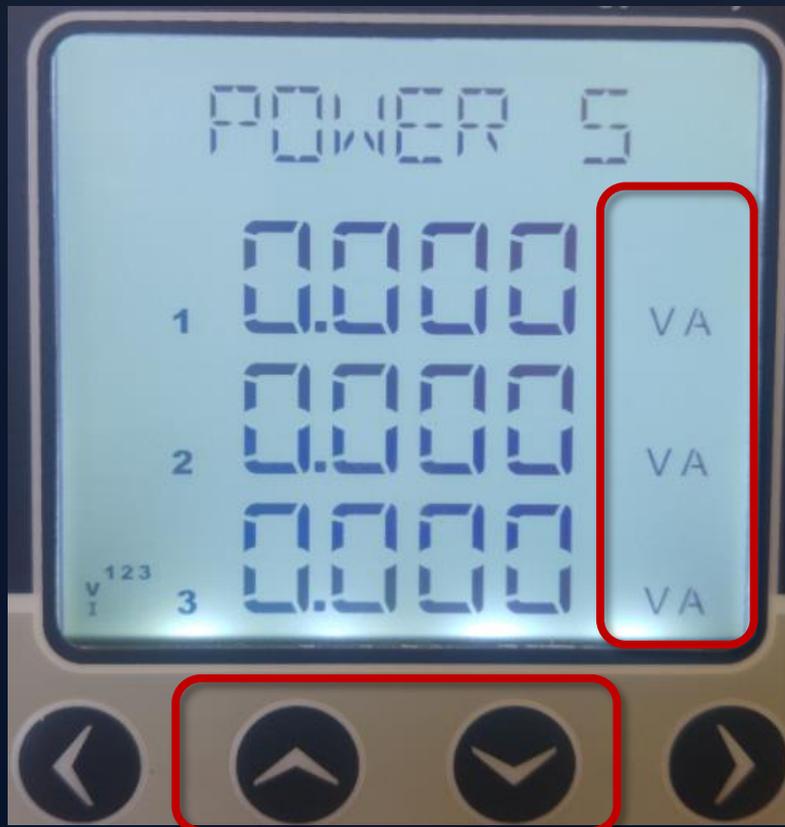
Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement menus - Apparent power

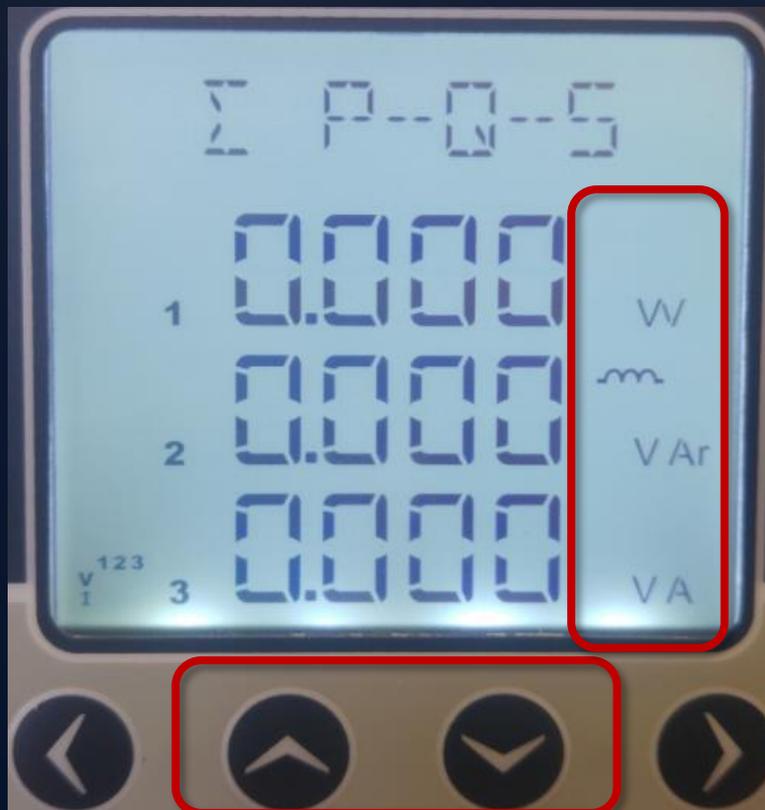
Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement menus - Total powers

Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement menus - Frequency

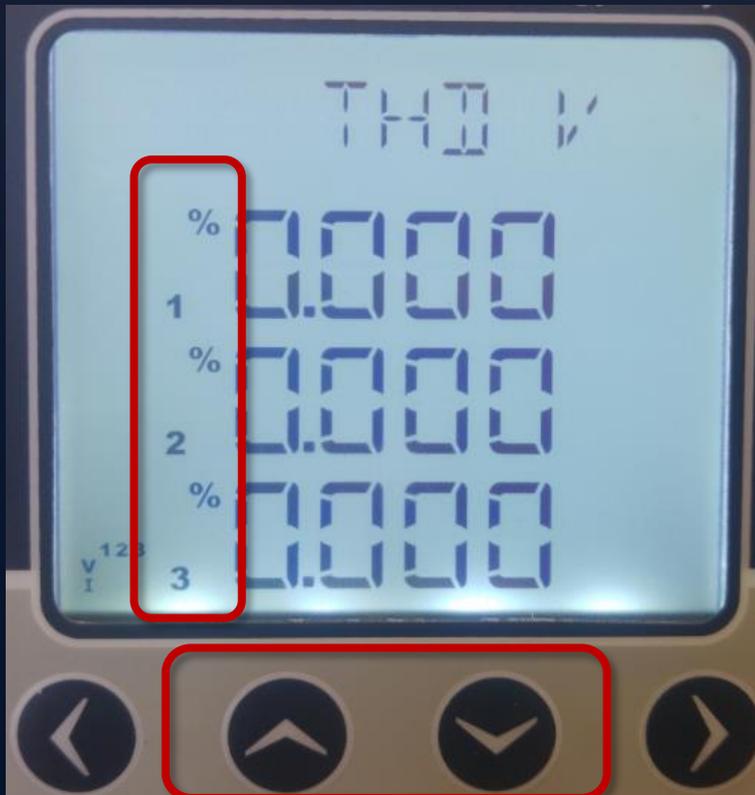
Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement Menu - THDv

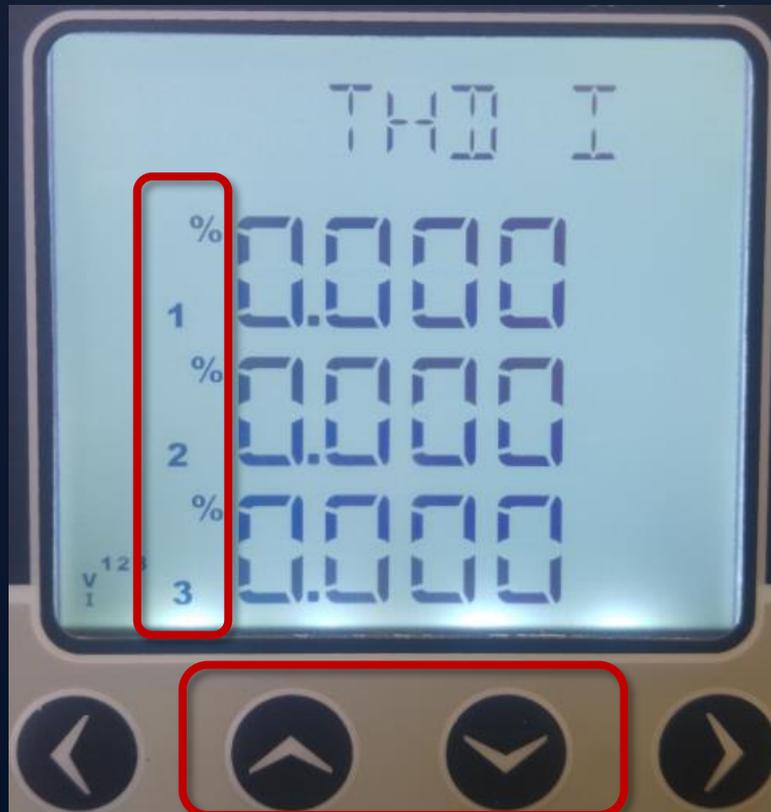
Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

Measurement Menus - THDi

Voltage (L-N and L-L), Current, neutral current, $\cos\phi$, power factor, active, reactive and apparent power, THDV and THDI values are shown in the instant menu.



To navigate across the parameters, use the up and down arrow keys.

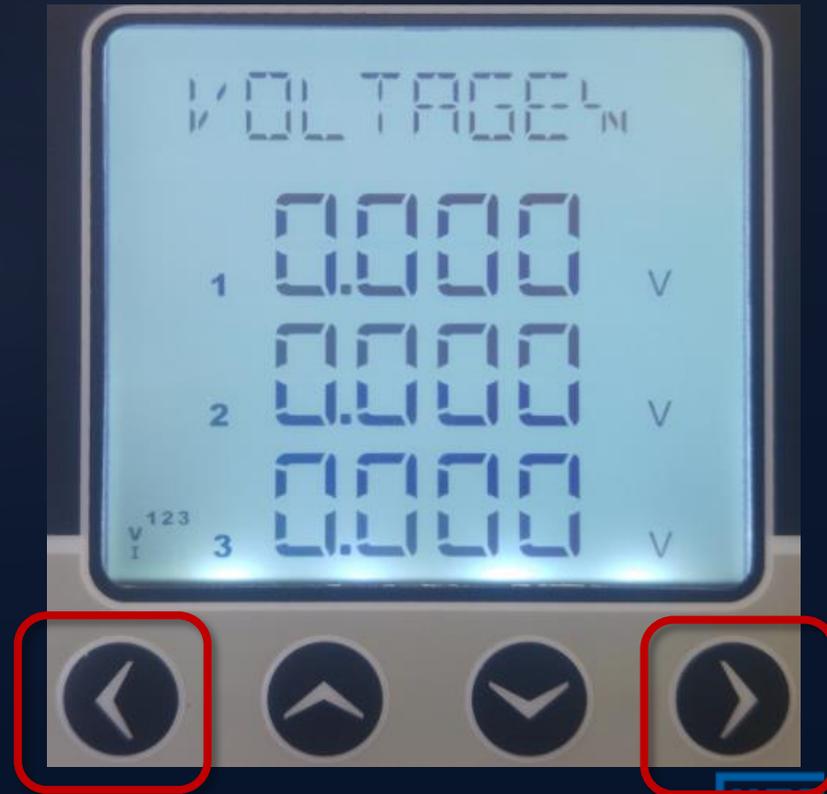
Measurement menus - V

Maximum and minimum values menu

Maximum and minimum values are calculated and stored in non-volatile memory for the following parameters:

- Voltage F-N and F-F
- Neutral current
- Frequency
- $\cos\phi$ and Power factor
- THDV and THDI

To navigate across the menus and max. & min. parameters, use the right and left arrow keys.



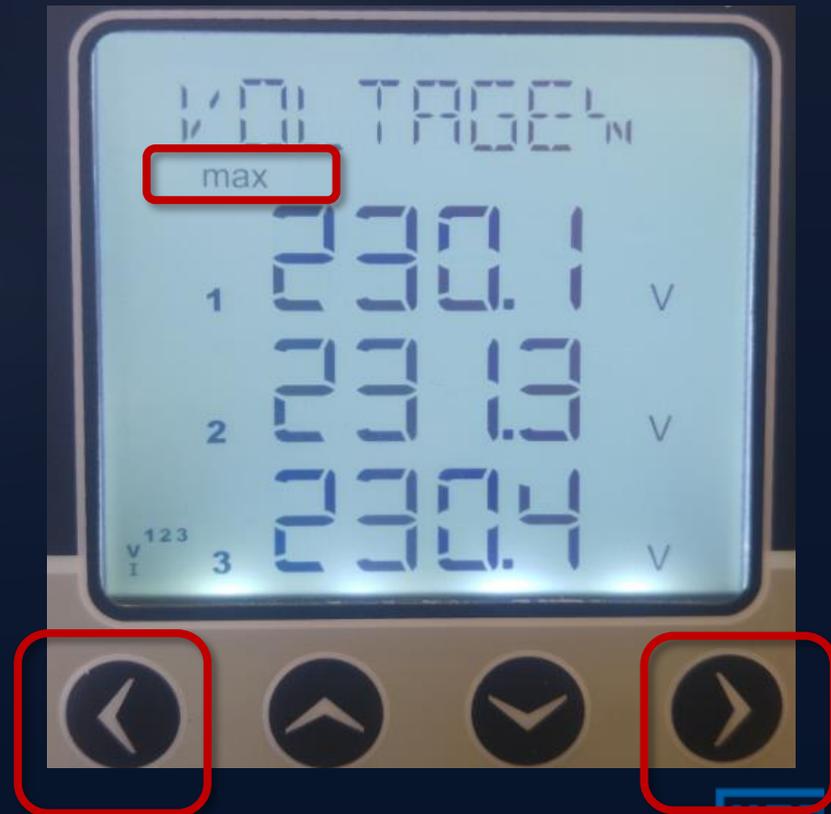
Measurement menus - V

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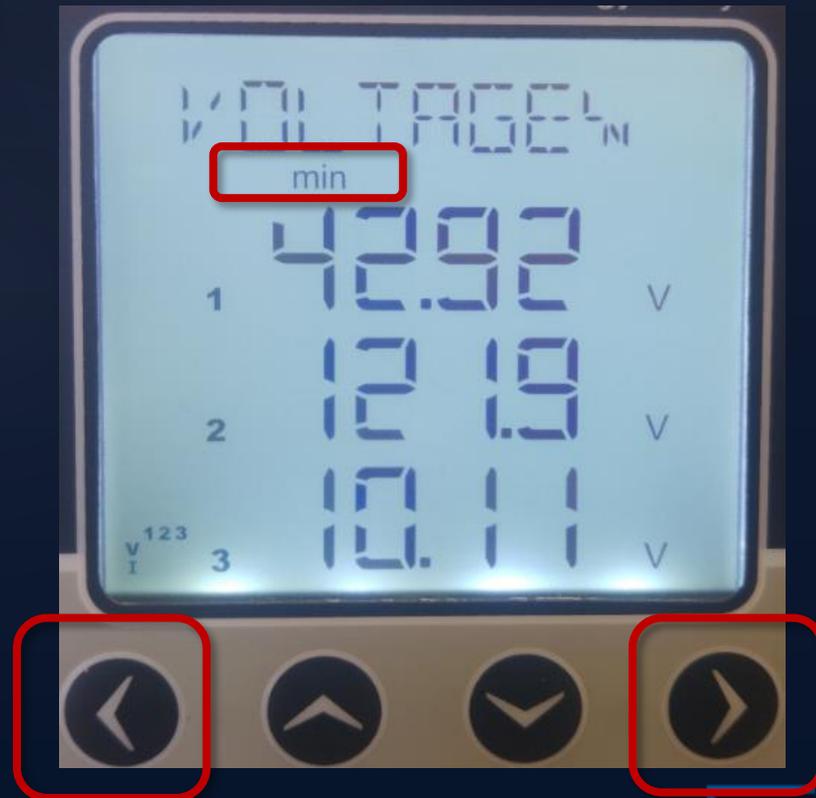
Measurement menus - V

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- Neutral current
- Frequency
- $\cos\phi$ and Power factor
- THDV and THDI

To navigate across the menus and max. & min. parameters, use the right and left arrow keys.



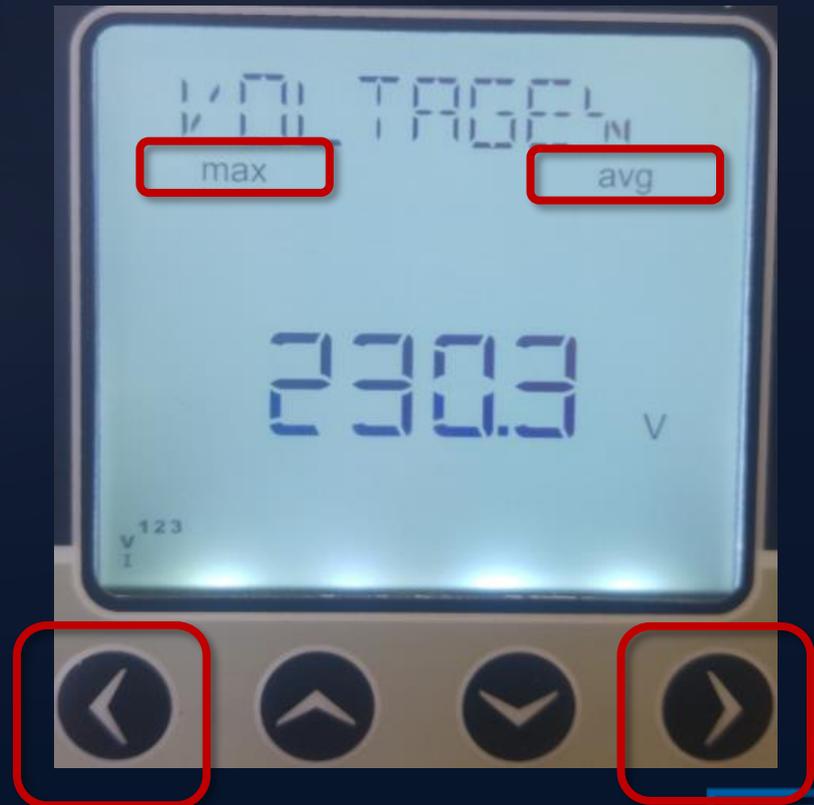
Measurement menus - V

Maximum and minimum values menu

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- Neutral current
- Frequency
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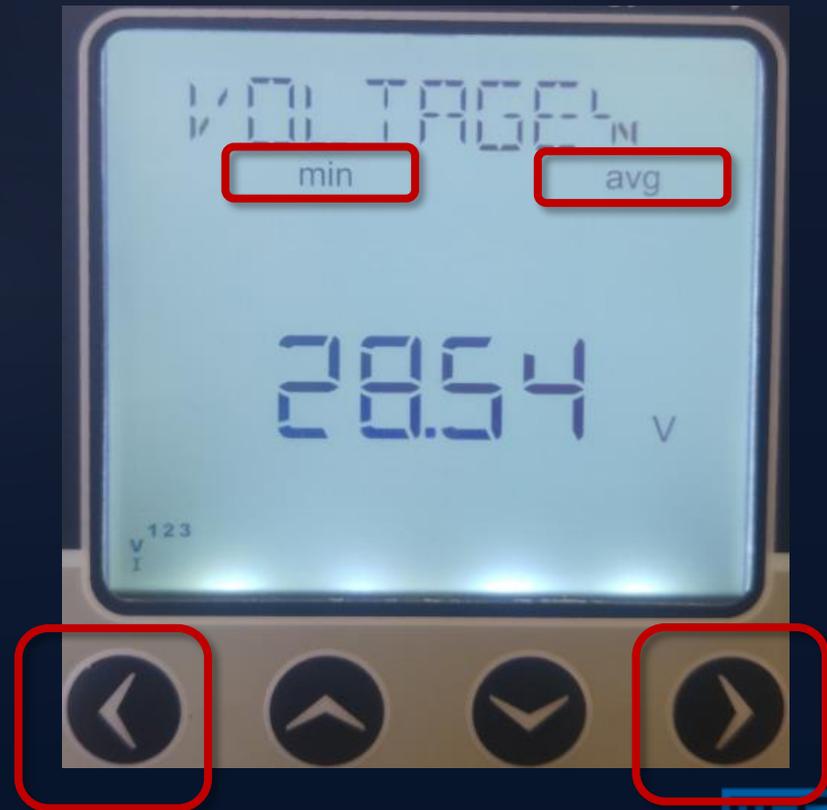
Measurement menus - V

Maximum and minimum values menu

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- Voltage F-N and F-F
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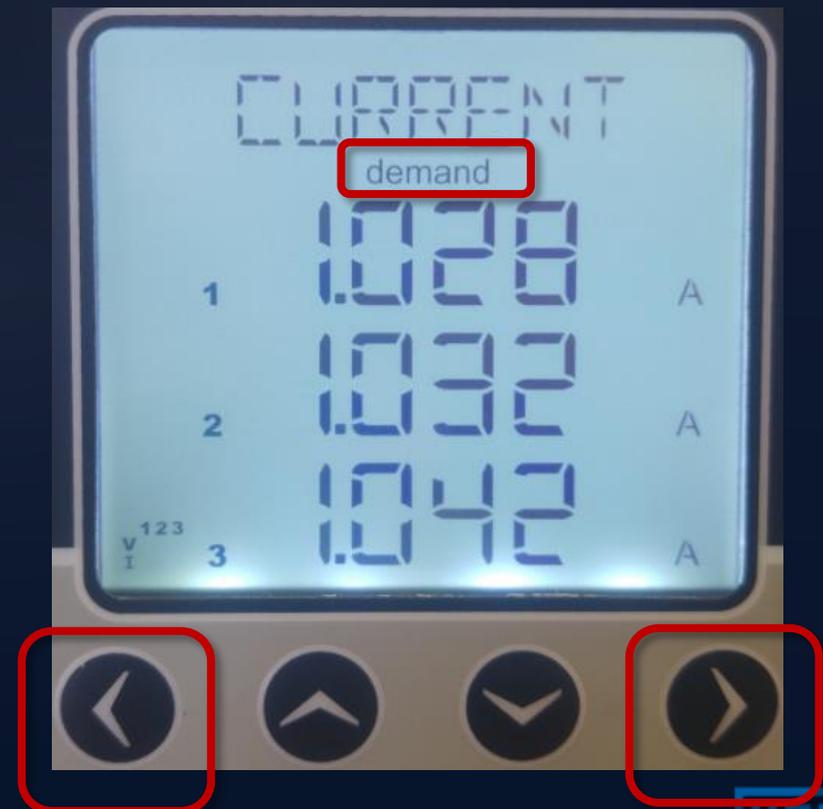


Measurement menus - Current

Maximum and minimum values and demand are calculated and stored in non-volatile memory for the following parameters:

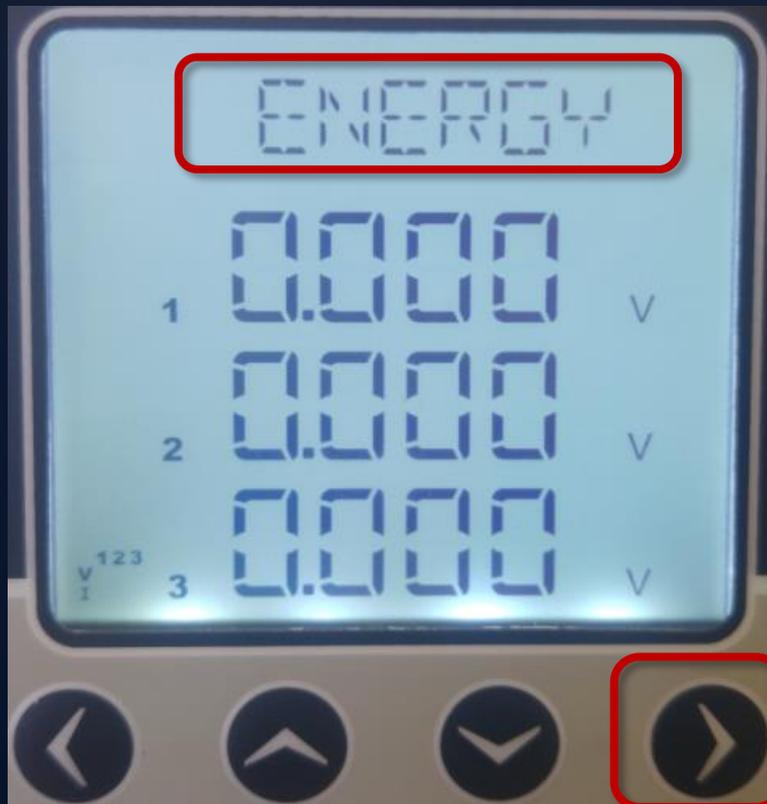
- Current
- Active power
- Reactive power
- Apparent power

To navigate across the menus and max. & min. parameters, use the right and left arrow keys.



Measurement menus - Energy

For the ENERGY menu, press the right arrow key for more than 1 second.



The device has two types of Tariff displayed in the "ENERGY" menu. Each tariff provides meters for import and export active energy, and import and export reactive energy.

Measurement menus - Energy

While in the ENERGY menu, navigate across the TARIFFs options by pressing the right arrow key.

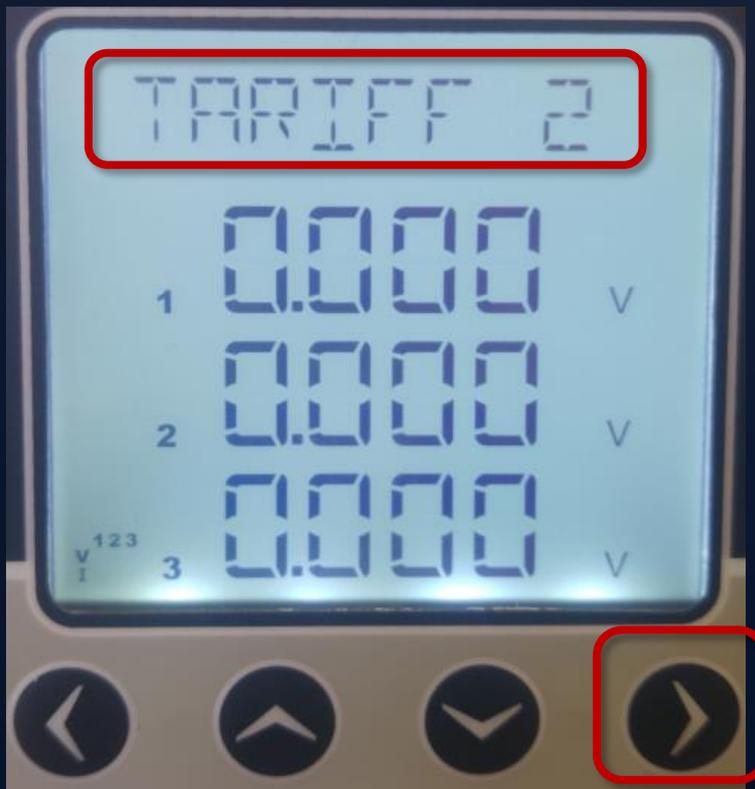


The device has two types of Tariff displayed in the "ENERGY" menu. Each tariff provides meters for import and export active energy, and import and export reactive energy.

Measurement menus - Energy

While in the ENERGY menu, navigate across the TARIFFS options by pressing the right arrow key.

NOTE: To activate the tariff 2 meter, first the digital input must be selected for that purpose. Thus, activating that input enables the Tariff 2 energy meter.

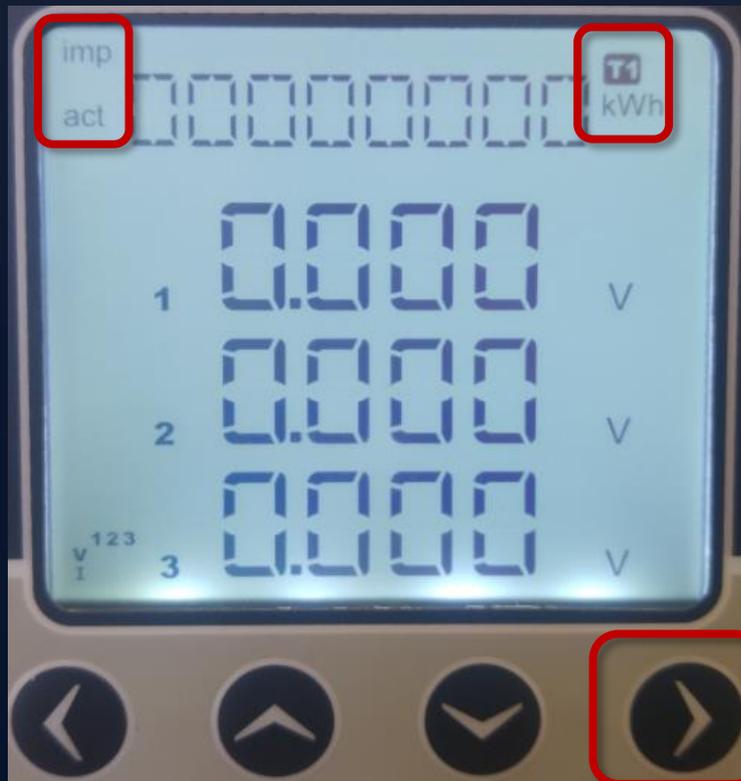


The DI digital input will become active when the GND outputs are short-circuited.

If there is no tariff 2, only tariff 1 will be shown on the display.

Measurement menus - Energy

If the right arrow key is pressed again, the energy meter will be available.



T1 : Tariff 1 meter

T2 : Tariff 2 meter

imp : Import energy meter

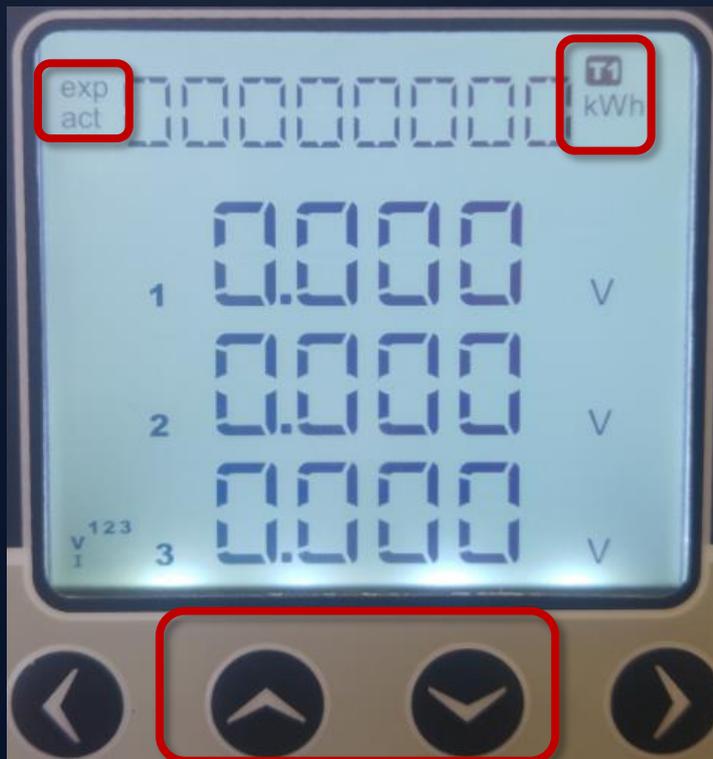
exp : Export energy meter

act : Active energy meter

rea : Reactive energy meter

Measurement menus - Energy

To navigate across the different types of energy meters, press the up and down arrow keys.



T1 : Tariff 1 meter

T2 : Tariff 2 meter

imp : Import energy meter

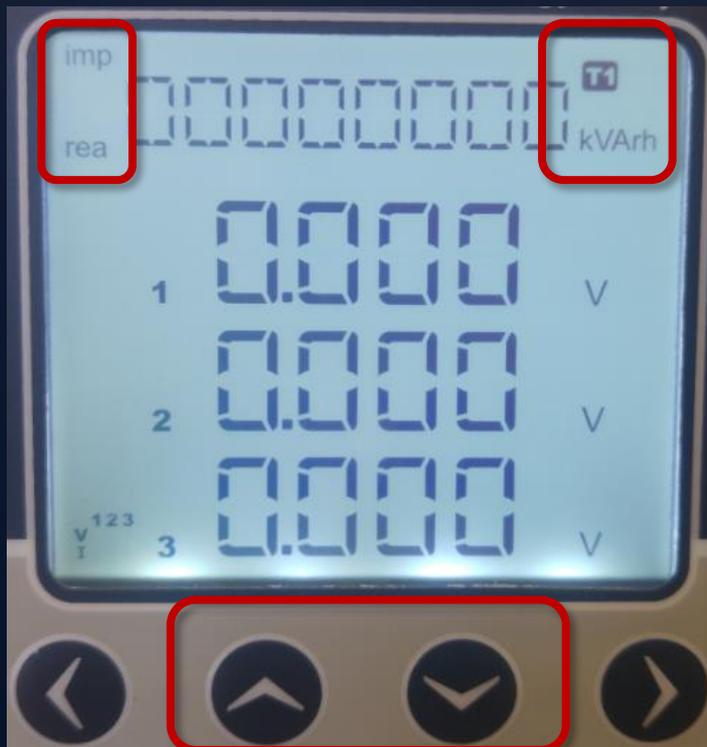
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Measurement menus - Energy

To navigate across the different types of energy meters, press the up and down arrow keys.



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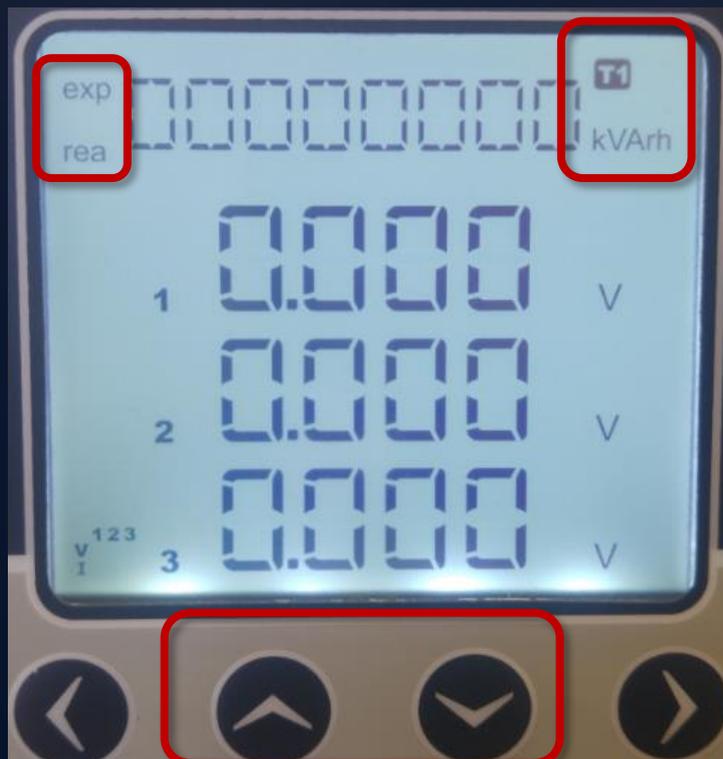
exp : Export energy meter

act : Active energy meter

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Measurement menus - Energy

To navigate across the different types of energy meters, press the up and down arrow keys.



T1 : Tariff 1 meter

T2 : Tariff 2 meter

imp : Import energy meter

exp : Export energy meter

act : Active energy meter

rea : Reactive energy meter

Measurement menus - Energy

Preset energy values

Press the right arrow key for 2 seconds. When the display starts flashing, using the right arrow key, select the digit to be changed.

Use the up and down arrow keys to set the desired number

After setting the desired number, use the left arrow key to confirm and end this step.

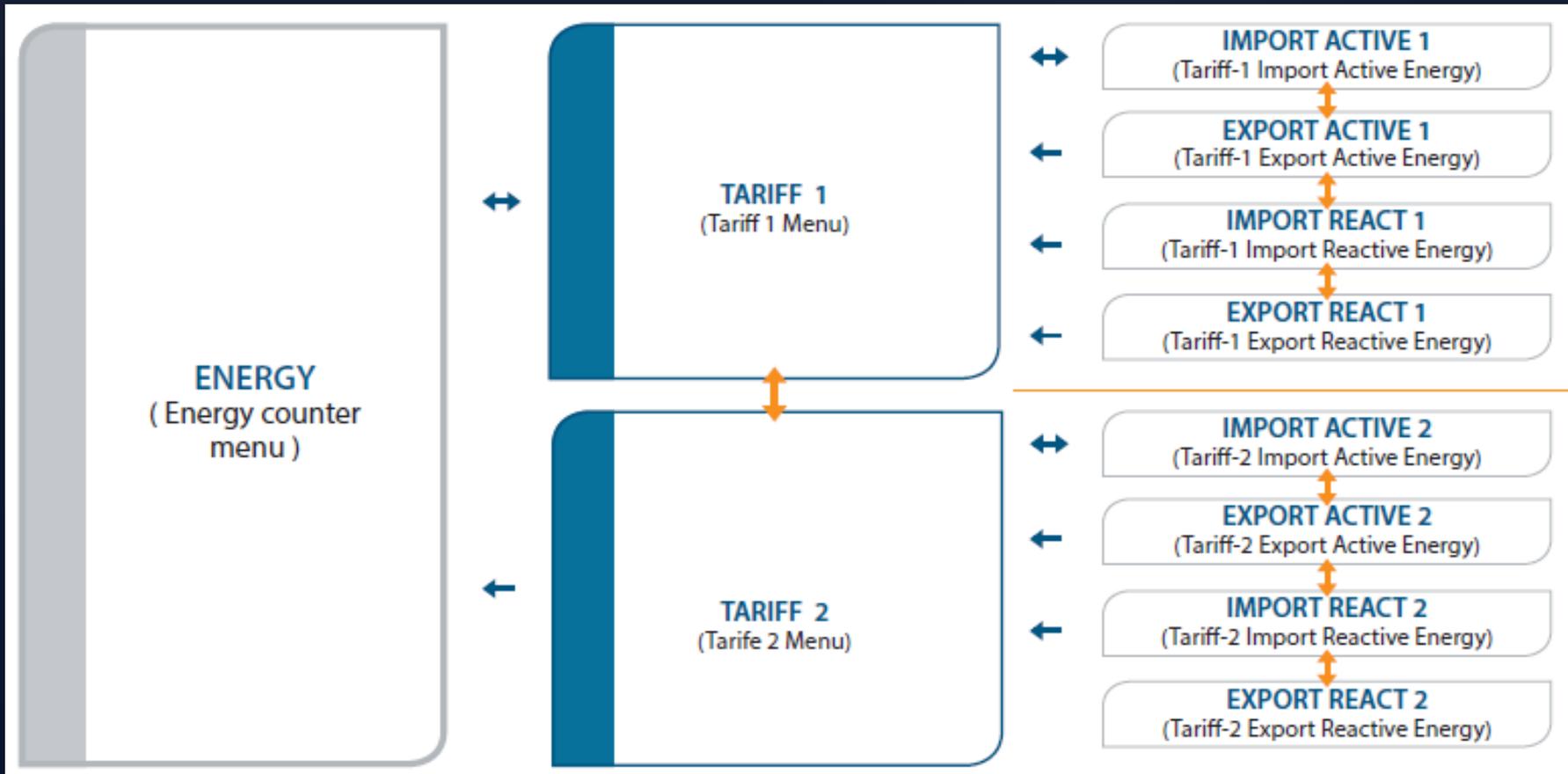
After that, navigate to the memory/records area to confirm the changes.



Press and hold > 2 s

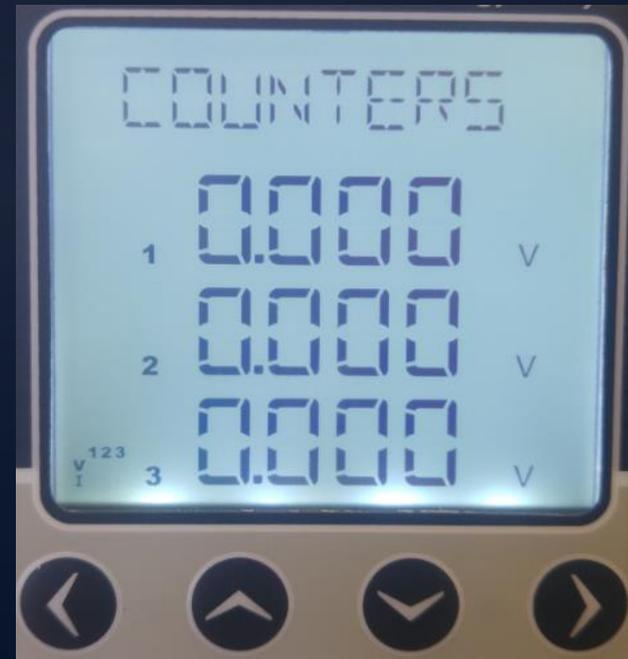
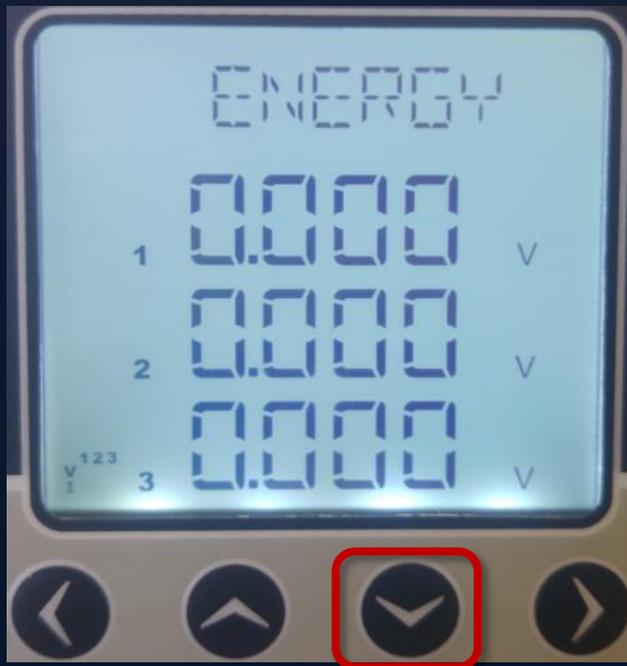
Enter the desired value

Measurement menus - Energy Structure



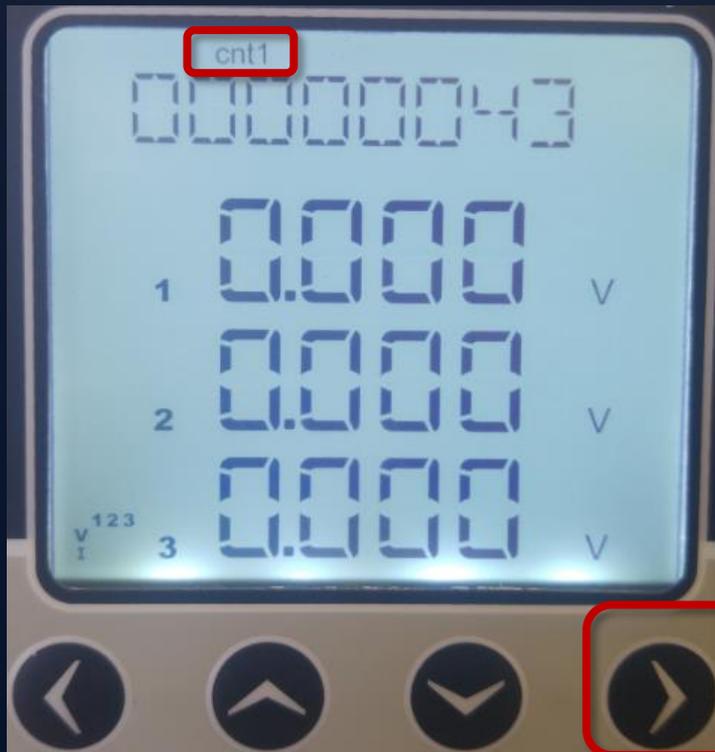
Counters Menu

To navigate to the COUNTERS menu, press the down arrow key when in the ENERGY menu.



Counters Menu

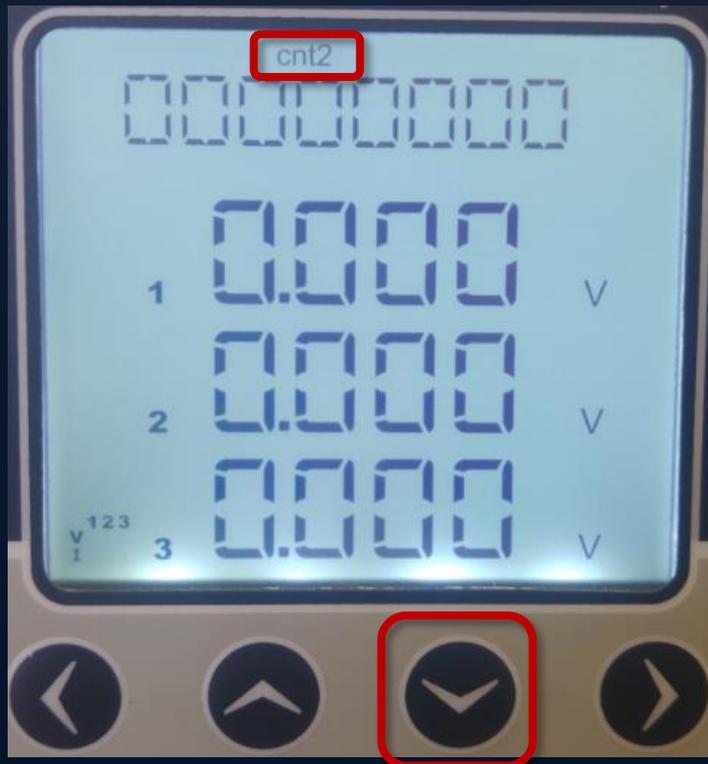
To navigate to the "cnt1" menu, press the right arrow key when in the "COUNTERS" menu.



"COUNTER1": When digital input 2 is set to counter, it will count the changes in the state of this input. The count value will be shown in the "cnt1" menu.

Counters Menu

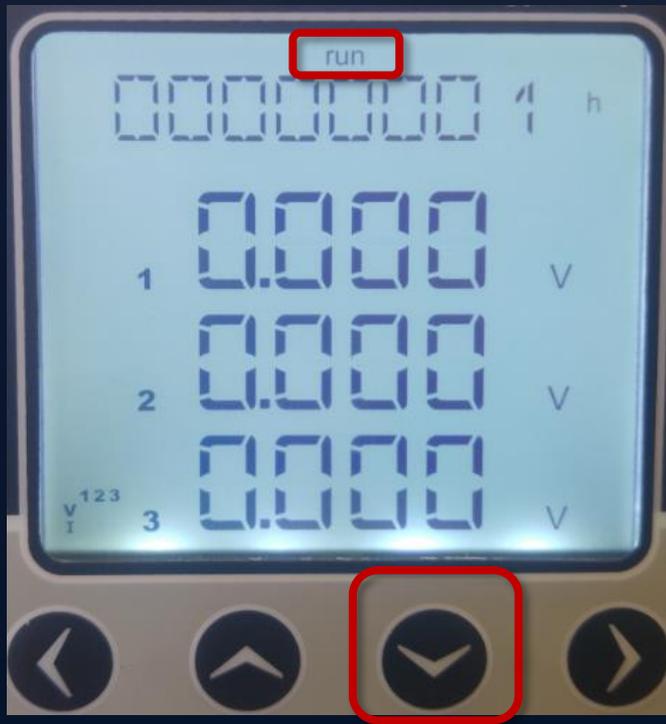
To navigate to the "cnt2" menu, press the down arrow key when in the "COUNTERS" menu.



"COUNTER2": When digital input 2 is set to counter, it will count the changes in the state of this input. The count value will be shown in the "cnt2" menu.

Counters Menu

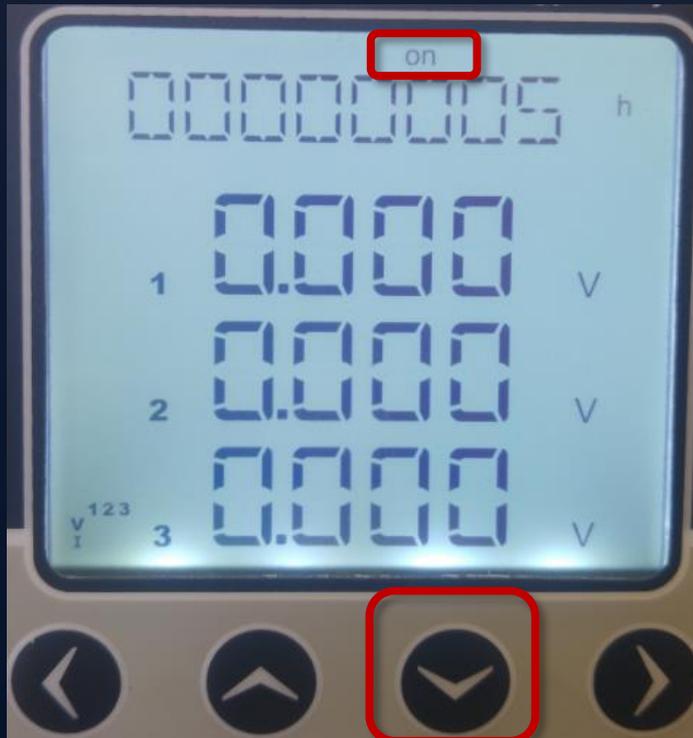
To navigate to the "run" menu, press the down arrow key when in the "COUNTERS" menu.



"RUN HOUR": If the digital input is set to "run hour enable", the time this digital input has been active will be counted. This counter requires a three-phase current and voltage signal for its operation without the digital input. The measured value is displayed in hours.

Counters Menu

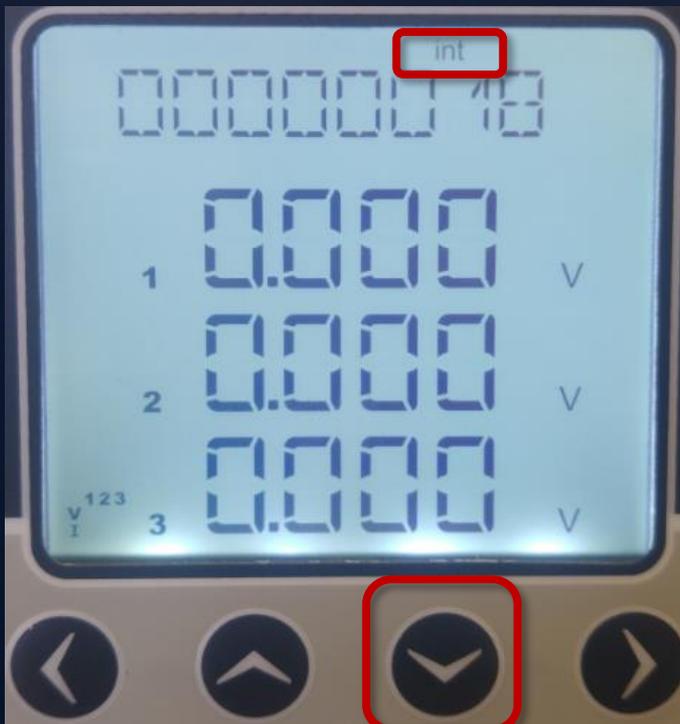
To navigate to the "on" menu, press the down arrow key when in the "COUNTERS" menu.



"ON HOUR": Counts the total hours that the equipment was energized.

Counters Menu

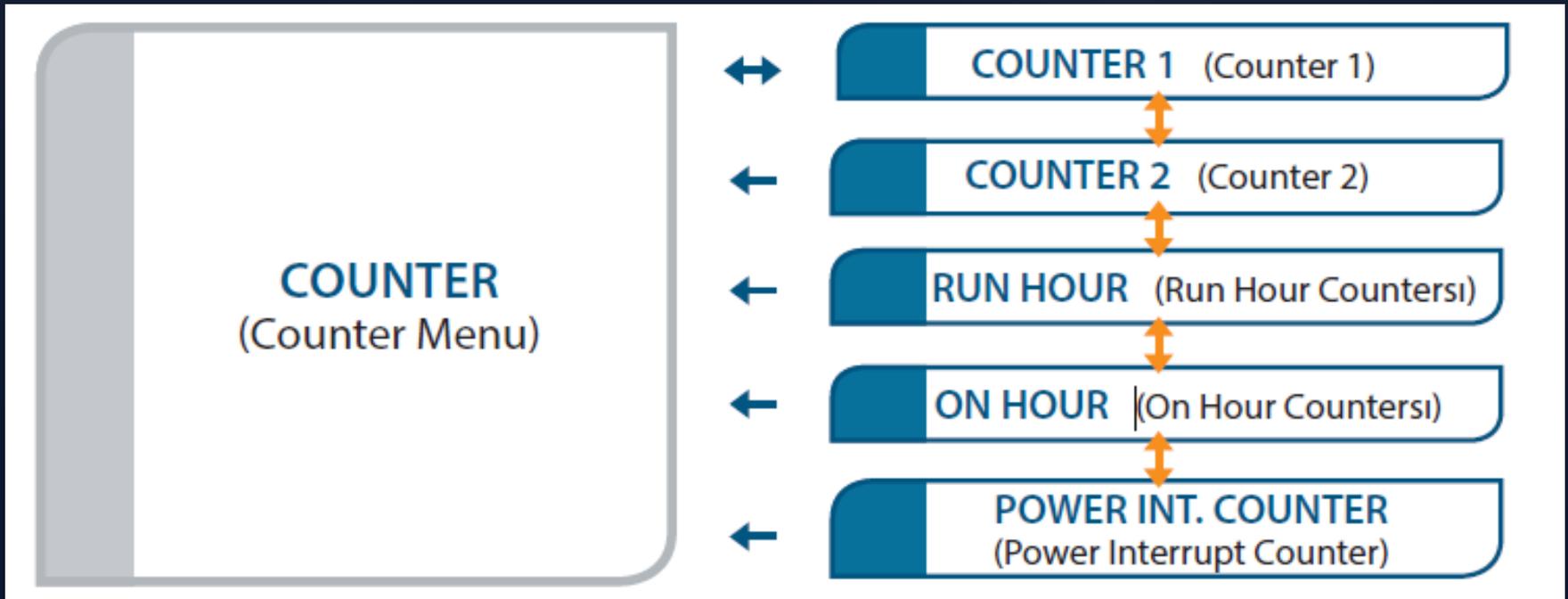
To navigate to the "int" menu, press the down arrow key when in the "COUNTERS" menu.



"POWER INTERRUPTION COUNTER": Counts the time the equipment was de-energized.

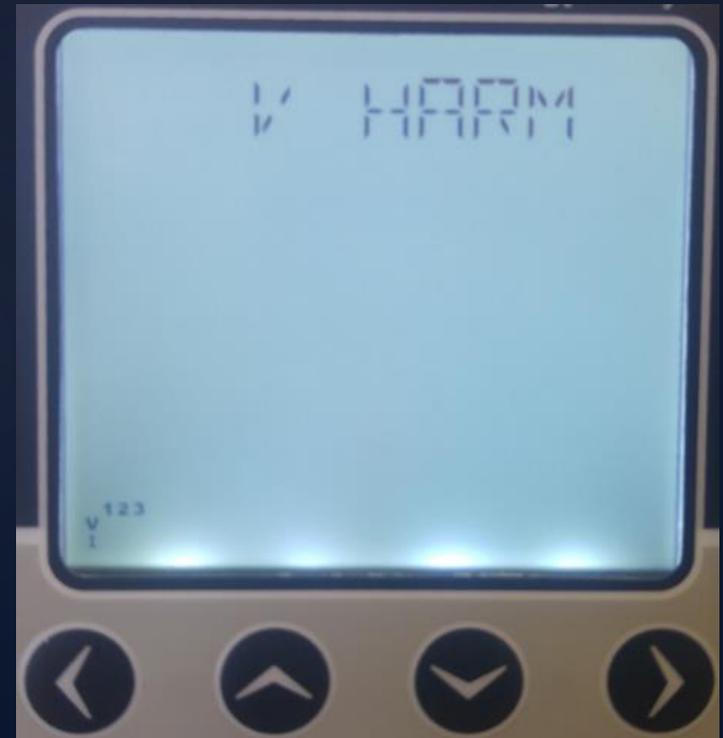
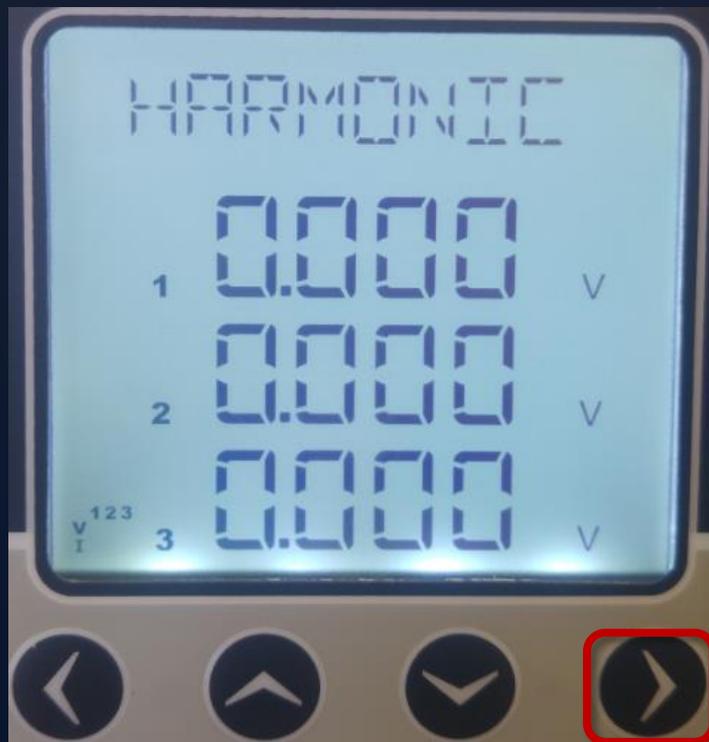
Counters Menus

Structure



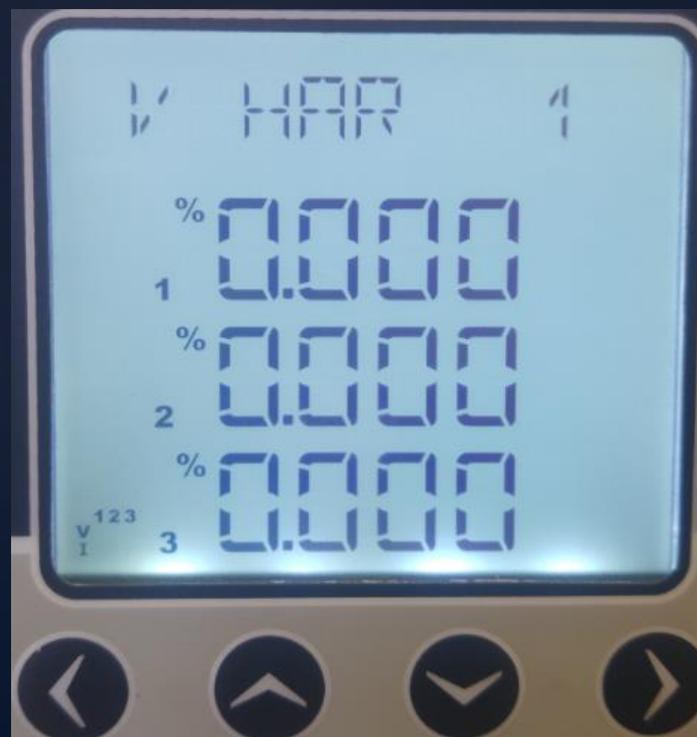
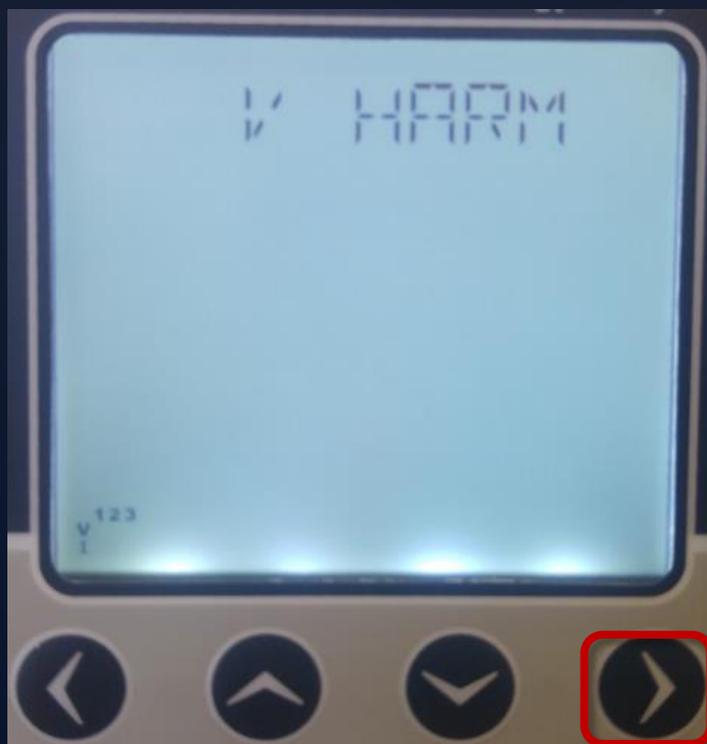
Harmonics Menu - V HARM

To navigate to "V HARM", go to the HARMONIC menu and press the right arrow key



Harmonics Menu - V HARM

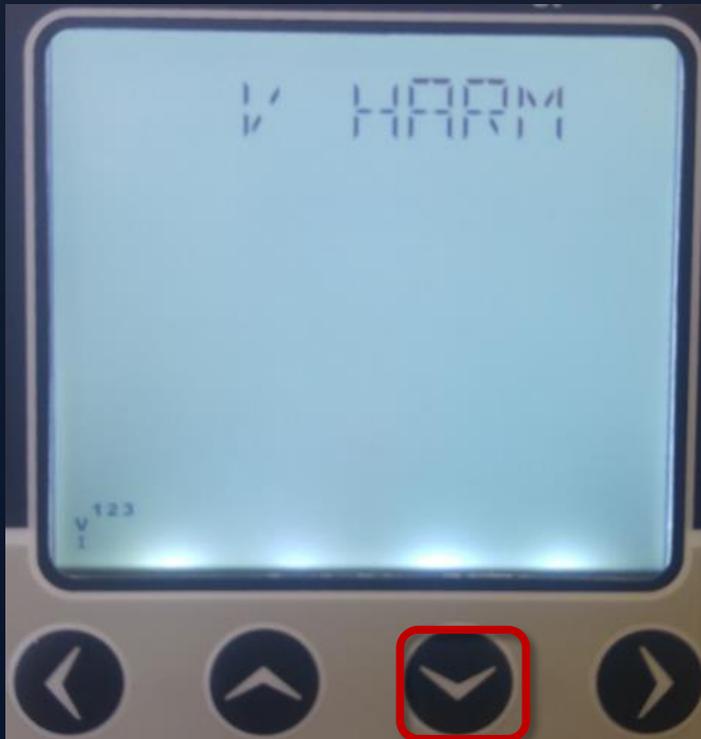
To navigate across the details of the V HARM menu, press the right arrow key



V HAR 1..31st order

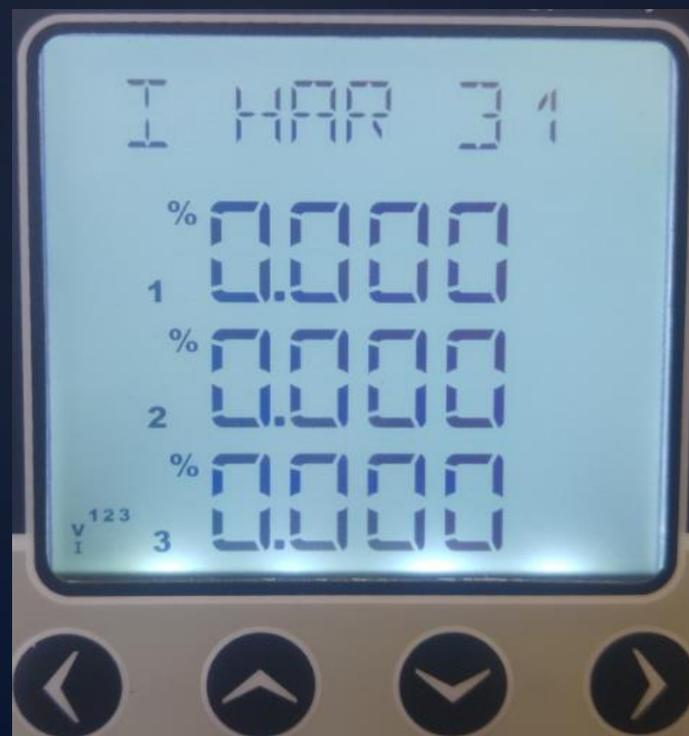
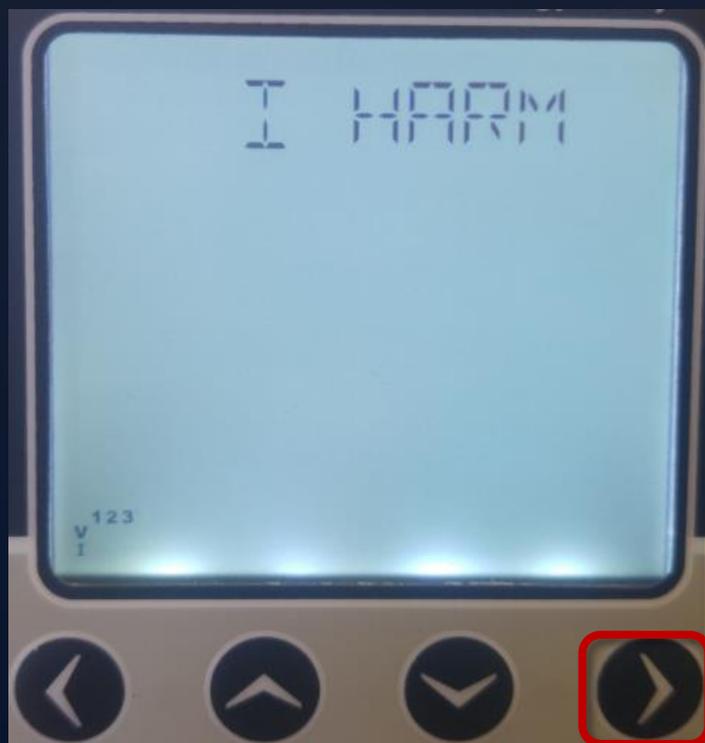
Harmonics Menu - I HARM

To navigate to "I HARM", go to the V HARM menu and press the down arrow key



Harmonics Menu - I HARM

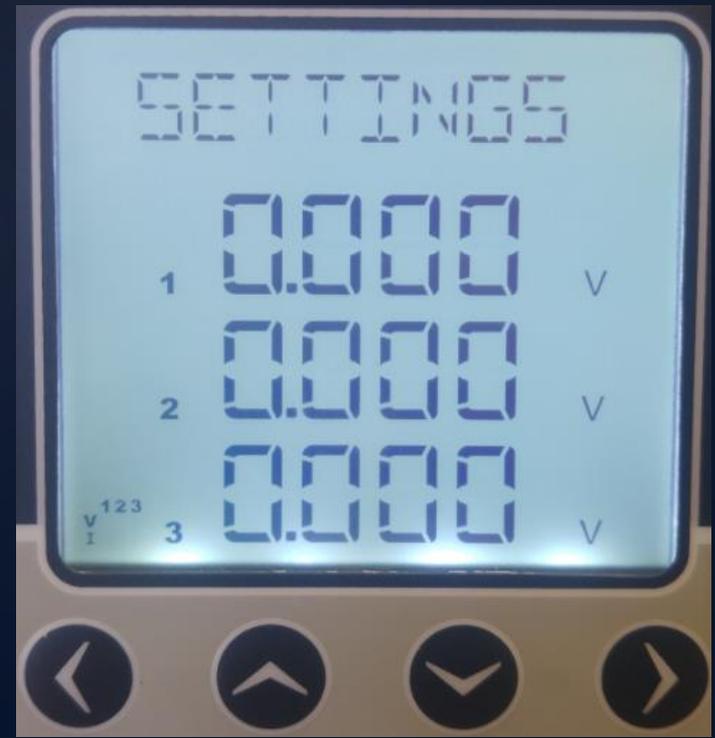
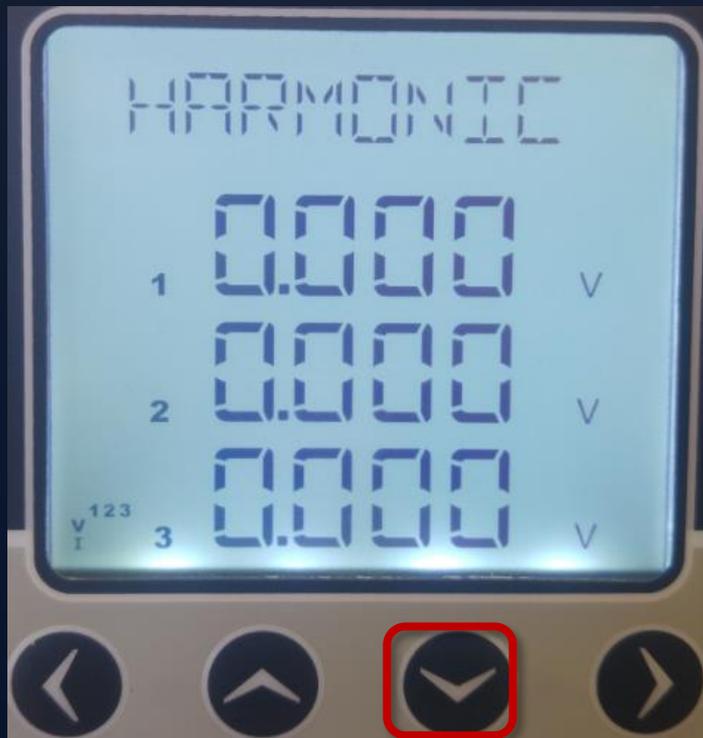
To navigate across the details of the I HARM menu, press the right arrow key



I HAR 1..31st

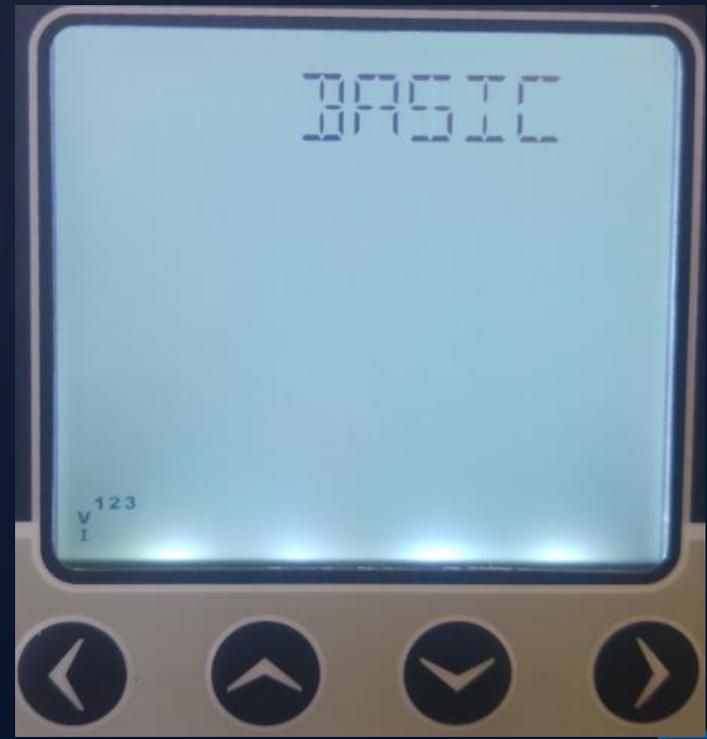
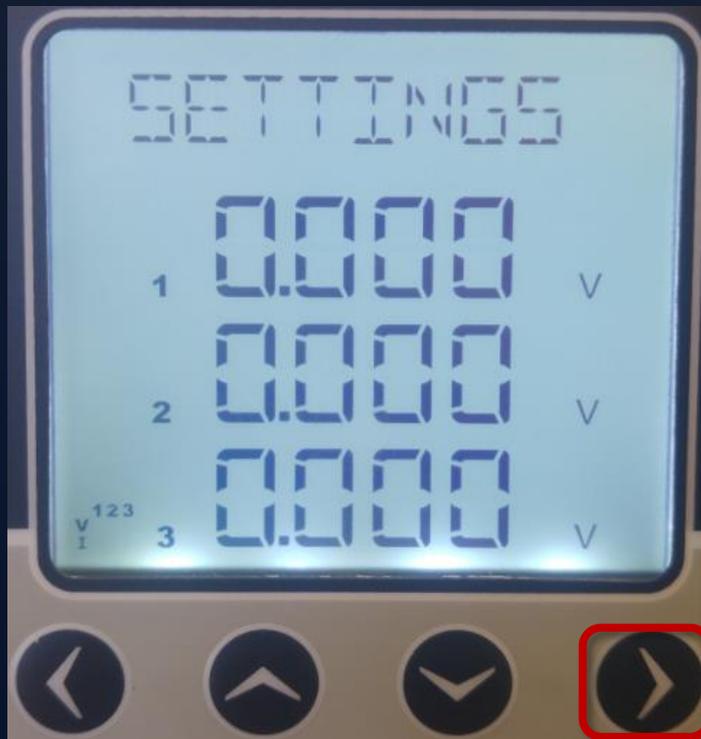
Settings menus

The parameters of the device are set in the "SETTINGS" menu. To navigate to the "SETTINGS" menu, press the down arrow key when in the "HARMONICS" menu.



Settings menus

To navigate to the submenus, press the right arrow key in the SETTINGS menu.





Settings

To navigate across the "SETTINGS" submenus, press the right arrow key when in the "SETTINGS" menu. The submenus are:

1. BASIC
2. ALARMS
3. RELAYS
4. DEMAND
5. RS485
6. DI INPUT
7. PULSE
8. SECURITY
9. DISPLAY
10. CLEAR
11. INFO

Settings menu - BASIC menu

In this submenu, the CT and PT transformation ratios are defined, as well as the measurement connection type



1-5000



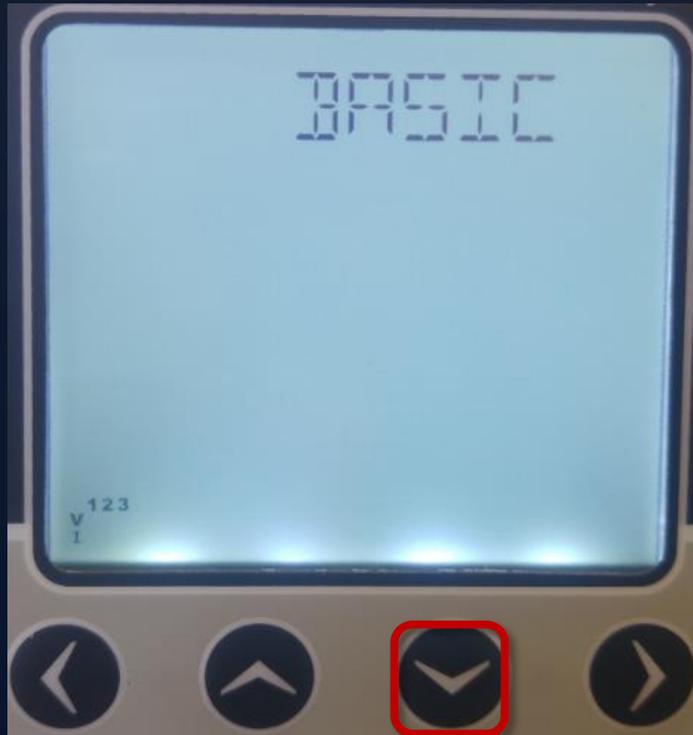
1.0 – 5000.0



3P4W, 3P3W

Settings menus - ALARMS menu

To navigate to the ALARMS menu, press the down arrow key when in the BASIC menu.





Settings menus - ALARMS menu

To navigate to the alarm submenus, press the right arrow keys when in the ALARMS menu.

The alarm submenus are:

1. V(L-N) ALARM
2. V(L-L) ALARM
3. I ALARM
4. IN ALARM
5. $\text{COS}\phi$ ALARM
6. PF ALARM
7. FREQ ALARM

Settings menu — Alarm V (L-N)

In this menu, the alarm limits, hysteresis and alarm actuation holding time are configured.



1-1500000.0



1-1500000.0



1-1500000.0



0-60 s

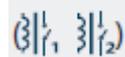
Settings menu – Alarms

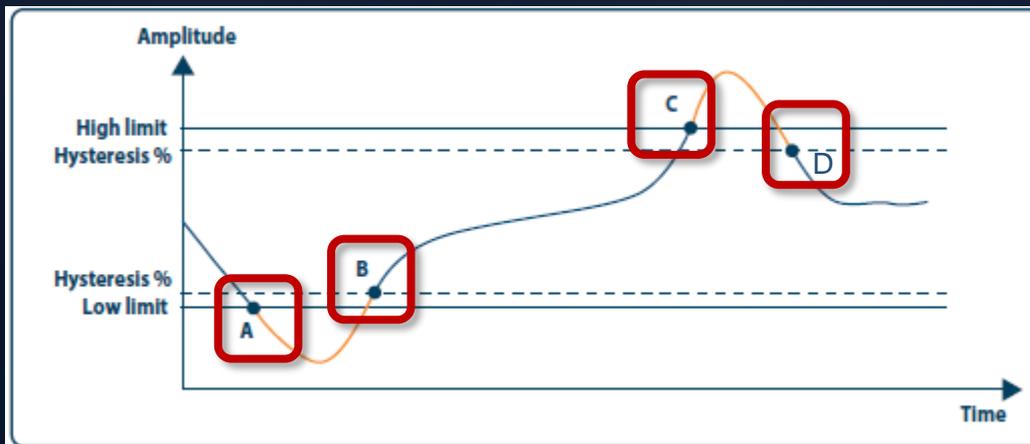
The other parameters are configured in the same way as the voltage alarm V (L-N)

Note:



Outside the alarm limits:

- the values set to the alarm parameter start flashing;
- When the alarm delay ends, the symbol  is shown on the display.
- If the relay outputs are assigned to any alarm, and an alarm is present in the system too, the related relay symbols  will be displayed on the main screen after the alarm delay



A = Lower limit
C = Upper limit

B = Alarm off after this point
D = Alarm off after point

Settings menus - Alarm relays

To navigate across the RELAYS menu, press the down arrow key



Settings menu – Relay 1

In this menu, the relay operating conditions are defined. They will work in one of the OFF, LOW, HIGH positions



Under alarm condition, the relay is not activated



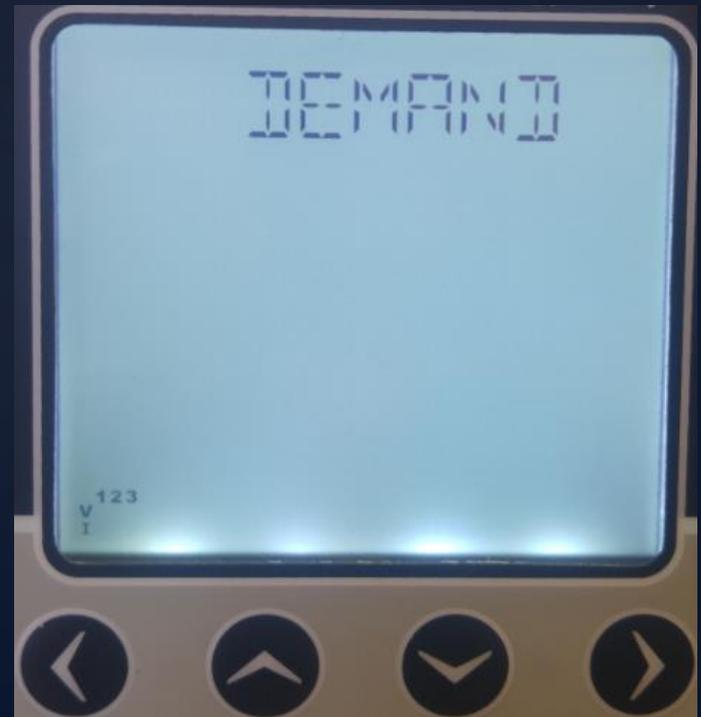
Relay is triggered when the lower limit is reached



Relay is triggered when the upper limit is reached

Settings menu – Demand

To navigate to the DEMAND menu, press the down arrow key when in the RELAYS menu



Settings menu – Demand

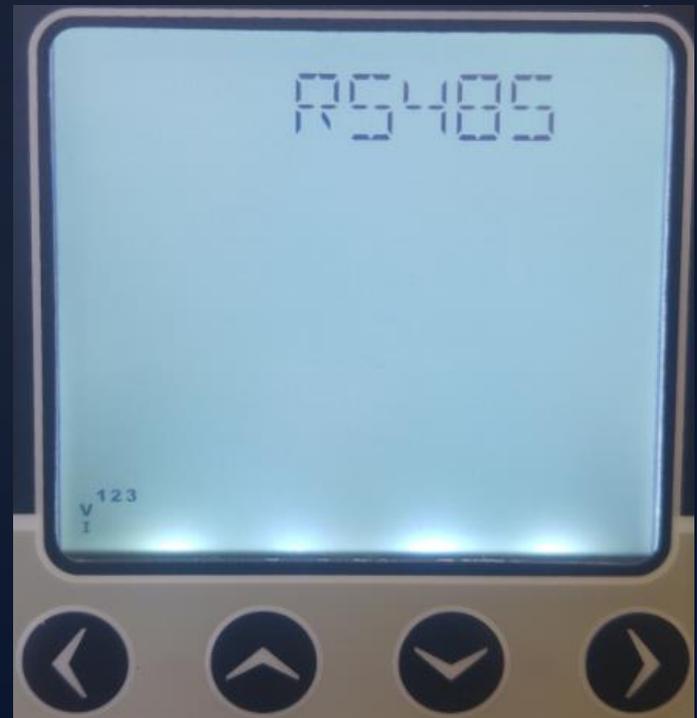
Use this menu to define the demand period/time to be considered. At the end of this time, the demands are calculated periodically.



1-60 min

Settings menu – RS485

To navigate to the RS485 menu, press the down arrow key when in the DEMAND menu



Settings menu – RS485

Use this menu to define the baud rate, slave ID, parity controls for communication via RS485



1200, 2400, 4800, 9600,
19200, 38400, 57600



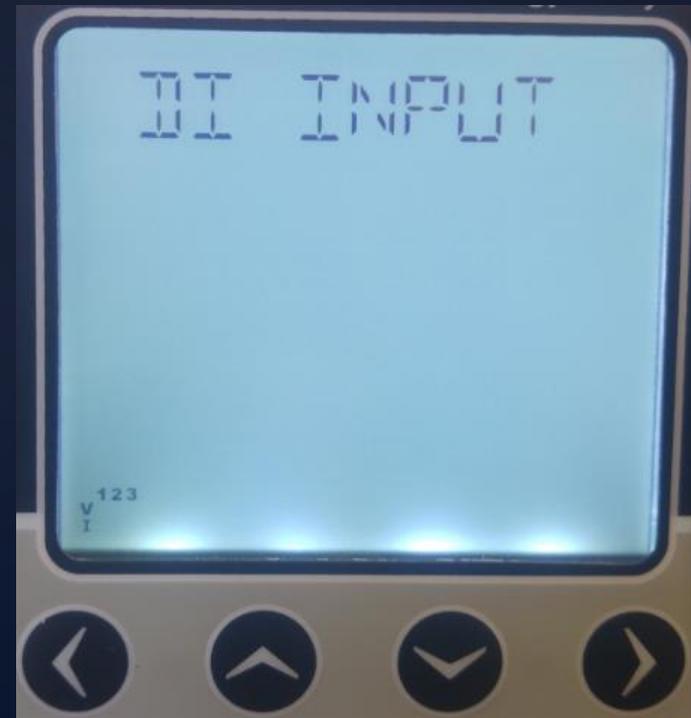
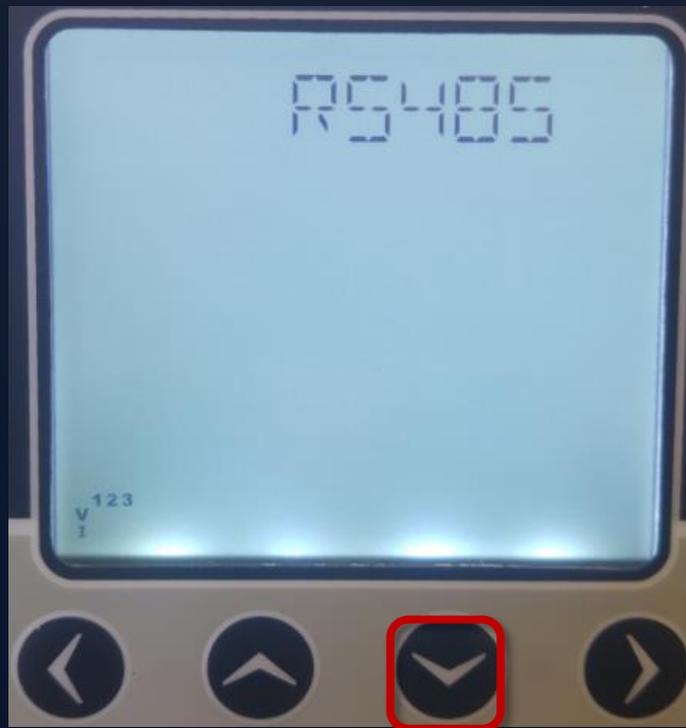
1-247



None, Even, Odd

Settings menu – DI input

To navigate to the DI INPUT menu, press the down arrow key when in the RS485 menu



Settings menu – DI input

In this menu, the ON/OFF position, input type, delay time and pulse counting type are set for the digital input



OFF, Tariff2, Counter, Run Hour



10-2000



Rising, Falling, Both Edge



Settings menu – DI input

Types of digital inputs

Tariff 2: When setting this option, the energy meter 2 will be enabled when the DI input is activated (a dry contact must be connected to the DI points (DI1 or 2 and GND)).

Counter: The counter will count the changes in the DI position. This count will depend on the choice made in the DETECTION EDGE (signal input type)

Run Hour: The hour meter starts counting when DI is activated

Detection Edge:

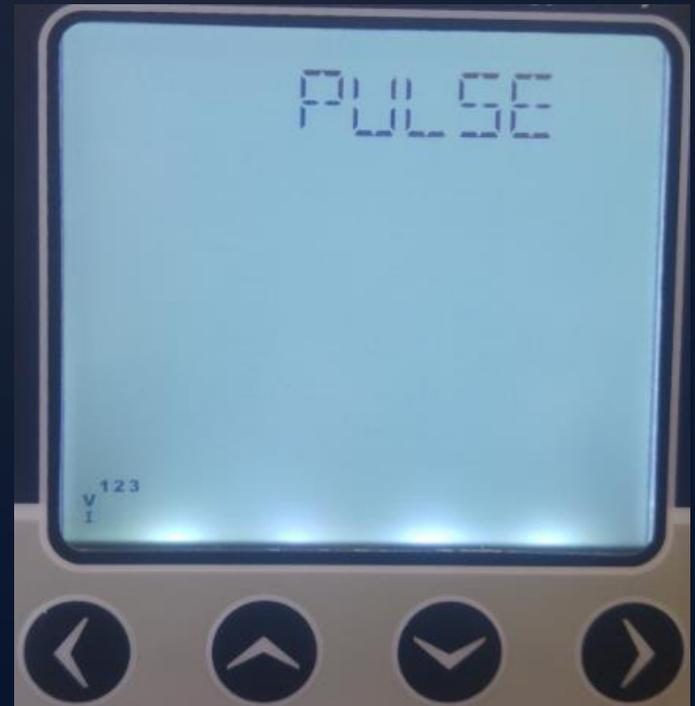
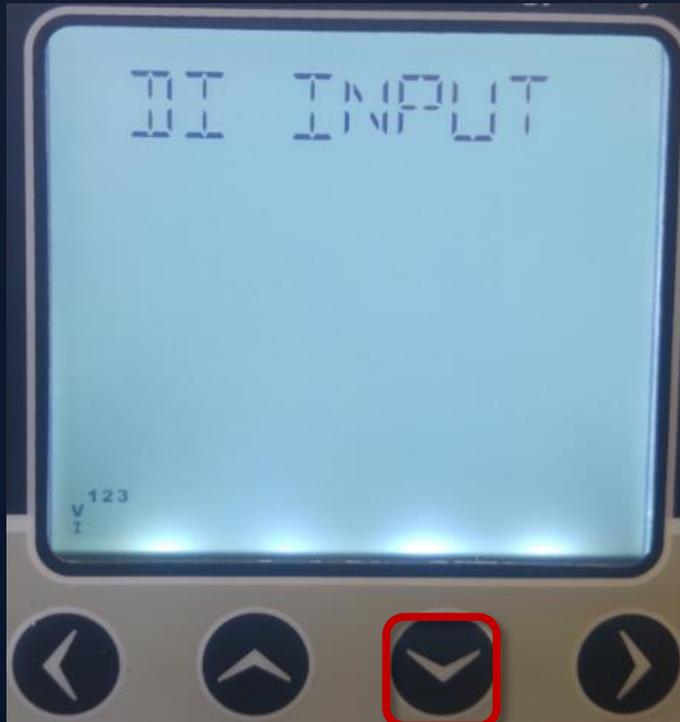
Rising: The counter will count one for each activation of the dry contact connected to the DI.

Falling: The counter will count one for each deactivation of the dry contact connected to the DI.

Both Edge: The counter will count one for each activation and deactivation of the dry contact connected to the DI.

Settings menu – Pulses

To navigate across the PULSE menu, press the down arrow key when in the DI INPUT menu



Settings menu – Pulses out1 and 2

Use this menu to set the ON/OFF position, output parameter, pulse duration and step range parameters for the pulsed input



OFF, imp. actv1, exp actv1, imp. reactive1, exp. reactive1, imp. actv2, exp act2, imp. reactive2, exp. reactive2, DIN1, DIN2



50-2500



1-99999999

Settings menu – Security

Use this menu to enable/disable the password, set the password activation time and configure the editing options.



NO, YES



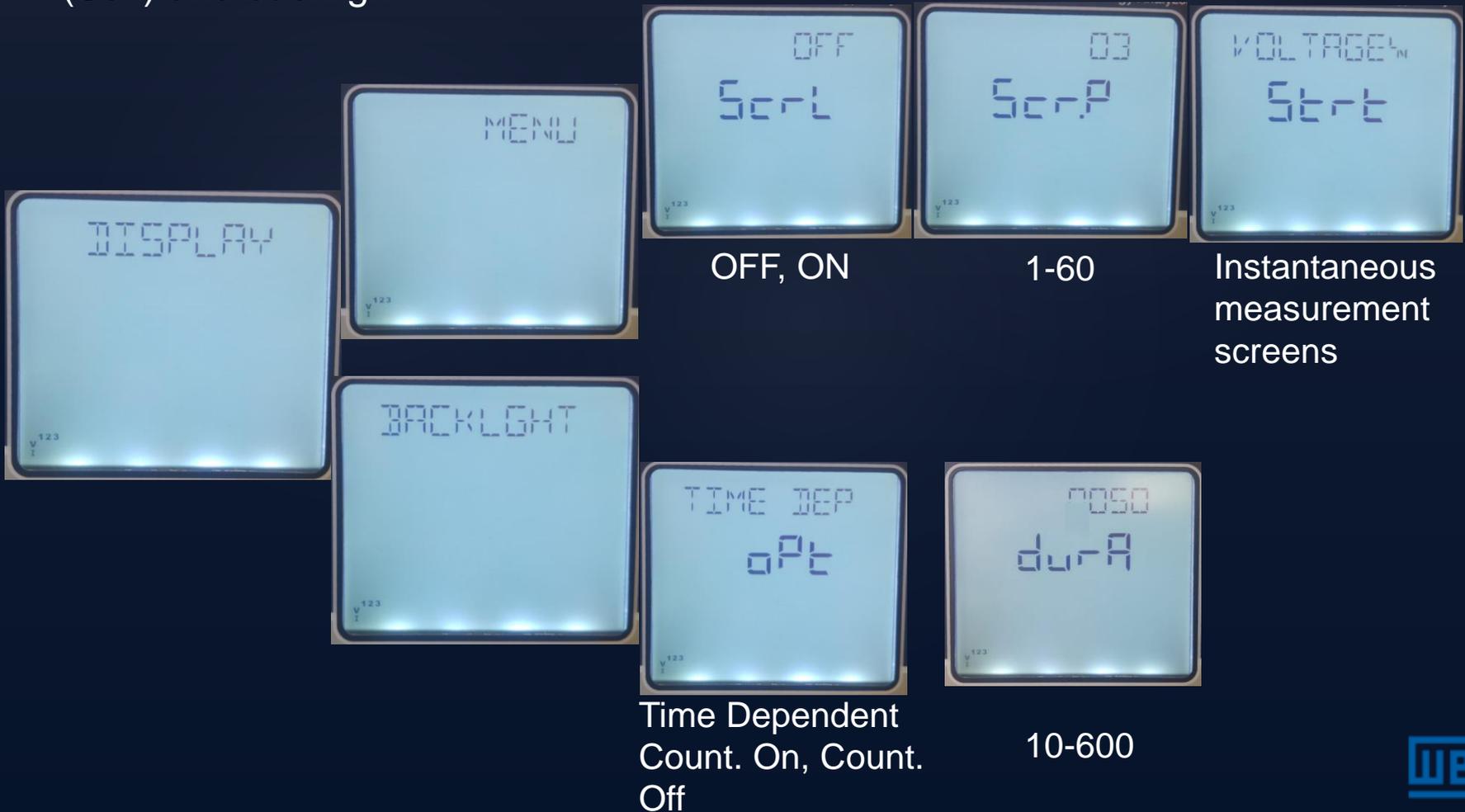
1-60 s



1-9999 (Default=1)

Settings menu – Display

The Display is configured in this menu. Screens with automatic navigation (Scrl) and backlight



Settings menu – CLEAR

Use this menu to delete values stored in the memory and to restore the factory settings



- OFF : Disables the cleaning process
- ALL : Deletes all records and restores the factory settings.
- ENERGY : Resets all energy records.
- COUNTERS : Resets all counters.
- MAX VALS : Resets all maximum values
- MIN VALS : Resets all minimum values
- DEMAND : Resets all demand values.
- SETTINGS : Restores all factory settings
- ALARMS : Restores the factory settings

Settings menu – INFO

This menu contains the firmware version



Saving procedure

Press the left arrow key until the "SAUE" screen appears. Confirm whether to save the changes or not.

To confirm the changes:



YES
SAVE

Press the right arrow key until "NO" flashes. Use the up or down arrow key to change from "NO" to "YES", then press the left arrow key to store the changes.

To discard the changes:



NO
SAVE

Press the right arrow key until "NO" flashes. In this screen, press the left arrow key to exit this menu without saving the changes.

Approval procedure

The following query screen is displayed to confirm the action or reject it. To confirm or change.

To confirm the action:



SWRT
YES

Press the right arrow key until "NO" flashes. Use the up or down arrow key to change from "NO" to "YES", then press the left arrow key to store the changes.

To discard the action:



SWRT
NO

Press the right arrow key until "NO" flashes. In this screen, press the left arrow key to exit this menu without saving the changes.

Technical specifications

Supply		
Voltage	85..300 V AC/DC	
Frequency	45..65Hz	
Power Consumption	< 4.5VA & <2W	
Measurement Inputs		
Voltage	5..300V AC (L - N)	
	10..500V AC (L - L)	
Current	10mA .. 6A AC	
Frequency	45..65Hz	
Network Connection Type	3 phase 4 wire, 3 phase 3 wire	
Digital Input		
Input Type	Dry Contact	
Isolation	5000V RMS	
Digital Output		
Output Type	Transistor	
Switching Voltage	5..30V DC	
Switching Current	50mA	
Isolation	5000V RMS	
Realy Output (KLEA 220P-POWYS 3121)		
	AC	DC
Maximum Switching Voltage	250V	30V
Maximum Switching Current	10A	5A
Maximum Switching Power	1250VA	150W

Accuracy

Symbol	Measurement Type	Class According to IEC 61557-12	Measurement Range	Other Standards
P	Total Active Power	0,5	10 % $I_b \leq I \leq I_{max}$ 0,5 Ind to 0,8 Cap	-
Q_v	Total Reactive Power	1	5 % $I_b \leq I \leq I_{max}$ 0,25 Ind to 0,25 Cap	-
tS_A	Total Apparent Power	0,5	10 % $I_b \leq I \leq I_{max}$ 0,5 Ind to 0,8 Cap	-
E_A	Total Active Energy	0,5	0 - 99999999 kWh 0-99 999 99.9 kWh (POWYS 3122)	IEC 62053-22 Class 0.5S
E_{rv}	Total Reactive Energy	2	0 - 99999999 kVarh 0-99 999 99.9 kVarh (POWYS 3122)	IEC 62053-23 Class 2
f	Frequency	0,1	45 – 65 Hz	-
I	Phase Current	0,5	20 % $I_b \leq I \leq I_{max}$	-
I_{nc}	Neutral Current (Measured)	0,5	20 % $I_b \leq I \leq I_{max}$	-
U	Voltage	0,2	$U_{min} \leq U \leq U_{max}$	-
PF_A	Power Factor	0,5	0,5 Ind to 0,8 Cap	-
$THDV$	Total Harmonic Distortion Voltage	1	0 % to 20 %	-
$THDI$	Total Harmonic Distortion Current	1	0 % to 100 %	-



WEG Drives & Controls

Thank you!