



# PFW03-M8

Automatic Power Factor Controller

## PFW03-M8

- It measures active (P) and reactive (Q) power of the system to which it is connected;
- With the result of such measurement, it activates capacitors in case it is necessary to compensate reactive inductive loads;
- Through the front panel, you can easily access all settings and readings of electrical quantities;
- One isolated RS485 port;
- Two output alarm relays;





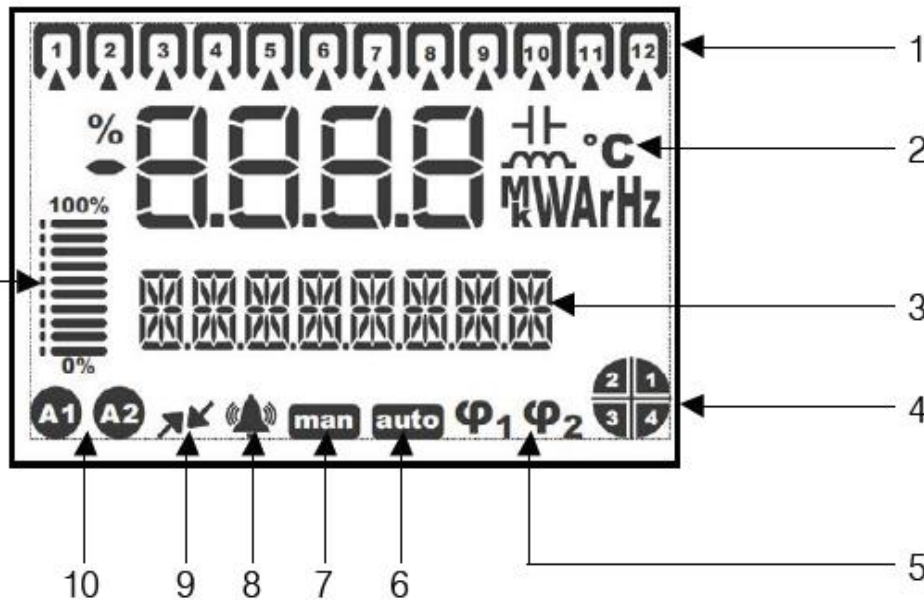
## PFW03-M8

Main differences between the M8 model and the other PFWs

PFW03-M12/M24/T12/T24	PFW03-M8
Graphic LCD display	Standard LCD Display
Dynamic monitoring of the capacitors	-----
Several stage control modes	Smart mode only
Automatic reading of the stages	Manual selection of the stages
Stages with reactors/inductors	Stages with capacitors only
Real time clock	-----
Hourly, daily and monthly records	No records
Fixed stages can be set	No fixed stages
Demand measurement	-----
Individual and total harmonic measurements up to 51st order	Only total harmonic distortion measurement up to 31st order
Energy measurements	-----
No setting of critical alarms	Setting of critical alarms

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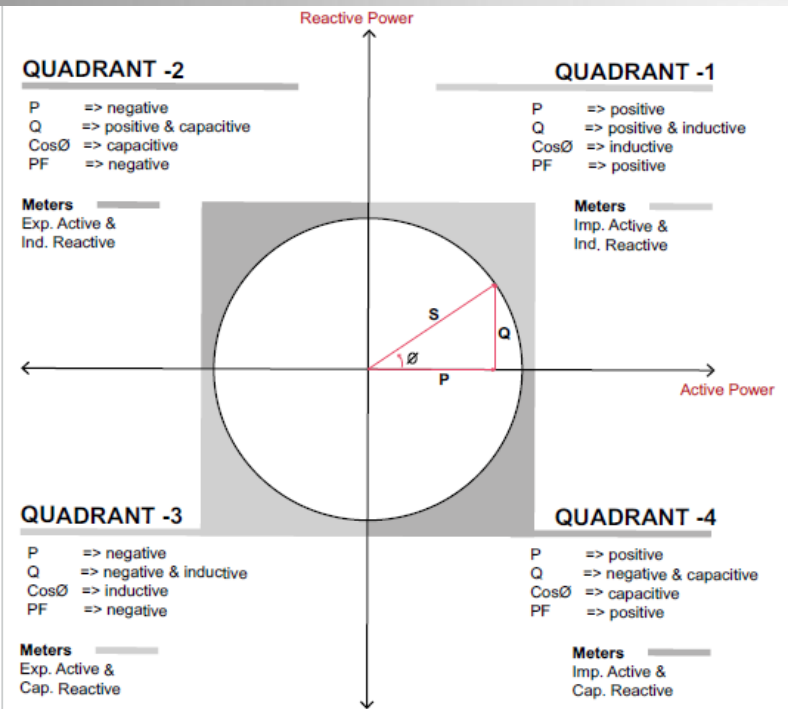
## Description of the display functions



- 1) Stages;
- 2) Units and indicators;
- 3) Menu bar;
- 4) Quadrant indicator
- 5) Target  $\cos\varphi$ ;
- 6) Automatic mode;
- 7) Manual mode;
- 8) Alarm indicator;
- 9) Communication indicator;
- 10) Alarm relay indicator;
- 11) Indication bar of the stages in operation in relation to the total stages

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## Description of the display functions



The direction of the energy flow is obtained by the angular phase shift  $\phi$  between voltage and current.

A positive value of the active/reactive power indicates energy being consumed.

A negative value indicates energy being generated.

E.g.:

$P = +10\text{kWh}$ ,  $Q = +5\text{kVAr}$  => Quadrant-1

$P = -10\text{kWh}$ ,  $Q = +5\text{kVAr}$  => Quadrant-2

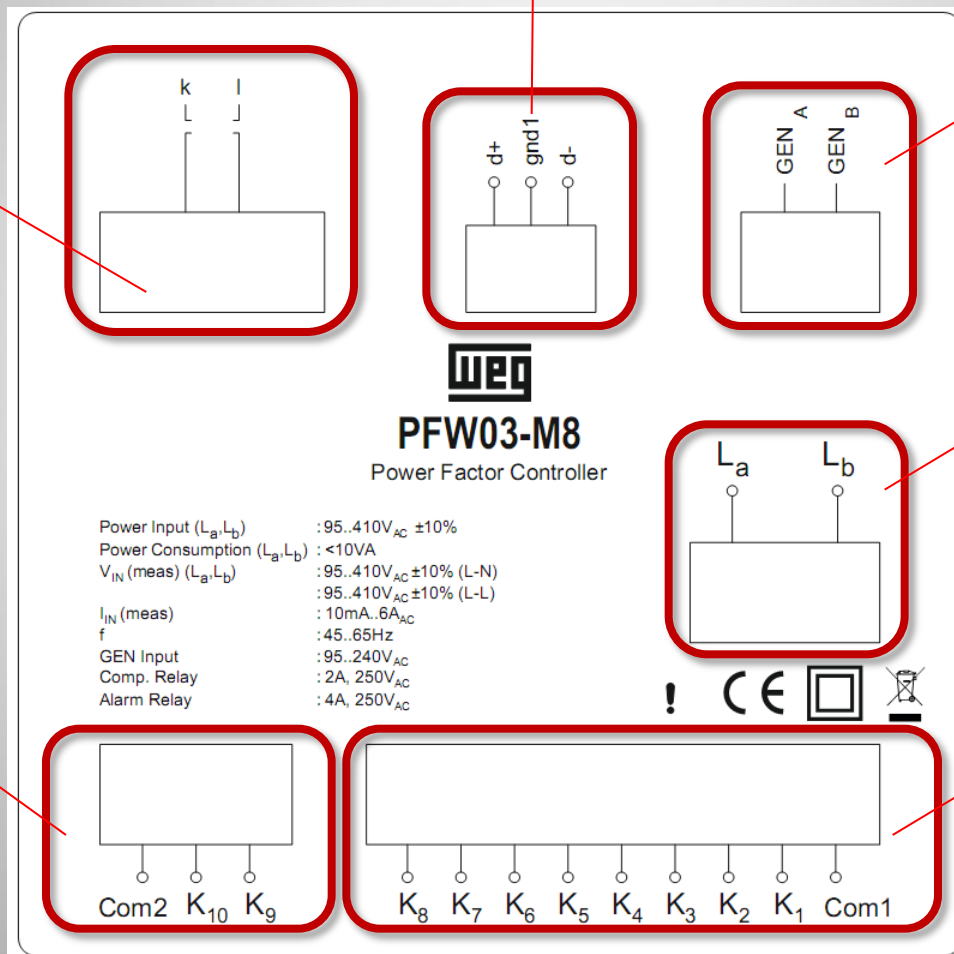
$P = -10\text{kWh}$ ,  $Q = -5\text{kVAr}$  => Quadrant-3

$P = +10\text{kWh}$ ,  $Q = -5\text{kVAr}$  => Quadrant-4

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## Connections

RS485 terminals



GEN input

Current measurement input

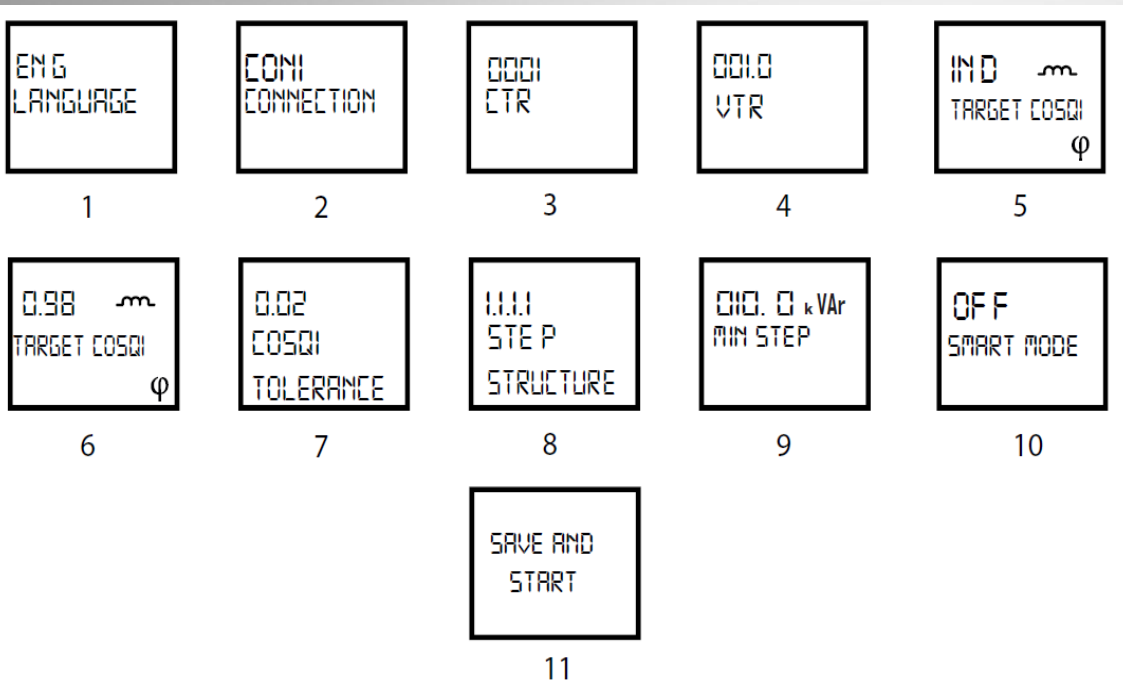
Power supply and voltage measurement

Terminals of the alarm relays

Connection of the stages

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## Settings - 1st energization of the device



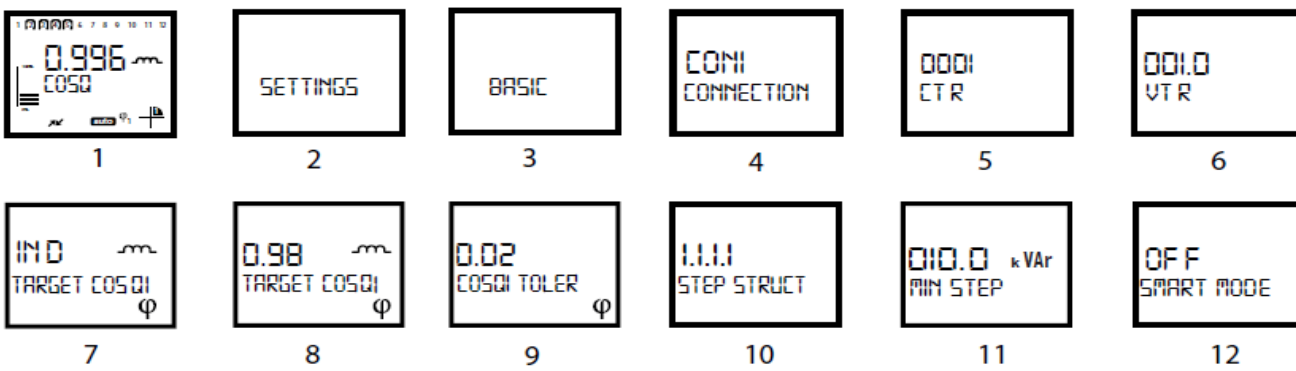
- 1) Language selection;
- 2) Selection of the connection type;
- 3) Input of the CT ratio;
- 3) Input of the PT ratio;
- 5) Selection of the  $\cos\phi_1$  type (ind or cap);
- 6) Input of the target value of  $\cos\phi_1$ ;
- 7) Input of the  $\cos\phi_1$  tolerance;
- 8) Selection of the stage structure (1.1.1.1.1.2.2.2.1.2.4.4, Entr)
- 9) Input of the \* Minimum stage value;
- 10) Setting the use or not of the \*\* Smart Mode;
- 11) Settings are saved and the device is started.

\* If the selection of the stage structure is "Entr", the "MIN STEP" indication is not displayed;  
Each stage is filled manually with power and voltage sequentially;

\*\* If the selection of stages is "Entr", the Smart mode is automatically enabled, and the option menu will not display screen 10.

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## Settings – Basic



- 1) Main screen;
- 2) Settings menu;
- 3) Basic settings menu;
- 4) Connection type: this menu contains 3 connection types: CON1, CON2, CON3

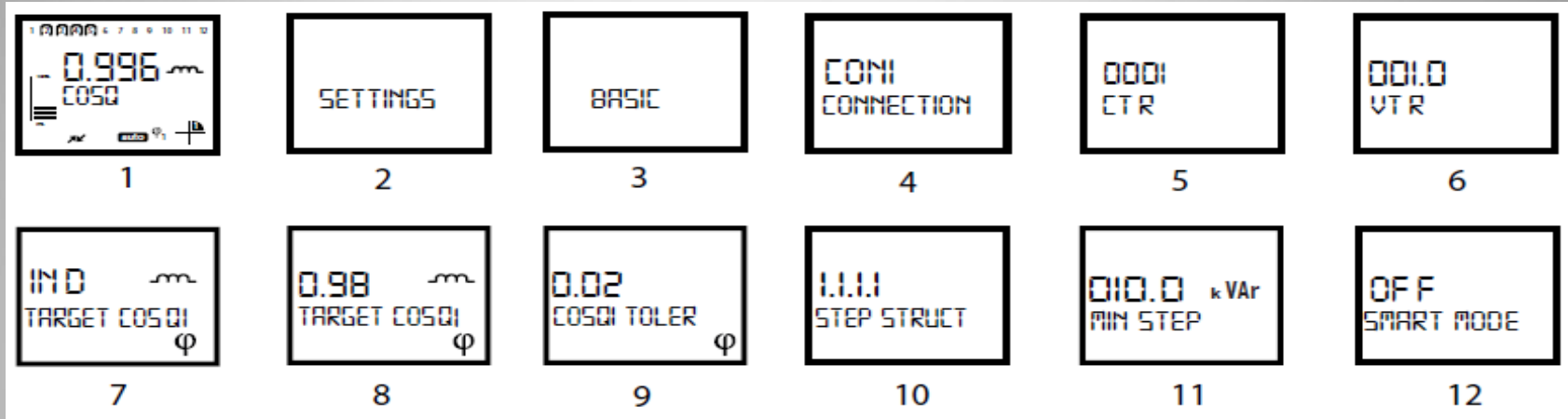
- **CON3: Phase-neutral connection.** For this configuration, the current measurement and the voltage measurement must be in the same phase
- **CON2: Phase-phase connection.** For connections without neutral, the phase-phase current measurement uses the measured phase and the next phase.
- **CON1: Phase-phase connection.** This is the type of phase-phase connection where the two phases are used, except for the phase in which the current is measured.

	CON 3	CON 2	CON 1
Akım (k-I)	Gerilim (La-Lb)	Gerilim (La-Lb)	Gerilim (La-Lb)
k1-I1	L1-N	L1-L2	L2-L3
k2-I2	L2-N	L2-L3	L3-L1
k3-I3	L3-N	L3-L1	L1-L2



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## Settings – Basic



- 5) CT ratio: range from 1 to 5000;
- 6) PT ratio: range from 0.1 to 999.9;
- 7) Type of  $\cos\phi_1$ : choose between inductive or capacitive;
- 8) Value of  $\cos\phi_1$ : setting range from 0.80 to 1.00;
- 9) Tolerance of  $\cos\phi_1$ :  $\cos\phi$  permissible range from 0.00 to 0.20;

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## Settings – Basic

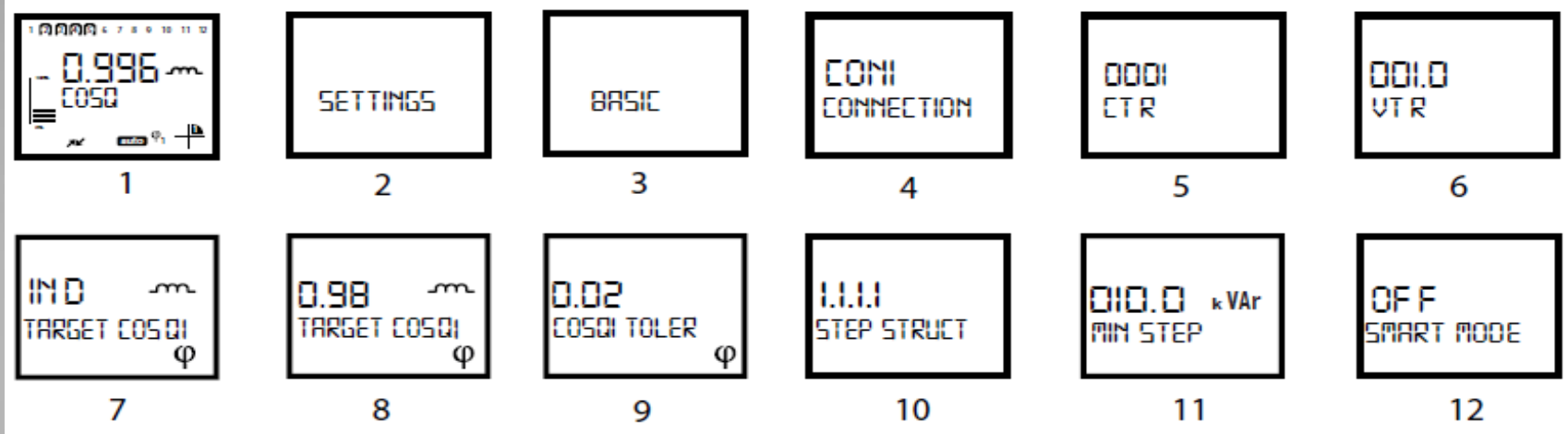


10) Definition among 4 reactive load compensation structures:

- 1.1.1.1 All stages are equal. First-in, first-out (FIFO) is applied. The first stage enabled will be the first stage to be disabled.
- 1.2.4.4: Stages are sized in the ratio 1.2.4.4. The first stage will always be the first stage to be enabled or disabled. The other stages are used sequentially.
- 1.2.2.2: Stages are sized in the ratio 1.2.2.2. The first stage will always be the first stage to be enabled or disabled. Different from the structure above, the other stages follow the FIFO scheme (first-in, first-out).
- Entr: Stages are set manually. During operation in this structure, the "Smart Mode" is enabled automatically. The device seeks the best correction with the least possible number of stages enabled.

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## Settings – Basic



11) When selecting modes 1.1.1.1, 1.2.4.4 or 1.2.2.2, the power of the smallest stage is defined in this menu;

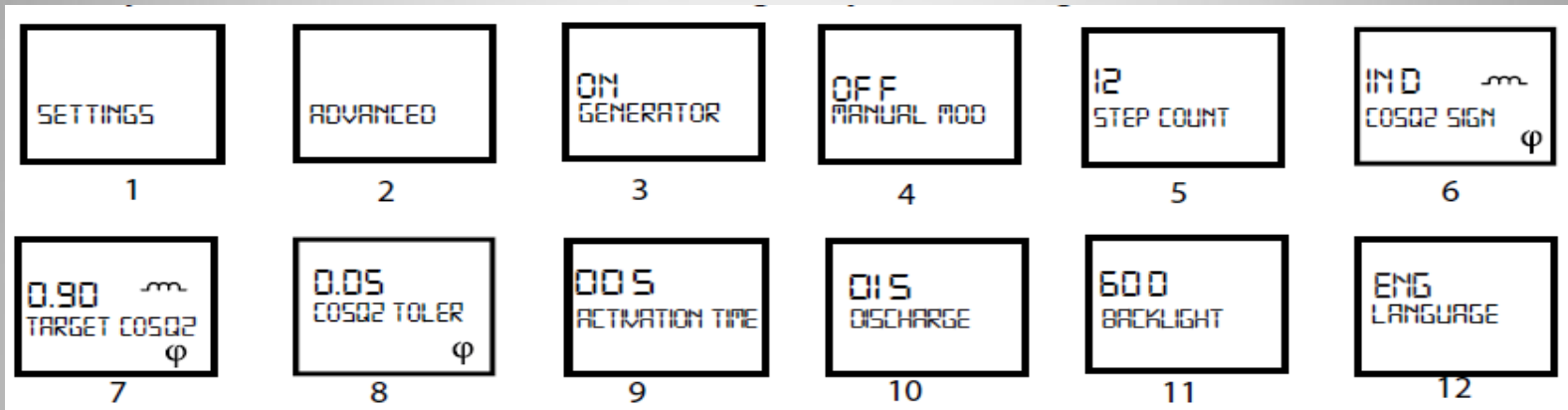
\*\*\* Stage power and voltage: If the structure is defined as "Entr", the power and voltage of the existing stages will be set sequentially in this menu;

12) Any of the modes 1.1.1.1; 1.2.4.4 or 1.2.2.2 that is selected will enable the "Smart Mode". In this option, the PFW will choose the smallest number of stages for the correction and will apply the FIFO scheme (first-in, first-out).

NOTE: When you select the "Entr" structure, Smart Mode will be activated automatically.

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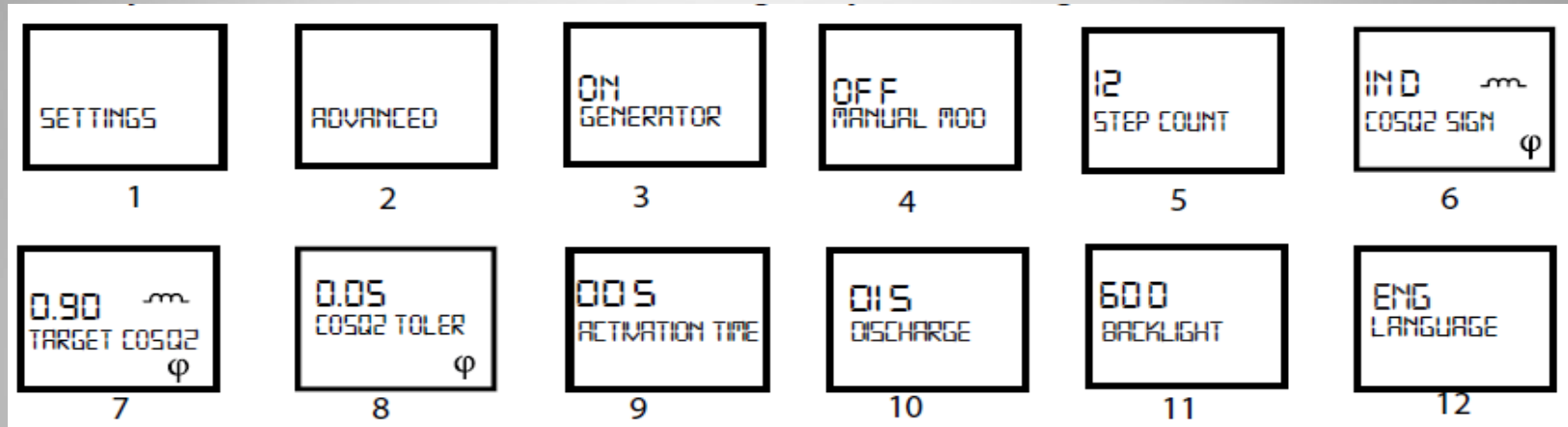
## Settings – Advanced



- 1) Settings menu;
- 2) Advanced settings;
- 3) If the "Generator" mode is "ON" when the GEN input is enabled, it is necessary to set "cos $\phi$  2 according to the following screens.  
To enable the GEN input, a voltage signal of 95-240 VAC is required;
- 4) While the Manual mode is enabled, the "man" symbol will appear at the bottom of the display in the main menu;  
Note: For the PFW to work in the Automatic mode the "Manual" mode must be "Off";
- 5) Input of the number of stages to be used;
- 6) Target Cos 2 SIGN: setting of the type of cos $\phi$  2 (induct. or capac.);

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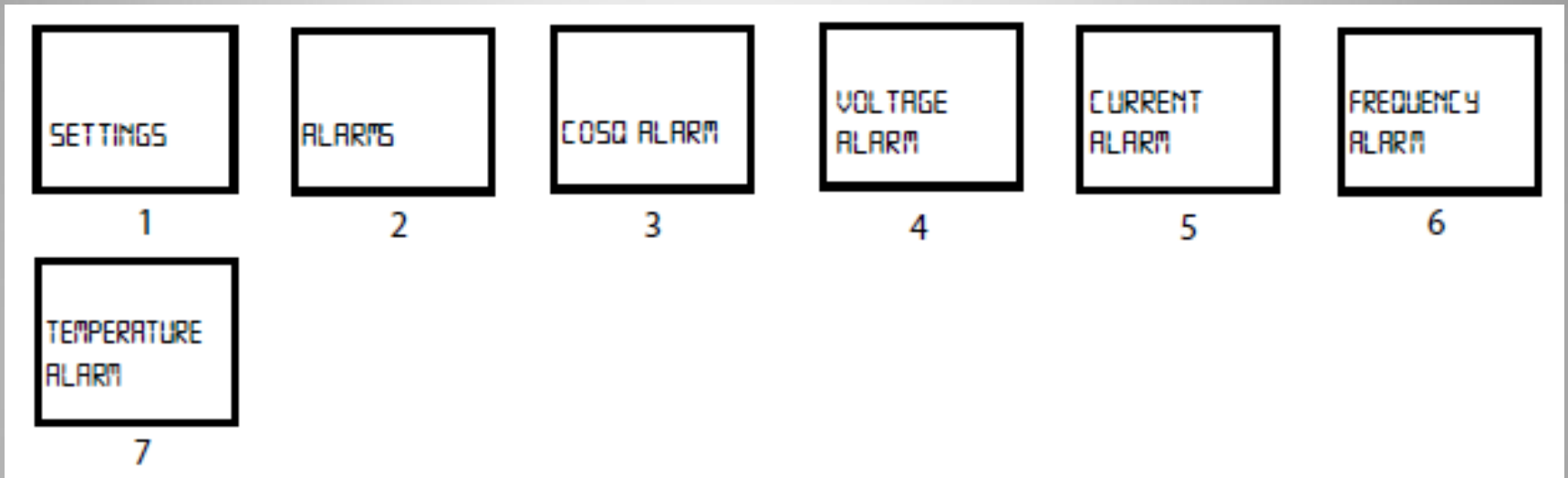
## Settings – Advanced



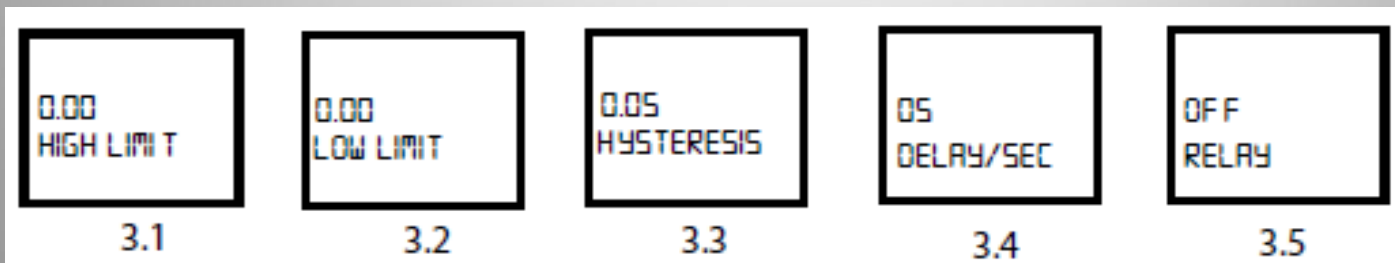
- 7) Input of the value of  $\cos\phi 2$ ;
- 8) Setting of the tolerance range of  $\cos\phi 2$  - value between 0.00 and 0.20;
- 9) Delay to enable the requested stage. Time between 1 and 600 seconds;
- 10) Delay to reactivate the stage. Time between 3 - 600 seconds;
- 11) Display backlight ON time (seconds);
- 12) Setting of the language to be used.

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## Settings - Alarms

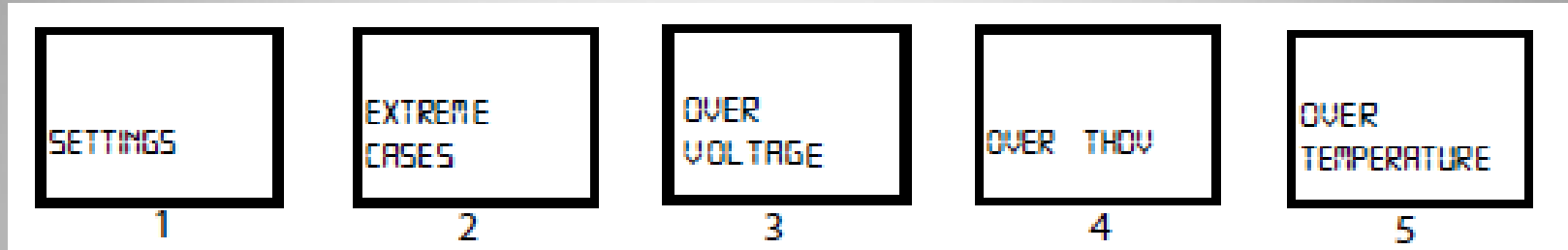


- 1) Main menu;
- 2) Alarm settings submenu;
- 3) In this menu, alarm triggering limits are set. When using this screen, the following submenu is displayed:

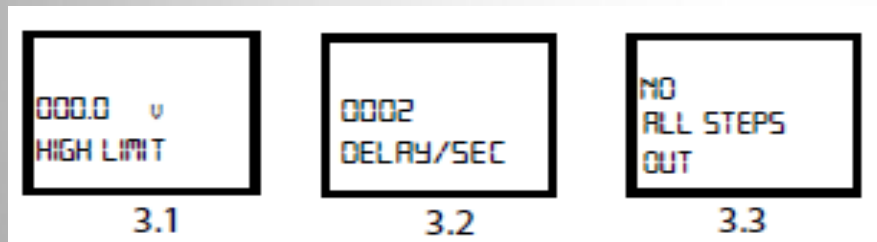


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## Settings - Extreme (critical) alarms



- 1) Main menu;
- 2) Critical alarm navigation menu;
- 3) Overvoltage setting. Navigate across the following submenus:

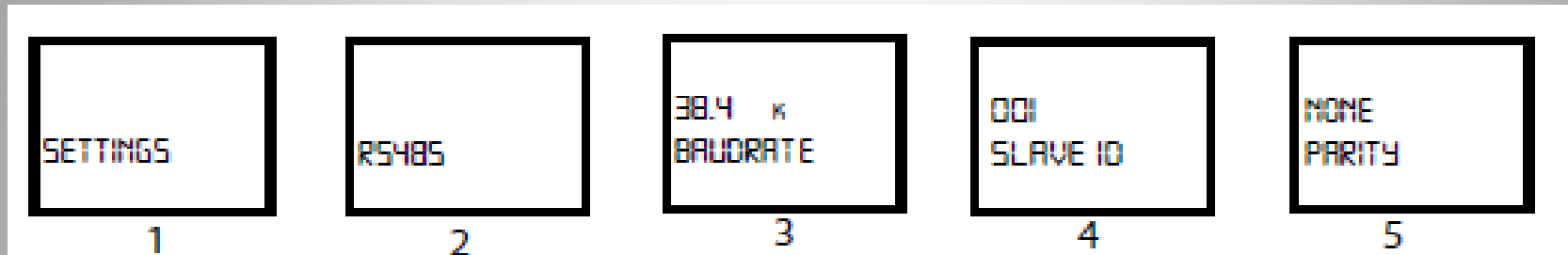


- 3.1) Setting of the alarm upper limit - range from 0 to 600;
- 3.2) Delay to trigger the alarm. From 0 to 9999 seconds;
- 3.3) When the upper limit is exceeded and the delay ends, all the stages are switched off at intervals of 10 seconds each;
- 4) THDV upper limit from 0 to 100%;
- 5) Temperature upper limit from 0 to 100 °C;



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## Settings - Communication

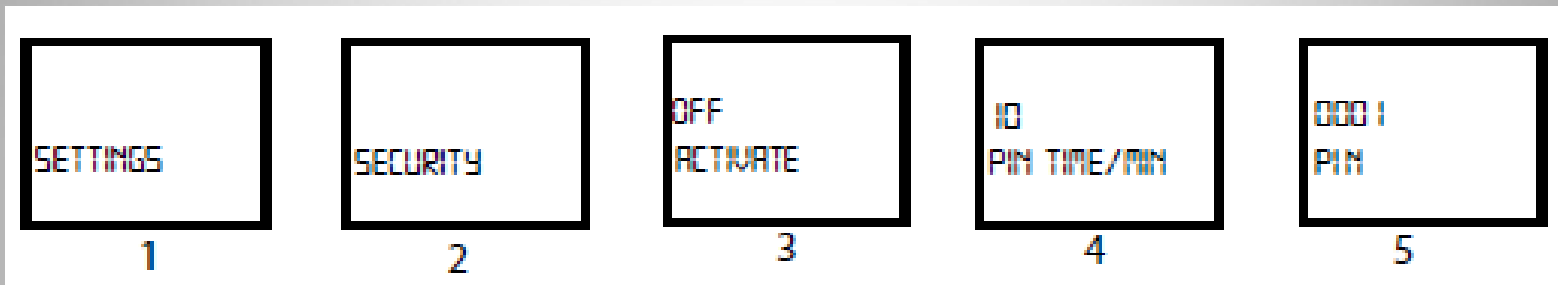


- 1) Settings menu;
- 2) RS485 menu;
- 3) Setting of the baud rate: speeds of 1200, 2400, 4800, 9600, 19200 and 38400 bits/second;
- 4) Slave ID: selectable address 1 - 247;
- 5) Parity: odd, even, none.



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## Settings - safety

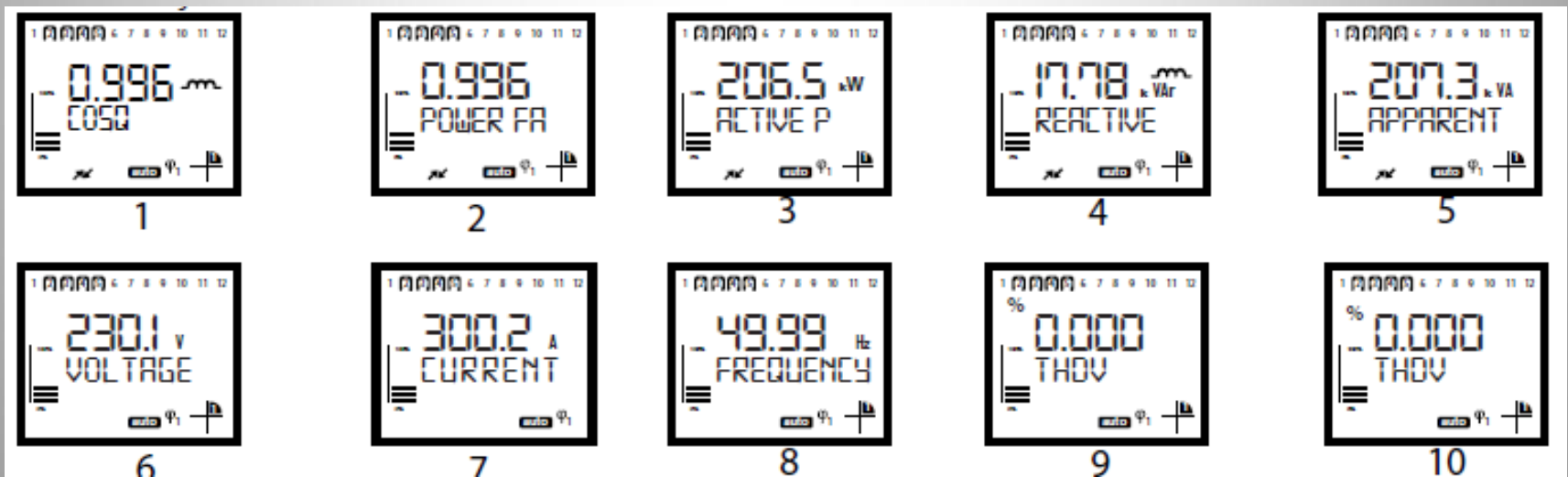


- 1) Settings menu;
- 2) Safety menu;
- 3) Password protection is enabled or not;
- 4) Time between the input of the password and the request to enter the password again;
- 5) Setting of the password. The factory default password is "1"

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## Settings - instant menus

In the main menu, you navigates across the available instant reading values using the up and down keys.





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## Technical data

### SUPPLY

Voltage .....120...510V AC  $\pm 10\%$

Frequency .....45...65 Hz

### MEASUREMENT INPUTS

Voltage .....120...510V AC  $\pm 10\%$  (L-N)

120...510V AC  $\pm 10\%$  (L-)

Current ..... 10mA...6A AC

GEN input..... 95...240V AC

### RELAY OUTPUTS FOR COMPENSATION

8 stages

Max. switching voltage..: 250 VAC

Max. switching current. : 1,5A

### ALARM RELAY OUTPUTS

2 pcs,

Max. switching current...: 4 A

Max. switching voltage....: 250 VAC

Max. switching power....: 1250 VA

### COMMUNICATION

Isolated RS485 Port.....: 1 Channel,

Baud Rate.....:1200 bps to 38400

Isolation.....:2000VRMS

### OPERATING TEMPERATURE/ STORAGE

### TEMPERATURE / RELATIVE HUMIDITY

-20°C..+55°C / -30°C..+80°C / maximum 95%

No Condensation

### PROTECTION CLASS

Front panel ..... : IP40

Rear cover ..... : IP20

### POWER CONSUMPTION

<10VA



# WEG Drives & Controls

Thank you!