



PFW03-T12

PFW03-T24

Automatic Power Factor Controller



PFW03-T12_24

Overview

- Reading for PF correction in three phases;
- Applicable to balanced and unbalanced lines;
- Compensation for 12 and 24 steps;
- Steps can be capacitive or inductive;
- Reads and learns connection types;
- Reads and learns step types and powers;
- Registers numbers of switches and service time of each step;
- 6 different modes of reactive power compensation;
- Monitors the step dynamically. Checks if any step is faulty (only for 12 steps);



PFW03-T12_24

Overview

- Allows testing the steps via manual actuation of the relays;
- Automatic calculation of C/k;
 - RESPONSE VALUE C/K:
Represents the minimum step to be inserted by the controller.

$$\frac{C}{k} = \frac{Q}{\sqrt{3} \cdot U \cdot k_{tc}}$$

C = Lowest current among the steps;
K or K_{ct}= CT ratio;
Q = Lowest power among the steps;
U = line voltage (V);



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Overview

- Measures and calculates:
 - Current, voltage and frequency;
 - Active, reactive and apparent power;
 - Voltage and current harmonics up to the 51st order;
 - THDV, THDI;
 - Power factor and $\cos\phi$;

➤ All values above per phase
- Alarm setting and saving of the last 50 alarms;
- Allows setting an alternate power factor using a digital input;




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Overview

- Saves active and reactive energy values hourly, of the previous hour, daily, of the previous day, monthly, of the previous month;
- Import and export energy meter (kWh and kvarh) with the choice of setting the start counting value and saving the records in real time;
- Phasor diagram and bar graph of harmonics;
- 2 alarm output relays;
- RS485 communication port, 2000 VRMS insulation;
- Graphic LCD display and 6 keys
- 4-digit access password;
- Real time clock;





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Technical data

Supply

Voltage.....95...272 V AC

Frequency.....45-65 Hz

Measurement Inputs

Voltage.....95...272V AC +_ 10% (L-N)

.....164...471V AC +_ 10% (L-L)

Current..... 0.01...6 A RMS

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

Night/Day Input. 95...240 VAC RMS

Relay Outputs for Compensation

12/24 pcs.,

Max. switching voltage... : 250 VAC

Max. switching current..... : 2A

Alarm Relay Outputs:

2 pcs,

Max. switching current.....: 4A

Max. switching voltage.....: 250 VAC

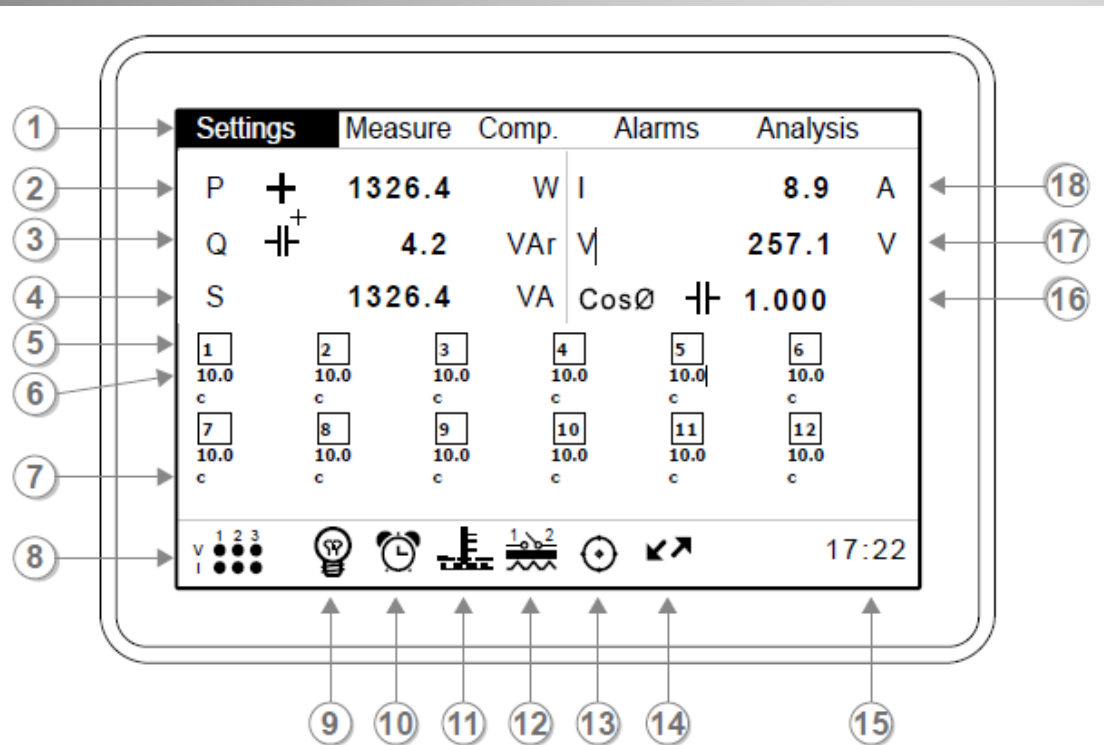
Max. switching power..... : 1250 VA

Protection class

IP40 front, IP20 rear

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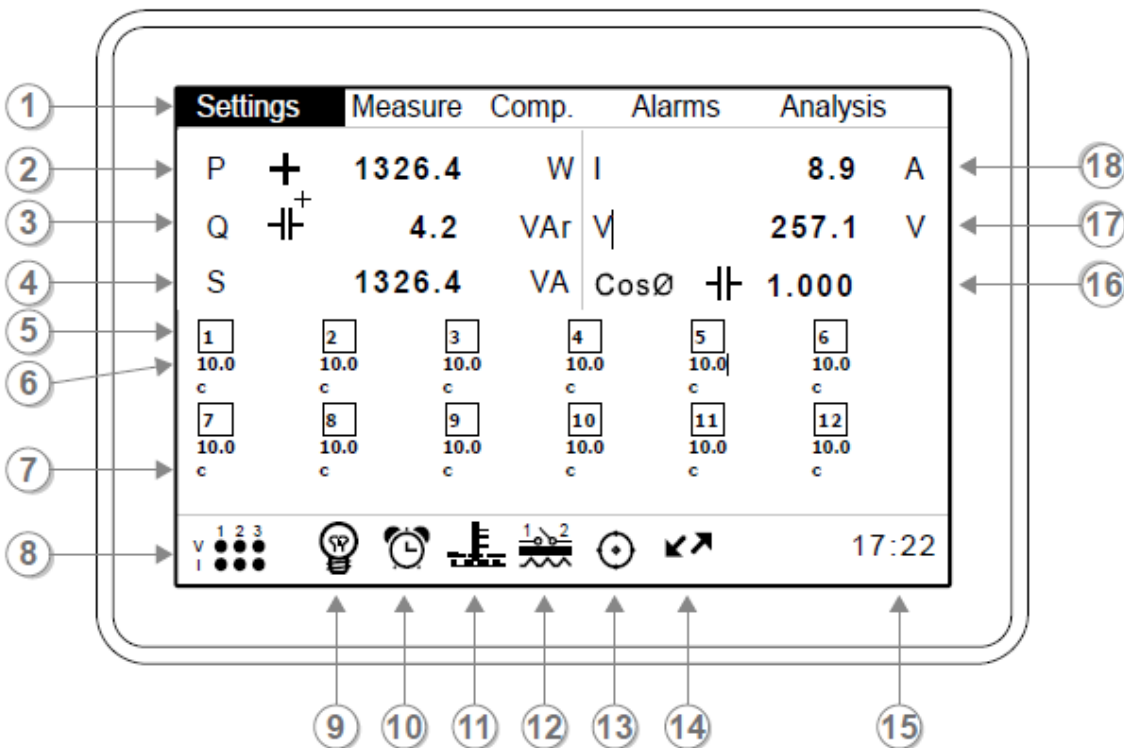
Description of the display functions



1. Menus
2. Total active power;
3. Total reactive power;
4. Total apparent power;
5. Step number;
6. Step power;
7. Step type (C or I);
8. Voltage and current presence indication;
9. Compensation mode selected;
10. Alarm indication enable;
11. Indication of temperature alarm enabled;

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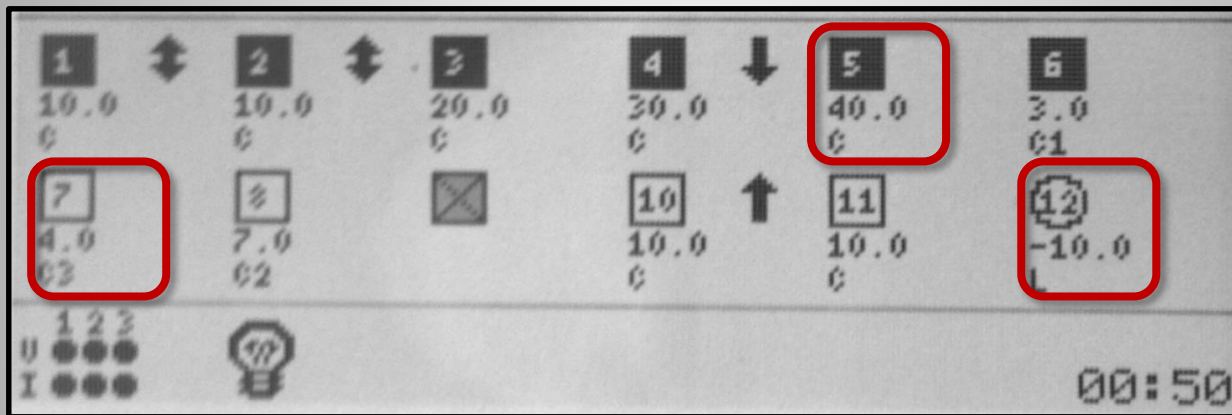
Description of the display functions



- 12. Alarm relay enabled;
- 13. Dynamic step monitoring mode-DCM enabled;
- 14. RS485 communication enabled;
- 15. Clock;
- 16. System CosΦ
- 17. Average line voltage (F-F);
- 18. Total current (3F);

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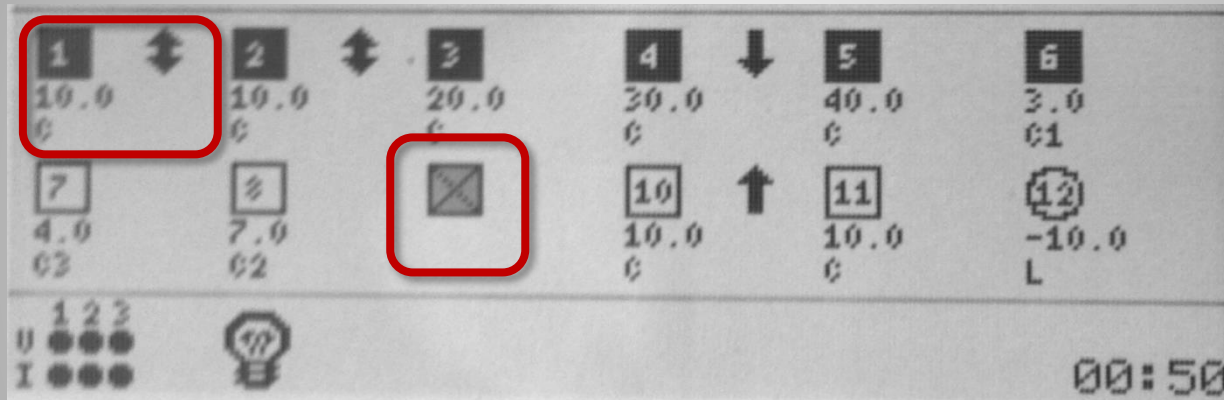
Description of the display functions



- Step types - C or L;
- Step powers - kvar;
- Status - step enabled or not;
- Connection types - e.g.: C3 is the single-phase capacitor in phase 3

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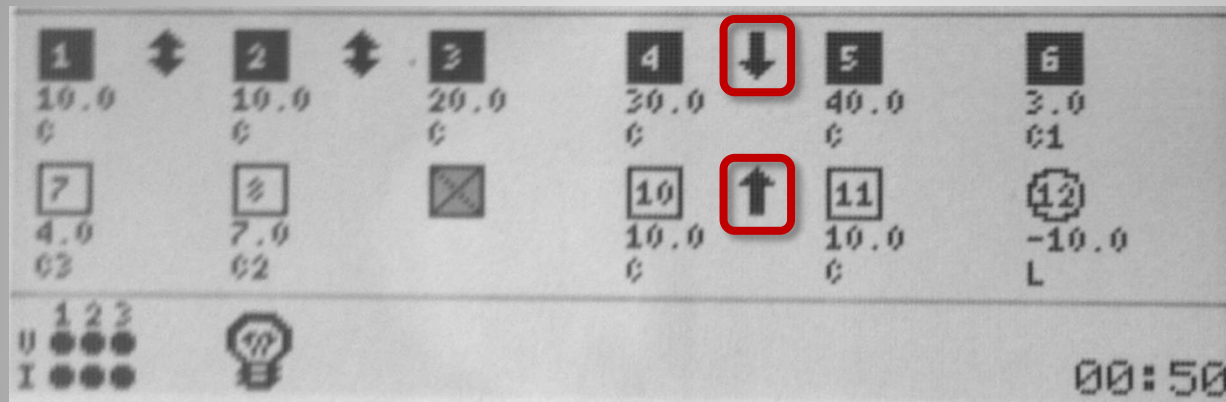
Description of the display functions



- Step availability

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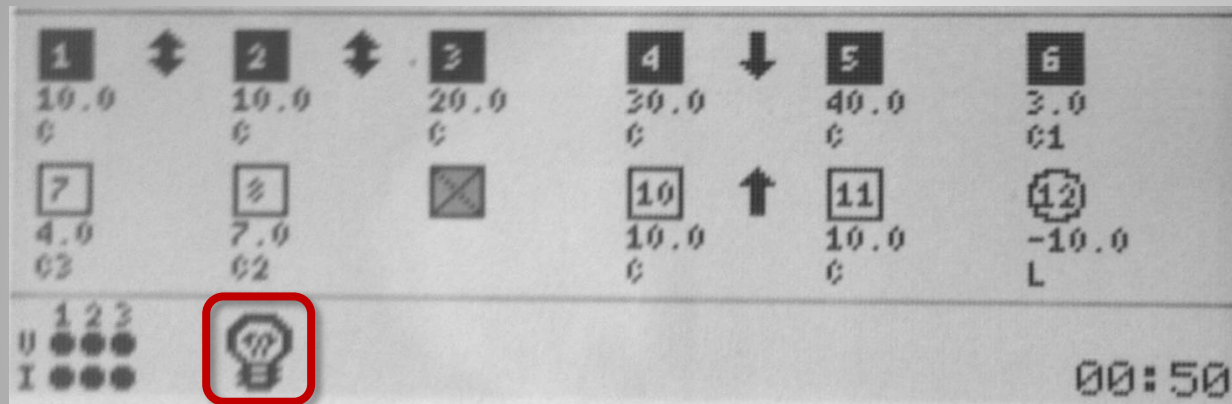
Description of the display functions



- Step availability

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Description of the display functions

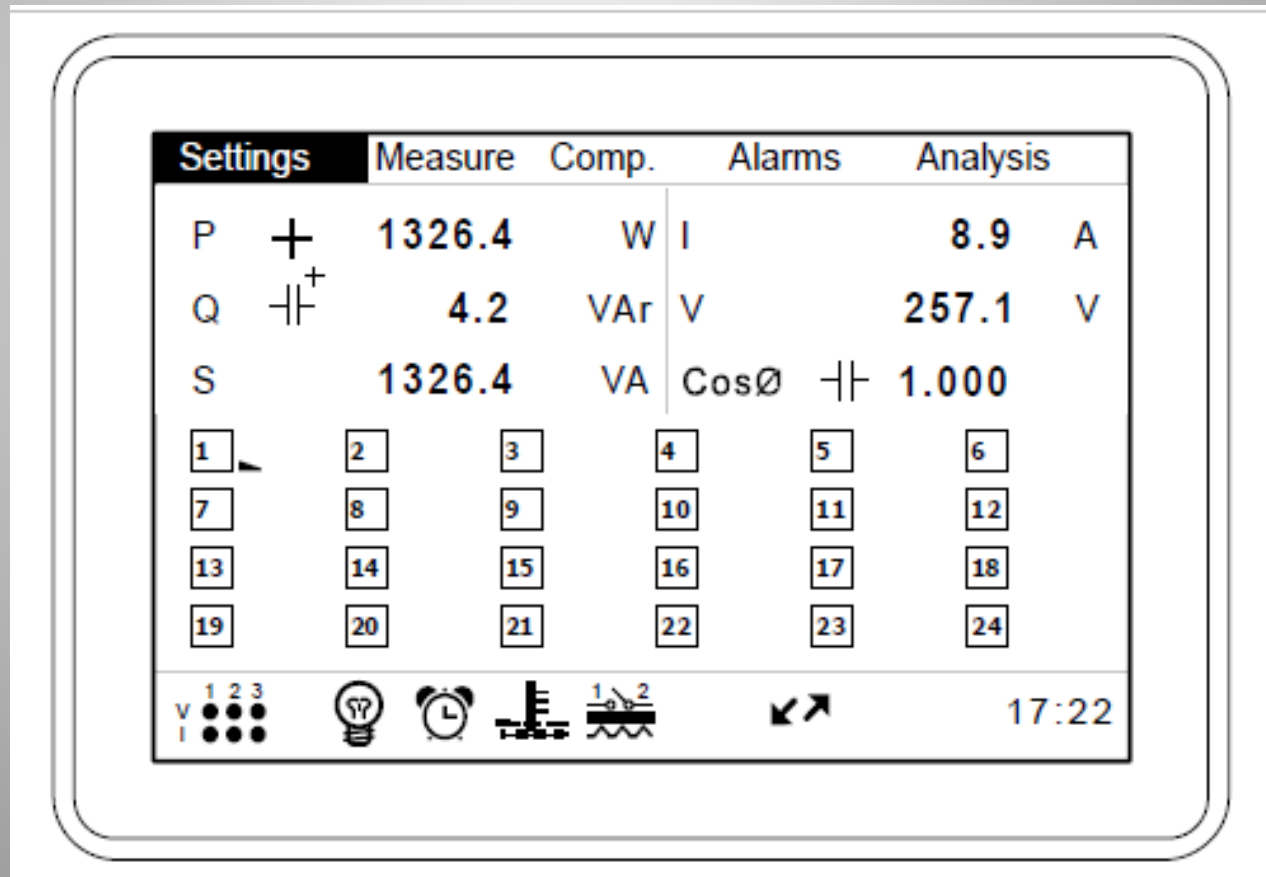


- Compensation mode indication configured

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Description of the display functions - 24 steps

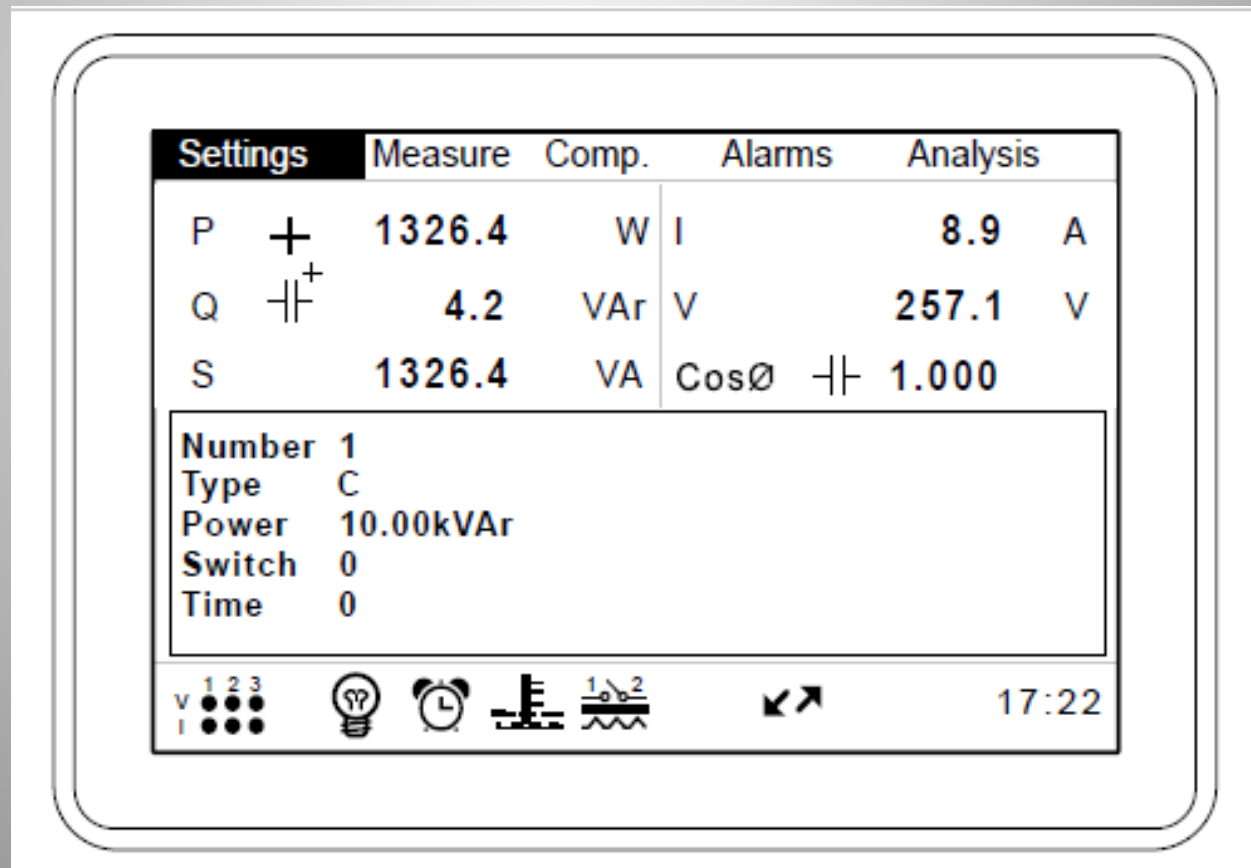
If the operator presses the "down" key, the reading of each step is enabled.



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Description of the display functions - 24 steps

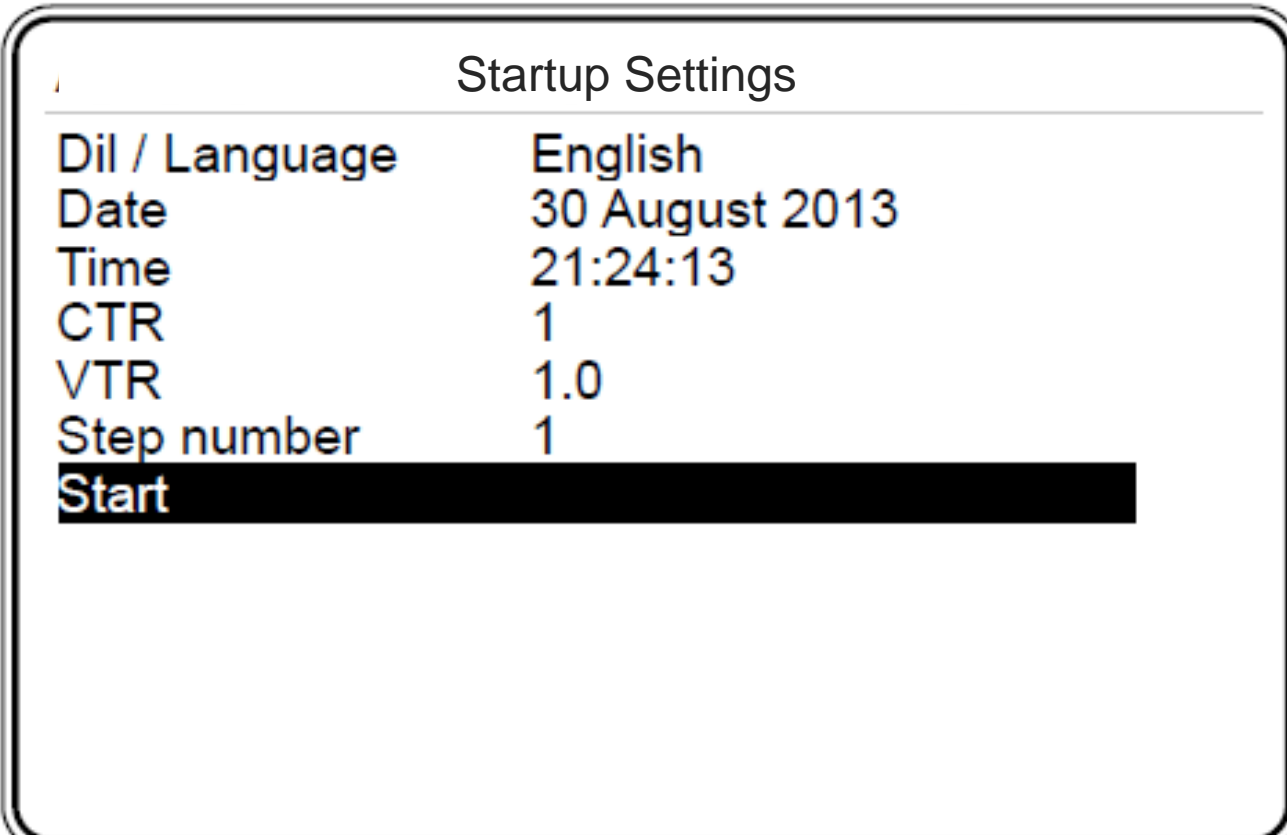
In the step menu, press the right and left keys to navigate across the steps. After choosing one, press OK to display the following screen:



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Settings - Startup - 1st power-on

When you turn on the PFW03 for the first time, the following screen will be displayed:

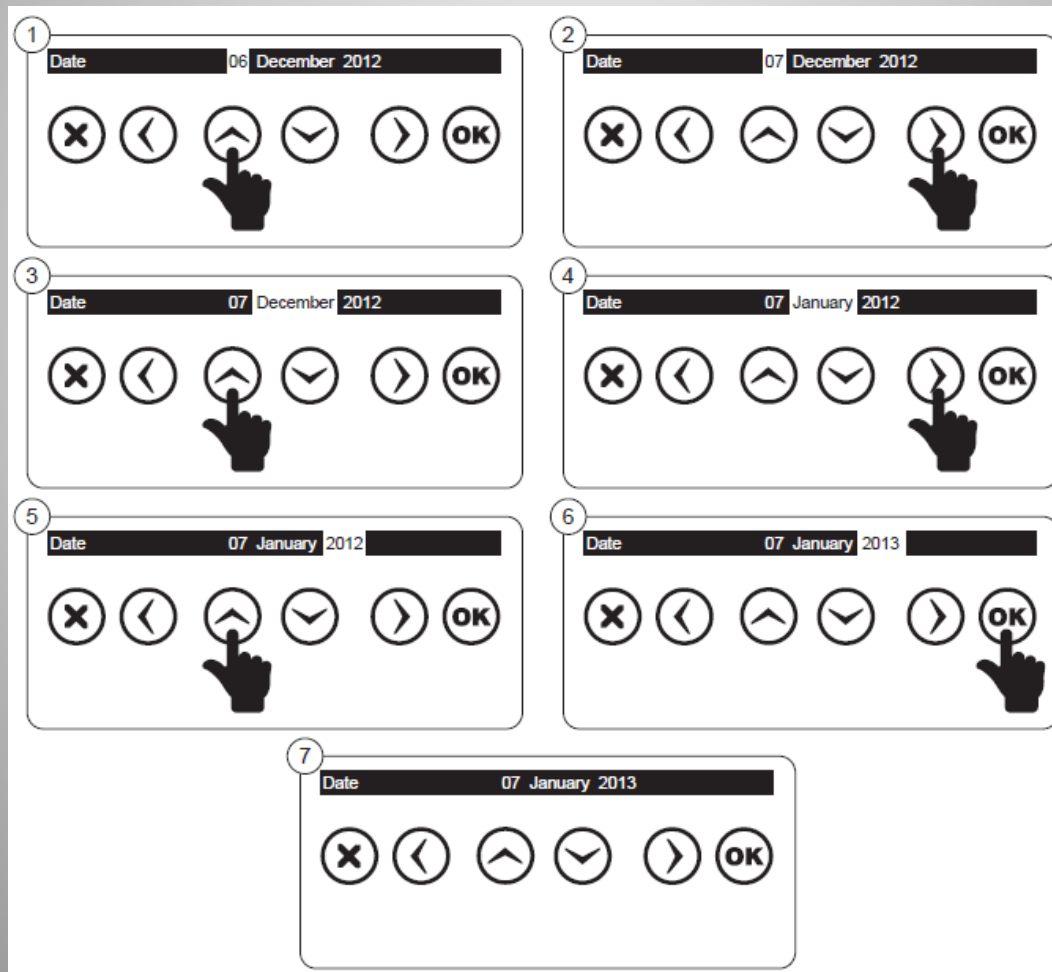
A screenshot of a device's startup settings screen. The screen has a white background with a black border. At the top, the title "Startup Settings" is centered. Below the title, there is a list of settings: "Dil / Language" set to "English", "Date" set to "30 August 2013", "Time" set to "21:24:13", "CTR" set to "1", "VTR" set to "1.0", and "Step number" set to "1". At the bottom, the word "Start" is displayed in a black box.

Startup Settings	
Dil / Language	English
Date	30 August 2013
Time	21:24:13
CTR	1
VTR	1.0
Step number	1
Start	

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Settings - Startup - 1st power-on

Use the keys to set the date:



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Settings - Startup - 1st power-on

Use the virtual keyboard to set the current transformer ratio - CTR:

Startup Settings

Dil / Language	English
Date	30 Aug
Time	17:25:
CTR	1
VTR	1.0
Connection	Phas
Step number	1
Start	

1

1	2	3	4
5	6	7	8
9	0	.	-
ok		clr	

Low limit
1

High limit
5000

- Press the OK key to open the virtual keyboard and enter the numbers;
- After entering the numbers, press OK on the virtual keyboard to confirm.

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Settings - Startup - 1st power-on

Use the virtual keyboard to set the voltage transformer ratio - VTR:

Startup Settings

Language	English
Date	07 Jan
Time	17:45:
CTR	1
VTR	1.0
Connection	3phase
Start	

1			
1	2	3	4
5	6	7	8
9	0	.	-
ok		clr	
Low limit 1.0			
High limit 5000.0			

- Press the OK key to open the virtual keyboard and enter the numbers;
- Use the virtual keyboard to enter the decimal point;

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Settings - Startup - 1st power-on

In this menu, you define the number of steps to be used.
The Learning function only works for three-phase capacitors.

Startup Settings

Dil / Language	English
Date	30 Aug
Time	21:24:
CTR	20
VTR	1.0
Step number	1
Start	

1

1	2	3	4
5	6	7	8
9	0	.	-
ok		clr	

Low limit
1

High limit
12

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Settings - Startup - 1st power-on - End

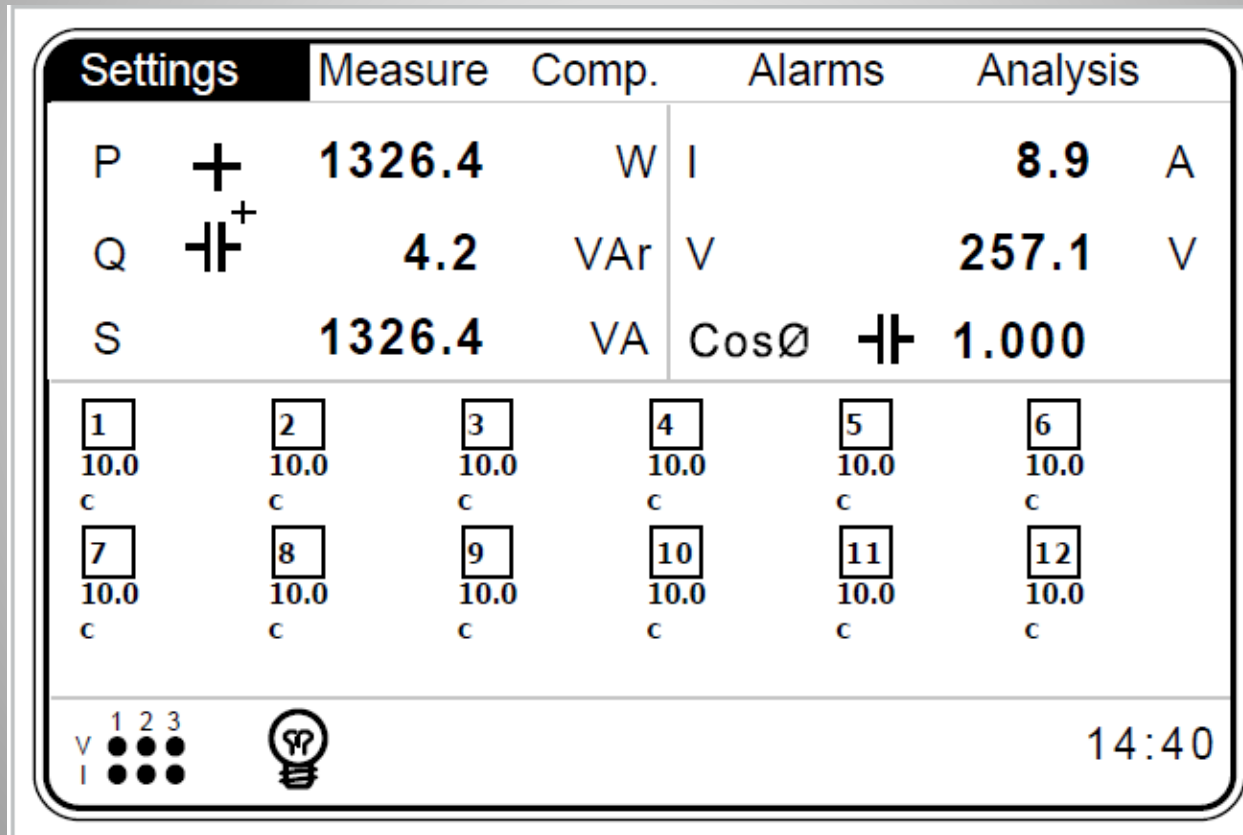
Startup Settings	
Dil / Language	English
Date	30 August 2013
Time	21:24:13
CTR	20
VTR	1.0
Step number	1
Start	
Initializing	

NOTE: the startup settings page is automatically shown the first time the PFW-03 is turned on.

After that, use the available menus to access it.

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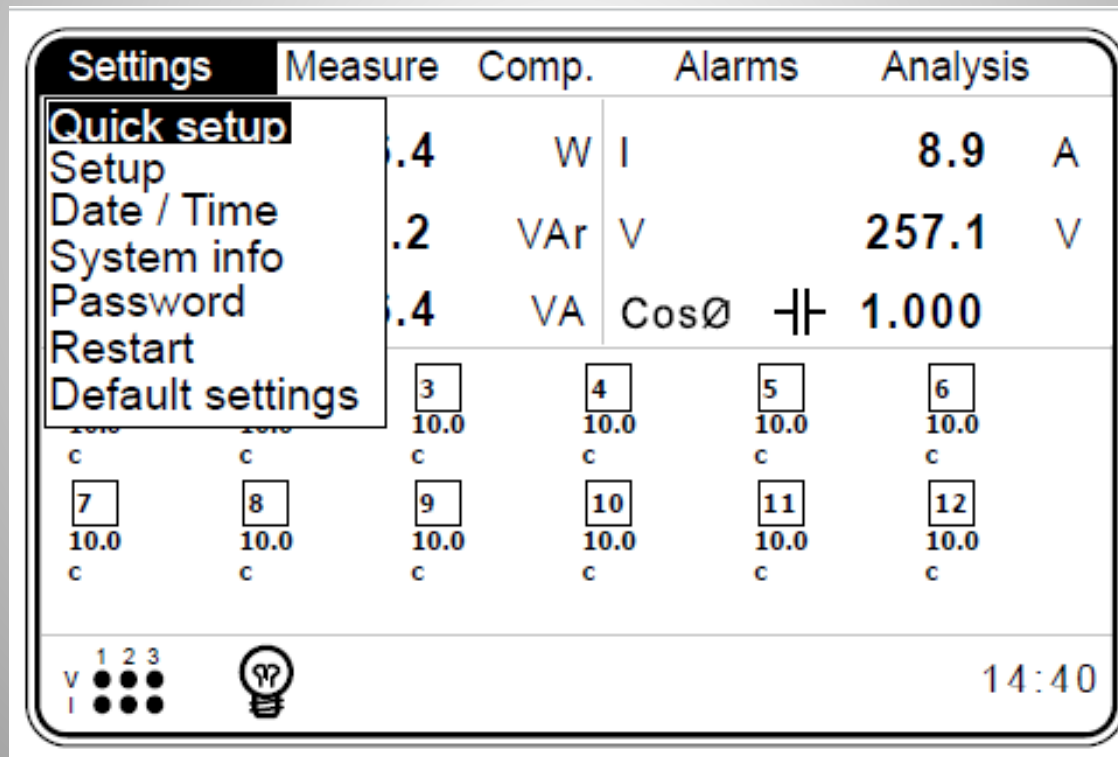
PFW home screen



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Settings Menu - Quick setup

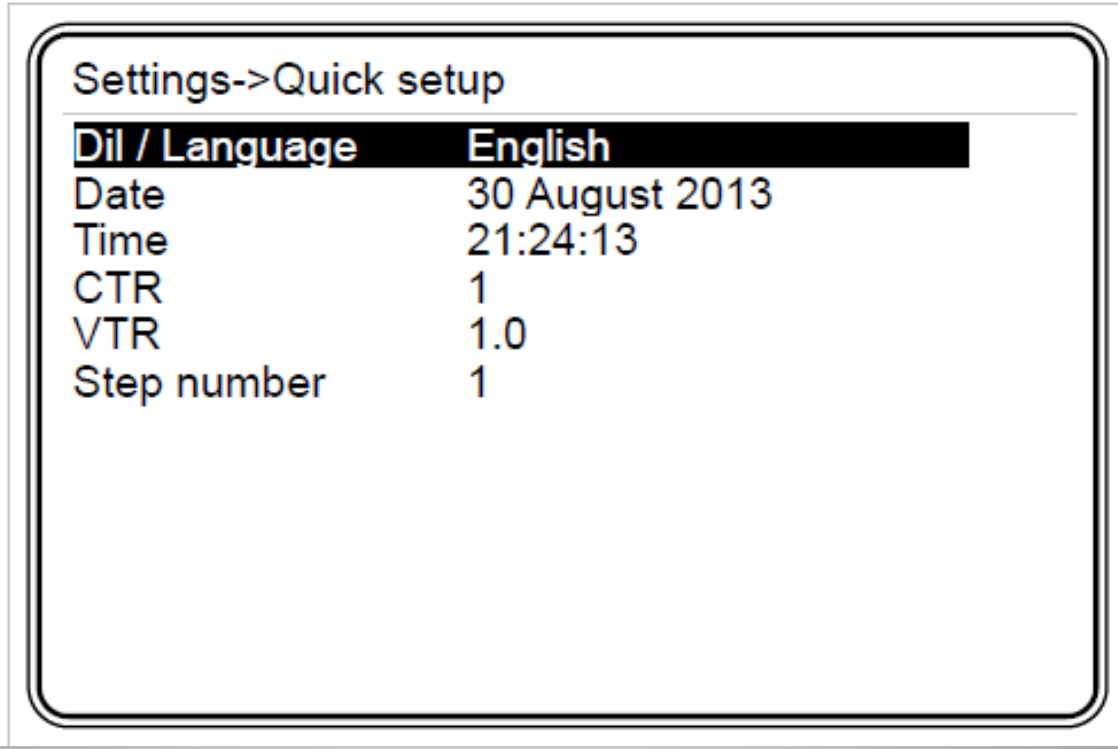
In this menu, the PFW03 is set.



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Settings Menu - Quick setup

The Quick setup has the following submenus:



A screenshot of a device's settings menu, specifically the 'Quick setup' section. The menu is displayed within a rounded rectangular frame. At the top, the title 'Settings->Quick setup' is shown. Below the title, a list of settings is presented in a two-column format. The first column lists the settings, and the second column shows their current values. The 'Dil / Language' setting is highlighted with a black background and white text. The other settings are in white text on a black background.

Settings->Quick setup	
Dil / Language	English
Date	30 August 2013
Time	21:24:13
CTR	1
VTR	1.0
Step number	1

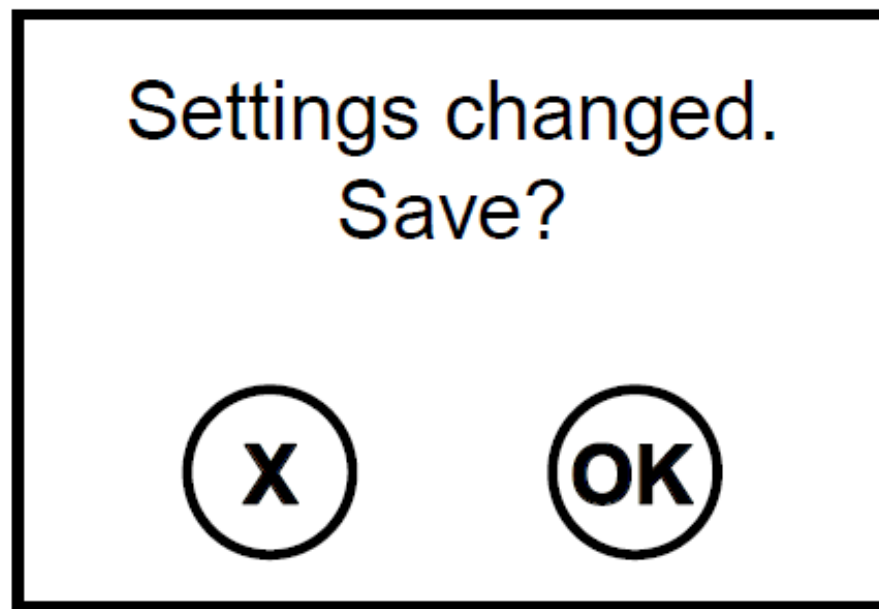


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Settings menu - Saving the settings

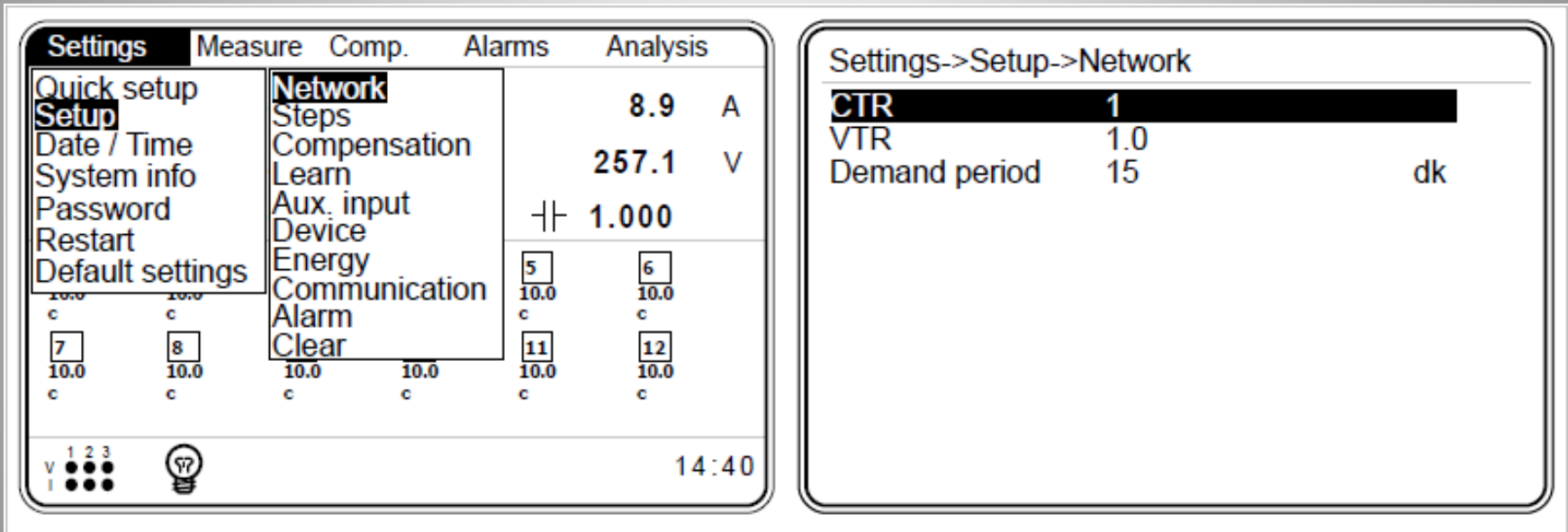
After setting the menus and submenus, confirm the changes by pressing the OK key when exiting the Settings menu.

This operation will always be requested when changes are made to the PFW settings.



1. Introduction

M	C	A	A	L	L
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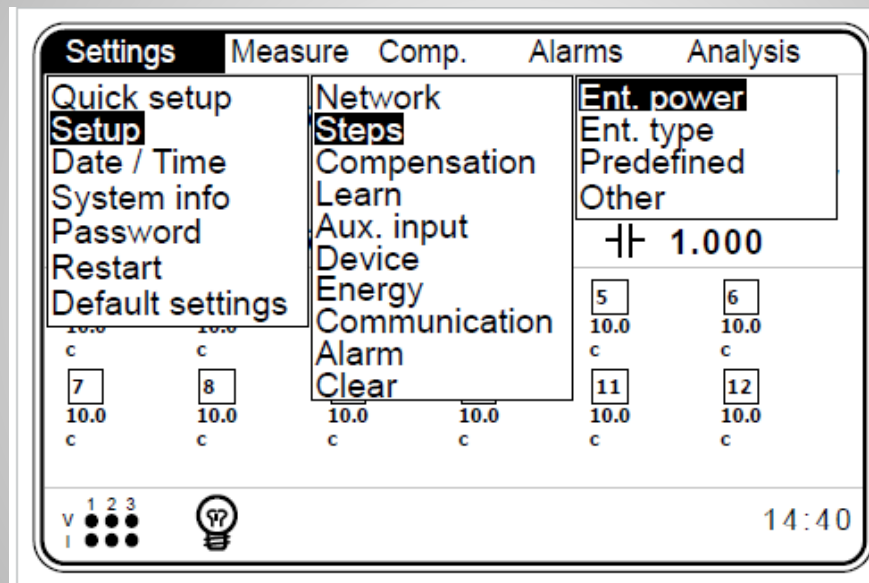


- CTR - CT turn ratio - Select between 1 and 5000.
- VTR - PT turn ratio - Select between 1.0 and 5000.0.
- Demand - Definition of the demand calculation time - 1 to 60 min.

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Menu Settings – Setup – Steps – Ent. power

In this menu, the following submenus are available:



- Note: the PFW03-T24 has two power inputs. In the "Ent. Power 1" submenu, the operator enters the powers into the 1st, 2nd...12th steps, and in the second Submenu "Power 2", into the 13th, 14th...24th steps.

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Menu Settings – Setup – Steps – Ent. power

For steps learned in the Learning mode, the powers are shown as below. The user can also change them manually in this menu.

Settings->Setup->Steps->Ent. power

Step 1	10.00	10.00
Step 2	10.00	
Step 3	10.00	
Step4	10.00	
Step 5	10.00	
Step 6	10.00	
Step 7	10.00	
Step 8	10.00	
Step 9	10.00	
Step 10	10.00	
Step 11	10.00	
Step 12	10.00	

1234

5678

90.-

okclr

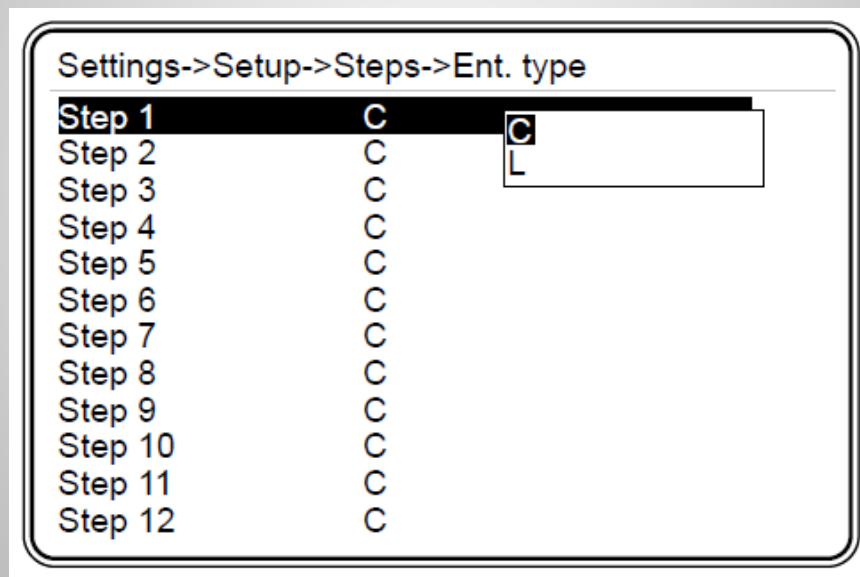
Low limit
0.00

High limit
1000.00

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Menu Settings – Setup – Steps – Ent. Type

For steps learned in the Learning mode, the types of reactive powers are shown as below. The user can also change them manually in this menu.



Step 1	C	C
Step 2	C	
Step 3	C	
Step 4	C	
Step 5	C	
Step 6	C	
Step 7	C	
Step 8	C	
Step 9	C	
Step 10	C	
Step 11	C	
Step 12	C	

Note: the user must always check that the PFW03 has read and recorded the values of the steps correctly. If not, follow one of the procedures below:

- Start the LEARN function again;
- Manually redo the step values;

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Menu Settings – Setup – Steps – Predefined

The steps can be configured by a predefined structure according to the submenus below:

Settings->Setup->Steps->Predefined			
Structure	1 - 1 - 1 - 1	1 - 1 - 1 - 1	
Power	10.00	1 - 1 - 2 - 2	
Count	12	1 - 2 - 2 - 4	
		1 - 2 - 3 - 3	
		1 - 2 - 4 - 4	
		1 - 1 - 2 - 4	
		1 - 2 - 3 - 4	
		1 - 2 - 4 - 8	
		1 - 1 - 2 - 3	

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Menu Settings – Setup – Steps – Predefined

■ Example:

Consider that structure 1.2.4.8 was selected, 10 kVAR is the power set and 8 is the number of steps.

Therefore, the steps will be:

- 1st step: 10 kVAR
- 2nd step: 20 kVAR
- 3rd step: 40 kVAR
- 4th step: 80 kVAR
- 5th step: 80 kVAR
- 6th step: 80 kVAR
- 7th step: 80 kVAR
- 8th step: 80 kVAR

Settings->Setup->Steps->Predefined				
Structure	1 - 1 - 1 - 1	1 - 1 - 1 - 1	1 - 1 - 1 - 1	1 - 1 - 1 - 1
Power	10.00	1 - 1 - 2 - 2	1 - 2 - 2 - 4	1 - 2 - 3 - 3
Count	12	1 - 2 - 4 - 4	1 - 1 - 2 - 4	1 - 2 - 3 - 4
		1 - 2 - 4 - 8	1 - 1 - 2 - 3	

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Menu Settings – Setup – Steps – Other

The discharge time is set in this menu.

The PFW03 waits for the discharge time to reactivate a step. It varies from 3 to 1000 sec.

The screenshot shows a menu interface for the PFW03-T12_24 device. The menu path is "Settings->Setup->Steps->Other". The "Discharge time" is currently set to 15. A numeric keypad is visible, with the number 15 entered. Below the keypad, the "Low limit" is set to 3 and the "High limit" is set to 1000.

Settings->Setup->Steps->Other			
Discharge time		15	
1	2	3	4
5	6	7	8
9	0	.	-
ok		clr	
Low limit		3	
High limit		1000	

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Menu Settings – Setup – Compensation

The Compensation menu is composed of the following menus:

Settings->Setup->Compensation		
Steps	Entered	
Program	Smart	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Steps

- There are 3 methods for defining the types and powers of the steps:

- **Entered:** the values are manually entered;
- **Predefined:** the values are entered as previously explained.

- **DCM (Dynamic Capacitor Monitoring):**

- The PFW03 dynamically monitors the values of the steps.

Thus, the correction of reactive powers will be done using the effectively available powers in the steps.

- **NOTE:** DCM (Dynamic Capacitor Monitoring) is only available on the PFW03-T12.


Settings->Setup->Compensation		
Steps	Entered	
Program	Smart	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Program

The reactive power compensation can be done by six different programs according to the submenu below:

Settings->Setup->Compensation		
Steps	Entered	Smart
Program	Smart	Asc. sequential Des. sequential Linear Circular Manual
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	



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Menu Settings – Setup – Compensation – Program

Smart Mode:

- This mode activates the closest step(s) to the reactive demand required to correct $\text{Cos}\Phi$.

Ascending Sequential:


- The activation and deactivation of the steps is done starting from the smallest step.

Note: all steps must have three-phase inductors or capacitors.

Descending Sequential :

- Activation and deactivation of the steps start from the biggest step close to the demand.

Note: all steps must have three-phase inductors or capacitors



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Menu Settings – Setup – Compensation – Program

Linear Mode:

- The first enabled step is the last one to be disabled (FILO);

Note: this program only applies to the 1.1.1.1 step structure and three-phase inductors and capacitors

Circular Mode:

- The first enabled step is the first one to be disabled (FIFO);

Note: this program only applies to the 1.1.1.1 step structure and three-phase inductors and capacitors

Manual Mode:

- The steps are enabled and disabled manually;

When this program is enabled, a "Hand" is displayed in the lower left corner of the main page.

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Menu Settings – Setup – Compensation – Target 1

- The Target 1 Cos Φ value is set in this menu. It may range from -0.8 (capacitive) to 0.8 (inductive).

Settings->Setup->Compensation		
Steps	Entered	
Program	Rapidus	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Target 2

- The Target 2 Cos Φ value is set in this menu. It may range from 0.800 (inductive) to 1.000.
 - This feature is triggered by one of the functions:
 - Night/day
 - Generator
 - GEN input activated by a voltage signal between 85 and 265 VAC.
- * See Settings – Setup – Aux. input

Settings->Setup->Compensation		
Steps	Entered	
Program	Rapidus	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Low/High lim.

- Target low limit: lower tolerance for target 1 and target 2. Adjustable from 0.000 to 0.200.
- Target high limit: higher tolerance for target 1 and target 2. Adjustable from 0.000 to 0.200.

Settings->Setup->Compensation		
Steps	Entered	
Program	Rapidus	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Activation time

- Activation Time: delay to enable the step. Adjustable from 1 to 600 seconds.

Settings->Setup->Compensation		
Steps	Entered	
Program	Rapidus	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Deactivation time

- Deactivation Time: delay to disable the step. Adjustable from 1 to 600 seconds.

Settings->Setup->Compensation		
Steps	Entered	
Program	Rapidus	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Shift angle

- Shift Angle: inclusion of transformer losses that are not measured into the compensation of reactive powers.
- **E.g.:**
 - Considering $\cos\phi = 1.000$.
 - If the user enters 20° as the shift angle, the PFW03 will calculate the value of $\cos\phi$ as 0.940 inductive.
 - If you use -30° as the shift angle, the value of $\cos\phi$ will be 0.866 capacitive

Settings->Setup->Compensation		
Steps	Entered	
Program	Rapidus	
Target 1	1.000	
Target 2	0.900	
Target low lim.	0.002	
Target high lim.	0.002	
Activation time	10	sec.
Deactivation time	10	sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Averaging time

- Averaging Time: if the operator does not need a quick response from the PFW03, use this menu to adjust the equipment.
- The PFW03 uses the calculated average power related to the interval set (5 sec - 60 sec). Immediately after the time set has elapsed, the reactive power compensation will be done according to the calculated average power.

Settings->Setup->Compensation

Steps	Entered	Off
Program	Rapidus	5 sec.
Target 1	1.000	10 sec.
Target 2	0.900	20 sec.
Target low lim.	0.002	30 sec.
Target high lim.	0.002	40 sec.
Activation time	10	50 sec.
Deactivation time	10	60 sec.
Shift angle	0.00	
Averaging time	Off	
Fixed steps	None	

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Menu Settings – Setup – Compensation – Fixed steps

- Fixed steps: the first three steps of the PFW03 can be fixed.
- In the main menu, the symbol "↕" will be displayed next to the steps defined as fixed.

Settings->Setup->Compensation

Steps	Entered
Program	Rapidus
Target 1	1.000
Target 2	0.900
Target low lim.	0.002
Target high lim.	0.002
Activation time	10 sec.
Deactivation time	10 sec.
Shift angle	0.00
Averaging time	Off
Fixed steps	None

Settings		Measure	Comp.	Alarms	Analysis
P	+	1326.4	W	I	8.9 A
Q	⎓ ⁺	4.2	VA	V	257.1 V
S		1326.4	VA	CosØ	⎓ 1.000
1	↕	2	↕	3	↕
10.0		10.0		10.0	
c		c		c	
7		8		11	
10.0		10.0		10.0	
c		c		c	

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Menu Settings – Setup - Learn – Learn connection

- Learn connection:
 - On => The PFW03 automatically "learns" the executed connections when turned on or restarted;
 - Off => The PFW03 does not automatically "learn" the executed connections when turned on or restarted;

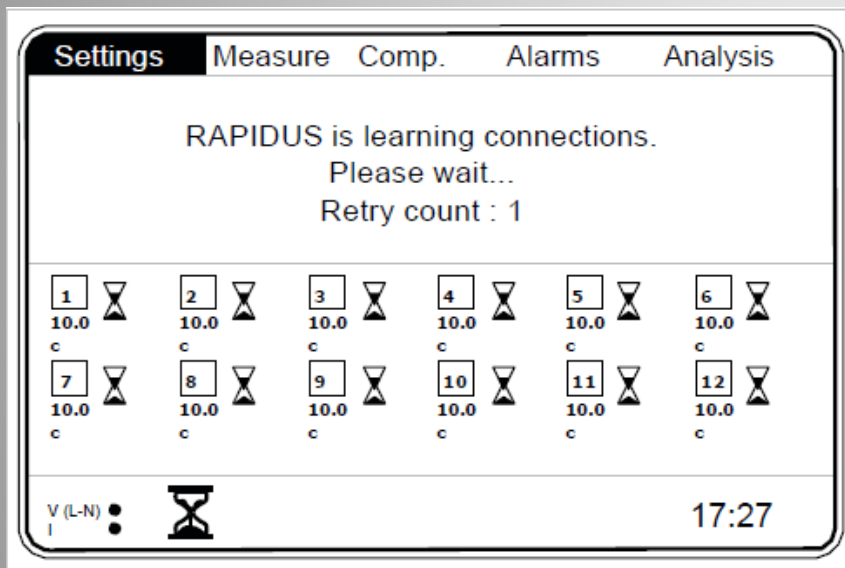
Settings->Setup->Learn->Learn conn.

Learn at start	Off	Off
Step number	1	On
Retry timer	5	
Retry count	3	

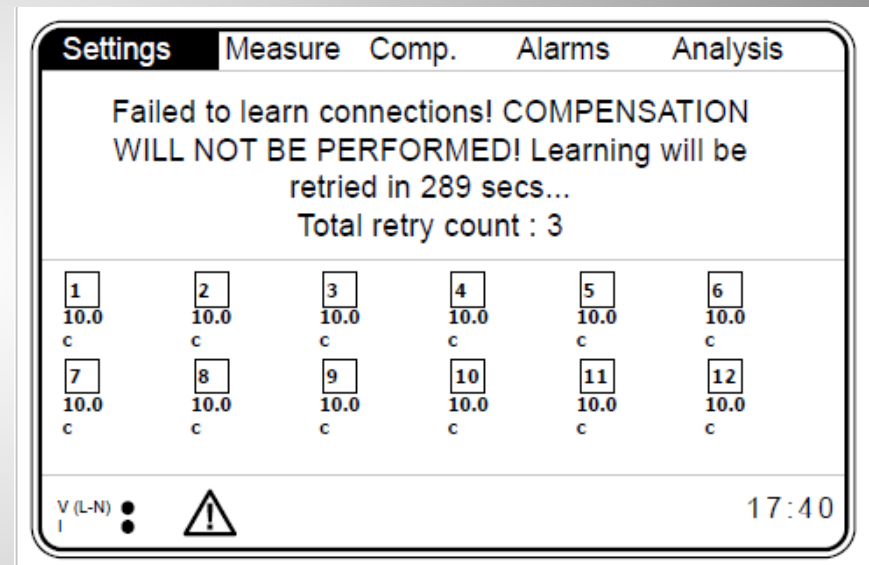
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Menu Settings – Setup - Learn – Learn connection

Learning connections



Learn connection not executed



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Menu Settings – Setup - Learn – Learn connection

- Step Number: this function is valid for three-phase capacitors

NOTE: it is advisable to enter the number of the step that has the highest installed power;

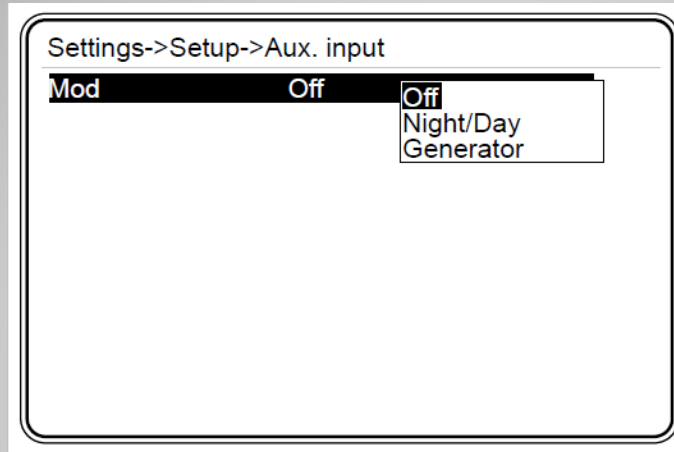
- Retry Timer: in case the PFW does not "learn" the connection, it will retry it after the time set in this menu;
- Retry count: when the PFW does not "learn", it will retry it according to the number set in this menu;

Settings->Setup->Learn->Learn conn.

Learn at start	Off	<input type="button" value="Off"/>
Step number	1	<input type="button" value="On"/>
Retry timer	5	
Retry count	3	

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Menu Settings – Setup – Aux. input



- The auxiliary input is used to activate the second option "target 2 cosØ" and to allow the use of the functions:
 - Night/Day: in this function, when the input is enabled, compensation is done as defined in TARGET 2. The energy meters remain counting.
 - Generator: in this function, when the input is enabled, compensation is done as defined in TARGET 2. The energy meters do not count while the input is enabled.

PFW03-T12_24

Menu Settings – Setup – Device

In this menu you set:

- Language
- Contrast
- Password protection
- New password
- Display on
- Display on time

Settings

Measure

Comp.

Alarms

Analysis

Quick setup

Setup

Date / Time

System info

Password

Restart

Default settings

Network

Steps

Compensation

Learn

Aux. input

Device

Energy

Communication

Alarm

Clear

8.9

257.1

1.000

5

6

11

12

A

V

10.0

10.0

10.0

10.0

7

8

10.0

10.0

10.0

10.0

1 2 3

V

I

14:40

Settings->Setup->Device

Language

English

Contrast

Level -3

Pass. protection

Off

New password

1

Display on

Time dependent

Display on time

600

sec.

PFW03-T12_24

Menu Settings – Setup – Energy

In this menu, you define the criteria for using the energy meters.

- Star of day: setting of the time to start the energy meters;
- Star of month: setting of the day of the month to start the energy meters;
- kWh; kwh E (export); kVArh I; kVArh C: implementation of start values of the meters;

Settings->Setup->Energy		
Start of day	0	
Start of month	1	
kWh	0.0	kWh
kWh E.	0.0	kWh
kVArh I.	0.0	kVArh
kVArh C.	0.0	kVArh

PFW03-T12_24

Menu Settings – Setup – Communication

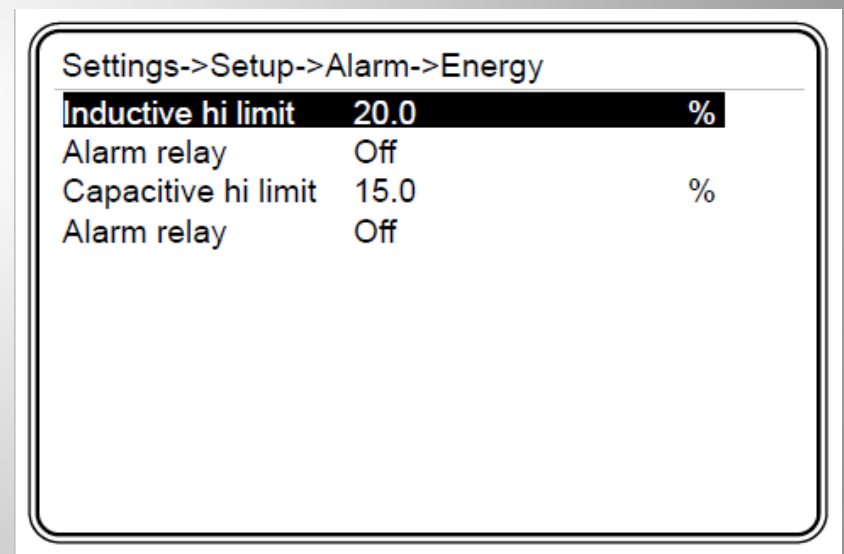
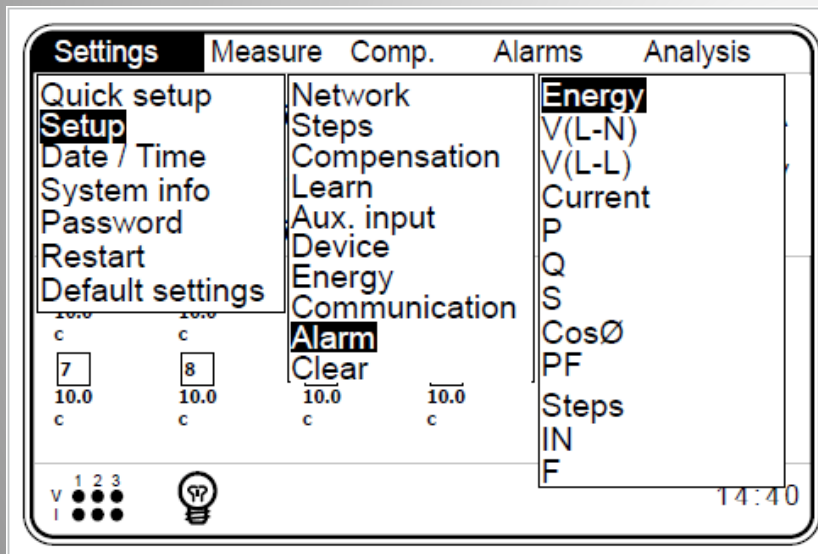
Communication parameters are set in this menu.

Settings->Setup->Communication	
Baud rate	38400
Slave Id	1
Parity	None
Stop bit	1 Stop

PFW03-T12_24

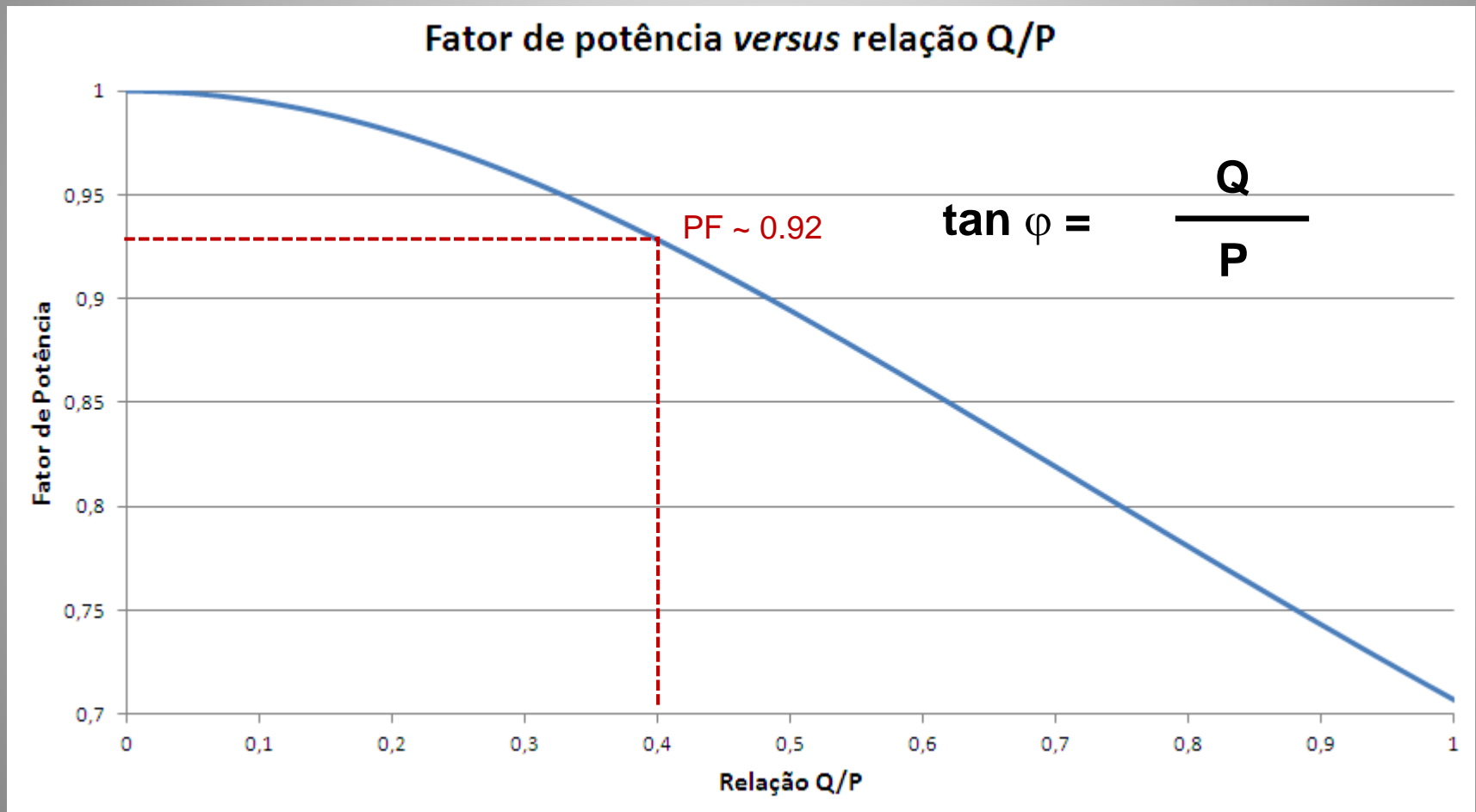
Menu Settings – Setup – Alarm-Energy

This menu is used to set the high limit alarm of the Inductive/Active and Capacitive/Active energy rates.



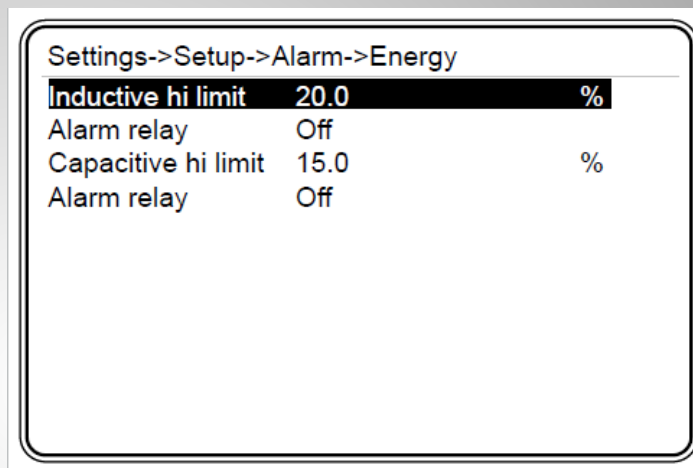
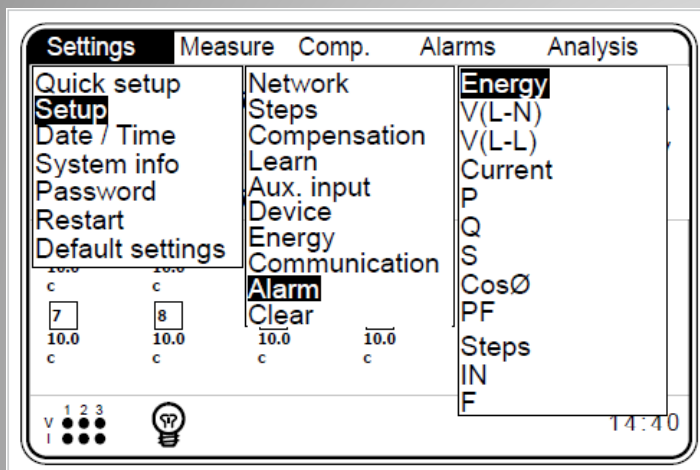
PFW03-T12_24

Description of the display functions



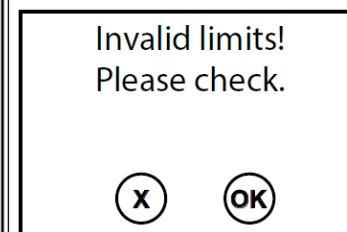
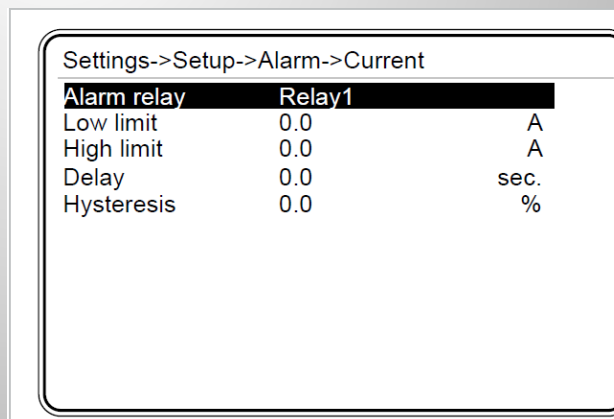
PFW03-T12_24

Menu Settings – Setup – Alarm-Energy



NOTE:

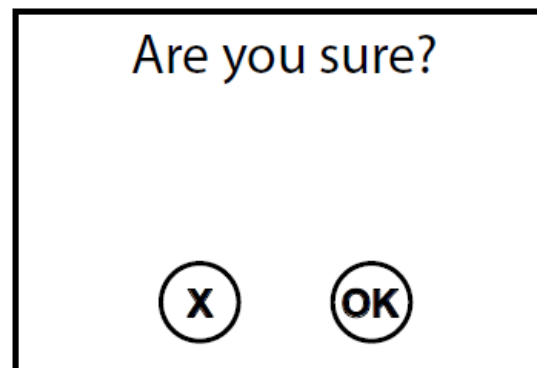
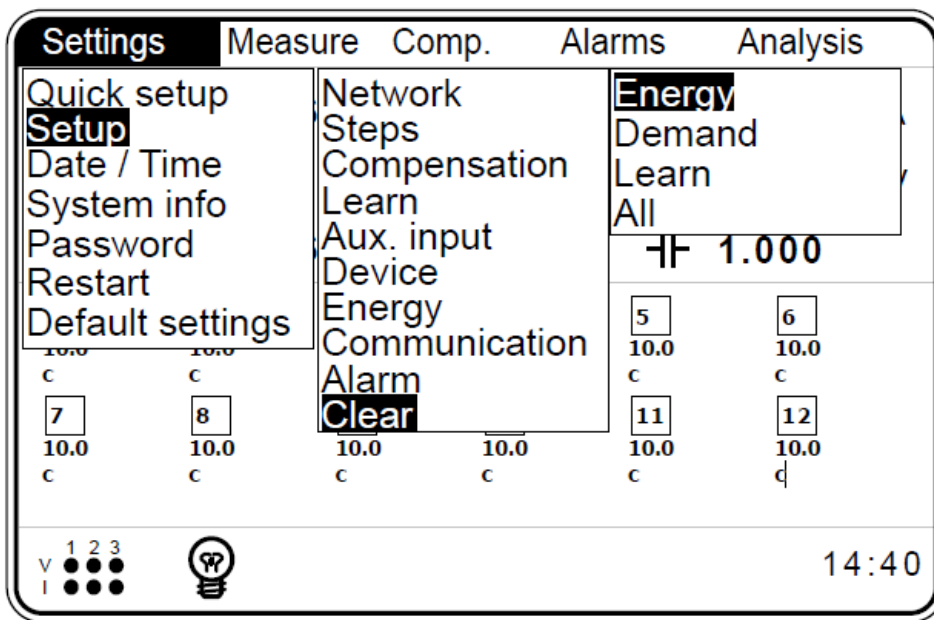
- If the high and low limits are the same, the alarm will not be activated;
- If the low limit is greater than the high limit, the PFW will display the message "Invalid limits! Please check".



PFW03-T12_24

Menu Settings – Setup – Clear

In this menu, energy and demand values can be cleared;
"Learned" connections return to the factory settings;



PFW03-T12_24

Menu Settings – Date / Time

Settings

Quick setup

Setup

Date / Time

System info

Password

Restart

Default settings

Measure	Comp.	Alarms	Analysis
1326.4	W	I	8.9 A
4.2	VA	V	257.1 V
1326.4	VA	CosØ	1.000
3	4	5	6
10.0	10.0	10.0	10.0
c	c	c	c
7	8	9	10
10.0	10.0	10.0	10.0
c	c	c	c
11	12		
10.0	10.0		
c	c		

V

I

1

2

3

4

5

6

7

8

9

10

11

12

14:40

Settings->Date / Time

Time

14 : 40 : 00

Date

30 August 2013

PFW03-T12_24

Menu Settings – System info

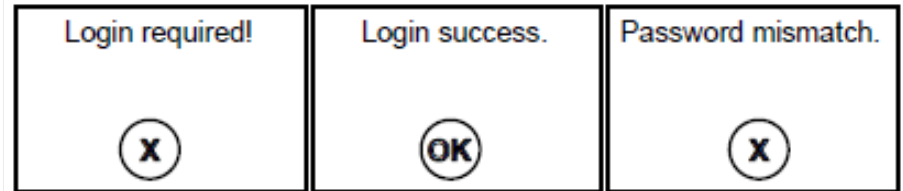
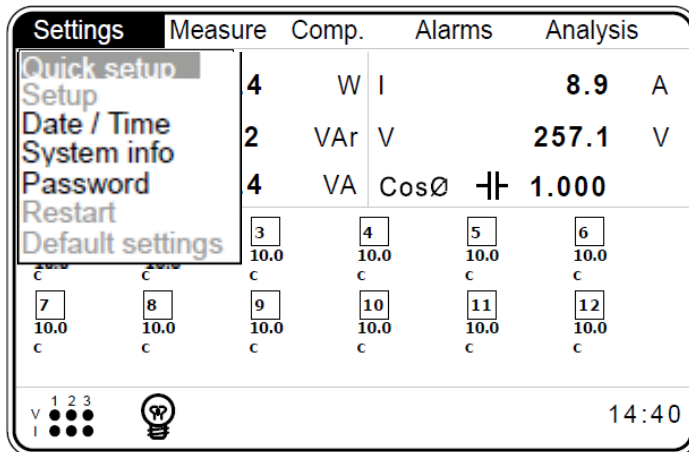
- There is no setting in this menu. Only product information.
- Battery voltage and temperature can be read via RS485.

WEG	
PFW03 – autom. power fact. controller	
Model	606000
Serial number	2359339
Language	English
Firmware version	1.00
PCB version	1_1-2
Build date	08 January 2018
Temperature	27.1 °C
Battery voltage	3.18 V

Menu Settings – Password

If the password is not entered, only "Date / Time"; "System info" and "Password" are enabled.

To enable the other menus, enter the password. (Default password = 1)



PFW03-T12_24

Menu Settings – Default Settings

This menu returns the equipment to the factory settings.

Settings	Measure	Comp.	Alarms	Analysis
Quick setup	.4	W	I	8.9 A
Setup	.2	VA	V	257.1 V
Date / Time	.4	VA	CosØ	1.000
System info				
Password				
Restart				
Default settings				
	3	4	5	6
	10.0	10.0	10.0	10.0
	c	c	c	c
7	8	9	10	11
10.0	10.0	10.0	10.0	10.0
c	c	c	c	c
12				
10.0				
c				

V 1 2 3
I ● ● ●
● ● ●

14:40

Are you sure?

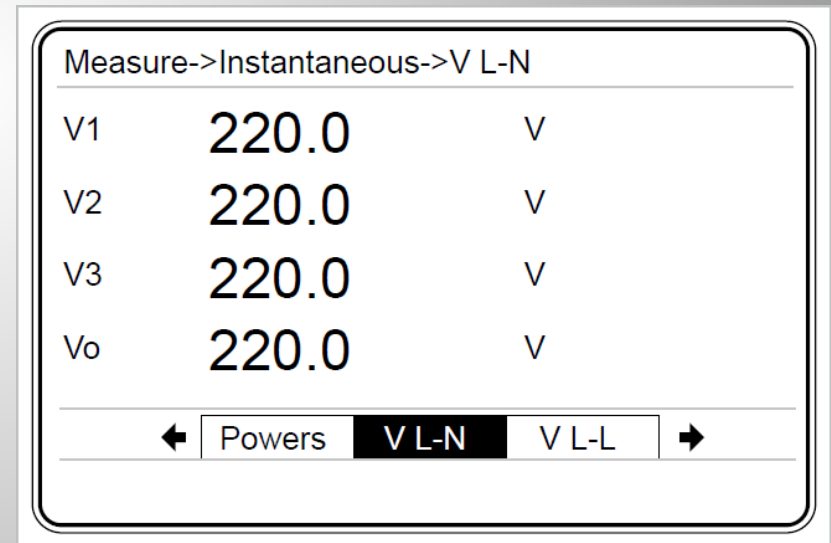
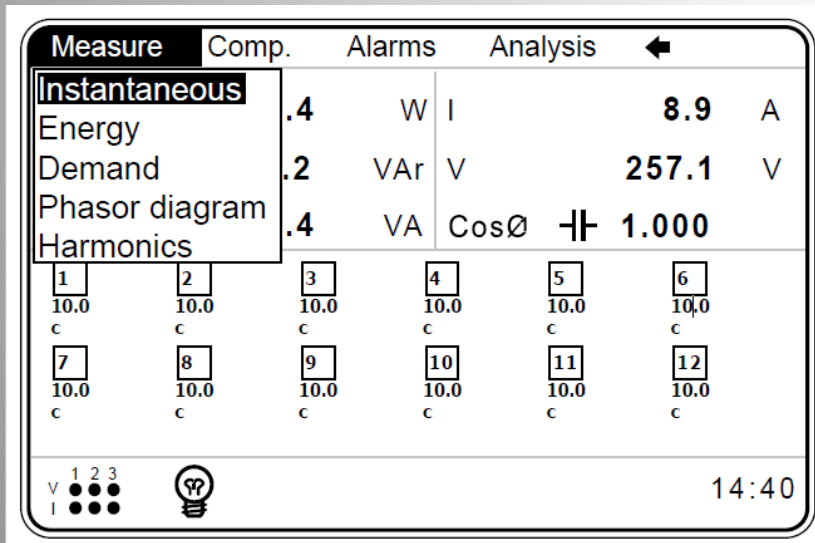
X OK

NOTE: indexed values and date / time are not reset in this operation.

PFW03-T12_24

Menu Measure – Instantaneous

This menu shows the reading of the values: V(L-N), V(L-L), (I), (IN), CosØ, (PF), (P), (Q), (S), (F), THDV, THDI



PFW03-T12_24

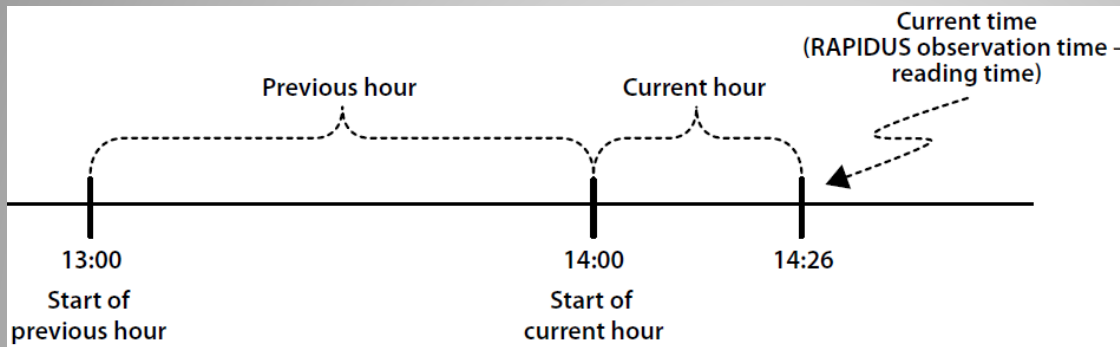
Menu Measure – Energy

The energy measure menu includes Imp. active (import active energy); Exp. Active (export active energy); Ind. Reactive (inductive reactive energy); Cap. reactive (capacitive reactive energy)

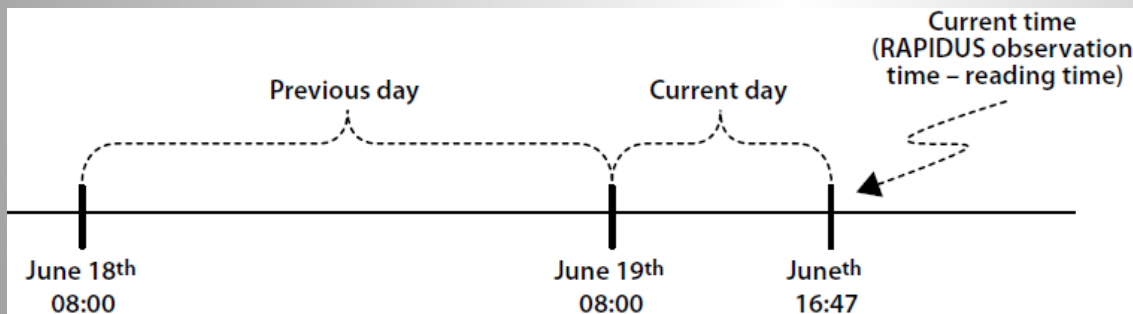
Measure->Energy->Imp. active		
Index	0.0	kWh
Curr. hour	0.0	kWh
Prev. hour	0.0	kWh
Curr. day	0.0	kWh
Prev. day	0.0	kWh
Curr. month	0.0	kWh
Prev. month	0.0	kWh

PFW03-T12_24

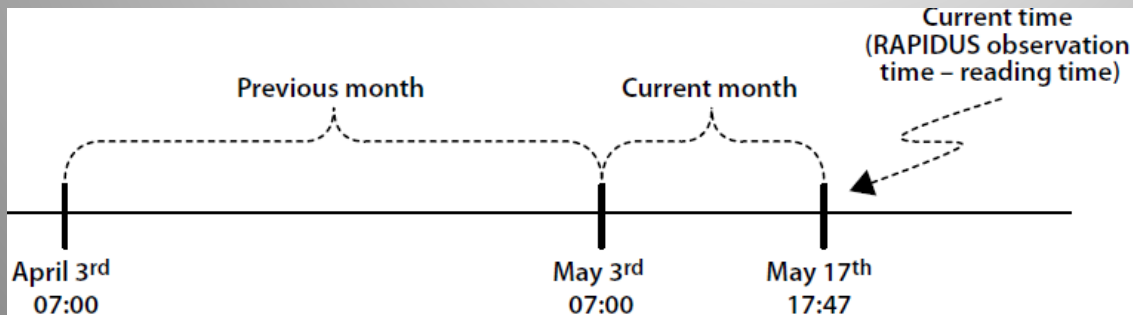
Menu Measure – Energy



Current/Previous Hour



Current/Previous Day



Current/Previous Month

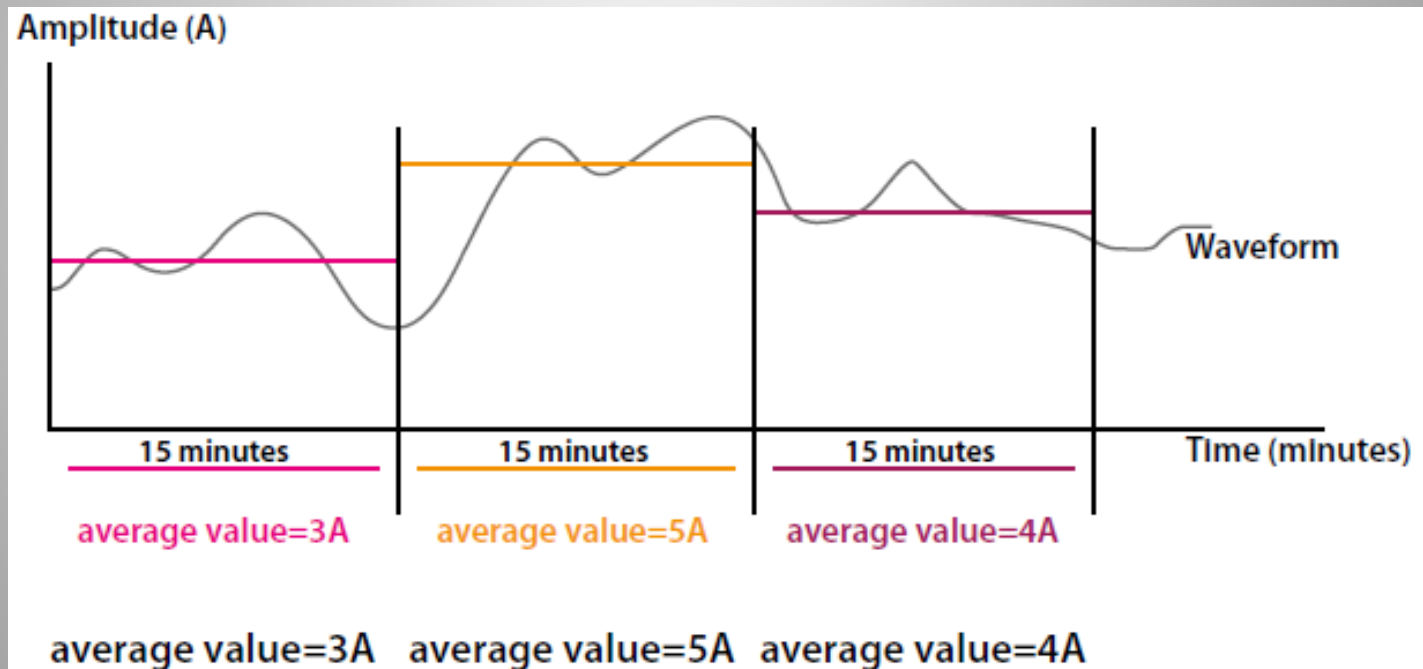
The demand value is saved with date and time tag.
The demand menu has submenus with current and energy values saved by phase and total.



PFW03-T12_24

Menu Measure – Demand

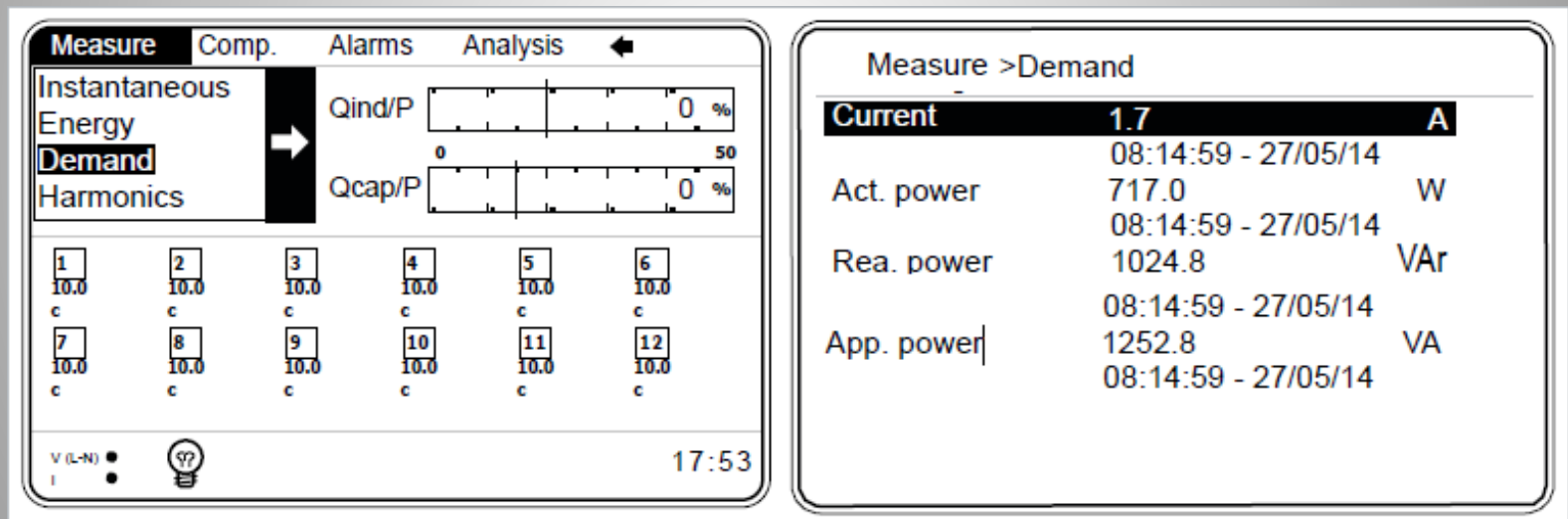
The highest averages of current and power are recorded according to the time defined for such calculation.



PFW03-T12_24

Menu Measure – Demand – Current

In the demand submenus, present and total power values are shown for the measured phase.

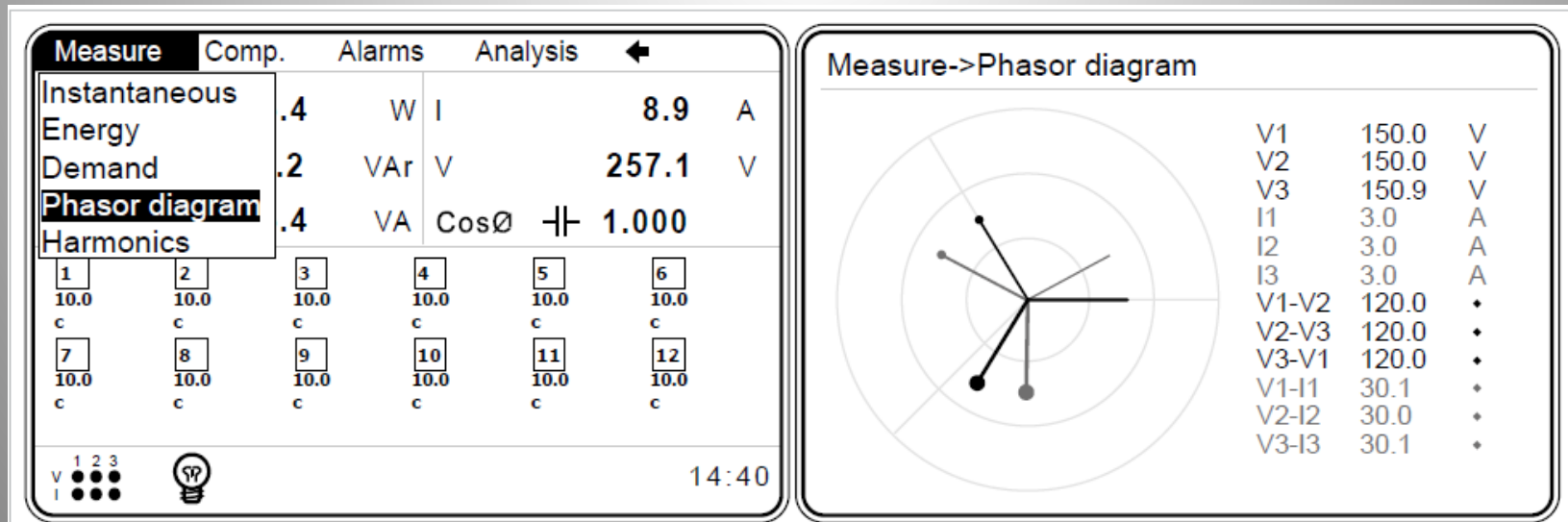


PFW03-T12_24

Menu Measure – Phasor diagram

In the phasor diagram menu, in the image below on the right, the following information is displayed:

- Current (gray line) and voltage angles (black line);
- Angular phase shift;



PFW03-T12_24

Measure Menu – Harmonics – Table

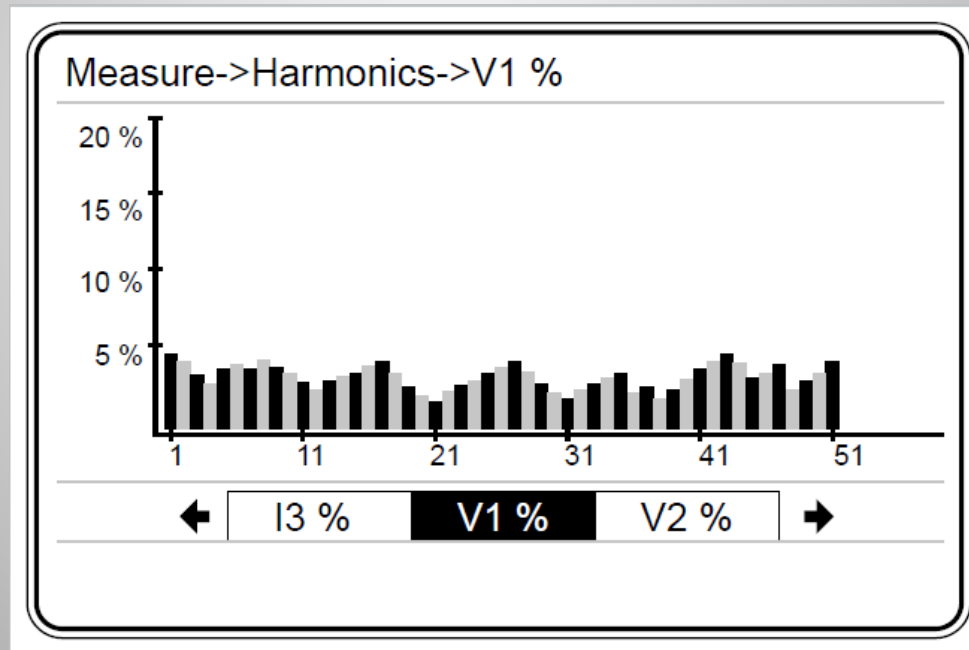
The PFW measures/calculates harmonics up to the 51st order.
Voltage and current are shown in separate tables as is the image below.
There are 6 tables = V1, V2, V3, I1, I2, I3

Measure->Harmonics->V1 %					
	1	2	3	4	5
1-5	99.01	0.00	1.02	0.00	0.05
6-10	0.00	2.10	0.00	3.30	0.00
11-15	5.70	0.00	0.75	0.00	0.00
16-20	0.00	0.00	0.00	0.00	0.00
21-25	0.00	0.00	0.00	0.00	0.00
26-30	0.00	0.00	0.00	0.00	0.00
31-35	0.00	0.00	0.00	0.00	0.00
36-40	0.00	0.00	0.00	0.00	0.00
41-45	0.00	0.00	0.00	0.00	0.00
46-50	0.00	0.00	0.00	0.00	0.00
<div><div>←</div><div>I3 %</div><div>V1 %</div><div>V2 %</div><div>→</div></div>					

PFW03-T12_24

Menu Measure – Harmonics – Graphic

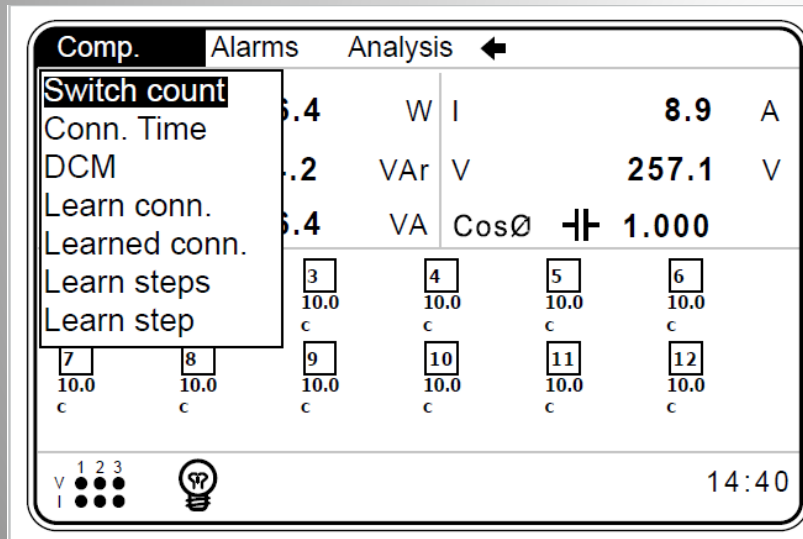
There are 6 bar graphs = V1, V2, V3, I1, I2, I3



PFW03-T12_24


Menu Comp .

In the compensation menu, the number of operations and the connection time of each step are shown.



Comp.->Switch count	
Step 1	0
Step 2	0
Step 3	0
Step 4	0
Step 5	0
Step 6	0
Step 7	0
Step 8	0
Step 9	0
Step 10	0
Step 11	0
Step 12	0

Comp.->Conn. time		
Step 1	0	min
Step 2	0	min
Step 3	0	min
Step 4	0	min
Step 5	0	min
Step 6	0	min
Step 7	0	min
Step 8	0	min
Step 9	0	min
Step 10	0	min
Step 11	0	min
Step 12	0	min



PFW03-T12_24

Menu Comp. - DCM (only on the PFW03-T12)

Dynamic Capacitor Monitoring:

The first results of the step power verification require at least 128x8 step switches.

The following power values will be updated every 128 operations.

The previous estimated power will be the step reference value for the new estimate/calculation cycle.

DCM works in any of the selected compensation programs.

If one of the step power values defined by the DCM algorithm is less than 20% of the previous value or greater than 180% of the previous value, the related step will not be used as compensation.

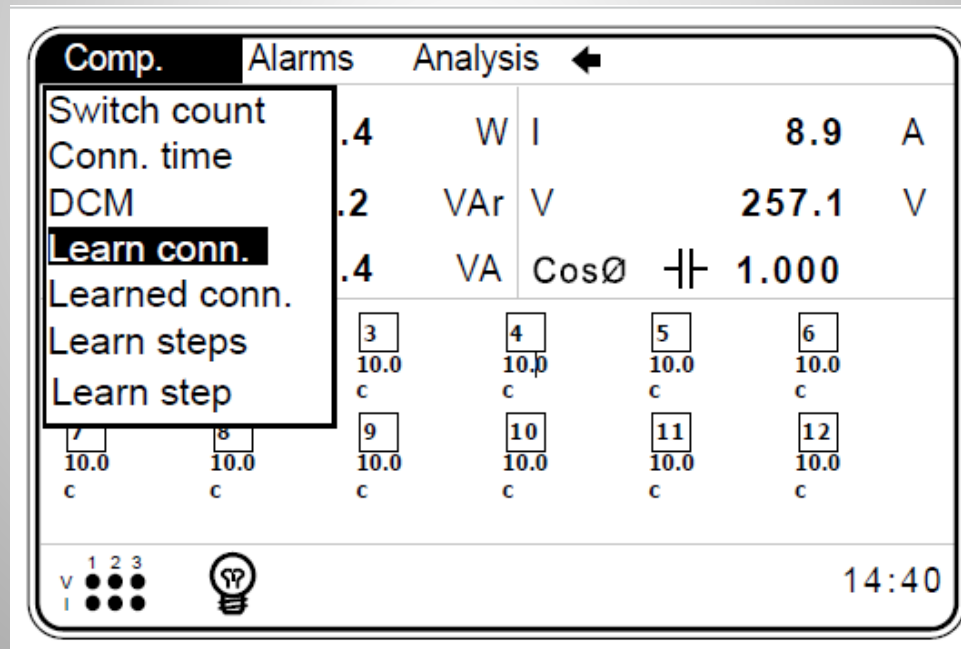
In this situation, the step and its connection must be checked. An alarm can be set for this situation.

NOTE: DCM is not available on the PFW03-T24.

PFW03-T12_24

Menu Comp – Learn connection

This function can "learn" the connection only for three-phase capacitors. The appropriate capacitor can be set in the "Step number" submenu of the "Quick Setup" menu or in the "Settings-> Setup-> Learn-> Learn Conn." menu.

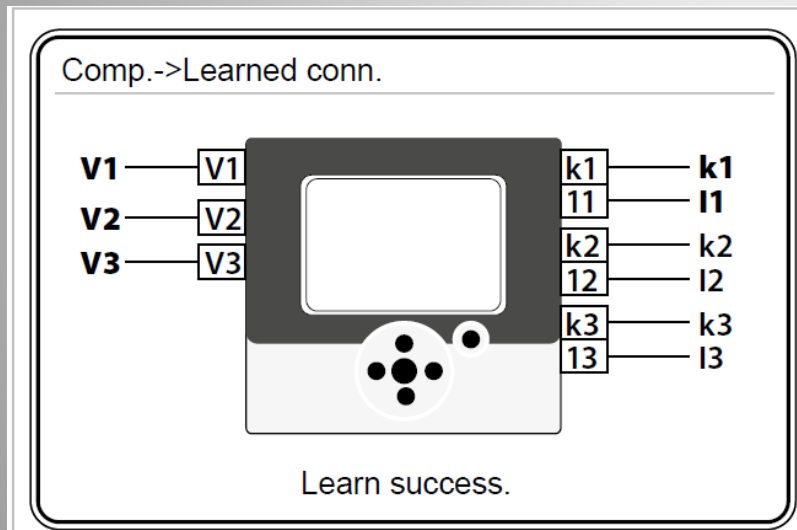


NOTE: in the "Step number" setting, the number of the step to be entered is the step with the highest installed power.

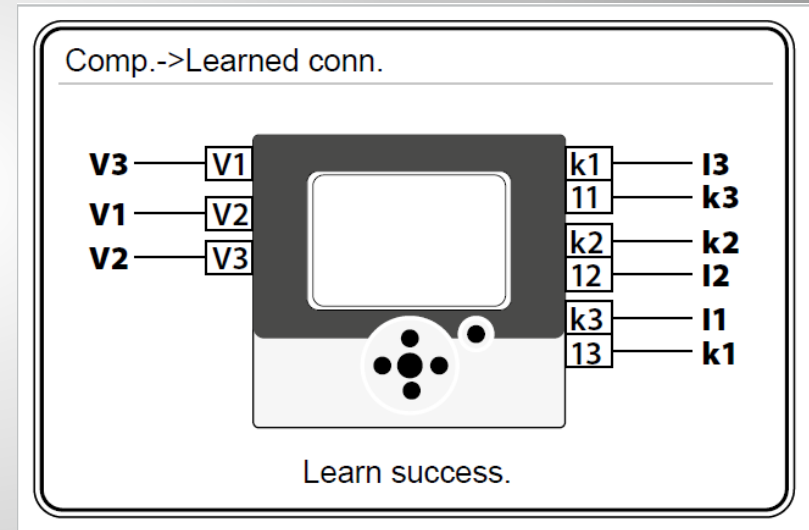
PFW03-T12_24

Menu Comp – Learn connection

Learned connections are shown on the display



Phase1 -> V1, I1
Phase2 -> V2, I2
Phase3 -> V3, I3

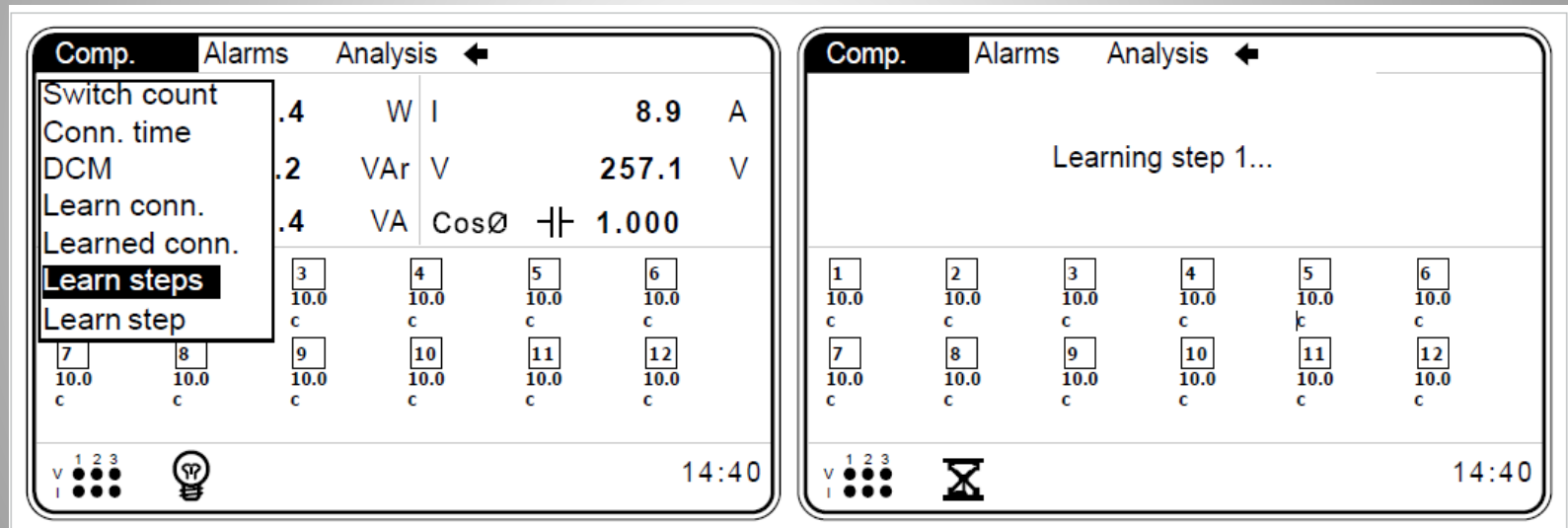


Phase1 -> V2, I3
Phase2 -> V3, I2
Phase3 -> V1, I1

PFW03-T12_24

Menu Comp – Learn steps

The PFW03 learns the power and the correction type (capacitor or reactor) of each step.

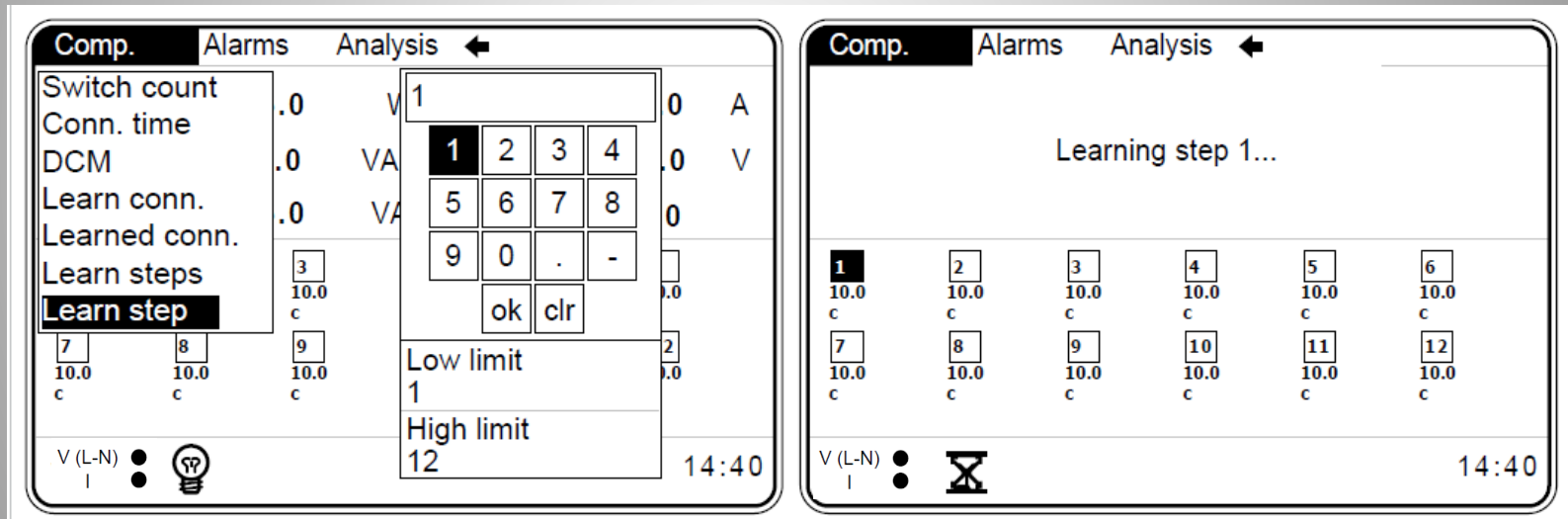


NOTE: no loads (current, amplitude and cosØ) must present changes in the system to ensure that the step powers are learned correctly. Otherwise, the PFW03 may learn the step powers incorrectly.

PFW03-T12_24

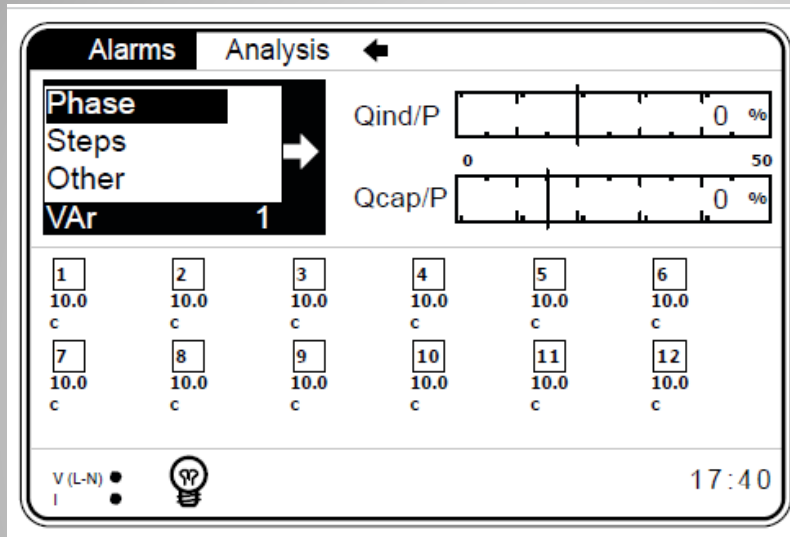
Menu Comp – Learn steps

Through this menu, the PFW03 learns the step power and its type.



PFW03-T12_24

Alarms Menu



Steps: an alarm is activated when the value set in Settings-Setup-Alarm-Steps-Low limit is reached;

Other:

Battery = if the voltage drops below 1.9 V, the alarm is activated; in this case, contact your dealer. Do not open the device.

Alarms->Phase	
V	Alarm
I	Normal
P	Normal
Q	Normal
S	Normal
CosØ	Normal
PF	Normal
V harmonics	Normal
THDV	Normal
I harmonics	Normal
THDI	Normal
F	Normal

Alarms->Steps	
Step 1	Normal
Step 2	Normal
Step 3	Normal
Step 4	Normal
Step 5	Normal
Step 6	Normal
Step 7	Normal
Step 8	Normal
Step 9	Normal
Step 10	Normal
Step 11	Normal
Step 12	Normal

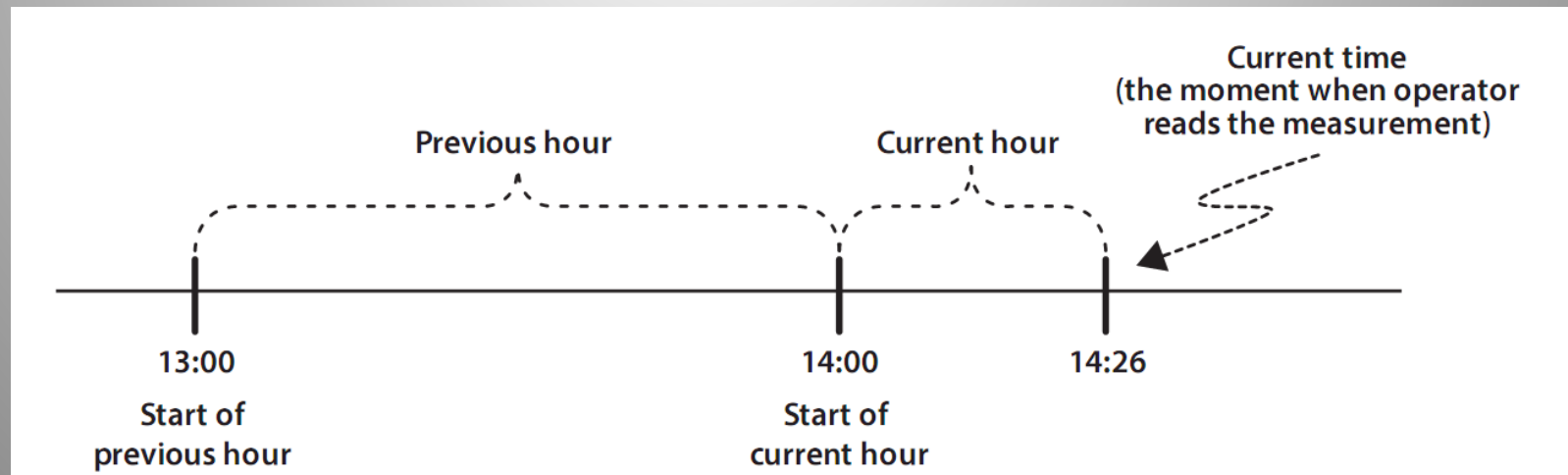
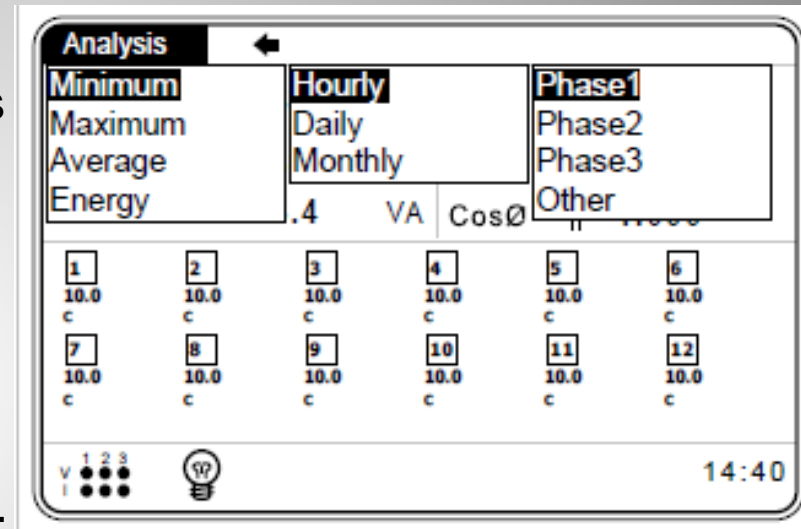
Alarms->Other	
Under comp.	Normal
Over comp.	Normal
Ind. energy	Alarm
Cap. energy	Alarm
Temperature	Normal
Battery	Normal

PFW03-T12_24

Analysis Menu (minimum; maximum; average; energy)

In this menu, you can read the maximum, minimum and average values of voltage (V), current (I), active power (P), reactive power (Q), apparent power (S), $\cos\phi$, power factor (PF) and frequency (F);

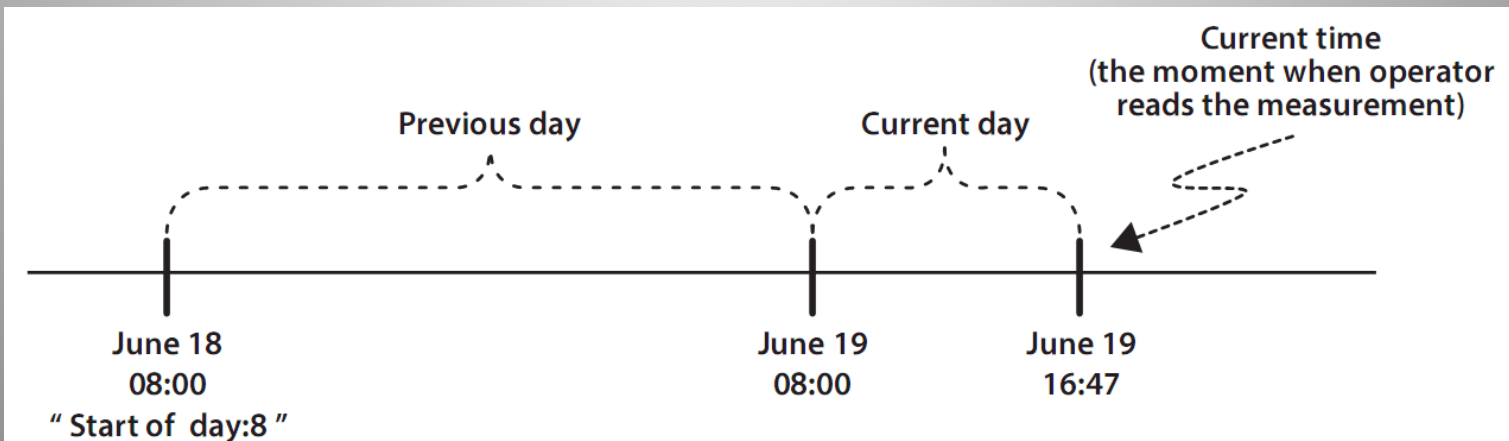
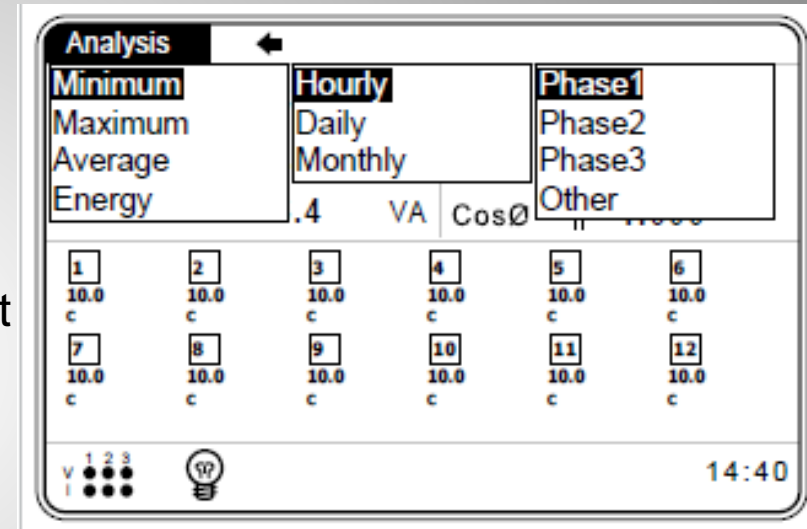
Hourly : value measured from the beginning of the hour to the current time.



PFW03-T12_24

Analysis Menu (minimum; maximum; average; energy)

Daily: value measured from the day start time to the current time



PFW03-T12_24

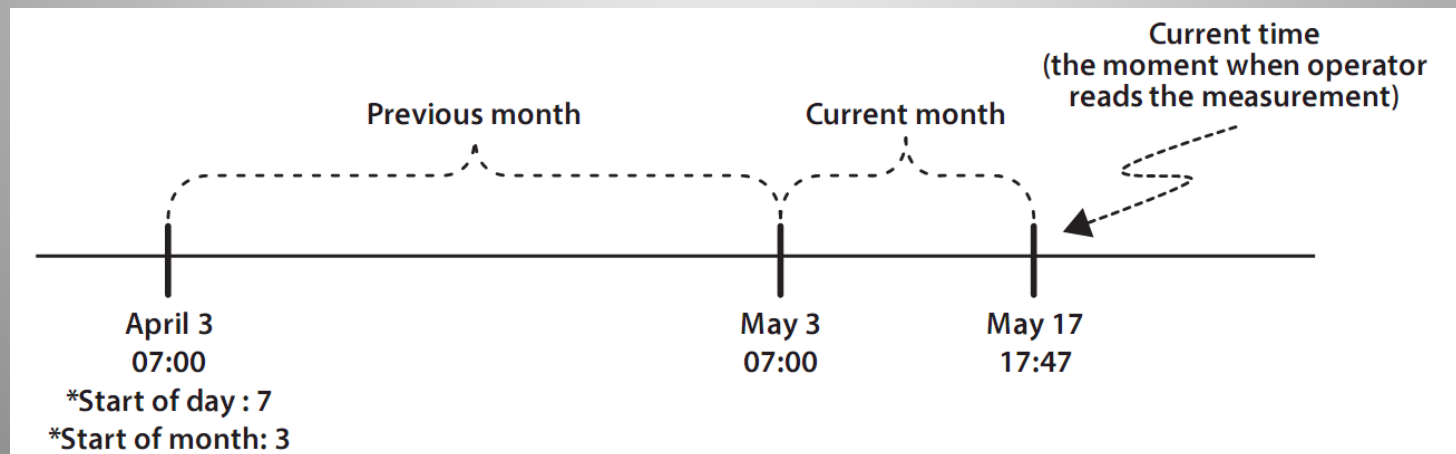
Analysis Menu (minimum; maximum; average; energy)

Monthly: value measured from the first day of the month and the day start time to the current time.

The screenshot shows a device interface with the 'Analysis' menu selected. It features three sub-menus: 'Minimum' (with options Minimum, Maximum, Average, Energy), 'Hourly' (with options Daily, Monthly), and 'Phase' (with options Phase1, Phase2, Phase3, Other). Below these are fields for '.4', 'VA', and 'CosØ'. A 12-day data table is displayed with values of 10.0 and units 'c'. At the bottom, there are indicators for voltage (V) and current (I) across three phases, a light bulb icon, and a timestamp of 14:40.

1	2	3	4	5	6
10.0	10.0	10.0	10.0	10.0	10.0
c	c	c	c	c	c

7	8	9	10	11	12
10.0	10.0	10.0	10.0	10.0	10.0
c	c	c	c	c	c





WEG Drives & Controls

Thank you!