



PEM330/PEM333/PEM333-P

1. Short instructions

These short instructions do not replace the operating manual. You will find the operating manual on www.bender.de

Make sure that the personnel has read this manual and understood all instructions relating to safety.

2. Intended use

The digital universal measuring device PEM330/PEM333(-P) is suitable for measuring and displaying electrical parameters of electricity networks. The device measures current, voltage, energy consumption and power as well as the total harmonic distortion for assessment of the voltage and current quality.

The accuracy of the active energy metering corresponds to class 0,5 S in compliance with the DIN EN 62053-22 (VDE 0418 Part 3-22):2003-11.



3. Scope of delivery

- one PEM330 or PEM333 or PEM333-P
- Safety instructions for Bender Products
- these short instructions
- one sealing frame "IP54"

4. Safety instruction

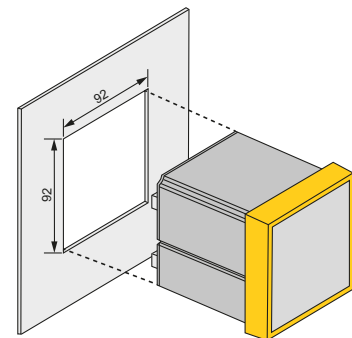
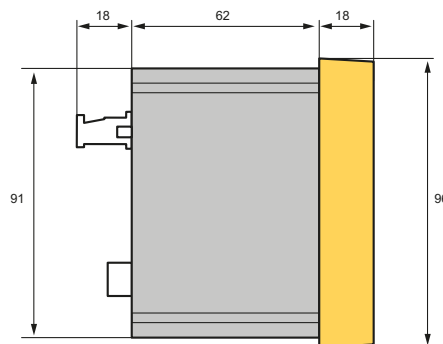
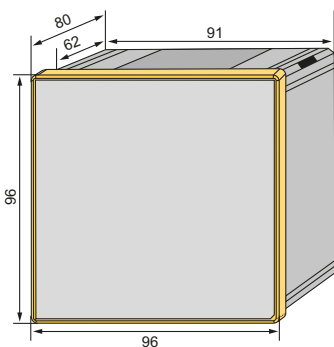


Danger of electric shock!

Follow the basic safety rules when working with electricity. Consider the data on the **rated voltage and supply voltage** as specified in the technical data!

5. Installing the device

Front panel mounting (front view, side view, panel cut-out)

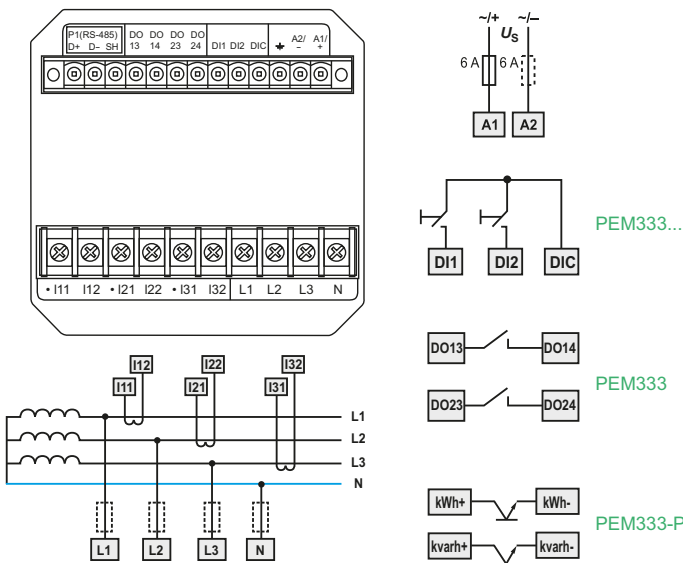


A front panel cutout of 92 mm x 92 mm is required for the device.

1. Fit the device through the cut-out in the front panel.
2. Put the 4 transparent mounting brackets from behind on the edges of the device.
3. Push the clips tightly against the panel to secure the device.
4. Check the device to ensure that it is firmly installed in the front panel.

6. Connection of the device

Wiring diagram



Terminal	Description
A1, A2, \perp	Supply voltage. Power protection by a 6 A fuse, quick response. If being supplied from an IT system, both lines have to be protected by a fuse.
DI1, DI2, DIC	Digital inputs (PEM333...)
DO13...DO24	Digital outputs (N/O contacts) (PEM333 only)
kWh+, kWh-, kvarh+, kvarh-	Pulse outputs (opto-coupler) for kWh and kvarh (PEM333-P only)
I11...I32	Connection to the system to be monitored
D+, D-, SH	Connection RS-485 bus (PEM333... only)
L1, L2, L3, N	Measuring voltage inputs: The measuring leads should be protected with appropriate fuses.

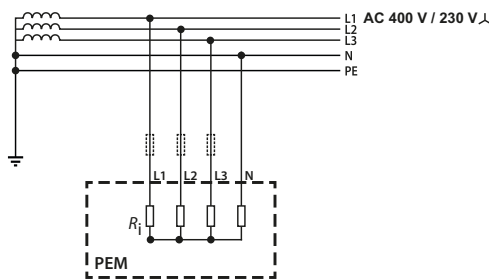
Connection

- The connecting terminals are located on the rear. Connect the PEM330/PEM333(-P) to the supply voltage (terminals A1 and A2 resp. +/-). Connect terminal " \perp " to the protective conductor.

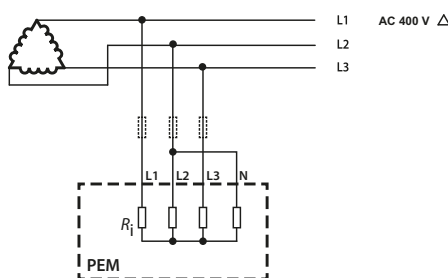
- Power protection by a 6 A fuse, quick response. If being supplied from an IT system, both lines have to be protected by a fuse.
- Connection to the RS-485-Bus is made via the terminals D+, D- and SH. Up to 32 devices can be connected to the bus. The maximum cable length for the bus connection of all devices is 1200 m.

7. Connection diagram voltage inputs

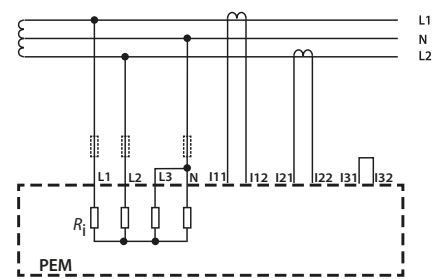
Three-phase 4-wire system (TN, TT, IT systems)



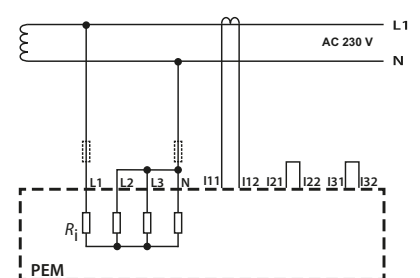
Three-phase 3-wire system



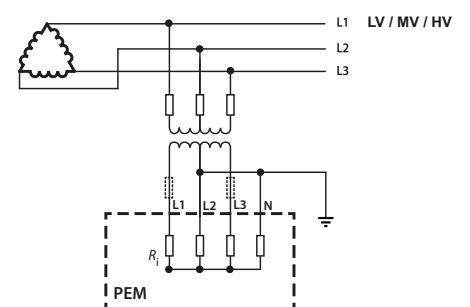
One-phase 3-wire system (1P3W)



One-phase 2-wire system (1P2W)



Connection via voltage transformers



For usage in three-wire systems, the connection type (TYPE) has to be set to delta (DELTA). For this purpose, the measurement inputs L2 and N are to be bridged.

8. Commissioning

Check proper connection

During installation and connection, abide by the relevant standards and regulations and follow the operating manuals for the device.

Before switching on

1. Before switching on think carefully about these questions:
2. Does the connected supply voltage US correspond to the nameplates information?
3. Is the nominal system voltage of the measuring current transformer not exceeded?
4. Does the measuring current transformer's maximum current correspond to the nameplate information of the connected device?

Switching on

After switching on, proceed as follows:

1. Connect the supply voltage.
2. Set the bus address/IP address.
3. Set the CT transformer ratio (for each channel).
4. Change the measuring current transformer's counting direction, if required.
5. Set the nominal voltage.
6. Select wye connection or delta connection.

9. Getting to know the operating elements



Legend

LED "kWh" and LED "kvarh": Pulse output

"SYSTEM" button: Display mean value and total value (current, voltage); **in the menu**: in case of numerical values: move the cursor one position to the left

"PHASE" button: Display line-conductor related measured quantities; **in the menu**: go up one entry; in case of numerical values: increasing the value

"ENERGY" button: Display measured values: Active and reactive energy import/active and reactive energy export (line 4); **in the menu**: move down one entry; in case of numerical values: reduce the value

"SETUP" button: Press > 3 s: switching between setup menu and standard display;

in the menu: selection of the parameter to be edited; confirm entry

10. Data display

"SYSTEM" button

Overview; depending on the mode the display may not show all values.

Column left	Column right	First line	Second line	Third line
	A W PF	$\emptyset I$	P_{ges}	Power factor λ
LL	V kvar Hz	$\emptyset U_{LL}$	Q_{ges}	F
	kW kvar kVA	P_{ges}	Q_{ges}	S_{ges}
Ln	V A kW	Wye connection: $\emptyset U_{LN}$ Delta connection: $\emptyset U_{LL}$	$\emptyset I$	P_{ges}
I 4	A	I_4		
U I	% %		Un-balance U	Un-balance I
D M D	A A A	Demand I_1	Demand I_2	Demand I_3
D M D	kW kvar kVA	Demand P	Demand Q	Demand S

Button "ENERGY"

Parameters in the fourth line:

Column left	Column right	Value
	kWh	Active energy import
--	kWh	Active energy export
	kvarh	Reactive energy import
--	kvarh	Reactive energy export
S		Apparent energy

"PHASE" button

Overview; depending on the mode the display may not show all values.

Column left	Column right	First line	Second line	Third line
	A A A	I_1	I_2	I_3
Ln Ln Ln	V V V	U_{L1}	U_{L2}	U_{L3}
LL LL LL	V V V	U_{L1L2}	U_{L2L3}	U_{L3L1}
	kW kW kW	P_{L1}	P_{L2}	P_{L3}
	var var var	Q_{L1}	Q_{L2}	Q_{L3}
	kVA kVA kVA	S_{L1}	S_{L2}	S_{L3}
	PF PF PF	λ_{L1}	λ_{L2}	λ_{L3}
D P F	PF PF PF	Displacement factor $\cos(\varphi)_{L1}$	Displacement factor $\cos(\varphi)_{L2}$	Displacement factor $\cos(\varphi)_{L3}$
U t	% % %	THD U_{L1}	THD U_{L2}	THD U_{L3}
I t	% % %	THD I_1	THD I_2	THD I_3
K F		k-factor I_1	k-factor I_2	k-factor I_3
U ∠		Phase angle U_{L1}	Phase angle U_{L2}	Phase angle U_{L3}
I ∠		Phase angle I_1	Phase angle I_2	Phase angle I_3

"SETUP" button

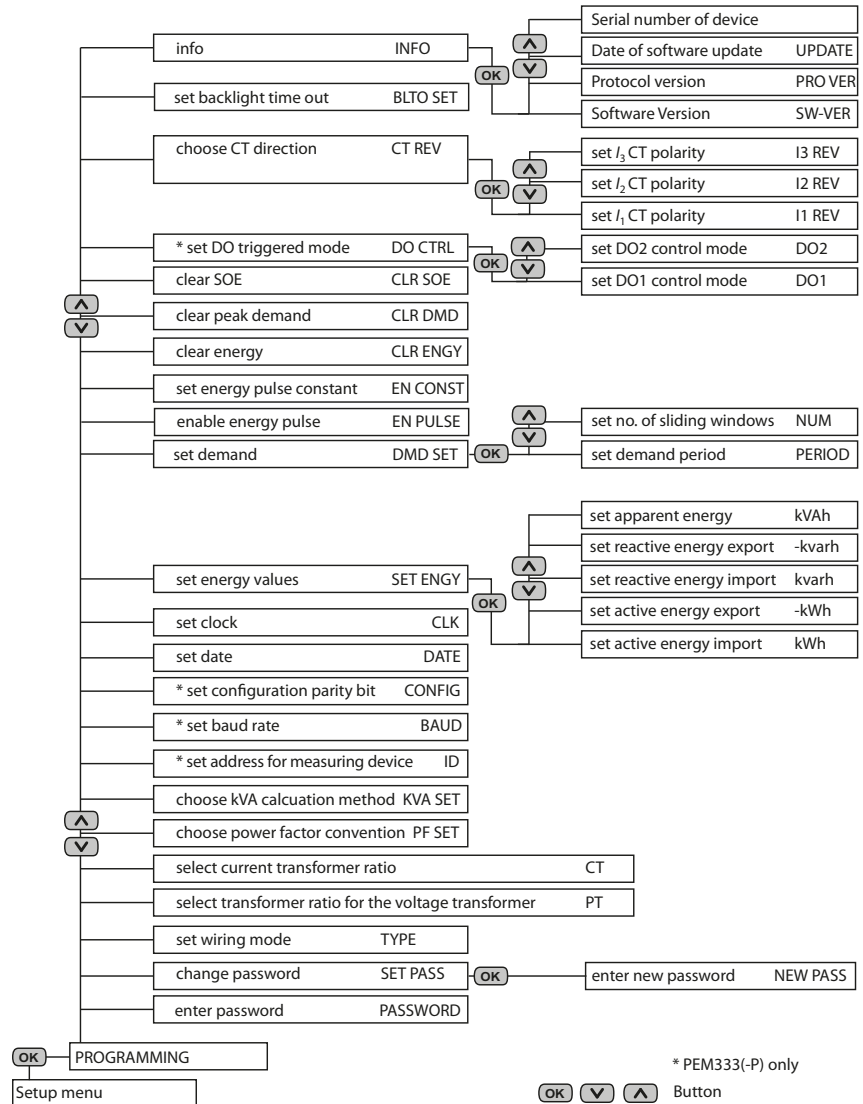
Press the "SETUP" button for more than 3 s to access the setup mode.
Press the "SETUP" button again to return to the default display screen.



To be able to change parameters, you must first enter the password. (factory setting: 0)

Menu overview

The following diagram will help you to familiarise yourself with the menu:



All rights reserved. Reprinting only with permission of the publisher. Subject to change!
© Bender GmbH & Co. KG



BENDER Group

Photos: Bender archives

Bender GmbH & Co. KG

Londorfer Str. 65 • 35305 Gruenberg • Germany
P. O. Box 1161 • 35301 Gruenberg • Germany

Tel.: +49 6401 807-0
Fax: +49 6401 807-259

E-Mail: info@bender.de
www.bender.de

