



PEM353 - Universal measuring device



Part of the device documentation in addition to this quickstart is the enclosed "Safety instructions for Bender products" and the manual, downloadable at <https://www.bender.de/en/service-support/download-area>. The quickstart guide does not replace the manual.

Quickstart guide for the following devices

Type	Art.-No.
PEM353	B93100355
PEM353-P	B93100354
PEM353-N	B93100353

Scope of delivery

PEM353, rubber seal, 4 x retaining clips, safety instructions for Bender products, quickstart guide

Safety instructions



Risk of fatal injury due to electric shock! Touching live parts of the system carries the risk of an electric shock, damage to the electrical installation or destruction of the device. **Before installing and connecting the device, make sure that the installation has been de-energised.** Observe the rules for working on electrical installations. **Refer to the rated and supply voltage values as specified in the technical data!**

Intended use

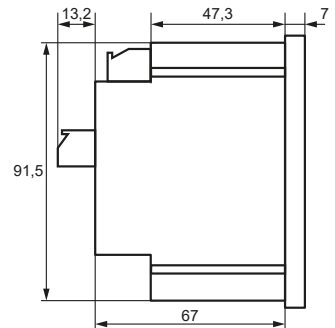
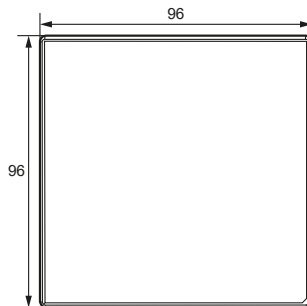
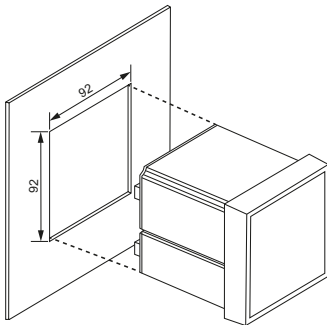
The PEM353 is suitable for use in 2-, 3- and 4-wire systems and in their respective versions as TN, TT and IT systems. The current measurement inputs of the PEM353 are always connected via external .../1A or .../5A measuring current transformers. In principle, measurements in medium and high-voltage systems are carried out via voltage transformers. Use for the intended purpose also includes:

- Device-specific settings compliant with local equipment and operating conditions
- Adhering to the manual

Any other use than that described in this manual is regarded as improper.



Installation (mm)



Mounting in a front panel

Mounting opening 92 mm x 92 mm (max. 92.8 x 92.8 mm).

1. Mount the rubber seal on the back of the device.
2. Insert the device into the mounting opening of the front panel.
3. Place the four retaining clips over the device corners from behind.
4. Push the retaining clips tightly against the front plate.
5. Check the device to ensure that it is firmly installed.

The device is installed.

Connection

Overview of the terminals: The connections are located on the back of the device.

	DO _a	DO _b	DO _c	DO _d
PEM353(-N)	DO13	DO14	DO23	DO24
PEM353-P	E1+	E1-	E2+	E2-

L1 L2 L3 N	Measuring voltage inputs: The measuring leads should be protected with 2 A fuses.	
A1/+ A2/-	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.	
I41 NC I42	Measuring current inputs I4 (PEM353-N only)	
D+ D-	RS-485 bus connection; Up to 32 devices can be connected to the bus. The maximum cable length for the bus connection of all devices is 1200 m.	
DIC DI1...4	4 Digital inputs, galvanically isolated, 24 V; An external circuit providing at least a current I_{min} of 1 mA is required for triggering the inputs.	
DOa...d	Digital outputs	<p>PEM353(-N) features 2 configurable outputs (N/O relay)</p> <p>PEM353-P features 2 pulse outputs ("Solid State Relay")</p>
I11 I12 I21 I22 I31 I32	Measuring current inputs $I_{1...3}$ Current measurement inputs must not be "protected" by fuses. Provide a shorting block for each current measurement input as described in IEC 60364-5-55 (edition 2.2) chapter 557.5.3 (wiring diagrams: disconnect terminal of the measuring current transformers "Y"). The current measurement inputs must not be earthed in low-voltage applications.	

Operating elements

	No.	Element	Description
	1	LED Pulse (red)	Indication of energy pulsing
	2	LED Comm. (green)	Indication of communication activity
	3	Display	LCD graphic display
	4	Button 1	The function of the buttons varies depending on the context. The meaning of the buttons is always shown on the display above the corresponding button.
	5	Button 2	
	6	Button 3	
7	Button 4		

Connection diagrams

Connect the device according to the connection diagram. Please observe the technical data.

<p>1P2W L-N Source</p> <p>Load</p>	<p>1P2W L-L Source</p> <p>Load</p>	<p>1P3W with 2 measuring current transformers Source</p> <p>Load</p>
<p>3P3W with 3 measuring current transformers Source</p> <p>Load</p>	<p>3P4W with 3 (4) measuring current transformers Source</p> <p>Load</p>	<p>In principle, measurements in medium and highvoltage systems are carried out via voltage transformers. Please refer to the manual for wiring diagram examples.</p>

Setup menu overview

<p>Browse View configuration</p> <p>Enter Password The configuration can be changed after entering the correct password. (Factory setting: 0000)</p>	<p>Setup</p> <ul style="list-style-type: none"> Browse / Enter Password <ul style="list-style-type: none"> Basic <p>Wiring Mode, PT Primary, PT Secondary, CT Primary, CT Secondary, I4 Primary, I4 Secondary, PF convention, kVA calculation, CT1...3 polarity, THD calculation method, Demand Period, No. of windows, Predicted response, EN pulse constant, LED EN pulse, EN Period, kvarh Calc., On Time Threshold</p> Comm. <p>COM1...2: Protocol, Unit ID, Baud rate, Data format</p> Setpoints <p>Group 1...9: Type, Parameter, OverLimit, UnderLimit, ActiveDelay, InactiveDelay, Trigger 1...2</p> I/O <p>Digital Input: Function, Debounce, Pulse weight DO Pulse width: DO1, DO2 DO Function</p> Display <p>Timeout, Contrast, Language, Delimiter, Main 1...4, Setpoint LCD Alarm</p> Clock <p>Time, Date, Date format</p> Maintenance <p>Password Setup, Clear registers, Clear all data, DO control</p> Information <p>Firmware, Update, Modbus, BACnet MSTP, DNP, Serial number</p>
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Technical data

Measuring circuit 1 (IC1)	(L1, L2, L3, N)
TN and TT system.....
Nominal voltage.....	400/690 V
Overvoltage category/Rated voltage.....	III/600 V
IT system
Nominal voltage.....	480 V
Overvoltage category/Rated voltage.....	III/300 V
Nominal voltage.....	690 V
Overvoltage category/Rated voltage.....	II/1000 V
Measuring circuit 2 (IC2)	(-I11, I12, -I21, I22, -I31, I32)
Overvoltage category/Rated voltage.....	III/300 V
Supply circuit (IC3)	(A1/+, A2/-)
Overvoltage category/Rated voltage.....	III/300 V
Output circuit 1 (IC4) for PEM353-N and PEM353	(DO13, DO14)
Overvoltage category/Rated voltage.....	III/300 V
Output circuit 1 (IC4) for PEM353-P	(E1+, E1-)
Overvoltage category/Rated voltage.....	III/50 V
Output circuit 2 (IC5) for PEM353-N and PEM353	(DO23, DO24)
Overvoltage category/Rated voltage.....	III/300 V
Output circuit 2 (IC5) for PEM353-P	(E2+, E2-)
Overvoltage category/Rated voltage.....	III/50 V
Control circuit 1 (IC6)	(DI1, DI2, DI3, DI4)
Overvoltage category/Rated voltage.....	III/50 V
Control circuit 2 -RS485 (IC7)	(D+, D-)
Overvoltage category/Rated voltage.....	III/50 V
Supply voltage	
Supply voltage	AC/DC 95...250 V ($\pm 10\%$)
Frequency range	DC, 47...440 Hz
Power consumption.....	< 5 VA

Measuring voltage inputs

Refer to insulation coordination

Measuring range.....	10...828 V (max. 120% U_n)
Rated frequency.....	45...65 Hz
Internal resistance UL1-N, L2-N, L3-N	> 12 M Ω
Transformation ratio of the measuring voltage transformer	configurable (see manual)

Measuring current transformer inputs

I_{nom}	5 A
Measuring range	0.1...200% I_{nom}
Load	< 0.15 VA
Overload range	2 x I_{nom} permanent
.....	20 x $I_{nom} \leq 1$ s
Transformation ratio of the measuring current transformer
.....	configurable (see manual)

Switching elements

Outputs	2 N/O contacts
Operating principle	N/O operation
PEM353-N, PEM353	
Relay contacts, N/O operation, AC 250 V or DC 30 V	5 A
Minimum current I_{min}	1 mA at AC/DC ≥ 10 V
PEM353-P	
Pulse output	max. DC 30 V, max. 30 mA
Cable length	≤ 30 m
Inputs	4 common galv. isolated digital inputs
I_{min}	1 mA
U_{BI}	DC 24 V

