

Insulation monitor PMD s20



The insulation monitor monitors the insulation resistance of unearthed AC/DC systems (IT systems). It meets the requirements of EN 61557-8, IEC 60364-7-710 and DIN VDE 0100-710.

Approvals

	PMD s20
	◆

Unit features

- ▶ Relay output:
2 auxiliary changeover contacts (C/O)
- ▶ Detects symmetrical and asymmetrical insulation faults
- ▶ Two insulation measuring circuits
- ▶ Connection for external switch contacts to trigger the manual reset and for function testing
- ▶ Unit parameter settings are menu-driven and infinitely variable via a display and rotary encoder with key function (turn and push)
- ▶ Configuration is stored on a chip card
- ▶ Status indicators (LEDs) for:
 - Supply voltage (Power)
 - Insulation resistance
 - Fault

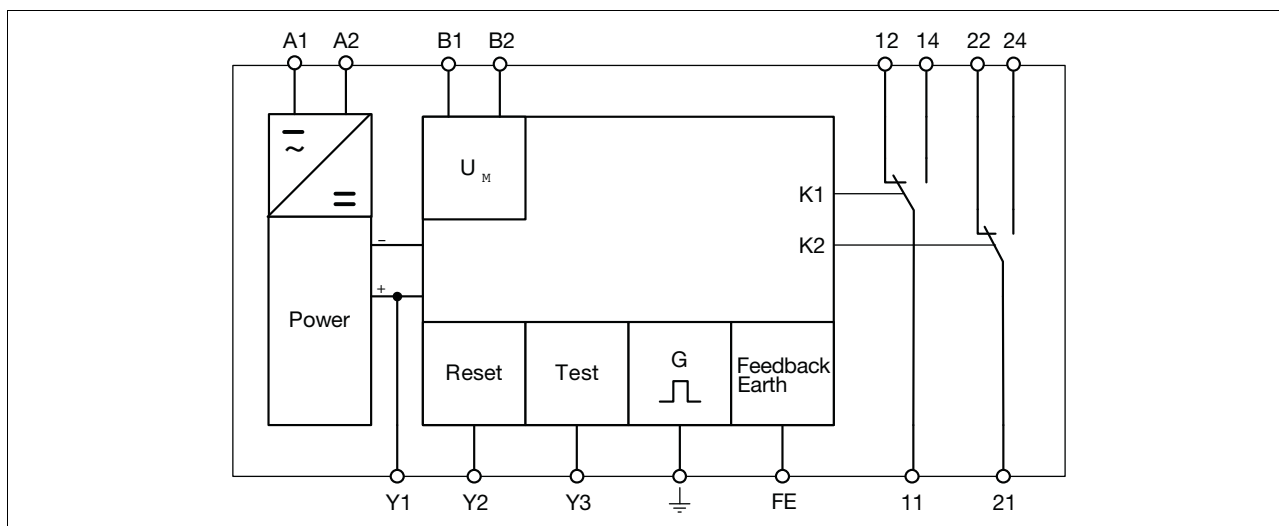
requirements of EN 61557-8, IEC 60364-7-710 and DIN VDE 0100-710 and may be used:

- ▶ To monitor unearthed AC/DC systems (including on board ships)
- ▶ In medical locations
- ▶ As a trip device if insulation resistances are outside the permitted range

Unit description

The insulation monitor monitors the insulation resistance of unearthed AC/DC systems (IT systems). It meets the

Block diagram



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Function description

The insulation monitor prevents hazardous insulation faults in galvanically separated systems. The insulation resistances are measured between the network phases and the operating earth. The measuring principle detects symmetrical and asymmetrical insulation faults.

Relay outputs (K1 and K2)

K1 and K2 operate in normally energised mode. In their default state, aux-

iliary contacts 11-14 and 21-24 are closed and auxiliary contacts 11-12 and 21-22 are open. Normally energised mode is the default setting; this setting can be changed via the menu.

Response resistance

If the insulation resistance falls below the set response resistance R_{an} in either of the two measuring circuits ($R_E < R_{an}$), the LED "Out 1" or "Out 2" will light and the relay contacts will de-energise.

Response resistance Ran1:

Auxiliary contacts 11-14 will open and auxiliary contacts 11-12 will close (normally energised mode).

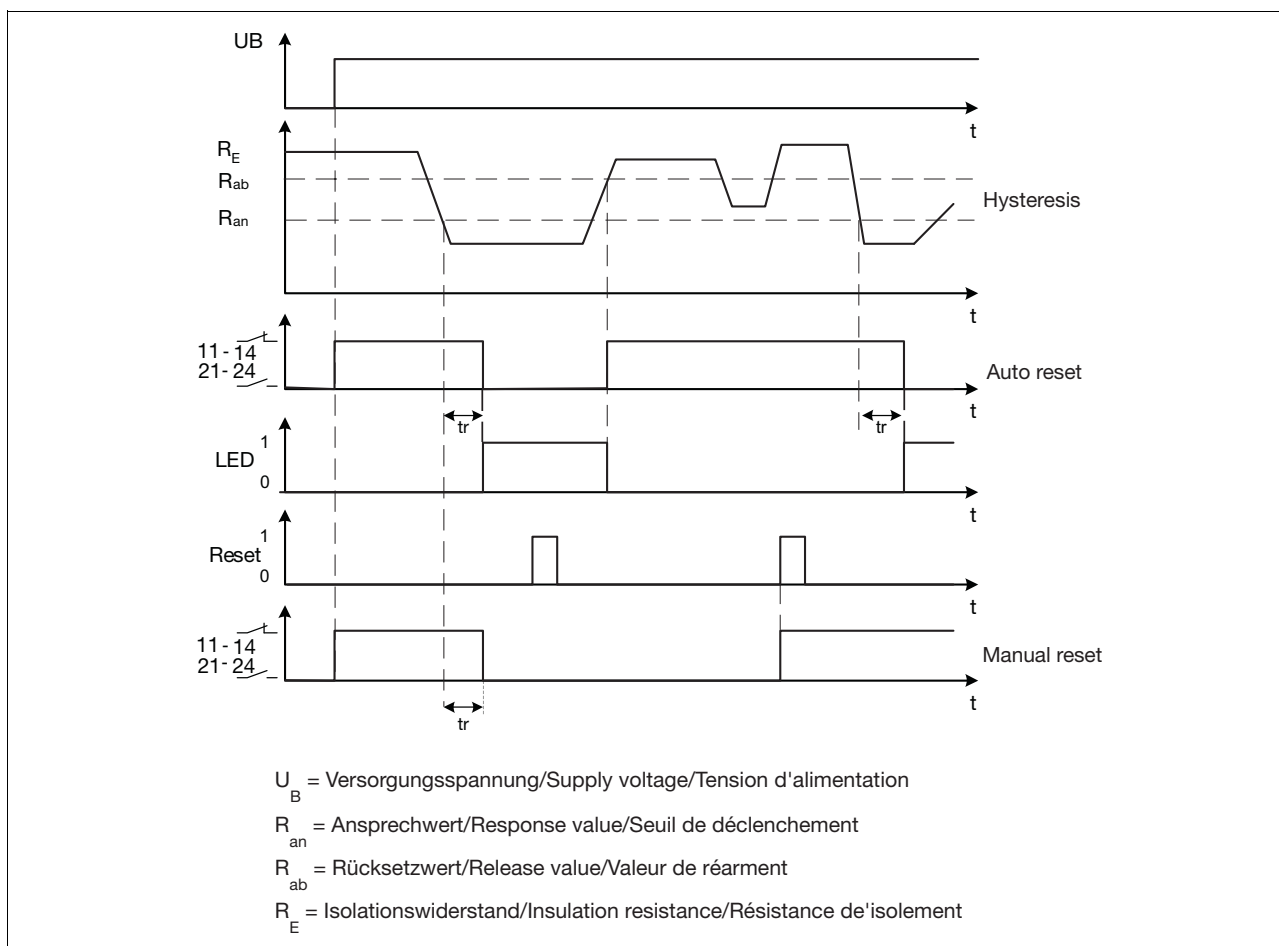
Response resistance Ran2:

Auxiliary contacts 21-24 will open and auxiliary contacts 21-22 will close (normally energised mode).

Monitoring the operating earth

If the connection between the operating earth and the FE terminal is broken, contacts 11-12 and 21-22 will close (normally energised mode).

Timing diagram



Wiring

When commissioning, please note the following:

- ▶ Output contacts 11-12-14 and 21-22-24 are auxiliary contacts (e.g. for a display or contactor control)
- ▶ Only wire the unit when the supply voltage is switched off!

- ▶ Use copper wiring.
- ▶ To prevent contact welding, a fuse should be connected before the output contacts (see technical details).
- ▶ Ensure that the cables are laid carefully, because an open circuit in the

measuring circuit will cause the unit to malfunction.

- ▶ Ensure there is adequate fuse protection on the connection cables at terminals B1 and B2.

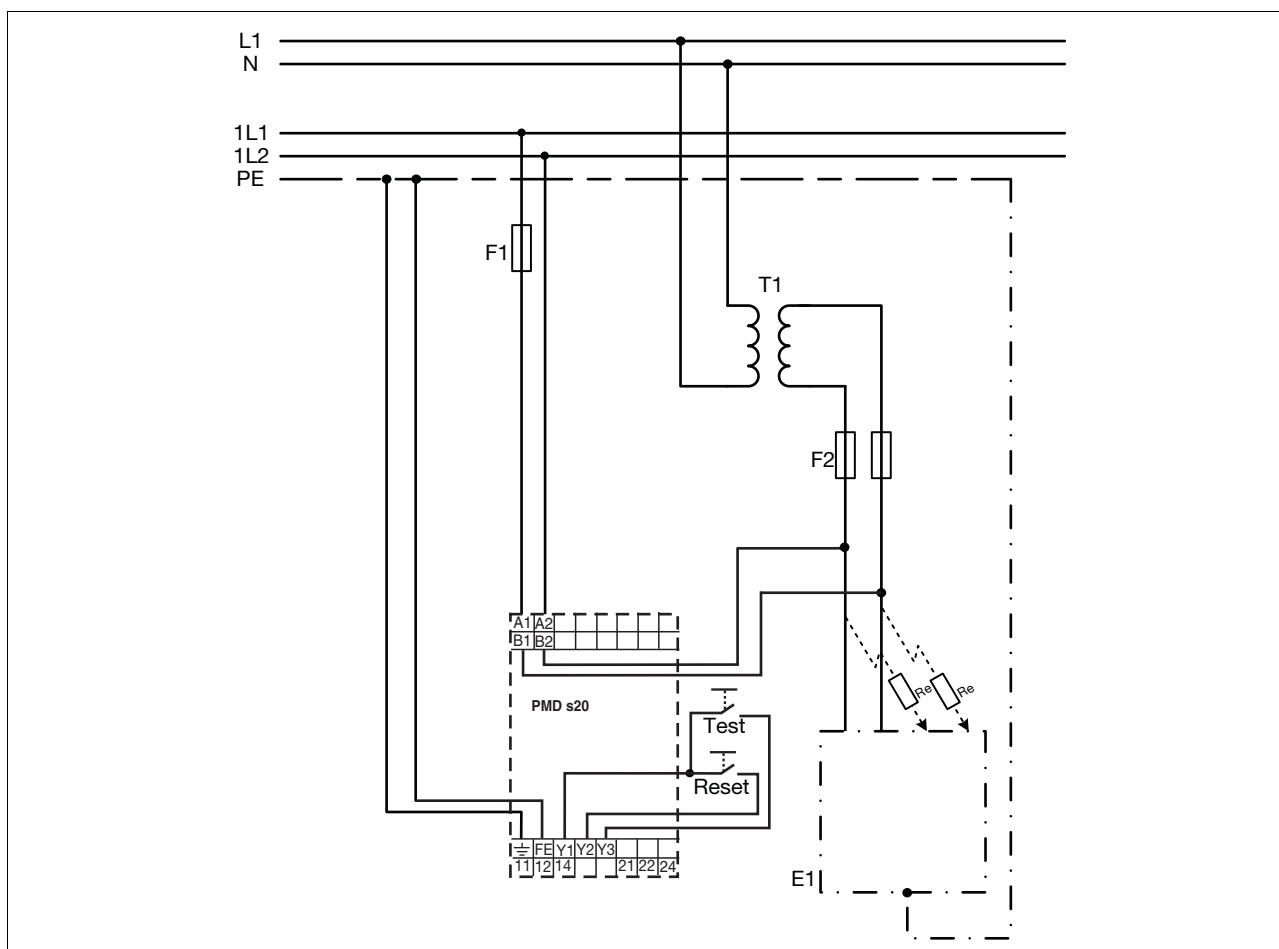
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- ▶ Only **one** insulation monitor should be connected to galvanically connected systems.
- ▶ A function test involving a real earth fault (resistance) must be carried out in order to check that the unit is properly connected.
- ▶ Information given in the “Technical details” must be followed.

Preparing for operation

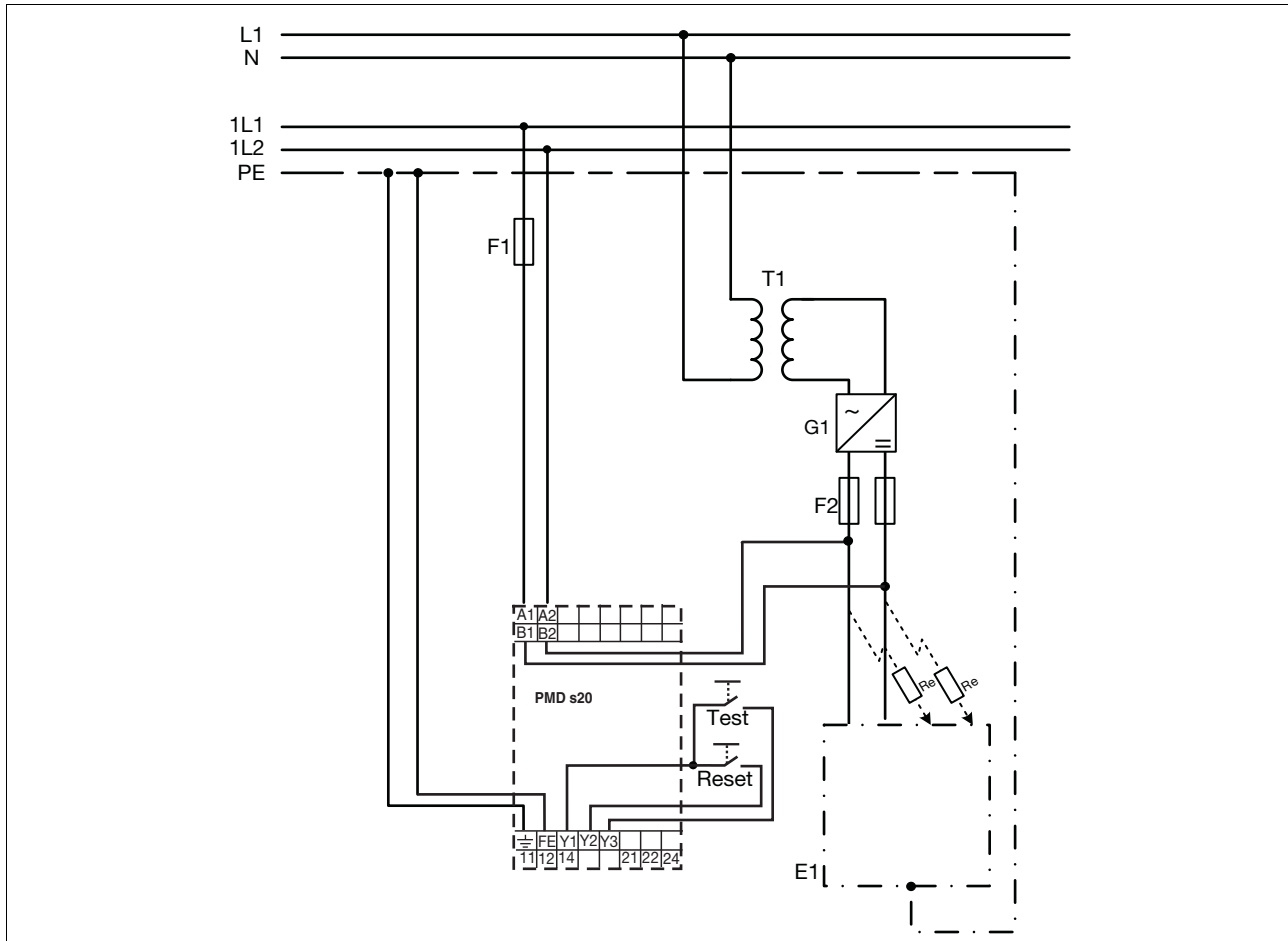
- ▶ Supply voltage UB:
 - Connect the supply voltage UB to A1/A2. The supply voltage UB can also be taken from the measuring circuit.
 - ▶ Measuring circuit (system to be monitored):
 - 2-phase system:
 - Connect one phase of the monitored system to the terminals B1/B2 respectively.
 - 3-phase system:
 - Link terminals B1/B2 and connect them to the system's star point.
 - ▶ Connect the output contacts in accordance with the relevant application circuit.
 - ▶ **Function test:**
 - By pressing a button at terminals Y1 and Y3 or
 - Pressing the rotary knob for at least 3 seconds
- Please note:
Do not connect any cables to undesignated terminals.

Application circuit AC



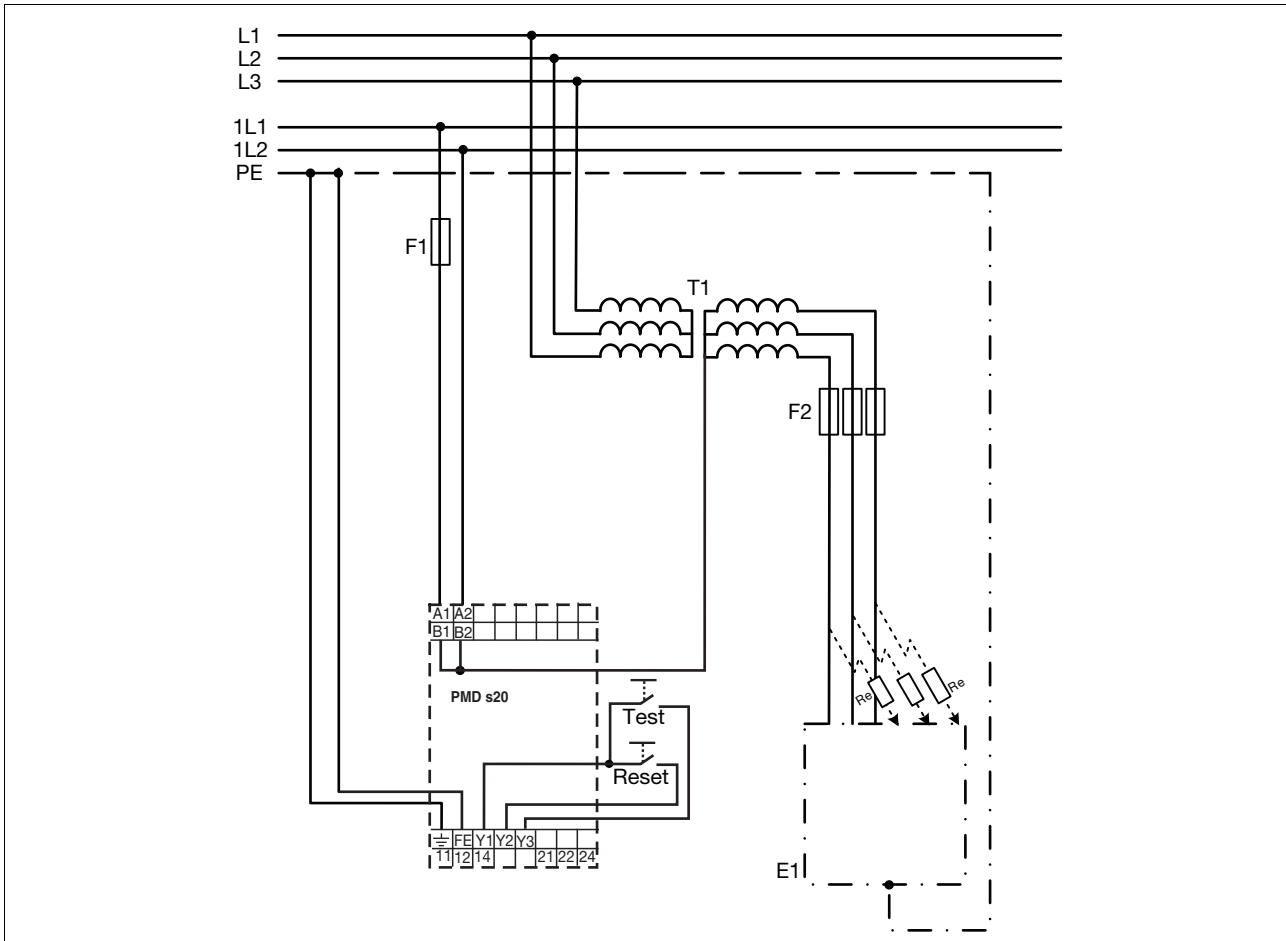
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Application circuit DC



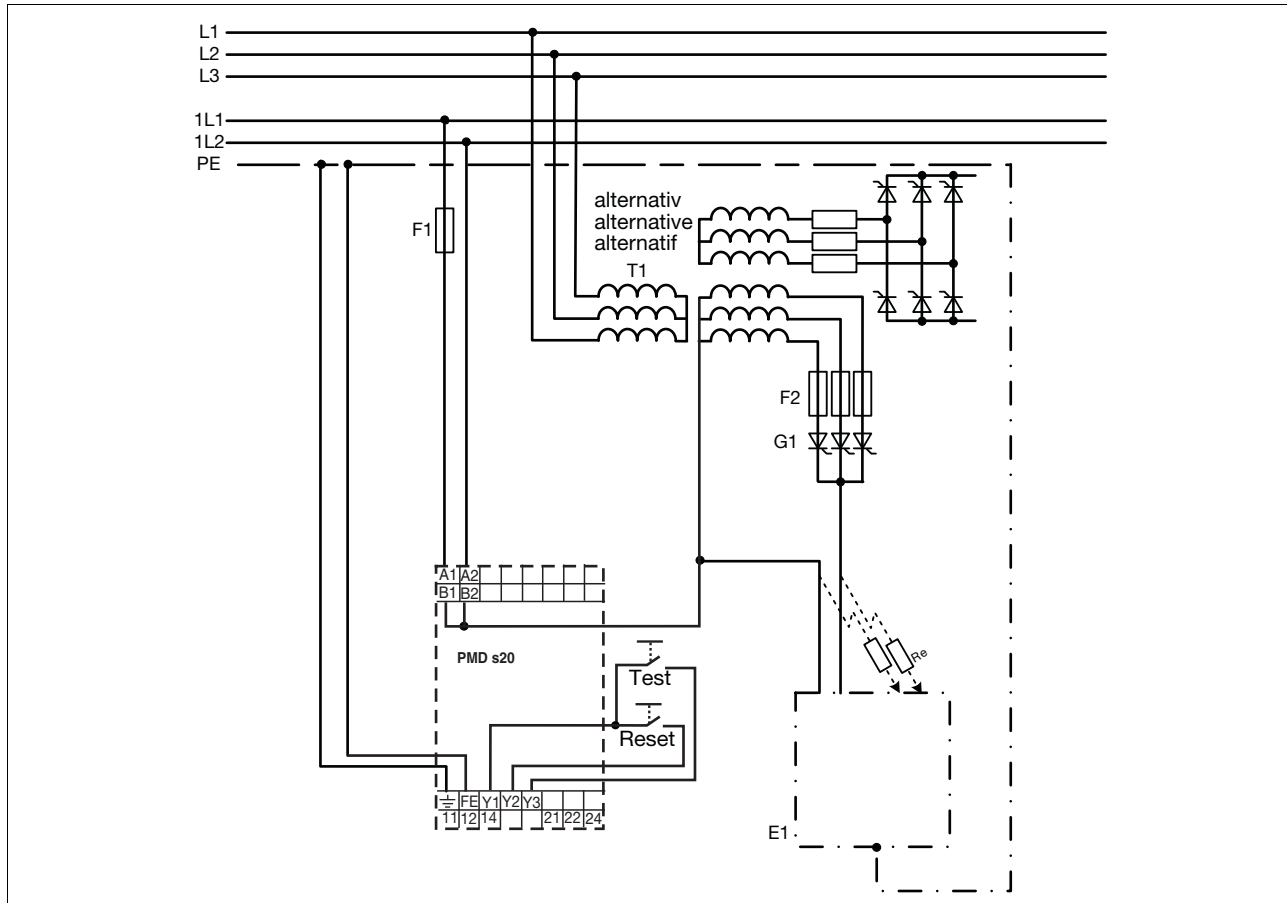
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Application circuit 3 AC



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Application circuit 3 AC/DC



Parameter setting

The menu settings are made on the unit's display via a rotary knob. You have the option to make the settings

on the knob by hand or with a screwdriver. If you make the settings with a

screwdriver, the knob can remain within the unit.

Installation

- ▶ The unit should be installed in a control cabinet with a protection type of at least IP54.
- ▶ Use the notch on the rear of the unit to attach it to a mounting rail.
- ▶ In environments exposed to heavy vibration or when installing on a vertical mounting rail (35 mm), the unit should be secured using a fixing element (e.g. retaining bracket or end angle).
- ▶ Push the unit upwards or downwards before lifting it from the mounting rail.

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Notice

This data sheet is only intended for use during configuration. For installation and operation, please refer to the operating instructions supplied with the unit.

Technical details	
Electrical data	
Supply voltage U_B AC/DC	24 - 240 V
Voltage tolerance	-15 %/+10 %
Power consumption at U_B AC	5.0 VA
Power consumption at U_B DC	2.5 W
Frequency range AC	50 - 60 Hz
Residual ripple DC	20 %
Utilisation category in accordance with EN 60947-4-1	
Auxiliary contacts: AC1 at 240 V	I_{min} : 0.10 A , I_{max} : 5.0 A P_{max} : 1200 VA
Auxiliary contacts: DC1 at 24 V	I_{min} : 0.10 A , I_{max} : 5.0 A P_{max} : 120 W
Utilisation category in accordance with EN 60947-5-1	
Auxiliary contacts: AC15 at 230 V	I_{max} : 3.0 A
Auxiliary contacts: DC13 at 24 V (6 cycles/min)	I_{max} : 2.0 A
Contact material	AgCdO + 3.0 μ m Au
External contact fuse protection ($I_K = 1$ kA) to EN 60947-5-1	
Blow-out fuse, quick	
Auxiliary contacts:	6 A
Blow-out fuse, slow	
Auxiliary contacts:	4 A
Measuring circuit	
Rated mains voltage	0 ... 400 V
Rated mains voltage in according with UL	0 ... 300 V
Max. external voltage	460 V
Max. measuring voltage U_M	± 16 V
Max. measuring current I_M	1 mA
Min. measuring circuit impedance	250 kOhm
Response value R_{an}	10 ... 200 kOhm
Max. response error in accordance with EN 61557-8	± 15 % ± 1 kOhm
Max. leakage capacitance	20 μ F
Environmental data	
EMC	EN 61000-6-2, EN 61000-6-4
Vibration to EN 60068-2-6	
Frequency	10 - 55 Hz
Amplitude	0.35 mm
Climatic suitability	EN 60068-2-78
Airgap creepage in accordance with	EN 60664-1
Pollution degree	2
Overvoltage category	III
Rated insulation voltage	250 V
Rated impulse withstand voltage	
Auxiliary contacts for the remaining circuits	6.00 kV
Supply voltage, measuring circuit for the remaining circuits	4.0 kV
Ambient temperature	-10 - 55 °C
Storage temperature	-40 - 85 °C

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Environmental data	
Protection type	
Mounting (e.g. cabinet)	IP54
Housing	IP40
Terminals	IP20
Condensation and ice formation	not permitted
Mechanical data	
Housing material	
Housing	PC
Front	PC
Cross section of external conductors with screw terminals	
1 core flexible	0.25 - 2.50 mm² , 24 - 12 AWG No. 760120
with crimp connectors, without insulating sleeve	0.25 - 1.00 mm² , 24 - 16 AWG No. 760120
without crimp connectors or with TWIN crimp connectors	0.20 - 1.50 mm² , 24 - 16 AWG No. 760120
Torque setting with screw terminals	0.50 Nm
Cross section of external conductors with spring-loaded terminals: Flexible with/without crimp connectors	0.20 - 2.50 mm² , 24 - 12 AWG No. 761120
Stripping length	9 mm No. 761120
Dimensions	
Height	98.0 mm
Width	45.0 mm
Depth	120.0 mm
Weight	270 g

Cable capacitance	Measuring time
0.5 µF	5 s
1 µF	10 s
5 µF	50 s
20 µF	240 s

Order reference			
Type	Features	terminals	Order no.
PMD s20	24 - 240 V AC/DC	with screw terminals	760 120
PMD s20 C	24 - 240 V AC/DC	with spring-loaded terminals	761 120