



GM400 onshore PE monitor

Intended use

The GM400 onshore PE monitor is used to monitor the PE connection of ships, which are supplied with electrical energy via an onshore medium-voltage feed. The PE connection is permanently monitored by means of corresponding test signals on a low-impedance connection.

Features

- Monitoring of the PE conductor by means of a push-through opening
- PE loop measurement via a pilot wire using a locating current (HPR method)
- PE loop measurement in the event of parasitic earthing via seawater or other design elements (LPR method)

Functional description

The GM400 onshore PE monitor continuously monitors the PE connection of vessels during the time spent in port. To enable this, the PE conductor is fed through a corresponding opening in the housing. To ensure safe and reliable operation, the PE conductor must be insulated in the onshore plug connection. It must not be earthed.

- HPR method: A corresponding locating current is generated and transmitted via a pilot line, which also needs to be fed through the plug connector. The pilot line must be connected to PE onboard the ship. Proper earthing therefore produces a conductor loop. The generated locating current is in turn evaluated in the GM400 onshore PE monitor and generates a corresponding relay message, HPR release.
- LPR method: Due to parasitic earthing via seawater or other design elements, further earth connections could result in parallel to the PE conductor. Therefore a corresponding measurement current signal is impressed into this low-impedance conductor loop. The impressed locating current is in turn evaluated in the GM400 onshore PE monitor and a corresponding relay message, LPR release, is generated.

Both methods work in parallel. When one of the two measuring methods recognises the PE connection and the corresponding release relay message appears, permission to switch the medium voltage can be carried out by implementing the relay contacts in the safety circuit.

Both methods can detect if the PE conductor has been interrupted and the medium-voltage feed is then switched off.

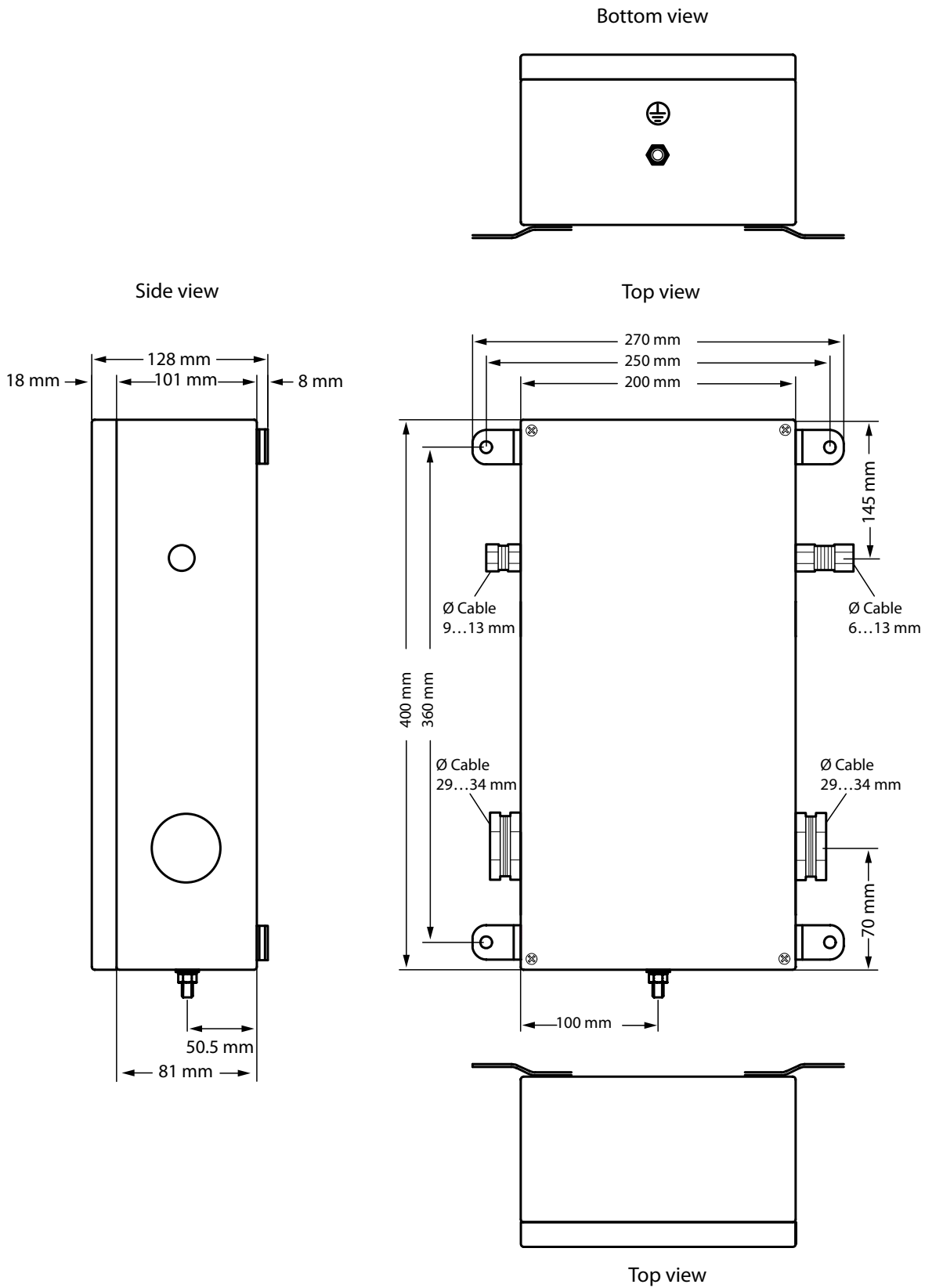
Components

The GM400 onshore PE monitor is composed of the following components:

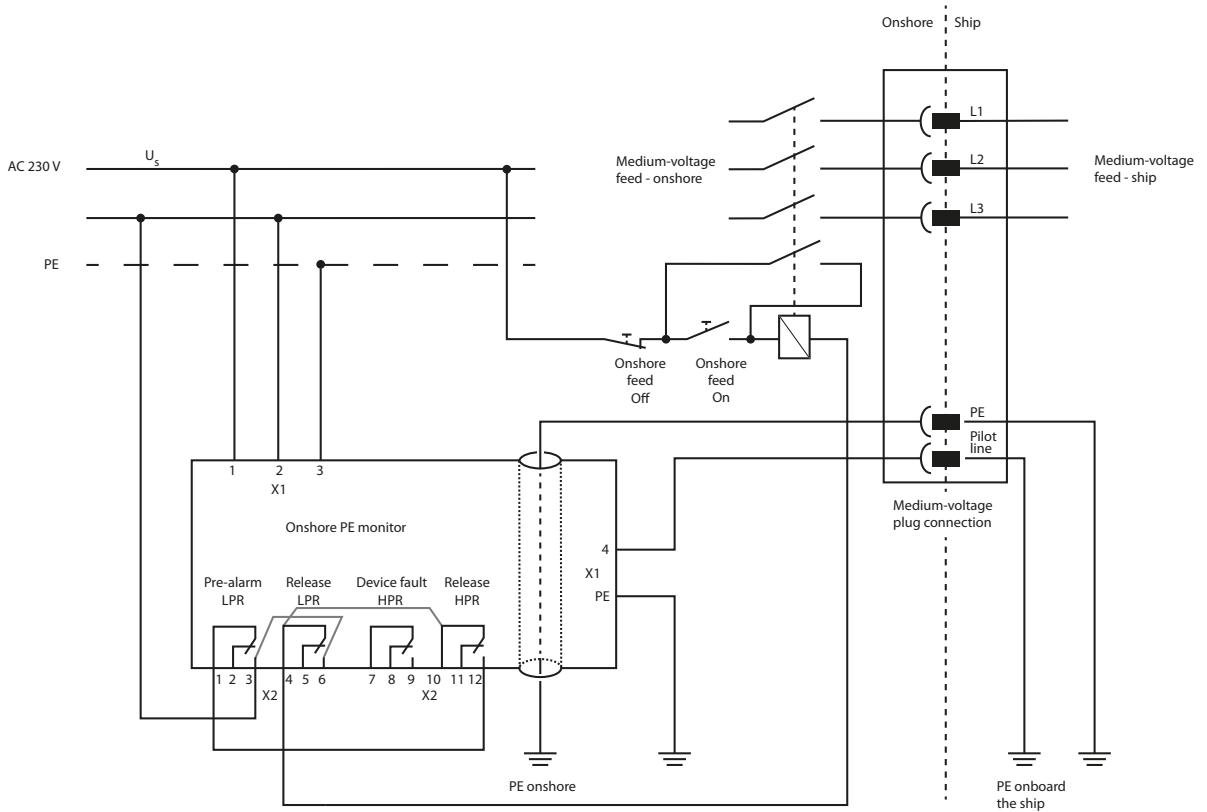
- Residual current monitoring device RCMA420-D-2
AC/DC 0...2000 Hz 10...500 mA
- W35AB current transformer D=35 mm
- Switch-mode power supply AN410
DC 120...370 V/AC 47...63 Hz 90...264 V
- Locating current generator PGH471
AC 20...575V/DC 20...504V
- Insulation fault locating device EDS460-D-2
2...10 mA, AC 100 mA...10 A

W35 current transformer D=35 mm

Dimension diagram



Connection example



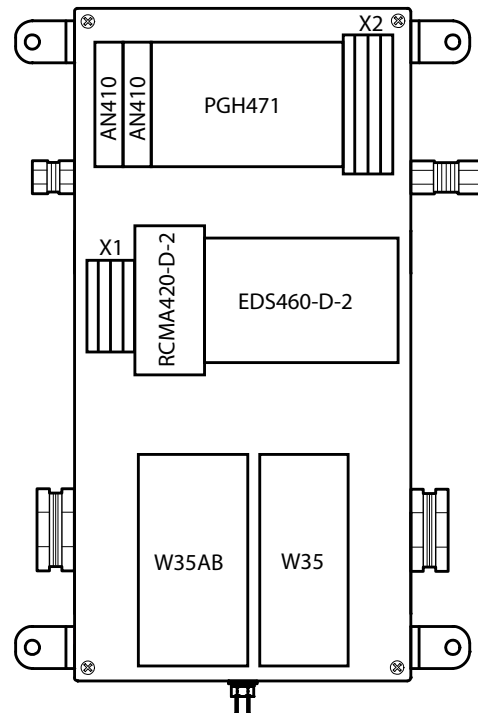
Operation

The manuals of the individually installed devices are required for operation. These can be found at:
www.bender-de.com/de/service-support/downloadbereich.html

Factory settings

- Response value: 5 mA
- RCMA 420-D-2: Relay 1: Pre-alarm
Relay 2: Main alarm
- The other 11 channels of the EDS460-L-2 are disabled

Device components



Technical data

Insulation coordination

Rated impulse voltage (IEC 60664-1) 2.5 kV
 Overvoltage category III
 Pollution degree 3

Supply voltage

Supply voltage U_s AC 230 V
 Operating range of U_s 0.85 . . . 1.15 x U_s
 Frequency range of U_s 47 . . . 63 Hz

Switching elements

Number of switching elements 4 x 1 changeover contact
 Operating principle N/C operation or N/O operation (N/C operation)*
 Electrical service life under rated operating conditions 10,000 switching operations
 Contact data acc. to IEC 60947-5-1
 Utilisation category AC-13 AC-14 DC-12 DC-12 DC-12
 Rated operational voltage 230 V 230 V 24 V 110 V 220 V
 Rated operational voltage UL 200 V 200 V 24 V 110 V 200 V
 Rated operational current 5 A 3 A 1 A 0.2 A 0.1 A
 Minimum contact rating 1 mA at AC/DC ≥ 10

PE loop measurement

HPR method:
 Locating current PGH471 ≤ 25 mA
 Test voltage ≤ 24 V
 Test cycle / test interval 2 s / 4 s
 Response time ≤ 30 s
 LPR method:
 Locating current RCMA420 ≤ 500 mA
 Operating time t_{ae} at $I_{\Delta n} = 1 \times I_{\Delta n1/2}$ ≤ 180 ms

Ordering details

Type	Art. No.
GM400 onshore PE monitor	S103 288

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