

isoLR275 / AGH-LR

Digital Ground Fault Monitor / Ground Detector

For Low-Resistance Ungrounded (Floating) AC/DC Systems



isoLR275 / AGH-LR

**Ground Fault Monitor / Ground Fault Relay
for Ungrounded AC, DC, and AC/DC Systems
Designed for Low-Resistance Systems**



**isoLR275 ground detector
with coupling device AGH-LR**

Device features

- Insulation monitoring for ungrounded systems: single- or three-phase AC 0...793 V, DC 0...1100 V
- Designed for low resistance, ungrounded systems
- Two separately adjustable response values 200 Ω...100 kΩ
- **AMP^{plus}** measuring principle
- Automatic adaptation to the system leakage capacitance
- Info key to display device settings and the system leakage capacitance
- Self monitoring with automatic alarm message
- Automatic self-test setting
- Settings stored in nonvolatile memory
- History memory with real-time clock
- Connection for external metering
- Internal and external test/reset
- Two separate alarms with two voltage-free SPDT contacts
- Normally energized or normally de-energized operation
- Backlit LCD display
- RS-485 interface

Description

The isoLR275 monitors for ground faults in ungrounded AC 0 - 793 V and DC 0 - 1100 V systems by measuring the system's insulation resistance. The isoLR275 is able to detect ground faults in ungrounded systems before leakage current may even be present. The isoLR275 is designed for ungrounded systems that operate with a low resistance to ground.

The **AMP^{plus}** measuring principle meets the requirements of modern power supplies which often include rectifiers, variable frequency drives, and pure DC components by automatically adapting itself to prevailing system conditions.

Applications

- AC systems, single- and three-phase
- Pure DC and mixed AC/DC systems
- UPS systems and battery systems
- Systems with variable frequency drives
- Systems with power conversion components, such as rectifiers and inverters
- Large industrial systems
- Systems with large furnaces / smelters
- Ungrounded systems including high leakage capacitances
- Systems with low resistance to ground

Function

When the insulation resistance from system to ground falls below the set response value, the alarm relays switch and the alarm LEDs activate. Two separately adjustable alarm contacts can be set to a prewarning and main warning alarm. The measured value is indicated on the LCD display or an externally connectable measuring instrument. A latching setting allows the device to reset automatically or require a manual reset. An external and internal test/reset can be activated remotely or on the device. A comprehensive INFO menu displays additional information such as the current leakage capacitance.

The isoLR275 continuously monitors the equipment ground connection to ensure proper operation. The device's easy-to-use onboard menu manages all settings via the detailed LCD screen.

Additional Features

The isoLR275 includes the following additional features:

- History memory with real-time clock to store all alarm messages with date and time stamp.
- Galvanically isolated RS-485 interface (BMS protocol) for data exchange with other BENDER devices
- Disconnect relays for the operation of several ground detectors in interconnected ungrounded systems
- Current output 0(4)...20 mA (electrically isolated)

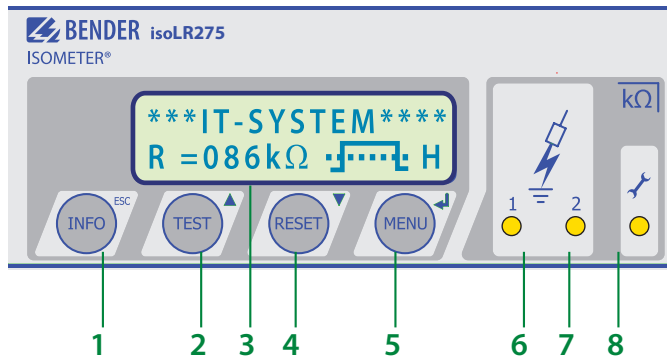
Use in interconnected ungrounded systems

Only one BENDER insulation monitor may be active when several ungrounded systems are coupled together. The disconnect relays and control inputs F1/F2 integrated into the isoLR275 guarantee no interference with other BENDER devices when system coupling is activated.

Measuring principle

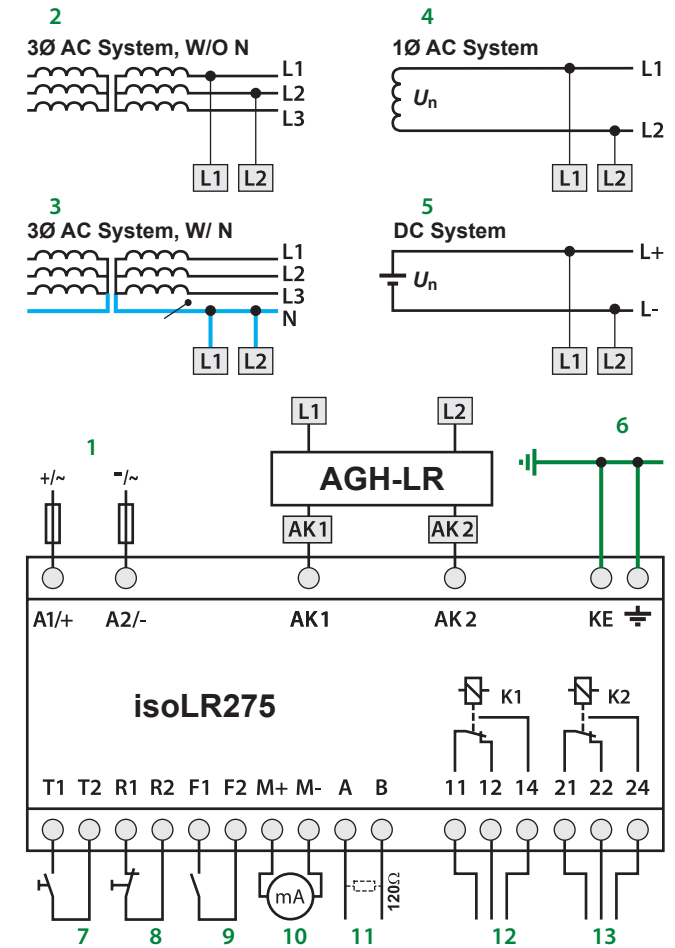
AMP^{plus} The isoLR275 uses the **AMP^{plus}** measuring principle. This measuring principle allows for the concise monitoring of modern power supply systems, pure DC systems, and systems where AC/DC rectification and power conversion may occur.

Front Display



- 1 - INFO / ESC key: Displays system information / goes back a step in menu
- 2 - TEST / UP key: Initiates self-test / moves up in menu
- 3 - LCD display
- 4 - RESET / DOWN key: Resets device when latching mode is active / moves down in menu
- 5 - MENU / ENTER key: Opens the main menu / confirms changes in menu
- 6 - LED "ALARM 1": Illuminates when alarm 1 is active.
- 7 - LED "ALARM 2": Illuminates when alarm 2 is active.
- 8 - LED "ERROR": Illuminates when a device error has occurred.

Wiring Diagram



- 1 - External supply voltage; 5 A fuse required for internal device protection
- 2,3 - Wiring diagram for a three-phase system. Only two connections to the system are necessary to monitor all three phases.
- 4 - Wiring diagram for a single-phase system
- 5 - Wiring diagram for a DC system
- 6 - Equipment ground connections
- 7 - External TEST terminal, N/O contact
- 8 - External RESET terminal, N/O contact
- 9 - STANDBY terminals: Closing F1/F2 will stop measurements.
- 10 - Analog outputs: 0/4... 20 mA
- 11 - RS-485 interface: Two-way communication with other BENDER devices
- 12 - Alarm relay K1: SPDT contact
- 13 - Alarm relay K2: SPDT contact

Technical Data: isoLR275

Insulation coordination acc. to IEC 60664-1 / IEC 60664-3

Rated voltage for isoLR275-3	AC 250 V
Rated impulse voltage/pollution degree	6 kV / III
Protective separation (reinforced insulation) between (A1/+, A2/-) - (11, 12, 14, 21, 22, 24) - (AK1, AK2, KE, PE, T1, T2, R1, R2, F1, F2, M+, M-, A, B)	
Voltage test acc. to IEC 61010-1	3.536 kV
Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV / III
Basic insulation between:	(11, 12, 14) - (21, 22, 24)
Voltage test acc. to IEC 61010-1	2.21 kV

Voltage ranges

Nominal system voltage U_n	via AGH-LR
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isoLR275-335:

Supply voltage U_s (also see nameplate)	AC 88...264 V**
Frequency range U_s	42...460 Hz
Power consumption	≤ 16 VA
Supply voltage U_s (also see nameplate)	DC 77...286 V**
Power consumption	≤ 8 W

isoLR275-327:

Supply voltage U_s (also see nameplate)	DC 19.2...72 V**
Power consumption	≤ 8 W

Response values

Response value R_{an1}	0.2...100 kΩ
Factory setting R_{an1} (Alarm1)	4 kΩ
Response value R_{an2}	0.2...100 kΩ
Factory setting R_{an2} (Alarm2)	1 kΩ
Relative uncertainty (7 kΩ...100 kΩ) (acc. to IEC 61557-8)	±15 %
Relative uncertainty (0.2 kΩ...7 kΩ)	±1 kΩ
Response time tan	see table TGH1468 starting from page 39
Hysteresis	25 %, +1 kΩ

Measuring circuit

Measuring voltage U_m (peak value)	± 50 V
Measuring current I_m (at $R_f = 0 \Omega$)	≤ 1.5 mA
Internal DC resistance DC R_i	≥ 35 kΩ
Impedance Z_i at 50 Hz	≥ 35 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 1100 V
Max. system leakage capacitance C_e	≤ 500 μF (150 μF)*

Displays

Display	backlit LCD display, two line
Characters (number / height)	2 x 16 / 4 mm
Display range measured value	0.2 kΩ...1 MΩ
Operating uncertainty	±15%, ±1 kΩ

Outputs/Inputs

Test/reset button	internal/external
Cable length test/reset button, external	≤ 10 m
Current output (load)	0/4...20 mA (500 Ω)
Accuracy current output, related to the value indicated (1 kΩ...100 kΩ)	± 15 %, ± 1 kΩ

Serial interface

Interface/protocol	RS-485 / BMS
Connection terminals	A/B
Cable length	≤ 1200 m
Shielded cable (shield to PE on one end)	2-core, ≥ 0.6 mm ² , e. g. J-Y(St)Y 2x0.6
Terminating resistor	120 Ω (0.5 W)
Device address, BMS bus	1...30 (3)*

Switching elements

Switching elements	2 SPDT contacts: K1 (Alarm1), K2 (Alarm2, device error)
Operating mode K1, K2 (Alarm1 / Alarm2)	normally energized or normally de-energized (N/D operation)*

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 current	5 A	3 A	1 A	0.2 A	0.1 A
Minimum contact rating	1 mA at AC/DC ≥ 10 V				

Environment/EMC

EMC	
not suitable for household and small companies	IEC 61326-2-4 Ed. 1.0
Operating temperature	- 13 °F...+ 158 °F (- 25 °C...+ 70 °C)
Classification of climatic conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3K5 (with condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (with condensation and formation of ice)
Long-term storage (IEC 60721-3-1)	1K4 (with condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	
for screw fixing with accessories B990056	3M7
for DIN rail mounting	3M4
Transport (IEC 60721-3-2)	2M2
Long-term storage (IEC 60721-3-1)	1M3

Connection

Connection	screw-type terminals
Connection, rigid/flexible	0.2...4 mm ² / 0.2...2.5 mm ²
Connection flexible with ferrule, without/with plastic sleeve	0.25...2.5 mm ²
Tightening torque	0.5 Nm
Conductor sizes (AWG)	24...12
Cable length between isoLR275 and AGH-LR	≤ 0.5 m

Other

Operating mode	continuous operation
Mounting	display-oriented
Distance to adjacent devices	≥ 30 mm
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Type of enclosure	X112, free from halogen
DIN rail mounting	DIN EN 60715 / IEC 60715
Screw mounting by means of support	2 x M4
Flammability class	UL94 V-0
Software version	D369 V2.1
Weight	< 510 g

()* = factory setting

The values marked with** are absolute values

Technical Data: AGH-LR

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 800 V
Rated impulse voltage/pollution degree	8 kV/3

Voltage ranges

Nominal system voltage U_n	AC, 3(N)AC 0...793 V, DC 0...1100 V
Nominal frequency f_n	DC, 10...460 Hz
Max. AC voltage U_{\sim} in the frequency range $f_n = 0.1...10$ Hz:	$U_{\sim} \text{ max} = 110 \text{ V/Hz} * f_n$

Environment/EMC

EMC	IEC 61326-2-4 Ed. 1.0
Operating temperature	- 13 °F...+ 158 °F (- 25 °C...+ 70 °C)
Classification of climatic conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3K5 (with condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (with condensation and formation of ice)
Long-term storage (IEC 60721-3-1)	1K4 (with condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3M7
Transport (IEC 60721-3-2)	2M2
Long-term storage (IEC 60721-3-1)	1M3

Connection

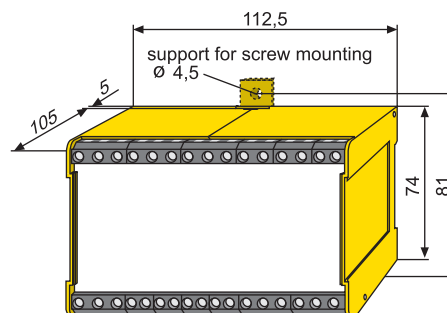
Connection	screw-type terminals
Connection, rigid/flexible	0.2...4 mm ² / 0.2...2.5 mm ²
Connection flexible with ferrules, without/with plastic sleeve	0.25...2.5 mm ²
Tightening torque	0.5 Nm
Conductor sizes (AWG)	24...12
Cable length between isoLR275 and AGH-LR	≤ 0.5 m

Other

Operating mode	continuous operation
Mounting	cooling slots must be ventilated vertically!
Distance to adjacent devices	≥ 30 mm
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Type of enclosure	X112, free from halogen
DIN rail mounting	DIN EN 60715 / IEC 60715
Screw mounting	2 x M4
Flammability class	UL94 V-0
Weight	< 230 g

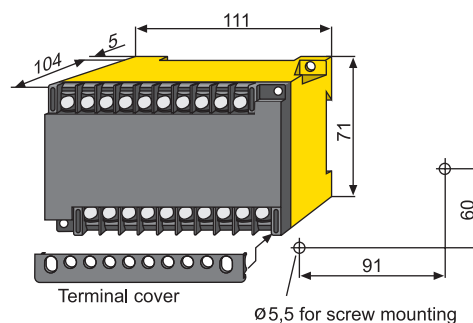
Dimensions: isoLR275

Dimensions in mm



Dimensions: AGH-LR

Dimensions in mm



Ordering information

Type	Nominal system voltage U_n	Supply voltage U_s	Art. No.
isoLR275-327 + AGH-LR-3	3(N) AC 0...793 V / DC 0...1100 V	DC 19.2...72 V	B 9106 5702W
isoLR275-335 + AGH-LR	3(N) AC 0...793 V / DC 0...1100 V	AC 88...264 / DC 77...286 V	B 9106 5703W

Note: isoLR275 and AGH-LR are only available as a set.

Accessories

Type	Art.-Nr.
Screw fixing	B 990 056



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