

A-ISOMETER® IRDH275**Ground Fault Monitor / Ground Fault Relay
for Ungrounded AC, DC, and AC/DC Systems****A-ISOMETER® IRDH275****Device features**

- Insulation monitoring for ungrounded systems: single- or three-phase AC 0...793 V, DC 0...650 V
- Nominal voltage extendable via coupling device
- Two separately adjustable response values 1 kΩ...10 MΩ
- **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
- Connection for external metering
- Internal and external test/reset
- Two separate alarms with two voltage-free SPDT contacts
- Normally energized or normally deenergized operation
- Backlit LCD display
- RS-485 interface

Approvals**Product description**

The A-ISOMETER® IRDH275 monitors for ground faults in ungrounded AC 0 - 793 V and DC 0 - 650 V systems by measuring the system's insulation resistance. The IRDH275 is able to detect ground faults in ungrounded systems before leakage current may even be present.

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.

An optional voltage coupler extends the nominal voltage range up to 7200 V. An external power supply allows offline/standby systems to be monitored. For a panel-mounted version of this device, refer to the IRDH375(B) series.

Application

- 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
- Ungrounded systems including high leakage capacitances
- Coupled ungrounded systems

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 fault storage 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 IRDH275 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.

"B" Version

The IRDH275B 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 A-ISOMETER®s in interconnected ungrounded systems
- Current output 0(4)...20 mA (electrically isolated)

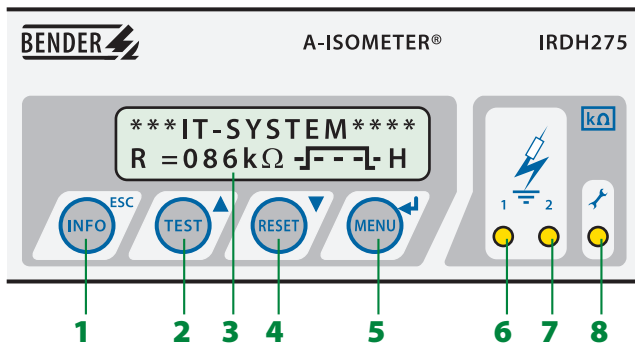
Use in interconnected ungrounded systems

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 IRDH275 guarantee no interference with other BENDER devices when system coupling is activated.

Measuring principle

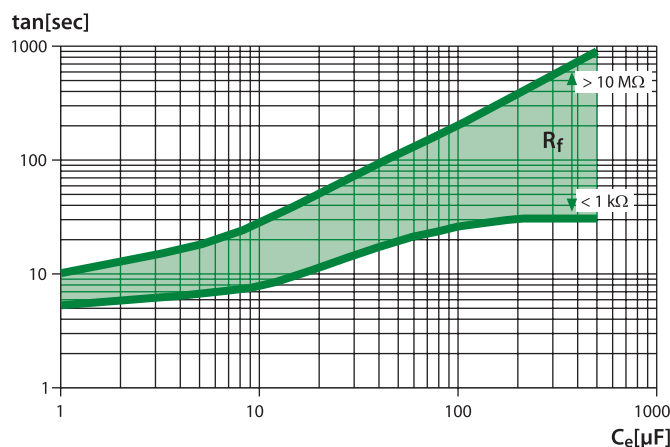
AMP^{plus} The IRDH275(B) series uses the patented **AMP^{plus}** measuring principle. This measuring principle allows for the concise monitoring of modern power supply systems, pure DC systems, and systems where AC/DC rectification and power conversion may occur.

Operating elements: IRDH275



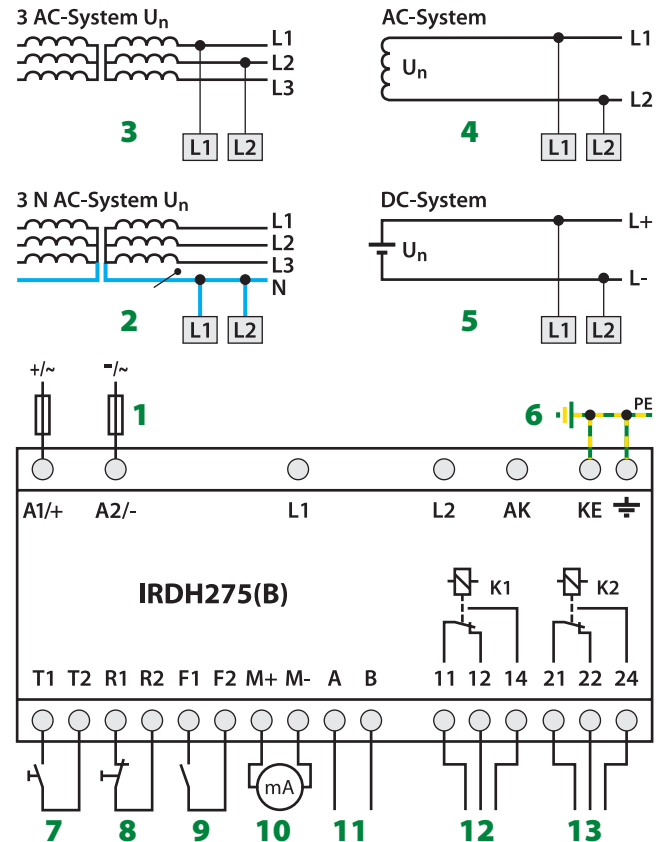
- 1 - INFO key: displays pertinent system information
ESC key: Goes back a step inside device's menu
- 2 - TEST button: Activates self-test
Arrow up key: Scrolls up inside device's menu
- 3 - LCD display
- 4 - RESET button: Resets device
Arrow down key: Scrolls down inside device's menu
- 5 - MENU key: Activates device's internal menu
Enter key: Confirm change inside device's menu
- 6 - Alarm LED 1 lights: Insulation fault, 1st warning level reached
- 7 - Alarm LED 2 lights: Insulation fault, 2nd warning level reached
- 8 - LED lights: Displays corresponding ground fault

Response times



A-ISOMETER® response times in relation to the system leakage capacitances: $C_e = 1 \dots 500 \mu\text{F}$, $U_n = 0 \dots 793 \text{ V/50 Hz}$

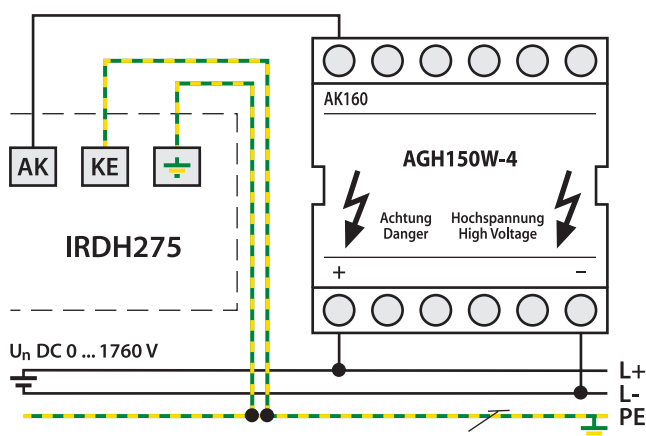
Wiring diagram



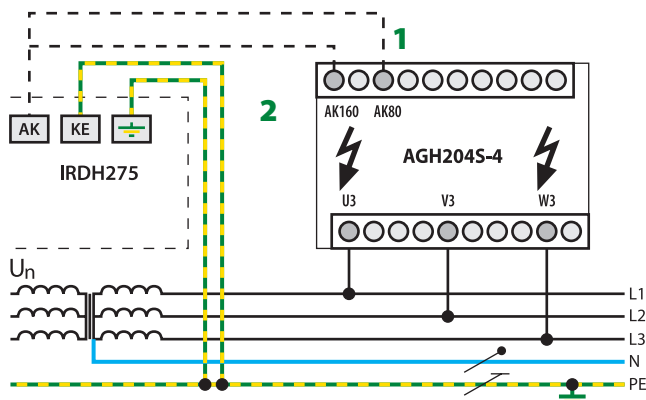
- 1 - External supply voltage used to power device
- 2, 3 - Wiring diagram for a three-phase system. Only two connections to the system are necessary to monitor all three phases.
- 4 - Wiring diagram for a single-phase system
- 5 - Wiring diagram for a DC system
- 6 - Equipment ground connections
- 7 - External test button (normally open contact)
- 8 - External reset button (normally closed contact). When the terminals are open, the fault message will not be stored.
- 9 - Standby contact. When the contact is closed, no insulation measurements take place.
- 10 - IRDH275: Analog output, electrically isolated: $0 \dots 400 \mu\text{A}$
IRDH275B: Analog output, electrically isolated: $0 \dots 20 \text{ mA}$ or $4 \dots 20 \text{ mA}$
- 11 - RS-485 interface:
IRDH275: One-way ASCII stream detailing status
IRDH275B: Two-way communication with other BENDER devices
- 12 - Alarm relay 1, normally energized or deenergized contact
- 13 - Alarm relay 2/System Fault Relay, normally energized or deenergized contact

Wiring diagrams – IRDH275 connected to various voltage couplers

A-ISOMETER® IRDH275 with coupling device AGH150W-4

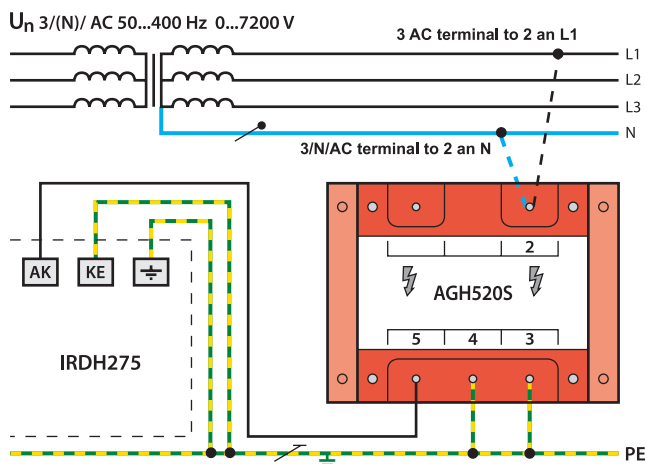


A-ISOMETER® IRDH275 with coupling device AGH204S-4



- 1 - without rectifier $U_n = 3AC\ 0...1650\ V$ (DC max. 1000 V)
 2 - with rectifier $U_n = 3AC\ 0...1300\ V$ (peak voltage downstream of the rectifier or intermediate voltage max. 1840 V)

A-ISOMETER® IRDH275 with coupling device AGH520S



Ordering information (standard and "B" option)

Type	Nominal voltage U_n	Supply-voltage U_s	Art. No.
IRDH275-435	AC 0...793 V/ DC 0...650 V*	AC 88...264/ DC 77...286 V*	B 9106 5100
IRDH275B-435	AC 0...793 V/ DC 0...650 V*	AC 88...264/ DC 77...286 V*	B 9106 5101
IRDH275-427	AC 0...793 V/ DC 0...650 V*	DC 19.2...72 V	B 9106 5104
IRDH275B-427	AC 0...793 V/ DC 0...650 V*	DC 19.2...72 V	B 9106 5105

* Absolute values

Accessories

External panel mounted meter (0 - 400 μA output)

Type	Art. No.
7204-1421	B 986 763
9604-1421	B 986 764

External panel mounted meter (0(4) - 20 mA output)

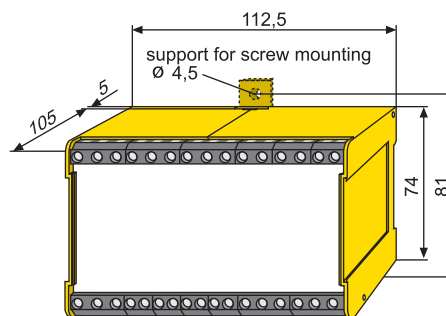
Type	Art. No.
9620-1421	B 986 841

Coupling devices

Type	Nominal system voltage U_n	Art. No.
AGH150W-4	DC 0...1760 V	B 9801 8006
AGH204S-4	AC 0...1650 (1300) V	B 914 013
AGH520S	AC 0...7200 V	B 913 033

Dimension diagram XM112

Dimensions in mm



Technical data A-ISOMETER® IRDH275

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...650 V
Rated frequency f_n	DC, 0.2...460 Hz
Supply voltage U_s	AC 88...264 V, DC 77...286 V
Frequency range U_s	20...460 Hz
Power consumption	≤ 14 VA

Response values

Response value R_{an1} (Alarm 1)	1 kΩ...10 MΩ
Response value R_{an2} (Alarm 2)	1 kΩ...10 MΩ
Absolute error (1 kΩ...10 kΩ)	+ 2 kΩ
Relative percentage error (10 kΩ...10 MΩ)	0 %...+ 20 %
Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1 \mu F$	< 5 s
Measuring time	see characteristic curves (TGH page 69)
Hysteresis (1 kΩ...10 kΩ)/(10 kΩ...10 MΩ)	+ 2 kΩ/25 %

Measuring circuit

Measuring voltage U_m (peak value)	± 50 V
Measuring current I_m (at $R_F = 0 \Omega$)	≤ 278 μA
Internal DC resistance R_i	≥ 180 kΩ
Impedance Z_i at 50 Hz	≥ 180 kΩ
Permissible extraneous DC voltage U_{ig}	≤ 1200 V
Permissible system leakage capacitance	≤ 500 μF
Factory setting	150 μF

Displays

Display (illuminated)	two-line display
Characters (number of characters, height)	2 x 16 characters/4 mm
Display range, measuring value	1 kΩ...10 MΩ
Absolute error (1 kΩ...10 kΩ)	± 1 kΩ
Relative percentage error (10 kΩ...10 MΩ)	± 10 %

Outputs

Test/reset button	internal/external
Current output measuring instrument	120 kΩ
Load	≤ 400 μA (12.5 kΩ)
Load B version	≤ 20 mA (500 Ω)

Serial interfaces

IRDH275	RS-485/ASCII
IRDH275B	RS-485/BMS
Max. cable length	1200 m
Recommended cable (shielded, shield on one side connected to ground)	J-Y(ST)Y 2 x 0.6
Terminating resistor	120 Ω (0.5 W)

Switching elements

Number of switching elements	2 SPDT contacts
Operating principle	normally energized/denergized operation
Factory setting	normally deenergized operation
Electrical service life, number of cycles	12000
Contact class IIB in accordance with DIN IEC 60255-0-20	
Rated contact voltage	AC 250 V/DC 300 V
Making capacity	AC/DC 5 A
Breaking capacity	2 A, AC 230 V, PF = 0.4 – 0.2 A, DC 220 V, L/R = 0.04 s
Minimum contact current at DC 24 V	2 mA (50 mW)

General data

Shock resistance IEC 60068-2-27 (during operation)	15 g/11 ms
Bumping IEC 60068-2-29 (during transport)	40 g/6 ms
Vibration resistance IEC 60068-2-6 (during operation)	1 g/10...150 Hz
Vibration resistance IEC 60068-2-6 (during transport)	2 g/10...150 Hz
Ambient temperature (during operation/during storage)	- 10 °C...+ 55 °C/- 40 °C...+ 70 °C
Climatic class acc. to DIN IEC 60721-3-3	3K5
Operating mode	continuous operation
Mounting	display oriented
Connection	screw-type terminals
Connection properties rigid/flexible	AWG 24...12 / 24...14
Degree of protection, internal components /terminal (DIN EN 60529)	IP30 / IP20, NEMA 1
DIN rail mounting acc. to	DIN EN 60715/IEC 60715
Screw mounting, mounting plate	2 x M4
Flammability class	UL94V-0
Product standards	DIN EN 61557-8: 1998-05 EN 61557-8: 1997-03, IEC 61557-8: 1997-02 ASTM F1669M-96, ASTM F1207M-96

Operating manual	TGH1361
Weight	approx. 1.1 lb

Option "W"

Shock resistance IEC 60068-2-27 (during operation)	30 g/11 ms
Bumping IEC 60068-2-29 (during transport)	40 g/6 ms
Vibration resistance IEC 60068-2-6	1.6 mm/10...25 Hz, 4 g/25...150 Hz
Ambient temperature (during operation)	- 40 °C...+ 70 °C
Ambient temperature (during transport)	- 40 °C...+ 85 °C

Ordering information: IRDH275 (For all models, including special options)

IRDH275

B

W

- 435

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①

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Code 2: Auxiliary supply voltage

Modifier	Supply voltage U_s (absolute values)
"435"	DC 77...286 V / AC 42...460 Hz 88...264 V
"425"	DC 10.2...36 V
"427"	DC 19.2...72 V

Code 1: Optional features

Modifier	Additional features
Nothing	Standard device
"B"	Real-time clock with history memory, 0(4) - 20 mA output
"W"	Additional vibration protection, greater temperature range
"BW"	Both features of the "B" and "W" above