

A-ISOMETER® IRDH275 Photovoltaic

Insulation monitoring device for unearthed AC, AC / DC and DC systems (IT systems) for photovoltaic systems



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Device features

- Insulation monitoring for unearthed AC, AC / DC systems 0...793 V, DC 0...650 V
- Nominal voltage extendable via coupling device
- Two separately adjustable response values 1 k Ω ...10 M Ω
- **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
- Automatic self test, selectable
- Connection for external k Ω indication
- Test and reset button
- Connection external test and reset button
- Two separate alarm relays with two voltage-free changeover contacts
- N / O or N / C operation
- Backlit LC display
- RS-485 interface

Approvals



Product description

The A-ISOMETER® of the IRDH275 series is designed to monitor the insulation resistance of unearthed main circuits (IT systems) AC, AC / DC 0...793 V resp. DC 0...650 V. Solar systems containing inverters and isolating transformers are often designed as IT systems. IRDH275 device variants using an **AMP^{Plus}** measuring principle capable of adapting to slow voltage fluctuations meet the particular requirements of modern solar systems. Due to wide spatial distribution or EMC interference suppression methods often high leakage capacitances against earth occur in these systems. Considering this, the IRDH275 automatically adapts to the system conditions in order to optimise the measuring time.

In combination with a coupling device, the devices can also be used for higher voltages. An external supply voltage allows de-energised systems to be monitored too.

Application

- AC, DC or AC / DC main circuits
- Solar systems with directly connected inverters
- Solar systems with high system leakage capacitances of up to 999 μ F
- Solar systems with high but slow voltage fluctuations
- Systems including switched-mode power supplies
- Coupled IT systems

Function

When the insulation resistance between the system conductors and earth falls below the set response value, the alarm relays switch and the alarm LEDs light up. Two separately adjustable alarm relays allow to distinguish between prewarning and alarm. The measured value is indicated on the LC display or an externally connectable measuring instrument. In this way any changes, for example when circuits are connected to the system, can be recognised easily. The fault message can be stored. The fault memory can be reset by pressing the reset button. By pressing the test button, the function of the device as well as the connections to system and earth can be tested. Pressing the Info key provides additional information, such as the existing system leakage capacitance or device settings.

The function of the device and the system and earth connections are continuously monitored. When a fault occurs, the system fault relay switches and the alarm LED "system fault" lights up. The parameterisation of the device can be carried out via the LC display or the function keys integrated in the front plate.

Device version IRDH275B

Device version IRDH275B includes the following additional functions:

- 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
- Isometer disconnecting relays for the operation of several A-ISOMETER®s in coupled IT systems
- Current output 0(4) ...20 mA (electrically isolated)

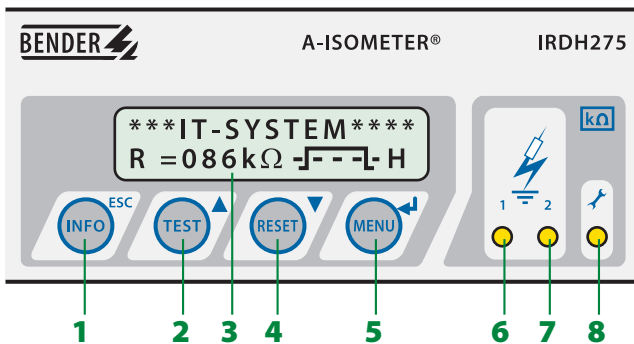
Use in coupled IT systems

Only one A-ISOMETER® may be active when several IT systems are coupled. Isometer disconnecting relays and the control inputs F1/F2 integrated in version IRDH275B guarantee that this requirement will always be met and make them suitable for coupled systems too.

Measuring principle

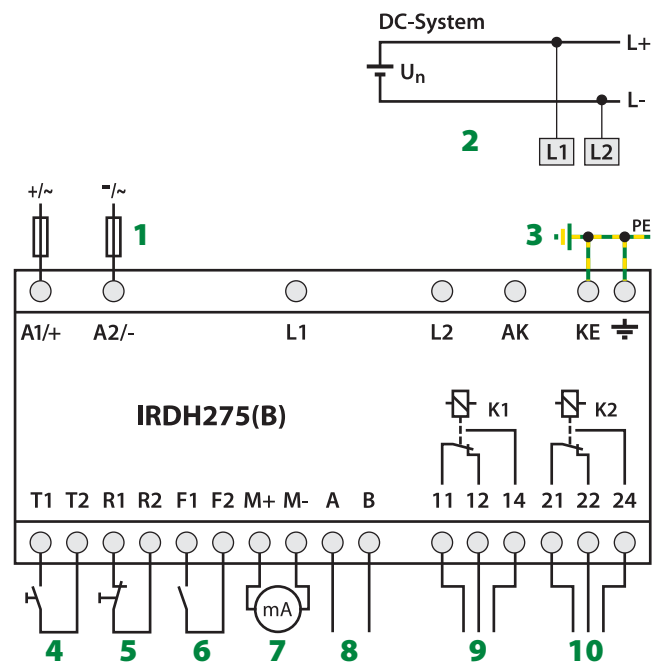
AMP^{Plus} The IRDH275(B) uses the patented **AMP^{Plus}** measuring principle. This measuring method allows concise monitoring of modern power supply systems, also in case of extensive, directly connected DC components and high system leakage capacitances.

Operating elements IRDH275



- 1 - INFO key: to query standard information
ESC key: back to the menu function
- 2 - TEST button: to call up the self test
Arrow up key: parameter change, scroll
- 3 - LC display
- 4 - RESET button: to delete alarm and fault messages
Arrow down key: parameter change, scroll
- 5 - MENU key: to activate the menu system
Enter key: to confirm parameter change
- 6 - Alarm LED 1 lights up: insulation fault, 1st warning level reached
- 7 - Alarm LED 2 lights up: insulation fault, 2nd warning level reached
- 8 - LED lights up: a system fault exists

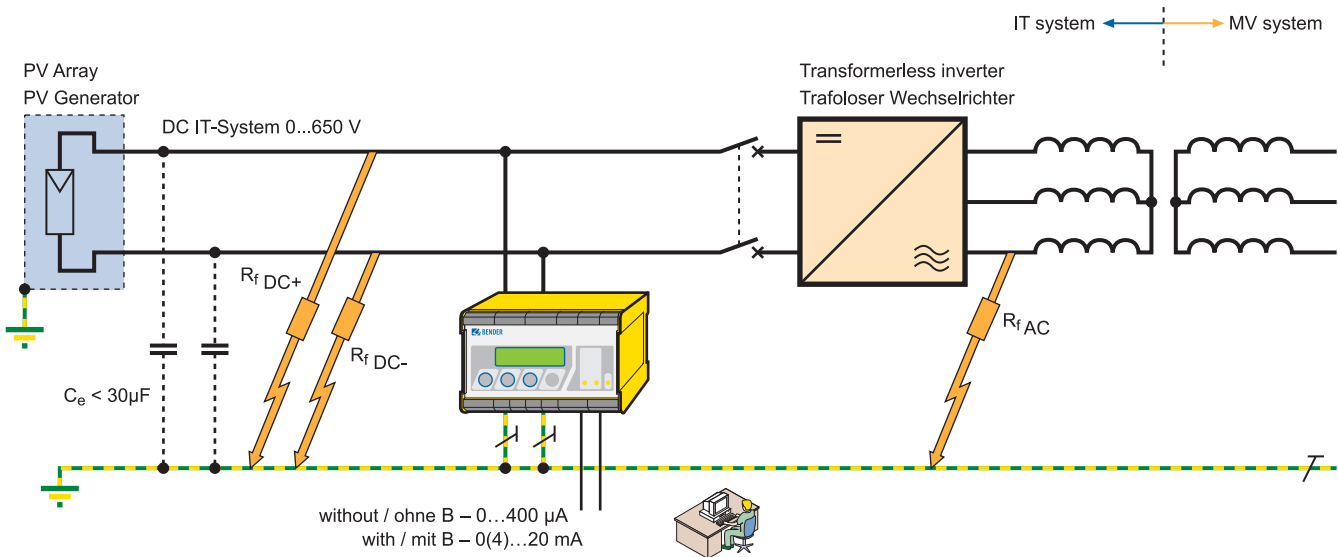
Wiring diagram



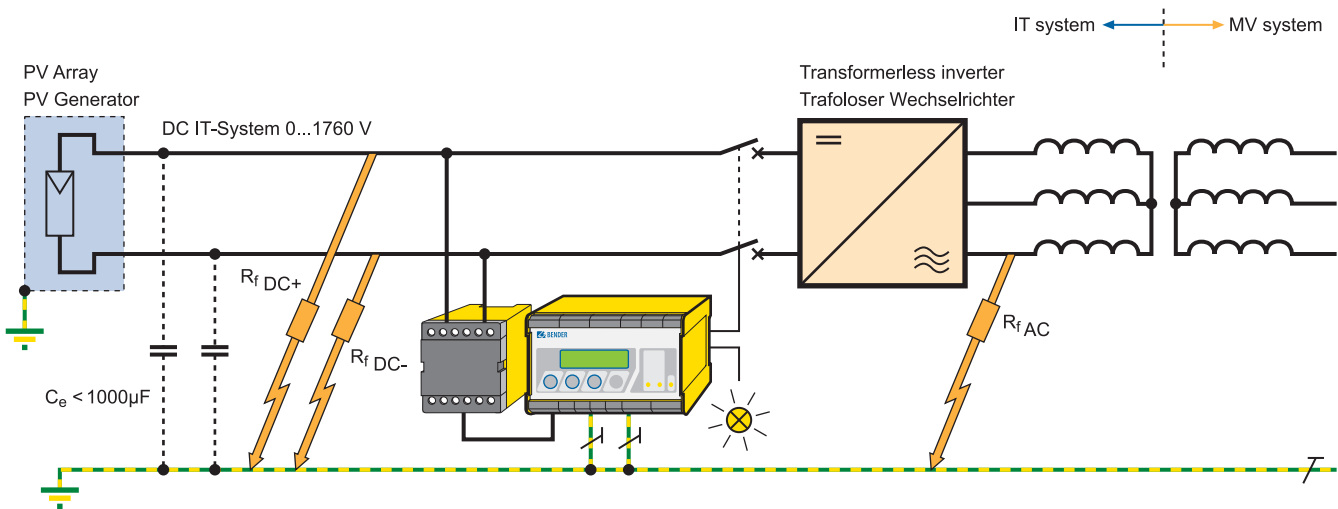
- 1 - Supply voltage U_S (see ordering information) via fuse
- 2 - Connection of the DC systems being monitored: Connect terminal L1 to conductor L+, terminal L2 to conductor L-
- 3 - Separate connection of the equipotential bonding conductor to PE and KE
- 4 - External test button "T1 / T2" (N / O contact)
- 5 - External reset button "R1 / R2" (N / C contact or wire jumper)
When the terminals are open, the fault message will not be stored.
- 6 - Standby by means of the function input "F1, F2": with the contact in closed position no insulation measurement takes place (Isometer disconnection B version only / no disconnection when operated via AK).
- 7 - IRDH275: Current output, electrically isolated: 0...400 μ A
IRDH275B: Current output, electrically isolated:
0...20 mA or 4...20 mA
- 8 - RS-485 interface
- 9 - Alarm relay: Alarm 1
- 10 - Alarm relay: Alarm 2 / system

Wiring diagram

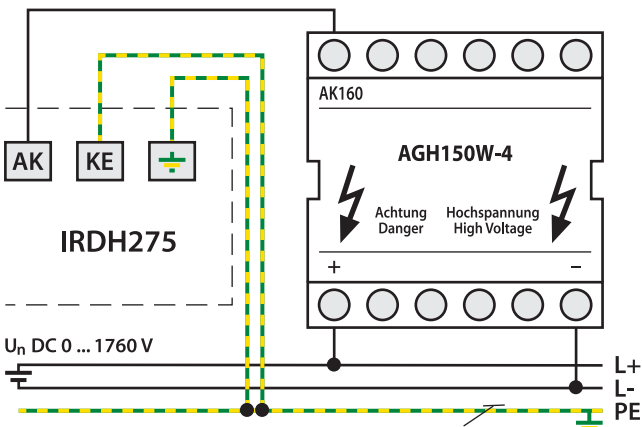
PV generator unearthed (IT system) with nominal voltage DC ≤ 650 V and A-ISOMETER® IRDH275



PV generator unearthed (IT system) with nominal voltage ≤ DC 1760 V and A-ISOMETER® IRDH275 with coupling device AGH150W-4

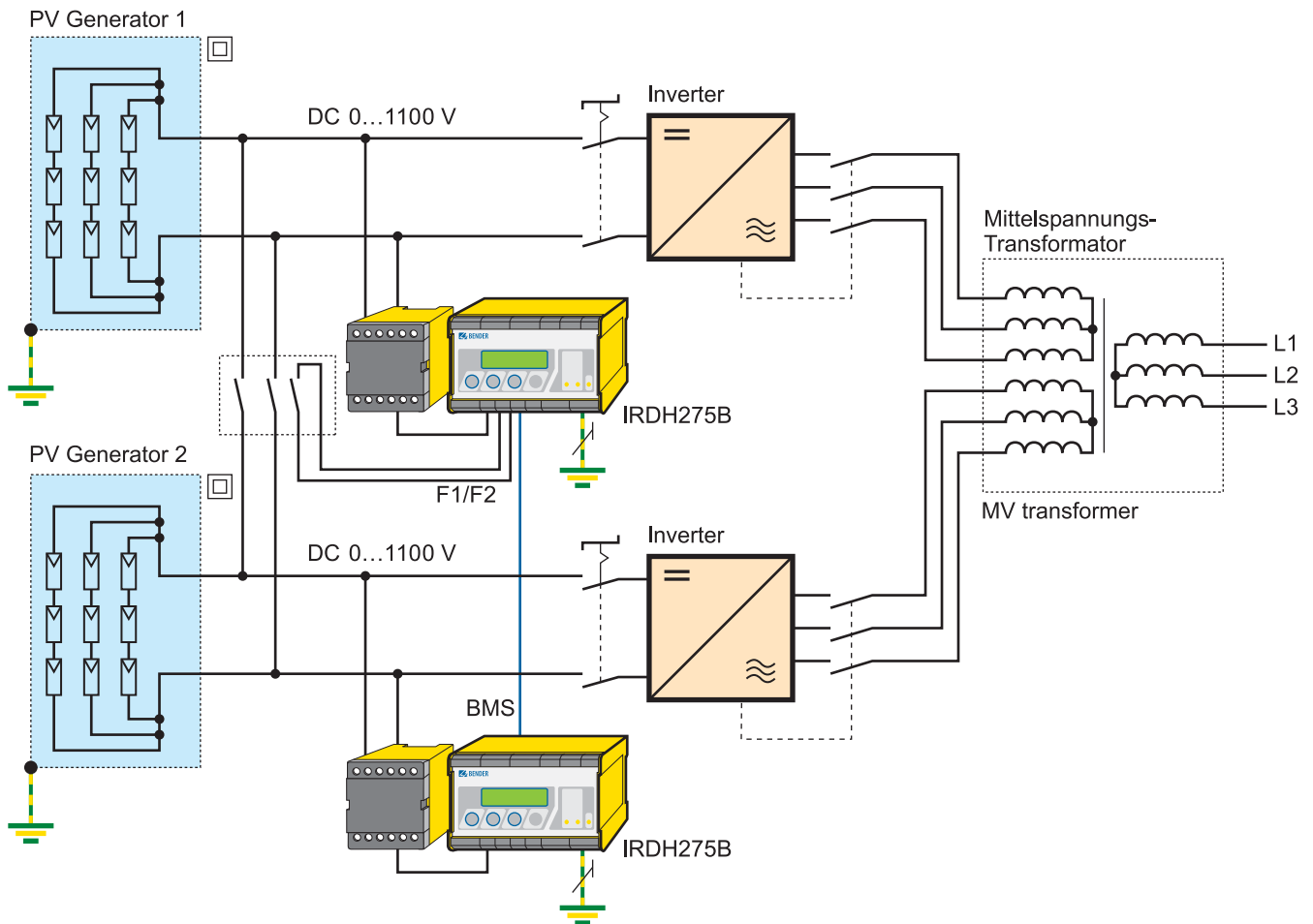


Wiring diagram – IRDH275 with coupling device AGH150W-4

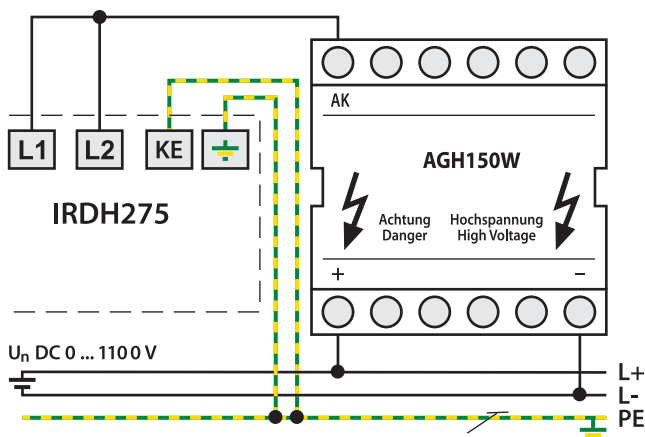


Please note: Choose adjustment "AK160" in the IRDH275B menu!

Several PV generators unearthed (IT system) with nominal voltage \leq DC 1000 V as a coupled system and A-ISOMETER® IRDH275B with coupling device AGH150W



Wiring diagram – IRDH275B with coupling device AGH150W



Please note: Choose adjustment "AK160" in the IRDH275B menu!

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 k Ω ...10 M Ω
Response value R_{an2} (Alarm 2)	1 k Ω ...10 M Ω
Relative uncertainty (1 k Ω ...10 k Ω)	+ 2 k Ω
Relative uncertainty (10 k Ω ...10 M Ω)	0 %...+ 20 %
Response time t_{an} $R_F = 5$ K, $R_{an} = 10$ K	< 360 s
Hysteresis (1 k Ω ...10 k Ω) / (10 k Ω ...10 M Ω)	+ 2 k Ω / 25 %

Measuring circuit

Measuring voltage U_m (peak value)	± 50 V
Measuring current I_m (at $R_F = 0$ Ω)	≤ 278 μ A
Internal DC resistance R_i	≥ 180 k Ω
Impedance Z_i at 50 Hz	≥ 180 k Ω
Permissible extraneous DC voltage U_{fg}	≤ 1200 V
Permissible system leakage capacitance C_e	≤ 999 μ F
Factory setting	999 μ F

Displays

Display (illuminated)	two-line display
Characters (number of characters, height)	2 x 16 characters / 4 mm
Display range, measuring value	1 k Ω ...10 M Ω
Operating uncertainty (1 k Ω ...10 k Ω)	± 1 k Ω
Operating uncertainty (10 k Ω ...10 M Ω)	± 10 %

Outputs

Test / reset button	internal / external
Current output for measuring instrument	120 k Ω
Load	≤ 400 μ A (12.5 k Ω)
Load, B version	≤ 20 mA (500 Ω)

Serial interfaces

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

Switching elements

Number of switching elements	2 x 1 changeover contact
Operating principle	N / O or N / C operation
Factory setting	N / O operation
Electrical endurance, 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, $\cos \phi = 0.4$ – 0.2 A, DC 220 V, L / R = 0.04 s
Contact rating 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 (transport)	40 g / 6 ms
Vibration resistance IEC 60068-2-6 (during operation)	1 g / 10...150 Hz
Vibration resistance IEC 60068-2-6 (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	0.2...4 mm ² / 0.2...2.5 mm ²
Degree of protection, internal components / terminal (DIN EN 60529)	IP30 / IP20
DIN rail mounting acc. to	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. 510 g

Ordering information A-ISOMETER® IRDH275			
Type	Nominal system voltage U_n	Supply voltage U_s	Art. No.
IRDH275B-49335	AC 0...793 V / DC 0...650 V*	AC 88...264 / DC 77...286 V*	B 9106 5123
IRDH275-49335	AC 0...793 V / DC 0...650 V*	AC 88...264 / DC 77...286 V*	B 9106 5127
IRDH275B-49327	AC 0...793 V / DC 0...650 V*	DC 19.2...72 V	B 9106 5129

* Absolute values

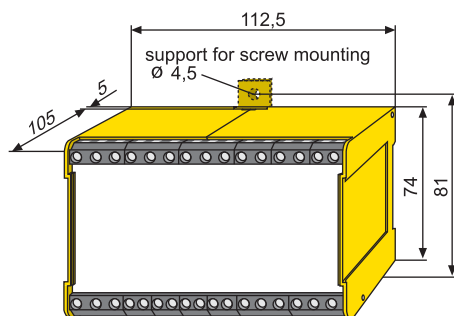
Accessories	
External kΩ measuring instrument 400 μA	
Type	Art. No.
7204-1421	B 986 763
9604-1421	B 986 764

External kΩ measuring instrument 20 mA	
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
AGH150W	DC 0...1100 V	B 915 576

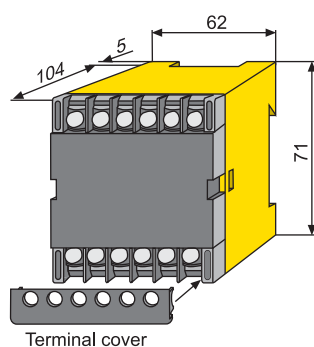
Dimension diagram XM112

Dimensions in mm



Dimension diagram X150

Dimensions in mm





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