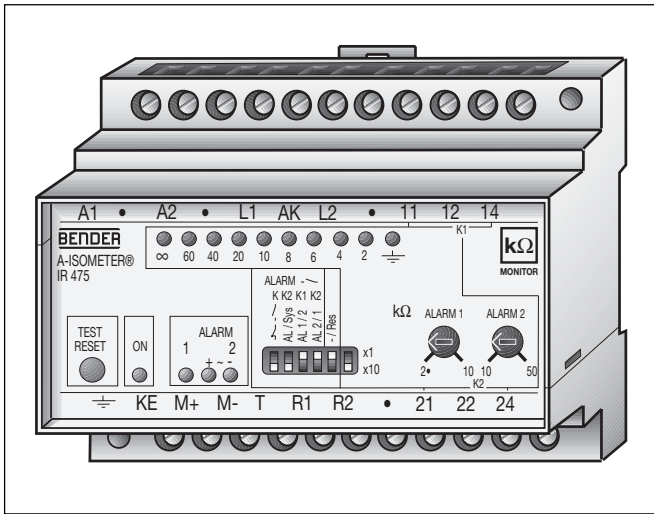




Insulation Monitoring Device for IT AC Distribution Systems with galvanically connected DC Circuits and for IT DC Systems (Isolated Power)



Product description

The A-ISOMETER® IR475LY... monitors the insulation resistance of IT systems (isolated power) up to AC 690 V or DC 400 V. The device can be used universally in AC, DC and AC/DC systems.

The A-ISOMETER is particularly suited for DC and AC systems with galvanically connected DC circuits. DC components or capacitances against earth (e.g. EMC) up to 20 µF do not influence the measuring result. The AMP measuring method guarantees reliable insulation monitoring of AC/DC systems as well as pure AC or DC systems.

Function

Within the A-ISOMETER a pulsating AC measuring voltage is generated. The positive pole is connected to the system to be monitored via the terminals L1/L2. The negative pole is connected to earth via an electronic circuitry and the terminals \perp /KE. The connections are monitored continuously. If one of these connections is interrupted, the alarm LEDs flash and the alarm relays switch.

The measuring pulse consists of positive and negative pulses of the same amplitude. The pulse duration depends on the respective leakage capacitances and insulation resistance of the system to be monitored.

The measuring circuit is closed via ohmic insulation faults. When the insulation value falls below the pre-set response value, the alarm LEDs "ALARM" illuminate and the alarm relays switch. The alarm LEDs "ALARM 2" indicate either "AC earth fault" or "DC earth fault".

Insulation faults in DC circuits which are directly connected to the AC system are only monitored when the rectifiers carry a load of at least 5 to 10 mA.

If the fault indication is to be stored, the terminals R1/R2 have to be bridged by an external reset button (NC contact) or the DIP switch has to be set to <Res>. The fault memory can be reset by pressing the front-mounted <TEST/RESET> button for a short time or by using an external reset button, provided that the insulation resistance is at least 25% above the pre-set response value.

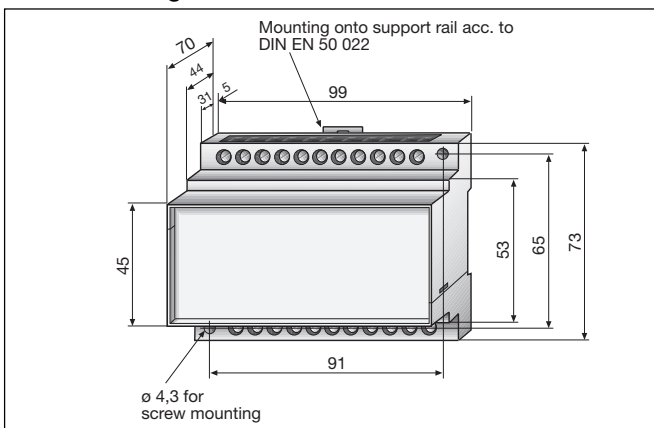
The correct function of the measuring circuit, the alarm LEDs and the alarm relays can be checked by using the test button.

The alarm relay 21-22-24 can optionally be used for fault alarm or system fault alarm (interruption of the connecting leads L1/L2 resp. \perp /KE, failure of the electronic measuring circuit). Both alarm relays can indicate both Alarm 1 as well as Alarm 2.

The response range can be selected by using the DIP switch x1 (2...10 kΩ, 10...50 kΩ) or x10 (20...100 kΩ, 100...500 kΩ). Scaling of the LED bar graph kΩ indicator is also related to the pre-set multiplier, e.g. x1 (4 = 4 kΩ), x10 (4 = 40 kΩ).

- ⇒ Insulation monitoring of IT AC, DC and AC/DC systems (isolated power) up to AC 690 V or DC 400 V
- ⇒ Nominal voltage expandable via coupling devices
- ⇒ Connection monitoring
- ⇒ Alarm or system fault alarm, selectable
- ⇒ AMP measuring method (patent pending)
- ⇒ automatic adaptation to the system
- ⇒ continuously adjustable response values 2...50 kΩ resp. 20...500 kΩ
- ⇒ Power On LED, alarm LED, LED bar graph kΩ indicator
- ⇒ Test and reset button
- ⇒ 2 alarm relays with one change-over contact each
- ⇒ N/O or N/C operation, selectable
- ⇒ Fault memory, selectable
- ⇒ transparent dust cover for ingress protection
- ⇒ protective separation between circuits according to DIN VDE 0106 T 101

Dimension diagram



Technical Data IR475LY-...

Insulation coordination acc. to IEC 664-1

Rated insulation voltage	AC 630 V
Rated impulse withstand voltage / contamination level	6 kV/3
Voltage test acc. to IEC 255	3.75 kV

Network being monitored

Rated mains voltage U_N	DC 0...400 V or AC 15...400 Hz, 0...690 V
Operating range U_N	0 ... 1.2 x U_N

Supply voltage

Supply voltage U_S	AC or DC (see ordering details or nameplate)
Max. power consumption	3.5 VA

Response value

	x1 / x10	
Response value R_{ALARM1}	2 ... 10 / 20 ... 100 k Ω	
Response value R_{ALARM2}	10 ... 50 / 100 ... 500 k Ω	
Response time ($R_E=0,5 \times R_{ALARM1}$, $C_E=1\mu F$)		
Range 6 ... 500 k Ω		< 8...12 sek.
Range 2 ... 6 k Ω		< 8...35 sek.
System leakage capacitance		max. 50 μF

Measuring circuit

Measuring voltage U_M (peak value)	20 V
Measuring current I_M	100 μA
Internal DC resistance R_i	200 k Ω
Impedance Z at 50 Hz	180 k Ω
Max. admissible stray DC voltage	DC 800 V

Outputs

Measuring instrument SKMP*	120 k Ω
Current output	0 ... 400 μA
Max. load	25 k Ω

Contact circuit

Switching components	2 x 1 change-over contacts
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Safety separation of circuits acc. to DIN VDE 0106 T 101:

(max. rated insulation voltage acc. to IEC 664-1)	
Contact circuits / U_N	320 V
Contact circuits / U_S	630 V
U_S / U_N	320 V
Set of contacts / set of contacts	250 V
Contact class	IIB acc. DIN IEC 255 part 0-20
Rated contact voltage	AC 250 V/DC 300 V
Admissible number of operations	12000 cycles
Limited making capacity	UC 5 A
Limited breaking capacity	
AC 230 V, cos phi = 0.4	AC 2 A
DC 220 V, L/R = 0.04 s	DC 0.2 A
Operating principle	N/O or N/C operation
Adjustment by factory	N/O operation

Type tests

Test of the Electromagnetic Compatibility (EMV):

Immunity against electromagnetic interferences acc. EN 50082-2

Emissions acc. to EN 50081:

Emissions acc. to EN 55011/CISPR11	class B ¹⁾
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Mechanical tests:

Shock resistance acc. to IEC 68-2-27	15 g/11 ms
Bumping acc. to IEC 68-2-29	40 g/6 ms
Vibration strength acc. to IEC 68-2-6	10 ... 150 Hz/0,15 mm - 2 g

Environmental conditions

Ambient temperature, during operation	-10°C ... +55°C
Storage temperature range	-40°C ... +70°C
Climatic class acc. to IEC 721	3K5, except condensation and formation of ice

General data

Operation class	permanent operation
Type of connection	screw terminals
Wire cross section	
single wire	0.2 ... 4 mm ²
fine braid	0.2 ... 2.5 mm ² (AWG 24 - 12)
Rapid mounting	Rail acc. DIN EN 50 022
Protection class EN 60529	
Internal components/Terminals	IP 30 / IP 20
Type of casing	X470
Flammability class	UL94V-0
Weight approx.	430 g

* Explanation:

R_E = insulation resistance between system and earth (total resistance)

C_E = leakage capacitance between system and earth (total leakage capacitance)

SKMP = meter scale centre point

Important information:



The IR475LY-... is suited for both single- and three-phase AC as well as DC systems. As indicated in the wiring diagram, there are several ways of connection. From the metrological point of view, it is irrelevant whether the connections L1 and L2 are connected to one or two different system conductors or to the N-conductor. L1 and L2 have to be led separately. Consider the maximum rated voltage when connecting the device. The terminals KE and have also to be led separately!

A response error of max. +/- 1 k Ω is possible within the setting range 2 ... 6 k Ω .

Operation in combination with coupling devices:

The A-ISOMETER[®] can be used in combination with the coupling devices AGH204S (up to AC 1.5 kV) and AGH520S (up to AC 6 kV) only within the range of 20 ... 500 k Ω . For this purpose, the range selector has to be set to **x10**! Connection monitoring is not possible when using the device with coupling devices! Therefore the connections L1 and L2 have to be bridged.

Standards

The A-ISOMETER[®] IR475LY... complies with the standards DIN 57 413 T8/VDE0413 T8/02.84 (*Isolationsüberwachungsgeräte für Wechselspannungsnetze mit galvanisch verbundenen Gleichstromkreisen und für Gleichspannungsnetze*), Draft of IEC 1557-8 (*Insulation monitoring devices for IT systems*); 1996, prEN 50197-8:1994 (*Isolationsüberwachungsgeräte für IT-Wechselspannungsnetze, für IT-Wechselspannungsnetze mit galvanisch verbundenen Gleichstromkreisen und für IT-Gleichspannungsnetze*), Draft of ASTM F-25.10.11 (*Standard Specification for Electrical Insulation Monitors for Monitoring Ground Resistance in Ungrounded Active AC Electrical Systems Having Large DC Components or DC Electrical Systems*).

Ordering details

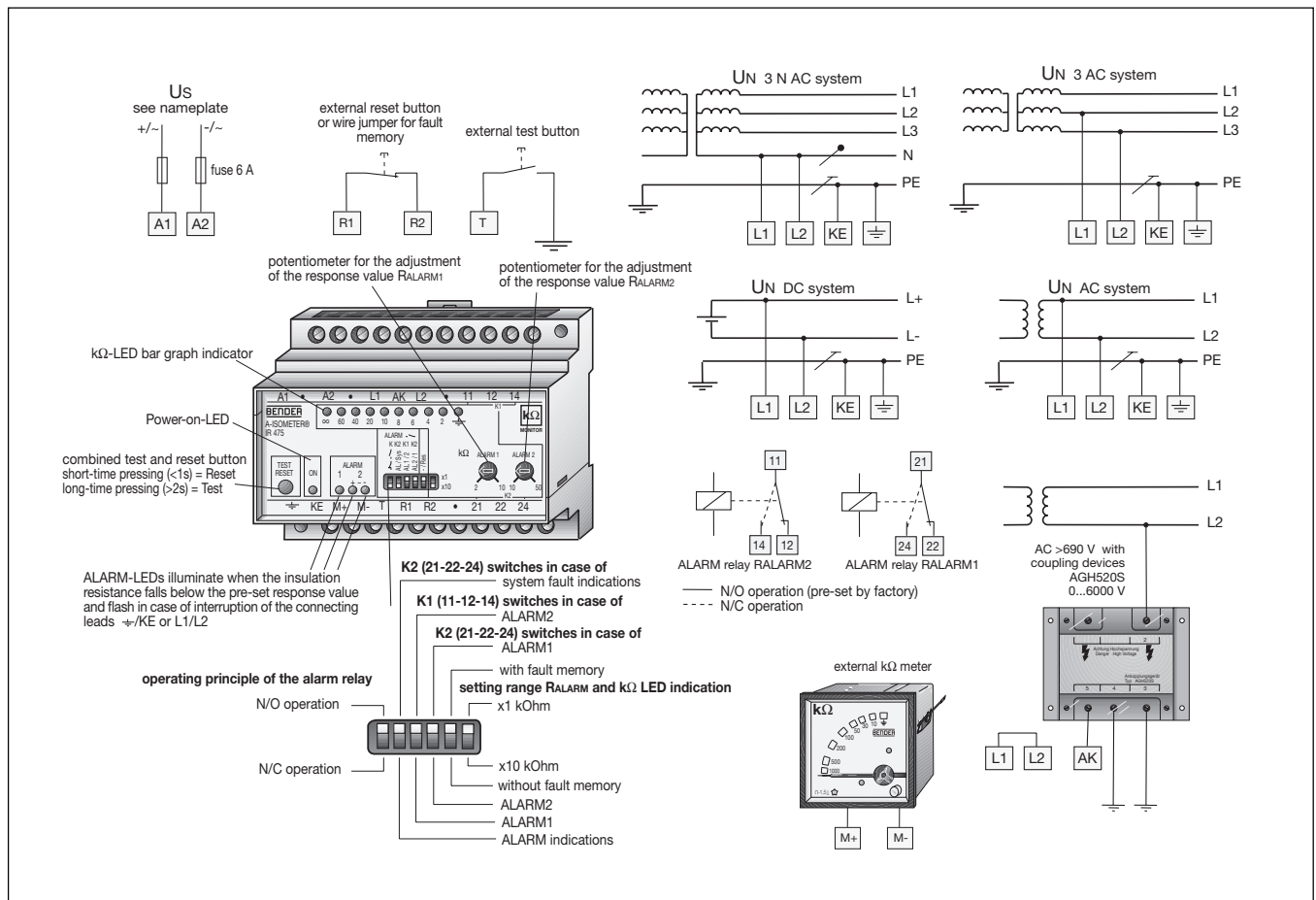
Type	Supply voltage U_S	Art. No.
IR475LY-4 ¹⁾	AC 230 V	91 068 038
IR475LY-411 ¹⁾	AC 24 V	91 068 039
IR475LY-412 ¹⁾	AC 42 V	91 068 040
IR475LY-413 ¹⁾	AC 90 ... 132 V*	91 068 041
IR475LY-415 ¹⁾	AC 400 V	91 068 042
IR475LY-416 ¹⁾	AC 500 V	91 068 047
IR475LY-417 ¹⁾	AC 690 V	91 068 043
IR475LY-421 ²⁾	DC 9,6 ... 84 V*	91 068 037
IR475LY-423 ²⁾	DC 77 ... 286 V*	91 068 044

Other supply voltages on request

*Operating range of the supply voltage

- Class B devices** are suitable for household and industrial use.
- Class A devices** are designed for industrial use. For any other use, it may be necessary to take additional measures for interference suppression.

Wiring diagram



Safety instructions

i Only one insulation monitoring device may be used in each interconnected system.

In any case, there must be a connection between L1/L2 for connection monitoring (e.g. via the winding of the isolating transformer).

Connection monitoring is essential to guarantee the safety measure. This function remains deactivated when L1/L2 or KE/PE are bridged.

In order to check the proper connection of the device, it is recommended to carry out a functional test using a genuine earth fault, e.g. via a suitable resistance, before using the A-ISOMETER.



When insulation or voltage tests are to be carried out, the device must be isolated from the system for the test period.

Please check for correct system voltage !

Electrical equipment shall only be installed by a skilled person in consideration of the current safety regulations.

For short-circuit protection, the connection to the supply voltage has to be equipped with a protective device according to IEC 364-4-473 (a fuse of 6A is recommended).



Short-circuit protection for network coupling and connection monitoring according to IEC 364-4-473 is not necessary when the wiring has been installed short-circuit and earth-fault proof; i.e. that the risk of a short-circuit is reduced to the absolute minimum.



For checking the connection of the measuring circuit to the system to be monitored, the A-ISOMETER is equipped with connection monitoring. The following fault indications are possible:

Fault indications	alarm-LEDs			alarm relays	
	1	Alarm 2 (+/-)	2 (-)	11-12-14	21-22-24
Alarm2 AC faults		x	x		x
Alarm2 DC faults L+		x			x
Alarm2 DC faults L-			x		x
Alarm1 AC faults	x	x	x	x	x
Alarm1 DC faults L+	x	x		x	x
Alarm1 DC faults L-	x		x	x	x
Interruption PE/E or L1/L2	o	o	o	x	x
Systemfault (DIP2 to Sys)					x

o = flashing
x = continuous indication



If one of these indications occurs, the connections have to be checked by a skilled person immediately.

Right to modifications reserved