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ISOMETER® IR426-D47

Insulation monitoring device for unearthed AC/DC systems

(IT systems for the supply of operating theatre luminaires)

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Device features

- Insulation monitoring for AC/DC systems supplying operating theatre luminaires
- Two separately adjustable response values
- Connection monitoring system/earth
- LEDs: Power On, Alarm 1, Alarm 2
- Internal/external test/reset button
- Two separate alarm relays (one changeover contact each)
- N/O or N/C operation, selectable
- Fault memory behaviour, selectable
- Self monitoring with automatic alarm message
- Multi-functional LC display
- Adjustable response delay
- Two-module enclosure (36 mm)

Approvals

CE EAC

Product description

The ISOMETER® IR426-D47 monitors the insulation resistance of unearthed AC/DC systems for the supply of operating theatre luminaires. DC-supplied components in AC/DC systems do not influence the operating characteristics. An external supply voltage allows de-energized systems to be monitored too.

Application

- AC/DC systems for the supply of operating theatre luminaires in medical locations according to IEC 60364-7-710 and DIN VDE 0100-710.

Function

The currently measured insulation resistance is indicated on the LC display. When the value falls below the preset response values, the response delay "t_{on}"starts. Once the response delay "t_{on}" has elapsed, the "K1/K2" alarm relays switch and the alarm LEDs "AL1/AL2" light up. Two separately adjustable response values/alarm relays allow a distinction to be made between prewarning and alarm. If the insulation resistance exceeds the release value (response value plus hysteresis), the alarm relays return to their initial position. Insulation faults are distinguished according to AC and DC faults (indication ±). If the fault memory is enabled, the alarm relays remain in the alarm state until the reset button is pressed or until the supply voltage is switched off. The device function can be tested using the test button. The parameterization of the device can be carried out via the LC display or the function keys integrated in the front plate.

The alarm messages of the IR426-D47 are transferred to the BMS bus via the alarm contact 11/14 resp. the input IN/T1 of the ISOMETER® 107TD47. That allows an alarm messages to be displayed at the MK2430 resp. at the TM operator panel in plain text format.

Connection monitoring

The connections to the system (L1 / L2) and earth (E / KE) are either automatically checked every 24 h, or by pressing the test button or when supply voltage is applied. In case of interruption of a connecting lead, the alarm relay K2 switch, the LEDs ON/AL1/AL2 flash and the following message appears on the display:

"E.02" indicating a fault in the connecting leads to the system,

"E.01" indicating a fault in the connecting leads to PE.

After eliminating the fault, the alarm relays return to their initial position either automatically or by pressing the reset button.

Measuring principle

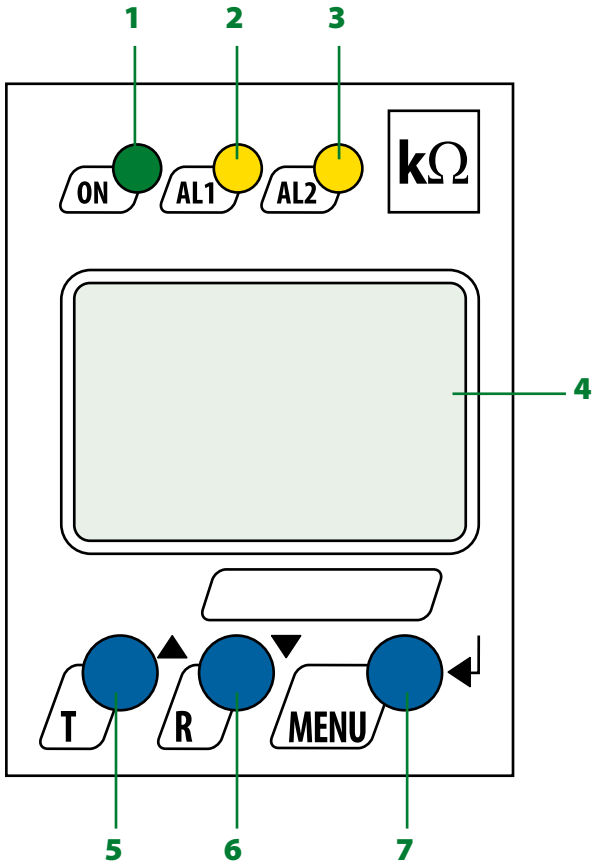
The ISOMETER® IR426 uses the AMP measuring principle.

Standards

The ISOMETER® of the IR426-D47 complies with the requirements of the device standards: DIN EN 61557-8, EN 61557-8, IEC 61557-8.

AC/DC

Operating elements



1 - Operation indicator “ON”, flashes in case of interruption of the connecting leads E/KE or L1/L2.

2 - Alarm LED “AL1”, lights when the value falls below the set response value Alarm 1 and flashes in case of interruption of the connecting leads E/KE or L1/L2).

3 - Alarm LED “AL2”, lights when the value falls below the set response value Alarm 2 and flashes in case of interruption of the connecting leads E/KE or L1/L2.

4 - LC display

5 - Test button “T”: to call up the self test

Arrow-up key: Parameter change, to move up in the menu.

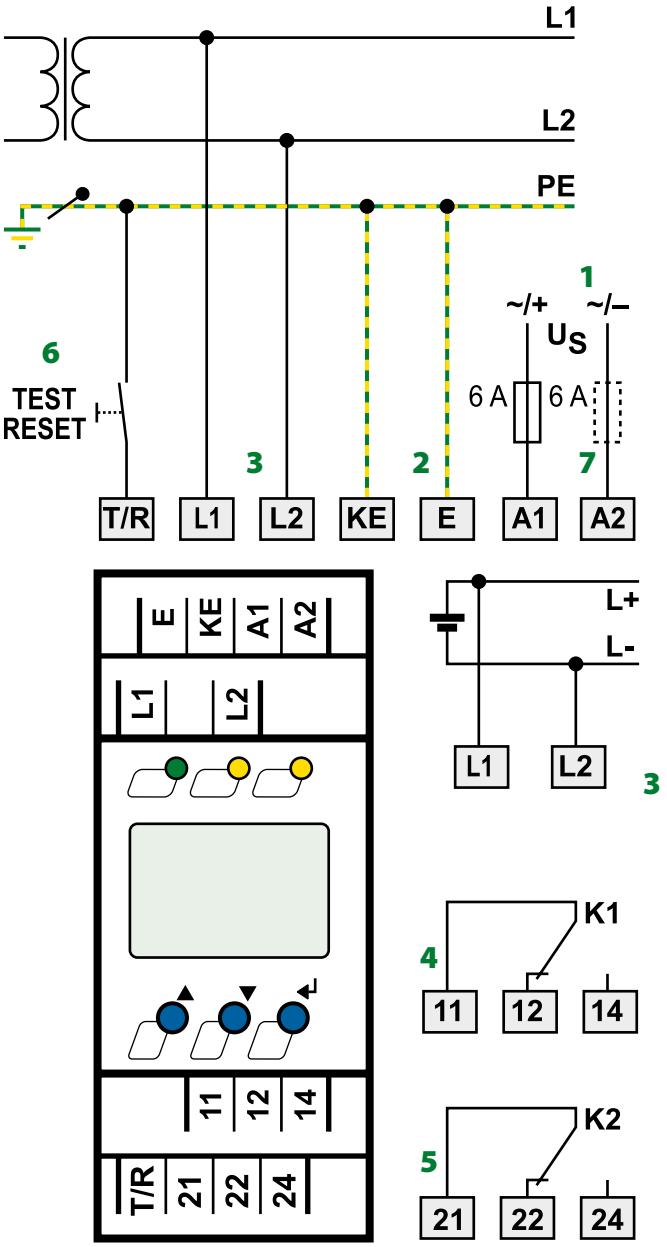
6 - Reset button “R”: to delete stored insulation fault alarms

Arrow-down key: Parameter change, to move down in the menu.

7 - MENU key: to call up the menu system

Enter key: to confirm parameter change.

Wiring diagram



1 - Supply voltage U_S (see ordering information) via fuse

2 - Separate connection of E, KE to PE

3 - Connection to the IT system being monitored:
AC: Connect terminals L1, L2 to conductor L1, L2.
DC: Connect terminal L1 to L+ and L2 to L-.

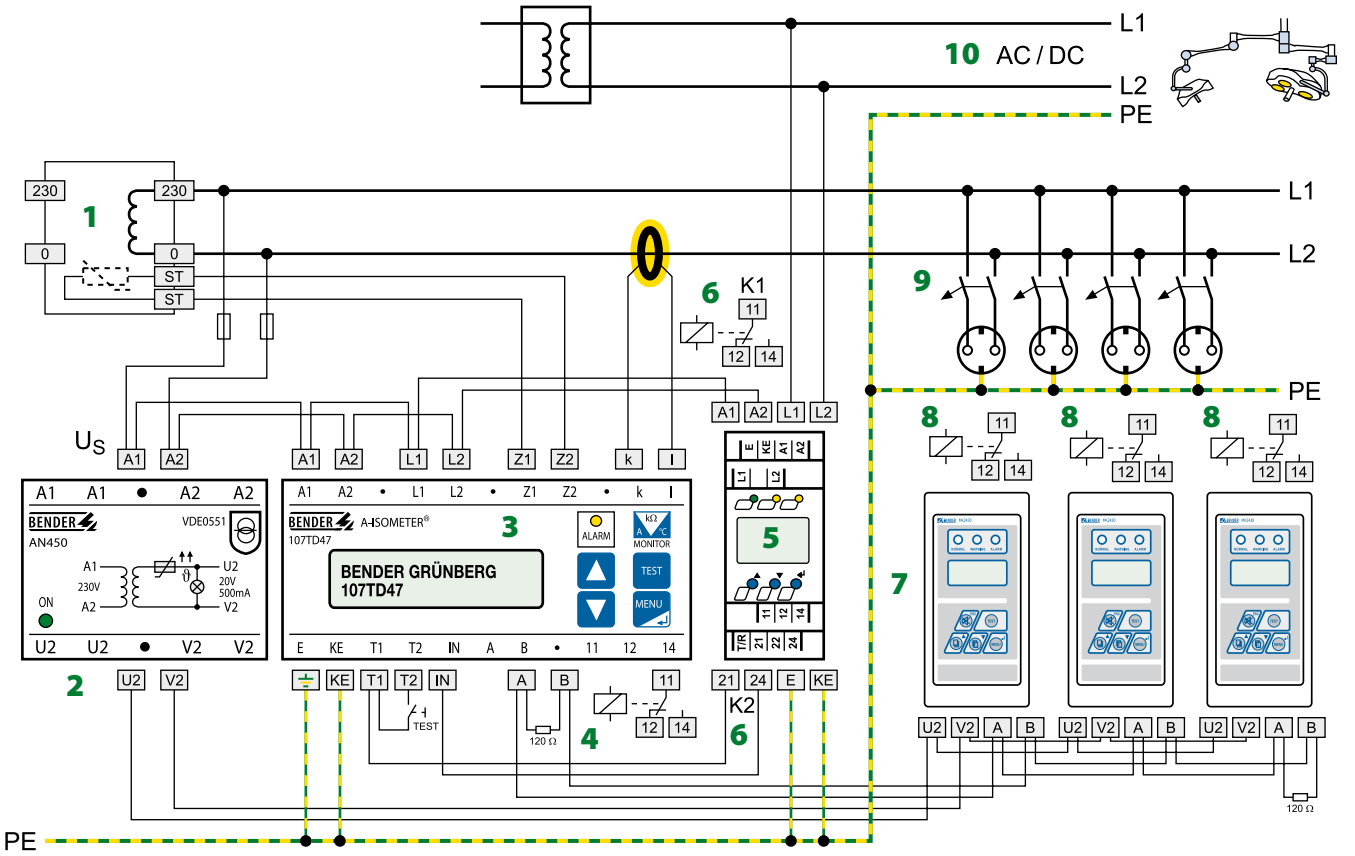
4 - Alarm relay K1: Alarm 1

5 - Alarm relay K2: Alarm 2

6 - Combined external test and reset button
short-time pressing (< 1.5 s) = RESET
long-time pressing (> 1.5 s) = TEST

7 - Line protection by a fuse in accordance with IEC 60364-4-43 (6 A fuse recommended). In case of supply (A1/A2) from an IT system, both lines have to be protected by a fuse.

Example of a monitoring system for IT systems and operating theatre luminaires circuits in medical locations according to IEC 60364-7-710 and DIN VDE 0100-710



1 - IT system transformer
2 - Power supply unit AN450 for max. 3 MK2430
3 - ISOMETER® 107TD47
4 - Alarm relay 107TD47
5 - ISOMETER® IR426-D47
6 - Alarm relay K1 IR426-D47
Alarm relay K2 IR426-D47
7 - Remote alarm indicator and test combination MK2430
8 - Alarm relay MK2430-11
9 - IT system operating theatre
10 - IT system operating theatre luminaire

Technical data

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

Rated insulation voltage	250 V
Rated impulse voltage/pollution degree	4 kV/3
Protective separation (reinforced insulation) between	
(A1, A2) - (L1, L2, E, KE, T/R) - (11, 12, 14) - (21, 22, 24)	
Voltage test according to IEC 61010-1	2.21 kV

Supply voltage

Supply voltage U_S	see ordering information
Power consumption	≤ 3 VA

IT system being monitored

Nominal system voltage U_n	AC/DC 0…132 V
Rated frequency f_n	DC, 42…62 Hz

Response values

Response value R_{an1} (Alarm 1)	10…200 kΩ (50 kΩ)*
Response value R_{an2} (Alarm 2)	10…200 kΩ (50 kΩ)*
Relative percentage error	± 15 %
Hysteresis	25 %

Specified time

Response time t_{an} at $R_F = 0.5$ x R_{an} and $C_e = 1$ µF	≤ 3 s
Start-up delay t	0…10 s (0 s)*
Response delay t_{on}	0…99 s (0 s)*

Measuring circuit

Measuring voltage U_m	± 12 V
Measuring current I_m (at $R_F = 0$ Ω)	≤ 100 µA
Internal DC resistance R_i	≥ 120 kΩ
Impedance Z_i at 50 Hz	≥ 117 kΩ
Permissible extraneous DC voltage	≤ DC 132 V
Permissible system leakage capacitance	≤ 20 µF

Displays, memory

Display	LC display, multi-functional, non-illuminated
Display range, measuring value	1 kΩ…1 MΩ
Operating error 1 kΩ…5 kΩ/5 kΩ…1 MΩ	± 1 kΩ/± 15 %
Password	off/0…999 (off, 1)*
Fault memory, alarm relay	on/off*

Inputs

Cable length test and reset button	≤ 10 m

Switching elements

Number of switching elements	2 x 1 changeover contact				
Operating principle	N/C operation/N/O operation (N/C operation)*				
Electrical service life, number of cycles	10.000				
Contact data acc. to IEC 60947-5-1					
Utilization category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	220 V	110 V	24 V
Rated operational current	5 A	3 A	0.1 A	0.2 A	1 A
Minimum contact load	1 mA at AC/DC ≥ 10 V				

Environmental conditions/EMC

EMC	IEC 61326
Operating temperature	- 25 °C…+ 55 °C
Climatic class acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Long-time storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-time storage (IEC 60721-3-1)	1M3

Connection

Connection	push-wire terminals
Connection properties:	
rigid	0.2…2.5 mm² (AWG 24…14)
Flexible without ferrules	0.2…2.5 mm² (AWG 24…14)
Flexible with ferrules	0.2…1.5 mm² (AWG 24…16)
Stripping length	10 mm
Opening force	50 N
Test opening, diameter	2.1 mm

Other

Operating mode	continuous operation
Mounting	any position
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Enclosure material	polycarbonate
Flammability class	UL94 V-0
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Weight	≤ 150 g

( )* = factory setting

Ordering information

Nominal system voltage* U_n	Supply voltage* U_S	Response value R_{an}	System leakage capacitance C_e	Type	Art. No.
AC/DC	AC/DC				
0…132 V, 42…62 Hz	70…300 V, 15…460 Hz	10…200 kΩ	≤ 20 µF	IR426-D47	B71016307

Device version with screw-type terminals on request
* absolute values

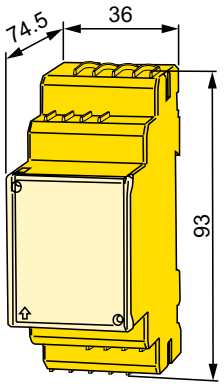
Accessories

Type designation	Art. No.
Mounting clip for screw mounting (1 piece per device)	B98060008

Dimension diagram XM420

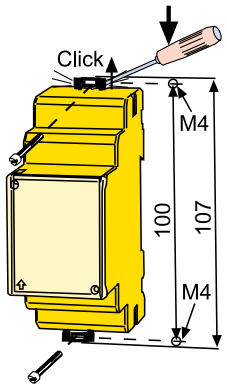
Dimensions in mm

Open the front plate cover in direction of arrow!



Screw mounting

Note: The upper mounting clip must be ordered separately (see ordering information).



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