A-ISOMETER® IR426-D47

Insulation monitoring device for unearthed AC/DC systems (IT systems for the supply of operating theatre luminaires)

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)

Product description
The A-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 “ton” starts. Once the response delay “ton” 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 A-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 relays K1 / 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 A-ISOMETER® IR426 uses the AMP measuring principle.
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 Uₜ (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 - A-ISOMETER® 107TD47
4 - Alarm relay 107TD47
5 - A-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 A-ISOMETER® IR426-D47

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

- Rated insulation voltage: 250 V
- Rated impulse voltage/pollution degree: 2.5 kV / III
- 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 Uₜ: see ordering information
- Power consumption: ≤ 3 VA

IT system being monitored

- Nominal system voltage Uₘ: AC/DC 0…132 V
- Rated frequency fₘ: DC, 42…62 Hz

Response values

- Response value Rₐ₁ (Alarm 1): 10…200 kΩ (50 kΩ)*
- Response value Rₐ₂ (Alarm 2): 10…200 kΩ (50 kΩ)*
- Relative percentage error: ± 15 %
- Hysteresis: 25 %

Specified time

- Response time tᵤ at Rₛ = 0.5 x Rₐ₁ and Cₛ = 1 μF: ≤ 3 s
- Start-up delay tₛ: 0…10 s (0 s)*
- Response delay tₛₐ: 0…99 s (0 s)*

Measuring circuit

- Measuring voltage Uₘ: ± 12 V
- Measuring current Iₘ (at Rₛ = 0 Ω): ≤ 100 μA
- Internal DC resistance Rₛ: ≥ 120 kΩ
- Impedance Zₛ at 50 Hz: ≥ 117 kΩ
- Permissible extraneous DC voltage: ≤ DC 132 V
- Permissible system leakage capacitance: ≤ 20 μF

Displays, memory

- 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*

Outputs

- 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
- 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: screw-type terminals
- rigid/flexible/conductor sizes: 0.2…4/0.2…2.5 mm²/24-12 AWG
- Multi-conductor connection (2 conductors with the same cross section): rigid/flexible: 0.2…1.5/0.2…1.5 mm²
- Stripping length: 8…9 mm
- Tightening torque: 0.5…0.6 Nm

Other

- Operating mode: continuous operation
- Degree of protection, internal components (IEC 60529): IP 30
- Degree of protection, terminals (IEC 60529): IP 20
- Enclosure material: polycarbonate
- DIN rail mounting acc. to: IEC 60715
- Screw mounting: 2 x M4 with mounting clip
- Product standards: DIN EN 61557-7, EN 61557-8, IEC 61557-8, ASTM F 1669M-96
- Operating manual: BP101016
- Weight: ≤ 150 g
- * = factory setting

Ordering information

<table>
<thead>
<tr>
<th>Type</th>
<th>Nominal system voltage* Uₘ</th>
<th>Supply voltage* Uₛ</th>
<th>Response value Rₛ</th>
<th>System leakage capacitance Cₛ</th>
<th>Art. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR426-D47</td>
<td>DC/AC 42…62 Hz 0…132 V</td>
<td>DC 70…300 V/AC 15…460 Hz 70…300 V</td>
<td>10…200 kΩ</td>
<td>≤ 20 μF</td>
<td>B 9101 6307</td>
</tr>
</tbody>
</table>

* Absolute values

Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Art. No.</th>
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<tr>
<td>Mounting clip for screw mounting (one piece per device)</td>
<td>B 9806 0008</td>
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Dimension diagram XM420

Dimensions in mm
Open the front plate cover in direction of arrow!

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