Product description
The A-ISOMETER®s of the IR425 series monitor the insulation resistance of unearthed AC / DC control circuits (IT systems) 0...300 V. DC components existing in AC/DC systems do not influence the operating characteristics. An external supply voltage allows de-energised systems to be monitored too.

Application
- AC/DC control circuits in the industrial sector, mechanical engineering, power plants, elevators, automation systems etc.
- AC / DC control and auxiliary circuits acc. to IEC 60204-1: “Safety of machinery – Electrical equipment of machines, Part 1: General requirements”
- Smaller AC/DC IT systems such as lighting systems

Function
The currently measured insulation resistance is indicated on the LC display. In this way any changes, for example when circuits are connected to the system, can be recognised easily. When the value falls below the preset response values, the response delay "t_on" starts. Once the response delay "t_on" has elapsed, the alarm relays "K1 / K2" 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 parameterisation of the device can be carried out via the LC display or the function keys integrated in the front plate.

Connection monitoring
The connections to the system (L1 / L2) and to earth (E / KE) are either automatically checked every 24 h, or by pressing the test button or when supply voltage has been connected. 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" signals a fault in the connecting leads to the system,
"E.01" signals 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.

Preset function
After connecting the device for the first time, the nominal system voltage is measured and the response values are set automatically.

Measurement method
The A-ISOMETER® IR425 uses the AMP measuring principle.

Standards
The IR425 series complies with the requirements of the device standards: IEC 61557-8, IEC 61557-9, ASTM F1669M-96 (2007).
1.3

**Operating elements**

1. LED Power "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 button: Parameter change, to move up in the menu.
6. Reset button "R": to delete stored insulation fault alarms
   Arrow down button: Parameter change, to move down in the menu.
7. "MENU" button: to call up the menu system.
   Enter button: to confirm parameter change

**Wiring diagram**

1. Supply voltage $U_S$ (see ordering information) via fuse
2. Separate connection of E and KE to PE
3. Connection to the IT system to be 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 "T/R" 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.
A-ISOMETER® IR425

Technical data

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 acc. to IEC 61010-1 2.21 kV

Supply voltage
Supply voltage $U_S$ see ordering information
Power consumption $\leq 3\text{ VA}$

IT system being monitored
Nominal system voltage $U_n$ AC / DC $0…300\text{ V}$
Nominal frequency $f_n$ DC $15…460\text{ Hz}$

Response values
Response value $R_{an1}$ (Alarm 1) $1…200\text{ k}\Omega$
Response value $R_{an2}$ (Alarm 2) $1…200\text{ k}\Omega$

Preset mode
$U_n \leq 72\text{ V} R_{an1} = 20\text{ k}\Omega / R_{an2} (\text{Alarm 2}) = 10\text{ k}\Omega$
$U_n > 72\text{ V} R_{an1} (\text{Alarm 1}) = 46\text{ k}\Omega / R_{an2} (\text{Alarm 2}) = 23\text{ k}\Omega$
Relative uncertainty $1\text{ k}\Omega / 5\text{ k}\Omega / 5\text{ k}\Omega / 1\text{ M}\Omega \pm 0.5\text{ k}\Omega / \pm 15\%$
Hysteresis $25\%$

Time response
Response time $t_{an}$ at $R_F = 0.5 \times R_{an}$ and $C_e = 1\mu\text{F}$ $\leq 2\text{ s}$
Start-up delay $t_{0} 0…10\text{ s (0 s)*}$
Response delay $t_{an} 0…99\text{ s (0 s)*}$

Measuring circuit
Measuring voltage $U_m$ $\pm 12\text{ V}$
Measuring current $I_m$ (at $R_F = 0\text{ }\Omega$) $\leq 200\mu\text{A}$
Internal DC resistance $R_i$ $\geq 62\text{ k}\Omega$
Impedance $Z_i$ at 50 Hz $\geq 60\text{ k}\Omega$
Permissible system leakage capacitance $C_e$ $\leq 20\mu\text{F}$

Displays, memory
Display range, measuring value $1\text{ k}\Omega / 5\text{ k}\Omega / 5\text{ k}\Omega / 1\text{ M}\Omega$
Operating uncertainty $0.5\text{ k}\Omega / 5\text{ k}\Omega / 5\text{ k}\Omega / 1\text{ M}\Omega \pm 0.5\text{ k}\Omega / \pm 15\%$
Password off / 0…999 (off)*
Fault memory, alarm relay on/off*

Outputs
Cable length test and reset button $\leq 10\text{ m}$

Switching elements
Number of switching elements $2 \times 1$ changeover contact
Operating principle NC / N/O operation (N/O operation)*
Electrical endurance, number of cycles 10.000
Contact data acc. to IEC 60947-5-1
Utilisation category AC-13 AC-14 DC-12 DC-12
Rated operational voltage $230\text{ V} / 230\text{ V} / 220\text{ V} / 110\text{ V} / 24\text{ V}$
Rated operational current $5\text{ A} / 3\text{ A} / 0.1\text{ A} / 0.2\text{ A} / 1\text{ A}$
Minimum contact rating $1\text{ mA at AC / DC} \geq 10\text{ V}$

Environment/EMC
EMC IEC 61326
Operating temperature $-25\degree\text{C}…+55\degree\text{C}$
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 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 type push-wire terminal
Connection properties
rigid $0.2…2.5\text{ mm}^2 / \text{ AWG 24-14}$
flexible without ferrule $0.2…2.5\text{ mm}^2 / \text{ AWG 24-14}$
flexible with ferrule $0.2…1.5\text{ mm}^2 / \text{ AWG 24-16}$
Stripping length $10\text{ mm}$
Opening force $50\text{ N}$
Test opening, diameter $2.1\text{ mm}$

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
DIN rail mounting acc. to IEC 60715

Screw mounting $2 \times M4$ with mounting clip
Operating manual TBP103005
Weight $\leq 150\text{ g}$

Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Art. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting clip for screw mounting (1 piece per device)</td>
<td>B 9806 0008</td>
</tr>
</tbody>
</table>

* Absolute values

Device version with screw terminals on request.

Ordering information

<table>
<thead>
<tr>
<th>Type</th>
<th>Nominal system voltage* $U_n$</th>
<th>Supply voltage* $U_S$</th>
<th>Response value $R_{an}$</th>
<th>System leakage capacitance $C_e$</th>
<th>Art. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR425-D4-1</td>
<td>DC / AC 15…460 Hz 0…300 V</td>
<td>DC 9.6…94 V / AC 15…460 Hz 16…72 V</td>
<td>$1…200\text{ k}\Omega$</td>
<td>$&lt; 20\mu\text{F}$</td>
<td>B 7103 6403</td>
</tr>
<tr>
<td>IR425-D4-2</td>
<td>DC / AC 15…460 Hz 0…300 V</td>
<td>DC 70…300 V / AC 15…460 Hz 70…300 V</td>
<td>$1…200\text{ k}\Omega$</td>
<td>$&lt; 20\mu\text{F}$</td>
<td>B 7103 6402</td>
</tr>
</tbody>
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* Absolute values
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).