

ISOMETER® IR425

Insulation monitoring device for unearthed
AC/DC control circuits (IT systems)



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Device features

- Insulation monitoring for AC/DC control circuits 0...300 V
- Two separately adjustable response values
- Preset function (automatic setting of basic parameters)
- 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
- Multi-functional LC display
- Adjustable response delay
- Two-module enclosure (36 mm)
- Push-wire terminal (two terminals per connection)

Approvals



Product description

The 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 in accordance with DIN EN 60204-1 "Electrical equipment of machines", IEC 60204-1, EN 60204-1
- AC/DC auxiliary circuits in accordance with DIN VDE 0100-725 (VDE 0100-725)
- 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 $\pm$). 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.

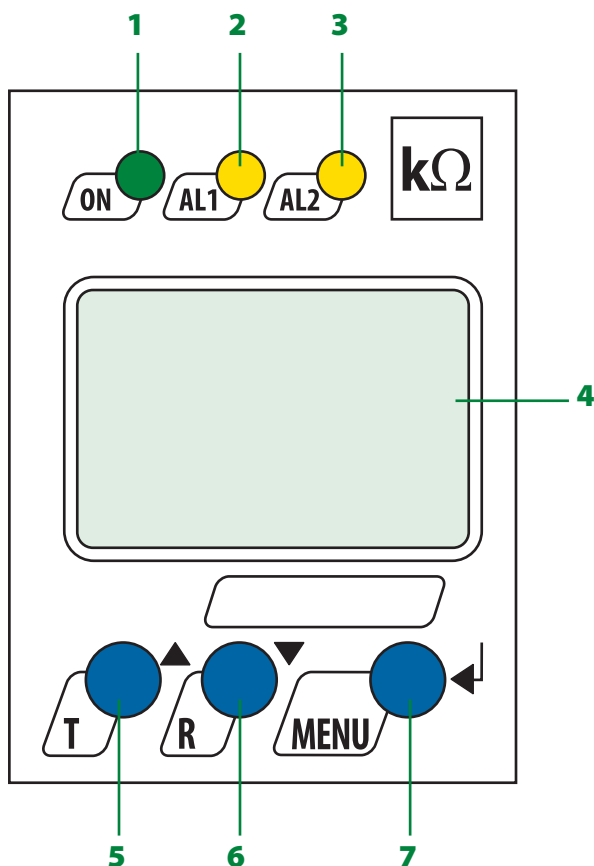
Measurement method

The ISOMETER® IR425 uses the AMP measuring principle.

Standards

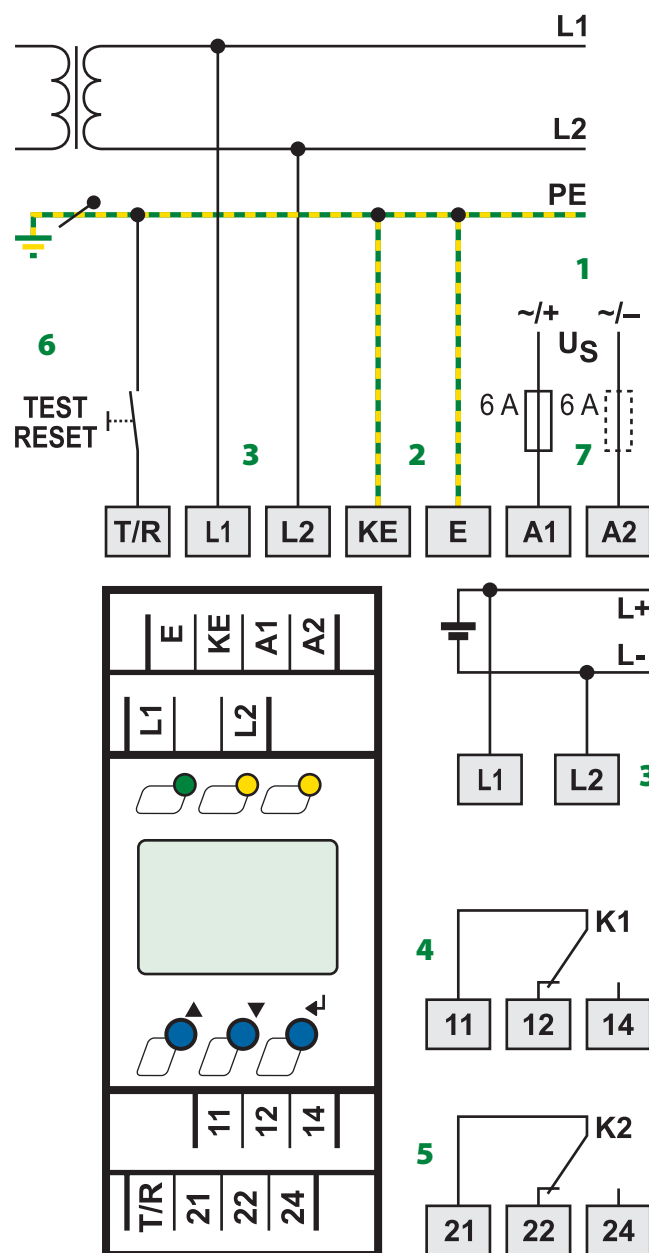
The ISOMETER® of the IR425 complies with the requirements of the device standards: DIN EN 61557-8 (VDE 0413-8), IEC 61557-8, ASTM F 1669M-96 (2007).

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 "MENU": to call up the menu system.
Enter button: Confirms parameter changes

Wiring diagram



- 1 - Supply voltage U_S (see ordering details) via fuse
- 2 - Separate connection of E, KE to PE
- 3 - Connection to the IT system to be monitored:
AC: connect terminals L1, L2 to conductor L1, L2.
- 4 - Alarm relay "K1": Alarm 1
- 5 - Alarm relay "K2": Alarm 2
- 6 - Combined 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.

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 acc. to IEC 61010-1	2.2 kV

Supply voltage

Supply voltage U_S	see ordering information
Power consumption	≤ 4 VA

IT system being monitored

Nominal system voltage U_n	AC/DC 0...300 V
Nominal frequency f_n	DC 15...460 Hz

Response values

Response value R_{an1} (Alarm 1)	1...200 k Ω
Response value R_{an2} (Alarm 2)	1...200 k Ω
Preset mode	$U_n \leq 72$ V R_{an1} (Alarm 1) = 20 k Ω / R_{an2} (Alarm 2) = 10 k Ω $U_n > 72$ V R_{an1} (Alarm 1) = 46 k Ω / R_{an2} (Alarm 2) = 23 k Ω
Relative uncertainty	1...5 k Ω /5...200 k Ω ± 0.5 k Ω / ± 15 %
Hysteresis	25 %

Time response

Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1$ μ F	≤ 2 s
Start-up delay (start time) 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)	≤ 200 μ A
Internal DC resistance R_i	≥ 62 k Ω
Impedance Z_i at 50 Hz	≥ 60 k Ω
Permissible system leakage capacitance	≤ 20 μ F

Displays, memory

Display range, measured value	1 k Ω ...1 M Ω
Operating uncertainty	1...5 k Ω /5 k Ω ...1 M Ω ± 0.5 k Ω / ± 15 %
Password	off/0...999 (off)*
Fault memory, alarm relay	on/off*

Inputs

Cable length test and reset button	≤ 10 m
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Switching elements

Number of switching elements	2 x 1 changeover contact				
Operating principle	NC/N/O operation (N/O operation)*				
Electrical endurance, number of cycles	10000				
Contact data acc. to IEC 60947-5-1					
Utilisation 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 rating	1 mA at AC/DC ≥ 10 V				

Environment/EMC

EMC	IEC 61326-2-4
Operating temperature	-25...+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 IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-time storage (IEC 60721-3-1)	1M3

Option "W"

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)	3M7
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 mm ² (AWG 24...14)
Flexible without ferrule	0.2...2.5 mm ² (AWG 24...14)
Flexible with ferrule	0.2...1.5 mm ² (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 (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Enclosure material	polycarbonate
Flammability class	UL94 V-0
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Documentation number	D00039
Weight	≤ 150 g

() * = factory setting

Ordering information

Supply voltage ¹⁾ U _S		Type	Art. No.
AC	DC		
16...72 V, 15...460 Hz	9.6...94 V	IR425-D4-1	B 7103 6403
		IR425-D4W-1	B 7103 6403W
70...300 V, 15...460 Hz	70...300 V	IR425-D4-2	B 7103 6402
		IR425-D4W-2	B 7103 6402W

Device version with screw terminals on request.

¹⁾ Absolute values

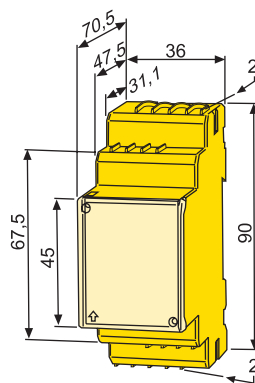
Accessories

Type designation	Art. No.
Mounting clip for screw mounting (1 piece per device)	B 9806 0008

Dimension diagram XM420

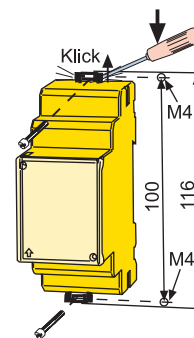
Dimensions in mm

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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