

IR420-D4 Series

Digital Ground Fault Monitor / Ground Detector
Ungrounded (Floating) AC Systems



A-ISOMETER® IR420-D4

**Ground Fault Monitor / Ground Fault Relay
for Ungrounded AC Systems less than 300 V**



Device features

- Insulation monitoring for ungrounded, low-voltage circuits AC 0...300 V
- Two separately adjustable response values
- Preset function (automatic assignment of basic parameters)
- Connection monitoring
- LEDs: Power On, Alarm 1, Alarm 2
- Internal/external test/reset button
- Two separately adjustable SPDT contacts
- Normally energized or normally de-energized operation
- Latching or non-latching behavior
- Detailed LCD display
- Adjustable response delay
- Two-module enclosure (36 mm)
- RoHS compliant

Approvals



Product description

The A-ISOMETER® IR420-D4 monitors for ground faults in ungrounded AC systems from 0 to 300 V by measuring the system's insulation resistance. The IR420-D4 is designed to provide predictive maintenance and detect ground faults in ungrounded systems before leakage current may even be present.

An external supply voltage is required to power the device.

Application

- General purpose industrial use in AC/DC control circuits
- Ungrounded systems at 300 V or less

Function

When the insulation resistance from system to ground falls below the set response value, the alarm relays switch and the alarm LEDs activate. Two separately adjustable alarm contacts can be set to a prewarning and main warning alarm. The measured value is indicated on the LCD display. A fault storage setting allows the device to either latch or automatically reset. TEST and RESET may be activated on the device or via a remote connection.

The IR420-D4 continuously monitors the equipment ground connection to ensure proper operation. The device's easy-to-use onboard menu manages all settings via the detailed LCD display.

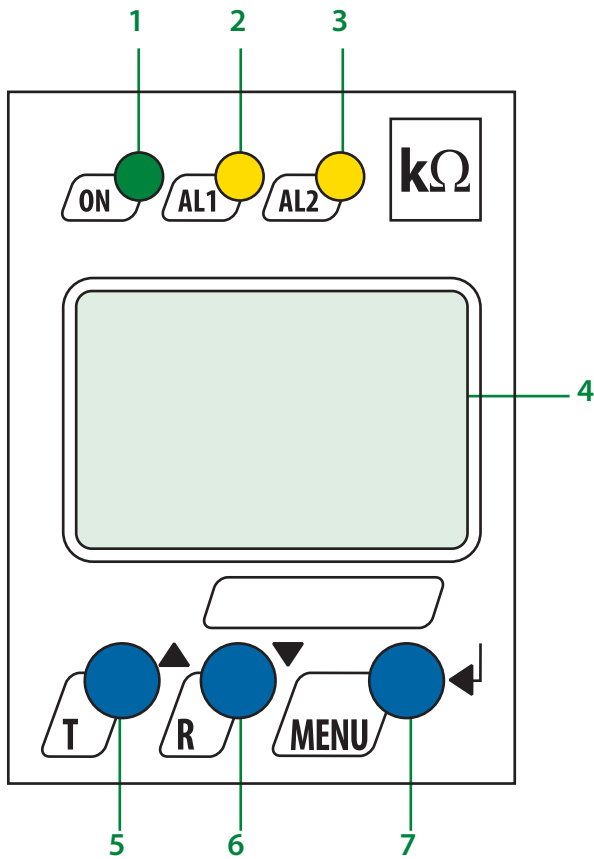
Preset function

The IR425 provides a preset function which, when first started up, will set response value alarms based on initial readings.

Measuring principle

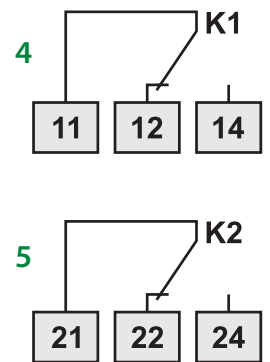
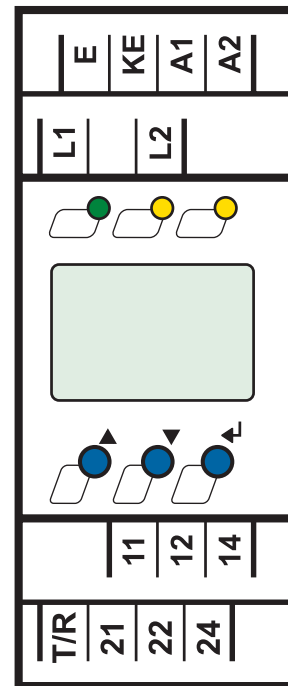
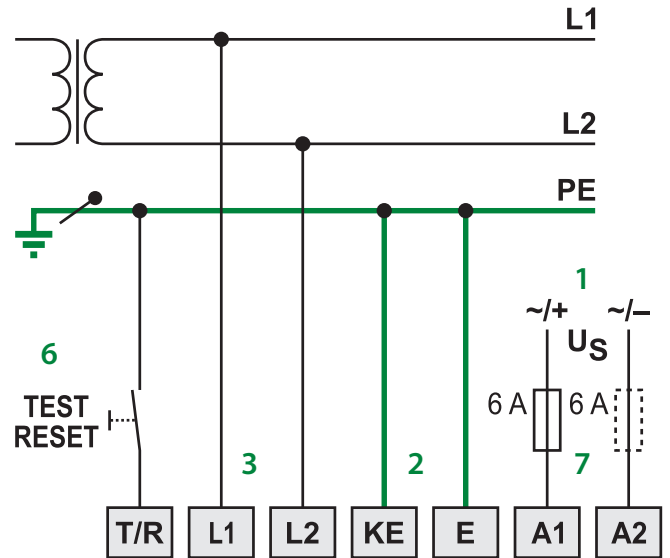
The A-ISOMETER® IR420-D4 uses a superimposed DC voltage measuring principle.

Operating elements



- 1 - Power ON LED "ON"; flashes during connection error
- 2 - Alarm LED "AL1," Insulation fault, alarm 1 reached (flashes during connection error)
- 3 - Alarm LED "AL2," Insulation fault, alarm 2 reached (flashes during connection error)
- 4 - LCD display
- 5 - Test button "T": Activates self-test
Arrow up key: Scrolls up inside device's menu
- 6 - Reset button "R": Resets device
Arrow down key: Scrolls down inside device's menu
- 7 - MENU key: Activates device's internal menu
Enter key: Confirm changes inside device's menu

Wiring diagram



- 1 - Supply voltage U_s (see ordering information) via fuse
- 2 - Equipment ground connections
- 3 - Connection to monitored system
- 4 - Alarm relay K1: Alarm 1
- 5 - Alarm relay K2: Alarm 2
- 6 - Combined external test and reset button "T/R":
Quick press (< 1.5 s) = RESET
Hold (> 1.5 s) = TEST
- 7 - Recommended line protection via fuse

Technical Data: A-ISOMETER® IR420-D4

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 U_s	see ordering information
Power consumption	≤ 3 VA

IT system being monitored

Nominal system voltage U_n	AC 0...300 V
Rated frequency f_n	42...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
Operating error 1 k Ω ...5 k Ω /5 k Ω ...200 k Ω	± 0.5 k Ω / ± 15 %
Hysteresis	25 %

Specified time

Response time t_{an} at $R_f = 0.5 \times R_{an}$ and $C_e = 1$ μ F	≤ 1 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)	≤ 200 μ A
Internal DC resistance R_i	≥ 62 k Ω
Impedance Z_i at 50 Hz	≥ 60 k Ω
Permissible extraneous DC voltage U_{fg}	\leq DC 300 V
Permissible system leakage capacitance C_e	≤ 20 μ F

Displays, memory

Display range, measuring value	1 k Ω ...1 M Ω
Operating error 1 k Ω ...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*

Outputs

Cable length test and reset button	≤ 10 m
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Switching elements

Number of switching elements	2 SPDT contacts				
Operating principle	Normally energized or normally de-energized				
Electrical service life	10.000 switching operations				
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 current	1 mA at AC/DC ≥ 10 V				

Environment/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 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	screwless-type terminals
Connection properties:	
rigid / flexible	0.2...2.5 mm ² (AWG 24...14)
flexible with connector sleeve	0.2...1.5 mm ² (AWG 24...16)
Stripping length	10 mm
Release force	50 N
Test aperture, diameter	2.1 mm

Other

Operating mode	continuous operation
Mounting	any position
Degree of protection, internal components (IEC 60529)	IP30 (NEMA 1)
Degree of protection, terminals (IEC 60529)	IP20 (NEMA 1)
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Product standards	DIN EN 61557-8: 1998-05, EN 61557-8: 1997-03, IEC 61557-8: 1997-02, ASTM F 1207M-96 (2002)
Operating manual	BP101012
Weight	≤ 150 g

()* = factory setting

Ordering information

Typ	Nominal system voltage* U_n	Supply voltage* U_s	Response value R_{an}	System leakage capacitance C_e	Art. No.
IR420-D4-1	AC 42...460 Hz 0...300 V	DC 9,6...94 V/AC 42...460 Hz 16...72 V	1...200 k Ω	< 20 μ F	B 9101 6409
IR420-D4-2	AC 42...460 Hz 0...300 V	DC 70...300 V/AC 42...460 Hz 70...300 V	1...200 k Ω	< 20 μ F	B 9101 6405

Device version with "screw-type terminals" on request.

* absolute values

Accessories

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

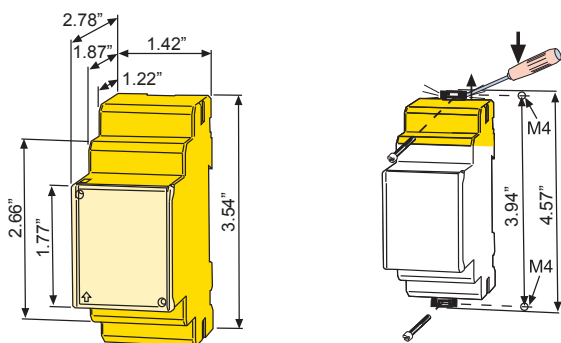
Dimensions

(dimensions in inches)

Open the front plate cover in direction of arrow!

Screw fixing

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



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