

## 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.

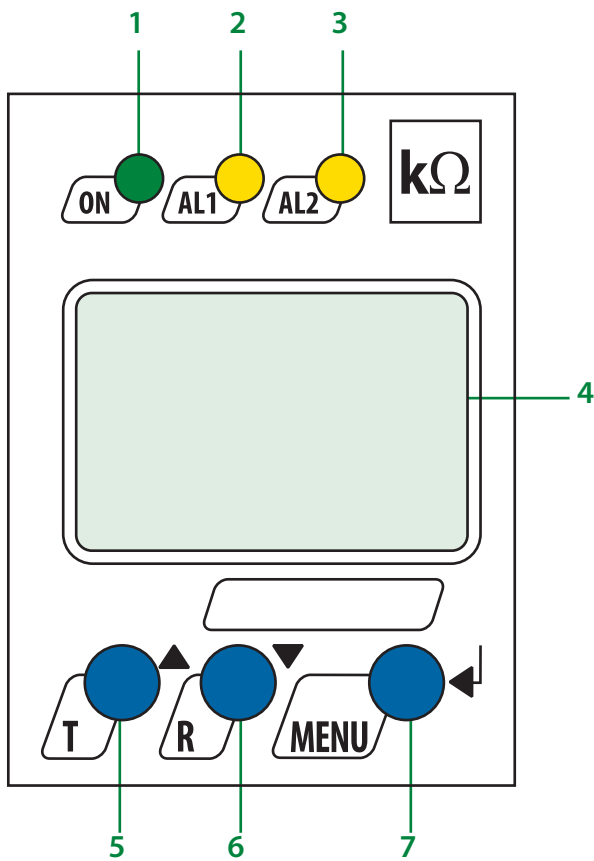
### Preset function

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

### Measuring principle

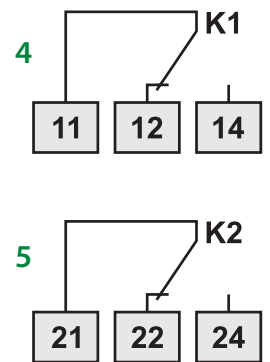
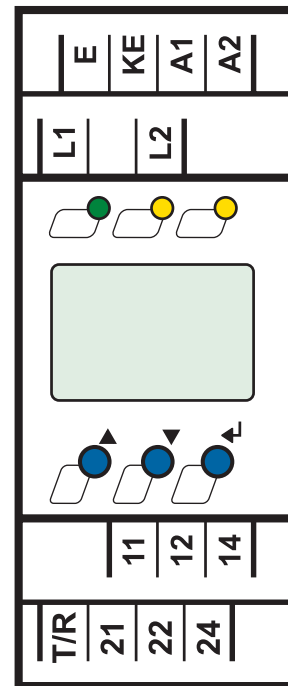
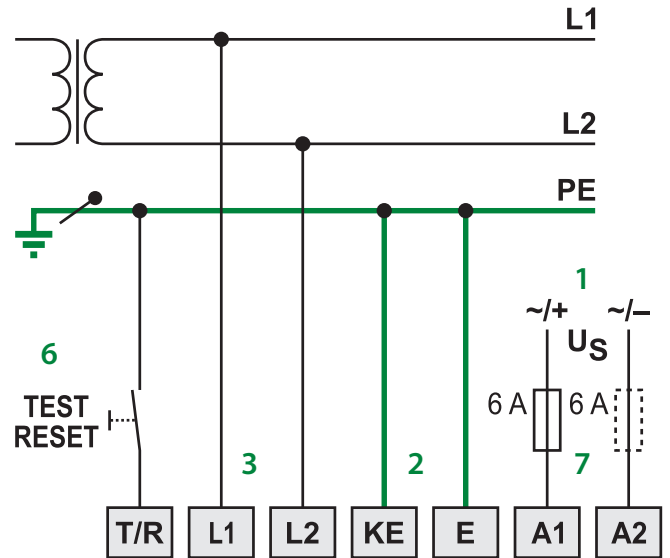
The A-ISOMETER® IR420-D4 uses a superimposed DC voltage measuring principle.

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	$\leq 3$ 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 $\Omega$
Response value $R_{an2}$ (Alarm 2)	1...200 k $\Omega$
Preset mode	$U_n \leq 72$ V $R_{an1}$ (Alarm 1) = 20 k $\Omega$ / $R_{an2}$ (Alarm 2) = 10 k $\Omega$ $U_n > 72$ V $R_{an1}$ (Alarm 1) = 46 k $\Omega$ / $R_{an2}$ (Alarm 2) = 23 k $\Omega$
Operating error 1 k $\Omega$ ...5 k $\Omega$ /5 k $\Omega$ ...200 k $\Omega$	$\pm 0.5$ k $\Omega$ / $\pm 15$ %
Hysteresis	25 %

### Specified time

Response time $t_{an}$ at $R_f = 0.5 \times R_{an}$ and $C_e = 1$ $\mu$ F	$\leq 1$ 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 $R_f = 0$ $\Omega$ )	$\leq 200$ $\mu$ A
Internal DC resistance $R_i$	$\geq 62$ k $\Omega$
Impedance $Z_i$ at 50 Hz	$\geq 60$ k $\Omega$
Permissible extraneous DC voltage $U_{fg}$	$\leq$ DC 300 V
Permissible system leakage capacitance $C_e$	$\leq 20$ $\mu$ F

### Displays, memory

Display range, measuring value	1 k $\Omega$ ...1 M $\Omega$
Operating error 1 k $\Omega$ ...5 k $\Omega$ /5 k $\Omega$ ...1 M $\Omega$	$\pm 0.5$ k $\Omega$ / $\pm 15$ %
Password	off / 0...999 (off)*
Fault memory, alarm relay	on/off*

### Outputs

Cable length test and reset button	$\leq 10$ 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 $\geq 10$ 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 <sup>2</sup> (AWG 24...14)
flexible with connector sleeve	0.2...1.5 mm <sup>2</sup> (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	$\leq 150$ 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 $\Omega$	< 20 $\mu$ 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 $\Omega$	< 20 $\mu$ 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

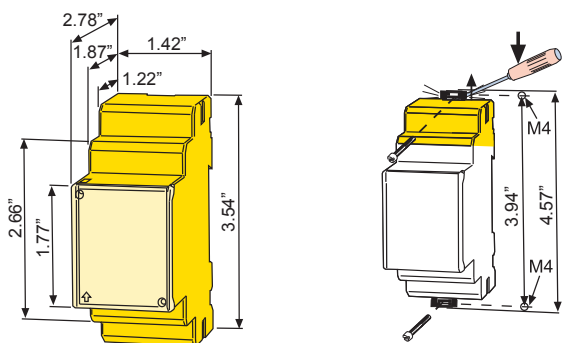
## Dimensions

(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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