

A-ISOMETER® IR423

Insulation monitoring device for
mobile generators



A-ISOMETER® IR423

Device features

- Insulation monitoring for mobile generators AC 0...300 V
- Protection by electrical separation with insulation monitoring and disconnection
- W version for protection against high mechanical stress
- Two separately adjustable response values
- Connection monitoring system / earth
- Power On LED, alarm LEDs: 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)

Standards, approvals and certifications



Product description

The A-ISOMETER® of the IR423 series monitors the insulation resistance R_F of an unearthed AC system of 0...300 V to earth that is supplied by a mobile generator. The IR423 is suitable for AC systems with operating frequencies ≥ 30 Hz as well as for AC systems with directly connected DC circuits. The maximum permissible system leakage capacitance C_{max} is 5 μ F.

Application

- IEC 60364-7-717: Low-voltage electrical installations, Part 7-717: Requirements for special installations or locations – Mobile or transportable units.
- GW 308 "Mobile auxiliary power generators on pipeline site" (Mobile Stromerzeuger für Rohrleitungsbaustellen) 8 / 00 (DVGW)

Function

The currently measured insulation resistance is indicated on the LC display. In this way, any changes, for example, when circuits of loads 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. 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 earth (E / KE) are either automatically checked every 1 h, or by pressing the test button or when supply voltage is applied. 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.

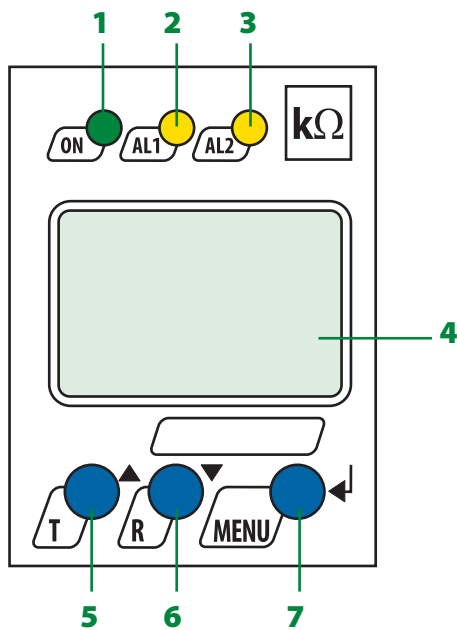
Measurement method

The A-ISOMETER® of the IR423 series uses a modified measurement method specially suited for mobile power generators (also for inverter technology).

Standards

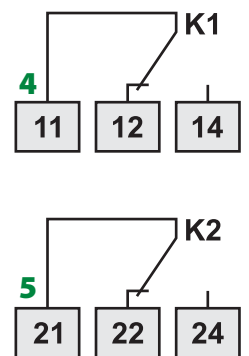
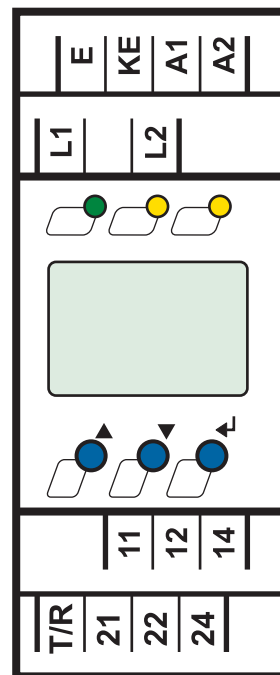
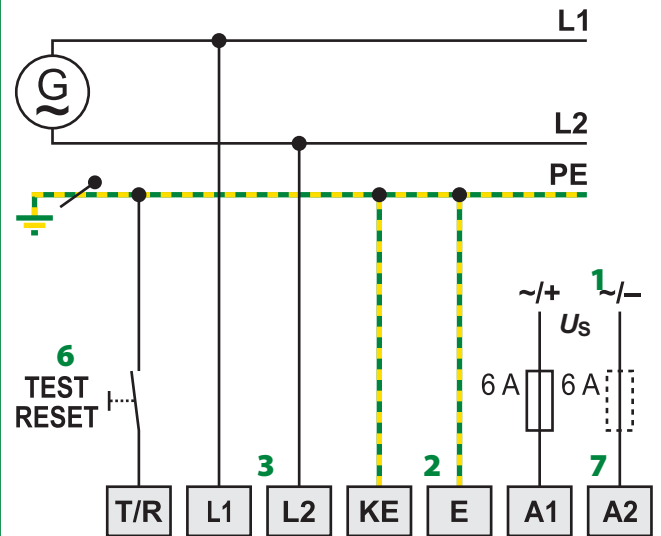
The A-ISOMETER® was designed in accordance with the following standards: IEC 61557-8, IEC 61326-2-4, IEC 60664-1, IEC 60664-3, ASTM F1669M-96 (2007), ASTM F1207M-96 (2007).

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: to call up the menu system.
Enter button: to confirm parameter change

Wiring diagram

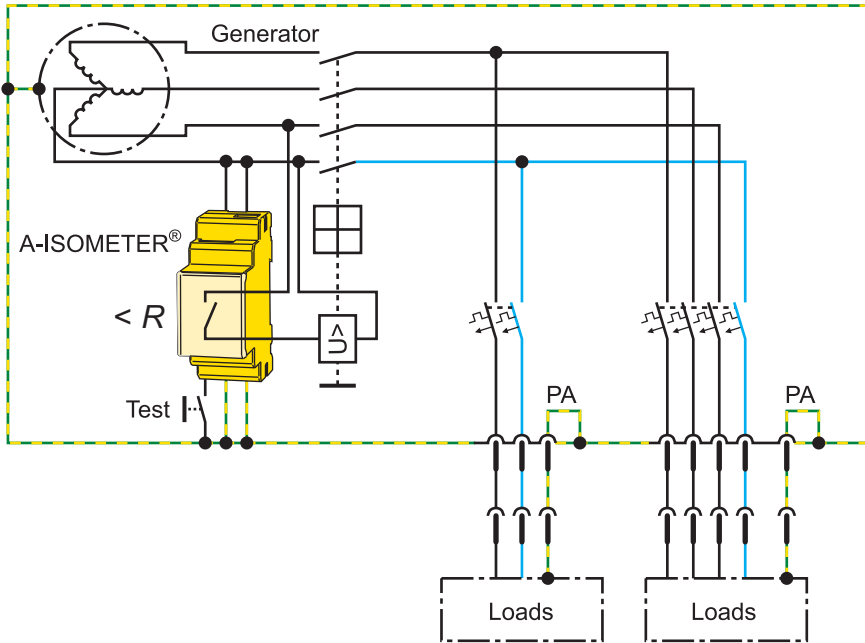


- 1 - Supply voltage U_s (see ordering information) via fuse
- 2 - Separate connection of E and KE to PE
- 3 - Connection to the AC system to be monitored:
AC: Connect terminals L1, L2 to the conductors L1, L2
- 4 - Alarm relay K1: Alarm 1
- 5 - Alarm relay K2: Alarm 2
- 6 - Combined test and reset button "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.

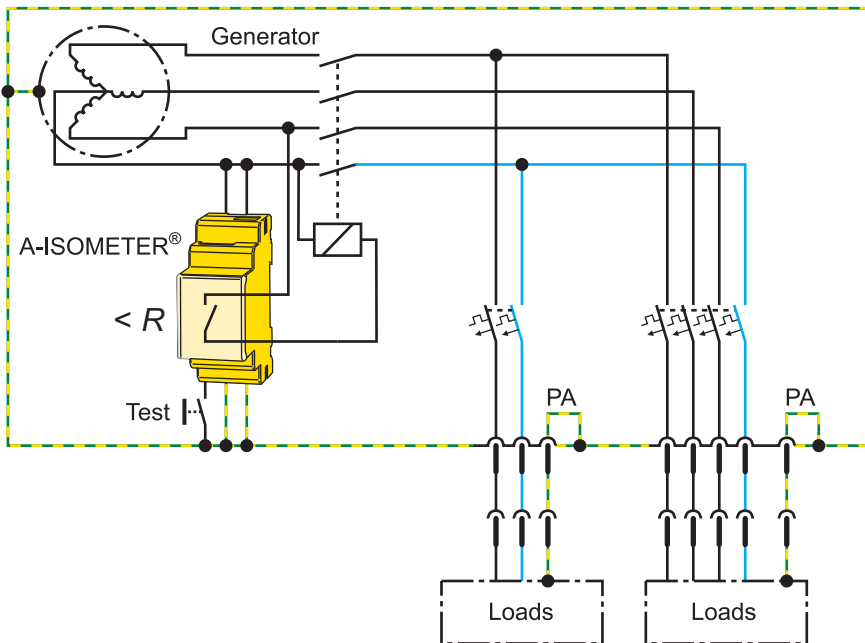
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Examples of application

Protective measure for mobile generators: "Protection by electrical separation with insulation monitoring and disconnection"



Setting of K1/K2 for overvoltage release:
N/O operation (n.o.); Fault memory setting: OFF

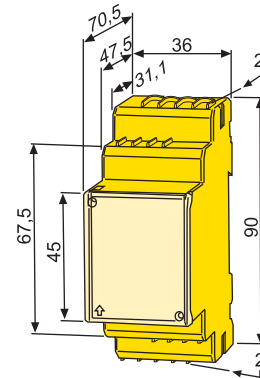


Setting of K1/K2 for contactor: N/C operation (n.c.), fault memory setting: ON

Dimension diagram XM420

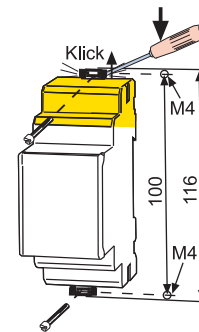
Dimensions in mm

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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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	≤ 3 VA

IT system being monitored

Nominal system voltage U_n	AC 0...300 V
Nominal frequency f_n	30...460 Hz

Response values

Response value R_{an1} (Alarm 1)	1...200 kΩ (46 kΩ)*
Response value R_{an2} (Alarm 2)	1...200 kΩ (23 kΩ)*
Relative uncertainty 1 kΩ...5 kΩ / 5 kΩ...200 kΩ	± 0.5 kΩ / ± 15 %
Hysteresis	25 % of the response value

Time response

Response time t_{an} at $R_f = 0.5 \times R_{an}$ and $C_e = 1 \mu F$	≤ 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 $R_f = 0 \Omega$)	≤ 200 μA
Internal DC resistance R_i	≥ 62 kΩ
Impedance Z_i at 50 Hz	≥ 60 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 300 V
Permissible system leakage capacitance C_e	≤ 5 μF

Displays, memory

Display range, measured value	1 kΩ...1 MΩ
Operating uncertainty 1 Ω...5 kΩ / 5 kΩ...1 MΩ	± 0.5kΩ / ± 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 x 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	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
Contact rating	1 mA at AC/DC ≥ 10 V				

Environment/EMC

EMC	IEC 61326-2-4
Operating temperature	-40 °C...+70 °C
Climatic class acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (with 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
Vibration resistance	acc. to IEC 60068-2-6
for DIN rail mounting	3 g / 30...150 Hz
for screw mounting	6 g / 30...150 Hz

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 /terminal (IEC 60529)	IP30 / IP20
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Operating manual	BP101013
Weight	≤ 150 g

()* = factory setting

Ordering information

Type	Nominal system voltage* U_n	Supply voltage* U_S	Art. No.
IR423D4-1	AC 0...300 V 30...460 Hz	AC 16...72 V 30...460 Hz, DC 9.6...94 V	B 7101 6304
IR423D4-2	AC 0...300 V 30...460 Hz	AC/DC 70...300 V 30...460 Hz	B 7101 6305
IR423-D4W-1	AC 30...460 Hz 0...300 V	DC 9.6...94 V / AC 30...460 Hz 16...72 V	B 7101 6304W
IR423-D4W-2	AC 30...460 Hz 0...300 V	DC / AC 30...460 Hz 70...300 V	B 7101 6305W

Device version with screw terminals on request. * Absolute values

Accessories

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

1.6