

ISOMETER® IR423

Insulation monitoring device for mobile generators



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Device features

- Insulation monitoring for mobile generators AC 0...300 V
- Protection by electrical separation with insulation monitoring and disconnection
- Version "W" 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)

Approvals



Product description

The 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 μF .

Application

- IEC 60364-7-717, DIN VDE 0100-717 (2005) Electrical installations in mobile or transportable units
- DIN VDE 0100-551 (VDE 0100-551), IEC 60364-5-551 Low-voltage generating sets (mobile generators)
- GW 308 "Mobile Stromerzeuger für Rohrleitungsbaustellen 8/00" (Mobile auxiliary power generators on pipeline site") (DVGW)
- BGI 867 (German Berufsgenossenschaft Information) Auswahl und Betrieb von Ersatzstromerzeugern auf Bau- und Montagestellen (Selecting and operating standby generators on construction and installation sites)

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.

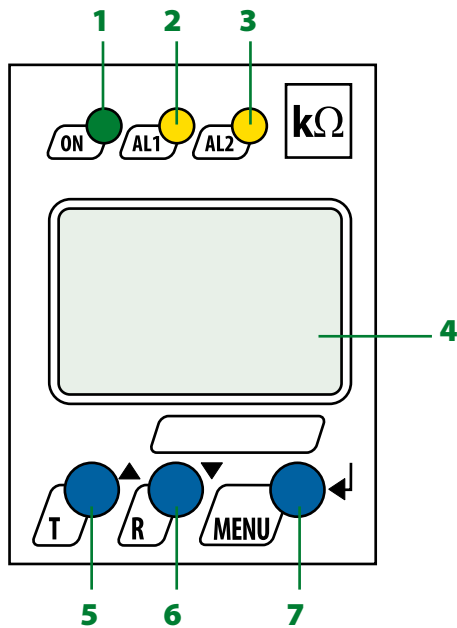
Measurement method

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

Standards

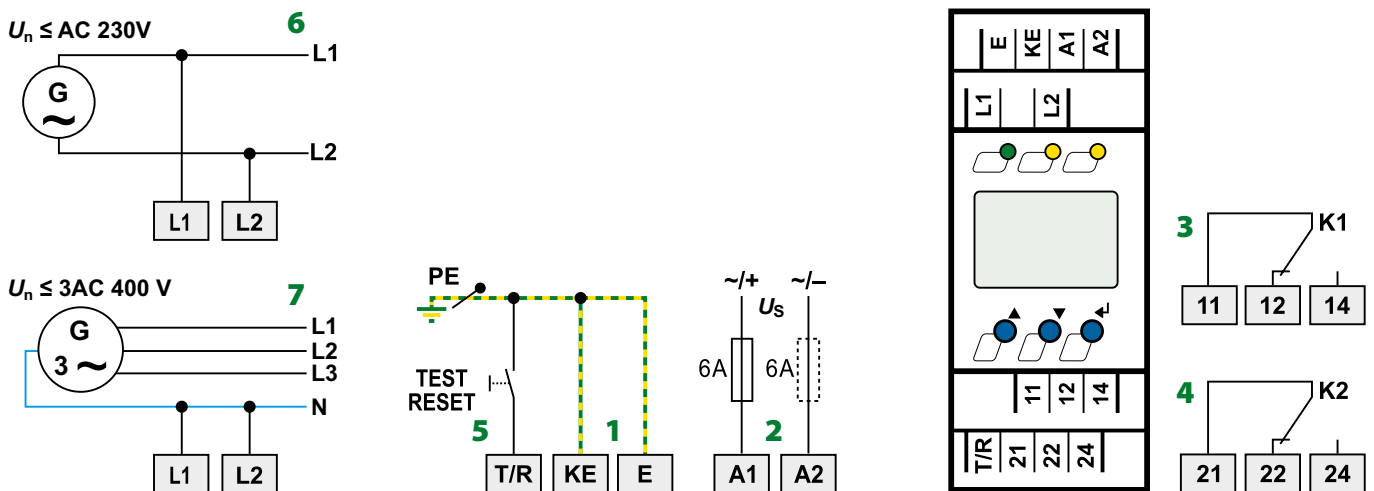
The ISOMETER® of the IR423 series complies with the requirements of the device standards: DIN EN 61557-8 (VDE 0413-8), EN 61557-8, IEC 61557-8, IEC 61326-2-4, DIN EN 60664-1 (VDE 0110-1), DIN EN 60664-3 (VDE 0110-3), ASTM F1669M-96 (2007), ASTM F1207M-96 (2007)

Operating elements



- 1 - Power On LED "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 parameter change, to move down in the menu
- 7 - "MENU" button: to call up the menu system.
Enter button: to confirm parameter changes

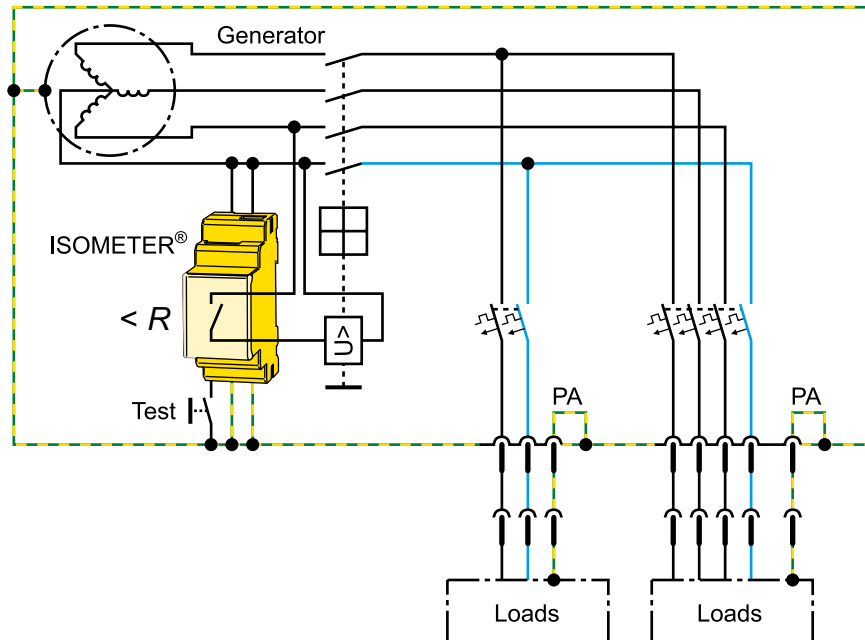
Wiring diagram



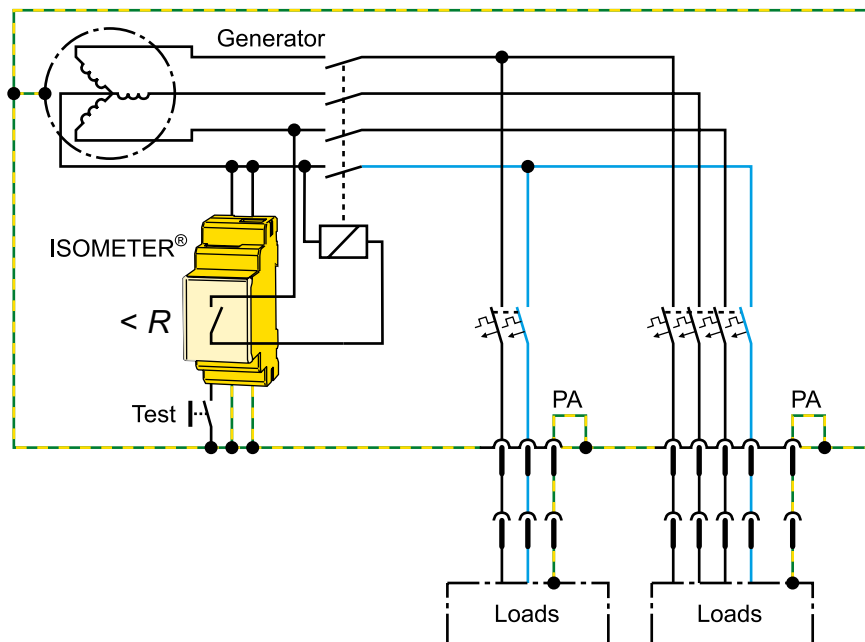
- | | |
|---|--|
| 1 - Connect the leads E and KE separately to PE. | 5 - for combined external test/reset button |
| 2 - Supply voltage U_s (see nameplate) via 6 A fuse | 6 - $U_n \leq$ AC 230 V: Terminals L1/L2 to L1/L2 of the generator |
| 3 - Alarm relay K1 | 7 - $U_n \leq$ 3AC 400 V: Terminals L1/L2 to N of the generator |
| 4 - Alarm relay K2 (system fault relay) | |

Examples of application

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



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



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

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	2.21 kV

Supply voltage

Supply voltage U_s	see ordering information
Frequency range U_s	30...460 Hz
Power consumption	≤ 4 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...5 kΩ/5...200 kΩ	± 0.5 kΩ/± 15 %
Hysteresis 1...5 kΩ/5...200 kΩ	+ 1 kΩ/+ 25 %

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 (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 $R_F = 0 \Omega$)	≤ 200 μA
Internal DC resistance R_i	≥ 62 kΩ
Impedance Z_i at 50 Hz	≥ 60 kΩ
Permissible extraneous DC voltage U_{iq}	≤ DC 300 V
Permissible system leakage capacitance	≤ 5 μF

Displays, memory

Display	LC display, multi-functional, non-illuminated
Display range, measured value	1 kΩ...1 MΩ
Operating uncertainty 1...5 kΩ/5 kΩ...1 MΩ	± 0.5 kΩ/± 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 or 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
Contact rating	1 mA at AC/DC ≥ 10 V				

Environment/EMC

EMC	acc. to IEC 61326
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

Connection

Connection type	push-wire terminal
Connection properties	
rigid	0.2...2.5 mm ² (AWG 24...14)
flexible without ferrule	0.75...2.5 mm ² (AWG 19...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	D00038
Weight	≤ 150 g

Option "W"

Ambient temperature	-40...+70 °C
Climatic categories acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3K5 (with condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3M7
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

(*) = factory setting

Ordering information

Version	Supply voltage ¹⁾ U_s			Type	Art. No.
	AC	DC	AC/DC		
Standard	16...72 V, 30...460 Hz	9.6...94 V	–	IR423-D4-1	B 7101 6304
	–	–	70...300 V, 30...460 Hz	IR423-D4-2	B 7101 6305
High mechanical stress	16...72 V, 30...460 Hz	9.6...94 V	–	IR423-D4W-1	B 7101 6304W
	–	–	70...300 V, 30...460 Hz	IR423-D4W-2	B 7101 6305W

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

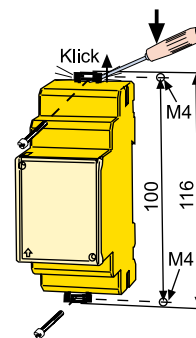
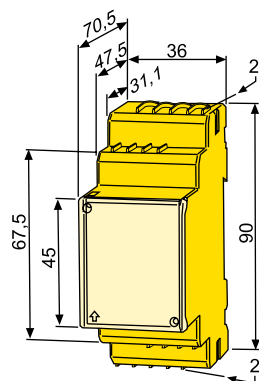
Dimension diagram XM420

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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