

A-ISOMETER® IR423

Insulation monitoring device for mobile generators





A-ISOMETER® IR423

Device features

- Insulation monitoring for mobile generators AC 0...300 V
- Option "W": For high mechanical stress when using the protective measure "Protective separation with insulation monitoring and disconnection"
- Two separately adjustable response values
- Connection monitoring system / earth
- Power On LED, LED Alarm 1, LED Alarm 2
- Internal and external test / reset button
- Two separate alarm relays (one change-over contact each)
- N / O or N / C operation
- Fault memory, selectable
- Self monitoring with automatic alarm message
- Multi-functional LC display
- Adjustable response delay
- Two-module enclosure (36 mm)

Product description

The IR423 A-ISOMETER® monitors the insulation resistance R_F of an unearthed AC system of 0...300 V to earth that is supplied by a mobile generator according to IEC 60364-5-551 (DIN VDE 0100-551). 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

- Electrical installations in mobile or transportable units IEC 60364-7-717: 2001; (Requirements for special installations and locations – Mobile or transportable units) DIN VDE 0100-717:2005

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 recognized easily. When the insulation resistance falls below the set response values, the response delay "t_{on}" starts running. Once the response delay "t_{on}" has expired, the "K1 / K2" alarm relays 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 parameterization of the device can be carried out via the LC display and 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 is applied. In case of interruption of a connecting lead, the alarm relays K1 / K2 switch, the LEDs ON // AL1 // AL2 flash and the following message appears on the display:

„E.02“ indicating a fault in the connecting leads to the system,

„E.01“ indicating 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.

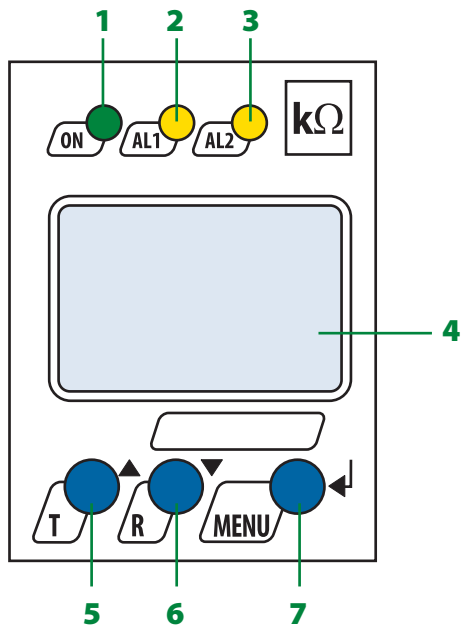
Measuring principle

The IR423 A-ISOMETER® uses the measuring principle "superimposed square-wave pulses".

Standards

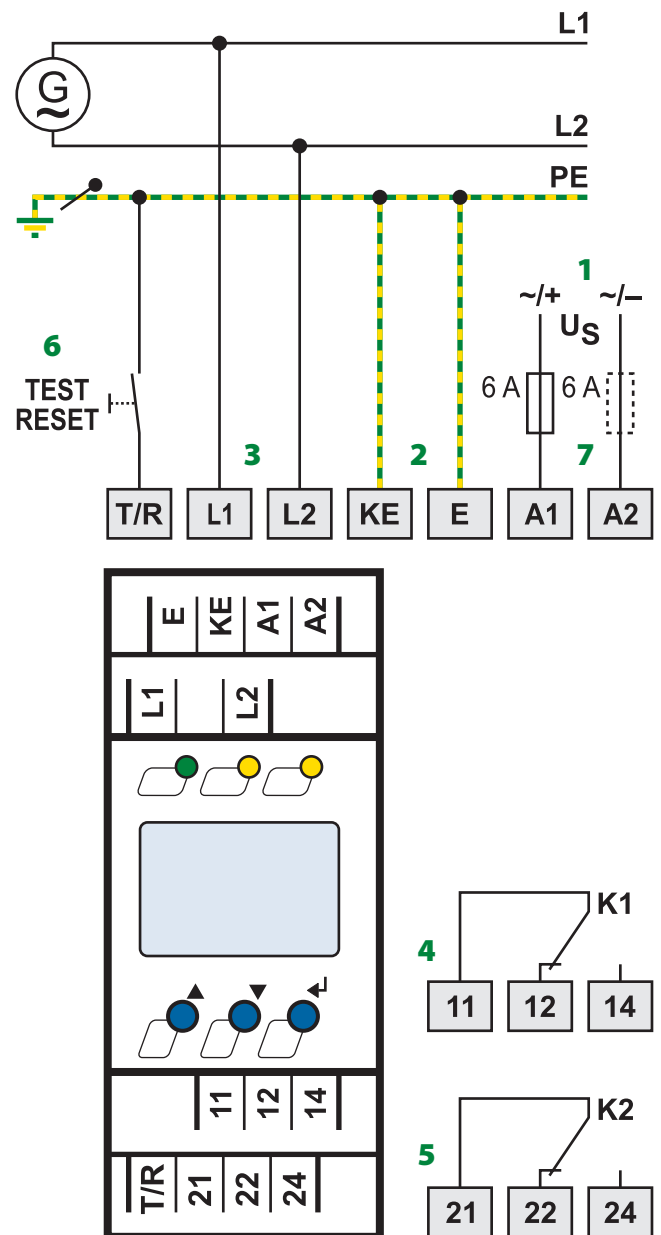
The IR423 type range complies with the standards: DIN EN 61557-8 (VDE 0413-8): 1998-05, EN 61557-8: 1997-03, IEC 61557-8: 1997-02, ASTM F 1669M-96: 2002, DIN VDE 0100-551: 1997, IEC 60364-5-551: 1994, IEC 60364-7-717: 2001, DIN VDE 0100-717: 2005.

Operating elements



- 1 - Power ON LED, flashes in case of interruption of the connecting leads earth / 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 earth / 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 earth / KE or L1 / L2.
- 4 - LC display
- 5 - Test button: to call up the self test
Arrow up key: parameter change, to move up in the menu
- 6 - Reset button: to delete stored insulation fault alarms
Arrow down key: parameter change, to move down in the menu
- 7 - MENU key: to call up the menu system
Enter key: to confirm parameter change

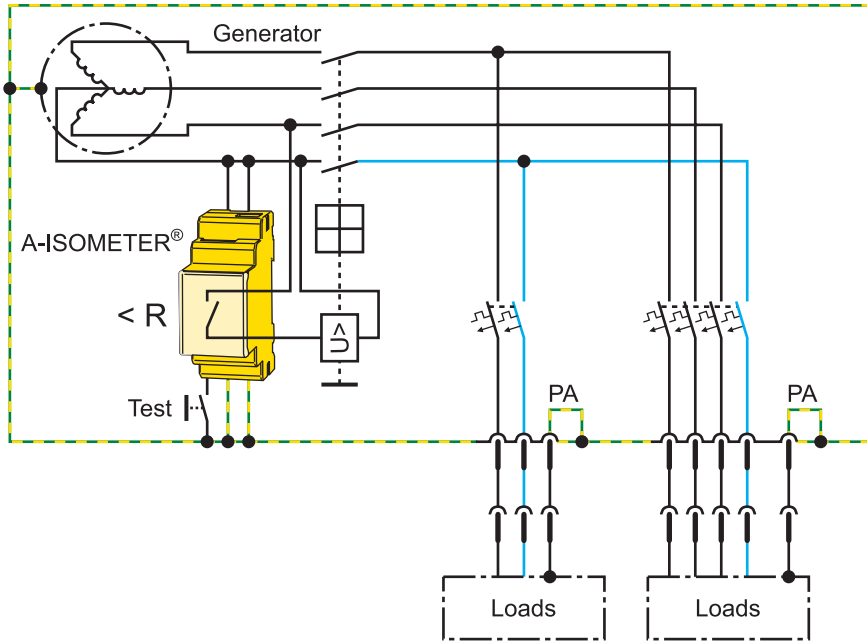
Wiring diagram



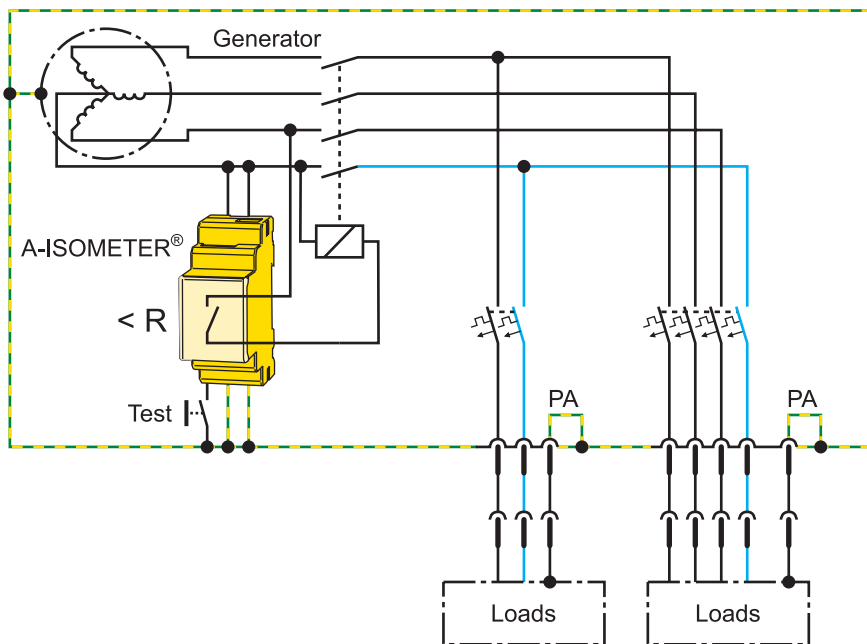
- 1 - Supply voltage U_S (see ordering details) via fuse
- 2 - Separate connection of E, KE to PE
- 3 - Connection of the AC system to be monitored:
AC: connect terminals L1, L2 to conductors L1, L2.
- 4 - Alarm relay K1: Alarm 1
- 5 - Alarm relay K2: Alarm 2
- 6 - Combined test and reset button,
short-time pressing (< 1.5 s) = Reset,
long-time pressing (> 1.5 s) = Test
- 7 - Line protection by a fuse in accordance with DIN VDE 0100-430 / IEC 60364-4-43 (6 A recommended). In case of supply (A1 / A2) from an IT system, both lines have to be protected by a fuse.

Application example

For mobile generators, protective measure "Protective separation with insulation monitoring and disconnection"



Setting K1 / K2 for
overvoltage release:
N / O operation (n.o.)
Setting fault memory: OFF



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

Technical data A-ISOMETER® IR423

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 details
Power consumption	≤ 3 VA
IT system being monitored	
Nominal system voltage U_N	AC 0...300 V
Rated frequency f_N	30...460 Hz
Response values	
Response value R_{an1} (ALARM 1)	1...200 k Ω (46 k Ω)*
Response value R_{an2} (ALARM 2)	1...200 k Ω (23 k Ω)*
Operating error 1 k Ω ...5 k Ω / 5 k Ω ...200 k Ω	± 0.5 kV / ± 15 %
Hysteresis	25 % of response value
Specified time	
Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1$ μ F	≤ 1 s
Starting 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
Admissible extraneous d.c. voltage U_{fg}	\leq DC 300 V
Permissible system leakage capacitance C_e	≤ 5 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 (off)*
Outputs	
Cable length test and reset button	≤ 10 m
Switching elements	
Number of changeover contacts	2 x 1 changeover contact
Operating principle	N / C operation / N / O operation (N / O operation)*
Electrical service life under rated operating conditions	10.000 operating cycles
Contact data acc. to IEC 60947-5-1	
Rated operational voltage	AC-13 AC-14 DC-12 DC-12 DC-12
Utilization category	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 61326-2-4
Operating temperature	-40 $^{\circ}$ C...+70 $^{\circ}$ C
Classification of climatic conditions IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (with condensation and formation of ice)
Transportation (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3M7
Transportation (IEC 60721-3-2)	2M2
Storage (IEC 60721-3-1)	1M3
Connections	
Connection	screw terminals
rigid / flexible / conductor sizes	0.2...4 / 0.2...2.5 mm ² / 24-12 AWG
Multi-conductor connection (2 conductors with the same cross section)	
rigid / flexible	0.2...1.5 / 0.2...1.5 mm ²
Stripping length	8 mm
Tightening torque	0.5...0.6 Nm
Other	
Operating mode	continuous operation
Position	any position
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Screw fixing	2 x M4 with mounting clip
Operating instructions	101013
Weight	≤ 150 g

* = factory setting

Ordering information

Type	Nominal system voltage* U_N	Supply voltage* U_S	Art. No.
IR423-D4W-2	AC 30...460 Hz 0...300 V	DC 70...300 V / AC 30...460 Hz 70...300 V	B 9101 6305W
IR423-D4W-1	AC 30...460 Hz 0...300 V	DC 9,6...94 V / AC 30...460 Hz 16...72 V	B 9101 6304W

* absolute values

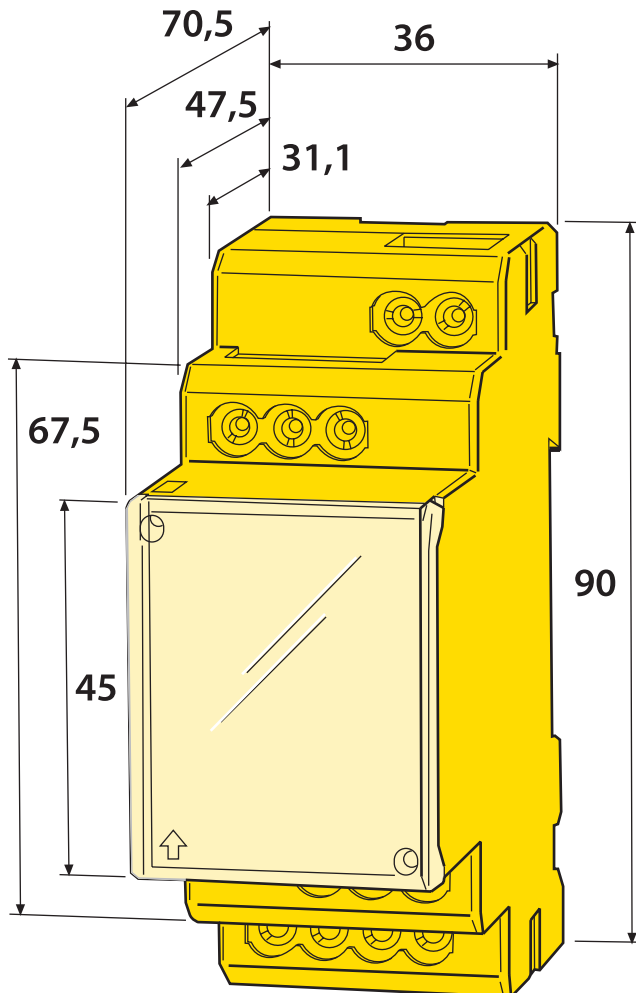
Accessories

Type	Art. No.
Mounting clip for screw fixing (1 unit required for each device)	B 9806 0008

Dimension diagram XM420

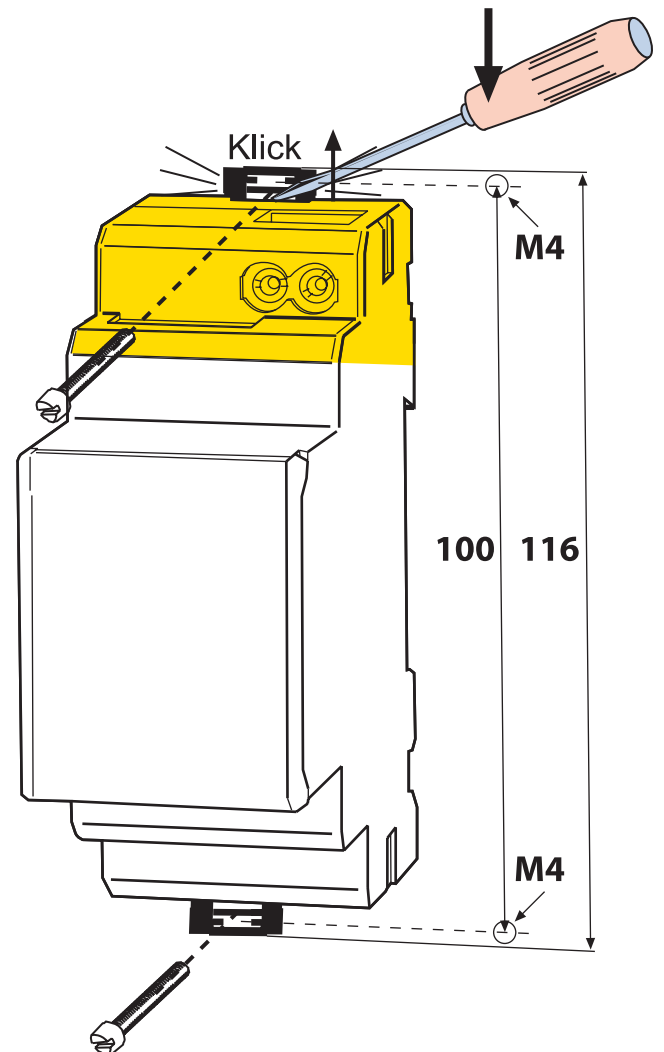
Dimensions are given in mm.

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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