

ISOMETER® IR420-D6

Offline monitor for de-energised AC, DC and 3(N)AC loads
in TN,TT and IT systems



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Device features

- Insulation monitoring for de-energised TN, TT and unearthed systems AC, 3(N)AC and DC
- Nominal voltage extendable via coupling device
- Two separately adjustable response values 100 kΩ...10 MΩ
- LEDs: Power On LED, LEDs Alarm 1, Alarm 2 for signalling insulation faults
- Combined test/reset button
- Two separate alarm relays with one changeover contact each
- Fault memory behaviour, selectable
- Push-wire terminal (two terminals per connection)

Approvals



Product description

The offline monitor of the IR420-D6 series monitors the insulation resistance of de-energised loads. These loads, usually temporarily operated or de-energised most of the time, e.g. fire extinguisher pumps, slide valve drives, elevator motors, emergency power generators etc., are supplied from TN, TT or IT systems. During the shut-down periods, however, humidity or other effects may cause insulation faults in the wiring or the loads which may go undetected. Switching the device on may then lead to the tripping of the protective device or may even result in motor fires and the device cannot be operated. In combination with a coupling device, the devices can also be used for higher voltages.

Application

- De-energised loads such as automatic fire extinguisher pumps, emergency drives, ship cranes, slide-valve drives in supply lines (gas, water, oil), motor-driven closing systems, diving pumps, drives for anchors, elevators, flue-gas valves and emergency power generators

Function

When the insulation resistance between the system conductors and earth falls below the set response value, the alarm relays switch and the alarm LEDs light up. The measured value is indicated on the internal LC display. In this way any changes, for example when circuits are connected to the system, can be recognised easily. The fault memory can be reset by pressing the reset button. The device function can be tested using the test button. Two separately adjustable response values with one alarm relay each allow prewarning already in case of very high-resistance insulation faults. When the lower response level is reached, an interlocking function will be activated and the connection of a defective load can be prevented.

The insulation resistance is measured via the output L1 or via a contact to the system being monitored. The contact is controlled via the external contact element K3. With the contact in closed position, the system is de-energised and the insulation resistance is being measured. If the system or load is in operation, K3 opens the contact and insulation monitoring is deactivated. Make sure that the main switch disconnects all poles. To ensure that the measuring voltage can be superimposed onto the system, a low-resistance connection must exist between all line conductors (e.g. by motor windings).

Note: If the IR420-D6 is operated via a coupling device, the auxiliary contact (N/C contact) of K3 between the ISOMETER® and the coupling device need not to be designed for the nominal voltage of the system. A rated contact voltage of AC 230 V will be sufficient here.

Measurement method

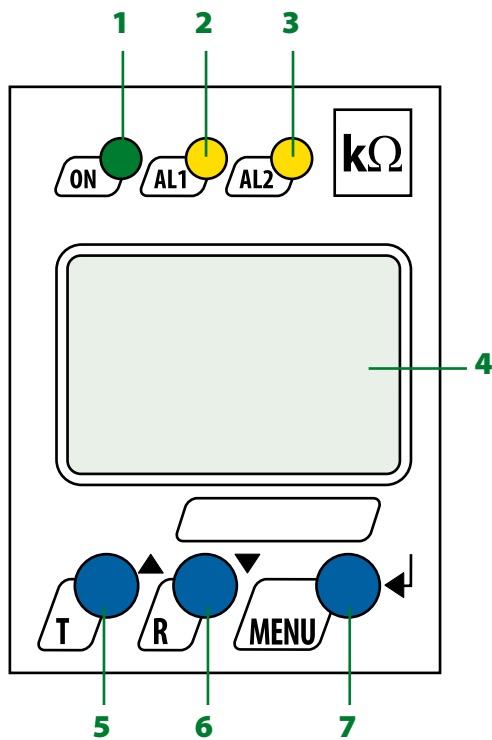


Superimposed DC voltage with inverter.

Standards

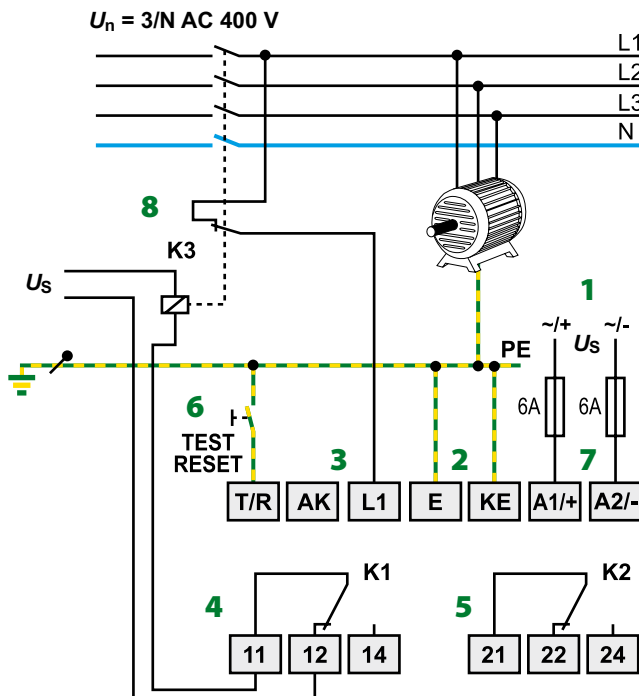
The ISOMETER® of the IR420 D6 series complies with the requirements of the device standards: DIN EN 61557-8 (VDE 0413-8), EN 61557-8, IEC 61557-8, IEC 61326-2-4, DIN EN 60664-1 (VDE 0110-1), DIN EN 60664-3 (VDE 0110-3), ASTM F1669M-96 (2007), ASTM F1207M-96 (2007)

Operating elements

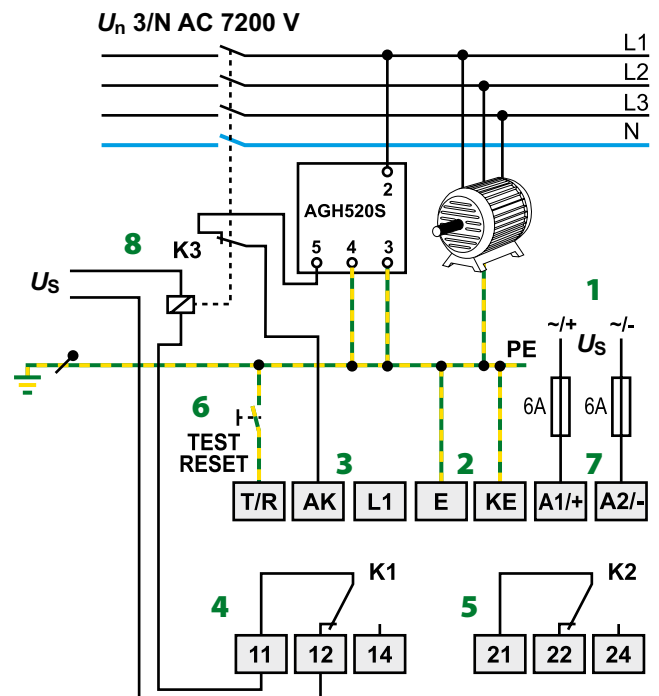


- 1 - Power On LED "ON", flashes in case of interruption of the connecting leads E/KE
- 2 - Alarm LED "AL1", lights when the value falls below the set response value Alarm 1 and flashes in case of interruption of the connecting leads E/KE
- 3 - Alarm LED "AL2", lights when the value falls below the set response value Alarm 2 and flashes in case of interruption of the connecting leads E/KE
- 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 diagrams (examples)



- 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:
- 4 - Alarm relay "K1": Alarm 1
- 5 - Alarm relay "K2": Alarm 2



- 6 - Combined test and reset button "TEST RESET"
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.
- 8 - K3 is also required and is not included in IR420-D6

Technical data

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Rated insulation voltage	(A1, A2) - (11, 12, 14) - (21, 22, 24) 300 V
Rated insulation voltage	(L1, AK, E, KE, T/R) 500 V
Rated impulse voltage	6 kV
Overvoltage category	II
Pollution degree	3
Protective separation (reinforced insulation) between:	
	(A1, A2) - (L1, AK, E, KE, T/R) - (11, 12, 14) - (21, 22, 24)
Voltage test acc. IEC 61010-1	2.2 kV

Supply voltage

IR420-D6-1:

Supply voltage U_s	AC 16...72 V/DC 9.6...94 V
Frequency range U_s	42...460 Hz/DC

IR420-D6-2:

Supply voltage U_s	AC/DC 70...300 V
Frequency range U_s	42...460 Hz, DC

Power consumption	≤ 3 VA
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System being monitored

Nominal system voltage U_n	AC 0...400 V
Tolerance of U_n	+25 %
Frequency range of U_n	42...460 Hz
without AGH:	nominal contact voltage of the N/C. contact (switch-on contactor)
with AGH520S:	AC 0...7200 V, 50...400 Hz

Response values

Response value R_{an1} (AL 1)	100 k Ω ...10 M Ω (1 M Ω)*
Response value R_{an2} (AL 2)	100 k Ω ...10 M Ω (100 k Ω)*
Operating error	±15 %
Hysteresis	+25 %

Time response

Response time t_{an} at $R_F = 0,5 \times R_{an}$ and $C_e = 1 \mu F$	≤ 4 s
Starting 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 ($R_F = 0 \Omega$)	≤ 10 μA
Internal d.c. resistance R_i	≥ 1.2 M Ω
Internal impedance Z_i (50 Hz)	≥ 1.1 M Ω
Admissible extraneous d.c. voltage U_{fg}	≤ DC 300 V
System leakage capacitance C_e	≤ 10 μF

Displays, memory

Display	LC display, multi-functional, non-illuminated
Display range, measuring value	10 k Ω ...20 M Ω
Percentage operating error	±15 %
Password	off/0...999 (off)*
Fault memory (alarm relay)	on/off (off)*

Inputs

Cable length external test/reset button	≤ 10 m
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Switching elements

Number of	2 (changeover contacts K1, K2)
Operating principle	N/O operation, N/C operation (N/O operation n.o.)*
Electrical endurance	10000 switching operations

Contact data according IEC 60947-5-1

Rated operational voltage AC	230 V	230 V	
Utilization category AC	AC 13	AC 14	
Rated operational current AC	5 A	3 A	
Rated operational voltage DC	220 V	110 V	24 V
Utilization category DC	DC 12	DC 12	DC 12
Rated operational current DC	0.1 A	0.2 A	1 A
Minimum current	1 mA at AC/DC ≥ 10 V		

Environment/EMC

EMC	acc. to IEC 61326
Operating temperature	-25 °C...+55 °C

Climatic categories acc. to IEC 60721:

Stationary use (IEC 60721-3-3) (except condensation and formation of ice)	3K5
Transport (IEC 60721-3-2) (except condensation and formation of ice)	2K3
Storage (IEC 60721-3-1) (except condensation and formation of ice)	1K4

Classification of mechanical conditions acc. to IEC 60721:

Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Storage (IEC 60721-3-1)	1M3

Connection

Connection screw-type terminals

Connection properties:	
rigid/flexible/AWG	0.2...4/0.2...2.5 mm ² / AWG 24...12
Two conductors with the same cross section:	
rigid/flexible	0.2...1.5/0.2...1.5 mm ²
Stripping length	8 mm
Tightening torque, terminal screws	0.5...0.6 Nm

Connection push-wire terminals

Connection properties:	
rigid	0.2...2.5 mm ² (AWG 24...14)
flexible without ferrules	0.75...2.5 mm ² (AWG 19...14)
flexible with ferrules	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
Position	any position
Degree of protection internal components (EN 60529)	IP30
Degree of protection terminals (EN 60529)	IP20
Enclosure material	polycarbonat
Flammability class	UL94 V-0
DIN rail mounting acc. to	IEC 60715
Screw fixing	2 x M4 with mounting clip
Weight	approx. 150 g

()* = Factory setting

Ordering information

Supply voltage ¹⁾ U _S		Type	Art. No.	
AC	DC		Screw-type terminal	Push-wire terminal
16...72 V, 42...460 Hz	9.6...94 V	IR420-D6-1	B91016415	B71016415
70...300 V, 42...460 Hz	70...300 V	IR420-D6-2	B91016407	B71016407
		IR420-D64-2	B91016408	B71016408

¹⁾ Absolute values

Accessories

Type designation	Art. No.
Mounting clip for screw mounting (1 piece per device)	B98060008

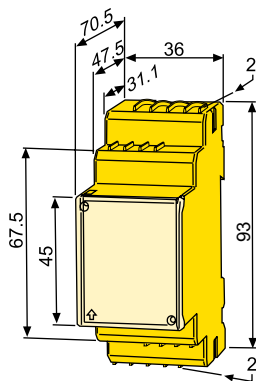
Suitable system components

Type designation	Type	Art. No.
Coupling device	AGH520S	B913033

Dimension diagram XM420

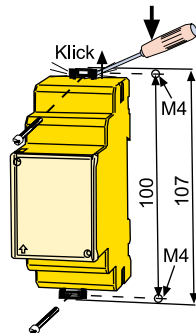
Dimensions in mm

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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