

## A-ISOMETER® IR420-D6

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



### Device features

- Insulation monitoring for de-energized 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, alarm LEDs for insulation faults Alarm 1, Alarm 2
- Combined test/reset button
- Two separate alarm relays with one changeover contact each
- Fault memory behaviour, selectable

### Approvals



Under development!

### Product description

The offline monitor of the IR420-D6 series is designed to monitor the insulation resistance of loads in the de-energized state. These loads, usually temporarily operated or de-energized most of the time, e.g. fire extinguisher pumps, slide valve drives 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 Isometers can also be used for higher voltages.

### Application

- De-energized 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 stand-by generators.

### Function

When the insulation resistance between the system conductors and earth falls below the set response values, 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 recognized 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-energized 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).

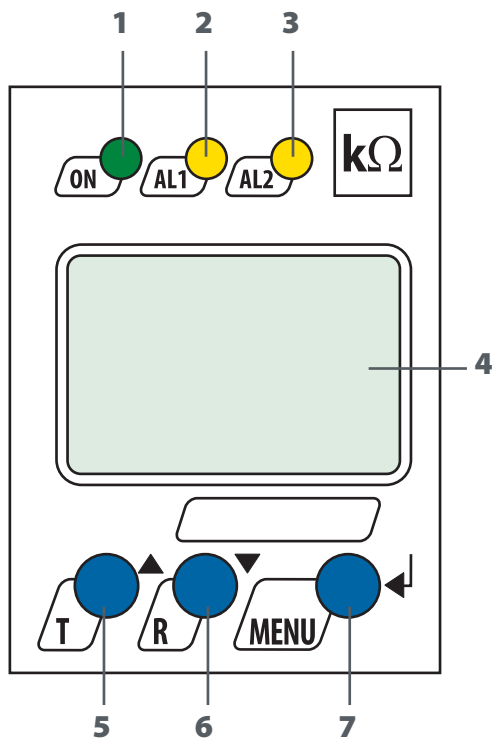
**Note:** If the IR420-D6 is operated via a coupling device, the auxiliary contact (N/C contact) of K3 between the A-ISOMETER® and the coupling device need not to be designed for the nominal voltage of the system. A rated contact voltage of AC 230 V will be sufficient here.

### Measuring principle



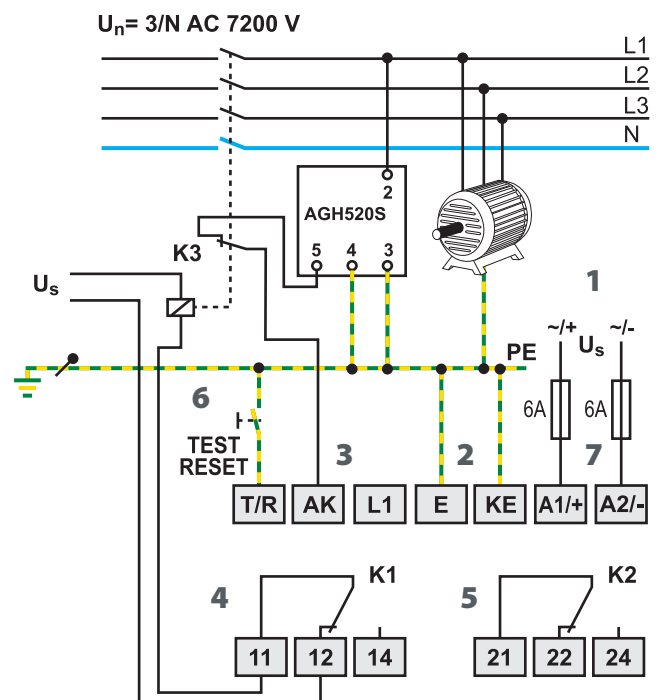
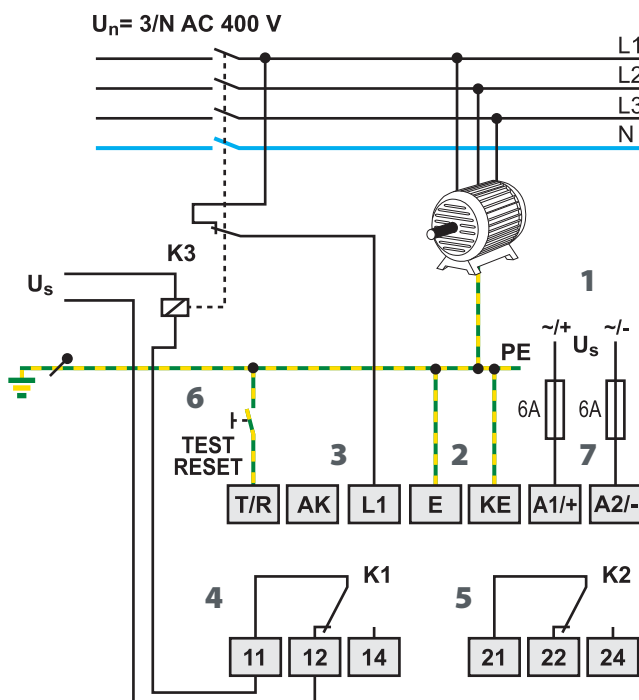
Superimposed DC voltage with inverter.

Operating elements



- 1 - Operation indicator "ON", flashes in case of interruption of the connecting leads earth/ 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 earth/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 earth/KE
- 4 - LC display
- 5 - Test button "T": to call up the self test.  
Arrow-up key: Parameter change, to move up in the menu.
- 6 - Reset button "R": 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 diagrams (examples)



- 1 - Supply voltage  $U_s$  (see ordering information) via fuse
- 2 - Separate connection of E, KE to PE
- 3 - Connection to the AC system being monitored:
- 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.

## Technical data A-ISOMETER® IR420-D6

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

Rated insulation voltage	400 V
Rated impulse voltage/pollution degree	4 kV / III
Protective separation (reinforced insulation) between (A1, A2) – (L1, AK, 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	≤ 3 VA

### IT system being monitored

Nominal system voltage $U_n$	offline
without AGH	Nominal contact voltage of the N/C contact of K3 (switch-on contactor)
with AGH520S	AC 50...400 Hz, 0...7200 V

### Response values

Response value $R_{an1}$ (Alarm 1)	100 kΩ...10 MΩ (1 MΩ)*
Response value $R_{an2}$ (Alarm 2)	100 kΩ...10 MΩ (100 kΩ)*
Relative percentage error	± 15 %
Hysteresis	+ 25 %

### Specified time

Response time $t_{an}$ at $R_F = 0.5 \times R_{an}$ and $C_e = 1 \mu F$	≤ 4 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 $R_F = 0 \Omega$ )	≤ 10 μA
Internal DC resistance $R_i$	≥ 1.2 MΩ
Impedance $Z_i$ at 50 Hz	≥ 1,1 MΩ
Permissible extraneous DC voltage $U_{Fg}$	≤ DC 300 V
Permissible system leakage capacitance $C_e$	≤ 10 μF

### Displays, memory

Display range, measuring value	10 kΩ...20 MΩ
Relative percentage error	± 15 %
Password	off / 0...999 (off)*
Fault memory alarm relay	on/off (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	N/C or N/O operation (N/O operation)*				
Electrical service life, number of cycles	10.000				
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 contact load	1 mA at AC/DC ≥ 10 V				

### Environmental conditions / 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	push-wire terminals
Connection properties:	
rigid	0.2...2.5 mm <sup>2</sup> (AWG 24...14)
Flexible without ferrules	0.2...2.5 mm <sup>2</sup> (AWG 24...14)
Flexible with ferrules	0.2...1.5 mm <sup>2</sup> (AWG 24...16)
Stripping length	10 mm
Opening force	50 N
Test opening, diameter	2.1 mm

### General data

Operating mode	continuous operation
Mounting	any position
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Product standards	DIN EN 61557-8
	EN 61557-8, IEC 61557-8, ASTM F1134-94
Operating manual	BP101014
Weight	≤ 150 g

( )\* = factory setting

### Ordering information

Type	Supply voltage* $U_S$	Response value $R_{an}$	System leakage capacitance $C_e$	Art. No.
IR420-D6-1	DC 9.6...94 V/AC 42...460 Hz 16...72 V	100 kΩ...10 MΩ	≤ 10 μF	B 7101 6415
IR420-D6-2	DC 70...300 V/AC 42...460 Hz 70...300 V	100 kΩ...10 MΩ	≤ 10 μF	B 7101 6407

Device version with screw-type terminals on request.

\* absolute values

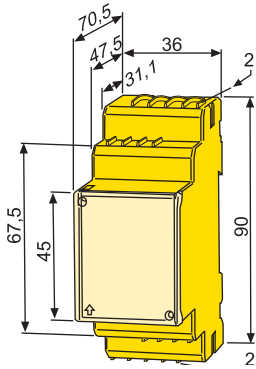
### Accessories

Type	Nominal system voltage* $U_n$	Art. No.	Type	Art. No.
AGH520S	AC 50...400 Hz 0...7200 V	B 913 033	Mounting clip for screw mounting (one piece per device)	B 9806 0008

**Dimension diagram XM420**

Dimensions in mm

Open the front plate cover in direction of arrow!



**Screw fixing**

Note: The upper mounting clip must be ordered separately (see ordering information).

