A-ISOMETER® IR420-D6

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

A-ISOMETER® IR420-D6

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 values100 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)

Standards, approvals and certifications

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 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.

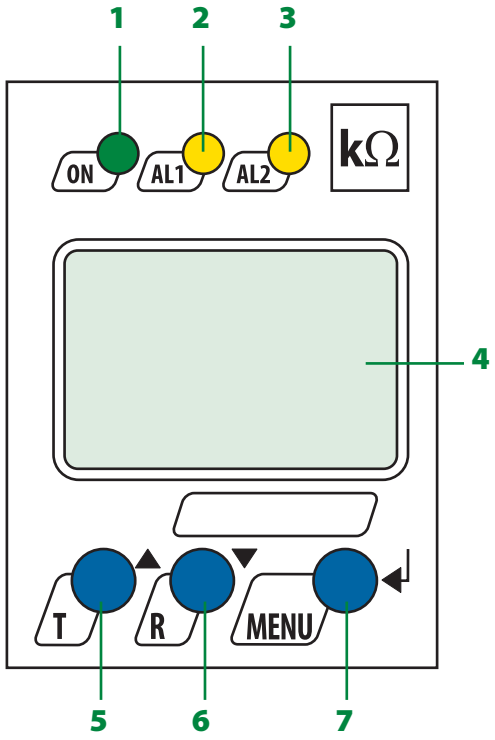
Measurement method

DC Superimposed DC voltage with inverter.

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

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

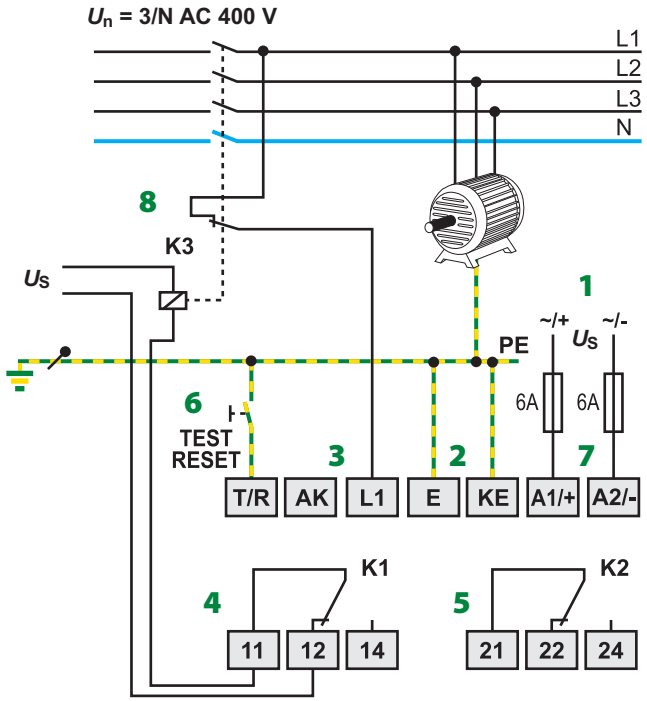
4 - LC display

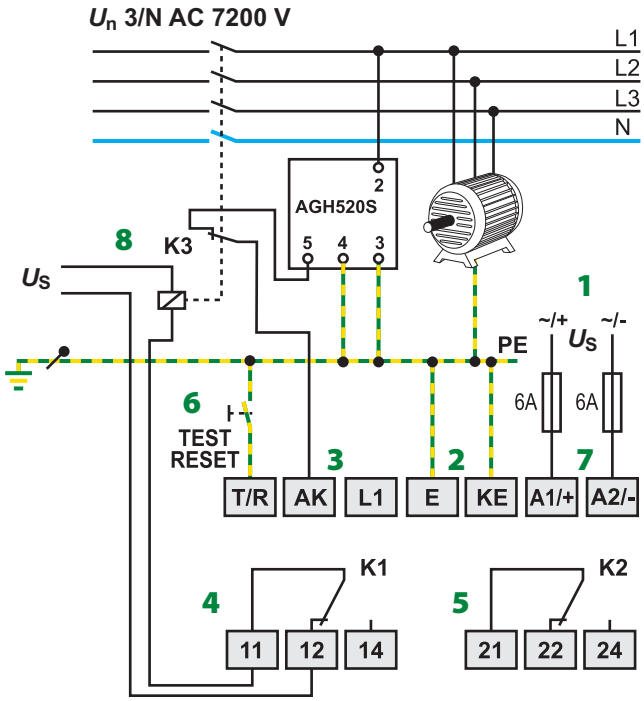
5 - Test button "T": to call up the self test.
Arrow up button: parameter change, to move up in the menu

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 change

Wiring diagrams (examples)





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

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 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

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Technical data

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 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	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 uncertainty	± 15 %
Hysteresis	25 %

Time response

Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1 µF	≤ 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 Ω)	≤ 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	≤ 10 µF

Displays, memory

Display range, measured value	10 kΩ…20 MΩ
Operating uncertainty	± 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 switching elements	2 x 1 changeover contact				
Operating principle	NC / N/O operation (N/O operation)*				
Electrical service life, 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
Minimum contact rating	1 mA at AC / DC > 10 V				

Environment/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 type	push-wire terminal
Connection properties	
rigid	0.2…2.5 mm² / AWG 24-14
Flexible without ferrule	0.2…2.5 mm² / AWG 24-14
Flexible with ferrule	0.2…1.5 mm² / 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 (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
Operating manual	TBP101014
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 terminals on request.
* Absolute values

Accessories

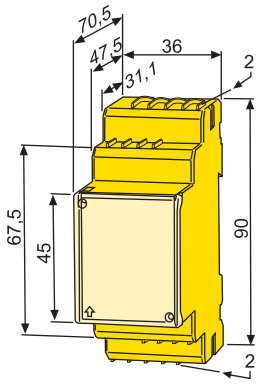
Type	Nominal system voltage* U_n	Art. No.
AGH520S	AC 50…400 Hz 0…7200 V	B 913 033

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

Dimension diagram XM420

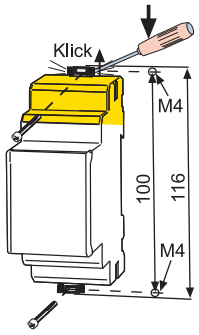
Dimensions in mm

Open the front plate cover in direction of arrow!



Screw mounting

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



Coupling device AGH520S

Coupling device AGH520S

Technical data

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 6.3 V
Rated impulse withstand voltage/pollution degree	17 kV/3

Voltage ranges

Netznennspannung U_n	3(N)AC 0…7200 V
Nominal frequency f_n	50…400 Hz

General data

Shock resistance IEC 60068-2-27 (device in operation)	15 g/11 ms
Bumping IEC 60068-2-29 (transport)	40 g/6 ms
Vibration resistance IEC 60068-2-6 (device in operation)	1 g/10…150 Hz
Vibration resistance IEC 60068-2-6 (transport)	2 g/10…150 Hz
Ambient temperature (during operation)	- 10 °C…+ 55 °C
Ambient temperature (during storage)	- 40 °C…+ 70 °C
Climatic class acc. to IEC 60721-3-3	3K5
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Degree of protection, internal components (IEC 60529)	IP 64
Degree of protection, terminals (IEC 60529)	IP 20
Type of enclosure	resin-encapsulated block
Screw mounting	4 x M5
Flammability class	UL94 V-0
Operating manual	BP109003
Weight approx.	4500 g

Ordering information

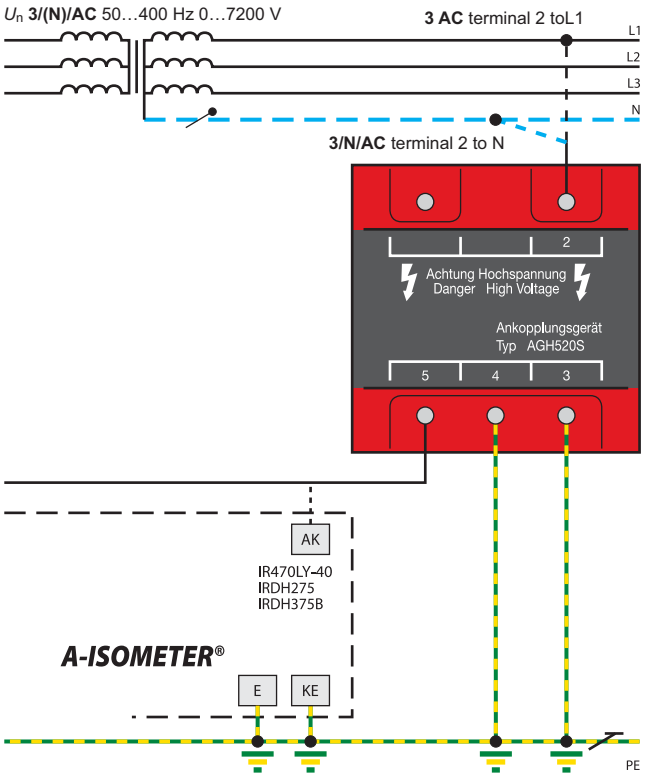
Type	Nominal system voltage U_n	Art. No.
AGH520S	3(N)AC 0…7200 V	B 913 033

Product description

The coupling device AGH520S is designed to extend the nominal voltage range of the A-ISOMETER® series described in the wiring diagram below to (3)AC 50…400 Hz, 0…7200 V. The coupling device is connected to the system to be monitored by one pole and connected to the terminal AK of the A-ISOMETER® by means of the terminal 5.

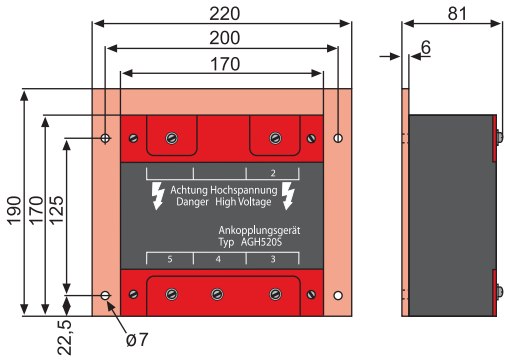
Standards, approvals and certifications

Wiring diagram



Dimension diagram

Dimensions in mm



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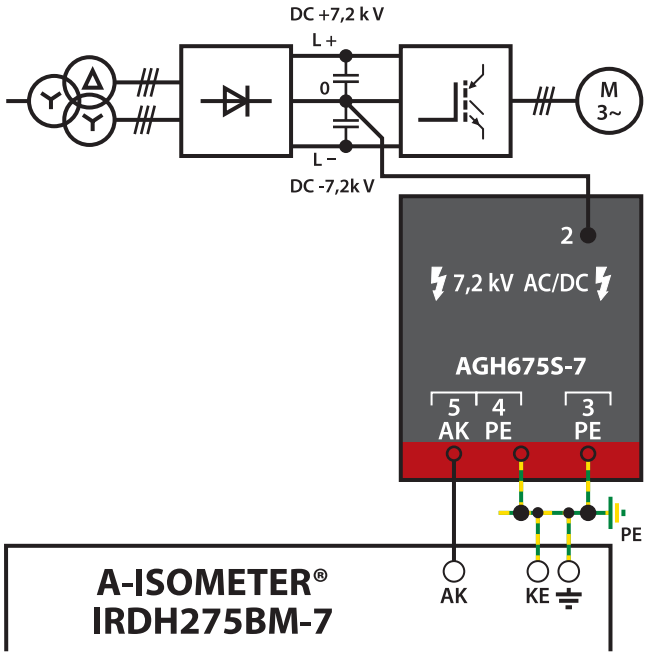
Product description

The coupling device AGH675S-7 is designed to extend the nominal voltage range of the A-ISOMETER® IRDH275BM-7 to AC/ 0…7.2 kV. The coupling device is connected to the system to be monitored by one pole and connected to the terminal AK of the A-ISOMETER® by means of the terminal 5.

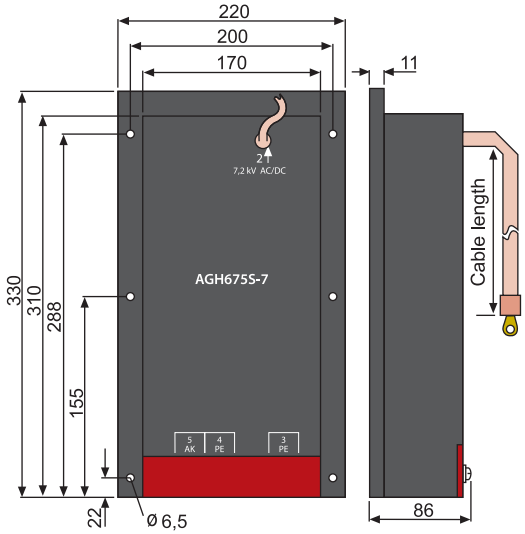
Standards, approvals and certifications

Wiring diagram (example)



Dimension diagram AGH675S-7

Dimensions in mm



Coupling device AGH675S-7

Technical data

Insulation coordination based on IEC 61800-5-1	
Rated insulation voltage	AC 7.2 V
Voltage test based on IEC 61800-5-1	
Type test	
Voltage impulse test	AC 80 kV
AC voltage test	AC 40 kV
Partial discharge test	14 kVeff
Routine test:	
AC voltage test, rate of increase < 2 kV/s	AC 40 kV
Voltage ranges	
Nominal system voltage U_n	AC/3(N)AC/DC 0…7.2 kV
Nominal frequency f_n	0…460 Hz
General data	
Shock resistance IEC 60068-2-27 (device in operation)	15 g/11 ms
Bumping IEC 60068-2-29 (transport)	40 g/6 ms
Vibration resistance IEC 60068-2-6 (device in operation)	1 g/10…150 Hz
Vibration resistance IEC 60068-2-6 (transport)	2 g/10…150 Hz
Ambient temperature, during operation	-10 °C…+55 °C
Ambient temperature for storage	-40 °C…+70 °C
Climatic class acc. to IEC 60721-3-3	3K5
Operating mode	continuous operation
Mounting	any position
Connection medium voltage	high-voltage cable (encapsulated on the device side)
Connection terminals 3, 4, 5	screw-type terminals
Connection, rigid/flexible	0.2…4 mm² / 0.2…2.5 mm²
Connection, flexible with ferrule	0.25…2.5 mm²
Degreee of protection, internal components (IEC 60529)	IP64
Degree of protection, terminals (IEC 60529)	IP20
Type of enclosure	resin-encapsulated block
Screw mounting	M5
Flammability class	UL94 V-0
Operating manual	TGH1395 (IRDH275BM-7)
Weight	approx. 5.1 kg

Ordering information

Type	Nominal system voltage U_n	Cable length	Art. No.
AGH675S-7-2000	AC / DC 0…7.2 kV 0…460 Hz	2000 mm	B 913 054
AGH675S-7-500	AC / DC 0…7.2 kV 0…460 Hz	500 mm	B 913 056