

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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Product description

The "Offline monitor" ISOMETER® IR420-D6 monitors the insulation resistance of deenergized loads. These loads, e.g. fire pumps, slidevalves drives, elevator motors or emergency generators, either temporarily deenergized or deenergized for the most time, are applied from TN, TT or IT systems. The maximum permissible nominal voltage depends on the nominal contact voltage of the N/C contact of K3 (switch-on contactor).

The nominal voltage range can be extended with a coupling device. A low-impedance connection between the active conductors is necessary to correctly monitor the de-energised cables. An inductive star-point coupling device DS2-31 and an inductive load AG70 are available for the monitoring of de-energised lines. The maximum permissible system leakage capacitance C_e is 10 μ F. Any other use than that described in this manual is regarded as improper.

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 k Ω ...10 M Ω
- 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



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
- EC 61557-8
- EC 61326-2-4
- DIN EN 60664-1 (VDE 0110-1)
- DIN EN 60664-3 (VDE 0110-3)

Ordering information

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

¹⁾ Absolute values

Accessories

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

Suitable system components

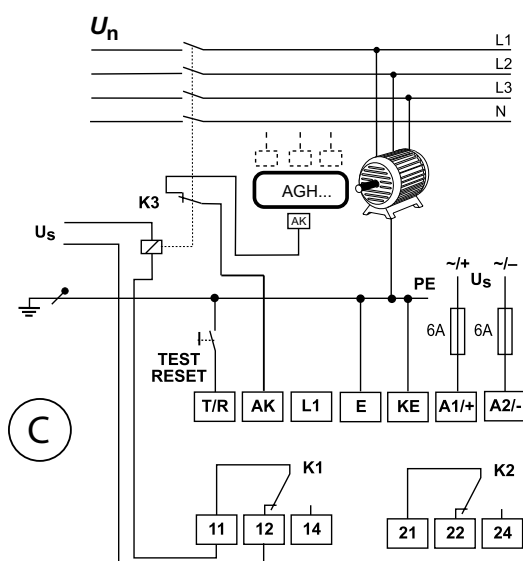
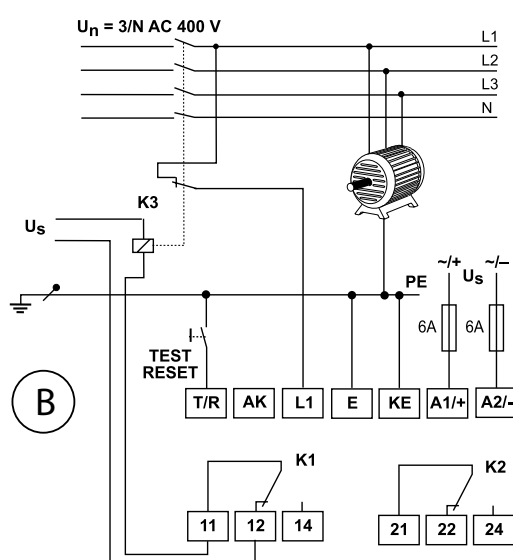
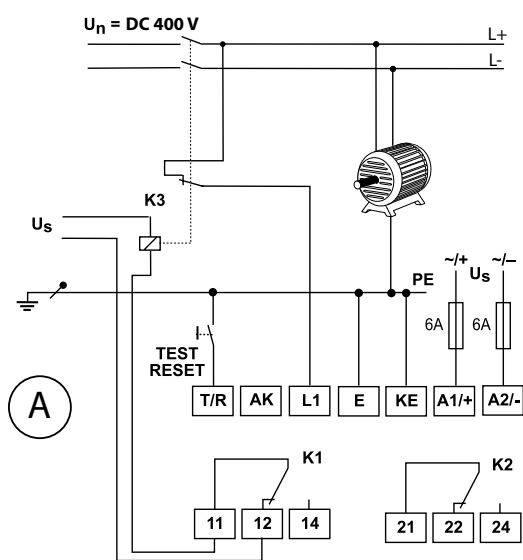
Description	Type	Nominal voltage ¹⁾ U_n	Art. No.
Coupling device	AGH150W	AC 0...1150 V, DC 0...1100 V	B915576
	AGH204S-4	AC 0...1650 V AC + DC 0...1300 V	B914013
	AGH520S	AC 50...400 Hz, 0...7200 V	B913033
	AG70	AC 230 V; 50 Hz	B984718
	DS2-31	3 AC 50...400 Hz, 0...500 V	B984092

¹⁾ Absolute values

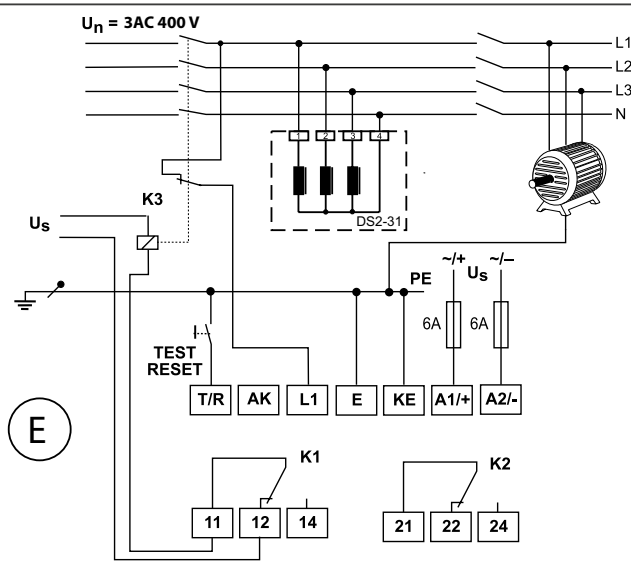
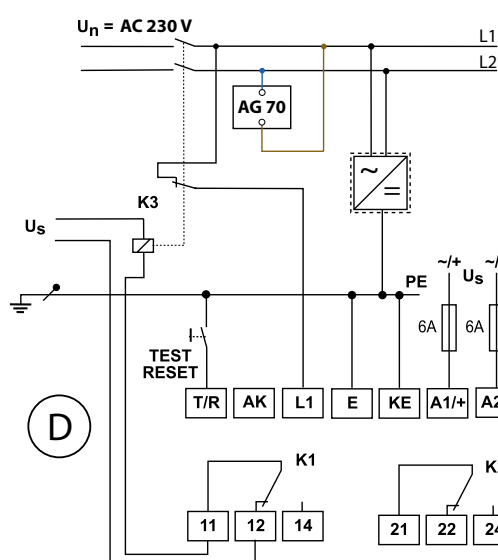
Operating elements

Device front	Element	Function
	ON	green - On
	AL1	yellow - Pre-warning
	AL2	yellow - Alarm
	▲ T	Up button Test button (press > 1.5 s) By pressing and holding the test button, the display elements are indicated.
	▼ R	Down button Reset button (press > 1.5 s)
	↵ MENU	ENTER MENU button (press > 1.5 s)

Wiring diagrams (examples)



U_n AC 0...1150 V DC 0...1100 V	U_n AC 0...1650 V AC + DC 0...1300 V	U_n AC 3(N)AC 0...7,2 kV
L1 L2 L1 L2 AGH150W AK80 AK	L1 L2 L3 U3 V3 W3 AGH204S-4 AK80 AK	L1 2 5 4 3 AK PE PE



Description		Terminal	Connection
A	Monitoring of disconnected DC loads up to 400 V with a low-resistance connection between L+ and L- via the load.	E, KE	Connect the leads E and KE separately to PE
B	Monitoring of disconnected 3-phase AC loads up to 400 V with a low-resistance connection between L1, L2 and L3 via the load.	A1, A2	Supply voltage U_s (see nameplate) via 6 A fuse
C	Monitoring of disconnected AC loads up to U_n with a low-resistance connection between L1, L2, and L3 via the load.	11, 12, 14	Alarm relay K1
D	Monitoring of disconnected lines or disconnected loads with high resistance between the active conductors L1 and L2. The inductive load AG70 connects the lines L1 and L2 via an inductance so that both lines can be monitored.	21, 22, 23	Alarm relay K2 (system fault relay)
E	Monitoring of disconnected lines or disconnected loads with high resistance between the active conductors L1, L2 and L3. The inductive star-point coupling device DS2-31 connects lines L1, L2 and L3 via an inductance so that four lines can be monitored.	K3	relay for isolating the ISOMETER®
		AGH...	Coupling device for the monitoring of loads up to U_n
		AG70 DS2-31	For the monitoring of loads with an undefined internal resistance or an open single conductor in cables
		T/R	for combined external test/reset button
		L1, AK	Connection to the system being monitored

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
(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	≤ 4 VA

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 K3 (switch-on contactor)	
with AGH520S	AC 50...400 Hz, 0...7200 V
with AGH150W	AC 0...1150 V
	DC 0...1100 V
with AGH204S-4	AC 0...1650 V
including DC components	0...1300 V

Response values

Response value R_{an1} (AL 1)	100 kΩ...10 MΩ (1 MΩ)*
Response value R_{an2} (AL 2)	100 kΩ...10 MΩ (100 kΩ)*
Operating error (≤ 1 MΩ)	±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
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 ($R_f = 0 \Omega$)	≤ 10 μA
Internal d.c. resistance R_i	≥ 1.2 MΩ
Internal impedance Z_i (50 Hz)	≥ 1.1 MΩ
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 kΩ...20 MΩ
Percentage operating error (≤ 1 MΩ)	±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

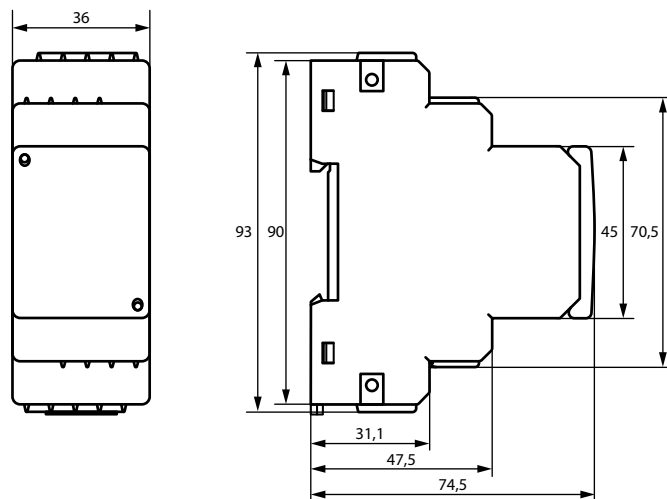
Utilization category	AC-13 / AC-14 / DC-12 / DC-12 / DC-12
Rated operational voltage	230 V / 230 V / 220 V / 110 V / 24 V
Rated operational current	5 A / 3 A / 0.1 A / 0.2 A / 1 A
Minimum current	1 mA at AC/DC ≥ 10 V

Technical data (continuation)

Environment/EMC		Connection	push-wire terminals
EMC	acc. to IEC 61326	Connection properties	
Operating temperature	-25...+55 °C	rigid	0.2...2.5 mm ² (AWG 24...14)
Climatic classes acc. to IEC 60721 (without condensation and formation of ice)		flexible	
Stationary use (IEC 60721-3-3)	3K24	without ferrules	0.75...2.5 mm ² (AWG 19...14)
Transport (IEC 60721-3-2)	2K11	with ferrules	0.2...1.5 mm ² (AWG 24...16)
Storage (IEC 60721-3-1)	1K22	Stripping length	10 mm
Classification of mechanical conditions acc. to IEC 60721:		Opening force	50 N
Stationary use (IEC 60721-3-3)	3M11	Test opening, diameter	2.1 mm
Transport (IEC 60721-3-2)	2M4	Other details	
Storage (IEC 60721-3-1)	1M12	Operating mode	continuous
Connection		Position	any position
Connection		Degree of protection internal components (EN 60529)	IP30
Connection properties		Degree of protection terminals (EN 60529)	IP20
screw terminals		Enclosure material	polycarbonat
rigid	0.2...4 mm ² (AWG 24... 12)	Flammability class	UL94 V-0
flexible	0.2...2.5 mm ² (AWG 24...14)	DIN rail mounting acc. to	IEC 60715
Two conductors with the same cross section		Screw mounting	2 x M4 with mounting clip
rigid/flexible	0.2...1.5 mm ² (AWG 24...16)	Documentation number	D00117
Stripping length	8 mm	Weight	approx. 150 g
Tightening torque, terminal screws	0.5...0.6 Nm	() * = Factory setting	

Dimension diagram XM420

Dimensions in mm



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Subject to change!

The specified standards take into account the
edition valid until 06.2026 unless otherwise
indicated.