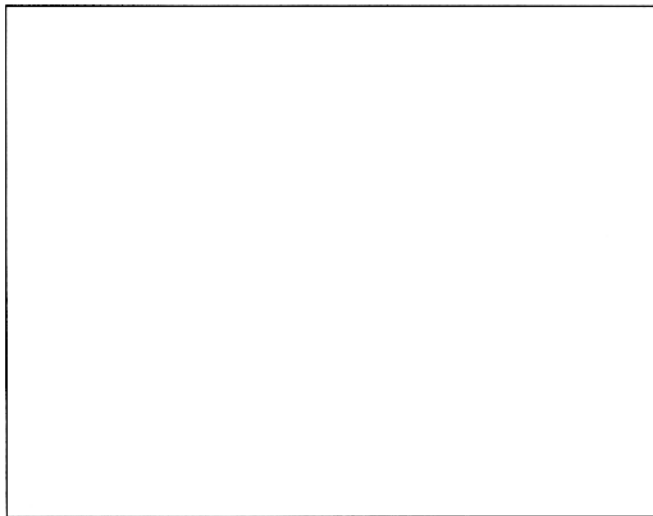


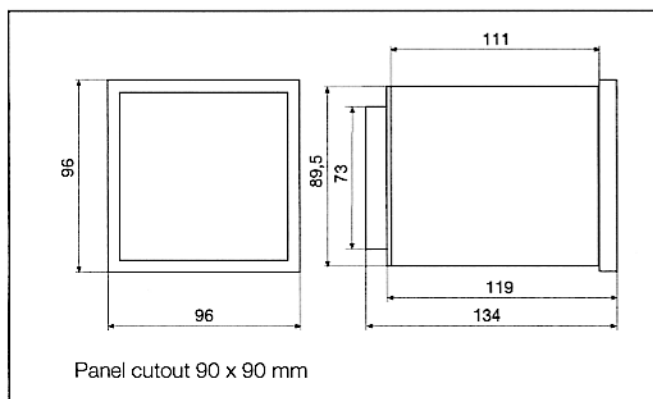


Insulation monitoring device for IT AC systems (isolated power)
and for off-line monitoring in earthed TN systems as well as for
residual current monitoring in AC systems



- ⇒ monitoring of electrical installations and consumers during operation or off-line monitoring
- ⇒ in combination with a coupling device up to 6 kV
- ⇒ adjustable response values:
-residual current 10 mA - 10 A
-insulation monitoring 10 kΩ - 1 MΩ or 100 kΩ - 10 MΩ
- ⇒ adjustable delay time
- ⇒ LED bar graph indications
- ⇒ CT and connection monitoring (RCM)

Dimension diagram



Product description

The A-ISOMETER IRC1500-... provides two functions: insulation monitoring and residual current monitoring. This allows to monitor insulation faults of electrical installations and consumers during operation as well as in switched-off state (off-line monitoring) and to prevent starting of defective consumers. The device is suitable for earthed TN- and TT systems and IT AC systems (isolated power). Via an external contact or control voltage the function insulation monitoring can be activated respectively deactivated.

The device is applicable, in particular, in all kind of industries where insulation may decrease due to humidity or other influences during long service interruption as this is the case with automatic fire pumps, emergency drives, reserve drives, submerged pumps, ship cranes, drives for anchors, etc.

For insulation monitoring of high-resistance and capacitive earthed systems, the A-ISOMETER can be used with additional residual current monitoring which is adapted to the network conditions.

The device is fitted in a plastic casing with the dimensions 96 x 96 mm, suitable for panel-mounting.

Function

Insulation monitoring

The insulation resistance of the consumer is only measured when the contact of the mains contactor at the terminals F1/F2 is closed, respectively, control voltage is applied (disconnected network).

A DC measuring voltage is generated which is connected to the system via the terminals U3 or AK (when using an external coupling device) and earth. To transmit the DC measuring voltage to the whole system, the supply conductors have to be connected via a low resistance (e.g. motor windings).

The current insulation resistance is indicated at the LED bar graph indicator.

The measuring circuit is closed via ohmic insulation faults. When the insulation value falls below the preset response value "ALARM" <5>, the alarm LED "ALARM" <1> illuminates and the alarm relay <23> switches after the expiry of the response delay t <6>.

Depending on the setting of the operating principle by means of the external DIP switch S2, the device works optionally in N/C or N/O operation and with or without latching (fault memory). The indication of the fault alarm is also selectable: on = not flashing, off = flashing.

The fault memory can be reset by pushing the <RESET> button <4> located at the front plate or an external button <20> (NO contact) provided that the insulation resistance exceeds the set response value by 50%.

The function of the LED bar graph indicator, the measuring leads, the alarm LEDs and the alarm relay can be checked by pushing the test button <Test> <3> located at the front plate or the external button <21> (NO contact).

If the IRC1500 is used for continuous insulation monitoring in an IT system, the terminals F1/F2 have to be bridged.

Residual current monitoring

The residual current measuring circuit is continuously activated.

The residual current is evaluated by a special current transformer <19> and converted into a measuring signal. The LED bar graph indicator <14> displays the measuring value. When the residual current exceeds the set response value "ALARM" <13>, the alarm LED "ALARM" <8> illuminates and the alarm relay <18> switches after the expiry of the response delay t <13>. Depending on the setting of the operating principle by means of the internal DIP switch S4, the device works optionally in N/C or N/O operation and with or without latching (fault memory).

The fault memory can be reset by pushing the <RESET> button <11> or the external button <15> (NO contact) provided that the residual current is 25% below the set response value.

The connection to the current transformer is continuously monitored. An open circuit is indicated by a flashing alarm LED "ALARM" <8> and the alarm relay <18>.

The function of the LED bar graph indicator, the transformer- and measuring circuit, the alarm LED and the alarm relay can be checked by pushing the test button <Test> <10> located at the front plate or an external button <16> (NO contact).

Please note

Please make sure that all supply conductors are connected by a low DC resistance (e.g. motor windings).

If the consumer is operated in star-delta connection or used as a pole-changing motor with separated windings, a low resistance connection between the phases is not provided. In this case, the coupling of the off-line monitor has to be carried out via an artificial neutral point (e.g. Bender DS2 or AGH204S).

All current-carrying conductors have to be led through the current transformer. The protective earth conductor must always bypass the current transformer.

When using the device in earthed systems (TN systems) for off-line monitoring, the consumer has to be switched off all-pole (including N conductor).

In order to check the proper connection of the device, it is recommended to carry out a functional test using a genuine earth fault, e.g. via a suitable resistance, before starting the operation.

Please check correct mains voltage !

Only one insulation monitoring device may be used in each interconnected system.

Earth faults in directly connected DC circuits are indicated with an increased response sensitivity.

Before opening the casing, the device has to be disconnected from the system.

When insulation and voltage tests are to be carried out, the device must be isolated from the system for the test period.

Electrical equipment shall only be installed by qualified personnel in consideration of the current safety regulations.

Technical data IRC1500

Insulation

Insulation coordination acc. to DIN VDE 0110 T1:	
Rated insulation voltage	AC 500 V/AC 250 V ^{*1)}
Rated impulse withstand voltage/contamination level	4 kV/6 kV/3
Dielectric test acc. to IEC 255-5, series C	2.5 kV/2 kV
Operation class	permanent operation

Network being monitored

Rated mains voltage U_N	IRC1500-4	0 ... 500 V
	IRC1500-6	0 ... 690 V
Frequency range		50 ... 60 Hz
Operating range		0 ... 1.15 U_N

Supply voltage

Supply voltage U_S	AC 50 ... 60 Hz 230/110 V
Operating range	0.8 ... 1.15 U_S
Self-consumption max.	4 VA

Response values A-ISOMETER

Response value ALARM	IRC1500-4	10 k Ω ...100 k Ω , 100 k Ω ...1 M Ω
	IRC1500-6	100 k Ω ...1 M Ω , 1 M Ω ...10 M Ω
Hysteresis		approx. 50% of ALARM
Response time (Re = 0 k Ω)		< 1 s
Delay time, adjustable		0 ... 10 s
Max. system leakage capacitance		20 μ F

^{*1} The rated insulation voltage of AC 500 V is only valid for the insulation monitoring unit. The rated insulation voltage for the residual monitoring unit is AC 250 V.

Measuring circuit

Measuring voltage U_M	15 V
Measuring current I_M	125 (-4) μ A/ 12.5 (-6) μ A
Internal DC resistance R_i acc. to DIN VDE 0413	120 k Ω (-4)/ 1.2 M Ω (-6)
Impedance Z_i , 50 Hz DIN VDE 0413	>100 k Ω (-4) >1 M Ω (-6)
Max. admissible stray DC voltage	500 V (-4) 690 V (-6)

Response values RCM

Response value ALARM	10 mA ... 10 A
Hysteresis	approx. 25% of ALARM
Accuracy	according to IEC1008
Response time	according to IEC1008
Delay time, adjustable	0 ... 10 s

Outputs

Meter output SKMP	0 ... 400 μ A
Current output (max. load)	10 k Ω
Length of the wiring to the current transformer	
Single wire 0.75 mm ²	< 1 m
Single wire 2 x 0.75 mm ² (twisted pair)	1 ... 10 m
Shielded cable 2 x 0.74 mm ² (shield to L)	> 10 ... 25 m

Contact circuit

Switching components	1 change over contact each
Contact class acc. to DIN IEC 255 Teil 0-20	IIB
Rated contact voltage	AC 250 V/DC 300 V
Admissible number of operations	12000 cycles
Limited making capacity	UC 5 A
Limited breaking capacity	
at AC 230 V and cos phi = 0.4	AC 2 A
at DC 220 V and L/R = 0.04 s	DC 0.2 A
Operating principle	N/O operation / N/C operation
Adjustment by factory	N/O operation

Special type tests

Test of electromagnetic compatibility (EMC)

Impulse voltage test acc. to IEC 255-5	class III
Electrical disturbance test acc. to IEC 255-5	class III
Electrical fast transient test burst acc. to IEC 801-4	-

Mechanical tests

Shock resistance acc. to IEC 68-2-27	15 g/11 ms
Vibration strength acc. to IEC 68-2-6	10 ... 15 kHz/0.15 mm - 2 g
Bumping acc. to IEC 68-2-29	40 g/6 ms

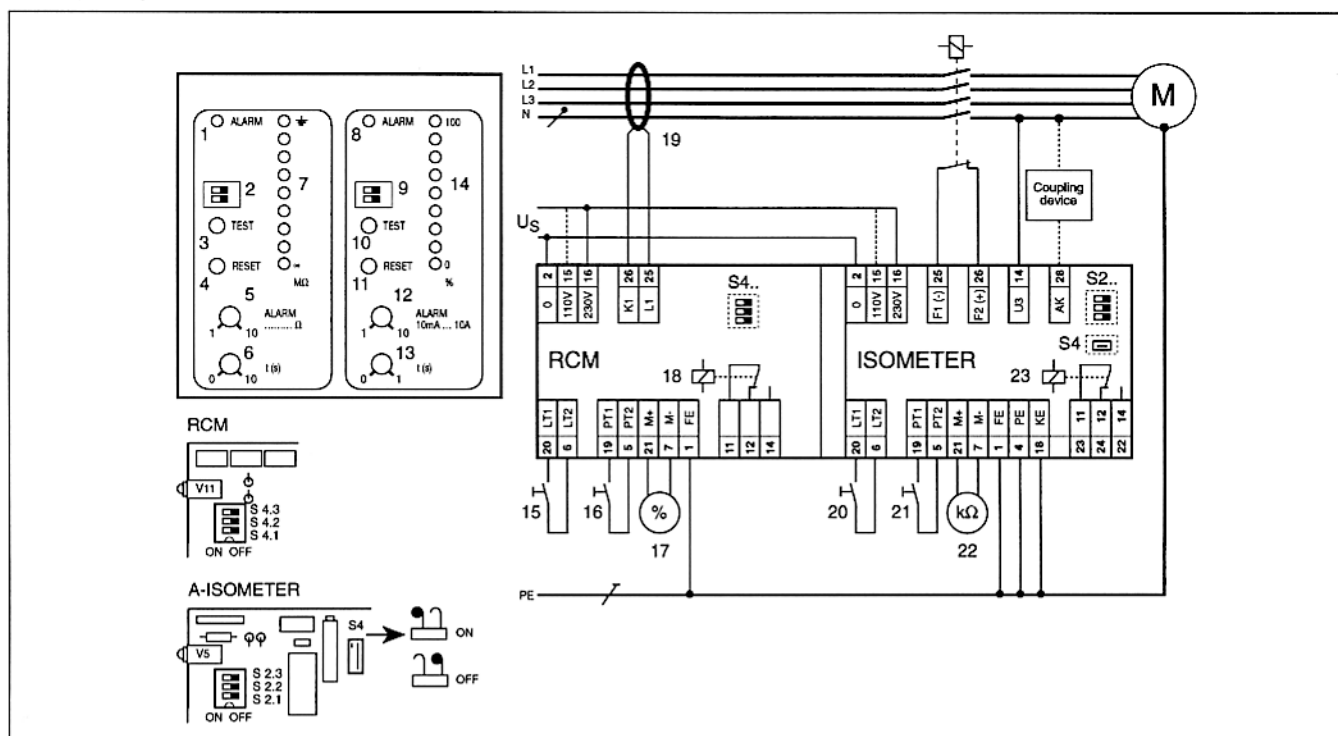
Environmental conditions

Ambient temperature, during operation	-10 ... +55°C
Storage temperature range	-40 ... +70°C
Climatic class acc. to DIN 40 040	F

General data

Mounting	as desired
Front plate width	-
Type of connection	connectors/series terminals
Wire cross section	
single wire	0.2 ... 4 mm ²
fine braid	0.2 ... 2.5 mm ²
Protection class acc. to DIN 40 050	
Internal components	IP 30
Terminals/with terminal covers	IP 20
Type of casing	panel mounting 96 x 96 mm
Flammability class	UL94V-0
Weight approx.	600 g
Wiring diagram	Z 120 570

Wiring diagram



Legend to wiring diagram

Insulation monitoring "A-ISOMETER"®

- 1 alarm LED "ALARM", illuminates when the insulation value falls below the preset response value "ALARM"
- 2 DIP switch for the setting of the response range "ALARM"

100 kΩ - 1 MΩ 10 kΩ - 100 kΩ



Black = switch position

- 3 test button <TEST>
- 4 reset button <RESET>
- 5 potentiometer for the adjustment of the response value "ALARM"
- 6 potentiometer for the adjustment of the delay time t
- 7 LED bar graph indicator "insulation value"
- 20 external reset button (NO contact)
- 21 external test button (NO contact)
- 22 external meter (kΩ scale) for the insulation value
- 23 alarm relay with one change over contact
- F1, Input, selection, insulation monitoring on/off
- F2 F1, F2 closed or DC 24 V = Insulation monitoring active
F1/F2 open or 0 V = Insulation monitoring inactive
- S2.. Internal DIP switch (remove front plate for selection)

S2.1 fault memory	on = storing	off = not storing*
S2.2 fault alarm	on = not flashing*	off = flashing
S2.3 alarm relay	on = N/O operation*	off = N/C operation
- S4 Internal switch for the level definition of F1/F2
on = isolated contact applied to F1/F2
off = control circuit voltage DC 24 V applied to F1/F2
(DC 24 V = on, 0 V = off)

Residual current monitoring "RCM"

- 8 alarm LED "ALARM", illuminates when the preset response value "ALARM" (10 mA - 10 A) is exceeded.
- 9 DIP switch for the adjustment of the response range "ALARM"

1 A ... 10 A 100 mA ... 1 A 10 mA ... 100 mA



Black = switch position

- 10 test button <TEST>
 - 11 reset button <RESET>
 - 12 potentiometer for the adjustment of the response value "ALARM"
 - 13 potentiometer for the adjustment of the time delay t
 - 14 LED bar graph indicator, indication in % related to the preset response value "ALARM"
 - 15 external reset button (NO contact)
 - 16 external test button (NO contact)
 - 17 external meter (0 ... 400 μA), indication in % related to the preset response value "ALARM"
 - 18 alarm relay with one change over contact
 - S4.. internal DIP switch (remove front plate for selection)

S2.1 fault memory	on = storing	off = not storing*
S2.2 measuring transformer	on = toroidal-core CT*	off = flexible strip CT
S2.3 alarm relay	on = N/C operation	off = N/O operation*
 - U_S supply voltage
- * = pre-set by factory

Ordering details

Type	Supply voltage	Art. No.
IRC1500-49	AC 230/110 V	915 541

Current transformers

Type	Internal diameter	Art. No.
W1 - P23	23 mm	911 710
W2 - P40	40 mm	911 726
W3 - P60	60 mm	911 727
W4 - P100	100 mm	911 728
W5 - P200	200 mm	911 729

Flexible strip current transformers

Type	Length	Art. No.
W500	500 mm	911 707
W600	600 mm	911 708
W700	700 mm	911 709
W800	800 mm	911 712
W900	900 mm	911 713
W1000	1000 mm	911 711

Coupling devices

Type	Rated mains voltage	Art. No.
AGH520S	50...400 Hz/0...6000 V	913 033
AGH204S	3AC 0...400 Hz/0...1500 V	914 013
DS2-1	AC 50...400 Hz/0...500 V	984 753

Measuring instruments

Type	Size/SKMP	Art. No.
9604-1421	96 x 96 mm / 120 k Ω	986 764
9604-1621	96 x 96 mm / 1.2 M Ω	986 782
9604-4241	96 x 96 mm / 0 - 100%	986 807