

ISOMETER® IR140Y-...

Insulation monitoring device for
unearthed AC systems (IT systems)



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IR140Y-...

Device characteristics

- Insulation monitoring for IT systems AC 0...138 V resp. 0...300 V
- Adjustable response values
- Connection monitoring system/ earth
- Power On LEDs and alarm LEDs for the indication of insulation faults AC, L+, L-
- Combined TEST and RESET button
- Connection for external TEST/RESET button
- Alarm relay with two voltage-free changeover contacts
- N/O or N/C operation, selectable
- Fault memory, selectable
- 45 mm enclosure with transparent dust cover for ingress protection

Approvals



Product description

The ISOMETERs® of the IR140Y series monitor the insulation resistance of unearthed AC control circuits (IT systems) up to 138 V respectively 300 V.

Due to a separate supply voltage source it is possible to monitor de-energized systems too.

The systems should not contain DC components. Due to the DC measuring principle, insulation faults behind directly connected rectifiers are indicated with increased response sensitivity. The preset response values apply to the pure AC system only. The versions IR140Y-40 and IR140Y-60 operate with higher measuring voltages, therefore the response sensitivity for insulation faults on the DC side will be reduced.

Application

- AC control circuits (without directly connected rectifiers) in industry, mechanical engineering, power plants, elevator controls, automation systems etc.
- AC control and auxiliary circuits in accordance with DIN EN 60204-1 "Elektrische Ausrüstung von Maschinen" (Electrical equipment of machines), IEC 60204-1, EN 60204-1
- AC auxiliary circuits in accordance with DIN VDE 0100-725 (VDE 0100 part 725)
- Small AC IT systems, e. g. lighting systems, mobile generators

Function

If the insulation resistance between the system conductor and earth falls below the preset response value, the alarm relay switches and the alarm LEDs light up, even in case of interruption of the earth or system connection. The alarm LEDs AC, DC+ and DC- allow to distinguish between insulation faults at the AC side and insulation faults at the DC side. The fault message can be stored. Pressing the RESET button resets the fault message. By pressing the TEST button, the function of the ISOMETER® can be tested.

Measuring principle



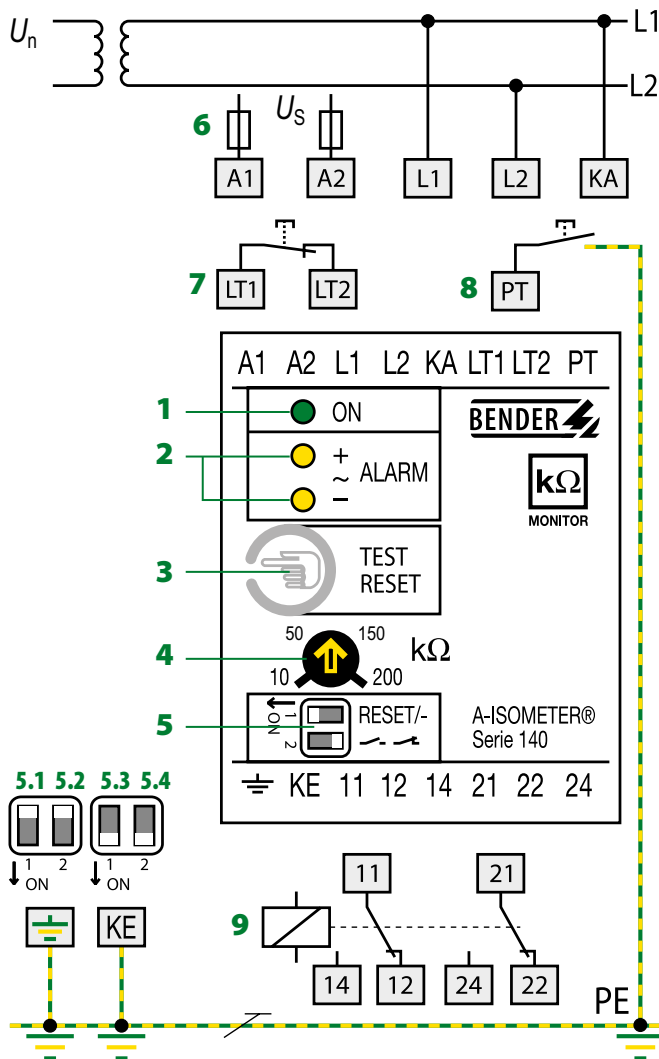
Superimposed DC measuring voltage with reversing stage.

Standards

The IR140Y series complies with the standards:

DIN EN 61557-8 (VDE 0413 part 8); EN 61557-8, IEC 61557-8, ASTM F 1669M-96.

Wiring diagram/operating elements



- 1 - Power On LED
- 2 - Alarm LEDs, illuminate when the insulation resistance falls below the preset response value and flash in case of interruption of the connecting leads earth / KE or L1 / L2
- 3 - Combined TEST and RESET button, short-time pressing (< 1 s) = RESET, long-time pressing (> 2 s) = TEST
- 4 - Potentiometer for the adjustment of the response value R_{an} (RALARM)
- 5 - DIP switch for the selection of the operating principle of the alarm relay and the latching properties in case of fault alarm
 - 5.1 - without fault memory
 - 5.2 - alarm relay in N/C operation
 - 5.3 - with fault memory
 - 5.4 - alarm relay in N/O operation
- 6 - Fuse 6 A, U_s see ordering details
- 7 - External RESET button for fault memory
- 8 - External TEST button
- 9 - Alarm relay with two changeover contacts

Response values/measuring circuit

Type	Response value R_{an}	System leakage capacitance C_e	Response time t_{an} at $R_f = 0,5 \times R_{an}^{1)}$	Measuring voltage U_m
IR140Y-3	1...20 kΩ	< 20 μF	< 0,8 s	< 20 V
IR140Y-4	10...200 kΩ	< 20 μF	< 0,8 s	< 20 V
IR140Y-40	10...200 kΩ	< 20 μF	< 0,8 s	< 40 V
IR140Y-6	0,5...5 MΩ	< 10 μF	< 2 s	< 20 V
IR140Y-60	0,5...5 MΩ	< 10 μF	< 2 s	< 40 V

Type	Measuring current max. I_m	Internal resistance/impedance R_i	Max. admissible extraneous DC voltage U_{fg}	Nominal voltage range U_n
IR140Y-3	< 0,72 mA	> 28 kΩ/24 kΩ	< 138 V	AC 0...138 V
IR140Y-4	< 0,17 mA	> 120 kΩ/98 kΩ	< 300 V	AC 0...300 V
IR140Y-40	< 0,34 mA	> 120 kΩ/110 kΩ	< 300 V	AC 0...300 V
IR140Y-6	< 17 μA	> 1,2 MΩ/980 kΩ	< 300 V	AC 0...300 V
IR140Y-60	< 34 μA	> 1,2 MΩ/1,1 MΩ	< 300 V	AC 0...300 V

¹⁾ The response time applies to an insulation fault $0,5 \times R_{an}$ at $1 \mu F$ system leakage capacitance according to IEC 61557-8.

Ordering details

Supply voltage U_s	Type	Art. No.
AC 230 V	IR140Y-3	B 9101 5504
	IR140Y-4	B 9101 6505
	IR140Y-6	B 9101 6507
	IR140Y-40	B 9101 6506
	IR140Y-60	B 9101 6508
AC 90...132 V ¹⁾	IR140Y-313	B 9101 5509
	IR140Y-413	B 9101 6523
	IR140Y-613	B 9101 6519
	IR140Y-4013	B 9101 6524
	IR140Y-6013	B 9101 6521
DC 9,6...84 V ¹⁾	IR140Y-321	B 9101 5508
	IR140Y-421	B 9101 6513
	IR140Y-621	B 9101 6515
	IR140Y-4021	B 9101 6514
	IR140Y-6021	B 9101 6516

Other voltages on request

¹⁾ absolute values

Accessories

Type	Art. No.
Mounting plate	B 990 056

Technische Daten

Insulation coordination acc. to IEC 60664-1

Rated voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Voltage ranges

Nominal system voltage U_n see	table "response values/measuring circuit"
Nominal frequency f_n	40...460 Hz
Supply voltage U_S	see ordering details
Operating range of U_S	0.8...1.15 x U_S
Frequency range U_S	50...460 Hz
Power consumption	< 3 VA

Response values	see table "response values/measuring circuit"
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Measuring circuit	see table "response values/measuring circuit"
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Outputs

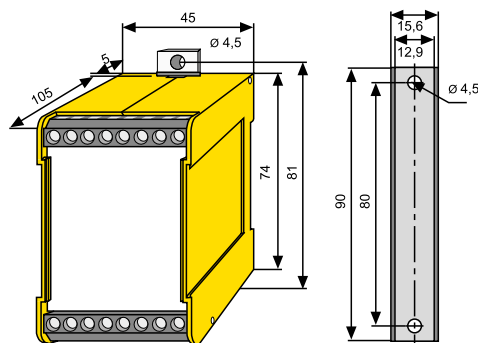
TEST/RESET button	internal/external
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Switching elements

Switching elements	2 changeover contacts
Operating principle	N/O / N/C operation
Factory setting	N/O operation
Electrical endurance	12000 cycles
Contact class	IIB acc. to DIN IEC 60255 part 0-20
Rated contact voltage	AC 250 V/DC 300 V
Making capacity UC	5 A
Breaking capacity	2 A, AC 230 V, $\cos \phi = 0.4 - 0.2$ A, DC 220 V, L/R = 0.04 s
Minimum contact current at DC 24 V	2 mA (50 mW)

Dimension diagram XM45

Dimensions in mm



Environment

Shock resistance acc. to IEC 60068-2-27 (device in operation)	15 g/11 ms
Bumping acc. to IEC 60068-2-29 (during transport)	40 g/6 ms
Vibration resistance acc. to IEC 60068-2-6 (device in operation)	1 g/10...150 Hz
Vibration resistance acc. to IEC 60068-2-6 (during transport)	2 g/10...150 Hz
Ambient temperature (during operation)	-10°C...+55°C
Storage temperature range	-40°C...+70°C
Climatic class according to IEC 60721-3-3	3K5

Connection

Connection	screw terminals
Wire cross section	
rigid, flexible	0.2...4 mm ² /0.2...2.5 mm ²

Other

Operating mode	continuous operation
Mounting	any position
Degree of protection, int. components/terminals (DIN EN 60529)	IP30/IP20
Screw fixing	with mounting plate
DIN rail mounting according to	DIN EN 60715/IEC 60715
Flammability class UL94V-0	
Documentation number	D00232
Weight approx.	280 g



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