

ISOMETER® IR145Y-...

Insulation monitoring device for unearthed
AC, DC and AC/DC systems (IT systems)



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IR145Y-...

Device characteristics

- Insulation monitoring for IT AC, AC/DC systems 0...300 V
- Adjustable response values
- Connection monitoring system/ earth
- Power ON LED and alarm LEDs, indicating AC, DC+ and DC- insulation faults
- Combined TEST and RESET button
- Connection for external TEST and RESET button
- Alarm relay with two voltage-free changeover contacts
- N/O or N/C operation, selectable
- Fault memory, selectable

Approvals



Product description

The ISOMETERS® of the IR145Y series monitor the insulation resistance of unearthed AC, DC or AC /DC control circuits (IT systems) 0...138 V respectively 0...300 V. DC-supplied components existing in AC/DC systems do not influence the operating characteristics. The response values correspond to the scale printed on the front plate. The supply voltage is taken from the system being monitored. A separate supply voltage source creates the possibility to monitor de-energized systems too.

Application

- Control circuits in the industrial sector, mechanical engineering, power plants, elevators, automation systems etc.
- 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
- Auxiliary circuits in accordance with DIN VDE 0100-725
- Small IT systems in lighting systems, computer networks, battery systems etc.

Function

If the insulation resistance between the system conductors and earth falls below the set response value, the alarm relay switches and the alarm LEDs light up. This also applies in case of interruption of the system and earth connection. Different alarm LEDs AC, DC+ and DC- allow to distinguish between insulation faults on the AC and the DC side. The fault message can be stored. The fault memory can be reset by pressing the RESET button. By pressing the TEST button, the function of the device can be tested.

Measuring principle

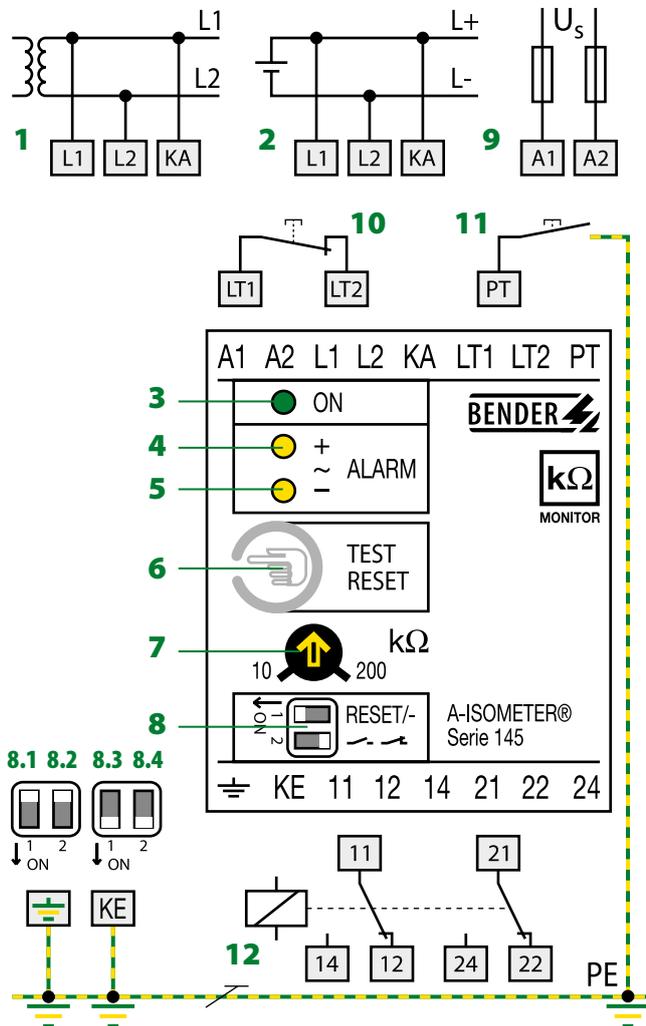


The IR145Y devices use a variant of the AMP measuring principle. The frequency range of the system being monitored can be within the DC range or 15...460 Hz. If frequencies of 0...15 Hz occur, it is recommended to use devices of the IRDH275, 375 or 575 series.

Standards

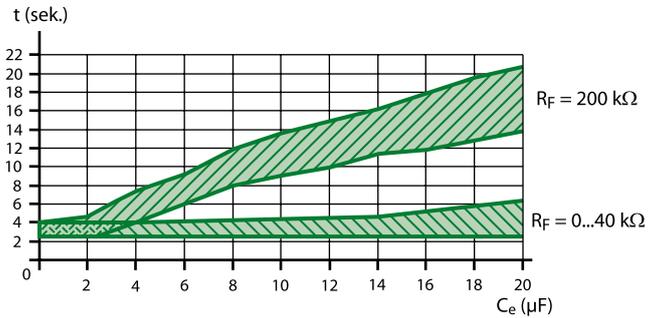
The IR145Y series complies with the standards: DIN EN 61557-8 (VDE 0413 part 8); EN 61557-8; IEC 61557-8, ASTM F 1669M-96.

Wiring diagram/operating elements



- 1 - System to be monitored: U_n AC
- 2 - System to be monitored: U_n DC
- 3 - Power On LED
- 4 - Alarm LEDs light up when the insulation value falls below
- 5 - The preset value and flash in case of interruption of the connecting leads earth / KE or L1 / L2
- 6 - Combined TEST and RESET button; short-time pressing (< 1 s) = RESET; long-time pressing (> 2 s) = TEST
- 7 - Potentiometer for the adjustment of the response value R_{an} (RALARM)
- 8 - DIP switch for the selection of the operating principle of the alarm relay and the fault memory in case of fault alarm
 - 8.1 - without fault memory
 - 8.2 - alarm relay in N/C operation
 - 8.3 - with fault memory
 - 8.4 - alarm relay in N/O operation
- 9 - U_s see ordering details, 6 A fuse
- 10 - External RESET button for fault memory
- 11 - External TEST button
- 12 - Alarm relay with 2 changeover contacts

Measuring time IR145Y-4...



C_e = system leakage capacitance, R_f = insulation fault, t = measuring time

Response values/measuring circuit

| Type | Response-value R_{an} | Response-time $t_{an}^{(1)}$ | System leakage-capacitance C_e max. | Measuring-voltage U_m |
|-------------|-------------------------|------------------------------|---------------------------------------|-------------------------|
| IR145Y-3... | 1...20 kΩ | ≤ 3 s | ≤ 20 µF | ≤ 15 V |
| IR145Y-4... | 10...200 kΩ | ≤ 5 s | ≤ 20 µF | ≤ 15 V |

| Type | Measuring current I_m | Max. internal resistance $R_i^{(2)}$ | Nominal system voltage U_n |
|------------|-------------------------|--------------------------------------|------------------------------|
| IR145Y-3.. | ≤ 0,47 mA | ≥ 28/25 kΩ | AC/DC 0...138 V |
| IR145Y-4.. | ≤ 0,11 mA | ≥ 120/115 kΩ | AC 0...300 V/DC 0...300 V |

¹⁾ Operating times at 1 µF leakage capacitance.
²⁾ Internal resistance as internal d. c. resistance/impedance

Fault indications

| Indication | Alarm LED | | Alarm relay |
|-------------------------------------|-----------|---|-------------|
| | + | - | |
| AC fault | ■ | ■ | ■ |
| DC fault L+ | ■ | | ■ |
| DC fault L- | | ■ | ■ |
| Interruption \neq /KE resp. L1/L2 | o | o | ■ |

o = flashing ■ = continuous indication

Ordering details

| Supply voltage U_s | Type | Art. No. |
|-----------------------------|------------|-------------|
| AC 230 V | IR145Y-3 | B 9103 5502 |
| | IR145Y-4 | B 9103 6502 |
| AC 90...132 V ¹⁾ | IR145Y-313 | B 9103 5505 |
| | IR145Y-413 | B 9103 6505 |
| DC 9,6...84 V ¹⁾ | IR145Y-321 | B 9103 5504 |
| | IR145Y-421 | B 9103 6504 |
| DC 77...286 V ¹⁾ | IR145Y-423 | B 9103 6517 |

¹⁾ absolute values

Accessories

| Type | Art. No. |
|----------------|-----------|
| Mounting plate | B 990 056 |

Technical data

Insulation coordination acc. to IEC 60664-1

| | |
|--|----------|
| Rated insulation 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 | DC, 15...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" |
|------------------------|---|

| | |
|--------------------------|---|
| Measuring circuit | see table "response values/measuring circuit" |
|--------------------------|---|

Outputs

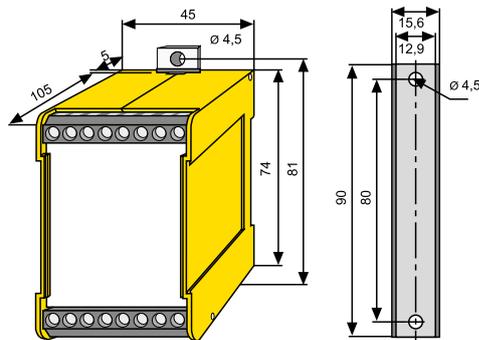
| | |
|-------------------|-------------------|
| TEST/RESET button | internal/external |
|-------------------|-------------------|

Switching elements

| | |
|-------------------------------------|--|
| Switching elements | 2 changeover contacts |
| Operating principle/factory setting | N/O / N/C operation/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 | AC/DC 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 | D00233 |
| Weight approx. | 280 g |



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