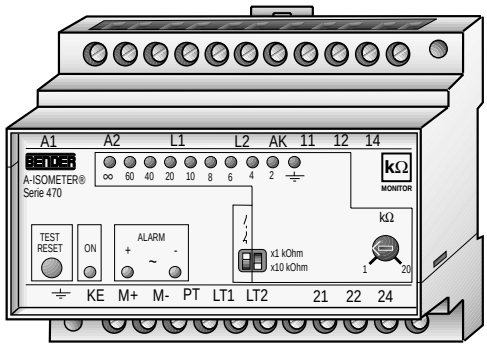
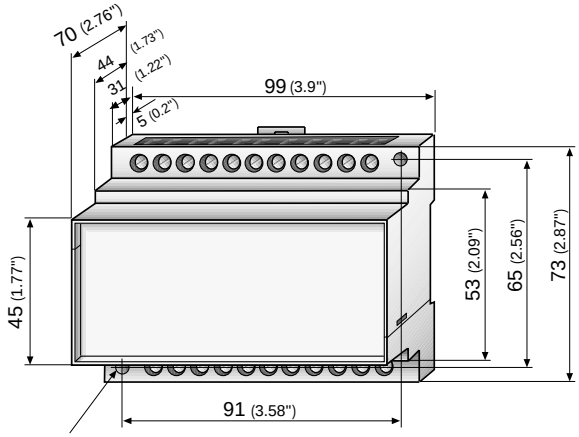
# GROUND FAULT MONITOR IR470LY-4..

**for Ungrounded AC Systems from 0...690V**

ISO 9001 CE UL LISTED c UL LISTED **VDE IEC**




**Dimension Diagram (mm/inch)**




- Insulation Monitoring Device for Ungrounded Single and Three-Phase AC Systems up to 690V
- High-voltage coupler connection for AC to 6 kV
- Built-in LED chain display indicating kΩ level and optional external 400µA analog kΩ-meter
- Connection monitoring
- Steplessly adjustable alarm set-point range selectable from 1kΩ...200kΩ
- Operation and alarm LEDs
- Two voltage-free change-over alarm contacts
- Compact housing with transparent cover which limits access to the settings
- Combined Test / Reset button
- Two Year Warranty

**Product Description**

The classic power supply system is a standard AC system. It contains neither converters nor DC components and system leakage capacitance is relatively low.

The BENDER Ground Fault Monitor IR470LY-4.. series can be used to montior these systems, up to 690V. For setting the alarm setpoint value, you can choose from two response ranges, either 1...20kΩ or 10...200kΩ. If the response range 10...200kΩ is selected, the IR470LY-4.. in combination with a high-voltage coupling device can be used for systems with higher voltages up to 6kV.

The monitors are designed for mounting in control and distribution panels using DIN #3 rail according to DIN EN 50 022 or for screw mounting.

**Operational Information**

The IR470LY monitors the insulation resistance of on-line single and three-phase ungrounded AC systems. A DC measuring voltage is superimposed on the system by the device. The terminals L1 and L2 (or "AK" via the high-tension coupling unit) are connected to the system conductors. Terminals " ⏚ " and "KE" are connected to the equipment grounding conductor or equivalent. The measuring circuit is completed by the insulation resistance between the system and ground.

A green LED indicates that the insulation monitor is ON. The LED-chain and/or an external analog meter (if connected) displays the insulation resistance to ground in kΩ. The alarm set-point is steplessly adjustable and selectable from 1kΩ...20kΩ or 10kΩ...200kΩ. For pure AC faults, both built-in ground fault alarm LEDs activate and the output relay "K1" energizes (N.D. mode) when the selected set-point alarm is reached. For DC faults, the LEDs indicate a positive or negative fault condition, but the alarm sensitivity is greater than in pure AC systems. The relay can be set to one of two modes: normally energized (N.E.) or normally de-energized (N.D.) mode. If fault indication is to be stored, the terminals LT1 / LT2 have to be bridged by a wire jumper or an external reset button (NC contact). The IR470LY continuously monitors the connections to the system conductors and to the equipment ground.

The insulation monitor can be reset by pushing the reset button if the insulation level increases 25% above the preset alarm set-point value. The monitor can be checked by pushing the test button. After pushing (>2 sec) the test button, the LED-chain and/or the external meter (if connected) should indicate to 0Ω and the alarm indication LED and output relay should activate.



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**Insulation**

| | |
|---|---|
| Rated insulation voltage | AC 630 V |
| Rated impulse voltage / disturbance grade | 6 kV/3 |
| Hi-pot test | 3kV |
| Operation class | continuous operation |

**Monitored System**

| | |
|---|---|
| Rated system voltage | AC 50...400Hz 0...690V |
| Operating range $U_N$ | 0 ... 1.15 x $U_N$ |

**Supply Voltage**

| | |
|---|---|
| Supply voltage $U_S$ | see "Ordering Guide" |
| Operating range $U_S$ | AC 0.8 ... 1.15 x $U_N$ |

**Alarm Response Value**

| | |
|---|---|
| Response value $R_{ALARM}$ | selectable |
| Range x 1kΩ | 1...20kΩ |
| Range x 10kΩ | 10...200kΩ |
| Response time ($R_E$=0.5 x $R_{ALARM}$ and $C_E$=1µF) | |
| Range x1kΩ | < 3 sec |
| Range x10kΩ | < 1 sec |
| Max. mains leakage capacitance | 20 µF |

**Measuring Circuit**

| | |
|---|---|
| Measuring voltage $U_M$ (peak value) | 40 V |
| Measuring current $I_M$ | 200 µA |
| Internal DC resistance $R_I$ | 200 kΩ |
| Impedance $Z_I$ at 50Hz | 180 kΩ |
| Max. admissible stray DC voltage $U_{eff}$ | DC 800V |

**Outputs**

| | |
|---|---|
| External Meter / Scale Midpoint (SKMP) | 120kΩ |
| Current output (max. load) | 400 µA (12.5kΩ) |
| Terminal [AK] for high-tension coupler | yes |

**Alarm Relay**

| | |
|---|---|
| Switching components | 1 voltage-free DPDT contact |
| Rated contact voltage | AC 250 V/DC 300 V |
| Rated current | UC 5 A |
| Break capacity AC 230V, p.f. = 0.4 | AC 2 A |
| Break capacity DC 220 V and L/R = 0.04 s | DC 0.2 A |
| Operating mode | Normally Energized / De-energized |
| Adjustment by factory | Normally De-energized |

**Testing**

| | |
|---|---|
| EMI test: | |
| - Electrical disturbance test | EN 50082-2 |
| - ESD | IEC 801-2/EN 60801-2 |
| - EM field | IEC 801-3 |
| - Burst | IEC 801-4 |
| - Surge | IEC 801-5 |
| Dielectric test: | |
| - Test voltage | 2kV |
| - Impulse voltage test | IEC 255, Class III |
| - Electrical disturbance test | IEC 255 |
| Disturbance transmission | EN 50081-1 |
| Emission | EN 55011 / CISPRII |
| Shock resistance | IEC 41B(CO)38 class I |
| Bumping | IEC 68-2-29 |
| Vibration amplitude | IEC TC41B class I |

**Environmental Conditions**

| | |
|---|---|
| Ambient temperature, during operation | -10°C ... +55°C |
| Storage temperature range | -40°C ... +70°C |
| Climate class according to IEC 721 | 3K5, without condensation |

General Data

| | |
|---|---|
| Type of connection | screw terminals |
| Wire size | |
| solid | 14 AWG |
| stranded | 16 AWG |
| Rapid mounting | DIN #3 rail EN50022 |
| Screw mounting | 90.7 x 64.8 mm centers |
| Protection class acc. to DIN 40050 | |
| - Internal components | IP30 |
| - Terminals | IP20 |
| Type of housing | X470 |
| Weight approx. | 1 lb |

**Ordering Guide**

| Type | Supply voltage $U_S$ | Art. No. |
|---|---|---|
| IR470LY-4013 | AC 120V | 910 48011 |
| IR470LY-40 | AC 230V | 910 48007 |
| IR470LY-4011 | AC 24V | 910 48012 |
| IR470LY-4012 | AC 48V | 910 48002 |
| IR470LY-4015 | AC 400V | 910 48008 |
| IR470LY-4016 | AC 500V | 910 48018 |
| IR470LY-4017 | AC 690V | 910 48017 |
| IR470LY-4021 | DC 10..84V | 910 48006 |

**High Voltage Couplers**

| Type | System Voltage $U_S$ | Art. No. |
|---|---|---|
| AGH204S-4 | AC 0...1.5kV | 914 013 |
| AGH520S | AC 0...6kV | 913 033 |

**Panel-mount External kΩ Meters**

| Type | Dimensions | Art. No. |
|---|---|---|
| 7204-1421 | 72 x 72mm | 986 763 |
| 9604-1421 | 96 x 96mm | 986 764 |

**Note:**

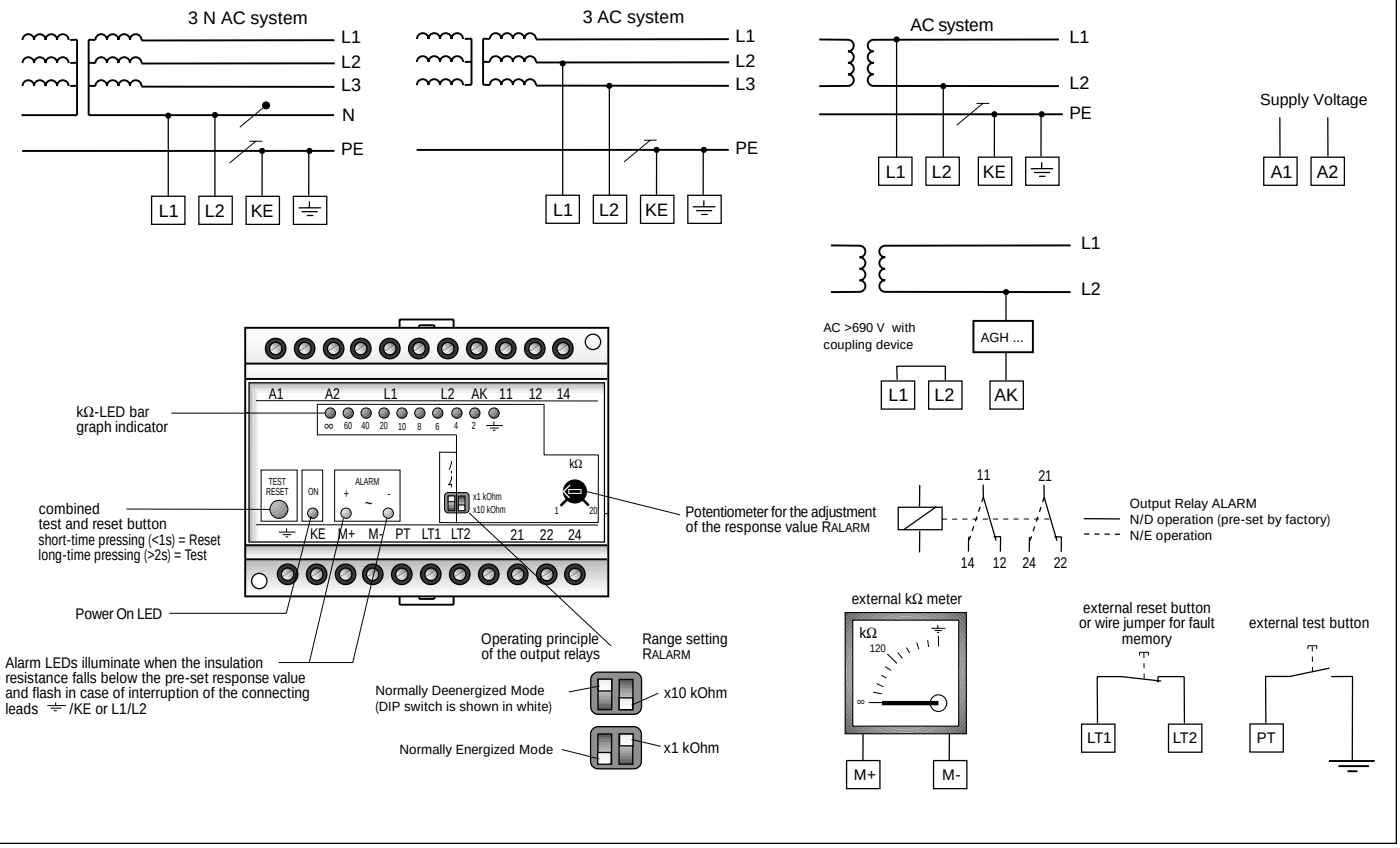
**Setting the adjustment range for the built-in LED meter:**

Changing the setting range from x1kΩ to x10kΩ, automatically changes the indication of the kΩ values on the LED bar graph:

Setting range x1kΩ:
Meter scale point x1kΩ

Setting range x10kΩ:
The meter scale has to be multiplied by 10kΩ

**Wiring Diagram**




**Important note:**

The IR470LY... is suited for both single and three phase AC systems. As indicated in the wiring diagram, there are several ways of connection. From the metrological point of view, it is irrelevant whether the connections L1 and L2 are connected to one or two different system conductors or to the N-conductor. L1 and L2 have to be led separately. Before connecting the device, the maximum rated voltage has to be considered.

The terminals KE and ⏚ also have to be led separately.

| Fault indications | Alarm LED + - | Output relay |
|---|---|---|
| AC fault | x x | x |
| DC fault L+ | x | x |
| DC fault L- | x | x |
| Interruption /KE or L1/L2 | o o | x |

o = flashing
x = continuous indication

**Please Note:**

Ground faults in directly connected DC circuits are indicated with an increased response sensitivity. The alarm set-point value applies to pure AC systems only. In order to avoid complex system conditions, DC supplied components shoud be galvanically isolated from the system being monitored or a monitor like BENDER IR475LY or IRDH265-4.. should be used.

Please check label for correct supply voltage.

Only one insulation monitoring device may be used per system.

In order to check the proper connection of the device, it is recommended to carry out a functional test by applying a real ground fault, via a suitable resistance, and confirming that the response of the monitor is correct.

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

Electrical equipment shall only be installed by qualified personnel in compliance with the current safety regulations.