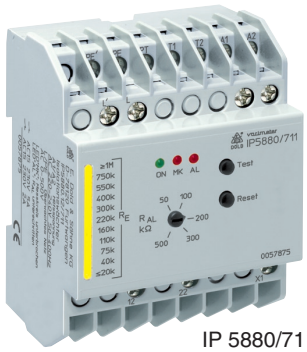
# Insulation Monitor
# IN 5880/710, IN 5880/711, IP5880/711 VARIMETER

0247384

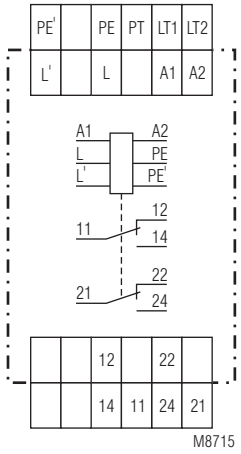

IN 5880/710


IN 5880/711

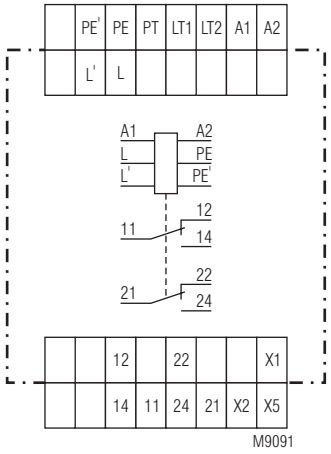



IP 5880/711

## Circuit diagrams




IN 5880/710, IN 5880/711




IP 5880/711

- According to IEC/EN 60 255, DIN VDE 0435-303, IEC/EN 61 557
- For rooms used for medical purposes according to IEC 60364-7-710, DIN VDE 0100-710
- For three-phase and A.C. power systems with 0 … 500 V and 10 … 1000 Hz (IT power systems)
- Adjustable alarm value for ground fault $R_{AL}$ of 50 … 500 kΩ
- Measuring circuit with broken wire protection
- As option, programmable for storing or non-storing of errors
- With reset and test button
- Additional external reset and test buttons can be connected
- LED indicators for operation, insulation fault, and interruption of measuring circuit
- 2 changeover contacts
- As option, with LED chain for indication of the current insulation status
- 52.5 mm width

## Approvals and Marking

CE

## Application

For insulation monitoring of the IT system of rooms used for medical purposes according to VDE 0100-710:

## Design and Method of Functioning

The terminals L/L' and PE/PE' are connected to the respective lines of the IT power system. If the IT transformer has a centre tapping or a star point, the terminals L / L' are preferably connected to this point. The terminals L' and PE' should be connected with separate lines and possibly not in the same place (at least not at the same terminal) of the IT power system to allow for safe recognition of an interruption in the measuring circle.

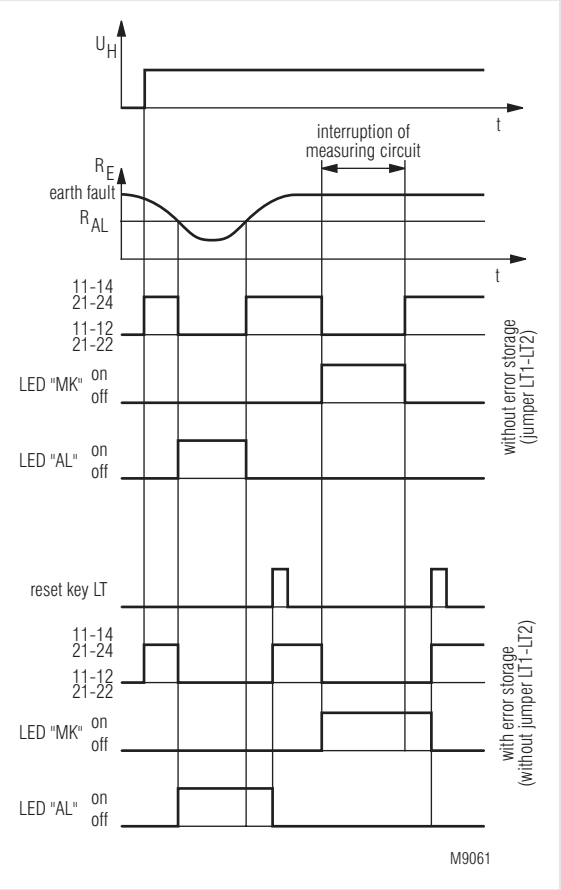
The insulation resistance of the IT power system against ground is measured between the terminals L / L' and PE / PE'. If the ground fault resistance $R_E$ falls below the pickup value $R_{AL}$ of the line isolation monitor, the red LED "AL" will be illuminated, and the two changeover contacts fall back into normal position. On interruption of the measuring circuit, the two changeover contacts will likewise fall back into normal position, and the red LED "MK" will be illuminated.
After correction of the error ($R_E > R_{AL}$, measuring circuit connected) and jumpered terminals LT1 – LT2 (= error not stored), the changeover contacts will change into work position (correct status), and the red error LEDs will stop lighting.
If you wish to store errors, remove the jumper LT1 – LT2. In this way, also short-lived errors as e.g. a temporary deterioration of insulation, for example by touching of a line or unreliable contact making in the measuring circuit may trigger a stored alarm: The output contacts remain open also after the error has been corrected. The type of the error can be seen in retrospect from the illuminated error LED "AL" or "MK".
The error memory can be reset by pressing the internal or external reset key, or by switching off the auxiliary voltage.

By pressing the internal or external "Test" key, a deterioration of insulation is simulated in the measuring circuit (= $R_E$ approx. 40 kΩ); thus, the correct response of the isolation monitor is checked.

The variant IN 5880/711 comprises an 11-stage LED chain for indication of the current insulation resistance of the power system. By means of differently colored LEDs, the insulation status in the range of 20 kΩ ... 1 MΩ is indicated. In this way, deterioration of insulation can be detected even before an alarm is triggered.

The variant IP 5880/711 includes a 11 step LED indicator to monitor the actual state of the insulation, an additional power supply and relays to connect a test and indicator unit UP 5862. The width is 70 mm.

## Function diagram insulation monitoring system




## Notes

**General**
Before checking insulation and voltage of the system, disconnect the monitoring device IN 5880 from the power source.

**Insulation monitoring system**
The isolation monitor is designed to monitor straight AC power systems. Any interfering direct voltages getting into the measuring circuit will not damage the device but will falsify the conditions in the measuring circuit while they are affecting it. As insulation measuring is performed via direct current, it will not be falsified by system capacitances against protective ground $C_E$. However, the pickup time may be longer in case of insulation failure, in the order of the time constant $R_E$ times $C_E$.
In every IT circuit, only one isolation monitor must be connected.

## Indicators

| | |
|---|---|
| Green LED “ON”: | is illuminated when auxiliary voltage has been applied (operability) |
| Red LED “AL”: | is illuminated when an insulation failure is present, $R_E < R_{AL}$ (value has fallen below alarm level) |
| Red LED “MK”: | is illuminated when one of the lines of the measuring circuit is interrupted (L, L’, PE, PE’) |

With IN 5880/711, additional 11-stage LED chain:

| | |
|---|---|
| Green LEDs: | at ≥ 1 MΩ, 750 kΩ, 550 kΩ |
| Yellow LEDs: | at 400 kΩ, 300 kΩ, 220 kΩ, 160 kΩ, 110 kΩ, 75 kΩ |
| Red LEDs: | at 40 kΩ, ≤ 20 kΩ |

## Technical Data

### Insulation measuring circuit

| | |
|---|---|
| **Nominal voltage $U_N$:** | AC 0 ... 500 V |
| **Voltage range:** | 0.8 ... 1.1 $U_N$ |
| **Frequency range:** | 10 ... 1000 Hz, |
| **Alarm value $R_{AL}$:** | Adjustable from 50 … 500 kΩ |
| **Internal testing resistor:** | corresponds to an $R_E$ of approx. 40 kΩ |
| **AC internal resistance:** | > 250 kΩ |
| **DC internal resistance:** | > 250 kΩ |
| **Measuring voltage:** | approx. DC 15 V (generated internally) |
| **Max. measuring current ($R_E$ = 0):** | < 50 µA |
| **Max. permissible interfering direct voltage:** | DC 500 V |
| **Operate delay:** | with $R_{AL}$ = 50 kΩ, CE = 1 µF |
| $R_E$ of ∞ to 0.9 $R_{AL}$: | < 1.3 s |
| $R_E$ of ∞ to 0 kΩ: | < 0.7 s |
| **Hysteresis**: | approx. 15 % |

### Auxiliary circuit

| | |
|---|---|
| **Auxiliary voltage $U_H$**: | AC 220 ... 240 V |
| **Voltage range:** | 0.85 ... 1.1 $U_H$ |
| **Nominal consumption:** | approx. 2 VA |
| **Nominal frequency:** | 45 ... 400 Hz |

### Output

**Number of contacts provided:** 2 changeover contacts

| | | |
|---|---|---|
| **Thermal current $I_{th}$:** | 5 A | |
| **Switching capacity** | | |
| acc. to AC 15 | | |
| NO contact: | 5 A / AC 230 V | IEC/EN 60 947-5-1 |
| NC contact: | 2 A / AC 230 V | IEC/EN 60 947-5-1 |
| **Contact life** | | |
| to AC 15 with 1 A, AC 230V: | 5 x $10^5$ operating cycles | IEC/EN 60 947-5-1 |
| **Short circuit strenght** | | |
| **max. fuse rating:** | 4 A gL | IEC/EN 60 947-5-1 |
| **Mechanical life:** | > 30 x $10^6$ operating cycles | |

### General Data

| | | |
|---|---|---|
| **Nominal operation:** | Permanent operation | |
| **Temperature range:** | - 20 ... + 60°C | |
| **Clearance and creepage distances** | | |
| overvoltage category/ | | |
| pollution degree: | 4 kV / 2 | IEC 60 664-1 |
| **EMC** | | |
| Static discharge (ESD): | 8 kV (air discharge) | IEC/EN 61 000-4-2 |
| HF irradiation: | 10 V / m | IEC/EN 61 000-4-3 |
| Fast transients: | 2 kV | IEC/EN 61 000-4-4 |
| Surges | | |
| between supply lines: | 1 kV | IEC/EN 61 000-4-5 |
| between wire and ground: | 2 kV | IEC/EN 61 000-4-5 |
| Radio interference suppression: | Limit value class B | EN 55 011 |
| **Degree of protection** | | |
| Housing: | IP 40 | IEC/EN 60 529 |
| Terminals: | IP 20 | IEC/EN 60 529 |
| **Housing:** | Thermoplast with V0 behavior according to UL Subject 94 | |
| **Vibration resistance:** | Amplitude 0.35 mm Frequency 10 ... 55 Hz | IEC/EN 60 068-2-6 |
| **Climate resistance:** | 20 / 060 / 04 | IEC/EN 60 068-1 |
| **Terminal designation:** | EN 50 005 | |
| **Wire connection:** | 2 x 2.5 mm² massive, or 2 x 1.5 mm² stranded wire with sleeve DIN 46 228-1/-2/-3 | |
| **Wire fixing:** | Screw terminals with self-lifting clamping piece | IEC/EN 60 999-1 |
| **Mounting:** | DIN rail | IEC/EN 60 715 |
| **Net weight** | | |
| IN 5880/710: | approx. 190 g | |
| IN 5880/711: | approx. 250 g | |
| IP 5880/711: | approx. 350 g | |

### Dimensions

| | |
|---|---|
| **Width x height x depth** | |
| IN 5880/710, IN 5880/711: | 52.5 x 90 x 59 mm |
| IP 5880/711: | 70 x 90 x 59 mm |

## Standard type

IN 5880.12/710 AC 220 – 240 V

| | |
|---|---|
| Article number: | 0056739 |
| • Output: | 2 changeover contacts |
| • Auxiliary voltage $U_H$: | AC 220 ... 240 V |
| • Overall width: | 52.5 mm |
| • Adjustable alarm value $R_{AL}$: | 50 ... 500 kΩ |

## Variant

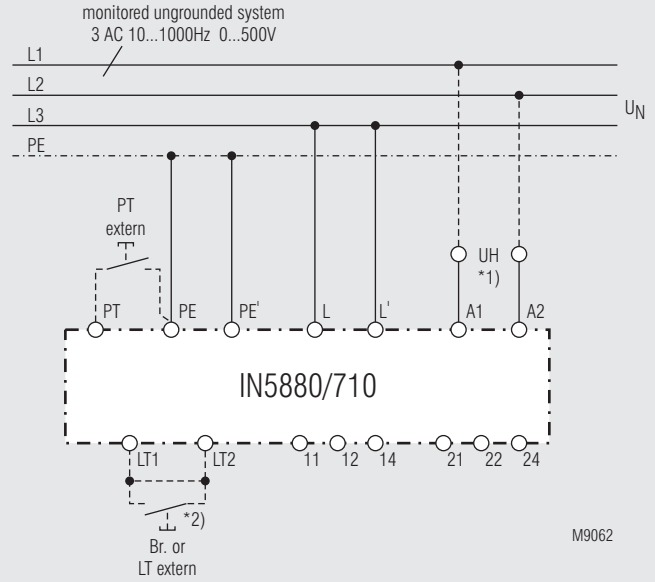
| | |
|---|---|
| IN 5880/711: | with 11-stage LED chain for indication of the current insulation value |
| IP 5880/711: | with 11-stage LED chain for indication of the current insulation value, in addition with connection for test and indicator panel UP 5862 |

## Ordering example

IN 5880.12/710 AC 220 ... 240 V 50 ... 500 kΩ

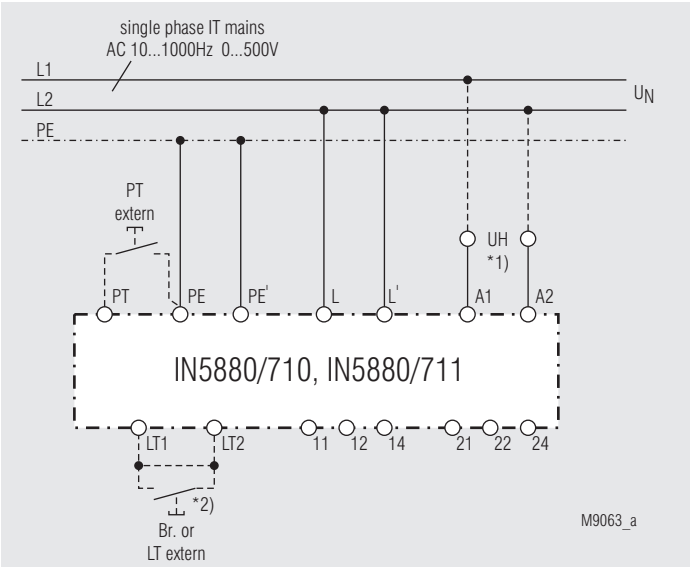
- 50 ... 500 kΩ: Alarm value
- AC 220 ... 240 V: Auxiliary voltage
- IN 5880.12/710: Type

## Connection example




Monitoring of a 3-phase IT power system

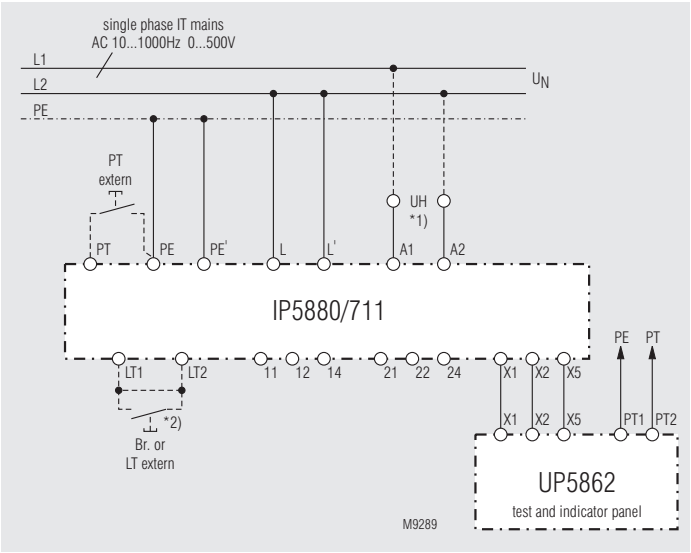
## Connection examples




Monitoring of a single phase IT power system

*1) The auxiliary voltage $U_H$ (A1 – A2) can also be drawn from the power system to be monitored. However, the voltage range of the auxiliary voltage must be taken into consideration.

*2) With jumper LT1 – LT2: No storing of error message (hysteresis behavior)
With jumper LT1 – LT2: Storing of error message; can be deleted by pressing the Delete (Reset) key LT



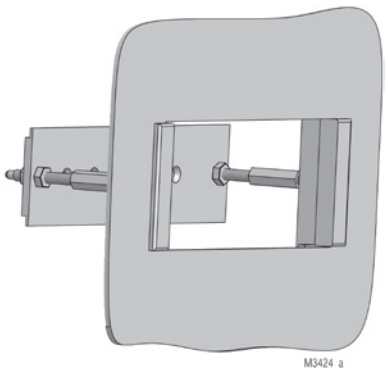
## Accessories

**Test and indicator panel UP 5862**
For insulation monitors in medically used rooms according to


- to mount in flush device boxes ø 60 mm, 35 mm deep;
- test button to check the function of the device
- with green LED to indicate operation
- reset button for audible alarm
- with yellow LED to monitor insulation failure

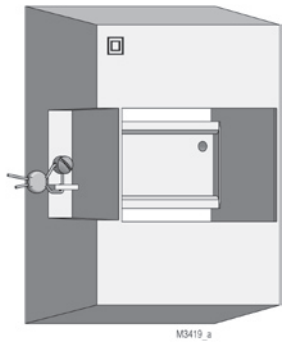
Dimensions (width x height): 80 x 80 mm

**Flush mounting kit**
Order reference: KU 4087-150/0056598




For universal use with:
- I-series devices of 17.5 to 105 mm width
- easy mounting

**Mounting kit for surface mounting**
KU 4087-100




| Device of I-series | Width (mm) | Order reference |
|---|---|---|
| IK | 17.5 | KU4087-100/56763 |
| IL | 35.0 | KU4088-100/56764 |
| IN | 52.5 | KU4084-100/56765 |
| IP | 70.0 | KU4089-100/56766 |
| IR | 105.0 | KU4090-100/56767 |