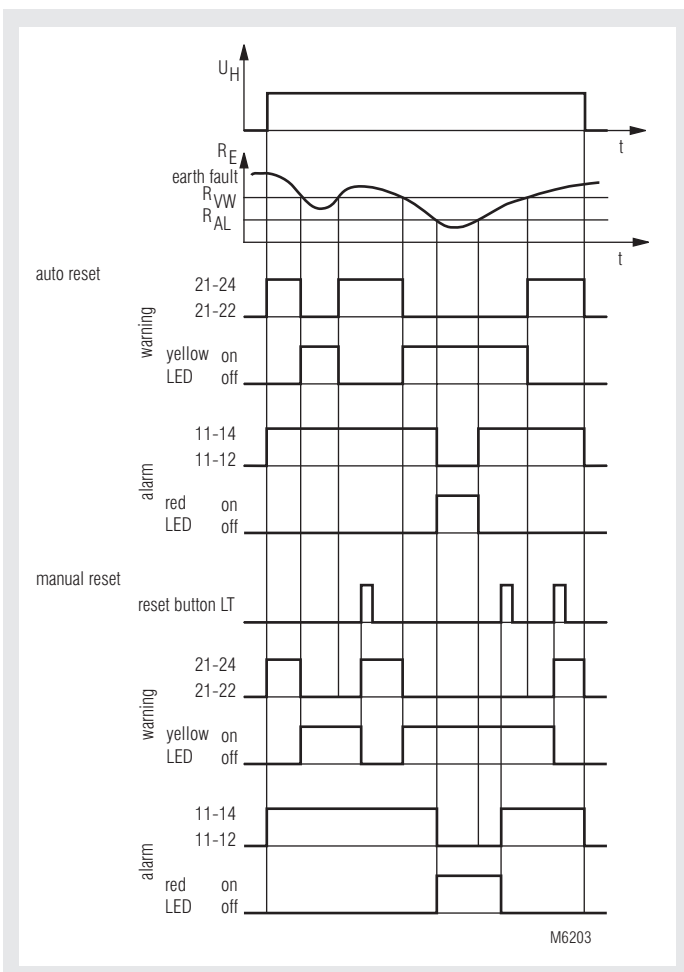


## VARIMETER IMD Insulation Monitor RP 5888



- Increasing the availability of machines and plants
- For preventive maintenance
- According to IEC/EN 61 557-8
- With configurable analogue output for insulating value
- For three-phase and A.C. power systems with 0 ... 500 V and 10 ... 1000 Hz
- Adjustable alarm value for ground fault  $R_{AL}$  of 5 k ... 5 M $\Omega$
- Monitors also disconnected voltage systems
- Energized / de-energized on trip settable
- Measuring circuit, auxiliary voltage, output contacts and analogue output are galvanically separated
- Programmable for manual reset or hysteresis function
- With test and reset button
- Connections for external test and reset buttons possible
- LED indicators for operation and alarm
- 2 changeover contacts
- Output function programmable
- With RS-485 interface, in preparation
- Width: 70 mm

### Function Diagram



Function: de-energized on trip  
With function energized on trip, the status of the relay contacts 11, 12, 14 and 21, 22, 24 is inverted

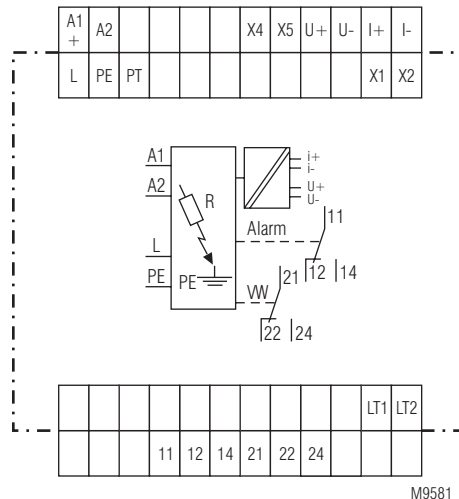
### Approvals and Markings



### Application

- Monitoring of insulation resistance of ungrounded voltage systems to earth
- Can also be used to monitor standby devices for earth fault, e.g. motor windings of devices that have to function in the case of emergency
- Other resistance monitoring applications

### Circuit Diagram



## Function

The device is connected to the supply via terminals A1-A2. The unit can either be supplied from the monitored voltage system or from an separate auxiliary supply. Terminal L is connected to the monitored voltage and PE to earth. If the insulation resistance  $R_E$  drops below the adjusted alarm value  $R_{AL}$  the red LED goes on and the output relay switches off (de-energized on trip) or switches on (energized on trip). If the unit is on auto reset (bridge between LT1-LT2) and the insulation resistance gets better ( $R_E$  rises), the insulation monitor switches on (de-energized on trip) or switches off (energized on trip) again with a certain hysteresis and the red LED goes off. Without the bridge between LT1-LT2 the Insulation monitor remains in faulty state even if the insulation resistance is back to normal. The reset is done by pressing the internal or external reset button or by disconnecting the auxiliary supply. By activating the "Test" button an insulation failure can be simulated to test the function of the unit.

5 measuring ranges can be selected by rotary switch. 5 ... 50 kOhm; 10 ... 100 kOhm; 50 ... 500 kOhm; 100 K ... 1 MOhm and 0.5 M ... 5 MOhm. The fine tuning is done with potentiometer  $R_{AL}$  x Bereich. With the range selector also the relay function is set. The 5 ranges on the left are with function de-energized on trip, the 5 functions on the right with function energized on trip.

With the 4 smaller ranges up to max. 1 MOhm a pre-warning can be adjusted between setting value and 5 MOhms. On the range 0.5 ... 5 MOhm the pre-warning is adjustable between setting value and 10 MOhm. The pre-warning reacts on contact 21, 22, 24, the alarm value on contact 11, 12, 14. Turning  $R_{VW}$  fully anti clockwise contact 21, 22, 24 switches together with the alarm contact.

The pre-warning behaves similar as the alarm signal concerning manual reset. Hysteresis, energized or de-energized on trip

The devices have an analogue output that indicates the insulation resistance.

A Version with RS 485 interface is in preparation.

### Analogue output:

Output Terminal	Terminal X4-X5 bridged	Terminal X4-X5 open
u+ / u-	2 ... 10 V	0 ... 10 V
i+ / i-	4 ... 20 mA	0 ... 20 mA

### Terminal X1-X2, Analogue output:

X1-X2 open: Insulation value within the adjusted measuring range  $R_{AL}$  e. g. 50 ... 500 kOhm is proportional to 0 ... 10 V on terminals u+/u- (x4-X5 is open).  
The analogue value in relation to the insulation resistance can be seen in the diagrams M9605, M9606 (page 3 Setting aid).

X1-X2 bridged: Insulation value from 5 times the measuring range max 10 MOhm down to  $R_{AL}$  setting. e.g. range  $R_{AL} = 5 \text{ kOhm} \times 10$  (max fine tuning)  $\times 5 = 250 \text{ kOhm}$   
setting value range  $5 \text{ kOhm} \times 4$  (fine tuning) = 20 kOhm  
Analogue output 4... 20 mA is proportional to 20 ... 250 kOhm

## Indication

green LED "ON": On, when supply voltage connected (readiness for operation)  
yellow LED "VW": On, when insulation resistance is under prewarning value,  $R_E < R_{VW}$   
red LED "AL": On, when insulation fault detected,  $R_E < R_{AL}$  (value has fallen below alarm level)

## Notes

The Insulation monitor RP 5888 is designed to monitor AC-voltage systems. Overlaid DC voltage does not damage the instrument but may change the conditions in the Measuring Circuit. In one voltage system only one Insulation monitor must be connected. This has to be observed when coupling voltage system.

Line capacitance  $C_E$  to ground does not influence the insulation measurement, as the measurement is made with DC-voltage. It is possible that the reaction time in the case of insulation time gets longer corresponding to the time constant  $R_E * C_E$ .

The Insulation monitor can be used, because of it's higher setting value, to monitor single or 3-phase loads for ground fault.

If the load is operated from a grounded system the insulation resistance of the load can only be monitored when disconnected from the mains. This is normally the fact with loads which are operated seldom or only in the case of emergency but then must be function (see connection example).

The auxiliary supply can be connected to a separate auxiliary supply or to the monitored voltage system. The range of the auxiliary supply input has to be observed.

When monitoring 3-phase IT systems it is sufficient to connect the insulation monitor only to one phase. The 3-phases have a low resistive connection (approx. 3 - 5  $\Omega$ ) via the feeding transformer. So failures that occur in the non-connected phases will also be detected.

## Technical Data

### Auxiliary circuit

**Auxiliary voltage  $U_H$ :** AC/DC 24 ... 80 V, AC/DC 80 ... 230 V  
**Voltage range:** DC 19 ... 110 V, AC 19 ... 90 V,  
 DC 64 ... 300 V, AC 64 ... 265 V  
 $0.9 \dots 1.25 U_N$   
**Nominal frequency:** AC 50 / 60 Hz

**Nominal consumption**  
 at AC: 5 VA  
 at DC: 2.5 W

### Measuring circuit

**Nominal voltage  $U_N$ :** AC 0 ... 500 V  
**Voltage range:** 0 ...  $1.1 U_N$   
**Frequency range:** 10 ... 1000 Hz  
**Alarm value  $R_{AL}$ :** 5 k ... 5 M $\Omega$   
**Prewarning value  $R_{VW}$ :**  $R_{AL} \dots 5 M\Omega$   
**Setting of ranges  $R_{AL}$  in 5 steps:** 5 ... 50 k $\Omega$ , 10 ... 100 k $\Omega$ ,  
 50 ... 500 k $\Omega$ , 100 k ... 1 M $\Omega$   
 and 0.5 M ... 5 M $\Omega$   
**Setting  $R_{AL}$ :** infinite variable  
**Setting  $R_{VW}$ :** on relative scale related to  $R_{AL}$  setting  
 value  
**Internal test resistor:** equivalent to earth resistance of < 5 k $\Omega$   
**Internal AC resistance:** > 250 k $\Omega$   
**Internal DC resistance:** > 250 k $\Omega$   
**Measuring voltage:** approx. DC 15 V, (internally generated)  
**Max. measuring current ( $R_E = 0$ ):** < 0.1 mA  
**Max. permissible noise DC voltage:** DC 500 V  
**Operate delay**  
 at  $R_{AL} = 50 k\Omega$ , CE = 1  $\mu$ F  
 $R_E$  from  $\infty$  to 0,9  $R_{AL}$ : < 2 s  
 $R_E$  from  $\infty$  to 0 k $\Omega$ : < 1,4 s  
**Hysteresis**  
 at  $R_{AL} = 50 k\Omega$ : approx. 15 %

### Output

**Contacts:** 1 changeover contact for alarm  
 1 changeover contact for prewarning  
 2 changeover contacts  
 at  $R_{AL} = R_{VW}$ :  
**Thermal current  $I_{th}$ :** 4 A  
**Switching capacity**  
 to AC 15  
 NO contacts: 5 A / AC 230 V IEC/EN 60 947-5-1  
 NC contacts: 2 A / AC 230 V IEC/EN 60 947-5-1  
**Electrical life**  
 to AC 15 at 1 A, AC 230 V:  $\geq 5 \times 10^5$  switch. cycl. IEC/EN 60 947-5-1  
**Short circuit strength**  
**max. fuse rating:** 4 A gL IEC/EN 60 947-5-1  
**Mechanical life:**  $\geq 30 \times 10^6$  switching cycles

### General Data

**Operating mode:** Continuous operation  
**Temperature range:** - 20 ... + 60°C  
**Clearance and creepage distances**  
 rated impuls voltage / pollution degree IEC 60 664-1  
 auxiliary supply / measuring input / contacts: 6 kV / 2 IEC 60 664-1  
 measuring input / analogue output: 4 kV / 2 IEC 60 664-1  
 contacts 11,12,14 / 21,22,24: 4 kV / 2 IEC 60 664-1  
**EMC**  
 Electrostatic discharge(ESD): 8 kV (air) 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  
 Surge voltages  
 between A1 - A2: 1 kV IEC/EN 61 000-4-5  
 between L - PE: 1 kV IEC/EN 61 000-4-5  
 Interference suppression: EN 61 000-6-3  
**Degree of protection:**  
 Housing: IP 40 IEC/EN 60 529  
 Terminals: IP 20 IEC/EN 60 529

## Technical Data

**Housing:** Thermoplastic with V0 behaviour according to UL subject 94  
**Vibration resistance:** Amplitude 0.35 mm  
 Frequency 10 ... 55 Hz, IEC/EN 60 068-2-6  
 20 / 060 / 04 IEC/EN 60 068-1  
**Climate resistance:**  
**Terminal designation:** EN 50 005  
**Wire connection:** 1 x 2.5 mm<sup>2</sup> solid or  
 1 x 2.5 mm<sup>2</sup> stranded wire  
 DIN 46 228-1/-2/-3/-4  
 box terminal with wire protection  
**Wire fixing:**  
**Fixing torque:** 0.4 Nm max.  
**Stripping length:** 7.5 mm  
**Mounting:** DIN rail IEC/EN 60 715  
**Weight:** approx. 200 g


### Dimensions

**Width x height x depth:** 70 x 90 x 71 mm

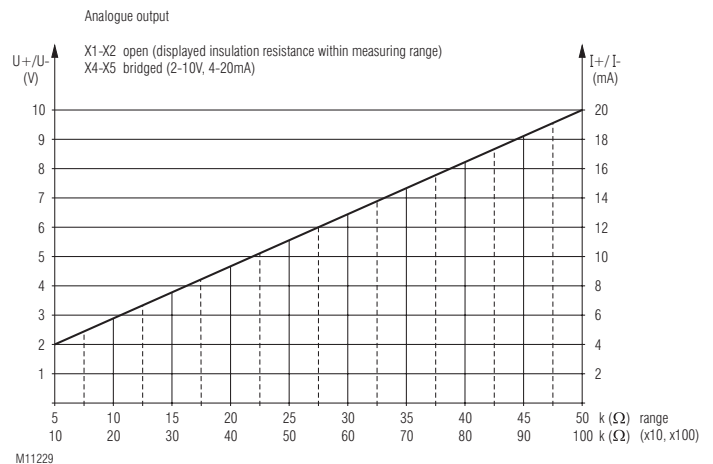
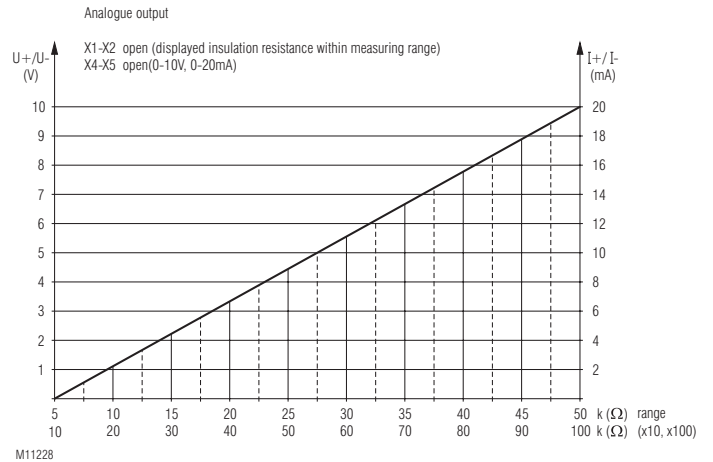
### Standard Type

RP 5888.12 AC/DC 80 ... 230 V  
 Article number: 0060868  
 • Auxiliary voltage  $U_H$ : AC/DC 80 ... 230 V  
 • Setting alarm value:  $R_{AL}$ : 5 k ... 5 M $\Omega$   
 • Width: 70 mm

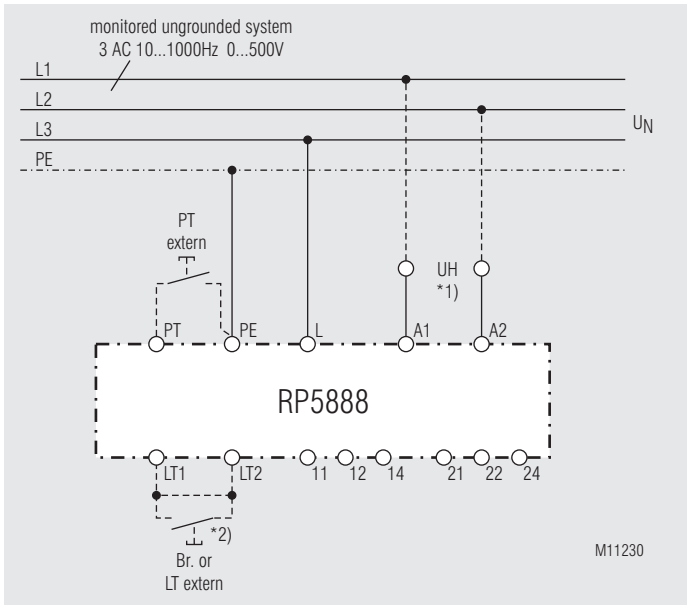
### Ordering Example

RP 5888 .12 AC/DC 80 ... 230 V  $R_{AL}$  5 k ... 5 M $\Omega$   
  
 Alarm value  
 Auxiliary voltage  
 Contacts  
 Type

### Setting Aid

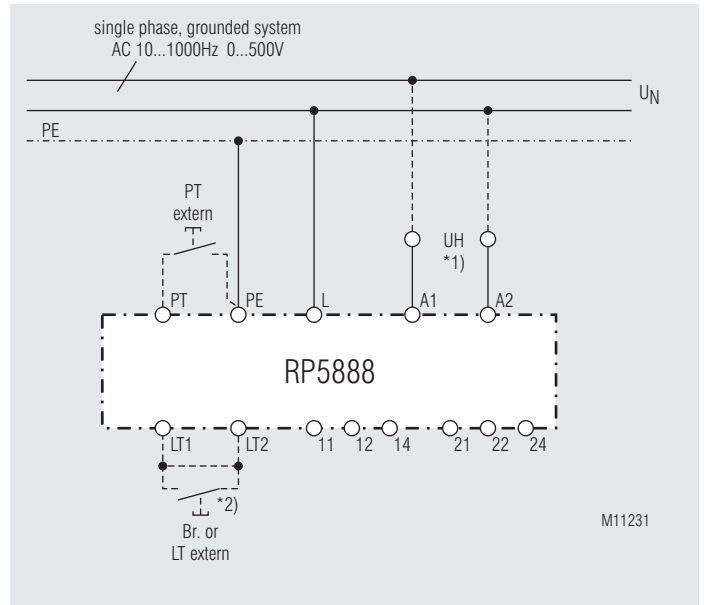


## Connection Examples



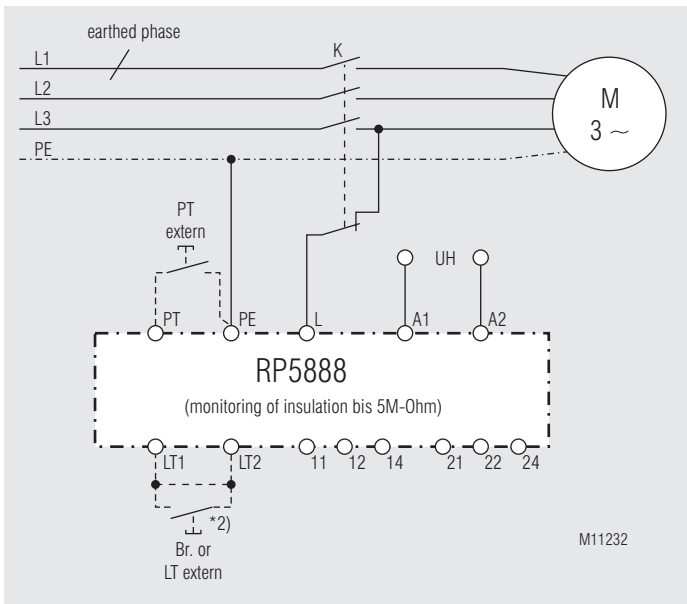
Monitoring of an ungrounded voltage system.

- \*1) Auxiliary supply  $U_H$  (A1 - A2) can be taken from the monitored voltage system. The range of the auxiliary supply input must be observed.
- \*2) with bridge LT1 - LT2: automatic reset  
without bridge LT1 - LT2: manual reset, reset with button LT



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Monitoring of motorwindings against ground.

The insulation of the motor to ground is monitored as long as contactor K does not activate the load.

- \*2) with bridge LT1 - LT2: automatic reset  
without bridge LT1 - LT2: manual reset, reset with button LT