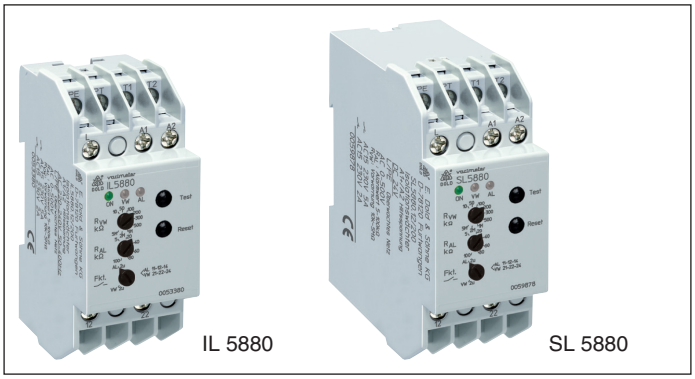
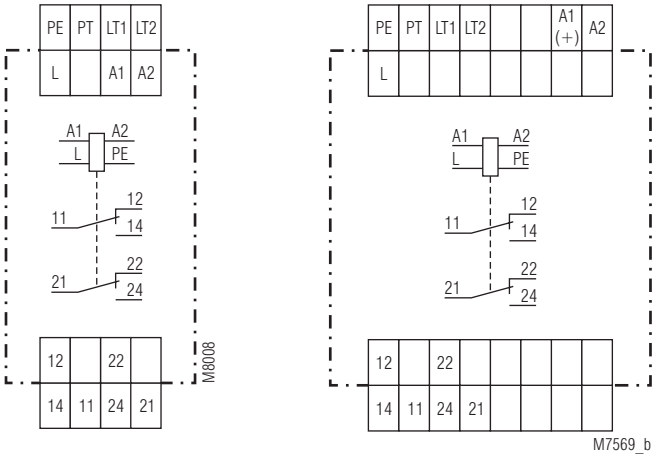
VARIMETER IMD
Insulation Monitor
IL 5880, IP 5880, SL 5880, SP 5880

0238809



Circuit Diagram



IL 5880, SL 5880

IP 5880, SP 5880

- According to IEC/EN 61 557-8
- For single and 3-phase AC-systems up to 0 ... 500 V and 10 ... 10000 Hz
- Adjustable tripping value R_{AL} of 5 ... 100 kΩ
- Monitors also disconnected voltage systems
- De-energized on trip
- Auxiliary voltage Measuring Circuit and output contacts are galvanically separated
- Manual and auto reset
- With test and reset button
- Connections of external test and reset buttons possible
- LED indicators for operation and alarm
- 2 changeover contacts
- IL/SL 5880/200 with additional prewarning
  - adjustable prewarning value 10 kΩ ... 5 MΩ
  - output function programmable
- Variant IL/SL 5880/300 according to DIN VDE 0100-551 for mobile generator sets available
- 4 models available:
  IL 5880, IP 5880: 61 mm deep with terminals near to the bottom to be mounted in consumer units or industrial distribution systems according to DIN 43 880
  SL 5880, SP 5880: 98 mm deep with terminals near to the top to be mounted in cabinets with mounting plate and cable ducts
- DIN rail or screw mounting
- 35 mm width

Approvals and Markings

A025518

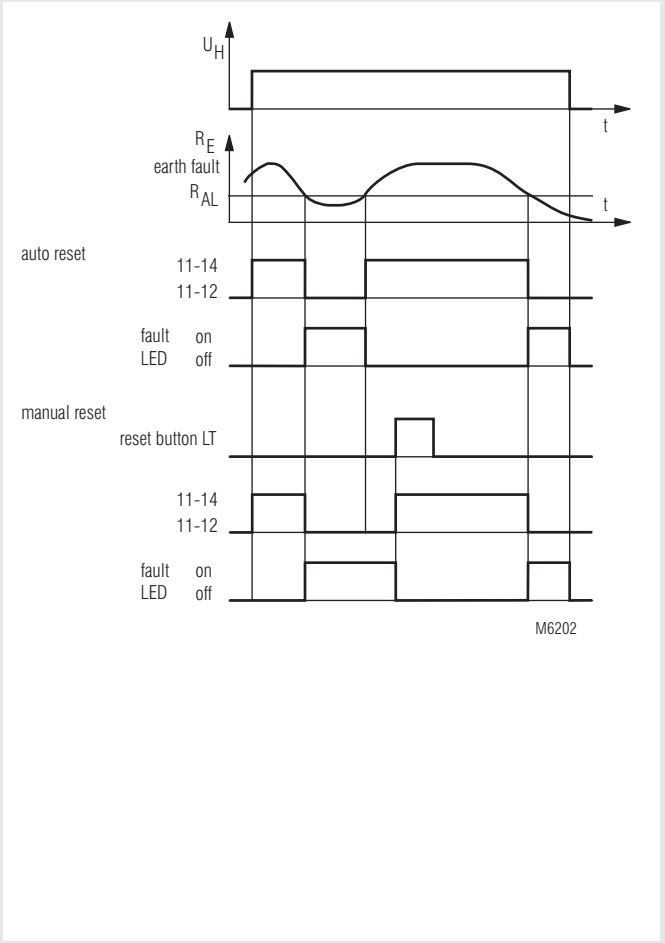
Applications

- Monitoring of insulation resistance of ungrounded voltage systems to earth.
- IL/SL 5880/200 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.
- IL/SL 5880/300 according to DIN VDE 0100-551 to monitor mobile generator systems
- Other resistance monitoring applications.
- For industrial and railway applications

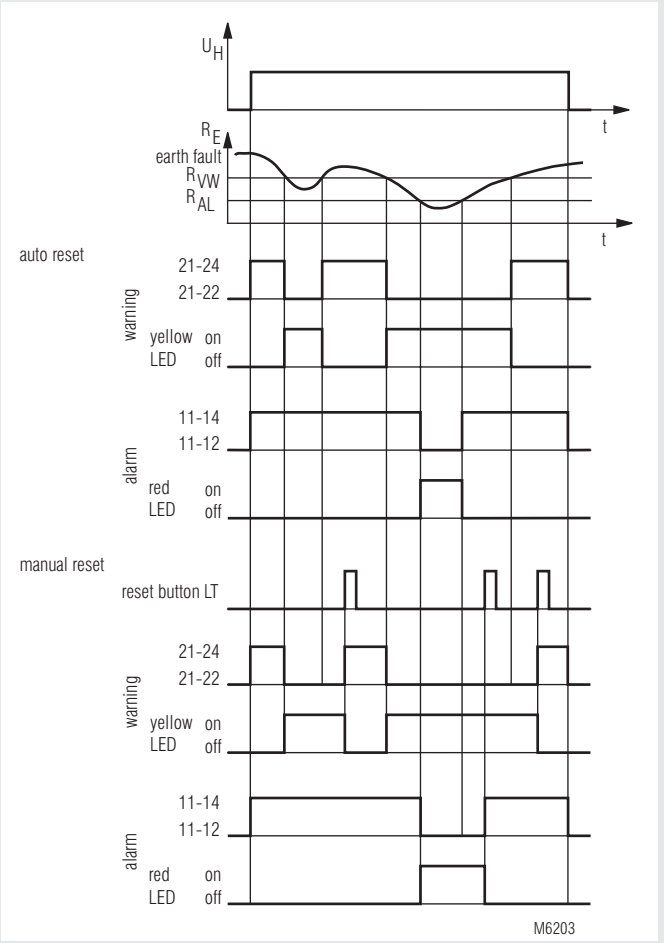
Function

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). 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 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. (In order to achieve failure storage, the voltage system showing a fault must not be switched off too fast after detection of the failure, see notes). 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.
The variants IL/SL 5880.12/200 have a second setting range with a higher resistance up to 5 MΩ (Potentiometer R_{VW}). This setting value can be used for pre-warning with relay output, by positioning the lower setting switch to "AL 11-12-14; VW 21-22-24".
If the higher setting range should be used only, the setting switch is put in position "VW 2u" and both contacts react only to the higher setting.
If the lower setting range should be used only, the setting switch is put in position "AL 2u" and both contacts react only to the lower setting.
When set to manual reset the latching is active on both settings R_{AL} and R_{VW}. Therefore it is possible in the case of a short insulation decrease (Switch position AL 11-12-14; VW 21-22-24), to pass the warning signal to a PLC while the main fault does not lead to a disconnection of the mains via the contacts 11-12-14.

Function Diagram



IL 5880, SL 5880, IP 5880, SP 5880



IL 5880/200, SL 5880/200, IP 5880/200, SP 5880/200

Indicators

Green LED "ON": On, when supply voltage connected
Red LED "AL": On, when insulation fault detected, ($R_E < R_{AL}$)
Yellow LED "VW": On, when insulation resistance is under prewarning value, ($R_E < R_{VW}$) (only with variant IL/SL 5880.12/2_ _ and /300)

Notes

Storing of insulation failures:
The storing of an insulation failure is delayed slightly longer the reaction of the output relay because of interference immunity. In cases where the defective voltage system is switched off immediartely by the output of the insulation monitor it can happen that the fault is not stored (e. g. mobile generator sets). For these applications we recommend the variant IL/SL 5880/300, where the output relay reacts only after the fault ist stored. All other features of this variant are simular to IL/SL 5880/200.
The Insulation monitors IL/SL 5880 are designed to monitor AC-voltage systems. Overlayed 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 model /200 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 Ω) via the feeding transformer. So failures that occure in the non-connected phases will also be detected.

Technical Data

Auxiliary Circuit

Nominal voltage U_N		
IL 5880, SL 5880:	AC 220 ... 240 V, AC 380 ... 415 V 0.8 ... 1.1 U_N DC 12 V, DC 24 V 0.9 ... 1.25 U_N	
IP 5880, SP 5880:	AC / DC 110 ... 240 V 0.7 ... 1.25 U_N	
Frequency range (AC):	45 ... 400 Hz	
Nominal consumption:		
AC:	approx. 2 VA	
DC:	approx. 1 W	

Measuring Circuit

Nominal voltage U_N:	AC 0 ... 500 V	
Voltage range:	0 ... 1.1 U_N	
Frequency range:	10 ... 10000 Hz	
Alarm value R_{AL}:	5 ... 100 kΩ	
Prewarning value R_{VW} (only at IL/SL 5880/2_ _ and IL/SL 5880/300):	10 kΩ ... 5 MΩ	
Setting R_{AL}, R_{VW}:	infinite variable	
Internal test resistor:	equivalent to earth resistance of < 5 kΩ	
Internal AC resistance:	> 250 kΩ	
Internal DC resistance:	> 250 kΩ	
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 kΩ, CE = 1 µF		
R_E from ∞ to 0.9 R_{AL}:	< 1.3 s	
R_E from ∞ to 0 kΩ:	< 0.7 s	
Response inaccuracy:	± 15 % + 1.5 kΩ	IEC 61557-8
Hysteresis		
at R_{AL} = 50 kΩ:	approx. 15 %	

Output

Contacts:		
IL / SL 5880.12, IP / SP 5880.12:	2 changeover contacts	
IL / SL 5880.12/2_ _, IL / SL 5880.12/300, IP / SP 5880.12/2_ _:	2 x 1 changeover contact, programmable	
Thermal current I_{th}:	4 A	
Switching capacity		
to AC 15		
NO:	5 A / AC 230 V	IEC/EN 60 947-5-1
NC:	2 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13:	2 A / DC 24 V	IEC/EN 60 947-5-1
Electrical life		
to AC 15 at 1 A, AC 230 V:	≥ 5 x 10^5 switching cycles	IEC/EN 60 947-5-1
Short circuit strength		
max. fuse rating:	4 A gL	IEC/EN 60 947-5-1
Mechanical life:	≥ 30 x 10^6 switching cycles	

General Data

Operating mode:	Continuous operation	
Temperature range:	- 20 ... + 60°C	
Clearance and creepage distances		
rated impulse voltage / pollution degree		
between auxiliary supply connections (A1- A2):	4 kV / 2 at AC-auxiliary voltage	IEC 60 664-1
between measuring input connections (L - PE):	4 kV / 2	IEC 60 664-1
between auxiliary supply and measuring input connections:	4 kV / 2	IEC 60 664-1
auxiliary supply connections and measuring input to relay contacts:	6 kV / 2	IEC 60 664-1
relay contact 11-12-14 to relay contact 21-22-24:	4 kV / 2	IEC 60 664-1

Technical Data

EMC		
Electrostatic discharge:	8 kV (air)	IEC/EN 61 000-4-2
HF irradiation		
80 MHz ... 1 GHz:	10 V / m	IEC/EN 61 000-4-3
1 GHz ... 2.5 GHz:	3 V / m	IEC/EN 61 000-4-3
2.5 GHz ... 2.7 GHz:	1 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:	2 kV	IEC/EN 61 000-4-5
HF-wire guided:	10 V	IEC/EN 61 000-4-6
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:	Thermoplastic with V0 behaviour according to UL Subjekt 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 solid or 2 x 1.5 mm² stranded wire DIN 46 228-1/-2/-3/-4	
Fixing torque:	0.8 Nm	
Wire fixing:	DIN rail mounting (IEC/EN60715) or screw mounting M4, 90 mm hole pattern, with additional clip available as accessory	
Mounting:	DIN rail mounting (IEC/EN60715) or screw mounting M4, 90 mm hole pattern, with additional clip available as accessory	
Weight:		
IL 5880:	160 g	
SL 5880:	189 g	
IP 5880:	250 g	
SP 5880:	300 g	

Dimensions

Width x height x depth:	
IL 5880:	35 x 90 x 61 mm
SL 5880:	35 x 90 x 98 mm
IP 5880:	70 x 90 x 61 mm
SP 5880:	70 x 90 x 98 mm

Classification to DIN EN 50155 for IL 5880

Vibration and shock resistance:	Category 1, Class B	IEC/EN 61 373
Protective coating of the PCB:	No	

Standard Types

IL 5880.12 AC 220 ... 240 V

Article number:	0053378
• Auxiliary voltage U_H :	AC 220 ... 240 V
• adjustable alarm value R_{AL}:	5 ... 100 kΩ
• Width:	35 mm

SL 5880.12 AC 220 ... 240 V

Article number:	0055396
• Auxiliary voltage U_H :	AC 220 ... 240 V
• adjustable alarm value R_{AL}:	5 ... 100 kΩ
• Width:	35 mm

Variants

IL / SL 5880.12/200:	with pre-warning and programmable outputs
IL / SL 5880.12/201:	as version IL / SL 5880.12/200, but both output relays with ergized on Trip principle
IL / SL 5880.12/300:	according to DIN VDE 0100-551 as version IL / SL 5880.12/200, but for use with mobile generator sets

Ordering example for variants

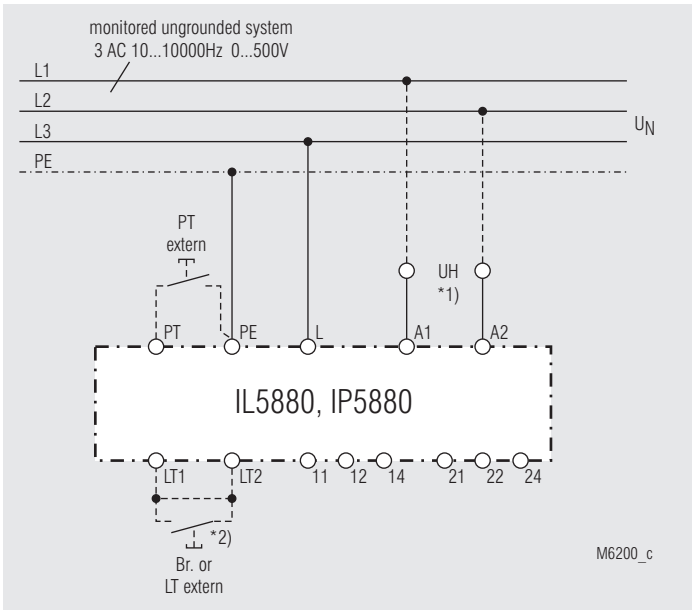
IL 5880 .12 / _ _ _ AC 380 ... 415 V AL 5 ... 100 kΩ VW 10 K ... 5MΩ

- VW 10 K ... 5MΩ: Pre-warning setting
- AL 5 ... 100 kΩ: Alarm setting
- AC 380 ... 415 V: Auxiliary voltage
- _ _ _: Variant, if required
- .12: Contacts
- IL 5880: Type

Accessories

ET 4086-0-2:	Additional clip for screw mounting Article number: 0046578

Connection Example

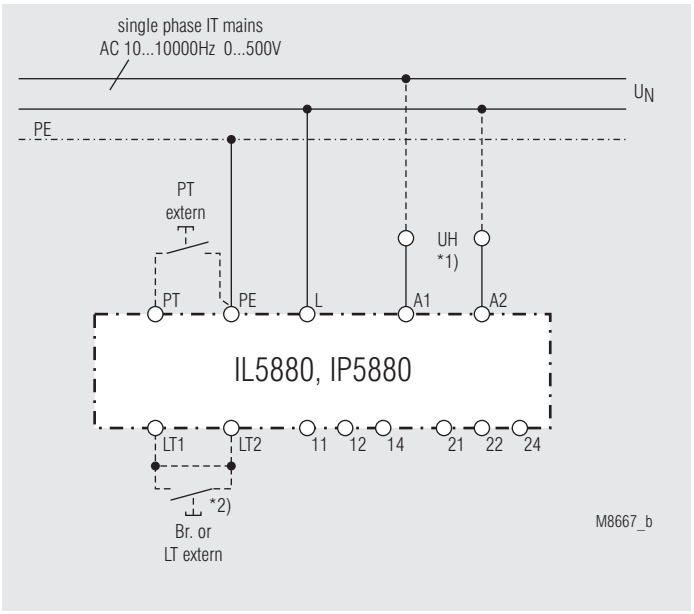


Monitoring of an ungrounded voltage system.

*1) Auxiliary supply U_H (A1 - A2) can be taken from the monitored voltage system. The voltage- and frequency 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

Connection Example



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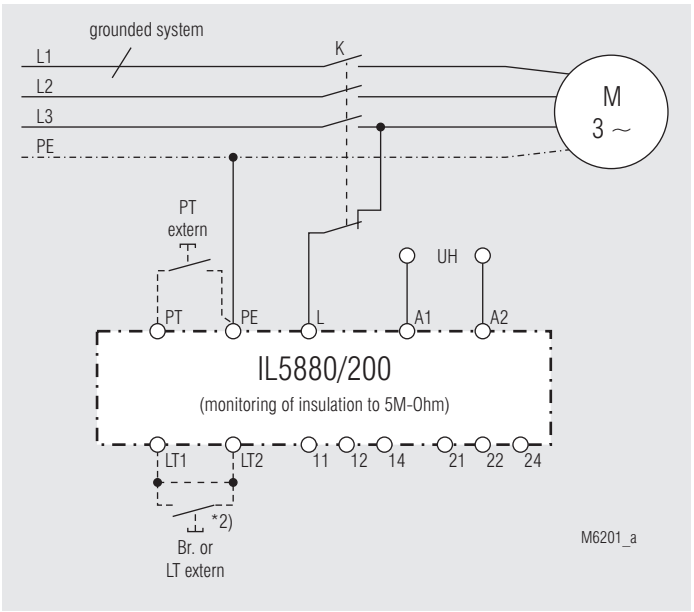

Monitoring of motorwindings against ground.
The insulation of the motor to ground is monitored as long as contactor K does not activate the load.

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without bridge LT1 - LT2: manual reset, reset with button LT