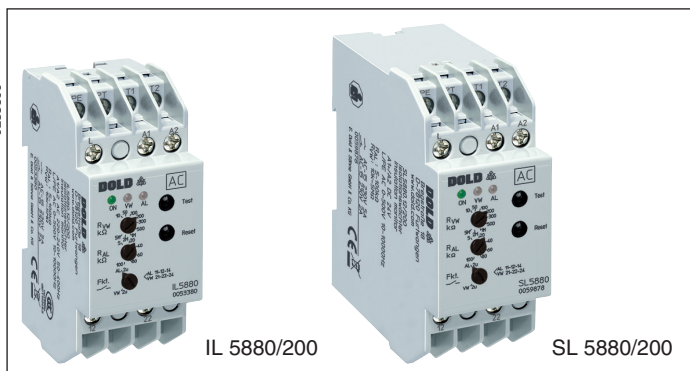


VARIMETER IMD Insulation Monitor IL 5880, IP 5880, SL 5880, SP 5880

Translation
of the original instructions



0238809

Your Advantage

- Preventive fire and system protection
- For single and 3-phase AC-systems up to 0 ... 500 V and 10 ... 10000 Hz
- Monitors also disconnected voltage systems
- Easy adjustment of response values

Features

- According to IEC/EN 61557-8
- Adjustable tripping value R_{AL} of 5 ... 100 k Ω or 10 ... 500 k Ω
- 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 k Ω ... 5 M Ω
 - 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 43880

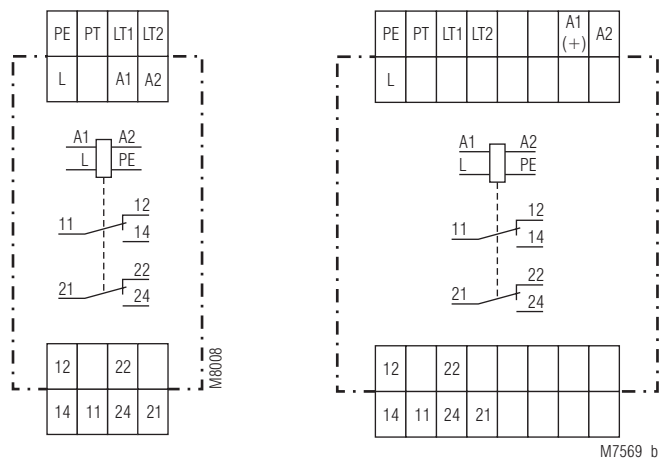
SL 5880, SP 5880: 98 mm deep with terminals near to the top to be mounted in cabinets with mounting plate and cable ducts

- DIN rail or screw mounting
- 35 mm width

Product Description

The insulation monitor IL 5880 of the series VARIMETER IMD monitors the insulation resistance of isolated single phase or 3-phase voltage systems (IT-systems) with nominal voltage up to AC 0 ... 500 V. The separate supply voltage (auxiliary voltage) allows also monitoring when the system is without voltage. The device has LEDs to indicate the operating status. The response value can be set in a user-friendly way on the front of the device via a potentiometer.

Circuit Diagram



IL 5880, SL 5880

IP 5880, SP 5880

M7569_b

Approvals and Markings



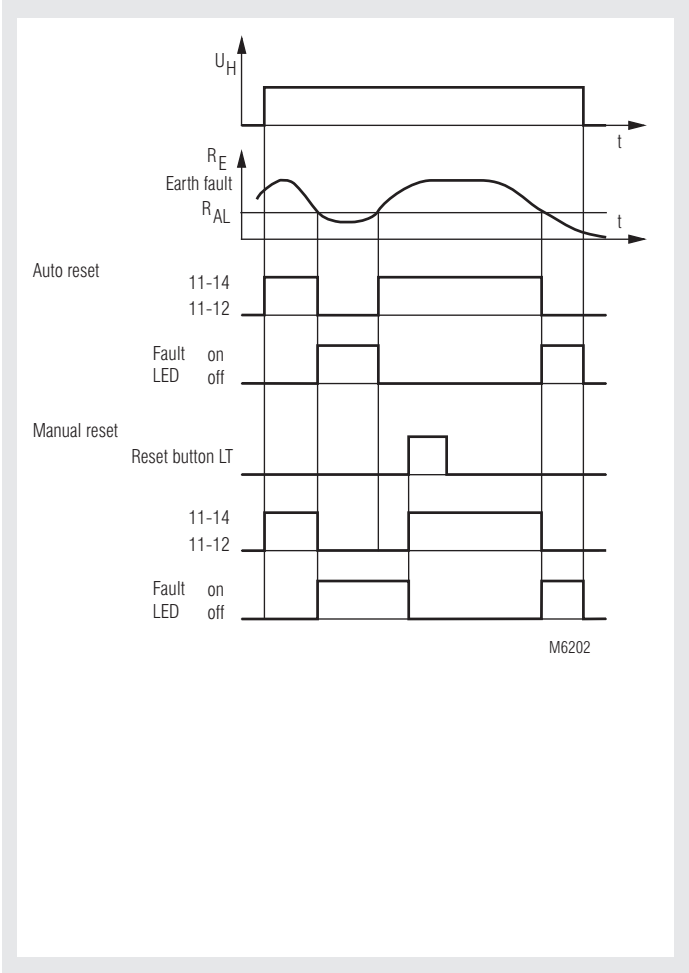
Applications

- 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

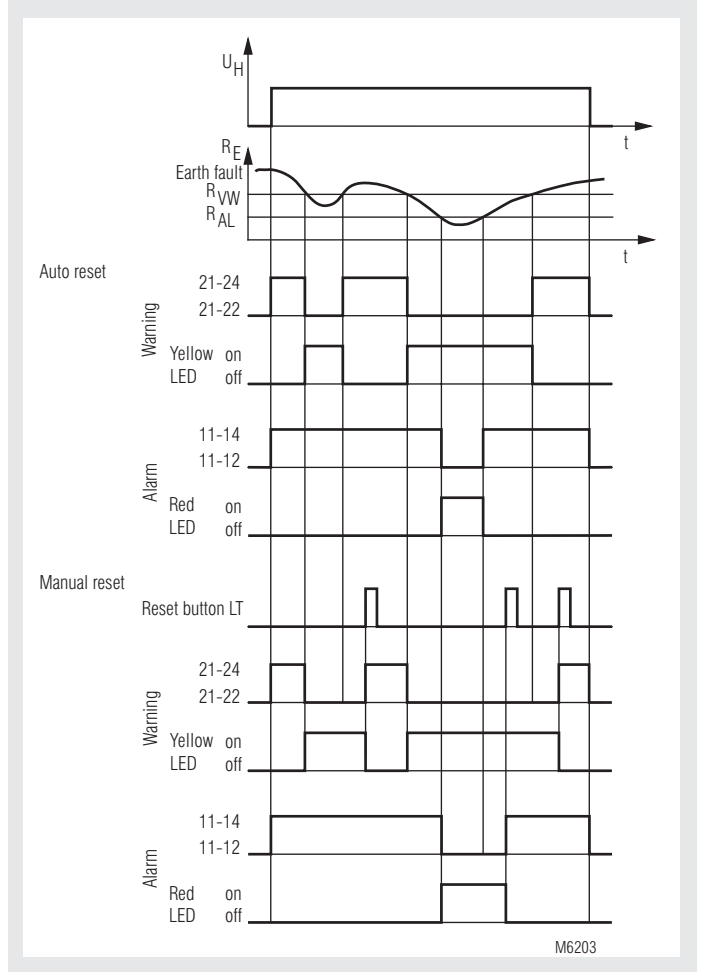
Connection Terminals

Terminal designation	Signal description
A1	L / +
A2	N / -
L	Connection for monitored IT-systems
PE	Connection for protective conductor
PT	Connection for external test button
LT1, LT2	Connections for external reset or manual and auto reset: LT1/LT2 bridged: hysteresis function LT1/LT2 not bridged: manual reset
11, 12, 14 21, 22, 24	Changeover contact (each for switch in position VW or AL)

Function Diagram



IL 5880, SL 5880, IP 5880, SP 5880



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

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 a 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 M Ω (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.

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



Risk of electrocution! Danger to life or risk of serious injuries.

- Disconnect the system and device from the power supply and ensure they remain disconnected during electrical installation.
- The terminals of the control input PT, LT1 und LT2 have no galvanic separation to the measuring circuit L and are electrically connected together, therefore they have to be controlled by volt free contacts or bridge. These contacts ore bridges must provide a sufficient separation depending on the mains voltage on L.
- No external potentials may be connected to external control terminals PT, LT1 und LT2.



Attention!

- Before checking insulation and voltage, disconnect the insulation monitor IL/SL 5880 from the power source!
- In one voltage system only one insulation monitor can be used. This has to be observed when interconnecting two separate systems.
- 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.



Attention!

- The Insulation monitors IL/SL 5880 are designed to monitor AC-voltage systems. Overlaid DC voltage does not damage the instrument but may change the conditions in the measuring circuit.
- 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).
- 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.
- 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 similar to IL/SL 5880/200.

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 45 ... 400 Hz

Frequency range (AC):

Nominal consumption:

AC:	Approx. 2 VA
DC:	Approx. 1 W

Measuring Circuit

Nominal voltage U_N :

Voltage range:

Frequency range:

Alarm value R_{AL} :

10 ... 500 k Ω

Prewarning value R_{VW}

(only at IL/SL 5880/2... and IL/SL 5880/300):

Setting R_{AL} , R_{VW} :

Internal test resistor:

Internal AC resistance:

Internal DC resistance:

Measuring voltage:

Max. measuring current

($R_E = 0$):

Max. permissible noise

DC voltage:

Operate delay

At $R_{AL} = 50$ k Ω , CE = 1 μ F

R_E from ∞ to 0.9 R_{AL} :

R_E from ∞ to 0 k Ω :

Response inaccuracy:

Hysteresis

At $R_{AL} = 50$ k Ω :

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
4 A

Thermal current I_{th} :

Switching capacity

To AC 15

NO: 5 A / AC 230 V IEC/EN 60947-5-1

NC: 2 A / AC 230 V IEC/EN 60947-5-1

To DC 13: 2 A / DC 24 V IEC/EN 60947-5-1

Electrical life

To AC 15 at 1 A, AC 230 V: $\geq 5 \times 10^5$ switching cycles IEC/EN 60947-5-1

Short circuit strength

max. fuse rating: 4 A gG / gL IEC/EN 60947-5-1

Mechanical life:

$\geq 30 \times 10^6$ switching cycles

Technical Data

General Data

Operating mode:

Continuous operation

Temperature range

Operation: - 25 ... + 60 °C

Storage: - 25 ... + 70 °C

Altitude: ≤ 2000 m

Clearance and creepage distances

Rated impulse voltage /
pollution degree

between auxiliary supply
connections (A1- A2): 4 kV / 2 at AC-auxiliary voltage IEC 60664-1

Between measuring input
connections (L - PE): 6 kV / 2 IEC 60664-1

Between auxiliary supply
and measuring input
connections: 6 kV / 2 IEC 60664-1

Auxiliary supply connections
and measuring input
to relay contacts: 6 kV / 2 IEC 60664-1

Relay contact 11-12-14
to relay contact 21-22-24: 4 kV / 2 IEC 60664-1

Insulation test voltage

Routine test:
AC 4 kV; 1 s
AC 2,5 kV; 1 s

EMC

Electrostatic discharge: 8 kV (air) IEC/EN 61000-4-2

HF irradiation

80 MHz ... 1 GHz: 10 V / m IEC/EN 61000-4-3

1 GHz ... 2.5 GHz: 3 V / m IEC/EN 61000-4-3

2.5 GHz ... 2.7 GHz: 1 V / m IEC/EN 61000-4-3

Fast transients: 2 kV IEC/EN 61000-4-4

Surge voltages

Between A1 - A2: 1 kV IEC/EN 61000-4-5

Between L - PE: 2 kV IEC/EN 61000-4-5

HF-wire guided: 10 V IEC/EN 61000-4-6

Interference suppression:

IL / SL 5880: Limit value class B EN 55011

IP / SP 5880: Limit value class A^{*)}

^{*)}The device is designed for the usage
under industrial conditions (Class A,
EN 55011).

When connected to a low voltage public
system (Class B, EN 55011) radio inter-
ference can be generated. To avoid this,
appropriate measures have to be taken.

Degree of protection:

Housing: IP 40 IEC/EN 60529

Terminals: IP 20 IEC/EN 60529

Housing:

Thermoplastic with V0 behaviour

according to UL Subjekt 94

Amplitude 0.35 mm IEC/EN 60068-2-6

frequency 10 ... 55 Hz IEC/EN 60068-1

25 / 060 / 04 EN 50005

Terminal designation: DIN 46228-1/-2/-3/-4

Wire connection: 2 x 2.5 mm² solid or

2 x 1.5 mm² stranded wire

10 mm

Stripping length: 0.8 Nm

Fixing torque: Flat terminals with self-lifting clamping
piece IEC/EN 60999-1

Wire fixing: DIN rail mounting (IEC/EN 60715) or

screw mounting M4, 90 mm hole pattern,

with additional clip available as accessory

Mounting:

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 61373

Service temperature classes: OT1 compliant

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 k Ω
- Width: 35 mm

SL 5880.12 AC 220 ... 240 V

Article number: 0055396

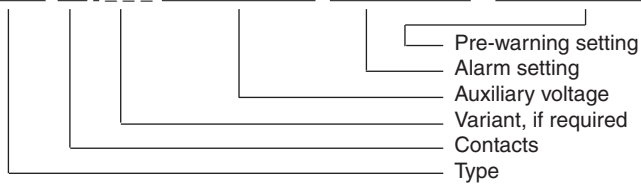
- Auxiliary voltage U_H : AC 220 ... 240 V
- Adjustable alarm value R_{AL} : 5 ... 100 k Ω
- Width: 35 mm

Variants

IL / SL 5880.12/001:	Same as standard type, but both output relays with energized on trip principle
IL / SL 5880.12/100:	Same as standard type, but alarm value not adjustable, but fixed value
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 energized 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

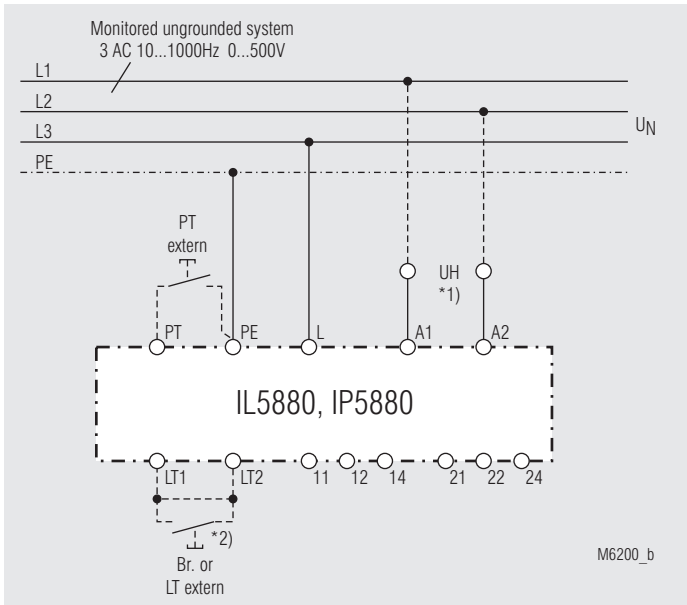
IL 5880 .12 / _ _ _ AC 380 ... 415 V AL 5 ... 100 k Ω VW 10 K ... 5M Ω



Accessories

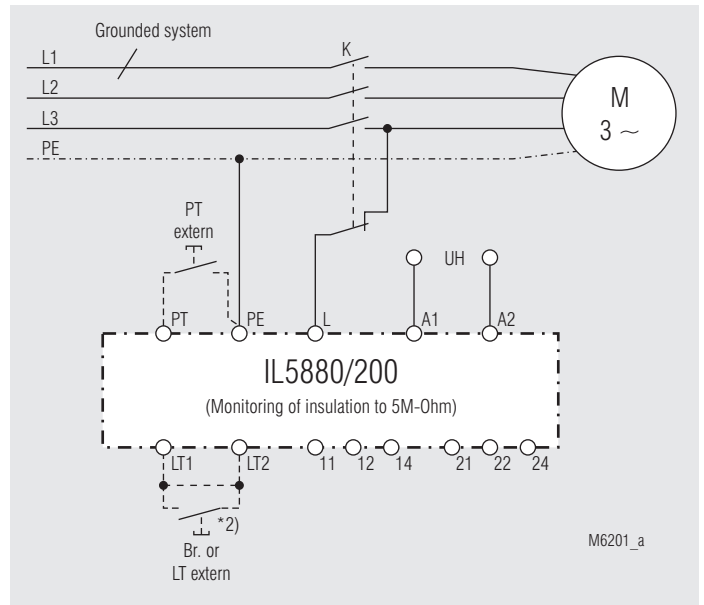
ET 4086-0-2: Additional clip for screw mounting
Article number: 0046578

Connection Example



Monitoring of an ungrounded voltage system.

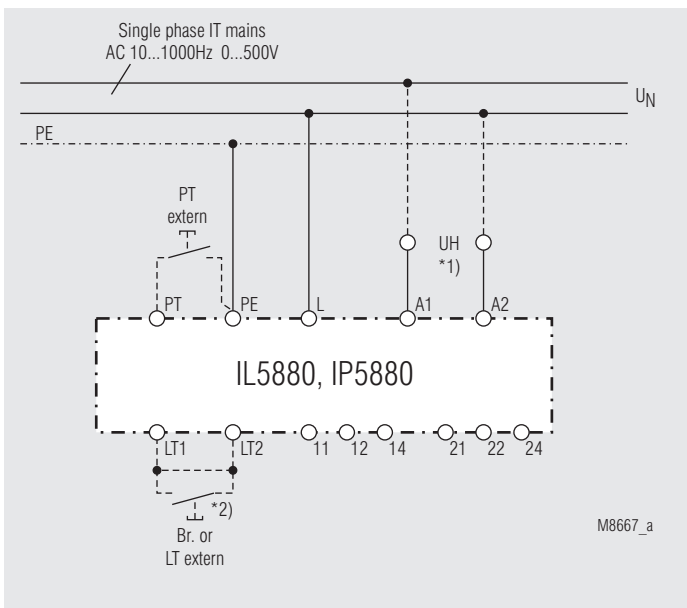
- *1) Auxiliary supply U_H (A1 - A2) can be taken from the monitored voltage system. The voltage- and frequency range of the auxiliary supply input must be observed.
- *2) With bridge LT1 - LT2: Automatic reset
without bridge LT1 - LT2: Manual reset, reset with button LT



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



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

