

Installation- / monitoring technique

Insulation monitor IL 5881, SL 5881 VARIMETER



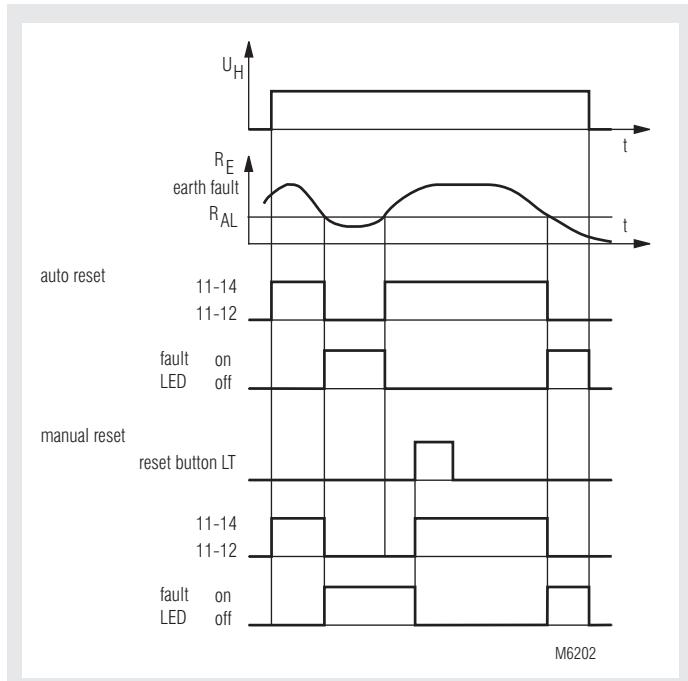
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IL 5881

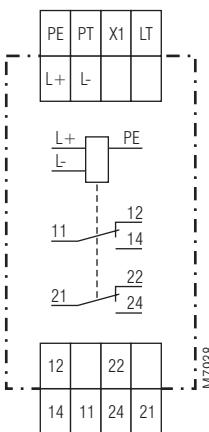
SL 5881

Function diagram

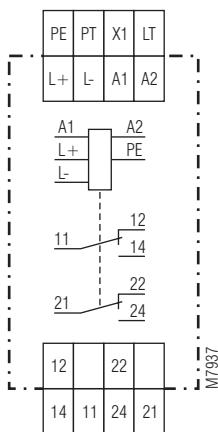


IL 5881/100, SL 5881/100; IL 5881, SL 5881

Circuit diagram



IL 5881.12/100



IL 5881.12

- According to IEC/EN 61 557
- For DC voltage systems up to 12 ... 280 V
- Wide voltage range of measuring input U_N DC 12 ... 280 V (on request DC 24 ... 500 V with separate auxiliary supply, Measuring range 20 ... 500 k Ω)
- Adjustable tripping value R_{AL} of 5 ... 200 k Ω
- Selective ground fault indication for L+ and L- allows fast fault finding
- Without auxiliary supply
- De-energized on trip
- 2 changeover contacts
- Automatic or manual reset, programmable
- With test and reset buttons
- Connection for external test and reset button possible
- galvanic separated AC or DC auxiliary supply available as option
- adjustable time delay as option

• 2 models available:

IL 5881: 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 5881: 98 mm deep with terminals near to the top to be mounted in cabinets with mounting plate and cable ducts

- 35 mm width

Approvals and marking



Application

Monitoring of insulation resistance of ungrounded DC-voltage systems to earth.

Function

If the insulation resistance R_E between L+ or L- to ground drops below the adjusted alarm value R_{AL} (insulation failure) the corresponding red LED goes on and the output relay switches off (de-energized on trip). If the unit is on auto reset (bridge between LT-X1) 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 LT-X1 the insulation monitor remains in faulty state even if the insulation resistance is back to normal. The location of the fault on L+ or L- is indicated on the corresponding LED (selective fault indication).

The reset is done by pressing the internal or external reset button or by disconnecting the auxiliary supply.

By activating the "Test" button internal or external an insulation failure can be simulated to test the function of the unit.

Indicators

Green LED "ON": On, when supply voltage connected
 Red LED "RE+": On, when insulation fault detected ($R_{E+} < R_{AL}$) on L+
 Red LED "RE-": On, when insulation fault detected ($R_{E-} < R_{AL}$) on L-

Notes

The IL/SL 5881 can be used in systems with high leakage capacity to ground. When the unit is adjusted to high alarm values a leakage capacity can create a pulse when switching the system on (short alarm pulse). This happens at the following values:

IL/SL 5881: $R_{AL} = 200 \text{ k}\Omega$; $C_E > 1 \mu\text{F}$

IL/SL 5881: $R_{AL} = 50 \text{ k}\Omega$; $C_E > 6 \mu\text{F}$

IL/SL 5881: $R_{AL} = 20 \text{ k}\Omega$; $C_E > 16 \mu\text{F}$

IL/SL 5881/100: $R_{AL} = 200 \text{ k}\Omega$; $C_E > 0.8 \mu\text{F}$

IL/SL 5881/100: $R_{AL} = 50 \text{ k}\Omega$; $C_E > 2.0 \mu\text{F}$

IL/SL 5881/100: $R_{AL} = 20 \text{ k}\Omega$; $C_E > 4.5 \mu\text{F}$

An optional time delay (on request) could suppress this pulse.

Because of the measuring principle with a resistor bridge the insulation monitor IL/SL 5881 will not detect symmetric ground faults of L+ and L-. Exact symmetric ground faults normally do not exist in practice.

On models with separate auxiliary supply the alarm state is not defined when the voltage drops below 3V. To avoid false alarm an additional auxiliary relay should be used which is connected to the monitored voltage.

On the models with galvanic separation between DC auxiliary supply and measuring input, the supply (A1/A2) can be connected to the monitored voltage system (L+/L-). The voltage range of the auxiliary input must be noticed which is only 1.25 of U_H while the measuring input always goes up to 280 V.

If no auxiliary supply is available the model IL/SL 5881/100 (without auxiliary supply) can be used which takes the auxiliary supply from the monitored system ($U_H = U_N = \text{DC } 12 \dots 280 \text{ V}$).

Technical Data

Auxiliary circuit (only at IL/SL 5881)

Auxiliary voltage U_H : AC 220 ... 240 V, 380 ... 415 V
DC 12 V, 24 V

Voltage range:

AC: 0.8 ... 1.1 U_H
DC: 0.9 ... 1.25 U_H

Frequency range (AC):

Nominal consumption

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

Measuring circuit

Nominal voltage U_N : DC 12 ... 280 V (residual ripple $\leq 5 \text{ %}$)
DC 12 ... 220 V (residual ripple 48 %)

Voltage range:

Alarm value R_{AL} : 0.9 ... 1.1 U_N

Setting R_{AL} : 5 ... 200 k Ω

Internal AC resistance

L+ and L- to PE: infinite setting

each approx. 75 k Ω

Max. measuring current

PE ($R_E = 0$): $U_N / 75 \text{ k}\Omega$

Operate delay

at $R_{AL} = 50 \text{ k}\Omega$, $C_E = 1 \mu\text{F}$

R_E from ∞ to 0.9 R_{AL} :

R_E from ∞ to 0 k Ω :

Hysteresis

at $R_{AL} = 50 \text{ k}\Omega$:

approx. 10 ... 15 %

Time delay: 0.5 ... 20 s (variant)

Technical Data

Output

Contacts:

IL / SL 5881.12: 2 changeover contacts

Thermal current I_{th} : 4 A

Switching capacity

to AC 15: 3 A / AC 230 V IEC/EN 60 947-5-1

Switching capacity

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: $\geq 2 \times 10^5$ 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:

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

General Data

Operating mode:

Continuous operation

- 20 ... + 60°C

Temperature range:

Clearance and creepage distances

rated impuls voltage /

pollution degree IEC 60 664-1

between auxiliary supply connections(A1 / A2): 4 kV / 2 at AC-auxiliary voltage IEC 60 664-1

between measuring input connections (L+ / L- / PE): 4 kV / 2 IEC 60 664-1

between auxiliary supply and measuring input connections: 4 kV / 2 IEC 60 664-1

Input to output(contacts): 4 kV / 2 (3 kV at DC-auxiliary voltage) IEC 60 664-1

Input to output(contacts): 6 kV / 2 IEC 60 664-1

EMC

Electrostatic discharge: 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 IEC/EN 61 000-4-5

(only at AC-auxiliary supply): 2 kV IEC/EN 61 000-4-5

between L+ / L- / PE: 1 kV IEC/EN 61 000-4-5

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

20 / 060 / 04 IEC/EN 60 068-1

Climate resistance: EN 50 005

Terminal designation: 2 x 2.5 mm² solid or

2 x 1.5 mm² stranded ferruled

DIN 46 228-1/-2/-3/-4

Wire connection: Flat terminals with self-lifting

clamping piece IEC/EN 60 999-1

DIN rail IEC/EN 60 715

Wire fixing: approx. 170 g

Mounting: approx. 200 g

Weight

IL 5881: SL 5881:

Dimensions

Width x height x depth:

IL 5881: 35 x 90 x 61 mm

SL 5881: 35 x 90 x 98 mm

Standard types

IL 5881.12/100 DC 12 ... 280 V 5 ... 200 kΩ

Article number: 0053805

- Without auxiliary supply U_H
- Nominal voltage U_N : DC 12 ... 280 V
- adjustable
- alarm value R_{AL} : 5 ... 200 kΩ
- Width: 35 mm

SL 5881.12/100 DC 12 ... 280 V 5 ... 200 kΩ

Article number:

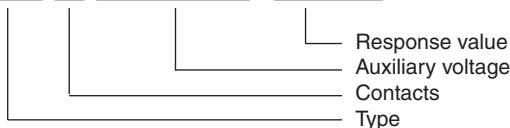
- Without auxiliary supply U_H
- Nominal voltage U_N : DC 12 ... 280 V
- adjustable
- alarm value R_{AL} : 5 ... 200 kΩ
- Width: 35 mm

Variant

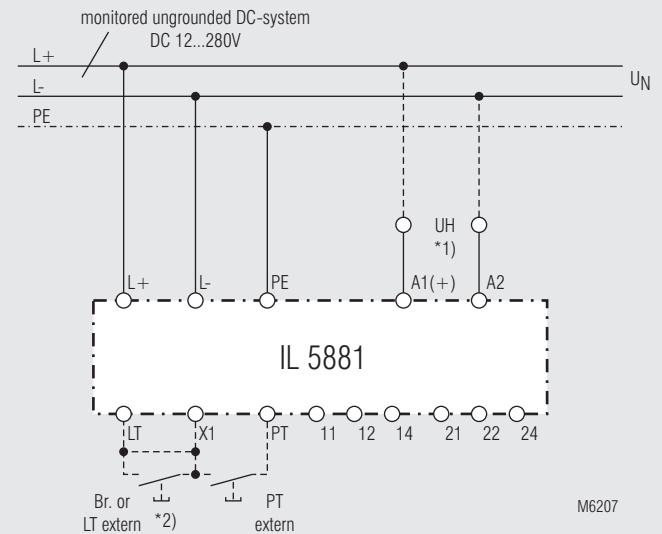
IL / SL 5881.12: with auxiliary supply
 IL / SL 5881.12/300 without auxiliary supply
 Nominal voltage U_N DC 12 ... 280 V
 closed circuit operation
 Time delay 0.5 ... 20 s

Order example for variant

IL 5881 .12 AC 220 ... 240 V 5 ... 200 kΩ



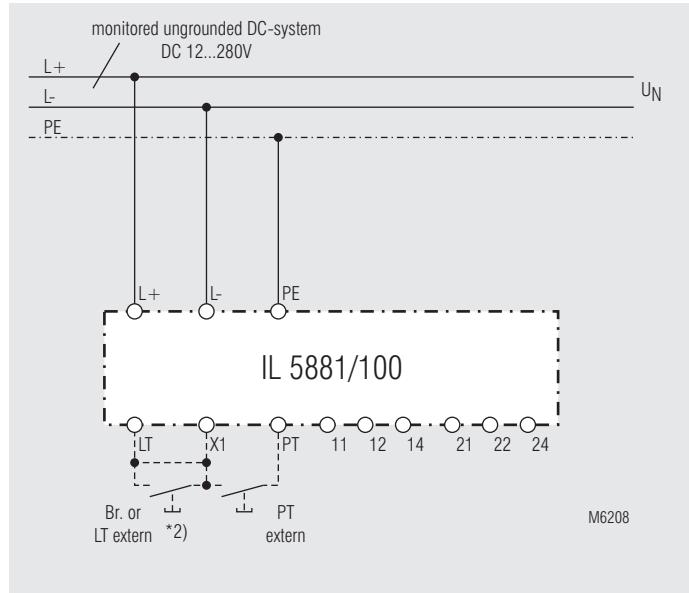
Connections diagrams



Monitoring of an ungrounded system.

*1) Auxiliary supply U_H (A1-A2) can be taken from monitored voltage system. The range of the auxiliary supply input must be observed.

*2) with bridge LT - X1: automatic reset
 without bridge LT - X1: manual reset, reset with button LT



Monitoring of an ungrounded system without auxiliary supply.

*2) with bridge LT - X1: automatic reset
 without bridge LT - X1: manual reset, reset with button LT

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