

## Insulation monitor IL 5881, SL 5881 VARIMETER



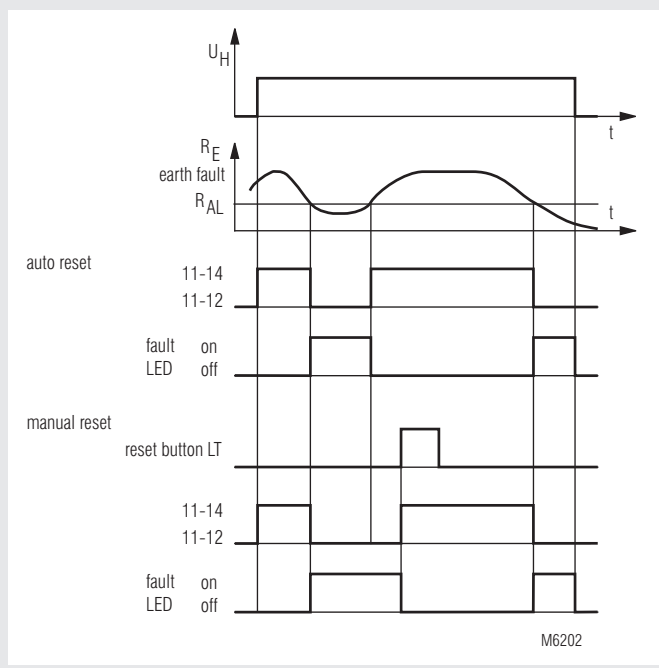
- According to IEC/EN 61 557
- For DC voltage systems up to 12 ... 280 V
- Wide voltage range of measuring input  $U_N$  DC 12 ... 280 V (on request DC 24 ... 500 V with separate auxiliary supply, Measuring range 20 ... 500 k $\Omega$ )
- Adjustable tripping value  $R_{AL}$  of 5 ... 200 k $\Omega$
- 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

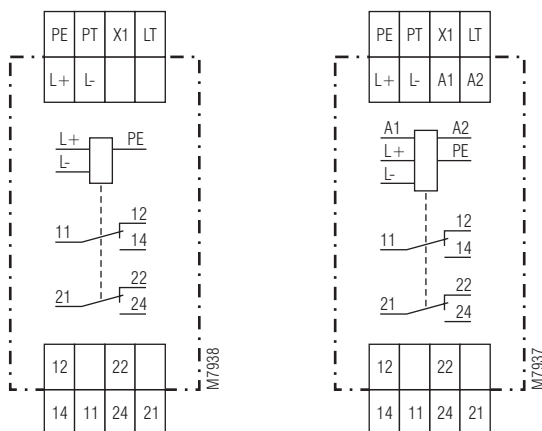
- 35 mm width

### Function diagram



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

### Circuit diagram



IL 5881.12/100

IL 5881.12

### 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:  $R_{AL} = 200 \text{ k}\Omega$ :  $C_E > 1 \text{ }\mu\text{F}$   
 IL/SL 5881:  $R_{AL} = 50 \text{ k}\Omega$ :  $C_E > 6 \text{ }\mu\text{F}$   
 IL/SL 5881:  $R_{AL} = 20 \text{ k}\Omega$ :  $C_E > 16 \text{ }\mu\text{F}$

IL/SL 5881/100:  $R_{AL} = 200 \text{ k}\Omega$ :  $C_E > 0.8 \text{ }\mu\text{F}$   
 IL/SL 5881/100:  $R_{AL} = 50 \text{ k}\Omega$ :  $C_E > 2.0 \text{ }\mu\text{F}$   
 IL/SL 5881/100:  $R_{AL} = 20 \text{ k}\Omega$ :  $C_E > 4.5 \text{ }\mu\text{F}$

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 3 V. 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):

45 ... 400 Hz

### Nominal consumption

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

### Measuring circuit

**Nominal voltage  $U_N$ :** DC 12 ... 280 V (residual ripple  $\leq 5 \%$ )  
 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 $\Omega$   
**Internal AC resistance** infinite setting

### Max. measuring current

L+ and L- to PE: each approx. 75 k $\Omega$

### PE ( $R_E = 0$ ):

$U_N / 75 \text{ k}\Omega$

### Operate delay

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

$R_E$  from  $\infty$  to 0.9  $R_{AL}$ : approx. 0.8 s

$R_E$  from  $\infty$  to 0 k $\Omega$ : approx. 0.4 s

### 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

#### Short circuit strength

to DC 13: 2 A / DC 24 V

0.2 A / DC 250 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

#### 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

#### Temperature range:

- 20 ... + 60°C

#### Clearance and creepage

##### distances

rated impuls voltage /

pollution degree

between auxiliary supply

connections(A1 / A2):

between measuring input

connections (L+ / L- / PE):

between auxiliary supply

and measuring input

connections:

Input to output(contacts):

#### EMC

Electrostatic discharge:

HF irradiation:

Fast transients:

Surge voltages

between A1 - A2

(only at AC-auxiliary supply):

between L+ / L- / PE:

#### Degree of protection

Housing:

Terminals:

#### Housing:

#### Vibration resistance:

#### Climate resistance:

#### Terminal designation:

#### Wire connection:

2 x 2.5 mm<sup>2</sup> solid or

2 x 1.5 mm<sup>2</sup> stranded ferruled

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

Flat terminals with self-lifting

clamping piece IEC/EN 60 999-1

DIN rail IEC/EN 60 715

#### Mounting:

#### Weight

IL 5881: approx. 170 g

SL 5881: approx. 200 g

### 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 k $\Omega$   
 Article number: 0053805  
 • Without auxiliary supply  $U_H$   
 • Nominal voltage  $U_N$ : DC 12 ... 280 V  
 • adjustable  
 alarm value  $R_{AL}$ : 5 ... 200 k $\Omega$   
 • Width: 35 mm

SL 5881.12/100 DC 12 ... 280 V 5 ... 200 k $\Omega$   
 Article number:  
 • Without auxiliary supply  $U_H$   
 • Nominal voltage  $U_N$ : DC 12 ... 280 V  
 • adjustable  
 alarm value  $R_{AL}$ : 5 ... 200 k $\Omega$   
 • Width: 35 mm

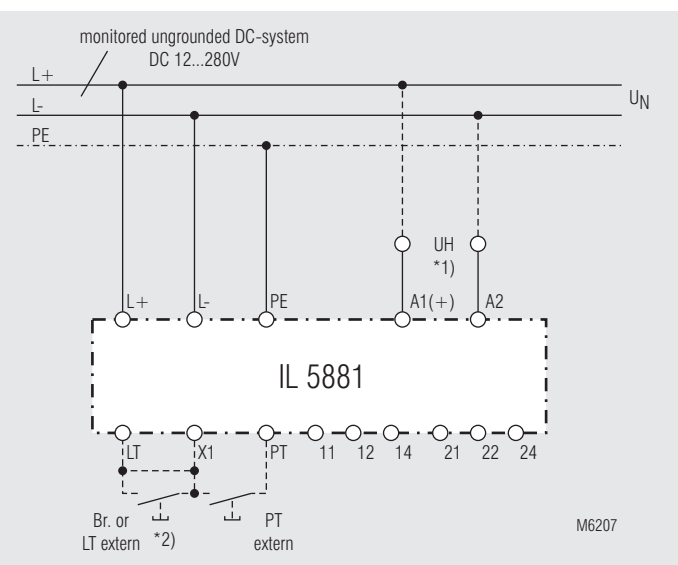
## Variant

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

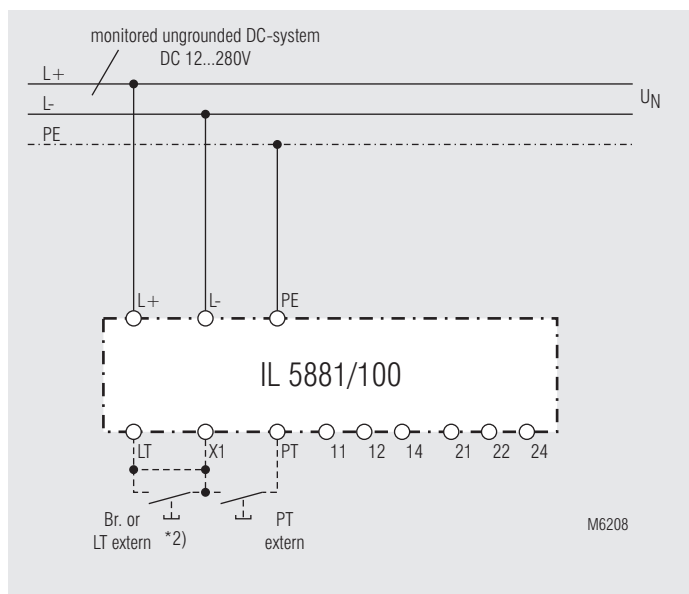
IL 5881 .12 AC 220 ... 240 V 5 ... 200 k $\Omega$   
 Response value  
 Auxiliary voltage  
 Contacts  
 Type

## 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

