**VARIMETER IMD**

**Insulation Monitor**

**IL 5881, SL 5881**

- **With reference to IEC/EN 61557-8 (see also section "Notes")**
- **For DC voltage systems up to 12 ... 280 V**
- **Wide voltage range of measuring input U_{in} DC 12 ... 280 V**
  (on request DC 24 ... 500 V with separate auxiliary supply, Measuring range 20 ... 500 kΩ)
- **Adjustable tripping value R_AL of 5 ... 200 kΩ or 10 ... 500 kΩ**
- **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 43880
  - **SL 5881:** 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**

**Function Diagram**

- **Monitoring of asymmetrical insulation resistance of ungrounded DC-voltage systems to earth.**
- **For industrial and railway applications**

**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-
### Circuit Diagrams

**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 X1 have no galvanic separation to the measuring circuit L+/L- and are electrically connected together, therefore they have to be controlled by volt free contacts or bridge. These contacts are bridges must provide a sufficient separation depending on the mains voltage on L+/L-.
- No external potentials may be connected to external control terminals PT, LT1 und X1.

#### Attention!
- Before checking insulation and voltage, disconnect the insulation monitor IL/SL 5881 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.
- According to IEC/EN 61 557-8 insulation monitors must be able to monitor the isolation resistance of the IT-system including symmetric and none symmetric occurrence of the isolation resistance. Because of the measuring principle with a resistor bridge (asymmetry principle) the insulation monitor IL/SL 5881 will not detect symmetric ground faults of L+ and L-. Also a voltfree (disconnected Un = 0V) system cannot be monitored. If the monitoring of symmetrical insulation resistances in ungrounded DC systems is required, the RL 5881 insulation monitor, for example, is suitable.

#### Attention!
- 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: \( R_{AL} = 200 \, k\Omega \), \( C_e > 1 \, \mu F \)
  - IL / SL 5881: \( R_{AL} = 50 \, k\Omega \), \( C_e > 6 \, \mu F \)
  - IL / SL 5881: \( R_{AL} = 20 \, k\Omega \), \( C_e > 16 \, \mu F \)
  - IL / SL 5881/100: \( R_{AL} = 500 \, k\Omega \), \( C_e > 0.8 \, \mu F \)
  - IL / SL 5881/100: \( R_{AL} = 200 \, k\Omega \), \( C_e > 0.8 \, \mu F \)
  - IL / SL 5881/100: \( R_{AL} = 50 \, k\Omega \), \( C_e > 2.0 \, \mu F \)
  - IL / SL 5881/100: \( R_{AL} = 20 \, k\Omega \), \( C_e > 4.5 \, \mu F \)

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

- 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 or the variant IL 5881.12/010 is used.

- 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 Un, 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 (Un = Un = DC 12 ... 280 V).
Auxiliary Circuit

(only at IL/SL 5881)

Auxiliary voltage $U_{H}$:
- AC 220 ... 240 V, 380 ... 415 V
- DC 12 V, 24 V
- DC 24 ... 60 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: Approx. 2 VA
- DC: Approx. 1 W

Measuring Circuit

Nominal voltage $U_{N}$ at
- ≤ 5 % residual ripple: DC 12 ... 280 V DC 12 ... 220 V
- ≤ 48 % residual ripple: DC 0.9 ... 1.1 $U_{H}$

Voltage range:
- 1) 5 ... 200 kΩ
- 2) 10 ... 500 kΩ

Alarm value $R_{AL}$:
- Setting $R_{AL}$: infinite setting

Internal DC resistance $L^{+}$ and $L^{-}$ to PE:
- 1) each appr. 75 kΩ
- 2) each appr. 100 kΩ

Max. meas. current at PE ($R_{E}$ = 0):
- 1) $U_{H}$ / 75 kΩ
- 2) $U_{H}$ / 100 kΩ

Operate delay
- At $R_{E}$ = 50 kΩ, $C_{E}$ = 1 µF
- $R_{E}$ from $≈$ to 0.9 $R_{E}$:
- Approx. 0.8 s

Response inaccuracy:
- At $R_{E}$ = 50 kΩ:
- Approx. 10 ... 15 %

Time delay:
- 20 s (variant)

Output

Contacts:
- IL / SL 5881.12: 2 changeover contacts
- Thermal current $I_{T}$:
- 4 A

Switching capacity
- To AC 15:
- 3 A / AC 230 V
- 2 A / DC 24 V

Switching capacity
- To DC 13:
- 0.2 A / DC 250 V

Electrical life
- To AC 15 at 1 A, AC 230 V:
- ≥ 2 x 10^6 switching cycles

Short circuit strength
- max. fuse rating:
- 4 A gG / gL
- ≥ 10 x 10^6 switching cycles

Dimensions

Width x height x depth:
- IL 5881: 35 x 90 x 61 mm
- SL 5881: 35 x 90 x 98 mm
**Monitoring of an ungrounded system.**

*1) Auxiliary supply $U_{IH}$ (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

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### Connections Examples

**Monitoring of an ungrounded system without auxiliary supply.**

*1) Auxiliary supply $U_{IH}$ (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

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### Standard Types

**IL 5881.12/100**

- DC 12 ... 280 V
- 5 ... 200 kΩ

**Article number:** 0053805

- Without auxiliary supply $U_{IH}$
- Nominal voltage $U_{IN}$: 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:** 0055168

- Without auxiliary supply $U_{IH}$
- Nominal voltage $U_{IN}$: DC 12 ... 280 V
- Adjustable alarm value $R_{AL}$: 5 ... 200 kΩ
- Width: 35 mm

### Variants

**IL / SL 5881.12:**

- With auxiliary supply

**IL / SL 5881.12/010:**

- With auxiliary supply
- No alarm at $U_{IH} < 3 \text{ V}$

**IL / SL 5881.12/300:**

- Without auxiliary supply
- Nominal voltage $U_{IN}$: DC 12 ... 280 V
- Closed circuit operation
- Time delay 0.5 ... 20 s

**IL / SL 5881.12/800:**

- Special low resistance range for the threshold value with limitation of the voltage range:
- Nominal voltage $U_{IN}$ at ≤ 5 % residual ripple: DC 12 ... 110 V DC 12 ... 24 V
- Voltage range: 0.8 ... 1.25 $U_{IN}$
- Alarm value $R_{AL}$: 1 ... 50 kΩ 0.2 ... 10 kΩ
- Setting $R_{AL}$: infinite setting infinite setting
- Internal AC resistance: each approx. 18.5 kΩ each approx. 2.8 kΩ
- Max. meas. current at PE ($R_{PE} = 0$): $U_{IN} / 18.5 \text{ kΩ}$ $U_{IN} / 2.8 \text{ kΩ}$

### Ordering example for variants

**IL 5881 12 AC 220 ... 240 V 10 ... 500 kΩ**

- Response value
- Auxiliary voltage
- Contacts
- Type

### Accessories

**ET 4086-0-2:**

- Additional clip for screw mounting
- Article number: 0046578