

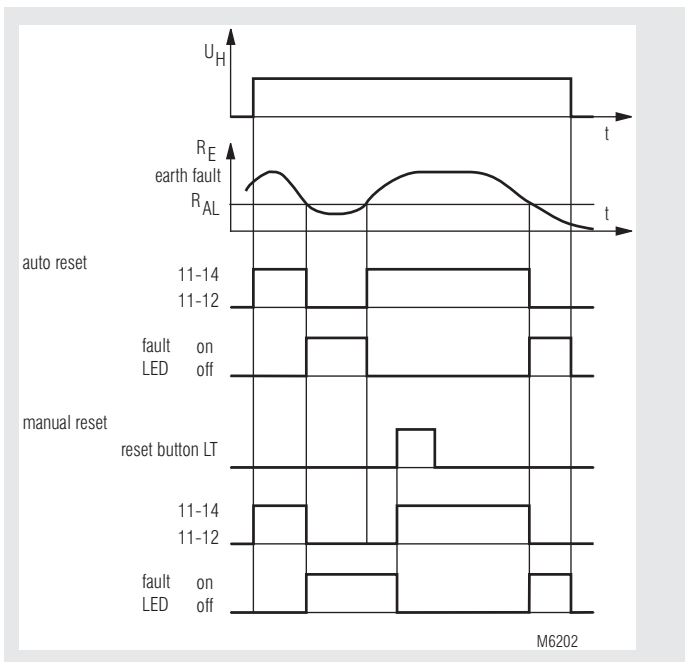
VARIMETER IMD Insulation Monitor IL 5881, SL 5881

Translation
of the original instructions



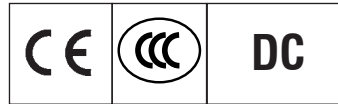
- With reference to IEC/EN 61557-8 (see also section "Notes")
- For DC voltage systems up to 12 ... 280 V
- Wide voltage range of measuring input U_N DC 12 ... 280 V (on request DC 24 ... 500 V with separate auxiliary supply, Measuring range 20 ... 500 k Ω)
- Adjustable tripping value R_{AL} of 5 ... 200 k Ω or 10 ... 500 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 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



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

Approvals and Markings



Application

- Monitoring of 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).

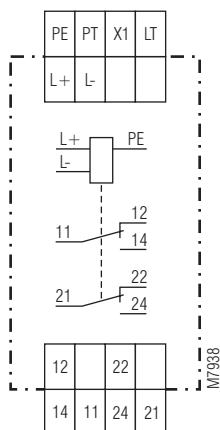
The reset is done by pressing the internal or external reset button or by disconnecting the auxiliary supply.

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

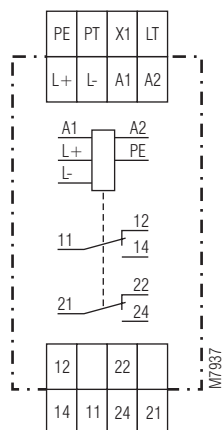
Indicators

- 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



IL 5881.12/100



IL 5881.12

Notes

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 ($U_H = U_N = DC 12 \dots 280 V$).



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 $U_N = 0V$) system cannot be monitored.

In one isolated voltage system only one insulation monitor must be connected, because several units would influence each other.

Connection Terminals

Terminal designation	Signal description
A1	L / +
A2	N / -
L+, L-	Connection for monitored IT-systems
PE	Connection for protective conductor
PT, X1	Connection for external test button
LT, X1	Connections for external reset or manual and auto reset: LT/X1 bridged: Hysteresis function LT/X1 not bridged: Manual reset
11, 12, 14 21, 22, 24	Changeover contact (insulation failure)

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: $R_{AL} = 500 \text{ k}\Omega$; $C_E > 0.8 \mu\text{F}$

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.

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.

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
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

	Standard	extended, on request
Nominal voltage U_N at $\leq 5\%$ residual ripple:	DC 12 ... 280 V	DC 24 ... 500 V
$\leq 48\%$ residual ripple:	DC 12 ... 220 V	
Voltage range:	0,9 ... 1,1 U_N	0,9 ... 1,1 U_N
Alarm value R_{AL}:	1.) 5 ... 200 k Ω 2.) 10 ... 500 k Ω	20 ... 500 k Ω
Setting R_{AL}:	infinite setting	infinite setting
Internal DC resistance L+ and L- to PE:	1.) each appr. 75 k Ω 2.) each appr. 100 k Ω	each approx. 190 k Ω
Max. meas. current at PE ($R_E = 0$):	1.) $U_N / 75 \text{ k}\Omega$ 2.) $U_N / 100 \text{ k}\Omega$	$U_N / 190 \text{ k}\Omega$

Operate delay

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

R_E from ∞ to 0.9 R_{AL} :

Approx. 0.8 s

R_E from ∞ to 0 k Ω :

Approx. 0.4 s

Response inaccuracy:

$\pm 15\% + 1.5 \text{ k}\Omega$

IEC 61557-8

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 60947-5-1

Switching capacity

To DC 13: 2 A / DC 24 V
0.2 A / DC 250 V IEC/EN 60947-5-1

Electrical life

To AC 15 at 1 A, AC 230 V: $\geq 2 \times 10^6$ switching cycles IEC/EN 60947-5-1

Short circuit strength

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

Mechanical life: $\geq 10 \times 10^6$ switching cycles

General Data

Operating mode: Continuous operation

Temperature range

Operation: - 20 ... + 60°C

Storage: - 20 ... + 60°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+ / L- / PE): 4 kV / 2 IEC 60664-1

Between auxiliary supply and measuring input connections: 4 kV / 2 IEC 60664-1

Input to output(contacts): 6 kV / 2 IEC 60664-1

EMC

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

HF irradiation:

80 MHz ... 1 GHz: 12 V / m IEC/EN 61000-4-3

1 GHz ... 2.7 GHz: 10 V / m IEC/EN 61000-4-3

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

Surge voltages

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

Between A1, A2 - PE and L+, L- - PE: 2 kV IEC/EN 61000-4-5

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

Interference suppression: Limit value class B EN 55011

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

Vibration resistance: Amplitude 0.35 mm frequency 10 ... 55 Hz IEC/EN 60068-2-6

20 / 060 / 04 IEC/EN 60068-1

Climate resistance: 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

Wire fixing: Flat terminals with self-lifting clamping piece IEC/EN 60999-1

Mounting: DIN rail mounting (IEC/EN 60715) or screw mounting M4, 90 mm hole pattern, with additional clip available as accessory

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

Classification to DIN EN 50155 for IL 5881

Vibration and

shock resistance: Category 1, Class B IEC/EN 61373

Ambient temperature: T1 compliant

T2, T3 and TX with operational limitations

Protective coating of the PCB: No

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: 0055168

• Without auxiliary supply U_H

• Nominal voltage U_N : 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 $U_N < 3$ V

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

IL / SL 5881.12/800: Special low resistance range for the threshold value with limitation of the voltage range:

Article number: 0056910 | 0056911

Nominal voltage U_N at DC 12 ... 110 V | DC 12 ... 24 V

≤ 5 % residual ripple: 0.8 ... 1.25 U_N | 0.8 ... 1.25 U_N

Voltage range: 1 ... 50 kΩ | 0.2 ... 10 kΩ

Alarm value R_{AL} : infinite setting | infinite setting

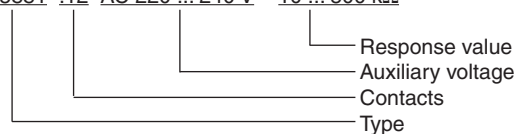
Setting R_{AL} : each approx. | each approx.

Internal AC resistance L+ and L- to PE: 18.5 kΩ | 2.8 kΩ

Max. meas. current at PE ($R_E = 0$): $U_N / 18.5$ kΩ | $U_N / 2.8$ kΩ

Ordering example for variants

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

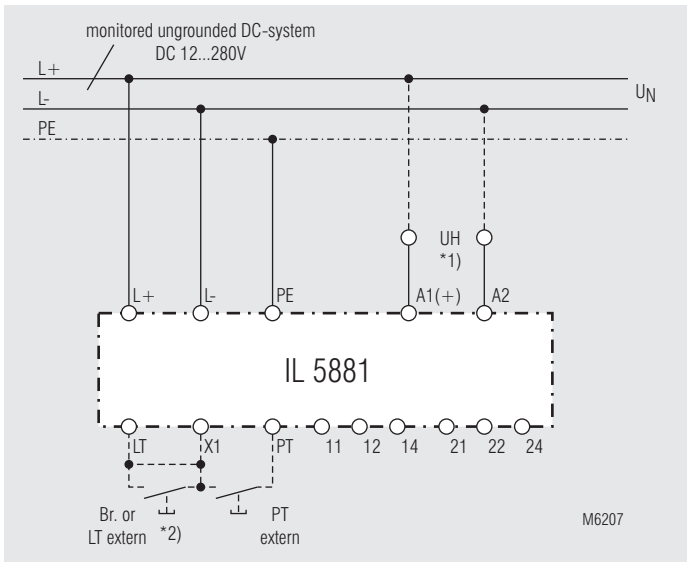


Accessories

ET 4086-0-2: Additional clip for screw mounting

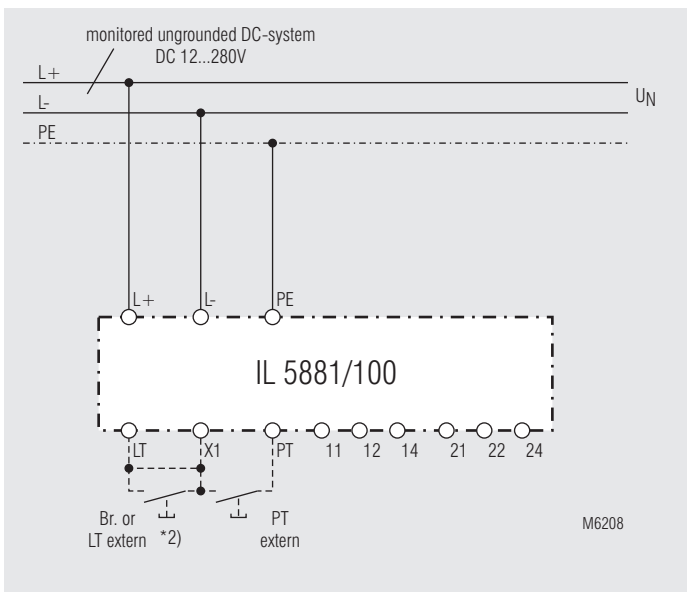
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Connections Examples



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