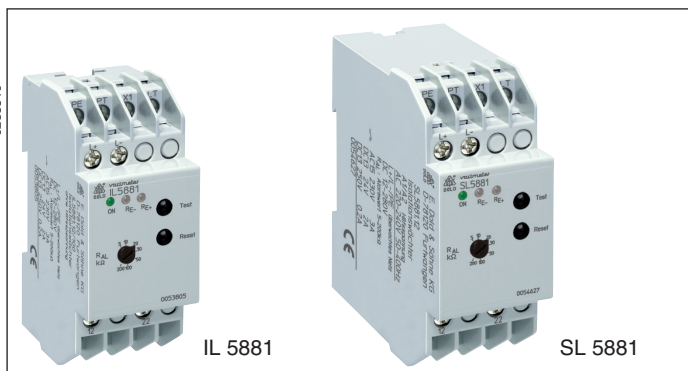
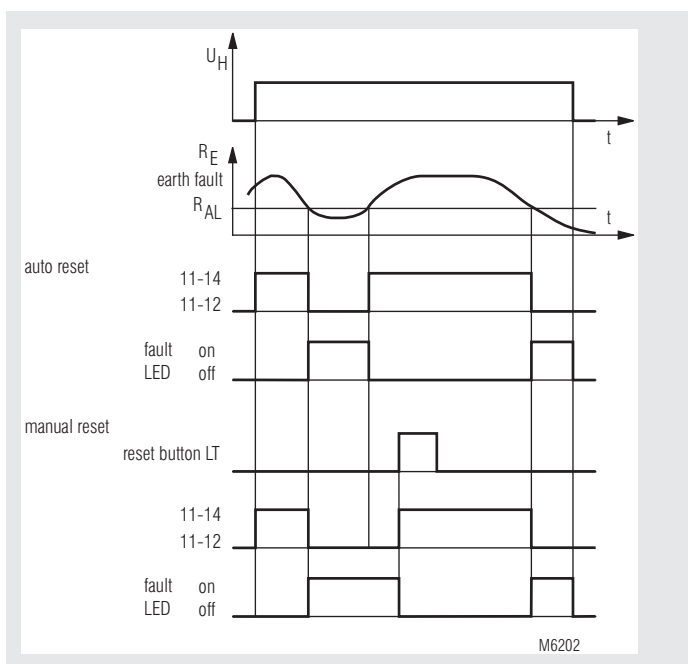


## VARIMETER IMD Insulation Monitor IL 5881, SL 5881



- With reference to IEC/EN 61 557-8 (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 $\Omega$ )
- Adjustable tripping value  $R_{AL}$  of 5 ... 200 k $\Omega$  or 10 ... 500 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
- 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).

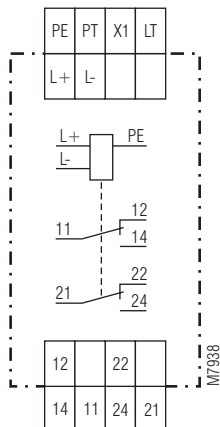
The reset is done by pressing the internal or external reset button or by disconnecting the auxiliary supply.

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

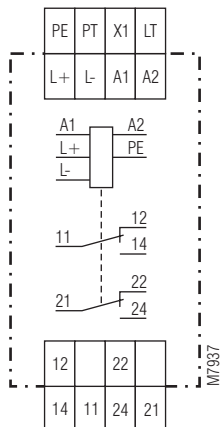
### Indicators

- 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
<b>Nominal voltage <math>U_N</math> at</b> $\leq 5\%$ residual ripple: $\leq 48\%$ residual ripple:	DC 12 ... 280 V DC 12 ... 220 V	DC 24 ... 500 V
<b>Voltage range:</b>	0,9 ... 1,1 $U_N$	0,9 ... 1,1 $U_N$
<b>Alarm value <math>R_{AL}</math>:</b>	1.) 5 ... 200 k $\Omega$ 2.) 10 ... 500 k $\Omega$	20 ... 500 k $\Omega$
<b>Setting <math>R_{AL}</math>:</b>	infinite setting	infinite setting
<b>Internal AC resistance</b> L+ and L- to PE:	1.) each appr. 75 k $\Omega$ 2.) each appr. 100 k $\Omega$	each approx. 190 k $\Omega$
<b>Max. meas. current at PE (<math>R_E = 0</math>):</b>	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  $\infty$  to 0.9  $R_{AL}$ :

$R_E$  from  $\infty$  to 0 k $\Omega$ :

**Response inaccuracy:**

**Hysteresis**

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

**Time delay:**

approx. 0.8 s

approx. 0.4 s

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

approx. 10 ... 15 %

0.5 ... 20 s (variant)

IEC 61557-8

Technical Data	
<b>Output</b>	
<b>Contacts:</b>	IL / SL 5881.12: 2 changeover contacts
<b>Thermal current <math>I_{th}</math>:</b>	4 A
<b>Switching capacity to AC 15:</b>	3 A / AC 230 V IEC/EN 60 947-5-1
<b>Switching capacity to DC 13:</b>	2 A / DC 24 V 0.2 A / DC 250 V IEC/EN 60 947-5-1
<b>Electrical life to AC 15 at 1 A, AC 230 V:</b>	$\geq 2 \times 10^6$ switching cycles IEC/EN 60 947-5-1
<b>Short circuit strength max. fuse rating:</b>	4 A gG / gL IEC/EN 60 947-5-1
<b>Mechanical life:</b>	$\geq 10 \times 10^6$ switching cycles
<b>General Data</b>	
<b>Operating mode:</b>	Continuous operation
<b>Temperature range</b>	
Operation:	- 20 ... + 60°C
Storage:	- 20 ... + 60°C
<b>Altitude:</b>	< 2.000 m
<b>Clearance and creepage distances</b>	
rated impulse voltage / pollution degree	
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):	6 kV / 2 IEC 60 664-1
<b>EMC</b>	
Electrostatic discharge:	8 kV (air) IEC/EN 61 000-4-2
HF irradiation:	
80 MHz ... 1 GHz:	12 V / m IEC/EN 61 000-4-3
1 GHz ... 2.7 GHz:	10 V / m IEC/EN 61 000-4-3
Fast transients:	2 kV IEC/EN 61 000-4-4
Surge voltages	
between A1 - A2 and L+ - L-:	1 kV IEC/EN 61 000-4-5
between A1, A2 - PE and L+, L- - PE:	2 kV IEC/EN 61 000-4-5
HF-wire guided:	10 V IEC/EN 61 000-4-6
Interference suppression:	Limit value class B EN 55011
<b>Degree of protection</b>	
Housing:	IP 40 IEC/EN 60 529
Terminals:	IP 20 IEC/EN 60 529
<b>Housing:</b>	Thermoplastic with V0 behaviour according to UL Subjekt 94
<b>Vibration resistance:</b>	Amplitude 0.35 mm frequency 10 ... 55 Hz IEC/EN 60 068-2-6 20 / 060 / 04 IEC/EN 60 068-1
<b>Climate resistance:</b>	
<b>Terminal designation:</b>	EN 50 005
<b>Wire connection:</b>	DIN 46 228-1/-2/-3/-4
Cross section:	2 x 2.5 mm <sup>2</sup> solid or 2 x 1.5 mm <sup>2</sup> stranded wire
Stripping length:	10 mm
<b>Fixing torque:</b>	0.8 Nm
<b>Wire fixing:</b>	Flat terminals with self-lifting clamping piece IEC/EN 60 999-1
<b>Mounting:</b>	DIN rail mounting (IEC/EN60715) or screw mounting M4, 90 mm hole pattern, with additional clip available as accessory
<b>Weight</b>	
IL 5881:	approx. 170 g
SL 5881:	approx. 200 g
<b>Dimensions</b>	
<b>Width x height x depth:</b>	
IL 5881:	35 x 90 x 61 mm
SL 5881:	35 x 90 x 98 mm

## Classification to DIN EN 50155 for IL 5881

<b>Vibration and shock resistance:</b>	Category 1, Class B IEC/EN 61 373
<b>Ambient temperature:</b>	T1 compliant T2, T3 and TX with operational limitations
<b>Protective coating of the PCB:</b>	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:

<b>Article number:</b>	0056910	0056911
<b>Nominal voltage <math>U_N</math> at <math>\leq 5</math> % residual ripple:</b>	DC 12 ... 110 V	DC 12 ... 24 V
<b>Voltage range:</b>	0.8 ... 1.25 $U_N$	0.8 ... 1.25 $U_N$
<b>Alarm value <math>R_{AL}</math>:</b>	1 ... 50 kΩ	0.2 ... 10 kΩ
<b>Setting <math>R_{AL}</math>:</b>	infinite setting	infinite setting
<b>Internal AC resistance</b>	each approx.	each approx.
L+ and L- to PE:	18.5 kΩ	2.8 kΩ
<b>Max. meas. current at PE (<math>R_E = 0</math>):</b>	$U_N / 18.5$ kΩ	$U_N / 2.8$ kΩ

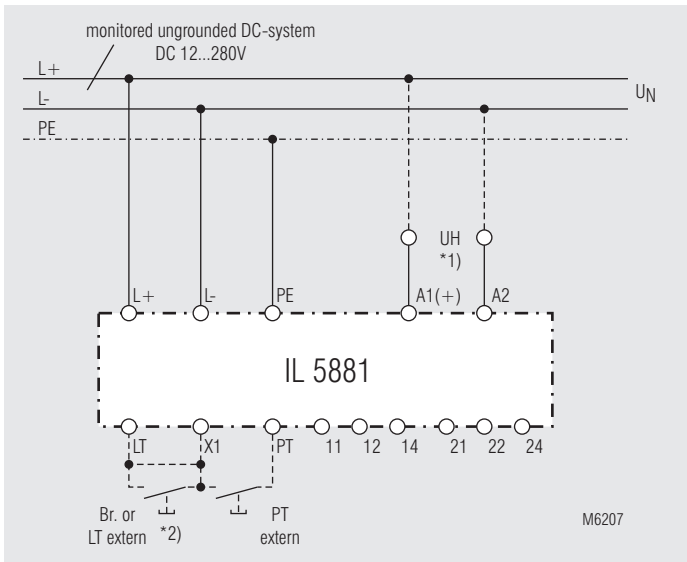
## Ordering example for variants

IL 5881	.12	AC 220 ... 240 V	10 ... 500 kΩ
			Response value
			Auxiliary voltage
			Contacts
			Type

## Accessories

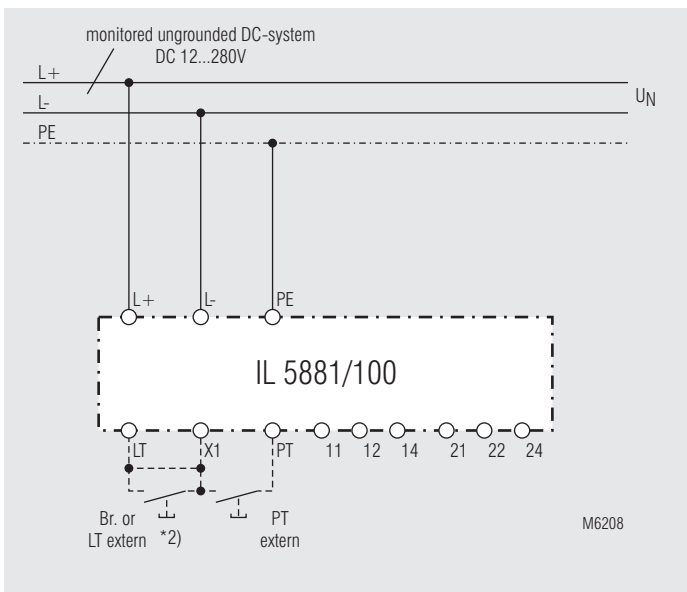
ET 4086-0-2:	Additional clip for screw mounting Article number: 0046578
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## Connections Examples



Monitoring of an ungrounded system.

- \*1) Auxiliary supply U<sub>H</sub> (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