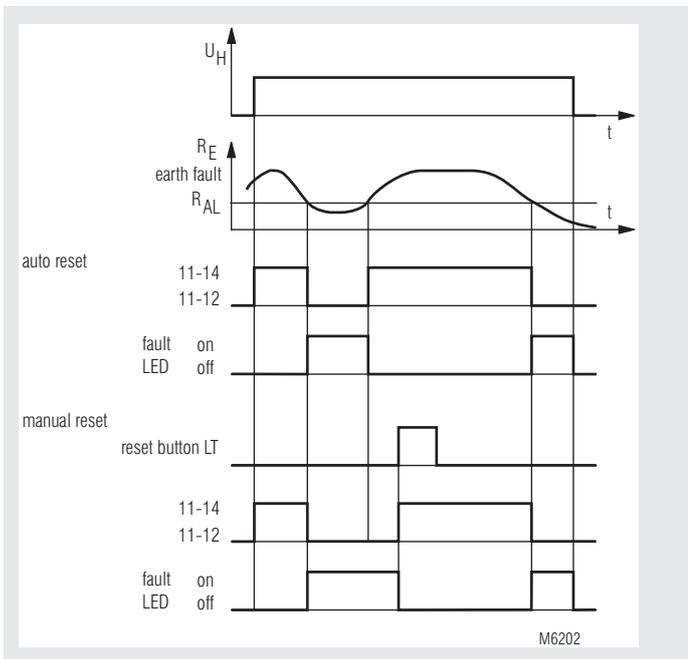


VARIMETER IMD Insulation Monitor IL 5881, SL 5881



- According to IEC/EN 61 557-8
- 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
- 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).

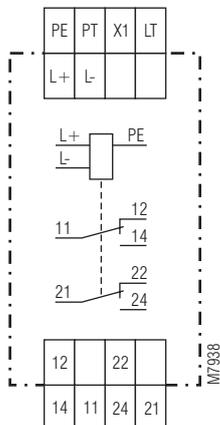
The reset is done by pressing the internal or external reset button or by disconnecting the auxiliary supply.

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

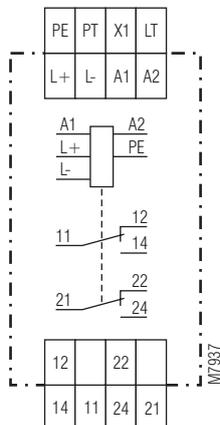
Indicators

- 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

Connection Terminals

Terminal designation	Signal designation
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.

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 voltage-free (disconnected $U_N = 0\text{V}$) system cannot be monitored.

Notes

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

In one isolated voltage system only one insulation monitor must be connected, because several units would influence each other (half response value if 2 devices are connected).

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}:	5 ... 200 k Ω	20 ... 500 k Ω
Setting R_{AL}:	infinite setting	infinite setting
Internal AC resistance	each approx. 75 k Ω	each approx. 190 k Ω
Max. Messstrom an PE ($R_E = 0$):	$U_N / 75 \text{ k}\Omega$	$U_N / 190 \text{ k}\Omega$

Operate delay

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

R_E from ∞ to $0.9 R_{AL}$:

R_E from ∞ to $0 \text{ k}\Omega$:

Response inaccuracy:

Hysteresis

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

Time delay:

approx. 0.8 s

approx. 0.4 s

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

IEC 61557-8

approx. 10 ... 15 %

0.5 ... 20 s (variant)

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
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

Short circuit strength

max. fuse rating: 4 A gL

IEC/EN 60 947-5-1

Mechanical life:

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

Technical Data	
General Data	
Operating mode:	Continuous operation
Temperature range	
Operation:	- 20 ... + 60°C
Storage:	- 20 ... + 60°C
Altitude:	< 2.000 m
Clearance and creepage distances	
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
EMC	
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
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:	
Terminal designation:	EN 50 005
Wire connection:	DIN 46 228-1/-2/-3/-4
Cross section:	2 x 2.5 mm ² solid or 2 x 1.5 mm ² stranded wire
Stripping length:	10 mm
Fixing torque:	0.8 Nm
Wire fixing:	Flat terminals with self-lifting clamping piece IEC/EN 60 999-1
Mounting:	DIN rail mounting (IEC/EN60715) 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 61 373
Ambient temperature:	T1 compliant T2, T3 and TX with operational limitations
Protective coating of the PCB:	No

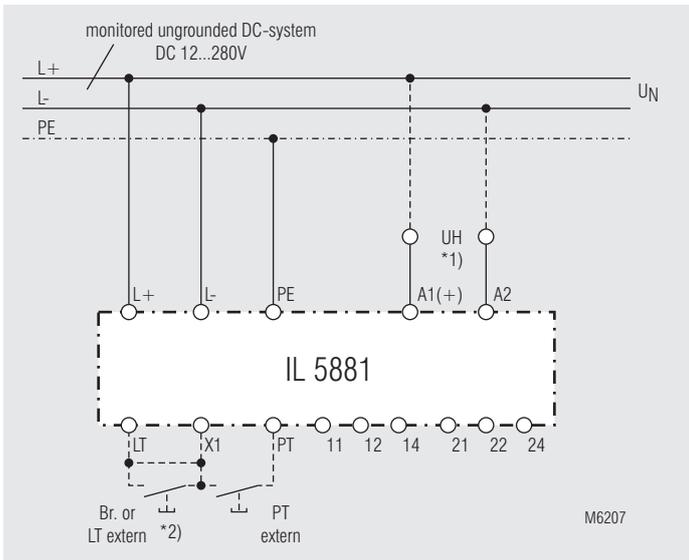
Standard Types	
IL 5881.12/100 DC 12 ... 280 V	5 ... 200 kΩ
Article number:	0053805
• Without auxiliary supply U _H :	
• Nominal voltage U _N :	DC 12 ... 280 V
• adjustable alarm value R _{AL} :	5 ... 200 kΩ
• Width:	35 mm
SL 5881.12/100 DC 12 ... 280 V	5 ... 200 kΩ
Article number:	0055168
• Without 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

Ordering example for variants	
IL 5881 .12 AC 220 ... 240 V	5 ... 200 kΩ

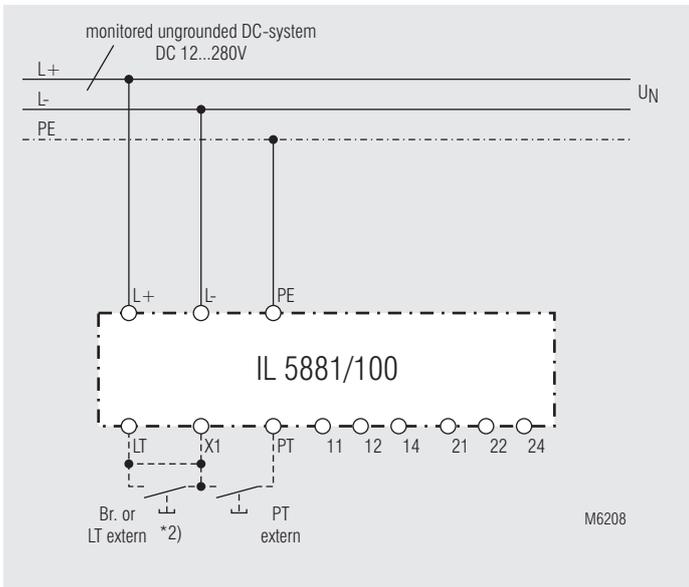
Accessories	
ET 4086-0-2:	Additional clip for screw mounting Article number: 0046578

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