Monitoring technique

VARIMETER IMD Insulation monitor UH 5892





Product Description

The insulation monitor UH 5892 of the series varimeter IMD monitors the ground resistance of isolated DC-voltage systems (IT-systems) with nominal voltage up to DC 600 V. The unit detects symmetrical as well as unsymmetrical faults. The separate auxiliary supply of AC/DC 24...60 V or AC/DC 85...230 V allows also monitoring when the system is without voltage. To indicate the actual ground resistance value the unit has an LED chain and an analogue output. When a fault is detected the relay switches and the red LED Alarm lights up, The device can be used for system with leakage capacities up to 20 uF.

Function Diagram



Your Advantages

- · Preventive fire and system protection
- Insulation monitoring of DC voltage systems up to 600 V nominal voltage
- · No additional coupling device required
- Suitable for leakage capacitances up to 20 µF
- · Monitoring also with voltage-free mains
- 2 wide voltage input ranges for auxiliary voltage

Merkmale

- Insulation monitoring according to IEC/EN 61557-8
- Detection of symmetric and asymmetric insulation faults
- 1 changeover contact for alarm
- Fixed response value R_{AN}: 50 kΩ, other on request
- Internal reset and test pushbutton
- External test and reset pushbutton can be connected
- LED indicator for auxiliary voltage and alarm
- LED chain to indicate the current insulation resistance
- Automatic or manual reset, programmable
- Analogue output for insulating value
- External indicating instrument can be connected
- Closed circuit operation
- · Open circuit operation on request
- With pluggable terminal blocks for easy exchange of devices
 with screw terminals
- or with cage clamp terminals
- Width 45 mm

Approvals and Markings

C E AC/DC

Applications

Monitoring of the resistance to earth in ungrounded DC systems

Function

The device is supplied with auxiliary voltage via terminals A1(+)/A2; ea green "ON" LED comes on. After connecting the auxiliary supply a 10 s start up delay is active allowing the measuring circuit to start. After this, measurement of the insulation resistance in the measuring circuits begins.

Measuring circuit

(Insulation measurement between terminals L(+)/L(-) and PE1/PE2).

Terminals L(+) and L(-) are connected to the mains to be monitored. In addition, the two terminals PE1 and PE2 must be connected to the protective conductor system via separate lines. An active measuring voltage with alternating polarity is applied between L(+)/L(-) and PE1/PE2 to measure the insulation resistance.

The length of the positive and negative measuring phases has a fixed factory setting of 16 s (max. leakage capacitance of 20μ F).

The LED-chain and the analogue output show the actual determined insulating resistance, and the output relays witch according to the respective response values set. If the response thresholds has been undercut the red LED "Alarm" lights up.

Indicators	
green LED "ON":	on, when auxiliary supply connected
red LED "Alarm":	on, when resistance is below the response value ${\rm R}_{_{\rm AN}}$
LED-chain:	the approx. value of actual rsistance to ground (PE)

Circuit Diagrams



Connection Terminals

Terminal designation	Signal designation	
A1(+), A2	Auxiliary voltage U _H	
L(+), L(-)	Connection for measuring circuit	
PE1, PE2	Connection for protective conducto	
X5(/LT1)	Control input (manual/auto reset) X5/LT1 bridged: manual reset X5/LT1 not bridged: auto reset	
PT1, PT2	connection option for external device test pushbutton	
LT1, LT2	connection option for external reset pushbutton	
X3, X4	Analogue output	
11, 12, 14	Alarm signal relay (1 changeover contact)	

Notes

The response value $\mathrm{R}_{_{\mathrm{AN}}}$ is fixed. An external indicator instrument can be connected.

The unit works de-energized on trip, that means, the output relay relase in position of rest at a insulation failures $R_{_{\rm F}} < R_{_{\rm AN}}$).

A bridge between X5 and LT1 allows to select auto or manual reset. The UH 5892 has a built in reset button on the front and allows connection of an external button at terminals LT1 and LT2 also.

For function test an external (terminals PT1-PT2) or built in push button can be used to simulate a ground fault. The push button has to be pressed for the length of a measuring period.

The analogue output (terminals X3 and X4) provides a voltage signal proportional to the actual insulation resistance of the mains. The following formula describes the input to output ratio.: (0V at $R_F = 0$ and 13.0 13.5 V at $R_F = \infty$)

$$U_{A} = \frac{U_{max}}{\frac{180 \text{ k}\Omega}{\text{ R}_{E}} + 1} ; \quad U_{max} = 13.25 \text{ V} \pm 0.25 \text{ V}$$

These values are valid for $C_{\rm E}$ = 0 (see diagram page 4). In practice it makes no sense to monitor values above 11 ... 12V as the tolerances increase, especially with mains capacity. On fluctuation of the mains voltage momentary false readings can occur. This is normal and caused by the cyclic measuring principle.

In one voltage system only one insulation monitor can be used. This has to be observed when interconnecting two separate systems.

Technical Data

Auxiliary circuit

Auxiliary voltage U _H	Voltage range	Frequency range	
	AC 19 68 V	45 400 Hz; DC 48 % W*)	
AC/DC 24 60V	DC 18 96 V	W*) ≤ 5 %	
AC/DC 85 230 V	AC 65 276 V	45 400 Hz; DC 48 % W*)	
	DC 75 300 V	W*) ≤ 5 %	
*) W = permitted residual ripple of auxiliary supply			

Nominal consumption:

Measuring Circuit

tion: max. 1.5 W

Nominal voltage U DC 0 ... 600 V / AC 0 ... 400 V 0 ... 1,15 U_N DC or 40 ... 60 Hz Voltage range: Frequency range: Response value R_{AN}: 50 k\Omega, 10 ... 440 k\Omega on request Setting R_{AN}: Internal AC resistance: fixed > 120 kΩ Internal DC resistance: > 150 kΩ approx. \pm 13 V Messspannung: Max. measuring current $(R_{F} = 0):$ < 0.3 mA Measuring cycle internally adjustable: 2 ... 16 s Line capacitance C_F to ground: 1 ... 20 μF Factory setting: 16 s (für $C_{F} = 20 \mu F$) **Operate delay** at $R_{AN} = 50 \text{ k}\Omega$, $C_E = 20 \,\mu\text{F}$ $R_E \text{ from } \infty \text{ to } 0.9 \,R_{AN}$: $R_E \text{ from } \infty \text{ to } 0 \,\text{k}\Omega$: < 100 s < 60 s Hysteresis at $R_{AN} = 50 \text{ k}\Omega$: Response inaccuracy:: approx. 5 % $\pm~15\%\pm1.5~k\Omega$ IEC/EN 61557-8

Output

1 changeover contac AC 250 V 5 A	ct
5 A / AC 230 V 2 A / AC 230 V	IEC/EN 60 947-5-1 IEC/EN 60 947-5-1
6 A gL	IEC/EN 60 947-5-1
1 x 10 ⁵ switching cycles > 50 x 10 ⁶ switching cycles	
	1 changeover contact AC 250 V 5 A 5 A / AC 230 V 2 A / AC 230 V 6 A gL 1 x 10^5 switching cyc > 50 x 10^6 switching

Analogue output

for actual insulating value, no galvanic separation

Terminals X3-X4: typ. 0 ... 13.25 V / R_i approx. 50 Ω (0 V at R_E = 0 and 13.0 ... 13.5 V at R_E = ∞) X4 is internal connected with PE

General Data

Operating mode:	Continuous operation	
Temperature range		
Operation:	- 20 + 60°C	
Storage:	- 25 + 70°C	
Altitude:	< 2.000 m	
Clearance and creepage		
distances		
overvoltage category /		
pollution degree:		IEC 60 664-1
meas. ciruit to auxiliary voltage		
and relay contact:	6 kV/2	
auxiliary voltage to relay contact	::6 kV/2	
Insulation test voltage		
Routine test:	AC 4 kV; 1 s	

Technical Data

EMC		
Electrostatic discharge:	8 kV (air)	IEC/EN 61 000-4-2
HF irradiation		
80 MHz 1 GHz:	20 V / m	IEC/EN 61 000-4-3
1 GHz 2.7 GHz	10 V / m	IEC/EN 61 000-4-3
Fast transients:	4 kV	IEC/EN 61 000-4-4
Surge voltage		
between A1(+) - A2 and $(x) = 1$	4 1.57	
L(+) - L(-):	IKV	IEC/EN 61 000-4-5
$L(\pm)$ $L(\pm)$ = PE.	2 kV	IEC/EN 61 000-4-5
between control lines:	0.5 kV	IEC/EN 61 000-4-5
between control lines	0,0	
and ground:	1 kV	IEC/EN 61 000-4-5
HF-wire guided:	20 V	IEC/EN 61 000-4-6
Interference suppression:	Limit value class B	EN 55 011
Degree of protection		
Housing:	IP 40	IEC/EN 60 529
Terminals:	IP 20	IEC/EN 60 529
Housing:	I hermoplastic with	V0 behaviour
Vibration registeres	Amplitude 0.25 mm	
vibration resistance.	frequency 10 55 k	1EC/EN 00 000-2-0
Climate resistance:	20 / 060 / 04	IEC/EN 60 068-1
Terminal designation:	EN 50 005	
Wire connection:	c	DIN 46 228-1/-2/-3/-4
Plug in with screw terminals		
max. cross section		
for connection:	1 x 0.25 2.5 mm ² solid or	
	stranded ferruled (is	olated) or
	2 x 0.25 1.0 mm ²	solid or
Inculation of wires	stranded terruled (Is	solated)
or sleeve length:	7 mm	
Plug in with cage	7 11111	
clamp terminals		
max. cross section		
for connection:	1 x 0.25 2.5 mm ²	solid or
	stranded ferruled (is	olated)
	2 x 0.25 1.5 mm ²	
	stranded twin ferrule	ed (isolated)
Insulation of wires	4.0	
or sleeve length:	10 mm	
wire fixing:	or cape clamp torm	N
Fixing torque:	0 8 Nm	11015
Mounting:	DIN rail	IEC/EN 60 715
Weight:	approx, 270 g	120/21100 / 10
	approvid in a g	
Dimensions		
Width x height xdepth:	45 x 107 x 121 mm	
Classification to DIN EN 50	155	
Vibration and		
shock resistance: Protective coating of the PCB:	Category 1, Class E No	B IEC/EN 61 373
Standard Types		
••		

UH 5892.11PS AC/DC 24 ... 60 V 50 kΩ Article number: 0066309 1 Wechsler Output:: Auxiliary voltage U_H: AC/DC 24 ... 60 V Response value R_{AN}: . $50 \ k\Omega$. Line capacitance: 20 µF De-energiezed on trip . • Width: 45 mm UH 5892.11PS AC/DC 85 ... 230 V 50 kΩ Article number: 0066946 • Output: 1 Wechsler Auxiliary voltage U_{H} : AC/DC 85 ... 230 V . Response value R_{AN}: 50 k Ω • Line capacitance: 20 µF • • De-energiezed on trip • Width: 45 mm

Options with Pluggable Terminal Blocks



Screw terminal (PS / plug in screw)



Cage clamp terminal (PC / plug in cage clamp)

Accessories

EH 5861/004:

indicating instrument, degree of protection: IP 52 Article number: 0030618



The indicating device EH 5861 is externally connected to the insulation monitor and shows the actual insulation resistance of the voltage system to ground. Dimensions: Width x heigth x depth $96 \times 96 \times 52 \text{ mm}$

Connection Examples





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