**Product Description**

The insulation monitor AN5892/800 of the series VARIMETER IMD monitors the ground resistance of isolated DC-voltage systems (IT-systems) with directly connected inverters with nominal voltage up to DC 100 ... 1000 V.

The unit detects symmetrical as well as unsymmetrical faults. The separate auxiliary supply 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 lights up. The device can be used for systems with leakage capacities up to 20 μF.

**Features**

- Insulation monitoring according to IEC/EN 61557-8
- Fixed response value R_{AN}
- Internal reset button
- External reset and test button can be connected
- LED indicator
- 1 changeover contact
- Programmable for manual reset or hysteresis function
- Analogue output for insulating value
- External connection of indicating instrument possible
- De-energized on trip
- Width 100 mm

**Function**

The device is supplied with auxiliary voltage via terminals A1/A2. 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 L1(+)/L2(-) and PE). Terminals L1(+) and L2(-) are connected to the mains to be monitored the terminal PE must be connected to the protective conductor system.

An active measuring voltage with alternating polarity is applied between L1(+) and L2(-) and PE 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 20μF).

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 "R_L < R_{AN}" lights up.

**Indicators**

<table>
<thead>
<tr>
<th>LED chain:</th>
<th>The approx. value of actual resistance to ground (PE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red LED:</td>
<td>On when resistance is below the response value R_{AN}</td>
</tr>
</tbody>
</table>
Circuit Diagram

Connection Terminals

<table>
<thead>
<tr>
<th>Terminal designation</th>
<th>Signal description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1, A2</td>
<td>AC-auxiliary voltage $U_{H}$</td>
</tr>
<tr>
<td>L1(+), L2(-)</td>
<td>Connection for measuring circuit</td>
</tr>
<tr>
<td>PE</td>
<td>Connection for protective conductor</td>
</tr>
<tr>
<td>X5 (/LT1)</td>
<td>Control input (manual / auto reset) X5/LT1 bridged: manual reset X5/LT1 not bridged: auto reset</td>
</tr>
<tr>
<td>LT1, LT2</td>
<td>Connection option for external reset-button</td>
</tr>
<tr>
<td>X3, X4</td>
<td>Analogue output</td>
</tr>
<tr>
<td>11, 12, 14</td>
<td>Alarm signal relay (1 changeover contact)</td>
</tr>
</tbody>
</table>

**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 X5, LT1 and LT2 have no galvanic separation to the measuring circuit L1(+) - L2(-) and are electrically connected together, therefore they have to be controlled by volat free contacts or bridge. These contacts or bridges must provide a sufficient separation depending on the mains voltage on L1(+) - L2(-).

- No external potentials may be connected to control terminals X5, LT1 and LT2.

- The analogue output X3 and X4 have no galvanic separation to the measuring circuit L1(+) - L2(-) and are electrically connected together, therefore they have to be controlled by volat free contacts or bridge. These contacts or bridges must provide a sufficient separation depending on the mains voltage on L1(+) - L2(-).

⚠️ **Attention!**

- Before checking insulation and voltage, disconnect the insulation monitor AN 5892/800 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.

- The device must not be operated without PE connection!

- On fluctuation of the mains voltage momentary false readings can occur. This is normal and caused by the cyclic measuring principle.

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**Attention!**

- The unit is connected to the DC side of the voltage system and monitors the insulation on AC and DC side with the same sensitivity. The response value is fixed. An external indicator instrument can be connected.

- If a monitored DC system includes galvanically connected AC circuits (e.g. via an inverter), an insulation failure on the AC side can only be detected correctly, when a current of min 10 mA can flow via the semiconductor connections.

- The response value $R_{\text{min}}$ 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 ($R_{E} < R_{\text{min}}$).

- A bridge between X5 and LT1 allows to select auto or manual reset. The AN 5892/800 has a built in reset button on the front and allows connection of an external button at terminals LT1 and LT2 also. To provide a function test an external or built in push button PT 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

$$(0 \text{V at } R_{E} = 0 \text{ and } 13,0 \ldots 13,5 \text{ V at } R_{E} = \infty)$$

$$U_{A} = \frac{U_{\text{max}}}{\frac{180 \text{ k} \Omega}{R_{E}} + 1} ; \quad U_{\text{max}} = 13,25 \text{ V } \pm 0,25 \text{ V}$$

These values for $U_{A}$ are valid for $C_{L} = 0$ (see characteristic). In practice it makes no sense to monitor values above $11 \ldots 12 \text{ V}$ as the tolerances increase, especially with mains capacity.
### Technical Data

#### Auxiliary circuit
- **Auxiliary voltage** $U_{H}$: AC 230 V
- **Voltage range**: 0.8 ... 1.2 $U_{H}$
- **Frequency range**: 40 ... 400 Hz
- **Nominal consumption**: Approx. 4 VA

#### Measuring Circuit
- **Nominal voltage** $U_{N}$: DC 100 ... 1000 V
- **Voltage range**: 0 ... 1.5 $U_{N}$
- **Response value $R_{AN}$**: 50 kΩ, 10 ... 440 kΩ on request
- **Setting $R_{AN}$**: Fixed
- **Internal AC resistance**: > 120 kΩ
- **Internal DC resistance**: > 150 kΩ
- **Measuring voltage**: Approx. +/- 13 V
- **Max. measuring current** ($RE = 0$): < 0.3 mA
- **Measuring cycle internally adjustable**: 2 ... 16 s
- **Line capacitance CE to ground**: 1 ... 20 µF
- **Factory setting**: 16 s (for CE = 1 µF)
- **Operate delay**
  - $R_{AN} = 50$ kΩ, $CE = 20$ µF
  - $R_{AN}$ from 0 to 0.9 $R_{AN}$: < 100 s
  - $R_{AN}$ from 0 to 0 kΩ: < 60 s
- **Hysteresis**
  - $R_{AN} = 50$ kΩ: Approx. 5 %
- **Nominal consumption**: Approx. 4 VA
- **Response inaccuracy**: ± 15% ± 1.5 kΩ
- **Phase failure bridging**: > 40 ms

#### Output
- **Contacts**
  - AN 5890.11: 1 changeover contact
  - **Max. switching voltage**: AC 250 V
  - **Thermal current $I_{th}$**: 5 A
  - **Switching capacity**
    - To AC 15
      - NO contact: 3 A / AC 230 V
      - NC contact: 1 A / AC 230 V
    - **Electrical life**
      - At 8 A, AC 250 V: 2 x 10⁶ switching cycles
    - **Short circuit strength**
      - Max. fuse rating: 6 A gG / gl
      - **Mechanical life**: 30 x 10⁶ switching cycles

#### Analogue output
- **For actual insulating value, no galvanic separation**
- **Terminals X3-X4**
  - Typ. 0 ... 13.25 V / $R_L$ approx. 50 Ω
  - (0 V at $R_L = 0$ and 13.0 ... 13.5 V at $R_L = ∞$)
  - X4 is internal connected with PE

#### General Data
- **Operating mode**: Continuous operation
- **Temperature range**
  - Operation: - 20 ... + 60 °C
  - Storage: - 25 ... + 70 °C
  - Altitude: < 2000 m
- **Clearance and creepage distances**
- **Overvoltage category / pollution degree**
- **Measuring circuit to aux. voltage and relay contact**
  - 6 kV / 2
  - IEC 60664-1
  - **Auxiliary voltage**
  - to relay contact: 6 kV / 2
  - IEC 60664-1
  - **Insulation test voltage**
  - **Routine test**
  - AC 4 kV; 1 s

### Dimensions
- **Width x height x depth**: 100 x 78 x 115 mm
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 height x depth
96 x 96 x 52 mm

<table>
<thead>
<tr>
<th>Standard Type</th>
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<tbody>
<tr>
<td>AN 5892.11/800 AC230 V 50 kΩ</td>
</tr>
<tr>
<td>Article number: 0061228</td>
</tr>
<tr>
<td>• Output: 1 changeover contact</td>
</tr>
<tr>
<td>• Auxiliary voltage Uaux: AC 230 V</td>
</tr>
<tr>
<td>• Response value Raux: 50 kΩ</td>
</tr>
<tr>
<td>• Line capacitance: 20 µF</td>
</tr>
<tr>
<td>• De-energized on trip</td>
</tr>
<tr>
<td>• Width: 100 mm</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>EH 5861/004: Indicating instrument, degree of protection: IP 52</td>
</tr>
<tr>
<td>Article number: 0030618</td>
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</tbody>
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Diagram showing connection examples.
Analogue Output Voltage $U_A$ (Terminals X3-X4) against Insulation Resistance $R_E$ with $C_E = 0$

Parameter: Max. Analogue Output Voltage $U_{\text{max}}$ (at $R_E = \text{infinite}$)

Characteristic

![Graph showing the relationship between Analogue Output Voltage $U_A$ and Insulation Resistance $R_E$. The graph includes three lines for different maximum voltages: $U_{\text{max}} = 13.0 \, \text{V}$, $U_{\text{max}} = 13.25 \, \text{V}$, and $U_{\text{max}} = 13.5 \, \text{V}$, each with a different line style.]