According to IEC/EN 61557-8
- For single and 3-phase AC-systems up to 0 ... 500 V and 10 ... 1000 Hz
- Monitors also disconnected voltage systems
- Adjustable tripping value $R_{\text{t}}$ of 5 ... 100 kΩ
- De-energized on trip
- Auxiliary voltage, measuring circuit and output contacts are galvanically separated
- Manual and auto reset
- With test and reset button
- Connections for external test and reset buttons possible
- LED indicators for operation and alarm
- 2 changeover contacts
- MK 5880N/200 with additional prewarning
  - Adjustable prewarning value 10 kΩ ... 5 MΩ
- MH 5880/500: Similar to MK 5880N but with galvanic separated analogue output and 11 step LED chain for the actual insulation value
- Wire connection: also 2 x 1.5 mm² stranded ferruled, or 2 x 2.5 mm² solid DIN 46228-1/-2/-3/-4
- As option with pluggable terminal blocks for easy exchange of devices
  - With screw terminals
  - Or with cage clamp terminals
- MK 5880N: 22.5 mm width
- MH 5880: 45 mm width

The insulation monitors MK 5880N and MH 5880 of the VARIMETER IMD family provides best insulation monitoring of pure three-phase and AC IT systems in a state of the art way fulfilling the relevant standards. The adjustment of the setting values is simple and user friendly done on 2 rotary switches on the front of the device. The MH 5880 also has a galvanic separated analogue output and a 11 step LED chain for display the actual insulation value.

Circuit Diagrams

<table>
<thead>
<tr>
<th>MK 5880N</th>
<th>MH 5880</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1, A2</td>
<td>L</td>
</tr>
<tr>
<td>L1, L2</td>
<td>PT, PE</td>
</tr>
<tr>
<td>11</td>
<td>21</td>
</tr>
</tbody>
</table>

Approvals and Markings

- Monitoring of insulation resistance of ungrounded voltage systems to earth
- MK 5880N/200 can also be used to monitor standby devices for earth fault, e.g. motor windings of devices that have to function in the case of emergency.
- Other resistance monitoring applications

Connection Terminals

<table>
<thead>
<tr>
<th>Terminal designation</th>
<th>Signal description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1, A2</td>
<td>Auxiliary voltage</td>
</tr>
<tr>
<td>L</td>
<td>Connection for measuring circuit</td>
</tr>
<tr>
<td>PE</td>
<td>Connection for protective conductor</td>
</tr>
<tr>
<td>PT/PE</td>
<td>Connection for external test button</td>
</tr>
<tr>
<td>LT1/LT2</td>
<td>Connection for external reset or control input for hysteresis function or manual reset LT1/LT2 bridged: Hysteresis function LT1/LT2 not bridged: Manual reset</td>
</tr>
<tr>
<td>11, 12, 14</td>
<td>Alarm signal relay (1 changeover contact)</td>
</tr>
<tr>
<td>21, 22, 24</td>
<td>Prewarning signal relay (1 changeover contact)</td>
</tr>
<tr>
<td>U, I, G, X1</td>
<td>Analogue output X1/G not bridged: U-G 0 ... 10V; I-G 0 ... 20mA X1/G bridged: U-G 2 ... 10V; I-G 4 ... 20mA</td>
</tr>
</tbody>
</table>

1) Only MK 5880N/200 and MH 5880
2) Only MH 5880
The device is connected to the supply via terminals A1-A2. The unit can either be supplied from the monitored voltage system or from an separate auxiliary supply. Terminal L is connected to the monitored voltage and PE to earth. If the insulation resistance $R_E$ drops below the adjusted alarm value $R_{AL}$, the red LED goes on and the output relay switches off (de-energized on trip). If the unit is on auto reset (bridge between LT1-LT2) 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 LT1-LT2 the insulation monitor remains in faulty state even if the insulation resistance is back to normal. The reset is done by pressing the internal or external reset button or by disconnecting the auxiliary supply. By activating the "Test" button an insulation failure can be simulated to test the function of the unit.

The variant MK 5880N.38/200 has a second setting range with a higher resistance up to 5 MΩ (Potentiometer $R_{VW}$). This setting value can be used for pre-warning with relay output. When set to manual reset the latching is active on both settings $R_{AL}$ and $R_{VW}$. Therefore it is possible in the case of a short insulation decrease that the fault is stored and passed via contacts 21-22-24 to a PLC while the main fault does not lead to a disconnection of the mains via the contacts 11-12-14.

### Indicators
- **Green LED "ON":** On, when supply voltage connected
- **Red LED "AL":** On, when insulation fault detected ($R_E < R_{AL}$)
- **Yellow LED "VW":** On, when insulation resistance is under prewarning value, $R_E < R_{VW}$ (only with variant MK 5880N.38/200)

### Setting
- Setting of alarm value for earth fault
- Setting of pre-warning value (only with MK5880N/200)
- Setting of reset button
- Test button
- Manual reset
- Auto reset
**WARNING**

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 PT, LT1 and LT2 have no galvanic separation to the measuring circuit L and are electrically connected together, therefore they have to be controlled by volt free contacts or bridge. These contacts are bridges must provide a sufficient separation depending on the mains voltage on L.
- No external potentials may be connected to control terminals PT, LT1 and LT2.

**Attention!**

- Before checking insulation and voltage, disconnect the monitoring device MK 5880N / MH 5880 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 auxiliary supply can be connected to a separate auxiliary supply or to the monitored voltage system. The range of the auxiliary supply input has to be observed.

**Info**

- The insulation monitors MK 5880N / MH 5880 are designed to monitor AC-voltage systems. Overlaid DC voltage does not damage the instrument but may change the conditions in the measuring circuit.
- Line capacitance $C_E$ to ground does not influence the insulation measurement, as the measurement is made with DC-voltage. It is possible that the reaction time in the case of insulation time gets longer corresponding to the time constant $R_E \times C_E$.
- The model MK 5880N.38/200 can be used, because of it’s higher setting value up to 5 MΩ, to monitor single or 3-phase loads for ground fault. If the load is operated from a grounded system the insulation resistance of the load can only be monitored when disconnected from the mains. This is normally the fact with loads which are operated seldom or only in the case of emergency but then must be function (see connection example.)
- When monitoring 3-phase IT systems it is sufficient to connect the insulation monitor only to one phase. The 3-phases have a low resistive connection (approx. 3 - 5 Ω) via the feeding transformer. So failures that occur in the non-connected phases will also be detected.
- The MH5880/500 has in addition to the prewarning function also a galvanic separated analogue output and an 11 step LED chain indicator, that displays the actual insulation value between 20 kOhm and 1 MOhm. On terminals U/G of the analogue output 0-10 V are provided, on terminals I/G 0-20 mA are available. By bridging terminals X1 and G the output can be switched over to 2 ... 10 V and 4 ... 20 mA. For the scaling of the analogue output see Characteristic.
### Auxiliary circuit

**Nominal voltage UN:**
- AC 220 ... 240 V, AC 380 ... 415 V
- DC 12 V, DC 24 V

**Voltage range:**
- AC: 0.8 ... 1.1 UN
- DC: 0.9 ... 1.25 UN

**Frequency range (AC):** 45 ... 400 Hz

**Nominal consumption:**
- AC: Approx. 2 VA
- DC: Approx. 1 W

### Measuring circuit

**Nominal voltage UN:**
- AC 0 ... 500 V

**Voltage range:**
- 0 ... 1.1 UN

**Frequency range:**
- 10 ... 1000 Hz

**Alarm value RAL:**
- 5 ... 100 kΩ

**Prewarning value RVW** (only at MK 5880N/200): 10 kΩ ... 5 MΩ

**Setting Rᵦ, RVW:** Infinite variable

**Internal test resistor:** Equivalent to earth resistance of < 5 kΩ

**Internal AC resistance:** > 250 kΩ

**Internal DC resistance:** > 250 kΩ

**Measuring voltage:** Approx. DC 15 V, (internally generated)

**Max. permissible noise (Rᵦ = 0):** < 0.1 mA

**Max. measuring current (RE = 0):** ≤ 0.1 mA

**Response inaccuracy:** ± 15 % + 1.5 kΩ

**Hysteresis**

**Operate delay**
- At Rᵦ = 50 kΩ, Cᵦ = 1 μF
- Rᵦ from = to 0.9 Rᵦ:
  - Approx. 1.3 s
- Rᵦ from = to 0 kΩ:
  - Approx. 0.7 s

**Insulation test voltage**
- Routine test: AC 2.5 kV; 1 s

**Temperature range:**
- Operation: -20 ... +60 °C
- Storage: -25 ... +70 °C
- Altitude: < 2000 m

**Clearance and creepage distances**

**Overvoltage category:**
- Auxiliary and measuring voltage ≤ 300 V: III
- > 300 V: II

**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 - PE):
  - 4 kV / 2
  - IEC 60664-1
- Between auxiliary supply and measuring input:
  - 4 kV / 2
  - IEC 60664-1
- Between auxiliary supply and measuring input to relay contacts:
  - 4 kV / 2
  - IEC 60664-1
- Between relay contacts 11-12-14 to relay contacts 21-22-24:
  - 4 kV / 2
  - IEC 60664-1

**HF-wire guided**
- 10 V
- IEC 60664-1

**Interference suppression:**
- Devices with AC-aux. voltage: Limit value class B EN 55011
- Devices with DC-aux. voltage: Limit value class A*)

*) The device is designed for the usage under industrial conditions (Class A, EN 55011). When connected to a low voltage public system (Class B, EN 55011) radio interference can be generated. To avoid this, appropriate measures have to be taken.

**Degree of protection**
- Housing: IP 40
- Terminals: IP 20

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

**Climate resistance:**
- 20 / 060 / 04
- IEC/EN 60068-1

**Analogue output with MH 5880/500**

**Technical Data**

**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:**
- Auxiliary and measuring voltage ≤ 300 V: III
- > 300 V: II

**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 - PE):
  - 4 kV / 2
  - IEC 60664-1
- Between auxiliary supply and measuring input:
  - 4 kV / 2
  - IEC 60664-1
- Between auxiliary supply and measuring input to relay contacts:
  - 4 kV / 2
  - IEC 60664-1
- Between relay contacts 11-12-14 to relay contacts 21-22-24:
  - 4 kV / 2
  - IEC 60664-1

**HF-wire guided**
- 10 V
- IEC 60664-1

**Interference suppression:**
- Devices with AC-aux. voltage: Limit value class B EN 55011
- Devices with DC-aux. voltage: Limit value class A*)

*) The device is designed for the usage under industrial conditions (Class A, EN 55011). When connected to a low voltage public system (Class B, EN 55011) radio interference can be generated. To avoid this, appropriate measures have to be taken.

**Degree of protection**
- Housing: IP 40
- Terminals: IP 20

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

**Climate resistance:**
- 20 / 060 / 04
- IEC/EN 60068-1

**Analogue output with MH 5880/500**
### Technical Data

<table>
<thead>
<tr>
<th>Wire connection</th>
<th>DIN 46228-1/-2/-3/-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminals</td>
<td>(integrated):</td>
</tr>
<tr>
<td></td>
<td>1 x 4 mm² solid or</td>
</tr>
<tr>
<td></td>
<td>1 x 2.5 mm² stranded ferruled or</td>
</tr>
<tr>
<td></td>
<td>2 x 1.5 mm² stranded ferruled or</td>
</tr>
<tr>
<td></td>
<td>2 x 2.5 mm² solid</td>
</tr>
<tr>
<td>Insulation of wires</td>
<td></td>
</tr>
<tr>
<td>or sleeve length:</td>
<td>8 mm</td>
</tr>
<tr>
<td><strong>Plug in with screw terminals</strong></td>
<td></td>
</tr>
<tr>
<td>Max. cross section for connection:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 x 2.5 mm² solid or</td>
</tr>
<tr>
<td></td>
<td>1 x 2.5 mm² stranded ferruled</td>
</tr>
<tr>
<td>Insulation of wires or sleeve length:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 mm</td>
</tr>
<tr>
<td><strong>Plug in with cage clamp terminals</strong></td>
<td></td>
</tr>
<tr>
<td>Max. cross section for connection:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 x 4 mm² solid or</td>
</tr>
<tr>
<td></td>
<td>1 x 2.5 mm² stranded ferruled</td>
</tr>
<tr>
<td>Min. cross section for connection:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 mm²</td>
</tr>
<tr>
<td>Insulation of wires or sleeve length:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 x ² mm</td>
</tr>
<tr>
<td><strong>Wire fixing:</strong></td>
<td>Plus-minus terminal screws M 3.5 box terminals with wire protection or cage clamp terminals</td>
</tr>
<tr>
<td><strong>Fixing torque:</strong></td>
<td>0.8 Nm</td>
</tr>
<tr>
<td><strong>Mounting:</strong></td>
<td>DIN rail IEC/EN 60715</td>
</tr>
</tbody>
</table>

**Weight**
- MK 5880N: Approx. 180 g
- MH 5880: Approx. 320 g

**Dimensions**
- Width x height x depth
  - MK 5880N: 22.5 x 90 x 97 mm
  - MK 5880N PC: 22.5 x 111 x 97 mm
  - MK 5880N PS: 22.5 x 104 x 97 mm
  - MH 5880: 45 x 90 x 97 mm

### CCC-Data

**Auxiliary circuit**
- AC 220 ... 240 V

**Nominal voltage Uₐ:**
- DC 12 V, DC 24 V

**Switching capacity:**
- To AC 15
- NO contact: 1.5 A / AC 230 V

**Technical data that is not stated in the CCC-Data, can be found in the technical data section.**

### Standard Type

<table>
<thead>
<tr>
<th>MK 5880N.12 AC 220 ... 240 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article number:</td>
</tr>
<tr>
<td>• Auxiliary voltage Uₐ :</td>
</tr>
<tr>
<td>• Adjustable alarm value Rₐ :</td>
</tr>
<tr>
<td>• Width:</td>
</tr>
</tbody>
</table>

### Variants

- MK 5880N.38/200: With pre-warning
  - Similar to MK 5880N but with galvanic separated analogue output (current/voltage) and 11 step LED chain for the actual insulation value
  - Width: 45 mm

### Ordering example for variants

- **MK 5880N 38 PS 200 AC 380 ... 415 V AL 5 ... 100 kΩ VW 10 K ... 5MΩ**

### Options with Pluggable Terminal Blocks

- **Screw terminal (PS/plugin screw)**
- **Cage clamp terminal (PC/plugin cage clamp)**

### Notes

Removing the terminal blocks with cage clamp terminals

1. The unit has to be disconnected.
2. Insert a screwdriver in the side recess of the front plate.
3. Turn the screwdriver to the right and left.
4. Please note that the terminal blocks have to be mounted on the belonging plug in terminations.
Monitoring of an ungrounded voltage system.

*1) Auxiliary supply $U_h$ (A1 - A2) can be taken from the monitored voltage system. The range of the auxiliary supply input must be observed.

*2) with bridge LT1 - LT2: automatic reset
   without bridge LT1 - LT2: manual reset, reset with button LT

Monitoring of motor windings against ground

The insulation of the motor to ground is monitored as long as contactor K does not activate the load.

*2) With bridge LT1 - LT2: automatic reset
   Without bridge LT1 - LT2: manual reset, reset with button LT