VARIMETER RCM
Residual Current Monitor, Type B for AC and DC Systems
RN 5883

Product Description
The AC/DC sensitive residual current monitor RN 5883 allows an early detection of insulation faults and detects differential currents with AC as well as DC components in grounded voltage systems (type B). The measurement takes place via an external current transformer.

Contrary to an RCD the residual current monitor RN 5883 does not disconnect the mains when detecting a fault but only indicates it. Besides the easy to read LED chain indicating the actual current several LEDs display operation, pre-alarm and alarm. The 4 measuring ranges cover 10 to 3 A. Additional features are broken wire detection, test function and adjustable pre-alarm.

The residual current monitor RN 5883 provides early information for precise and cost effective maintenance before the plant stops.

Circuit Diagram

Connection Terminals

<table>
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<th>Terminal designation</th>
<th>Signal description</th>
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</thead>
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<tr>
<td>A1, A2</td>
<td>Auxiliary voltage U_H</td>
</tr>
<tr>
<td>i1, k1, i2, k2</td>
<td>Connection of an external residual current transformer</td>
</tr>
<tr>
<td>X1, X2</td>
<td>Parameterization input energized or de-energized on trip</td>
</tr>
<tr>
<td>11, 12, 14</td>
<td>Contacts alarm signal</td>
</tr>
<tr>
<td>21, 22, 24</td>
<td>Contacts pre-alarm signal</td>
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<tr>
<td>U-, U+</td>
<td>Analogue output (option)</td>
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Indication
- green LED „ON“: On, when auxiliary supply connected
- yellow LED „Pre-Alarm“: Flashes during time delay t_v, On, when pre-alarm active
- red LED „Alarm“: Flashes during time delay t_v, On, when alarm active
- yellow and red LED: Flashes on broken wire or extremely high input signal
- yellow LED-chain: LED chain indicates fault current in % of adjusted alarm value

Notes
The devices measure AC and DC current (AC / DC sensitive. Due to the measurement principle they also detect magnetic fields in the next to the current transformer.

When planning a panel with AC/DC sensitive residual current monitors please make sure that no components are placed next to the CT that create a magnetic field, e.g. contactors, transformers etc. If an influence is detected, also a rotation of the CT by 90° could positively reduce the influence.
The Measuring circuit includes an external residual current transformer. All conductors of a voltage system are fed through the transformer except the ground wire. In a healthy system the sum of all flowing currents is zero, so that no voltage is induced in the CT. If an earth fault occurs, sourcing a current flowing to ground, the current difference induces a current in the CT that is detected by the RN 5883.

If an earth fault occurs, sourcing a current flowing to ground, the current difference induces a current in the CT that is detected by the RP 5883.

On broken sensor wires and broken CT coils the unit goes into alarm state and the LEDs for pre-alarm (yellow) and alarm (red) flashes.

The unit has 2 changeover output contacts. One for alarm 11, 12, 14 and 21, 22, 24 and one for pre-alarm.

4 Setting Ranges can be selected from 10 mA to 3 A. The fine adjustment is made via potentiometer “Factor”. Measuring range = Range x Factor.

The alarm relay switches at 100 % of the adjusted response value.

The pre-alarm can be set in 10% steps between 10 and 100% of the alarm value.

Potentiometer tₖ sets the switching delay between 0 and 10 seconds. The delay reacts on pre-alarm and alarm.

The different CT sizes require a correct adaption of the residual current monitor. 3 models are available:

<table>
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<tr>
<th>Type</th>
<th>Suitable residual current transformer</th>
<th>Frequency range</th>
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<td>DC + AC up to 250 Hz</td>
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<td>RN 5883.12/010/61</td>
<td>ND 5015/070</td>
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<td>RN 5883.12/020</td>
<td>ND 5018/105 ND 5018/140 ND 5018/210</td>
<td>DC + AC up to 60 Hz</td>
</tr>
</tbody>
</table>

It is of advantage to keep the range small and the Factor high.

Example: Setting 300 mA: Range 0,1 x Factor 3 = 300 mA

An external link on X1-X2 allows the change between energized and de-energized on trip. A change of the function will only be valid after interruption of the supply voltage.

Terminal X1 / X2: external link = De-energized on trip, open = Energized on trip

De-energized on trip: In the case of ground fault or missing auxiliary supply the relays are de-energized, the NC contacts 11/12; 21/22 are closed

In fault free state the relays are energized, the NO contacts 11/14; 21/24 are closed

Energized on trip: In the case of ground fault the relays are energized, the NO contacts 11/14; 21/24 are closed

in fault free state the relays are de-energized, the NC contacts 11/12; 21/22 are closed

If an adjusted value is reached on the measuring input (alarm or pre-warning) at the standard type RN 5883 the signal is stored. Reset is made by pressing the button „Test/Reset” for < 3 s or by disconnecting the auxiliary supply (approx. 30 s).

If the „Test/Reset” button is pressed for > 3 s, a test of the unit is made. The time delays run, the pre-warning and alarm is activated.

An LED chain shows the fault current between 10 and 100% of the adjusted alarm value.

An analogue output 0...10 V indicates also the fault current. 10 V corresponds to 100% of the adjusted alarm value.
**Technical Data**

### Input

**Auxiliary voltage \( U_H \):**
- AC/DC 24 ... 80 V, AC/DC 80 ... 230 V

**Voltage range:**
- \( U_H = \text{AC/DC 24 ... 80 V:} \)
  - DC 19 ... 110 V, AC 19 ... 90 V
  - DC 64 ... 300 V, AC 64 ... 265 V
- \( U_H = \text{AC/DC 80 ... 230 V:} \)
  - DC 64 ... 300 V, AC 64 ... 265 V

**Nominal frequency \( U_H \):** 50 / 60 Hz

**Nominal consumption:**
- at AC: 5 VA
- at DC: 2.5 W

**Measuring range:**
- fine adjustment: 1 ... 10
- Überlastbarkeit: with overload protection

**Alarm:**
- 100 % of the adjusted measuring range
- Pre-alarm: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 % of the adjusted alarm value

**Voltage range at \( U_H = \text{AC/DC 24 ... 80 V:} \):**
- DC 19 ... 110 V, AC 19 ... 90 V
- DC 64 ... 300 V, AC 64 ... 265 V

**Voltage range at \( U_H = \text{AC/DC 80 ... 230 V:} \):**
- DC 64 ... 300 V, AC 64 ... 265 V

**Measuring range**
- 10 ... 100 mA, 30 ... 300 mA, 100 ... 1000 mA, 300 ... 3000 mA
- (3 ... 30 mA on request)

**Measuring range fine adjustment:** 1 ... 10

**Überlastbarkeit:** with overload protection

**Alarm:**
- 100 % of the adjusted measuring range
- Pre-alarm: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 % of the adjusted alarm value

**Frequency range:**
- DC and AC to 250 Hz
- depending on the differential current transformer used. See “Function” Table 1.

**Repeat accuracy:** \( \leq \pm 3 \% \)

**Temperature drift:** \( \leq \pm 0.1 \% / K \)

**Reaction time:** 300 ms

**Switching delay**
- Pre-alarm / alarm: 0 ... 10 s

**Output Contacts:**
- 1 changeover contact for pre-alarm,
- 1 changeover contact for alarm

**Thermal current \( I_{th} \):**
- up to 30 °C: 5 A
- up to 40 °C: 4 A
- up to 60 °C: 2 A

**Switching capacity relays** at AC 15:
- NO contact: 3 A / AC 230 V IEC/EN 60947-5-1
- NC contact: 1 A / AC 230 V IEC/EN 60947-5-1

**Electrical life** to AC 15 at 1 A, AC 230 V:
- 3 x 10^6 switching cycles

**Mechanical life:**
- 10^6 switching cycles

**Analogue Output (option)**

**Terminal \( U^+ / U^-: \)**
- 0 ... 10 V, 5 mA

**Max. measuring frequency:** DC, AC (0 – 250 Hz)

**Wire connection:**
- AWG 20 - 12
- 60°C / 75°C copper conductors only

**Dimensions**

**Width x height x depth:** 52.5 x 90 x 71 mm

### Technical Data

**EMC**

- Surge voltages: Class 3 (5 kV / 0.5 J) DIN VDE 0435-303
- Electrostatic discharge: 8 kV (air) IEC/EN 61000-4-2
- HF irradiation
  - 80 MHz ... 2,7 GHz: 20 V / m (class 3) IEC/EN 61000-4-3
  - 10 V (class 3) IEC/EN 61000-4-6
- Fast transients: 2 kV (class 3) IEC/EN 61000-4-4
- Surge voltages: 1 kV class 3) IEC/EN 61000-4-4
- Interference suppression: Limit value class B EN 55011

**Degree of protection**
- Housing: IP 30 IEC/EN 60529
- Terminals: IP 20 IEC/EN 60529

**Vibration resistance:**
- Amplitude 0.35 mm

**Climate resistance:**
- frequency 10 ... 55 Hz IEC/EN 60668-2-6

**Terminal designation: Wire connection:**
- Fixed screw terminals
- Cross section: 0.5 ... 4 mm² (AWG 20 - 10) solid or stranded wire without ferrules
- 0.5 ... 2.5 mm² (AWG 20 - 10) stranded wire with ferrules
- 6.5 mm Cross-head screw / M3 box terminals

**Fixing torque:**
- 0.5 Nm

**Mounting:**
- DIN rail

**Weight:**
- approx. 160 g IEC/EN 60715

**Dimensions**

**Width x height x depth:** 52.5 x 90 x 71 mm

### UL-Data RN 5883

These devices only monitor residual currents and are not intended to be used as Ground Fault Circuit Interrupter (GFCI) in accordance with UL1053 / UL943.

These devices have been investigated to be used with external differential current transformers manufactured by E. Dold & Söhne KG, Cat. Nos. ND5015/024/61, ND5015/035/61 or ND5015/070/61.

**Supply voltage \( U_n: \)**
- AC/DC 24-80V single or double phase
- 50/60 Hz
- AC/DC 80-230V single or double phase
- 50/60 Hz

**Switching capacity relays**
- Ambient temperature 30°C:
  - 5A, 250Vac G.P.
  - 250 Vac, 2A pilot duty
  - 250 Vac, 1/2hp
- Ambient temperature 40°C:
  - 4A, 250Vac G.P.
  - 250 Vac, 2A pilot duty
  - 250 Vac, 1/2hp
- Ambient temperature 60°C:
  - 2A, 250Vac G.P.

**Analogue output**
- Max. measuring frequency: DC, AC (0 – 250Hz)
- Wire connection: AWG 20 - 12
- 60°C / 75°C copper conductors only

**Technical data that is not stated in the UL-Data, can be found in the technical data section.**
Residual Current Monitor ND 5015/024, ND 5015/035

 Ambient temperature: - 40 ... + 60°C  / 233 K ... 333 K
 Inflammability class: V0 according to UL94
 Insulation coordination according to IEC 61869-1

Highest rated operating voltage U_m: AC 720 V
Rated impulse voltage: 3 kV
Length of connection wires
Type of wire to CT, e.g. up to 1 m
Single wire: up to 10 m
Screened wire: up to 25 m
Wire cross section: 0.2 ... 1.5 mm²
Stripping length: 8 mm

ND 5015:
Wire fixing: Terminals with spring connection and direct (Push in) technology
Actuation power: 40 N max.
DIN rail mounting: integrated clips for vertical and horizontal mounting
Screw fixing: M3 or M4
Fixing torque: max. 0.8 Nm
ND 5018:
Wire fixing: Flat terminals with self-lifting clamping piece
DIN rail mounting: using mounting adapter ET 5018
Screw fastening: (only at ND 5018/105, ND 5018/140, ND 5018/210) M 5

Variants
For residual current transformer ND5015/024 und ND5015/035:
RN 5883.12/001/61: With analogue output 0 ... 10 V
RN 5883.12/800/61: Fixed values, without analogue output
RN 5883.12/802/61: Fixed values, without analogue output; with bridge on X1/X2:
- Alarm: Energized on trip
- Pre-alarm: De-energized on trip without bridge:
- Alarm: De-energized on trip
- Pre-alarm: Energized on trip

Für residual current transformer ND5015/070:
RN 5883.12/011/61: with analogue output 0 ... 10 V

For residual current transformer ND5018/105, ND5018/140, ND5018/210:
RN 5883.12/021: with analogue output 0 ... 10 V

For residual current transformer ND5015/024 and ND5018/035:
RN 0066451
- For residual current transformer ND 5015/024 and ND 5018/035
- Alarm und Pre-alarm
- Energized or de-energized on trip
- Without analogue output
- Auxiliary voltage U_m: AC/DC 80 ... 230 V
- Width: 52.5 mm

ND 5015/035/61
Article number: 006641
- Residual current transformer for RN 5883
- Diameter: 35 mm

Dimensions/mm 24 82 75 24 54 25 42* 46 4.2
Weight / g approx. 80

*) Drill tolerance for screw mounting: ± 0.5 mm

For residual current transformer ND5015/070:
RN 5883.12/011/61: with analogue output 0 ... 10 V

For residual current transformer ND5018/105, ND5018/140, ND5018/210:
RN 5883.12/021: with analogue output 0 ... 10 V

Ordering example for variants
RN 5883 12 / ... /61 AC/DC 80 ... 230 V 50 / 60 Hz
- Nominal frequency
- Auxiliary voltage
- UL approval
- Variant, if required
- Contacts
- Type

Technical data that is not stated in the UL-Data, can be found in the technical data section.
The residual current monitor ND 5018/105 can also be mounted on DIN-rail. To do this, the metal screw fixings have to be removed and have to be replaced by 2 mounting clips (ET5018; art.no. 0058754; set with 2 pcs)
Accessories

Residual Current Monitor ND 5018/105

Disassembling Residual Current Monitor ND 5015/024 and /035

Disassembling Residual Current Monitor ND 5015/070

for DIN rail mounting

<table>
<thead>
<tr>
<th>ND 5018/105</th>
<th>ØD</th>
<th>L</th>
<th>B</th>
<th>H</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions/mm</td>
<td>105</td>
<td>170</td>
<td>33</td>
<td>146</td>
<td>55</td>
</tr>
<tr>
<td>Weight / g</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>530</td>
</tr>
</tbody>
</table>
Installation of Wires

Connection Example

X1-X2 open: operating current
X1-X2 bridged: de-energized