

## VARIMETER RCM

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



0272374

### Your Advantage

- Preventive fire and system protection
- Increasing the availability of plants by early fault detection
- Universal usage at AC/DC mains
- Protection against manipulation by sealable transparent cover over setting switches

### Features

- According to IEC/EN 62 020, VDE 0663
- For AC and DC systems Type B, according to IEC/TR 60755
- To detect earth faults in grounded voltage systems
- 4 setting ranges from 10 mA to 3 A
- Manual reset, with alarm and pre-warning
- With adjustable switching delay
- Energized or de-energized on trip
- LED indicator for operation, pre-alarm and alarm
- With test function
- LED-chain indicates fault current
- As option with analogue output
- Broken wire detection
- Width: 52.5 mm

### 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.

### Approvals and Markings

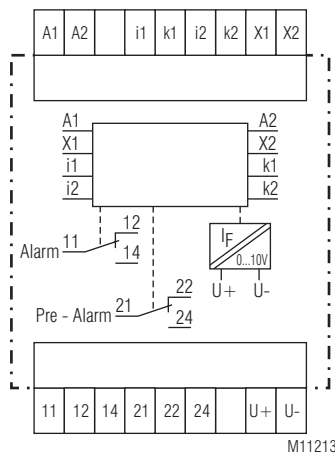


1) RN 5883 Variant /61; 2) ND 5015

### Application

The residual current monitor type B is designed to monitor DC systems and AC systems up to 250 Hz.

### Circuit Diagram



M11213

### Indication

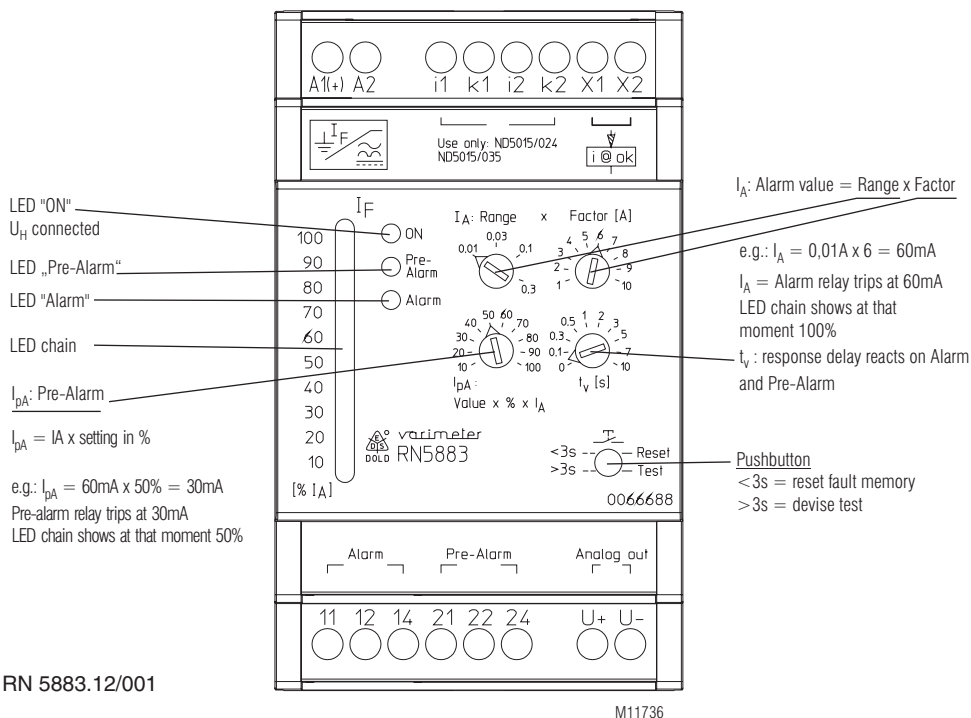
- green LED „ON“: On, when auxiliary supply connected
- yellow LED „Pre-Alarm“: Flashes during time delay  $t_v$   
On, when pre-alarm active
- red LED „Alarm“: Flashes during time delay  $t_v$   
On, when alarm active
- yellow and red LED: Flashes on broken wire or extremely high input signal
- yellow LED-chain: LED chain indicates fault current in % of adjusted alarm value

### Connection Terminals

| Terminal designation | Signal description                                       |
|----------------------|--|
| A1, A2               | Auxiliary voltage $U_H$                                  |
| i1, k1, i2, k2       | Connection of an external residual current transformer   |
| X1, X2               | Parameterization input energized or de-energized on trip |
| 11, 12, 14           | Contacts alarm signal                                    |
| 21, 22, 24           | Contacts pre-alarm signal                                |
| U-, U+               | Analogue output (option)                                 |

### 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.



RN 5883.12/001

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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

**Function**

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  $t_v$  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:

| Type              | Suitable residual current transformer     | Frequeny range       |
|-------------------|---|----------------------|
| RN 5883.12/61     | ND 5015/024<br>ND 5015/035                | DC + AC up to 250 Hz |
| RN 5883.12/010/61 | ND 5015/070                               | DC + AC up to 180 Hz |
| RN 5883.12/020    | ND 5018/105<br>ND 5018/140<br>ND 5018/210 | DC + AC up to 60 Hz  |

Table 1

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 groundfault 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 groundfault 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 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

|  |  |
|--|--|
| <b>Auxiliary voltage <math>U_H</math>:</b> | AC/DC 24 ... 80 V, AC/DC 80 ... 230 V  |
| <b>Voltage range</b>                       |  |
| at $U_H = AC/DC 24 \dots 80 V$ :           | DC 19 ... 110 V, AC 19 ... 90 V,   |
| at $U_H = AC/DC 80 \dots 230 V$ :          | DC 64 ... 300 V, AC 64 ... 265 V   |
| <b>Nominal frequency <math>U_H</math>:</b> | AC 50 / 60 Hz  |
| <b>Nominal consumption</b>                 |  |
| at AC:                                     | 5 VA   |
| at DC:                                     | 2.5 W  |
| <b>Measuring range:</b>                    | 10 ... 100 mA, 30 ... 300 mA,<br>100 ... 1000 mA, 300 ... 3000 mA<br>(3 ... 30 mA on request)                          |
| <b>Measuring range fine adjustment:</b>    | 1 ... 10   |
| <b>Überlastbarkeit:</b>                    | with overload protection   |
| <b>Alarm:</b>                              | 100 % of the adjusted measuring range  |
| <b>Pre-alarm:</b>                          | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 %<br>of the adjusted alarm value   |
| <b>Frequency range:</b>                    | DC and AC to 250 Hz*)<br>*) depending on the differential current<br>transformer used. See „Function“ <i>Table 1</i> . |
| <b>Repeat accuracy:</b>                    | $\leq \pm 3 \%$  |
| <b>Temperature drift:</b>                  | $\leq \pm 0.1 \%$ / K  |
| <b>Reaction time:</b>                      | 300 ms   |
| <b>Switching delay</b>                     |  |
| <b>Pre-alarm / alarm:</b>                  | 0 ... 10 s   |

### Output

|  |   |
|--|---|
| <b>Contacts:</b>                           | 1 changeover contact for pre-alarm,<br>1 changeover contact for alarm |
| <b>Thermal current <math>I_{th}</math></b> |   |
| up to 30 °C:                               | 5 A   |
| up to 40 °C:                               | 4 A   |
| up to 60 °C:                               | 2 A   |
| <b>Switching capacity</b>                  |   |
| at AC 15:                                  |   |
| NO contact:                                | 3 A / AC 230 V IEC/EN 60 947-5-1                                      |
| NC contact:                                | 1 A / AC 230 V IEC/EN 60 947-5-1                                      |
| <b>Electrical life</b>                     |   |
| to AC 15 at 1 A, AC 230 V:                 | 3 x 10 <sup>5</sup> switch. cycl. IEC/EN 60 947-5-1                   |
| <b>Short circuit strength</b>              |   |
| <b>max. fuse rating:</b>                   | 4 A gG /gL IEC/EN 60 947-5-1  |
| <b>Mechanical life:</b>                    | $\geq 10^8$ switching cycles  |

### Analogue Output (option)

|  |  |
|--|--|
| <b>Terminal <math>U_+</math> / <math>U_-</math>:</b> | 0 ... 10 V; 5 mA<br>variant RN 5883/_ _ 1<br>Screened wire; screen one end grounded<br>at device to PE |
|--|--|

### General Data

|  |  |
|--|--|
| <b>Operating mode:</b>   | Continuous   |
| <b>Temperature range</b>                                       |  |
| Operation:   | - 40 ... + 60°C<br>- 20 ... + 60°C (variant /_1_ and /_2_) |
| Storage:   | - 40 ... + 70°C  |
| <b>Altitude:</b>   | < 2,000 m  |
| <b>Insulation coordination</b>                                 |  |
| <b>according to IEC 60664-1:</b>                               |  |
| RN 5883 connected with<br>current transformer ND 5015, ND 5018 |  |
| Rated impuls voltage /<br>pollution degree:                    |  |
| Auxiliary voltage / Meas. circuit:                             | 6 kV / 2   |
| Auxiliary voltage / Contacts:                                  | 6 kV / 2   |
| Auxiliary voltage / Analoge output:                            | 6 kV / 2   |
| Contacts / Analoge output:                                     | 6 kV / 2   |
| Meas. circuit / Analoge output:                                | 6 kV / 2   |
| Contacts 11,12,14 / 21, 22, 24:                                | 4 kV / 2   |

## Technical Data

### EMC

|                           |   |
|---------------------------|---|
| Surge voltages:           | Class 3 (5 kV / 0.5 J) DIN VDE 0435-303 |
| Electrostatic discharge:  | 8 kV (air) IEC/EN 61 000-4-2            |
| HF irradiation            |   |
| 80 MHz ... 2,7 GHz:       | 20 V / m (class 3) IEC/EN 61 000-4-3    |
| HF-wire guided:           | 10 V (class 3) IEC/EN 61 000-4-6        |
| Fast transients:          | 2 kV (class 3) IEC/EN 61 000-4-4        |
| Surge voltages:           | 1 kV class 3) IEC/EN 61 000-4-5         |
| Interference suppression: | Limit value class B EN 55 011           |

### Degree of protection

|            |                     |
|------------|---------------------|
| Housing:   | IP 30 IEC/EN 60 529 |
| Terminals: | IP 20 IEC/EN 60 529 |

### Housing:

Thermoplastic with V0-behaviour  
according UL subject 94

### Vibration resistance:

Amplitude 0.35 mm  
frequency 10 ... 55 Hz IEC/EN 60 068-2-6  
40 / 60 / 03 IEC/EN 60 068-1

### Climate resistance:

### Terminal designation:

EN 50 005

### Wire connection:

### Fixed screw terminals

|                       |   |
|-----------------------|---|
| Cross section:        | 0.5 ... 4 mm <sup>2</sup> (AWG 20 - 10) solid or<br>0.5 ... 4 mm <sup>2</sup> (AWG 20 - 10)<br>stranded wire without ferrules<br>0.5 ... 2.5 mm <sup>2</sup> (AWG 20 - 10)<br>stranded wire with ferrules |
| Stripping length:     | 6.5 mm  |
| <b>Wire fixing:</b>   | Cross-head screw / M3 box terminals   |
| <b>Fixing torque:</b> | 0.5 Nm  |
| <b>Mounting:</b>      | DIN rail IEC/EN 60 715  |
| <b>Weight:</b>        | approx. 160 g   |

### Dimensions

|                                |                   |
|--------------------------------|-------------------|
| <b>Width x height x depth:</b> | 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.

|   |  |
|---|--|
| <b>Supply voltage <math>U_N</math>:</b> | AC/DC 24-80V single or double phase<br>50/60 Hz;<br>AC/DC 80-230V single or double phase<br>50/60 Hz |
|---|--|

### Switching capacity relays

|                           |   |
|---------------------------|---|
| Ambient temperature 30°C: | 5A, 250Vac G.P.<br>250 Vac, 2A pilot duty<br>250 Vac, 1/2hp |
|---------------------------|---|

|                           |   |
|---------------------------|---|
| Ambient temperature 40°C: | 4A, 250Vac G.P.<br>250 Vac, 2A pilot duty<br>250 Vac, 1/2hp |
|---------------------------|---|

|                           |                 |
|---------------------------|-----------------|
| Ambient temperature 60°C: | 2A, 250Vac G.P. |
|---------------------------|-----------------|

### Analogue output

|                        |               |
|------------------------|---------------|
| (only at variant/_1_): | 0 .. 10V, 5mA |
|------------------------|---------------|

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

### Wire connection:

|  |   |
|--|---|
|  | AWG 20 - 12<br>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.

### Standard Type

RN 5883.12/61 AC/DC 80 ... 230 V 50 / 60 Hz  
 Article number: 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  $U_H$ : AC/DC 80 ... 230 V  
 • Width: 52.5 mm

ND 5015/035/61  
 Article number: 0066841  
 • Residual current transformer for RN 5883  
 • Diameter: 35 mm

### 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:

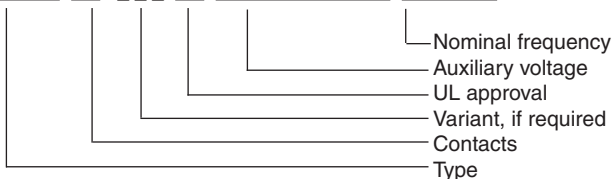
RN 5883.12/011/61: with analogue output 0 ... 10 V

#### For residual current transformer ND5018/105, ND5018/140, ND5018/210:

RN 5883.12/021: with analogue output 0 ... 10 V

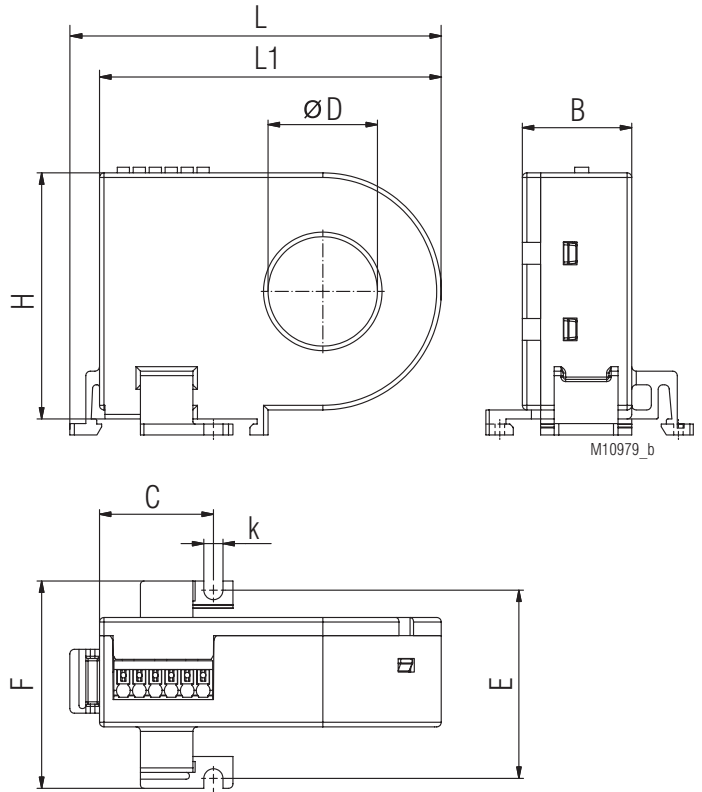
### Ordering example for variants

RN 5883 .12 / \_ \_ \_ /61 AC/DC 80 ... 230 V 50 / 60 Hz



### Accessories

#### Residual Current Monitor ND 5015/024, ND 5015/035



for DIN rail mounting or screw mounting

|               |            |    |    |    |    |    |     |    |     |
|---------------|------------|----|----|----|----|----|-----|----|-----|
| ND 5015/024   | øD         | L  | L1 | B  | H  | C  | E   | F  | k   |
| Dimensions/mm | 24         | 82 | 75 | 24 | 54 | 25 | 42* | 46 | 4.2 |
| Weight / g    | approx. 80 |    |    |    |    |    |     |    |     |
| ND 5015/035   | øD         | L  | L1 | B  | H  | C  | E   | F  | k   |
| Dimensions/mm | 35         | 88 | 81 | 24 | 67 | 25 | 42* | 46 | 4.2 |
| Weight / g    | approx. 90 |    |    |    |    |    |     |    |     |

\*) Drill tolerance for screw mounting:  $\pm 0.5$  mm

### UL-Daten ND 5015

Wire connection: AWG 24 - 16  
 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.

### Technical Data Residual Current Monitor ND 5015, ND 5018

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.  
 Single wire: up to 1 m  
 Single wire twisted pair (pair 1: i1 - k1; pair 2: i2 - k2): up to 10 m  
 Screened wire; screen one end grounded at device to PE: up to 25 m  
 Wire cross section: 0.2 ... 1.5 mm<sup>2</sup>  
 Stripping length: 8 mm

#### ND 5015:

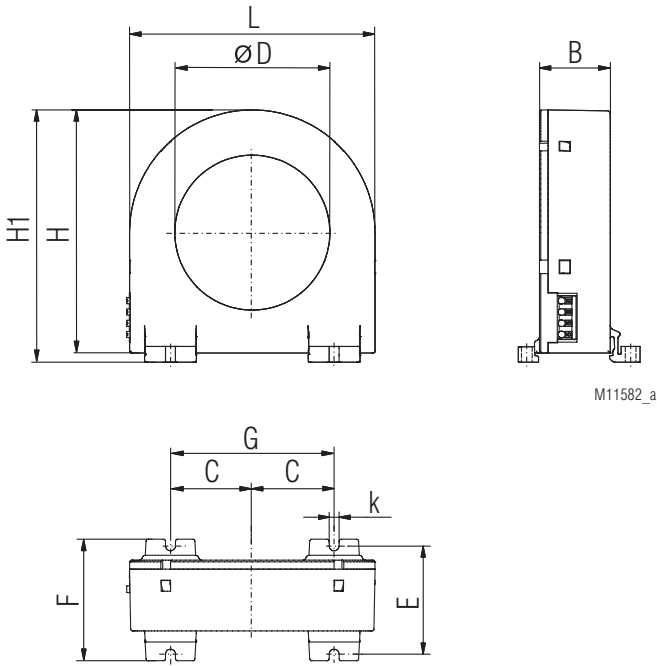
Wire fixing: Terminals with spring connection and direct (Push in) technology  
 Actuation power: 40 N max.  
 DIN rail mounting: integrated clips for vertical and horizontal mounting

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

Residual Current Monitor ND 5015/070



for DIN rail mounting or screw mounting

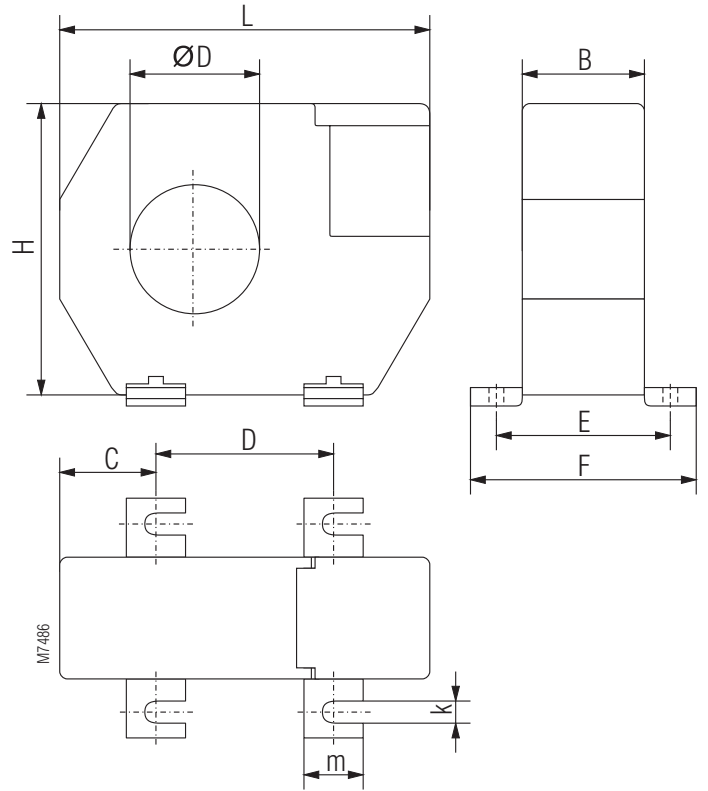
|               |             |     |     |     |    |    |    |     |     |     |
|---------------|-------------|-----|-----|-----|----|----|----|-----|-----|-----|
| ND 5015/070   | øD          | L   | H   | H1  | B  | C  | F  | k   | E   | G   |
| Dimensions/mm | 70          | 111 | 110 | 115 | 32 | 37 | 55 | 4,2 | 50* | 74* |
| Weight / g    | approx. 220 |     |     |     |    |    |    |     |     |     |

\*) Drill tolerance for screw mounting: ± 0.5 mm

**Mounting instructions for screw mounting**

High forces when mounting may damage the current transformer fixtures. The fixing clips are designed to support the current transformer. Forces that are applied by the cable running through the current transformer can only be tolerated within limitations. During installation and afterwards please make sure that the wires are led through the current transformer without applying pressure and remain stable in that position.

Residual Current Monitor ND 5018/105, ND 5018/140, ND 5018/210,

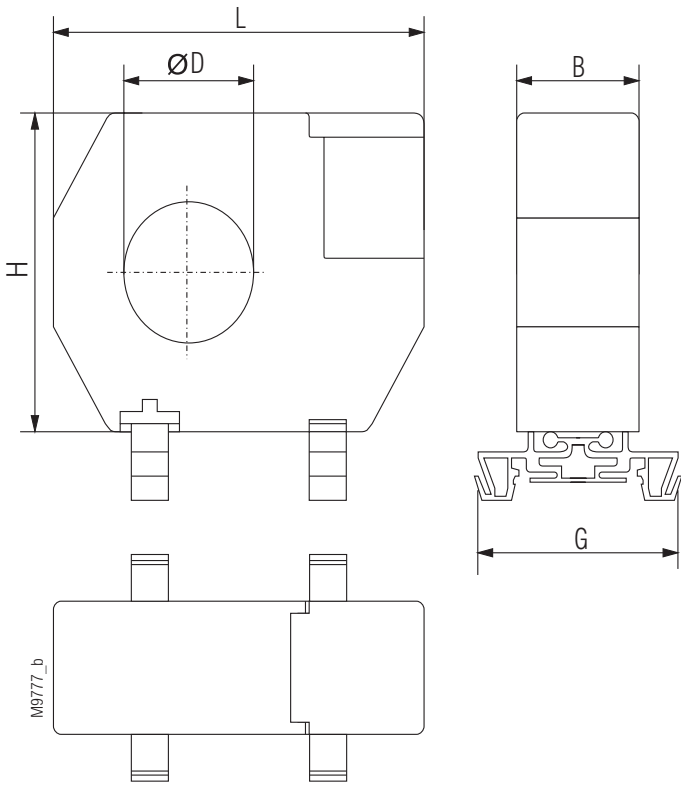


for screw mounting

|               |      |     |    |     |      |     |    |    |     |    |
|---------------|------|-----|----|-----|------|-----|----|----|-----|----|
| ND 5018/105   | øD   | L   | B  | H   | C    | D   | E  | F  | k   | m  |
| Dimensions/mm | 105  | 170 | 33 | 146 | 38   | 94  | 46 | 61 | 6.5 | 16 |
| Weight / g    | 530  |     |    |     |      |     |    |    |     |    |
| ND 5018/140   | øD   | L   | B  | H   | C    | D   | E  | F  | k   | m  |
| Dimensions/mm | 140  | 220 | 33 | 196 | 48.5 | 123 | 46 | 61 | 6.5 | 16 |
| Weight / g    | 1250 |     |    |     |      |     |    |    |     |    |
| ND 5018/210   | øD   | L   | B  | H   | C    | D   | E  | F  | k   | m  |
| Dimensions/mm | 210  | 299 | 33 | 284 | 69   | 161 | 46 | 61 | 6.5 | 16 |
| Weight / g    | 2100 |     |    |     |      |     |    |    |     |    |

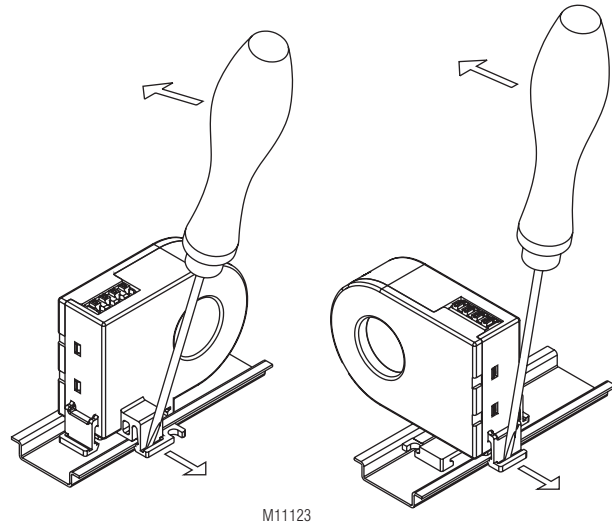
The residual current transformer ND 5018/105 can also be mounted on DIN-rail. To do this the metal screw fixings have to be removed and have to be replaced by 2 mounting clips (ET5018: art.no. 0058754; set with 2 pcs)

Residual Current Monitor ND 5018/105

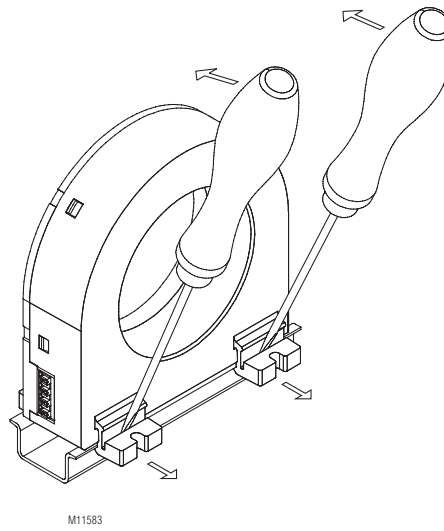


for DIN rail mounting

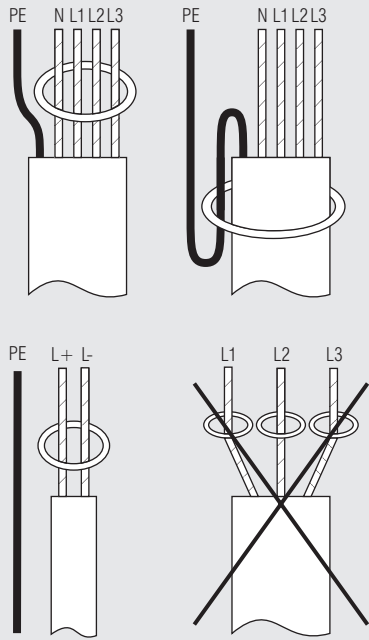
| ND 5018/105   | øD  | L   | B  | H   | G  |
|---------------|-----|-----|----|-----|----|
| Dimensions/mm | 105 | 170 | 33 | 146 | 55 |
| Weight / g    | 530 |     |    |     |    |



Disassembling Residual Current Monitor ND 5015/070

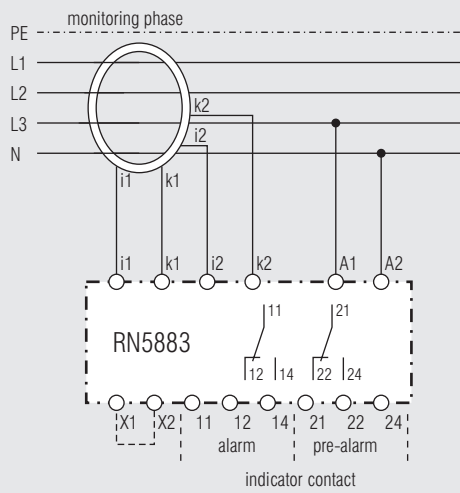


## Installation of Wires



M8362\_a

## Connection Example



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

M11294

