Installations- / Monitoring Technique

VARIMETER RCM
Residual Current Monitor, Type B
optionally with Modbus or analogue output RN 5884

Translation of the original instructions

Modbus MEMBER

DOLD

0282184

RN 5884 ND 5015/035 ND 5015/070

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
- Monitoring of 2 measuring channels simultaneously

Features

- According to IEC/EN 62020-1, VDE 0663
- For AC and DC systems Type B
- Optional for 2 measuring channels
- To detect earth faults in grounded voltage systems
- Setting range from 30 mA ... 5 A
- Manual / auto reset, with alarm and pre-warning
- With adjustable switching delay
- Energized or de-energized on trip
- Set parameters directly on the device
- Display
- LED indicator for RUN- / SET- Mode; BUS, Error
- With test function
- As option with analogue output
- As option with Modbus RTU-interface
- Broken wire detection
- Width 52.5 mm

Product Description

The AC/DC sensitive residual current monitor RN 5884 from the VARIMETER RCM series 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 (CT). Up to 2 measuring channels can be monitored simultaneously.

The residual current monitor can be easily parameterized and set via the operating buttons. If the measured differential current exceeds the set response values, this is signalled via the output relays K1 or K2. In order to detect faults in the system at an early stage, the residual current is shown visually on a display.

All versions have 2 output relays. Units for a connectable current transformer (1 measuring channel) give an alarm at output relay K1 and a pre-alarm at output relay K2. Units for 2 current transformers (2 measuring channels) output an alarm message for measuring channel current transformer CT1 at relay K1 or measuring channel current transformer CT2 at relay K2.

Other features include wire break detection, test function and adjustable switching delays. A Modbus RTU interface is available for communication with higher-level systems. Thus, the residual current monitor RN 5884 provides an information head start for targeted and cost-effective maintenance measure before the system comes to a standstill.

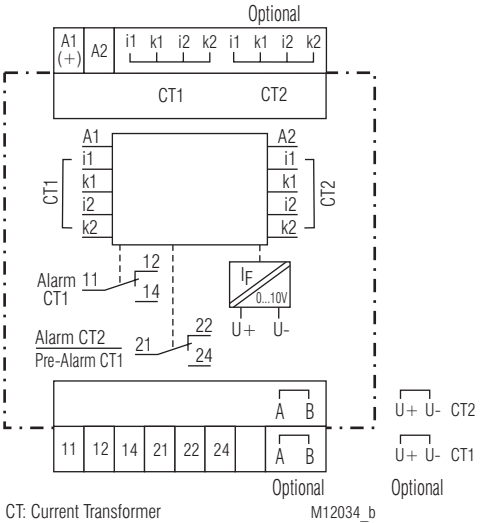
Approvals and Markings

CE

Application

The residual current monitor type B is designed to monitor DC systems and AC systems up to 2 kHz.

Circuit Diagram



CT: Current Transformer M12034_b

Connection Terminals

Terminal designation	Signal description
A1, A2	Auxiliary voltage U_H
i1, k1, i2, k2	Connection of an external residual current transformer
11, 12, 14	Contacts alarm signal measuring channel 1
21, 22, 24	Contacts alarm signal at variant with 2 measuring channels
	Contacts alarm signal at variant with 1 measuring channel
U-, U+	Analogue output (option)
A, B	Modbus (as option)

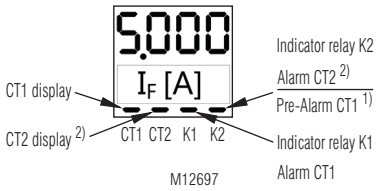
Indication

The colour of the backlight indicates the operating status of the device.

Off:	No supply voltage connected
Green:	Run-Mode
Red:	Failure status
Orange:	Device in SET-Mode; In RUN mode: Unit test (test button pressed > 2 s) Pre-alarm [1]

Actual value display

In RUN mode, the measured differential current is displayed. If the measured residual current exceeds the parameterised alarm or pre-alarm value, an error is signalled.

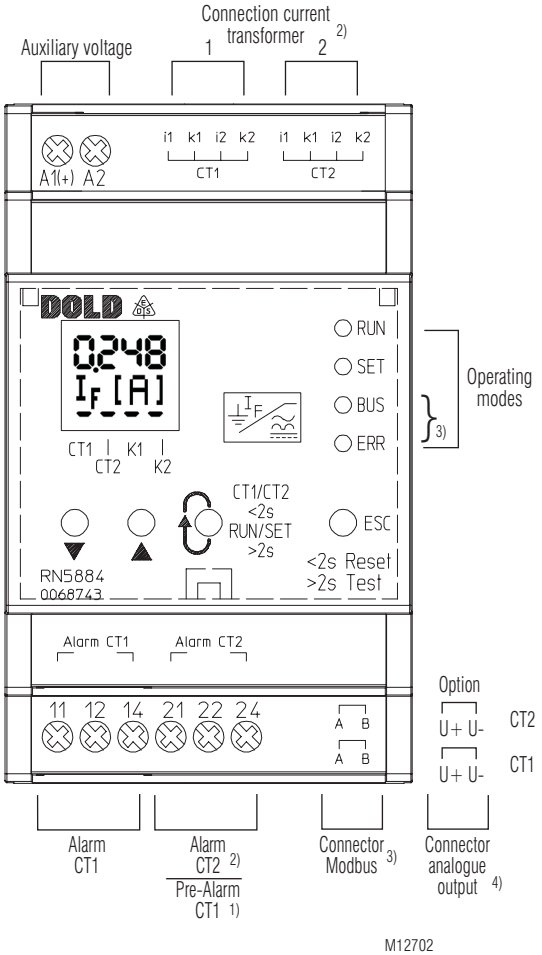


Cursor CT1:	Measuring value / failure CT1 (Current transformer 1)
Cursor CT2:	Measuring value / failure CT2 (Current transformer 2)
Cursor K1:	Rel 1 controlled, (Contact 11, 12, 14)
Cursor K1 flashes:	Start up delay t_A, on-delay t_V or off-delay t_{off} on CT1 not yet expired
Cursor K2:	Rel 2 controlled, (Contact 21, 22, 44)
Cursor K2 flashes:	Start up delay t_A, on-delay t_V or off-delay t_{off} on CT2 not yet expired

Mode	LED RUN	LED SET	Remark
RUN	x	-	Normal operation
SET	x	x	Display parameter
SET	-	x	Edit and save parameters

LED BUS: [3] BUS active
LED ERR: [3] BUS error

Set-up and Adjustment Facilities



RN 5884/005 with 2 CT and Modbus
(As option with analogue output, RN 5884/004)

Control buttons

ESC pushbutton:	Actuation time < 2 s pressed, reset is performed. Actuation time > 2 s pressed, Device test is performed.
RUN/SET Pushbutton:	Actuation time < 2 s pressed, display change CT1/CT2. Actuation time > 2 s pressed, change to parameterisation.
▲ and ▼ pushbutton:	Buttons are used for parameter selection

Modbus RTU [3]

For communication between residual current monitors RN 5884 and a supervising control the Modbus RTU protocol according to Specification V 1.1b3 is used.

Analogue output [4]

An optional analogue output 0 ... 10 V indicates the differential current. 10 V corresponds to 100 % of the set alarm value. 0 V corresponds to 0 % of the set alarm value.

Baud rate setting

Baud rate Setting value	1	2	3	4	5	6	7	8
Baud rate Baud [Hz]	1200	2400	4800	9600	19200	38400	57600	115200
Response Time [ms]	< 50	< 25	< 12	< 10	< 5	< 5	< 5	< 5

Bus Interface

Protocol	Modbus Seriell RTU
Adress	1 to 247
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Bit/s
Data bit	8
Stop bit	2
Parity	None

The bus parameters are set via the display and the keys of the unit and stored non-volatile in the EEprom of the unit.
The bus parameters are **only** accepted after the auxiliary voltage is applied again.

More information about the interface, wiring rules, device identification and communication monitoring can be found in the Modbus user manual.

Function-Codes

At RN 5884 the following function codes are implemented:

Funktions-Code	Name	Description
0x02	Read Discrete Inputs	Inputs read induvidually
0x03	Read Holding Register	Device parameter read word by word
0x04	Read Input Register	Actual values read word by word
0x05	Write Single Coil	Outputs write induvidually
0x06	Write Single Register	Device parameter write word by word
0x10	Write Multiple Register	Device parameter write in blocks

[1] Only for unit variant with 1 measuring channel
[2] Only for unit variant with 2 measuring channels
[3] Only for unit variant with modbus
[4] Only for unit variant with analogue output

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 measuring signal is generated.
If a fault current flows via earth due to an insulation fault, the current difference in the transformer causes a measuring signal which is detected and evaluated by the RN 5884.

Parameterization:
The unit can be set up individually according to the area of application using the following parameters. The following parameters are available for this purpose.

Para-meter	Parameter value	Display	Remark
REL	**De-energized on trip**	**n.c. Rel**	
	Energized on trip	n.o. Rel	
Mem	**Saving errors**	**on MEM**	
	Not saving errors	oFF MEM.	
Test	**For test > 2 s, Rel. non-switching**	**oFF Test**	The relays are not tested during a device test that was triggered manually.
	For test > 2 s, Rel. switching	on Test	The relays are not tested during a device test that was triggered manually.
Test24h	**Test every 24h OFF**	**oFF** Te24h	No automatic test is carried out.
	Test every 24h ON	on Te24h	An automatic test is carried out.
I_{A1}	30 mA ... 5 A **200 mA**	**0.200** I_{A1} [A]	Tripping value1 [2]
I_{A2}	30 mA ... 5 A **100 mA**	**0.100** I_{A2} [A]	Tripping value2 [2]
I_A	30 mA ... 5 A **200 mA**	**0.200** I_A [A]	Tripping value [1]
I_{PA}	30 mA ... 5 A **100 mA**	**0.100** I_{PA} [A]	Pre-alarm value [1]
Hys	Hysteresis 10 ... 30 % **20 %**	**20** Hys [%]	Only possible with oFF MEM.
t_A	Start-up delay 0,1 ... 10 s; **oFF**	**oFF** t_A [s]	Effective when applying the auxiliary voltage.
T_v	On-delay 0,1 ... 10 s; **oFF**	**oFF** T_v [s]	Switching delay effective for errors.
T_{off}	Off-delay 0,1 ... 10 s; **oFF**	**oFF** T_{off} [s]	Only possible with oFF MEM.
Adr. Modbus	Modbus adress 1 … 247 **1**	**1** adr.	Modbus adress [3]
Baud rate	Modbus baud rate 1 … 8 **6**	**6** baud.	Modbus baud rate [3] See baud rate setting

[1] Only for unit variant with 1 measuring channel
[2] Only for unit variant with 2 measuring channels
[3] Only for unit variant with modbus
[4] Only for unit variant with analogue output

Factory settings at delivery are highlighted

Alarm and also pre-alarm can be set in steps of 10 mA in the range 30 mA ... 5 A.

Function

Unit with 1 measuring channel: [1]
If the measured differential current in current transformer CT1 exceeds the response value for the pre-alarm (I_{PA}), the unit switches to pre-alarm. The changeover relay K2 is switched. If the current continues to rise above the alarm value (I_A), the unit switches to the alarm state and the changeover relay K1 switches over.

Unit with 2 measuring channels: [2]
Due to the integrated wire break detection, the device variant with two measuring channels must always be operated with both current transformers. In this device version, each CT1 and CT2 current transformer operates independently. If the measured differential current in the current transformer CT1 or CT2 exceeds its alarm value (I_{A1}) or (I_{A2}), each channel independently switches to the alarm state and the associated changeover relay K1 or K2 switches over.

If the value falls below the alarm value or pre-alarm value again, a „RESET“ can be carried out via the ESC key (> 2 s) in the error saving mode (on MEM.). Alternatively, the auxiliary voltage can be switched off for approx. 15 s. The unit switches to the good state.

In non-storing fault mode (oFF MEM.), the unit automatically switches to the good state if the differential current falls below the hysteresis range.

Broken wire detection:
In the event of a wire breakage or a faulty connection (wires reversed) to the differential current transformer, the unit switches to the error state and the error message CT1 or CT2 appears in the display.

Unit test:
If the ESC key is pressed for longer than 2 seconds, a device test is carried out.
Depending on the „Test“ parameterisation, the relays are also switched during the unit test and thus the switching operation is checked.
An automatic device test that is carried out every 24 hours can be activated via the „Test24h“ parameter. The relays are not switched during this test.
An automatic device test is carried out every time the auxiliary voltage is applied.
If an error is reported after the device test, contact our service.

De-energized on trip:
In the case of groundfault or missing auxiliary supply the relays are not activated, the NC contacts 11/12; 21/22 are closed.
In fault free state the relays are activated, the NO contacts 11/14; 21/24 are closed.

Energized on trip:
In the case of groundfault the relays are activated, the NO contacts 11/14; 21/24 are closed.
In fault free state the relays are not activated, the NC contacts 11/12; 21/22 are closed.

Function

Unit and error statuses:

Display indication:	Display color:	Description:	Measure:
I_F [A]	Green	The measuring channel is in the good state, pre-alarm and alarm have not been exceeded. Note cursor display [2]	
Test	Orange	A device test is carried out	
I_{PA} [A] [1]	Orange	Pre-alarm exceeded	
I_F [A]	Red	Alarm value of CT1 or CT2 exceeded. Note crusor display [2]	
CT1	Red	Wire break to current transformer CT1	Check cables to current transformer CT1
CT2 [2]	Red	Wire break to current transformer CT2	Check cables to current transformer CT2
TO_1, TO_2 [2]	Red	Time slot exceeded	Switch the units off and on again. If the error persists, contact our service department.
CRC1, CRC2 [2]	Red	Parameter error	Carry out parameterisation again. If the error persists, contact our service department.
ESC	Red	The button was pressed for longer than 6 s	Keep the area around the button clear. Something may be pressing on the button when installed.
Over1	Red	Measuring range exceeded at current transformer CT1	Reduce differential current in current transformer CT1.
Over2 [2]	Red	Measuring range exceeded at current transformer CT2	Reduce differential current in current transformer CT2.
CRC	Red	Checksum error	Contact our service department.
HW 1	Red	Error on measuring channel 1 after a unit test	Contact our service department.
HW 2 [2]	Red	Error on measuring channel 2 after a unit test	Contact our service department.

Offset adjustment

The residual current monitor RN 5884 must be calibrated to the current transformer in the system to be monitored by means of an offset adjustment.

An offset adjustment must be carried out:
- For a new installation
- When replacing a current transformer (CT)
- If the device shows an implausible value

Offset adjustment procedure

	Procedure	Display indication	Display colour	LEDs
1	Connect current transformer and RN 5884, auxiliary voltage U_H is not connected, press key ▼.	Off	Off	Off
2	Keep key ▼ pressed and connect auxiliary voltage U_H. **Calibration starts.** After the adjustment has started, the key ▼ can be released.	Zero	Red	LEDs flashing
3	**Adjustment completed.** The adjustment can be terminated with the ▼ key. (After approx. 30 s the unit automatically switches to normal operation).	OK	Green	LEDs flashing
4	Normal operation	Depending on operating status		

If no current transformer is connected during an offset adjustment, the offset adjustment cannot be completed.

Attention: During an offset adjustment, no measuring current may flow through the current transformer. (The system must be switched off).

Important: For error-free operation, make sure that there are no magnetic fields in the immediate vicinity.

Note: A faulty adjustment leads to incorrect and implausible measured values.

Notes

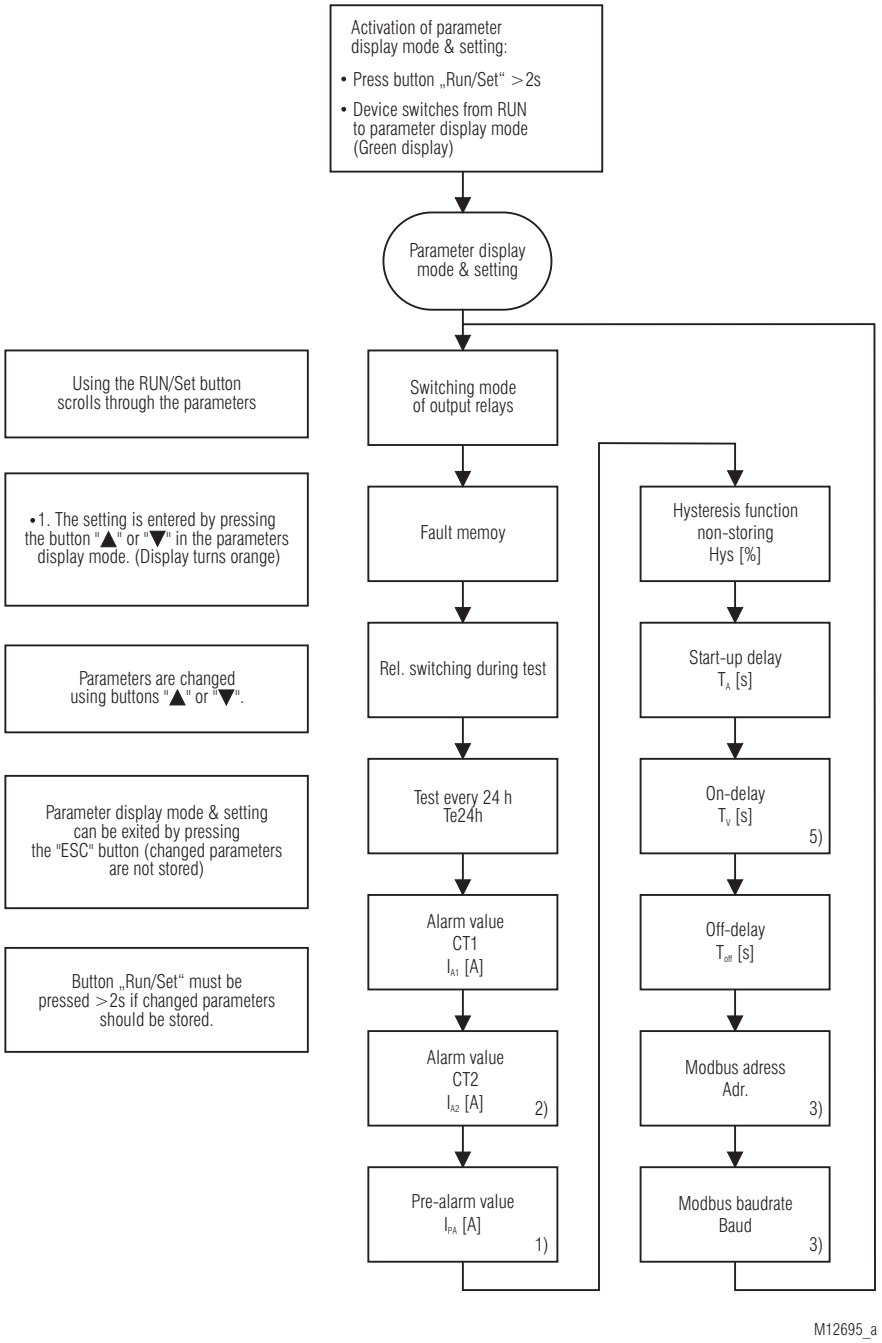
The RN 5884 measures AC and DC current (AC / DC sensitive). Due to the measurement principle they also detect magnetic fields in the next to the current transformer.

The following current transformers must be used for this unit:
ND 5015/024, ND 5015/035, ND 5015/70, ND 5018/105, ND 5018/140, ND 5018/210.

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 the current transformer is rotated by 90°, this can have a positive effect on the measurement accuracy.

If pulsating periodic direct currents are expected, the maximum setting range is 2 A.

Running chart parametrisation



[1] Only for unit variant with 1 measuring channel
[2] Only for unit variant with 2 measuring channels
[3] Only for unit variant with modbus
[4] Only for unit variant with analogue output
[5] Only with setting error not saving

Technical Data

Input

Auxiliary voltage U_H:	AC/DC 24 ... 100 V, AC/DC 80 ... 240 V
Voltage range	
at U_H = AC/DC 24 ... 100 V:	DC 20 ... 170 V, AC 19.2 ... 120 V
At U_H = AC/DC 80 ... 240 V:	DC 60 ... 350 V, AC 60 ... 276 V
Nominal frequency U_H:	AC 50 ... 400 Hz
Nominal consumption	
device with 1 CT:	At AC 24 V 3 VA; At DC 24 V 2 W
	At AC 230 V 3 VA, At DC 230 V 2 W
Device with 2 CT:	At AC 24 V 5.5 VA; At DC 24 V 3 W
	At AC 230 V 4.5 VA, At DC 230 V 3.2 W

Measuring circuit

By means of external measuring current transformer	
Setting range:	30 mA ... 5 A, in steps from 10 mA
Differential current measuring range:	AC 0 ... 7 A DC - 7 ... 7 A
Max. overload:	With overload protection
Alarm CT1:	Adjustable in the range of the measuring range
Alarm CT2 / pre-alarm CT1 (Pre-alarm can only be set in the range until alarm CT1):	Adjustable in the range of the measuring range
Frequency range:	DC and AC 30 Hz to 2 kHz
Repeat accuracy:	≤ ± 3 %
Temperature drift:	≤ ± 0.1 % / K
Reaction time:	< 650 ms
Switching delay t_A:	0 ... 10 s adjustable
On-delay t_V:	0 ... 10 s adjustable
Off-delay t_{off}:	0 ... 10 s adjustable

Output

Contacts:	1 changeover contact for Alarm CT1, 1 changeover contact for pre-alarm CT1 [1], (alarm CT2 [2])	
Thermal current I_{th}		
Ambient-temperature		
up to 30 °C:	5 A	
Up to 40 °C:	4 A	
Up to 60 °C:	2 A	
Switching capacity		
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 10^5 switch. cycl.	IEC/EN 60947-5-1
Short circuit strength		
max. fuse rating:	4 A gG / gL	IEC/EN 60947-5-1
Mechanical life:	≥ 10^8 switching cycles	

Analogue Output (option)

Terminal U+ / U-:	0 ... 10 V Response: 10 bit Settling time: 100 ms (95 % of the new value) Load impedance: ≥ 2000 Ω (per CT) Screened wire; screen one end grounded at device to PE

General Data

Operating mode:	Continuous
Temperature range	
Operation:	- 20 ... + 60 °C (in the field off 0 … - 30 °C possibily a limited function of the LCD display)
Storage:	- 40 ... + 70 °C
Altitude:	≤ 2000 m
Rated insulation voltage:	250 V

Technical Data

Insulation coordination according to IEC 60664-1:		
RN 5884 cennected with current transformer ND 5015, ND 5018		
Rated impuls voltage / pollution degree:		
Auxiliary voltage / Meas. circuit:	6 kV / 2	
Auxiliary voltage / Contacts:	6 kV / 2	
Auxiliary voltage / Analoge output, BUS:	6 kV / 2	
Contacts / Analoge output, BUS:	6 kV / 2	
Meas. circuit / Analoge output:	6 kV / 2	
Contacts 11, 12, 14 / 21, 22, 24:	4 kV / 2	
EMV		
Surge voltages:	Class 3 (5 kV / 0.5 J)	DIN VDE 0435-303
Electrostatic discharge (ESD):	8 kV (air)	IEC/EN 61000-4-2
HF irradiation		
80 MHz ... 1 GHz:	10 V / m (class 3)	IEC/EN 61000-4-3
1 GHz ... 6 GHz:	10 V / m (class 3)	IEC/EN 61000-4-3
HF-wire guided:	10 V (class 3)	IEC/EN 61000-4-6
Fast transients (Burst):	4 kV (class 3)	IEC/EN 61000-4-4
Surge voltages:	4 kV (class 3)	IEC/EN 61000-4-5
Interference suppression /000, /001, /003, /004 AC/DC 24 ... 100 V /000, /003		
AC/DC 80 ... 240 V:	Limit value class B	EN 55011
Interference suppression: /002, /005 AC/DC 24 ... 100 V /001, /002, /004, /005		
AC/DC 80 ... 240 V:	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 30 (not sealed)	IEC/EN 60529
	IP 40 (sealed with seal wire 50/30) The unit must be disconnected from the power supply before the seal is applied	IEC/EN 60529
Terminals:	IP 20	IEC/EN 60529
Housing:	Thermoplastic with V0-behaviour according UL subject 94	
Vibration resistance:	Amplitude 0.35 mm frequency 10 ... 55 Hz,	IEC/EN 60068-2-6
Climate resistance:	40 / 60 / 03	IEC/EN 60068-1
Terminal designation:	EN 50005	
Wire connection:		DIN 46228-1/-2/-3/-4
Fixed screw terminals		
Cross section:	0.5 ... 4 mm² (AWG 20 - 10) solid or 0.5 ... 4 mm² (AWG 20 - 10) stranded wire without ferrules 0.5 ... 2.5 mm² (AWG 20 - 10) stranded wire without ferrules	
Stripping length:	6.5 mm	
Wire fixing:	Cross-head screw / M3 box terminals	
Fixing torque:	0.5 Nm	
Connection CT, analogue output, BUS:	Pluggable PUSH IN	
Wire connection:	0.14 ... 1.5 mm² (AWG 28 ... AWG 14)	
Stripping length:	10 mm	
Insertion force / pulling force:	8 N / 4 N per pole	
Mounting:	DIN rail	IEC/EN 60715
Weight:	Approx. 170 g	

Dimensions

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

Standard Type

RN 5884.12 AC/DC 80 ... 240 V 50 / 60 Hz
Article number: 0068738
- Quantity of measur. channels: 1
- Without analogue output
- Without Modbus
- Auxiliary voltage U_H: AC/DC 80 ... 240 V
- Width: 52.5 mm

ND 5015/035
Article number: 0066841
- Residual current transformer for RN 5884
- Diameter: 35 mm

Variants

Ordering example for variants

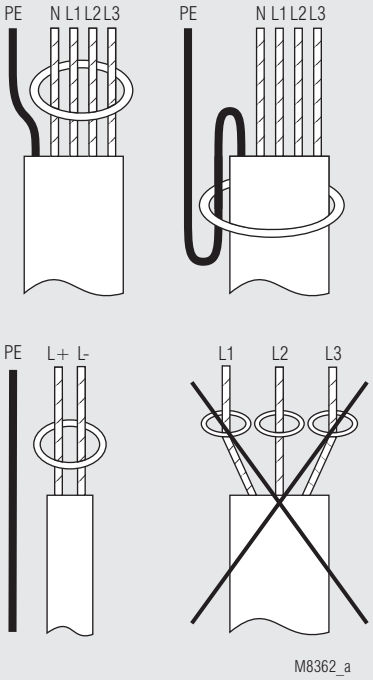
RN 5884 .12 /_ _ _ AC/DC 24 ... 240 V 50 / 60 Hz

- Nominal frequency
- Auxiliary voltage
- Variant, if required
- Contacts
- Type

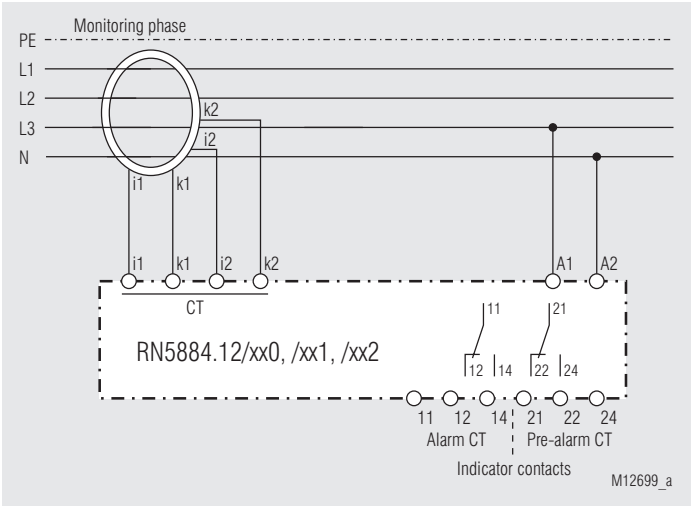
Device	Quantity of measuring channels	Feature
RN5884.12	1	
RN5884.12/001	1	With analogue output *)
RN5884.12/002	1	With modbus
RN5884.12/003	2	
RN5884.12/004	2	With analogue output *)
RN5884.12/005	2	With modbus

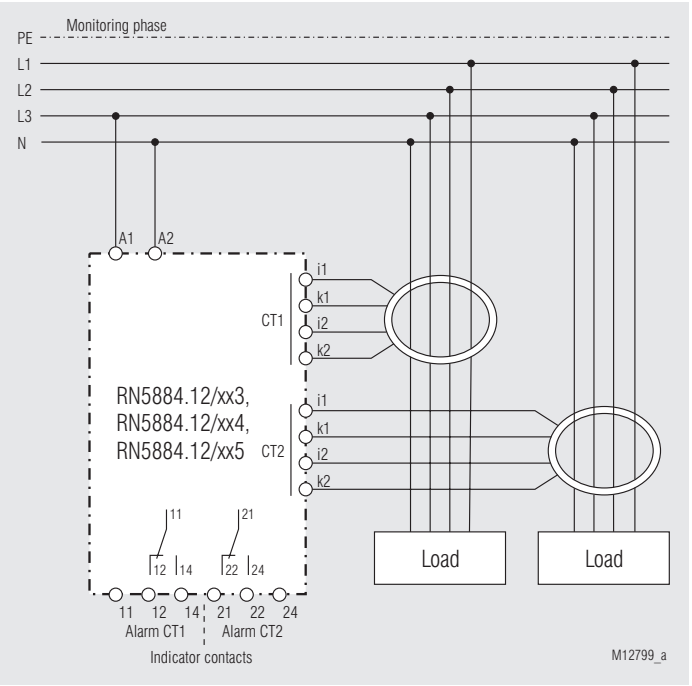
*) on request

Installation of Wires



Connection Example





Modbus register

Every slave owns an output-, configuration- and actual value table. In these tables it is defined under which address the parameters can be found.

Write Single Coil (Control signals) FC0x05:

Register address	Protocol address	Name	Value range	Description	Data type	Access rights
1	0	Reset	0x0000 0xFF00	No function Error acknowledgement	BIT	Write
2	1	Reserve	0x0000 0xFF00	Not used	BIT	Write
3	2	Write configuration	0x0000 0xFF00	No function Save parameters	BIT	Write
4	3	Reserve	0x0000 0xFF00	Not used	BIT	Write
5	4	Device test	0x0000 0xFF00	No function Start unit self-test	BIT	Write

Read Discrete Inputs (Status signals) FC0x02:

Register address	Protocol address	Name	Value range	Description	Data type	Access rights
10001	0	taA1 CT1	0 … 1	0: Start-up delay A1 inactive 1: Start-up delay A1 active	BIT	Reading
10002	1	taA1 CT1	0 … 1	0: On-delay A1 inactive 1: On-delay A1 active	BIT	Reading
10003	2	toffA1 CT1	0 … 1	0: Off-delay A1 inactive 1: Off-delay A1 active	BIT	Reading
10004	3	tvPA CT1	0 … 1	0: On-delay PA inactive 1: On-delay PA active	BIT	Reading
10005	4	toffPA CT1	0 … 1	0: Off-delay PA inactive 1: Off-delay PA active	BIT	Reading
10006	5	taA2 CT2	0 … 1	0: Start-up delay A2 inactive 1: Start-up delay A2 active	BIT	Reading
10007	6	taA2 CT2	0 … 1	0: On-delay A2 inactive 1: On-delay A2 active	BIT	Reading
10008	7	toffA2 CT2	0 … 1	0: Off-delay A2 inactive 1: Off-delay A2 active	BIT	Reading
10009	8	Rel1	0 … 1	0: Relay1 (K1) off 1: Relay1 (K1) on	BIT	Reading
10010	9	Rel2	0 … 1	0: Relay2 (K2) off 1: Relay2 (K2) on	BIT	Reading

Modbus register

Read Holding Registers (Device configuration) FC0x03:
Write Single Register (Device configuration) FC0x06:
Write MultipleRegisters (Device configuration) FC0x10:

Register address	Protocol address	Name	Value range	Description	Data type	Access rights
40001	0	Control word 1	0, 1, 2, 4, 16	Bit 0 = Reset Bit 1 = Reserve Bit 2 = Write configuration Bit 3 = Reserve Bit 4 = Device test	UINT16	Write / reading
42001	2000	Rel.	0 … 1 **0**	0 = De-energized on trip 1 = Energized on trip	UINT16	Write / reading
42002	2001	Mem.	0 … 1 **0**	0 = Saving errors 1 = Error not saving	UINT16	Write / reading
42003	2002	Test	0 … 1 **0**	0 = Relay not switching 1 = Relay switching	UINT16	Write / reading
42004	2003	Te24h	0 … 1 **0**	0 = Test every 24h is off 1 = Test every 24h is on	UINT16	Write / reading
42005	2004	I_{A1}	30 … 5000 **200**	Alarm value 1, CT1 in mA	UINT16	Write / reading
42006	2005	I_{PA}	30 … 5000 **100**	Pre-alarm value , CT1 in mA (Variant with 1 sensor)	UINT16	Write / reading
42007	2006	I_{A2}	30 … 5000 **200**	Alarm value 2, CT2 in mA (Variant with 2 sensors)	UINT16	Write / reading
42008	2007	Hys.	10 … 30 **20**	Hysteresis in % (Only off in the event of an memory error)	UINT16	Write / reading
42009	2008	t_A	0 … 100 **0**	Start-up delay in 1 / 10 s	UINT16	Write / reading
42010	2009	t_V	0 … 100 **0**	On-delay in 1 / 10 s	UINT16	Write / reading
42011	2010	t_{Off}	0 … 100 **0**	Off-delay in 1 / 10 s	UINT16	Write / reading

Factory settings at delivery are highlighted

Note:
If parameter values are described with values outside the specified range, the parameter values are limited to the minimum or maximum parameter value.

Important:
After changing parameters via the Modbus protocol, the data in the unit are only preloaded. **The preloaded settings can be read back, but are not yet effective.** The settings become effective when the configuration is confirmed via control word 1 (bit 2 = WriteKofig). The data is stored in the EEPROM. The effective settings can be read on the unit itself. Since the write cycles of an EEPROM are limited, the write process with these registers must not be cyclical.

Modbus register

Read Input Register (Status signals and measured values) FC0x04:

Register address	Protocol address	Name	Value range	Description	Data type	Access rights
30001	0	Device error	0 … 17	0: No failure 1: Alarm1 CT1 I_{A1} 2: Pre-alarm CT1 I_{PA} 3: Hardware CT1 HW1 4: Line breakage CT1 CT1 5: Measuring ranges CT1 OVER1 6: Firmware CT1 FW1 7: CRC error CT1 CRC1 8: Communication CT1 TO1 9: Communication error Modbus 10: Cross sum error EEprom 11: Alarm2 CT2 I_{A2} 12: Hardware CT2 HW2 13: Wire breakage CT2 CT2 14: Measuring ranges CT2 OVER2 15: Firmware CT2 FW2 16: CRC error CT2 CRC2 17: Communication CT2 TO2	UINT16	Reading
30002	1	Device status	0 … 4	0: Initialise unit INIT 1: Unit in run mode RUN 2: Unit in error mode ERROR 3: Unit in self-test mode TEST 4: Unit in set mode SET	UINT16	Reading
30003	2	Device flags CT1	0 … 255	Bit 0: Start-up delay taA1 Bit 1: On-delay tvA1 Bit 2: Off-delay toffA1 Bit 3: Start-up delay taPA *) Bit 4: On-delay tvPA *) Bit 5: Off-delay toffPA *) Bit 6: Status relay1 (K1) A1 Bit 6: Status relay2 (K2) PA *)	UINT16	Reading
30004	3	Device flags CT2	0 … 71	Bit 0: Start-up delay taA2 Bit 1: On-delay tvA2 Bit 2: Off-delay toffA2 Bit 3: Reserved Bit 4: Reserved Bit 5: Reserved Bit 6: Status relay2 (K2) A2 Bit 7: Reserved	UINT16	Reading
32000	2000	Fault current I_F CT1	0 … 5000	in mA	UINT16	Reading
32001	2001	Fault current I_F CT2	0 … 5000	in mA	UINT16	Reading

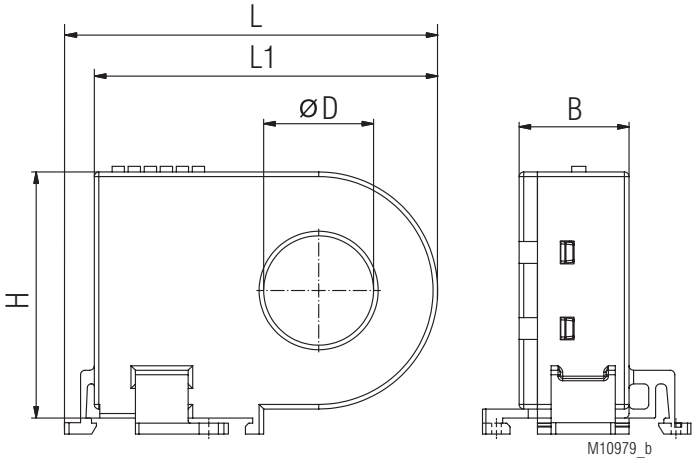
*) Status bits only available for units with 1 measuring channel (RN 5884.12/002)

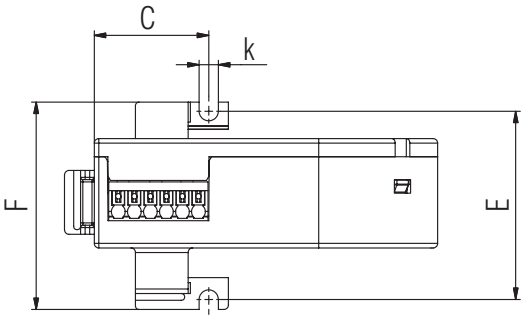
List of abbreviations:

CT1: Current Transformer1
CT2: Current Transformer2
A1: Alarm1
A2: Alarm2
PA: Pre-alarm
taA1: Start-up delay Alarm1
tvA1: On-delay Alarm1
toffA1: Off-delay alarm1
taA2: Start-up delay Alarm2
tvA2: On-delay Alarm2
toffA2: Off-delay alarm2
tvPA: On-delay Pre-Alarm
toffPA: Off-delay pre-alarm

Accessories

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





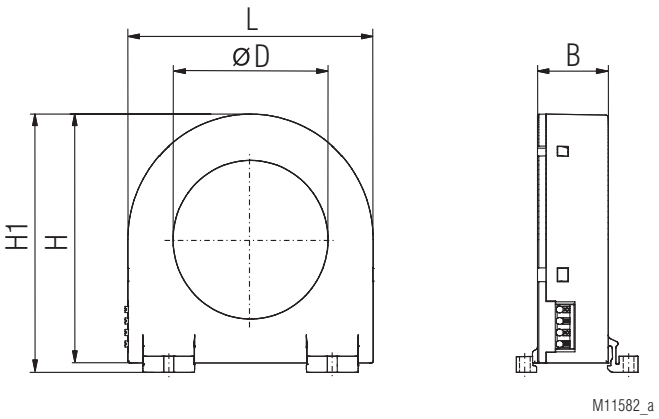
For DIN rail mounting or screw mounting

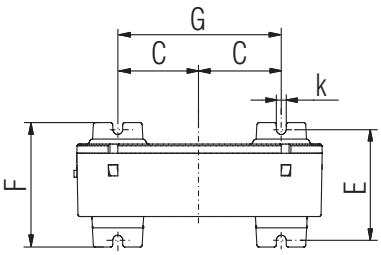
ND 5015/024	øD	L	L1	B	H	C	E	F	k
Dimensions / mm	24	82	75	24	54	25	42*	46	4.2
Weight / g	Approx. 80								

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: ± 0.5 mm

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

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 mm²
Stripping length: 8 mm

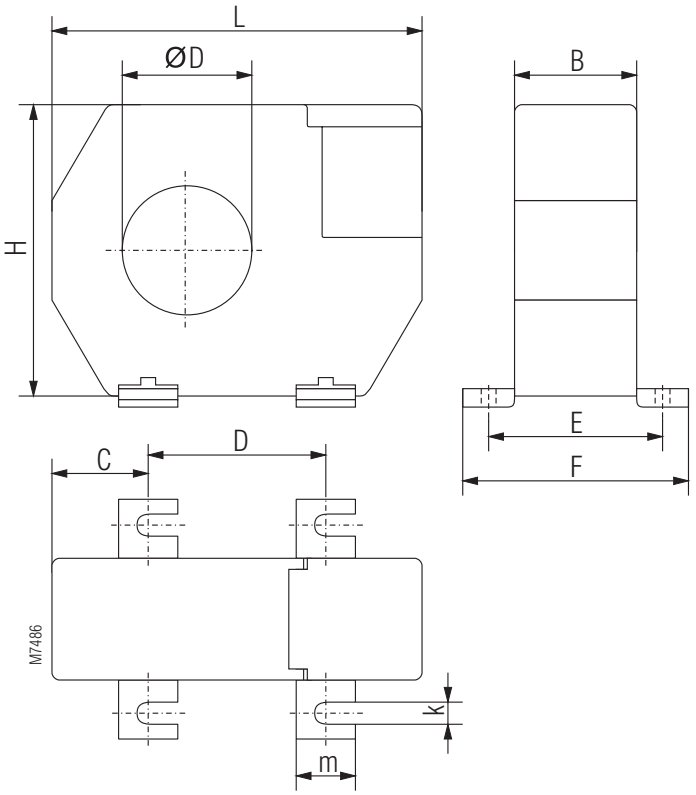
ND 5015:
Wire fixing: Terminals with spring connection and direct (Push in) technology
Actuation power: 40 N max.
DIN rail mounting: Integrated clips for vertical and horizontal mounting
Screw fixing: M3 or M4
Fixing torque: Max. 0.8 Nm

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

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

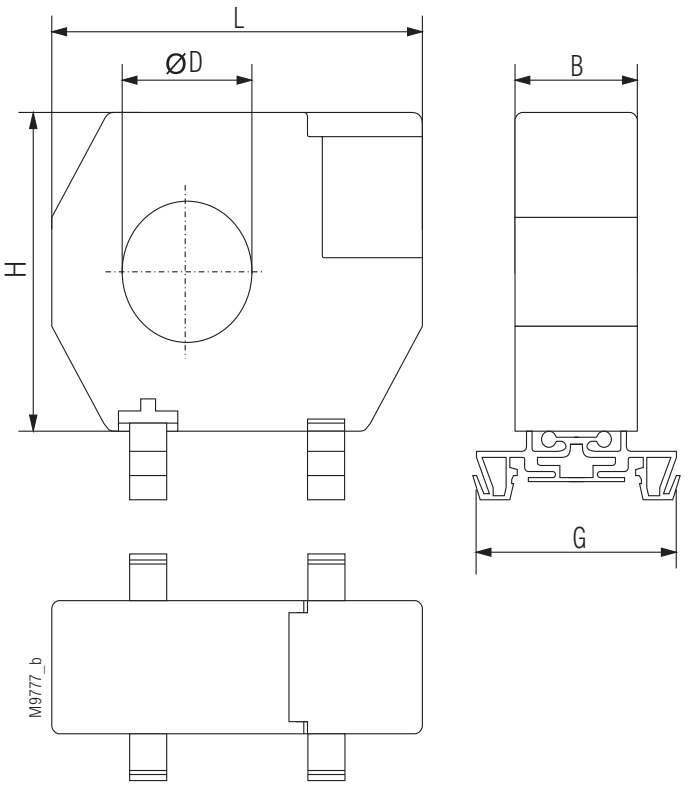
ND 5018/105	øD	L	B	H	C	D	E	F	k	m
Dimensions / mm	105	170	33	146	38	94	46	61	6.5	16
Weight / g	530									

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 a top-hat rail. To do this, remove the screw fastenings and replace them with 2 fastening clips (ET 5018: Art.-Nr. 0058754; VPE 2).

Residual Current Monitor ND 5018/105



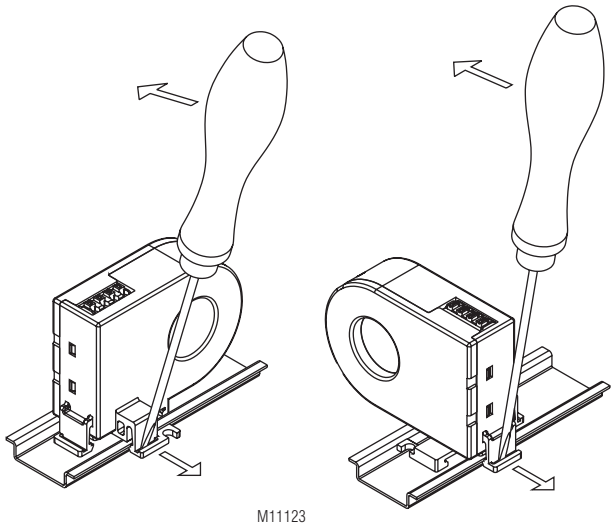
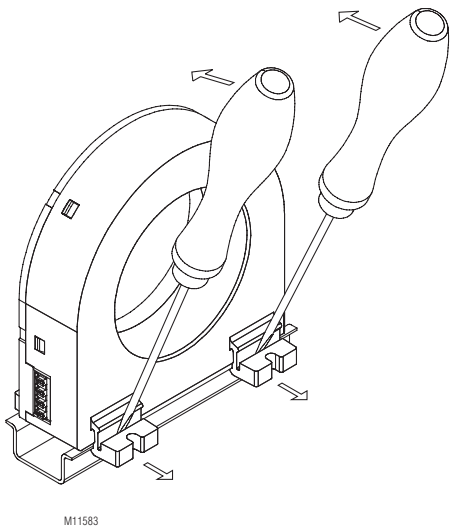
For DIN rail mounting

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

Note for accessoires

The listed current transformers are only approved for operation with this unit.

Disassembling Residual Current Monitor ND 5015/024 and /035



Disassembling Residual Current Monitor ND 5015/070