

VARIMETER RCM

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



IP 5883

ND 5018/035

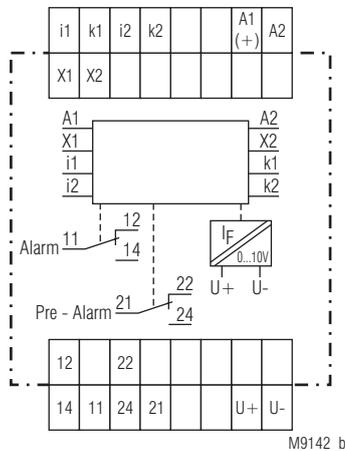
ND 5018/030

Product Description

The AC/DC sensitive residual current monitor IP 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 IP 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 IP 5883 provides early information for precise and cost effective maintenance before the plant stops.

Circuit Diagram



M9142_b

Connection Terminals

Terminal designation	Signal designation
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 ¹⁾
11, 12, 14	Contacts alarm signal
21, 22, 24	Contacts pre-alarm signal
U-, U+	Analogue output (option)

¹⁾ de-energized on trip via bridge

Your Advantage

- Preventive fire and system protection
- Increasing the availability of plants by early fault detection
- Universal usage at AC/DC mains

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 pre-warning
- As option pre warning without auto reset
- With adjustable pre-warning
- With adjustable switching delay
- Energized or de-energized on trip
- LED indicator for operation, prewarning and alarm
- LED-chain indicates fault current
- Analogue output
- With test function
- Broken wire detection
- Removable cover
- 70 mm width

Approvals and Markings



Application

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

Indication

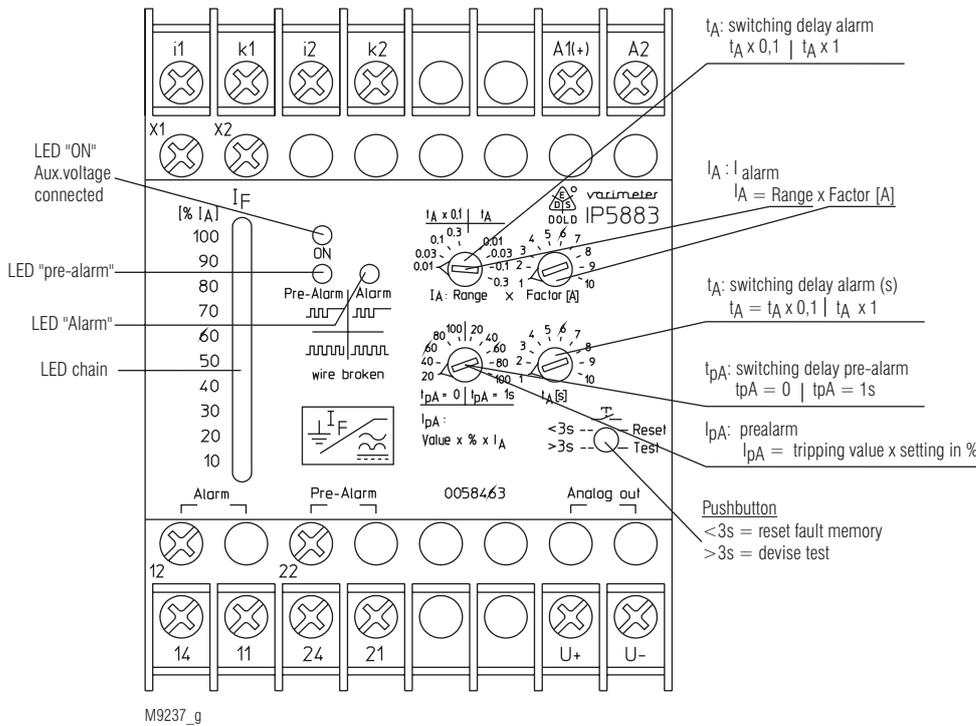
- Green LED "ON": On, when auxiliary supply connected
- Red LED "pre alarm": flashes during time delay, on, when pre-alarm active
- Red LED "alarm": flashes during time delay, on, when alarm active
- Both red LEDs: flashing on broken wire or extremely high input signal
- Yellow LEDs: LED chain indicates fault current in % of adjusted alarm value

Notes

The devices measure AC and DC current (AC/DC sensitive). Due to the measuring principle they are also influenced by magnetic fields next to current transformer.

When planning equipment with AC/DC sensitive residual current monitors, components that create magnetic fields as contactors, transformers etc., should not be placed near to the current transformer. If an influence cannot be avoided, turning the transformer 90° could reduce the influence.

Set-up and Adjustment Facilities



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 IP 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 IP 5883.

On broken sensor wires and broken CT coils the unit goes into alarm state and the both red LEDs for pre-alarm and alarm 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 between 20, 40, 60, 80 and 100 % of the alarm value.

Via rotary switch „t_A“ the time delay of the alarm relay can be adjusted in 2 ranges. Within the chosen range the value is adjusted on rotary switch „Range“.

$t_A \times 0,1$; $t_A = 0,1 \dots 1s$; $t_A \times 1$; $t_A = 1 \dots 10s$

For the time delay of the pre-alarm 2 settings are available.

$t_{pa} = 0$ and $t_{pa} = 1s$

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

Type	Frequeny range	Suitable residual current transformer
IP 5883	DC + AC up to 250 Hz	ND 5018/030 ND 5018/035
IP 5883/070	DC + AC up to 180 Hz	ND 5018/070
IP 5883/140	DC + AC up to 60 Hz	ND 5018/105 ND 5018/140 ND 5018/210

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 IP 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).

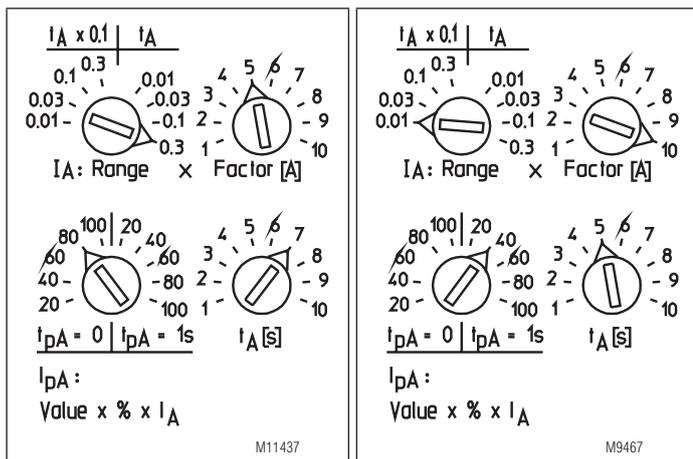
If the „Test/Reset“ button is pressed for > 3 s, a test of the unit is made. The time delays run, the pre-warning and alarm is activated.

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.

Settings

Front detail with potentiometers



Example 1

Alarm at 1.5 A (0.3 A x 5)
 Time delay alarm:
 $t_A = 1 \times 7 \text{ s}$
 Pre-warning at
 80 % of alarm value, 1.2 A
 Time delay pre-warning:
 $t_{pa} = 0 \text{ s}$

Example 2

Alarm at 100 mA (0.01 A x 10)
 Time delay alarm:
 $t_A = 0.1 \times 5 \text{ s}$
 Pre-warning at
 40 % of alarm value, 40 mA
 Time delay pre-warning:
 $t_{pa} = 1 \text{ s}$

Technical Data

Input

Auxiliary voltage U_H:	AC/DC 24 ... 80 V, AC/DC 80 ... 230 V
Voltage range:	DC 19 ... 110 V, AC 19 ... 90 V, DC 64 ... 300 V, AC 64 ... 265 V AC 50 / 60 Hz
Nominal frequency U_H:	
Nominal consumption	
at AC:	5 VA
at DC:	2.5 W
Measuring range:	10 ... 100 mA, 30 ... 300 mA, 100 ... 1000 mA, 300 ... 3000 mA
Measuring range fine adjustment:	1 ... 10
Max. overload:	with overload protection
Pre-warning:	20, 40, 60, 80, 100 %
Frequency range:	DC und AC to 250 Hz
Repeat accuracy:	$\leq \pm 3 \%$
Temperature drift:	$\leq \pm 0.1 \%$ / K
Reaction time:	< 50 ms
Switching delay pre-warning:	without delay or 1 s adjustable
Switching delay alarm:	x 0.1, x 1, fine adjustment 1 ... 10

Output

Contacts:	1 changeover contact for pre-warning, 1 changeover contact for alarm
Thermal current I_{th}:	5 A
Switching capacity	
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
Electrical life	
to AC 15 at 1 A, AC 230 V:	3 x 10 ⁵ switch. cycl. IEC/EN 60 947-5-1
Short circuit strength	
max. fuse rating:	4 A gL IEC/EN 60 947-5-1
Mechanical life:	$\geq 10^8$ switching cycles

Technical Data

Analogue Output

Terminal U_+ / U_- : 0 ... 10 V; 5 mA

If using the analogue output "out+ /out -" you have to use a shielded cable. The shield has to be grounded on both sides.

General Data

Operating mode:	Continuous
Temperature range:	- 40 ... + 60°C
Insulation coordination according to IEC 60664-1:	RN 5883 connected with current transformer ND 5018
Rated voltage:	800 V
Rated impuls voltage / pollution degree:	
Auxiliary voltage / Meas. circuit:	6 kV / 2
Auxiliary voltage / Contacts:	4 kV / 2
Auxiliary voltage / Analogue output:	6 kV / 2
Contacts / Analogue output:	4 kV / 2
Meas. circuit / Analogue output:	6 kV / 2
Contacts 11,12,14 / 21, 22, 24:	4 kV / 2
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	IEC/EN 61 000-4-3, DIN EN 50 121-3-2
80 MHz ... 1 GHz:	20 V / m
1 GHz ... 2.7 GHz:	10 V / m
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 40 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
Climate resistance:	20 / 60 / 03 IEC/EN 60 068-1
Terminal designation:	EN 50 005
Wire connection:	2 x 2.5 mm ² solid or 2 x 1.5 mm ² stranded wire with sleeve DIN 46 228-1/-2/-3/-4
Wire fixing:	Flat terminals with self-lifting clamping piece
Mounting:	DIN rail IEC/EN 60 715
Weight:	220 g

Dimensions

Width x height x depth: 70 x 90 x 59 mm

Classification to DIN EN 50155 for IP 5883

Vibration and shock resistance:	Category 1, Class B IEC/EN 61 373
Protective coating of the PCB:	No

Standard Type

- IP 5883 AC/DC 80 ... 230 V 50 / 60 Hz
 Article number: 0058463
- for residual current transformer ND 5018/030 and ND 5018/035
 - with pre warning and manual reset
 - Energized or de-energized on trip
 - Auxiliary voltage U_H : AC/DC 80 ... 230 V
 - Width: 70 mm

Variants

For residual current transformer ND5018/030, ND5018/035:

- IP 5883/001: manual reset,
pre warning with auto reset

For residual current transformer ND5018/070:

- IP 5883/070: pre warning and manual reset

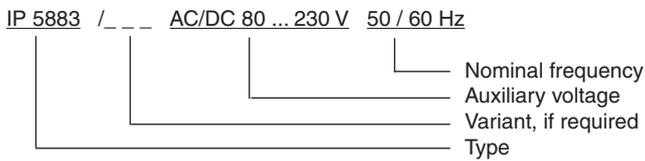
- IP 5883/071: manual reset,
pre warning with auto reset

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

- IP 5883/140: pre warning and manual reset

- IP 5883/141: manual reset,
pre warning with auto reset

Ordering example for variants



Technical Data Residual Current Monitor ND 5018

- Ambient temperature:** - 40 ... + 60°C / 253 K ... 333 K
Inflammability class: V0 according to UL94

Insulation coordination according to IEC 61869-1

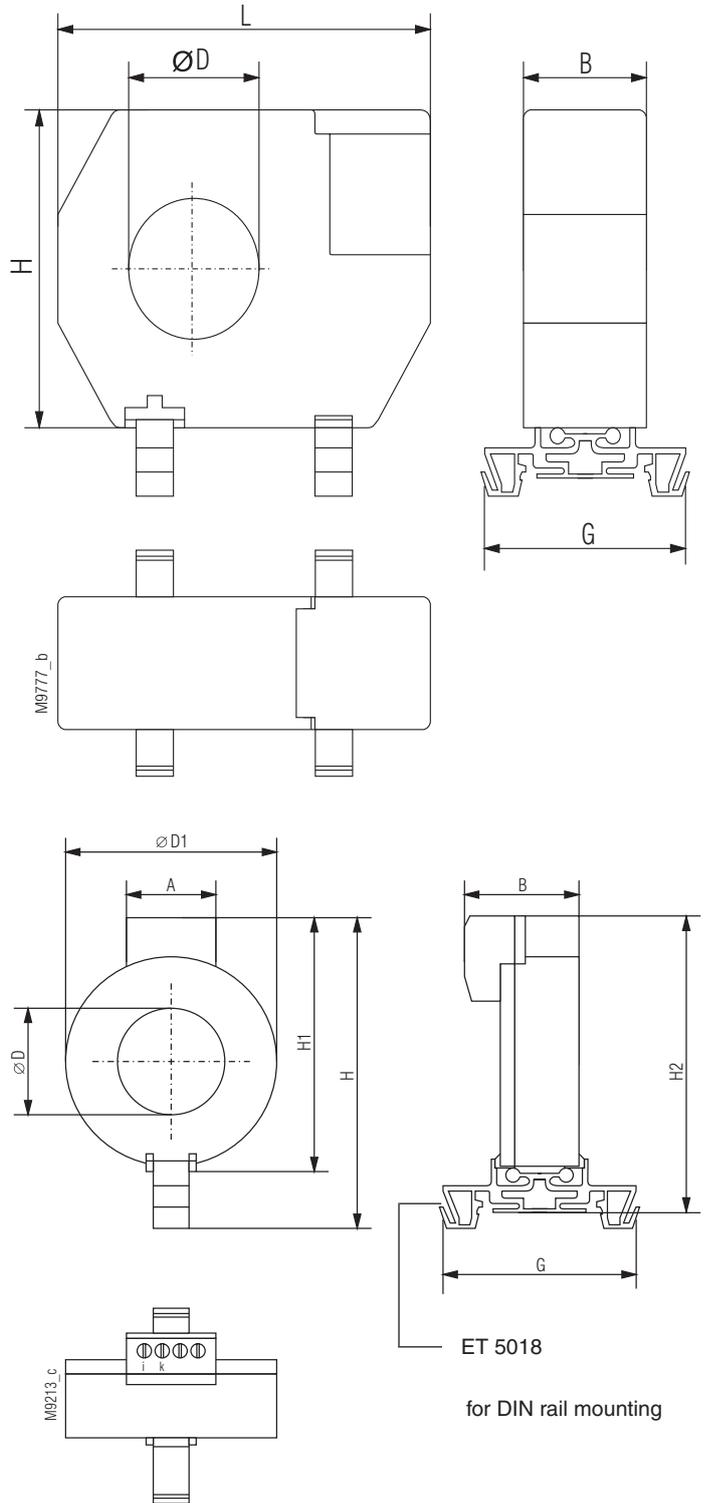
- Highest rated operating voltage U_m : AC 720 V
 Rated impulse voltage: 3 kV

- Length of connection wires
 Type of wire to CT, e.g.
 Single wire: up to 1 m
 Single wire twisted pair: up to 10 m
 (pair 1: i1 - k1; pair 2: i2 - k2): up to 25 m
 Screened wire; screen one end grounded to PE:
 Wire cross section: 0,2 ... 1,5 mm²
 Stripping length: 8 mm

- ND 5018:**
 Wire fixing: Flat terminals with self-lifting clamping piece
 Screw fastening: (only at ND 5018/035, ND 5018/070,
 ND 5018/105, ND 5018/140, ND 5018/210) M 5
 DIN rail mounting: using mounting adapter ET 5018

Accessories

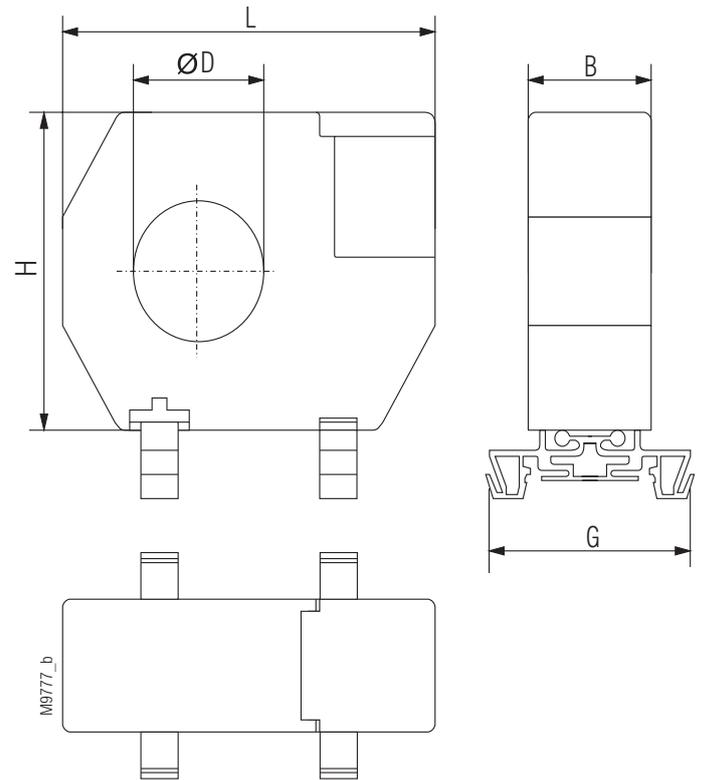
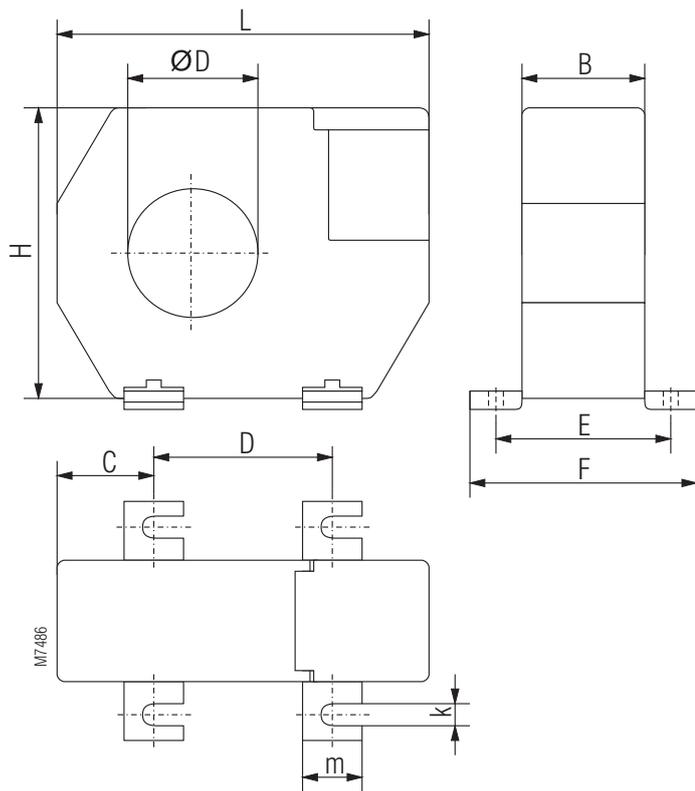
ND 5018/030 Residual Current Transformer



ND 5018/030	øD	øD1	L	B	A	H	H1
Dimensions/mm	30	59	55	32	25	87	70
Weight / g	90						

Residual Current Monitor ND 5018/035, ND 5018/070, ND 5018/105, ND 5018/140, ND 5018/210,

Residual Current Monitor ND 5018/035, ND 5018/070, ND 5018/105



for screw mounting

for DIN rail mounting

ND 5018/035	øD	L	B	H	C	D	E	F	k	m
Dimensions / mm	35	100	33	79	26	48.5	46	61	6.5	16
Weight / g	170									

ND 5018/035	øD	L	B	H	G
Dimensions / mm	35	100	33	79	55
Weight / g	170				

ND 5018/070	øD	L	B	H	C	D	E	F	k	m
Dimensions / mm	70	130	33	110	32	66	46	61	6.5	16
Weight / g	300									

ND 5018/070	øD	L	B	H	G
Dimensions / mm	70	130	33	110	55
Weight / g	300				

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									

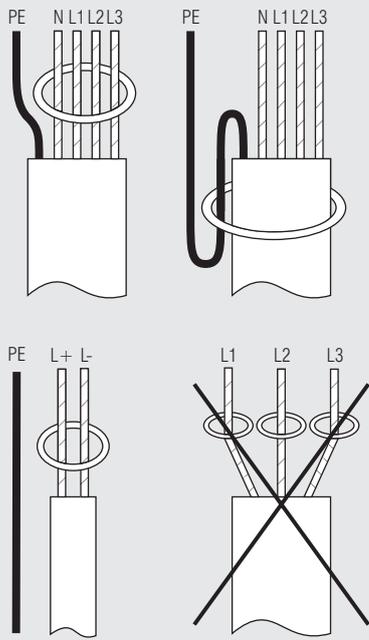
ND 5018/105	øD	L	B	H	G
Dimensions / mm	105	170	33	146	55
Weight / g	530				

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									

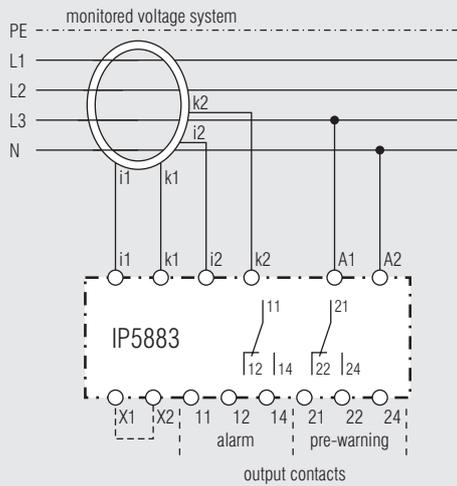
The residual current transformers ND 5018/035, ND 5018/070, ND 5018/105 can also be mounted on DIN-rail. To do this the metal screw fixings have to be removed and have to be replaced by 2 mounting clips (ET5018: art.no. 0058754; set with 2 pcs)

Installation of Wires



M8362_a

Connection Example



X1-X2 without bridge : energized on trip
 X1-X2 with bridge : de-energized on trip

M9238_a