

Installation and Operating Manual

Residual Current Signalling Relay DRCM 1A

General

The Relay DRCM 1A Relay is a residual current monitoring device designed in accordance with DIN EN 62020 / VDE 0663.

The Relay detects Type A residual currents via a remotely mounted current transformer, available from the DCT A-... Series. Only one DCT A-... transformer may be connected to a DRCM 1A signalling relay.

Residual current monitoring devices are intended to monitor an electrical installation or an electrical circuit for the occurrence of a residual current and to signal this with an alarm when a defined value is exceeded.

They are generally not used as an independent protection measure, but can be operated in conjunction with other protective devices (e. g. residual current circuit breakers).

The DRCM 1A is a mains voltage-dependent signalling relay for mounting in distribution boards in areas with overvoltage category III. The response range of the nominal residual current ($I_{\Delta n}$) can be selected, and the response time can be varied. Furthermore, the device triggers an alarm when the defined response threshold is exceeded and also incorporates a pre-alarm whose threshold value can be varied. Alarms are signalled on the device by means of LEDs and can also be polled via two independent, electrically isolated relay contacts.

In addition, various warning signals indicate a faulty connection to the external current transformer.

The level of the momentary residual current, the response threshold of the pre-alarm and the exceeding of the response thresholds are indicated via the integral LED display.

Installation

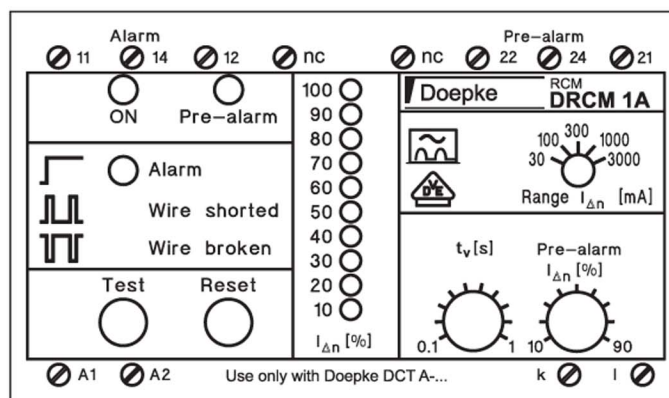
The manufacturer's safety and installation instructions, national codes and safety regulations must be observed. Inspect the DRCM 1A for visible signs of damage before installation. If damage or faults are discovered, the DRCM 1A must not be installed and operated. Use of the devices for other than their intended purpose may result in equipment damage and personal injury.

The residual current signalling relay operates independently of its position. It is installed by snapping onto a TH35 DIN rail in accordance with DIN EN 60715.

Installation may only be carried out by an authorised electrician familiar with the applicable installation regulations. The circuit diagram below must be observed during installation:

Terminal	Description
A1	Supply voltage (L)
A2	Supply voltage (N)
k	Transformer terminal
l	Transformer terminal
Alarm 11	Relay contact Alarm + (COM)
Alarm 12	Relay contact Alarm (NO)
Alarm 14	Relay contact Alarm (NC)
Pre-Alarm 21	Relay contact Pre-alarm + (COM)
Pre-Alarm 22	Relay contact Pre-alarm (NC)
Pre-Alarm 24	Relay contact Pre-alarm (NO)
nc	not connected

Note: The "Alarm" relay is active during normal fault-free operation (undervoltage detection) and closes contact 11 / 12.



Commissioning:

After connecting the transformer and switching on the supply voltage

- Correct connection of the operating voltage is indicated by a green LED (ON) on the device front panel.
- The relay switches on the „Alarm“ relay as long as there is no fault in the system.
- The set pre-alarm response threshold is indicated by a permanently lit LED on the 10 LED display.
- A possible residual current is signalled by a flashing LED on the 10 LED display.

Note: Should a residual current above the response threshold already be flowing, the LEDs "Pre-alarm" and possibly "Alarm" may be activated and the relay may change state accordingly.

Operating elements:

Test button "Test"

If the "Test" button is pressed when the operating voltage is switched on, a residual current above the response threshold for the alarm is simulated. This is signalled by the permanently lit red "Alarm" LED and the orange "Pre-alarm" LED and the relay contacts change state.

Furthermore, the lead to the external transformer is tested for short-circuit. If the transformer line has a short-circuit, both relay contacts change state. The orange "Pre-Alarm" LED is lit permanently and the red "Alarm" flashes as follows:



Short pulse, long pause:

Reset button "Reset"

When the "Reset" button is pressed, all fault displays and activated relays are reset to their normal operating state.

Note: If the fault still exists, the alarms trip again after a brief delay.

Rotary switch–response time “ t_v (s)”

The response time of the “Alarm” relay can be set in 10 steps (step increment 0.1 s) via the rotary switch on the face of the device: 0.1 s to 1 s.

This setting feature can be used to adjust the sensitivity to pulse-shaped residual currents e. g. switching surge voltages or thunder storms.

Pre-alarm rotary switch “Pre-alarm $I_{\Delta n}$ (%)”

The pre-alarm response threshold can be set in 10 % steps in the range from 10 % to 90 % of the response threshold of the main alarm. The set pre-alarm threshold is indicated by a static display on the 10 LED display.

Nominal response residual current rotary switch “Range $I_{\Delta n}$ (mA)”

This rotary switch allows the following values to be set in steps for the nominal response residual current $I_{\Delta n}$: 30, 100, 300, 1000, 3000 mA.

Displays/relays:

Operating display “ON”

Correct connection of the operating voltage is indicated by a green LED on the face of the device.

Alarm display and pre-alarm relay “Pre-alarm”

If the momentary residual current exceeds the value of the set pre-alarm response threshold or there is a fault in the transformer, the orange “Pre-alarm” LED is activated.

In addition, the “Pre-alarm” relay change state.


Alarm display and “Alarm” relay

If the momentary residual current exceeds the value of the set alarm response threshold, the red “Alarm” LED is activated.

In addition, the “Alarm” relay changes state.


If there is a fault in the transformer, this LED flashes as follows:

Wire shorted (transformer line short-circuit):

Short pulse, long pause: 

(The short-circuit detection functions only when the „Test“ button is pressed)

Wire broken (transformer line wire breakage):

Long pulse, short pause: 

Note: Wire breakage is monitored permanently; the detection of a broken wire is signalled after approx. 1.5 seconds.

10 LED display “ $I_{\Delta n}$ (%)”

The following values can be read off from this display:

- The momentary residual current in the form of a flashing LED. The displayed value corresponds to the percentage of the response threshold.
- The permanently lit LED indicates the value of the set pre-alarm response threshold. The displayed value corresponds to the percentage of the response threshold.
- If the 100 % LED flashes, this also signals that the response threshold for the alarm has been exceeded.

All displays operate output without any delay.

Note: The 100 % response threshold is permanently set to approx. 80 % of the selected nominal response residual current $I_{\Delta n}$.


Guarantee:

For correctly installed, unmodified device we give the statutory warranty from the date of purchase by the end user. The guarantee does not cover transport damage or damage caused by short-circuit or overload. Our works will replace all devices with manufacturing errors or material flaws discovered within the warranty period free of charge. Opening of the device will void all warranty claims.

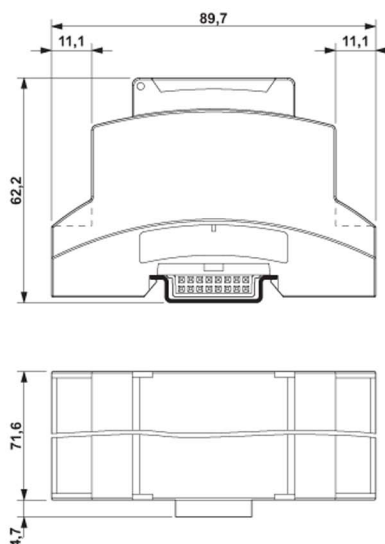
Technical data

Signalling Relay DRCM 1A	
DIN EN 62020	
Field of application	Signalling relay for connection to the external detection unit DCT A... for signalling Type A residual currents in electrical engineering installations
Supply voltage / Power consumption	85-264 V _{AC} , 50-60 Hz / Power consumption: < 4 VA
Rated response residual current I _{Δn}	3000 mA
Nominal response residual current I _{Δn}	variable: 30 mA, 100 mA, 300 mA, 1000 mA, 3000 mA
Response threshold, alarm	80 % + 20 % of the set nominal response residual current I _{Δn}
Response threshold, pre-alarm	variable: 10–90 % of the alarm threshold
Response time at 1x I _{Δn}	variable: 0,1 ... 1 s
Impulse withstand strength	with DCT A... transformer: lightning impulse current > 3 kA (8/20 μs)
DIN EN 60664	
Rated voltage U _n	230 V _{AC}
Rated impulse withstand voltage U _{imp}	4 kV
Overvoltage category	III
Pollution degree	2
Displays, operating elements	
Operation indicator / error message	operation: green LED; error: red LED, orange LED, flashing display LED, relay output
Operating elements	test button, reset button, rotary switch for nominal response residual current, rotary switch for pre-alarm threshold and response time
Residual current display I _{Δn} (%)	10 LED display 10–100%
Fault in transformer connection	wire breakage automatic / short-circuit on pressing the ‚Test‘ button
Error memory	yes, manual reset necessary
Relay contacts	
Alarm	changeover contact, ON during fault-free operation
Pre-alarm	changeover contact, OFF during fault-free operation
Rated voltage U _n / rated current I _n	230 V _{AC} / 5 A (cos φ > 0.9)
Device back-up fuse	internal device fuse 0.4 A / back-up fused dimensioned to protect the connecting lead
Relay contact back-up fuse / type	fuse link gL max. 4 A / micro switching contact (μ)
Terminals	
Type of terminals	screw terminal with strain-relief clamp / 0.2 mm ² to 2.5 mm ² with wire end ferrule or up to 4 mm ² rigid
Tightening torque of the terminals	0.6 Nm; tool: flat screwdriver 0.6 x 3.5 mm
Other data	
Housing dimensions / Weight	71.6 x 89.7 x 62.2 (W x H x D in mm) / 4 modules / Weight 0.170 kg
Housing type / Housing material / Operating position	distribution board housing in accordance with DIN 43880 for mounting on DIN rail to DIN EN 60715 / polycarbonate / operating position: any
Type of protection	IP 20; IP 40 with board installation with cover
Operating / Storage temperature range	-25°C to +65°C (storage: -40°C to +85°C)
Installation regulations / Test symbol	DIN EN 62020, DIN EN 60664 / VDE certified
Article number	09 340 250

Accessories

DCT A-... Series transformer: external transformer for DRCM 1A							
Field of application	Detection of residual currents in earthed networks with insulated cable systems; only in conjunction with signalling relay DRCM 1A or DMRC 1A						
Rated frequency	50 - 60 Hz						
Residual current detection characteristic	Typ A  AC and pulsating DC fault current 50–60 Hz						
Nominal response residual current	30 mA – 3000 mA						
Transformer lead	max. 10 m PVC single core twisted: LiY 0.5 mm ² or at least equivalent type with approval for use in low-voltage switchgear installations						
Transformer type designation DCT A-...	20	30	35	70	105	140	210
Transformer inside diameter	20 mm	30 mm	35 mm	70 mm	105 mm	140 mm	210 mm
Max. permissible OD of the lead(s)	13 mm	20 mm	23 mm	46 mm	70 mm	93 mm	140 mm
Rated voltage U _n	690 V						
Rated surge withstand capability U _{imp}	8 kV						
Rated current I _n with / without DMBT	50 A	100 A	125 A	660/200 A	330/250 A	420/350 A	500/400 A
Article number	09 340 253	09 340 254	09 340 255	09 340 256	09 340 257	09 340 258	09 340 259
Installation regulations	DIN EN 62020 / VDE 0663, DIN EN 60947-2-M / VDE 0660-101-M, DIN EN 60044						
Transformer accessories						Article number	
DCT-A clip	Installation clip for securing transformer on DIN rail						09 340 260
DMBT 35	Magnetic balance tube 35 mm						09 340 261
DMBT 70	Magnetic balance tube 70 mm						09 340 262
DMBT 105	Magnetic balance tube 105 mm						09 340 263
DMBT 140	Magnetic balance tube 140 mm						09 340 264
DMBT 210	Magnetic balance tube 210 mm						09 340 265

Dimensions



Circuit diagram

