Eaton.com

xEffect - Industrial Switchgear Range Residual Current Devices FRCmM-NA

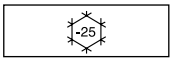
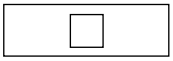
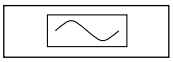
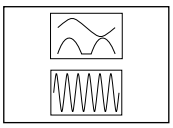
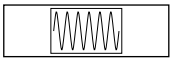
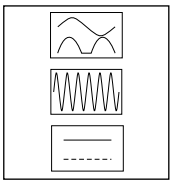
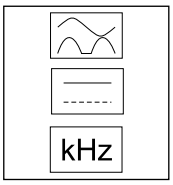
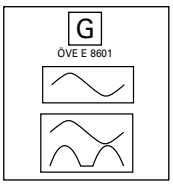
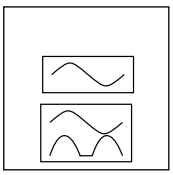
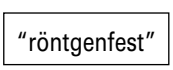
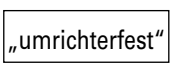
Catalog

EATON

Powering Business Worldwide

Residual Current Devices - General Data

Short description of the most important RCD types

Symbol	Description
	Eaton standard. Suitable for outdoor installation (distribution boxes for outdoor installation and building sites) up to -25° C.
	Conditionally surge-current proof (>250 A, 8/20 µs) for general application.
	Type AC: AC current sensitive RCCB
	Type A: AC and pulsating DC current sensitive RCCB, not affected by smooth DC fault currents up to 6 mA
	Type F: AC and pulsating DC current sensitive RCCB, trips also at frequency mixtures (10 Hz, 50 Hz, 1000 Hz), min. 10 ms time-delayed, min. 3 kA surge current proof, higher load capacity with smooth DC fault currents up to 10 mA
	Frequency range up to 20 kHz
	Trips also at frequency mixtures (10 Hz, 50 Hz, 1000 Hz)
	Type B: All-current sensitive RCD switchgear for applications where DC fault currents may occur. Non-selective, non-delayed. Protection against all kinds of fault currents.
	Type B+: All-current sensitive RCD switchgear for applications where DC fault currents may occur. Non-selective, non-delayed. Protection against all kinds of fault currents. Provides enhanced fire safety.
	RCD of type G (min 10 ms time delay) surge current-proof up to 3 kA. For system components where protection against unwanted tripping is needed to avoid personal injury and damage to property. Also for systems involving long lines with high capacitive reactance. Some versions are sensitive to pulsating DC. Some versions are available in all-current sensitive design.
	RCD of type S (selective, min 40 ms time delay) surge current-proof up to 5 kA. Mainly used as main switch, as well as in combination with surge arresters.This is the only RCD suitable for series connection with other types if the rated tripping current of the downstream RCD does not exceed one third of the rated tripping current of the device of type S. Some versions are sensitive to pulsating DC. Some versions are available in all-current sensitive design.
	„X-ray-proof“, for avoiding unwanted tripping caused by x-ray devices.
	„Frequency converter-proof“, for avoiding unwanted tripping caused by frequency converters, speed-controlled drives, etc.

Kind of residual current and correct use of RCD Types

Kind of current	Current profile	Correct use / application field of RCCB types AC	A	F	B / B+	Tripping current
Sinusoidal AC residual current		✔	✔	✔	✔	0.5 to 1.0 $I_{\Delta n}$
Pulsating DC residual current (positive or negative half-wave)		–	✔	✔	✔	0.35 to 1.4 $I_{\Delta n}$
Cut half-wave current		–	✔	✔	✔	Lead angle 90°: 0.25 to 1.4 $I_{\Delta n}$
Lead angle 90° el Lead angle 135° el			✔	✔	✔	Lead angle 135°: 0.11 to 1.4 $I_{\Delta n}$
Half-wave with smooth DC current of 6 mA		–	✔	✔	✔	max. 1.4 $I_{\Delta n}$ + 6 mA
Half-wave with smooth DC current of 10 mA		–	–	✔	✔	max. 1.4 $I_{\Delta n}$ + 10 mA
Smooth DC current		–	–	–	✔	0.5 to 2.0 $I_{\Delta n}$

Tripping time

Break time and non-actuating time for alternating residual currents (r.m.s. values) for type AC and A RCCB

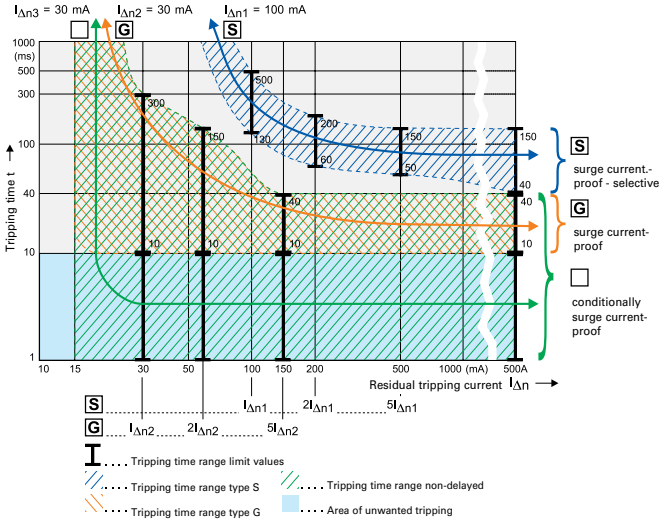
Classification	$I_{\Delta n}$ mA		$I_{\Delta n}$	$2xI_{\Delta n}$	$5xI_{\Delta n}$	5 x $I_{\Delta n}$ or 0.25A	500A
Standard RCD Conditionally surge current-proof 250 A	≤30	Max. tripping time (s)	0.3	0.15		0.04	0.04
Standard RCD Conditionally surge current-proof 250 A	>30	Max. tripping time (s)	0.3	0.15	0.04		0.04
RCCB Type G (Short-time-delay) Surge current-proof 3 kA	30	Min. non actuating time(s) Max. tripping time (s)	0.01 0.3	0.01 0.15		0.01 0.04	0.01 0.04
RCCB Type G (Short-time-delay) Surge current-proof 3 kA	>30	Min. non actuating time(s) Max. tripping time (s)	0.01 0.3	0.01 0.15	0.01 0.04		0.01 0.04
RCCB Type S (Selective) Surge current-proof 5 kA	>30	Min. non actuating time(s) Max. tripping time (s)	0.13 0.5	0.06 0.2	0.05 0.15		0.04 0.15

Break time for half-wave pulsating residual currents (r.m.s. values) for type A RCCB

Classification	$I_{\Delta n}$ mA		$1.4xI_{\Delta n}$	$2xI_{\Delta n}$	$2.8xI_{\Delta n}$	$4xI_{\Delta n}$	7 x $I_{\Delta n}$	0.35 A	0.5 A	350A
Standard RCD Conditionally surge current-proof 250 A	<30	Max. tripping time (s)		0.3		0.15			0.04	0.04
Standard RCD Conditionally surge current-proof 250 A	30	Max. tripping time (s)	0.3		0.15			0.04		0.04
Standard RCD Conditionally surge current-proof 250 A	>30	Max. tripping time (s)	0.3		0.15		0.04			0.04
RCCB Type G (Short-time-delay) Surge current-proof 3 kA	30	Max. tripping time (s)	0.3		0.15			0.04		0.04
RCCB Type G (Short-time-delay) Surge current-proof 3 kA	>30	Max. tripping time (s)	0.3		0.15		0.04			0.04
RCCB Type S (Selective) Surge current-proof 5 kA	>30	Max. tripping time (s)	0.5		0,2		0.15			0.15

Tripping Characteristics (IEC/EN 61008)

Tripping characteristics, tripping time range and selectivity of instantaneous, surge current-proof „G“ and surge current-proof - selective „S“ residual current devices.



IEC 60364-4-41 deals with additional protection: The use of RCDs with a rated residual operating current not exceeding 30 mA, is recognized in a.c. systems as additional protection in the event of failure of the provision for basic protection and/or the provision for fault protection or carelessness by users.

This means when using RCDs for fault current/residual current protection two RCDs must be connected in series.

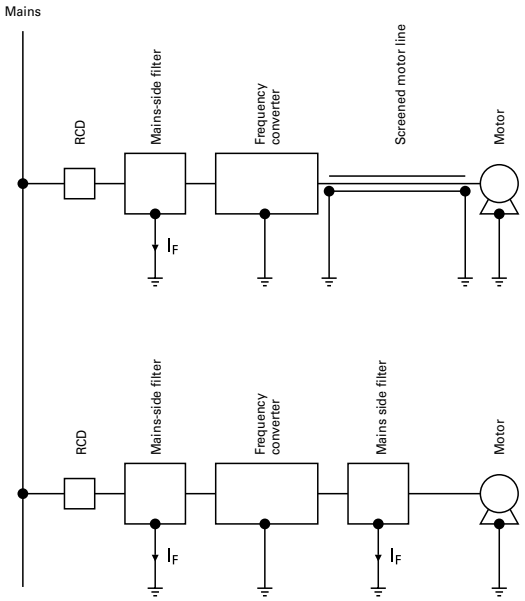
Testing:

RCDs with tripping time delay (Types -G and -S) may be function tested with conventional testing equipment which must be set according to the instructions for operation of the testing device. Due to reasons inherent in the measuring process, the tripping time determined in this way may be longer than expected in accordance with the specifications of the manufacturer of the measuring instrument.

However, the device is ok if the result of measurement is within the time range specified by the manufacturer of the measuring instrument.

Hints for the application of our frequency converter-proof RCDs:

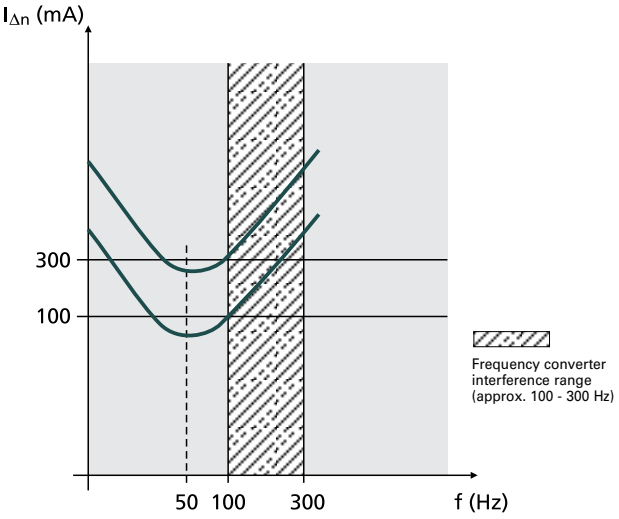
Due to the currents flowing off through the filters (designated IF), the sum of currents through the RCD is not exactly zero, which causes unwanted tripping.



Frequency converters are used in a wide variety of systems and equipment requiring variable speed, such as lifts, escalators, conveyor belts, and large washing machines. Using them for such purposes in circuits with conventional residual current devices causes frequent problems with unwanted tripping.

The technical root cause of this phenomenon is the following: Fast switching operations involving high voltages cause high interference levels which propagate through the lines on the one hand, and in the form of interfering radiation on the other. In order to eliminate this problem, a mains-side filter (also referred to as input filter or EMC-filter) is connected between the RCD and frequency converter. The anti-interference capacitors in the filters produce discharge currents against earth which may cause unwanted tripping of the RCD due to the apparent residual currents. Connecting a filter on the output side between frequency converter and 3-phase AC motor results in the same behaviour.

Tripping characteristic



This sample tripping characteristic of a 100 mA RCD and a 300 mA RCD shows the following: In the frequency range around 50 Hz, the RCDs trip as required (50 - 100 % of the indicated $I_{\Delta n}$).
In the range shown hatched in the diagram, i. e. from approx. 100 to 300 Hz, unwanted tripping occurs frequently due to the use of frequency converters. Frequency converter-proof residual current devices are much less sensitive in this frequency range than in the 50 - 60 Hz range, which leads to an enormous increase in the reliability of systems.

Therefore, we recommend to use RCDs designed for applications with frequency converter!
These special residual current devices can be recognised by an extension of the type designation („**-F**"). They meet the requirements of compatibility between RCDs and frequency converters with respect to unwanted tripping.

These are **NOT AC/DC-sensitive** (IEC 62423) RCDs of type B !!!

Our **RCDs of type „-F"** are characterised by **SENSITIVITY TO RESIDUAL PULSATING DC** and **SELECTIVITY** S or **SHORT-TIME DELAY** G

SG49612

Description

- Wide range of compact types of RCDs serving as fault-current and additional protection according to UL1053 & IEC/EN 61008 standards, suitable for worldwide use
- Comprehensive range of accessories
- Real contact position indicator
- Fault current tripping indicator
- Automatic re-setting possible
- Transparent designation plate
- Classified for the use in rail rolling stock

Type A

Conditionally surge current-proof 250 A, sensitive to residual pulsating DC, Type A

SG48612

2-poles

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
25/0.03	FRCmM-25/2/003-A-NA	167113	1/60
25/0.3	FRCmM-25/2/03-A-NA	167116	1/60
40/0.03	FRCmM-40/2/003-A-NA	167114	1/60
40/0.3	FRCmM-40/2/03-A-NA	167117	1/60
63/0.03	FRCmM-63/2/003-A-NA	167115	1/60
63/0.3	FRCmM-63/2/03-A-NA	167118	1/60

SG49612

4-poles

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
25/0.03	FRCmM-25/4/003-A-NA	167125	1/30
25/0.3	FRCmM-25/4/03-A-NA	167104	1/30
40/0.03	FRCmM-40/4/003-A-NA	167102	1/30
40/0.3	FRCmM-40/4/03-A-NA	167105	1/30
63/0.03	FRCmM-63/4/003-A-NA	167103	1/30
63/0.3	FRCmM-63/4/03-A-NA	167106	1/30

Type G/A

Surge current-proof 3 kA, sensitive to residual pulsating DC, Type G/A (ÖVE E 8601)

SG48612

2-poles

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
25/0.03	FRCmM-25/2/003-G/A-NA	167119	1/60
25/0.3	FRCmM-25/2/03-G/A-NA	167122	1/60
40/0.03	FRCmM-40/2/003-G/A-NA	167120	1/60
40/0.3	FRCmM-40/2/03-G/A-NA	167123	1/60
63/0.03	FRCmM-63/2/003-G/A-NA	167121	1/60
63/0.3	FRCmM-63/2/03-G/A-NA	167124	1/60

SG49612

4-poles

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
25/0.03	FRCmM-25/4/003-G/A-NA	167107	1/30
25/0.3	FRCmM-25/4/03-G/A-NA	167110	1/30
40/0.03	FRCmM-40/4/003-G/A-NA	167108	1/30
40/0.3	FRCmM-40/4/03-G/A-NA	167111	1/30
63/0.03	FRCmM-63/4/003-G/A-NA	167109	1/30
63/0.3	FRCmM-63/4/03-G/A-NA	167112	1/30

Specifications | Residual Current Devices FRCmM-NA

Description

- Residual current devices
- Purpose terminal lift above and below
- Universal tripping signal switch, also suitable for FAZ, FRBmM-1N can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Contact position indicator red - green
- Tripping indicator white - blue
- All types suitable for being used with standard fluorescent tubes with or without electronical ballast (30mA-RCD: 30 units per phase conductor, 300mA-RCD: 90 units per phase conductor).
  Notes: Depending of the fluorescent lamp ballast manufacturer partly more possible. Symmetrical allocation of the fluorescent lamp ballasts on all phases favourably. Shifting references of the fluorescent lamp ballast manufacturer consider.
- The device functions irrespective of the position of installation
- Tripping is line voltage-independent. Consequently, the RCD is suitable for "fault current/residual current protection" and "additional protection" within the meaning of the applicable installation rules.
- Mains connection at either side
- The 4-pole device can also be used for 2-pole connection:
  See connection possibilities.
- The test key "T" must be pressed every 6 months. The system operator must be informed of this obligation and his responsibility in a way that can be proven (self-adhesive RCD-label enclosed). Under special conditions (e.g. damply and/or dusty environments, environments with polluting and/or corroding conditions, environments with large temperature fluctuations, installations with a risk of overvoltages due to switching of equipment and/or atmospheric discharges, portable equipment ...), it's recommended to test in monthly intervals.
- Pressing the test key "T" serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (R_E), or proper checking of the earth conductor condition redundant, which must be performed separately.
- **Type -A**: Protects against special forms of residual pulsating DC which have not been smoothed.
- **Type -G/A**: Additionally protects against special forms of residual pulsating DC which have not been smoothed

Accessories:		
Auxiliary switch for subsequent installation to the left *)	Z-HK	248432
Tripping signal contact for subsequent installation to the right	Z-NHK	248434
Automatic restarting device *)	Z-FW/LP	248296
	Z-FW-LPD	265244
Remote control *)	Z-FW-MO	284730
Pre-mounted sets *)	Z-FW-LP/MO	290171
	Z-FW-LPD/MO	290172
Remote testing module *)	Z-FW/003	248298
	Z-FW/030	248300
Terminal cover 4-poles *)	Z-RC/AK-4TE	101062

*) without UL certification

Technical Data

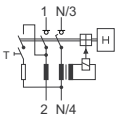
		FRCmM-NA
Electrical according to IEC/EN 61008		
Design according to		IEC/EN 61008, ÖVE E 8601
Classified according to		IEC 61373, EN 45545-2
Current test marks as printed onto the device		
Tripping		instantaneous
Type G		10 ms delay at 50 Hz
Rated voltage	U_n	240/415 V; 50/60 Hz
Limits operation voltage test circuit		
2-poles		196 - 264 V~
4-poles 30 mA		196 - 264 V~
4-poles 300 mA		196 - 456 V~
Rated tripping current	$I_{\Delta n}$	30, 300 mA
Sensitivity		AC and pulsating DC
Rated insulation voltage	U_i	440 V
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50µs)
Rated short circuit capacity	I_{cn}	10 kA with back-up fuse
Peak withstand current		
Type A		250 A (8/20 µs) surge current-proof
Type G/A		3 kA (8/20 µs) surge current-proof, 10 ms delay
Rated breaking capacitiy	I_m	
or rated fault breaking capacity	$I_{\Delta m}$	
I_n = 25-40 A		500 A
I_n = 63 A		630 A
Endurance		
electrical components		≥ 4,000 operating cycles
mechanical components		≥ 10,000 operating cycles
Electrical according to UL1053		
Design according to		UL1053
Current test marks as printed onto the device		
Tripping		instantaneous
Type G		8 ms delay at 60 Hz
Rated voltage	U_n	480Y/277 V, 60 Hz
Limits operation voltage test circuit		
2-poles		196 - 305 V~
4-poles 30 mA		196 - 305 V~
4-poles 300 mA		196 - 528 V~
Pick-up current		
30 mA Types		22 mA
300 mA Types		200 mA
Sensitivity		AC and pulsating DC
Overvoltage tested		530 V
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50µs)
Rated short circuit capacity	I_{cn}	5 kA acc. to CSA
Rated breaking capacitiy	I_m	
or rated fault breaking capacity	$I_{\Delta m}$	
I_n = 25-40 A		500 A
I_n = 63 A		630 A
Endurance		
electrical components		≥ 4,000 operating cycles
mechanical components		≥ 10,000 operating cycles

Mechanical

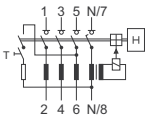
Frame size	45 mm
Device height	80 mm
Device width	35 mm (2MU), 70 mm (4MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Degree of predection in moisture-proof enclosure	IP54
Upper and lower terminals	lift terminals
Terminal protection	finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity	1.5 - 35 mm^2 single wire 2 x 16 mm^2 multi wire
Terminal screw	M5 (with slotted screw acc. to EN ISO 4757-Z2, Pozidriv PZ2)
Operation temperature	-25°C to +40°C
Storage- and transport temperature	-35°C to +60°C
Resistance to climatic conditions	acc. to IEC/EN 61008
Humidity	5-95 %
Pollution degree	2
Contact position indicator	red / green
Tripping indicator	white / blue

Connection diagram

2-poles

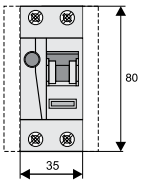


4-poles

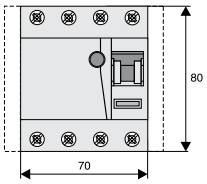


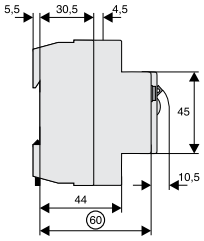
Dimensions (mm)

2P



4P

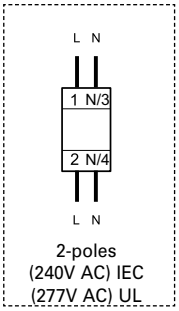




Correct connection

2-poles acc. to IEC61008/UL1053

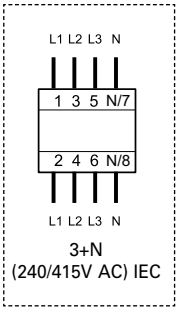
30, 300mA Types:



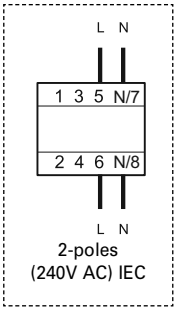
2-poles
(240V AC) IEC
(277V AC) UL

4-poles acc. to IEC61008

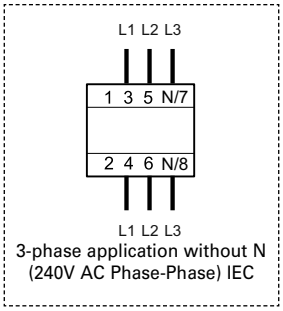
30mA Types:



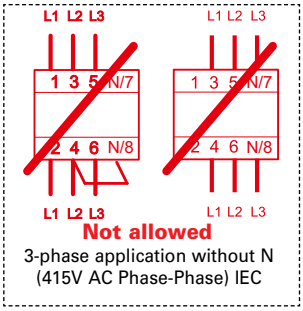
3+N
(240/415V AC) IEC



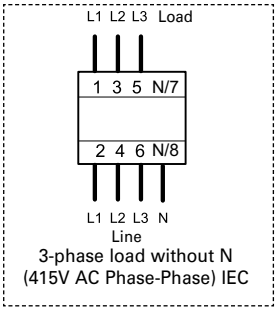
2-poles
(240V AC) IEC



3-phase application without N
(240V AC Phase-Phase) IEC

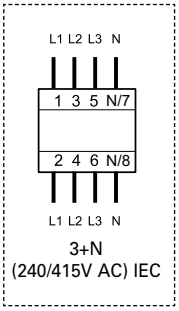


3-phase application without N
(415V AC Phase-Phase) IEC

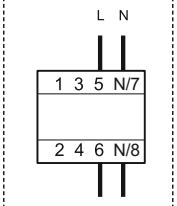


3-phase load without N
(415V AC Phase-Phase) IEC

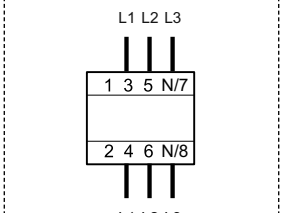
300mA Types:



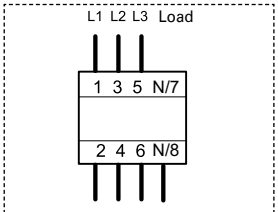
3+N
(240/415V AC) IEC



2-poles
(240V AC) IEC



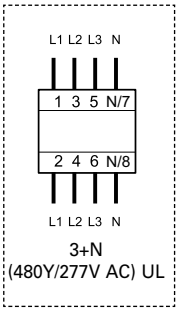
3-phase application without N
(240/415V AC Phase-Phase) IEC



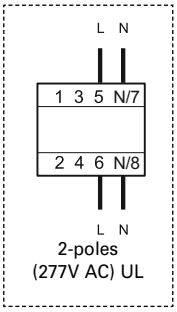
3-phase load without N
(415V AC Phase-Phase) IEC

4-poles acc. to UL1053

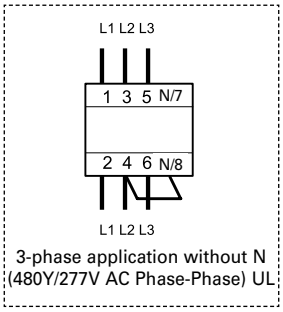
30, 300mA Types:



3+N
(480Y/277V AC) UL



2-poles
(277V AC) UL



3-phase application without N
(480Y/277V AC Phase-Phase) UL

Impact of ambient temperature on the maximum permanent current allowed (A) FRCmM-NA

	25A		40A		63A	
Ambient temperature	**2p**	**4p**	**2p**	**4p**	**2p**	**4p**
40°	25	25	40	40	63	63
45°	21	22	37	37	59	59
50°	18	19	33	34	55	55
55°	14	16	30	31	50	50
60°	–	–	26	27	45	45
65°	–	–	20	24	40	41
70°	–	–	14	19	34	37
75°	–	–	8	15	28	31

Note: Please make sure that these values are not exceeded and that any upstream thermal overload protection switches off in time.

Max. back-up fuse FRCmM-NA (acc. to IEC)

Rating	**Fuses**		**MCB's (Characteristic B/C)**	
In [A]	Short Circuit [A]	Overload [A]	Short Circuit [A]	Overload [A]
25	63 gG/gl	25 gG/gl	FAZ-C40	FAZ-C25
40	63 gG/gl	40 gG/gl	FAZ-C40	FAZ-C40
63	63 gG/gl	40 gG/gl	FAZ-C40	FAZ-C40

Important:
In the case that the maximal possible operating current of the electrical installation don´t exceed the rated current of the RCD only short circuit protection must be implemented. Overload protection must be implemented in the case if the maximal possible operating current of the electrical installation can exceed the rated current of the RCD.

Max. back-up fuse FRCmM-NA (acc. to UL)

In [A]	Short Circuit [A]
25-63	70 J-Class Fuse

Important:
The maximal possible operating current of the electrical installation may not exceed the rated current of the RCD (VDE 0100-520 Bbl. 2).

Residual Current Devices FRCmM-NA-110 Type A according to UL1053 & IEC/EN 61008

SG49612

Description

- Wide range of compact types of RCDs serving as fault-current and additional protection according to UL1053 & IEC/EN 61008 standards, suitable for worldwide use in the 110 V range of applications
- Comprehensive range of accessories
- Real contact position indicator
- Fault current tripping indicator
- Automatic re-setting possible
- Transparent designation plate
- Classified for the use in rail rolling stock

SG49612

SG48612

SG49612

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
Type A			
Conditionally surge current-proof 250 A, sensitive to residual pulsating DC, Type A			
4-poles			
25/0.03	FRCmM-25/4/003-A-NA-110	167699	1/30
25/0.3	FRCmM-25/4/03-A-NA-110	167702	1/30
40/0.03	FRCmM-40/4/003-A-NA-110	167700	1/30
40/0.3	FRCmM-40/4/03-A-NA-110	167703	1/30
63/0.03	FRCmM-63/4/003-A-NA-110	167701	1/30
63/0.3	FRCmM-63/4/03-A-NA-110	167704	1/30
Type G/A			
Surge current-proof 3 kA, sensitive to residual pulsating DC, Type G/A (ÖVE E 8601)			
2-poles			
25/0.03	FRCmM-25/2/003-G/A-NA-110	167693	1/60
25/0.3	FRCmM-25/2/03-G/A-NA-110	167696	1/60
40/0.03	FRCmM-40/2/003-G/A-NA-110	167694	1/60
40/0.3	FRCmM-40/2/03-G/A-NA-110	167697	1/60
63/0.03	FRCmM-63/2/003-G/A-NA-110	167695	1/60
63/0.3	FRCmM-63/2/03-G/A-NA-110	167698	1/60
4-poles			
25/0.03	FRCmM-25/4/003-G/A-NA-110	167705	1/30
25/0.3	FRCmM-25/4/03-G/A-NA-110	167708	1/30
40/0.03	FRCmM-40/4/003-G/A-NA-110	167706	1/30
40/0.3	FRCmM-40/4/03-G/A-NA-110	167709	1/30
63/0.03	FRCmM-63/4/003-G/A-NA-110	167707	1/30
63/0.3	FRCmM-63/4/03-G/A-NA-110	167710	1/30

Specifications | Residual Current Devices FRCmM-NA-110

Description

- Residual current devices
- Purpose terminal lift above and below
- Universal tripping signal switch, also suitable for FAZ, FRBmM-1N can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Contact position indicator red - green
- Tripping indicator white - blue
- All types suitable for being used with standard fluorescent tubes with or without electronical ballast (30mA-RCD: 30 units per phase conductor, 300mA-RCD: 90 units per phase conductor).
  Notes: Depending of the fluorescent lamp ballast manufacturer partly more possible. Symmetrical allocation of the fluorescent lamp ballasts on all phases favourably. Shifting references of the fluorescent lamp ballast manufacturer consider.
- The device functions irrespective of the position of installation
- Tripping is line voltage-independent. Consequently, the RCD is suitable for "fault current/residual current protection" and "additional protection" within the meaning of the applicable installation rules.
- Mains connection at either side
- The 4-pole device can also be used for 2-pole connection:
  See connection possibilities.
- The test key "T" must be pressed every 6 months. The system operator must be informed of this obligation and his responsibility in a way that can be proven (self-adhesive RCD-label enclosed). Under special conditions (e.g. damply and/or dusty environments, environments with polluting and/or corroding conditions, environments with large temperature fluctuations, installations with a risk of overvoltages due to switching of equipment and/or atmospheric discharges, portable equipment ...), it's recommended to test in monthly intervals.
- Pressing the test key "T" serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (R_E), or proper checking of the earth conductor condition redundant, which must be performed separately.
- **Type -A**: Protects against special forms of residual pulsating DC which have not been smoothed.
- **Type -G/A**: Additionally protects against special forms of residual pulsating DC which have not been smoothed.

Accessories:		
Auxiliary switch for subsequent installation to the left *)	Z-HK	248432
Tripping signal contact for subsequent installation to the right	Z-NHK	248434
Automatic restarting device *)	Z-FW/LP	248296
	Z-FW-LPD	265244
Remote control *)	Z-FW-MO	284730
Pre-mounted sets *)	Z-FW-LP/MO	290171
	Z-FW-LPD/MO	290172
Remote testing module *)	Z-FW/003	248298
	Z-FW/030	248300
Terminal cover 4-poles *)	Z-RC/AK-4TE	101062

*) without UL certification

Technical Data

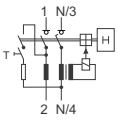
		FRCmM-NA-110
Electrical according to IEC/EN 61008		
Design according to		IEC/EN 61008, ÖVE E 8601
Classified according to		IEC 61373, EN 45545-2
Current test marks as printed onto the device		
Tripping		instantaneous
Type G		10 ms delay at 50 Hz
Rated voltage	U_n	110/190 V, 50/60Hz
Limits operation voltage test circuit		
2-poles		94 - 121 V~
4-poles 30 mA		94 - 121 V~
4-poles 300 mA		94 - 210 V~
Rated tripping current	$I_{\Delta n}$	30, 300 mA
Sensitivity		AC and pulsating DC
Rated insulation voltage	U_i	440 V
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50µs)
Rated short circuit capacity	I_{cn}	10 kA with back-up fuse
Peak withstand current		
Type A		250 A (8/20 µs) surge current-proof
Type G/A		3 kA (8/20 µs) surge current-proof, 10 ms delay
Rated breaking capacitiy	I_m	
or rated fault breaking capacity	$I_{\Delta m}$	
I_n = 25-40 A		500 A
I_n = 63 A		630 A
Endurance		
electrical components		≥ 4,000 operating cycles
mechanical components		≥ 10,000 operating cycles
Electrical according to UL1053		
Design according to		UL1053
Current test marks as printed onto the device		
Tripping		instantaneous
Type G		8 ms delay at 60 Hz
Rated voltage	U_n	208/120 V, 60 Hz
Limits operation voltage test circuit		
2-poles		94 - 132 V~
4-poles 30 mA		94 - 132 V~
4-poles 300 mA		94 - 230 V~
Pick-up current		
30 mA Types		22 mA
300 mA Types		200 mA
Sensitivity		AC and pulsating DC
Overvoltage tested		530 V
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50µs)
Rated short circuit capacity	I_{cn}	5 kA acc. to CSA
Rated breaking capacitiy	I_m	
or rated fault breaking capacity	$I_{\Delta m}$	
I_n = 25-40 A		500 A
I_n = 63 A		630 A
Endurance		
electrical components		≥ 4,000 operating cycles
mechanical components		≥ 10,000 operating cycles

Mechanical

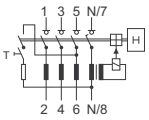
Frame size	45 mm
Device height	80 mm
Device width	35 mm (2MU), 70 mm (4MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Degree of predection in moisture-proof enclosure	IP54
Upper and lower terminals	lift terminals
Terminal protection	finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity	1.5 - 35 mm^2 single wire 2 x 16 mm^2 multi wire
Terminal screw	M5 (with slotted screw acc. to EN ISO 4757-Z2, Pozidriv PZ2)
Operation temperature	-25°C to +40°C
Storage- and transport temperature	-35°C to +60°C
Resistance to climatic conditions	acc. to IEC/EN 61008
Humidity	5-95 %
Pollution degree	2
Contact position indicator	red / green
Tripping indicator	white / blue

Connection diagram

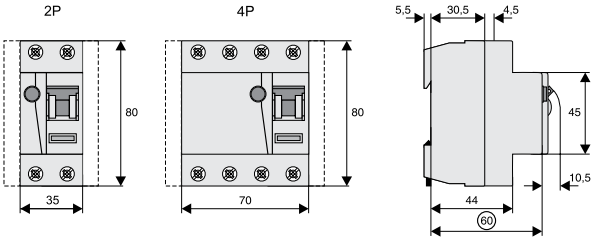
2-poles



4-poles



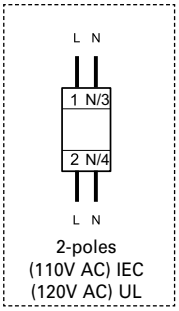
Dimensions (mm)



Correct connection

2-poles

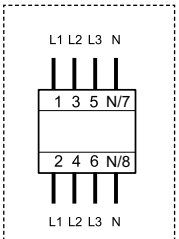
30, 300mA Types:



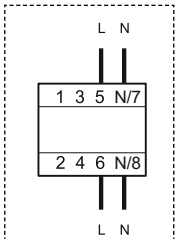
2-poles
(110V AC) IEC
(120V AC) UL

4-poles

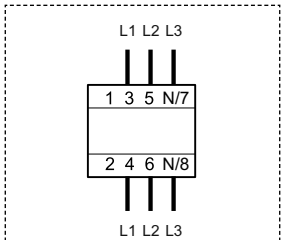
30, 300mA Types:



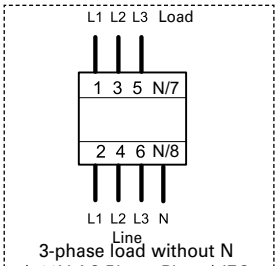
3+N
(110/190V AC) IEC
(208/120V AC) UL



2-poles
(110V AC) IEC
(120V AC) UL



3-phase application without N
(110/190V AC Phase-Phase) IEC
(208/120V AC Phase-Phase) UL



3-phase load without N
(190V AC Phase-Phase) IEC
(208V AC Phase-Phase) UL

Impact of ambient temperature on the maximum permanent current allowed (A) FRCmM-NA-110

	25A		40A		63A	
Ambient temperature	**2p**	**4p**	**2p**	**4p**	**2p**	**4p**
40°	25	25	40	40	63	63
45°	21	22	37	37	59	59
50°	18	19	33	34	55	55
55°	14	16	30	31	50	50
60°	–	–	26	27	45	45
65°	–	–	20	24	40	41
70°	–	–	14	19	34	37
75°	–	–	8	15	28	31

Note: Please make sure that these values are not exceeded and that any upstream thermal overload protection switches off in time.

Max. back-up fuse FRCmM-NA-110 (acc. to IEC)

Rating	**Fuses**		**MCB's (Characteristic B/C)**	
In [A]	Short Circuit [A]	Overload [A]	Short Circuit [A]	Overload [A]
25	63 gG/gl	25 gG/gl	FAZ-C40	FAZ-C25
40	63 gG/gl	40 gG/gl	FAZ-C40	FAZ-C40
63	63 gG/gl	40 gG/gl	FAZ-C40	FAZ-C40

Important:
In the case that the maximal possible operating current of the electrical installation don´t exceed the rated current of the RCD only short circuit protection must be implemented. Overload protection must be implemented in the case if the maximal possible operating current of the electrical installation can exceed the rated current of the RCD.

Max. back-up fuse FRCmM-NA-110 (acc. to UL)

In [A]	Short Circuit [A]
25-63	70 J-Class Fuse

Important:
The maximal possible operating current of the electrical installation may not exceed the rated current of the RCD (VDE 0100-520 Bbl. 2).

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