Residual Current Devices PFIM MW

- A complete spectrum of compact residual current devices for a wide range of applications
- For fault current/residual current protection and additional protection
- Wide variety of nominal currents
- Comprehensive range of accessories
- Real contact position indicator
- Automatic re-setting possible

SG17011

Residual Current Devices PFIM — MW

Conditionally surge current-proof 250 A, type AC

SG16611

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
2-pole			
16/0.01	PFIM-16/2/001	235389	1 / 60
25/0.03	PFIM-25/2/003	235390	1 / 60
25/0.10	PFIM-25/2/01	235391	1 / 60
25/0.30	PFIM-25/2/03	235392	1 / 60
25/0.50	PFIM-25/2/05	235393	1 / 60
40/0.03	PFIM-40/2/003	235394	1 / 60
40/0.10	PFIM-40/2/01	235395	1 / 60
40/0.30	PFIM-40/2/03	235396	1 / 60
40/0.50	PFIM-40/2/05	235397	1 / 60
63/0.03	PFIM-63/2/003	235398	1 / 60
63/0.10	PFIM-63/2/01	235399	1 / 60
63/0.30	PFIM-63/2/03	235400	1 / 60
63/0.50	PFIM-63/2/05	235401	1 / 60
80/0.03	PFIM-80/2/003	235402	1 / 60
80/0.10	PFIM-80/2/01	235403	1 / 60
80/0.30	PFIM-80/2/03	235404	1 / 60
80/0.50	PFIM-80/2/05	235405	1 / 60
100/0.03	PFIM-100/2/003	102821	1 / 60
100/0.10	PFIM-100/2/01	102874	1 / 60
100/0.30	PFIM-100/2/03	102822	1 / 60

SG17011

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
4-pole			
25/0.03	PFIM-25/4/003	235406	1 / 30
25/0.10	PFIM-25/4/01	235407	1 / 30
25/0.30	PFIM-25/4/03	235408	1 / 30
25/0.50	PFIM-25/4/05	235409	1 / 30
40/0.03	PFIM-40/4/003	235410	1 / 30
40/0.10	PFIM-40/4/01	235411	1 / 30
40/0.30	PFIM-40/4/03	235412	1 / 30
40/0.50	PFIM-40/4/05	235413	1 / 30
63/0.03	PFIM-63/4/003	235414	1 / 30
63/0.10	PFIM-63/4/01	235415	1 / 30
63/0.30	PFIM-63/4/03	235416	1 / 30
63/0.50	PFIM-63/4/05	235417	1 / 30
80/0.03	PFIM-80/4/003	235418	1 / 30
80/0.10	PFIM-80/4/01	235419	1 / 30
80/0.30	PFIM-80/4/03	235420	1 / 30
80/0.50	PFIM-80/4/05	235421	1 / 30
100/0.03	PFIM-100/4/003	102823	1 / 30
100/0.10	PFIM-100/4/01	102824	1 / 30
100/0.30	PFIM-100/4/03	102825	1 / 30
100/0.50	PFIM-100/4/05	102826	1 / 30

Residual Current Devices PFIM — MW

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

SG79511

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
2-pole			
16/0.01	PFIM-16/2/001-A	235422	1 / 60
16/0.03	PFIM-16/2/003-A	235423	1 / 60
25/0.03	PFIM-25/2/003-A	235424	1 / 60
25/0.10	PFIM-25/2/01-A	235425	1 / 60
25/0.30	PFIM-25/2/03-A	235426	1 / 60
40/0.03	PFIM-40/2/003-A	235427	1 / 60
40/0.10	PFIM-40/2/01-A	235428	1 / 60
40/0.30	PFIM-40/2/03-A	235429	1 / 60
40/0.50	PFIM-40/2/05-A	235430	1 / 60
63/0.03	PFIM-63/2/003-A	235431	1 / 60
63/0.10	PFIM-63/2/01-A	235432	1 / 60
63/0.30	PFIM-63/2/03-A	235433	1 / 60
63/0.50	PFIM-63/2/05-A	235434	1 / 60
100/0.10	PFIM-100/2/01-A	102827	1 / 60
100/0.30	PFIM-100/2/03-A	102828	1 / 60

SG17011

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
4-pole			
25/0.03	PFIM-25/4/003-A	235435	1 / 30
25/0.10	PFIM-25/4/01-A	235436	1 / 30
25/0.30	PFIM-25/4/03-A	235437	1 / 30
25/0.50	PFIM-25/4/05-A	235438	1 / 30
40/0.03	PFIM-40/4/003-A	235439	1 / 30
40/0.10	PFIM-40/4/01-A	235440	1 / 30
40/0.30	PFIM-40/4/03-A	235441	1 / 30
40/0.50	PFIM-40/4/05-A	235442	1 / 30
63/0.03	PFIM-63/4/003-A	235443	1 / 30
63/0.10	PFIM-63/4/01-A	235444	1 / 30
63/0.30	PFIM-63/4/03-A	235445	1 / 30
63/0.50	PFIM-63/4/05-A	235446	1 / 30
80/0.03	PFIM-80/4/003-A	235447	1 / 30
80/0.30	PFIM-80/4/03-A	235448	1 / 30
100/0.03	PFIM-100/4/003-A	102829	1 / 30
100/0.10	PFIM-100/4/01-A	102870	1 / 30
100/0.30	PFIM-100/4/03-A	102871	1 / 30
100/0.50	PFIM-100/4/05-A	102872	1 / 30

Residual Current Devices PFIM MW

Surge current-proof 3 kA, type G (ÖVE E 8601)

SG16611

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
2-pole			
25/0.03	PFIM-25/2/003-G	235449	1 / 60
25/0.10	PFIM-25/2/01-G	235450	1 / 60
40/0.03	PFIM-40/2/003-G	235451	1 / 60
40/0.10	PFIM-40/2/01-G	235452	1 / 60
100/0.10	PFIM-100/2/01-G	110100	1 / 60

SG17011

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
4-pole			
40/0.03	PFIM-40/4/003-G	235453	1 / 30
40/0.10	PFIM-40/4/01-G	235455	1 / 30
63/0.03	PFIM-63/4/003-G	235456	1 / 30
63/0.10	PFIM-63/4/01-G	235458	1 / 30
80/0.03	PFIM-80/4/003-G	104385	1 / 30
100/0.03	PFIM-100/4/003-G	104383	1 / 30
100/0.3	PFIM-100/4/03-G	104384	1 / 30

Residual Current Devices PFIM MW

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

SG16611

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
2-pole			
40/0.03	PFIM-40/2/003-G/A	108045	1 / 60
40/0.1	PFIM-40/2/01-G/A	109429	1 / 60
63/0.03	PFIM-63/2/003-G/A	108046	1 / 60
80/0.03	PFIM-80/2/003-G/A	108047	1 / 60
100/0.03	PFIM-100/2/003-G/A	108048	1 / 60

SG17011

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
4-pole			
40/0.03	PFIM-40/4/003-G/A	235454	1 / 30
63/0.03	PFIM-63/4/003-G/A	235457	1 / 30
63/0.1	PFIM-63/4/01-G/A	109771	1 / 30
100/0.03	PFIM-100/4/003-G/A	102875	1 / 30
100/0.3	PFIM-100/4/03-G/A	102873	1 / 30

Explanation PFIM:
P = XPole, FI = RCD, M = 10 kA

Residual Current Devices PFIM — MW

Surge current-proof 3 kA, X-ray application, type R

SG17011

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
4-pole			
63/0.03	PFIM-63/4/003-R	235459	1 / 30
100/0.03	PFIM-100/4/003-R	102876	1 / 30

Residual Current Devices PFIM — MW

Selective + surge current-proof 5 kA, type S

SG16611

SG17011

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
2-pole			
40/0.10	PFIM-40/2/01-S	235460	1 / 60
40/0.30	PFIM-40/2/03-S	235461	1 / 60
4-pole			
25/0.30	PFIM-25/4/03-S	235463	1 / 30
80/0.10	PFIM-80/4/01-S	235473	1 / 30

Residual Current Devices PFIM — MW

Selective + surge current-proof 5 kA, sensitive to residual pulsating DC, type S/A

SG16611

SG17211

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
2-pole			
40/0.10	PFIM-40/2/01-S/A	109770	1 / 60
4-pole			
25/0.10	PFIM-25/4/01-S/A	235464	1 / 30
40/0.10	PFIM-40/4/01-S/A	235467	1 / 30
40/0.30	PFIM-40/4/03-S/A	235468	1 / 30
63/0.10	PFIM-63/4/01-S/A	235471	1 / 30
63/0.30	PFIM-63/4/03-S/A	235472	1 / 30
80/0.30	PFIM-80/4/03-S/A	235475	1 / 30
100/0.30	PFIM-100/4/03-S/A	290220	1 / 30

Explanation PFIM:
P = XPole, FI = RCD, M = 10 kA

Sealing Cover Set Z-RC/AK

- for PFIM, PFR, PF6, PF7, CFI6, dRCM (not to use for PFDM)

SG82011

	Type Designation	Article No.	Units per package
2-pole	Z-RC/AK-2TE	285385	10 / 30
4-pole	Z-RC/AK-4TE	101062	10 / 600

Residual Current Devices PFIM-U

- Special residual current devices
  – for frequency converter applications
- For fault current/residual current protection and additional protection
- Comprehensive range of accessories
- Real contact position indicator
- Selective or short-time delayed

SG62111

Residual Current Devices PFIM-U

Selective + surge current-proof 5 kA, frequency converter-proof, type U

SG62111

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
4-pole			
40/0.10	PFIM-40/4/01-U	235744	1 / 30
40/0.30	PFIM-40/4/03-U	235745	1 / 30
63/0.10	PFIM-63/4/01-U	235746	1 / 30
63/0.30	PFIM-63/4/03-U	235747	1 / 30
80/0.30	PFIM-80/4/03-U	290221	1 / 30
100/0.30	PFIM-100/4/03-U	290222	1 / 30

Residual Current Devices PFIM-U

Short-time delayed + surge current-proof 3 kA, frequency converter-proof, type U

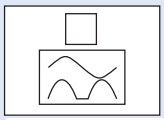
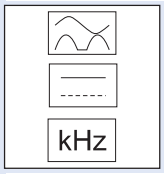
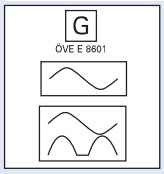
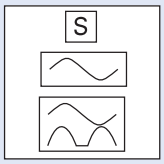
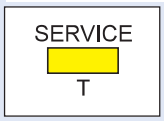
SG62111

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
4-pole			
63/0.03	PFIM-63/4/003-U	285465	1 / 30

Technical Data

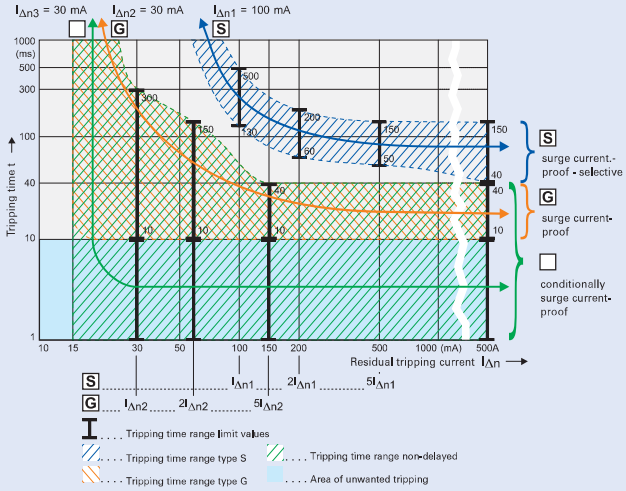
Residual Current Devices - General Data

Short description of the most important RCD types:

Symbol	Description
	Eaton/Moeller 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.
	RCD sensitive to pulsating DC for application where residual pulsating DC may occur. Non-selective, instantaneous. Protects only against special forms of residual pulsating DC which have not been smoothed.
	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. Also meets the requirements of the VDE 0664-400 standard (formerly known as VDE V 0664-110) and therefore 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 compulsory to avoid personal injury and damage to property (§ 12.1.6 of ÖVE/ÖNORM E 8001-1). Also for systems involving long lines and high line capacity. 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 according to ÖVE/ÖNORM E 8001-1 § 12.1.5, 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.
 	Integrated overload protection. Calculating and rating of the back-up temperature fuse to avoid overload on the RCD is not required. Overload fuse = short circuit back-up fuse.
 	Press service key when putting the device into operation, and subsequently approximately once per year. Pressing the key once per month is not required any more and can be omitted unless shorter testing intervals are required under any applicable regulations (e.g. on building sites).

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.

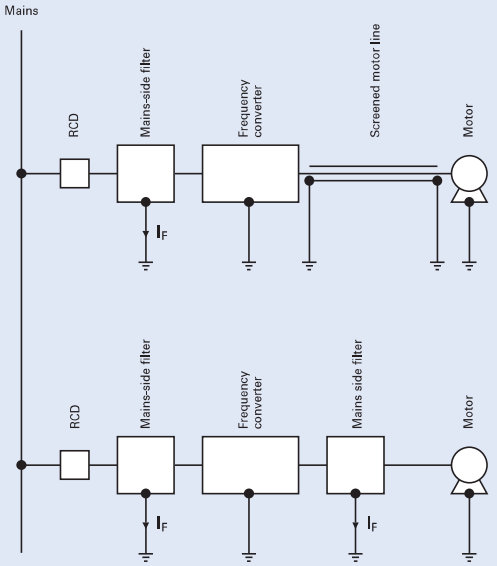


§ 6.1.1 of ÖVE/ÖNORM E 8001-1/A1 deals with **additional protection** and provides essentially the following:
In circuits with **sockets up to 16 A** with fault current/residual current protection by protective earthing, protective multiple earthing or residual current devices (RCDs), additional residual current protection devices with a rated tripping current of **0.03 A** must be installed. **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:

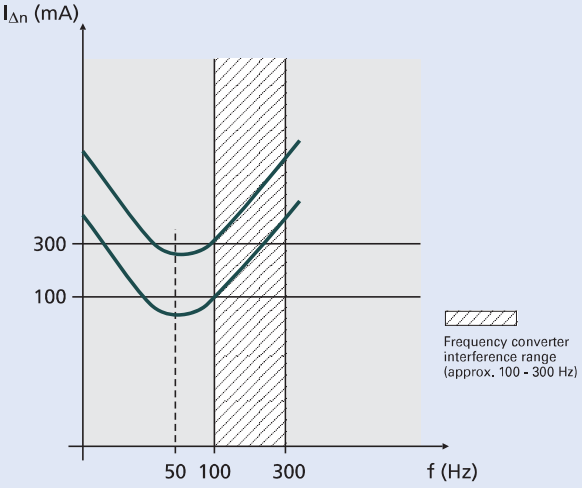
Due to the currents flowing off through the filters (designated IF), the sum of currents through the RCD is not exactly zero, which causes unwanted tripping.



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 frequency converter-proof RCDs!
These special residual current devices can be recognised by an extension of the type designation ("**-U**"). They meet the requirements of compatibility between RCDs and frequency converters with respect to unwanted tripping.

These are **NOT AC/DC-sensitive** RCDs of type B !!!

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

Protective Measures

The following rules for the application of RCDs of type" -U" are only applicable in those cases where an RCD of type "-B" is not explicitly demanded in the instructions of the manufacturer of the frequency converter.

How can you make sure that the required protective measures are in place when using RCDs type "-U" and frequency converters in one system?

In Austria, the ÖVE Decision EN 219 is applicable.

Under this standard

- frequency converters must be equipped with current limiting devices in order to ensure disconnection in cause of faults or overload, and
- the installer of a system is obliged to make sure that additional equipotential bonding is provided (additional inclusion of all metal components, such as frequency converters, mains filters, motor filters, etc. into the existing equipotential bonding), in order to ensure that the permissible touch voltage of 50 V AC or 120 V DC is not exceeded. (In ÖVE/ÖNORM E 8001-1 the term "touch voltage" has been omitted. There is only a fault voltage limit of 65 V AC or 120 V DC which must not be exceeded).

In Germany, VDE 0100 is applicable, in Switzerland SEV 1000.

In case of application in any **other country** than those mentioned take into account national rules and recommendations.

Residual Current Devices PFIM

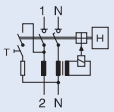
- Residual current devices
- Shape compatible with and suitable for standard busbar connection to other devices of the P-series
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Universal tripping signal switch, also suitable for PLS., PKN., Z-A. can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Contact position indicator red - green
- Delayed types suitable for being used with standard fluorescent tubes with or without electronical ballast (30mA-RCD: 30 units per phase conductor, 100mA-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 the meaning of the applicable installation rules
- Mains connection at either side
- The 4-pole device can also be used for 3-pole connection.
  For this purpose use terminals 1-2, 3-4, and 5-6 (+ cable link).
- The 4-pole device can also be used for 2-pole connection.
  For this purpose use terminals 5-6 and N-N.
- The test key "T" must be pressed every month. The system operator must be informed of this obligation and his responsibility in a way that can be proven (self-adhesive RCD-label enclosed)
- 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 have not been smoothed
- **Type -G**: High reliability against unwanted tripping. Compulsory for any circuit where personal injury or damage to property may occur in case of unwanted tripping (ÖVE/ÖNORM E 8001-1 § 12.1.6).
- **Type -G/A:** Additionally protects against special forms of residual pulsating DC which have not been smoothed.
  Special types for X-ray application PFIM-...-R
- **Type -R**: To aviod unwanted tripping due to X-ray devices.
- **Type -S**: Selective residual current device sensitive to AC, type -S. Compulsory for systems with surge arresters downstream of the RCD (ÖVE/ÖNORM E 8001-1 § 12.1.5).
- **Type -S/A:** Additionally protects against special forms of residual pulsating pulsating DC which have not been smoothed.
- **Type -U**: Suitable for speed-controlled drives with frequency converters in household, trade, and industry.
  Unwanted tripping is avoided thanks to a tripping characteristic designed particularly for frequency converters.
  See also explanation "Frequency Converter-Proof RCDs - What for?"
  Application according to ÖVE/ÖNORM E 8001-1 and Decision EN 219 (1989), VDE 0100, SEV 1000.

Accessories:

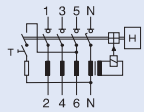
Auxiliary switch for subsequent installation to the left	Z-HK	248432
Tripping signal contact for subsequent installation to the right	Z-NHK	248434
Remote control and automatic switching device	Z-FW/LP	248296
Compact enclosure	KLV-TC-2	276240
	KLV-TC-4	276241
Sealing cover set	Z-RC/AK-2TE	285385
	Z-RC/AK-4TE	101062
Switching interlock	IS/SPE-1TE	101911

Connection diagrams

2-pole



4-pole



Technical Data

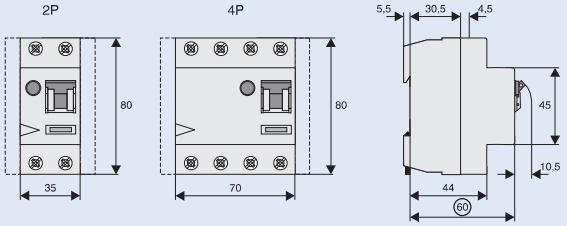
Electrical

Design according to		IEC/EN 61008 Type G acc. to ÖVE E 8601
Current test marks as printed onto the device		
Tripping		instantaneous
	Type G, R	10 ms delay
	Type S	40 ms delay - with selective disconnecting function
	Type U (only 30 mA)	10 ms delay
	Type U (without 30 mA)	40 ms delay - with selective disconnecting function
Rated voltage U_n		230/400 V, 50 Hz
Rated tripping current $I_{\Delta n}$		10, 30, 100, 300, 500 mA
Sensitivity		AC and pulsating DC
Rated insulation voltage U_i		440 V
Rated impulse withstand voltage U_{imp}		4 kV
Rated short circuit strength I_{nc}		10 kA
Maximum back-up fuse		Short circuit
I_n = 16-63 A		63 A gG/gL
I_n = 80 A		80 A gG/gL
I_n = 100 A		100 A gG/gL
Type PFIM-X:		
I_n = 40A		63 A gG/gL
I_n = 63A		63 A gG/gL
Rated breaking capacity I_m or Rated fault breaking capacity $I_{\Delta m}$		
I_n = 16-40 A		500 A
I_n = 63 A		630 A
I_n = 80 A		800 A
I_n = 100 A		1,000 A
Voltage range of test button	2-pole	184 - 250 V~
	4-pole	184 - 440 V~
Endurance		
electrical comp.		≥ 4,000 operating cycles
mechanical comp.		≥ 20,000 operating cycles

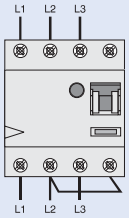
Mechanical

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
Deg. of prot. in moisture-proof encl.	IP54
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1.5 - 35 mm^2 single wire 2 x 16 mm^2 multi wire
Busbar thickness	0.8 - 2 mm
Tripping temperature	-25°C to +40°C
Storage- and transport temperature	-35°C to +60°C
Resistance to climatic conditions	25-55°C/90-95% relative humidity acc. to IEC 60068-2

Dimensions (mm)



RCD PFIM in a Three-Phase AC Network without Neutral Conductor



The N-terminal must be connected by a cable link with the phase L2 (or L1), so that the test loop is supplied with current and the RCD is tested correctly.

Influence of the ambient temperature to the maximum continuous current (A)

	16A		*25A*		*40A*		*63A*		*80A*		*100A*	
Ambient temperature	***2p***	***4p***	***2p***	***4p***	***2p***	***4p***	***2p***	***4p***	***2p***	***4p***	***2p***	***4p***
40°	16	16	25	25	40	40	63	63	80	80	100	100
45°	14	14	21	22	37	37	59	59	76	76	95	95
50°	11	11	18	19	33	34	55	55	72	72	90	90
55°	9	9	14	16	30	31	50	50	68	68	85	85
60°	– *)	–	–	–	26	27	45	45	64	64	80	80

Annotation: It has to be ensured that the values in the table are not exceeded and the back-up fuse/thermal protection works properly

*) not applicable