

Residual Current Devices Type F - mixed frequency sensitive



Powering Business Worldwide

Residual Current Devices Type F



Benefits:

- Reliable protection for electrical consumers with 1 phase frequency converters
- Increased protection due to
 - detection of mixed frequencies
 - higher load rating with DC residual currents up to 10 mA
- Reduction of nuisance tripping thanks to
 - time delayed tripping
 - high current withstand capability

Definition

The type F RCD is defined according to IEC/EN 62423. It provides safe and reliable protection against sinusoidal residual currents and pulsating DC fault currents (like type A devices). It is also capable of handling residual currents with mixed frequencies of up to 1 kHz (10, 50, 1000 Hz) in accordance with the IEC 62423 standard.

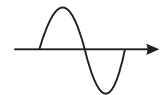
Type F RCDs can accept smooth DC residual currents

of up to 10 mA without affecting their standard functionality, have a time delayed tripping and distinguish themselves from other devices thanks to their high resistance to power surges: this ensures minimal false tripping and a high degree of safety.

They are available as RCCBs (2-pole or 4-pole up to 63 A) as well as RCBOs (1N and 2-pole up to 40 A). With two versions for different residual currents

(30 and 300 mA), the type F functionality is voltage independent and can be used for fault and additional protection. As a result, the recommendations for installations including variable frequency drives have been modified.

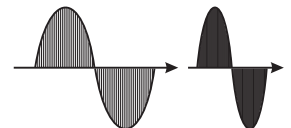
Eaton also offers a digital version of the type F RCBO, which displays fault currents at the device in real time.



Alternate current can be detected by type AC, A and F RCDs



Pulsating current with DC components can be detected by type A and F RCDs



Variable frequency detected only by type F RCDs

Field of Application

Type F residual current devices are designed specifically for use in applications with single phase frequency converters, such as washing machines, heat pumps or hammer drills. In this type of application, residual currents with mixed frequencies can arise which residual current devices type AC and A are unable to cope with.

The detection of mixed frequencies and the higher load rating with DC residual currents up to 10 mA enables the RCD type F to provide excellent protection for humans and the system in all applications which contain appliances and motors with single phase frequency converter.

The time delayed tripping and the high current withstands capability support in addition avoiding nuisance tripping. Overall, the RCD type F enables electrical installers to increase the reliability of the system while ensuring high safety levels for the user.





Digital protection switches – the new era has begun.

Better security with proactive communication!

The digital RCCB from Eaton's xEffect series are capable to do more than just switch off: They monitor electrical installations and issue advance warnings of critical current flows. Thanks to short time delay and optimized tripping threshold, briefly occurring malfunctions do not induce the digital protection switch to shut down.

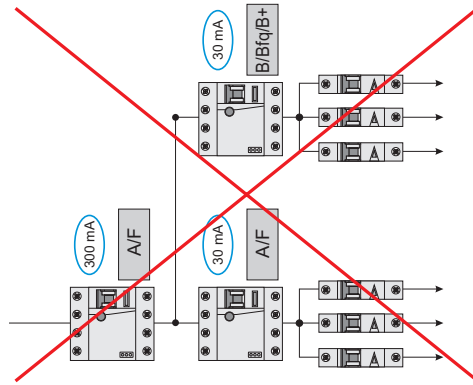
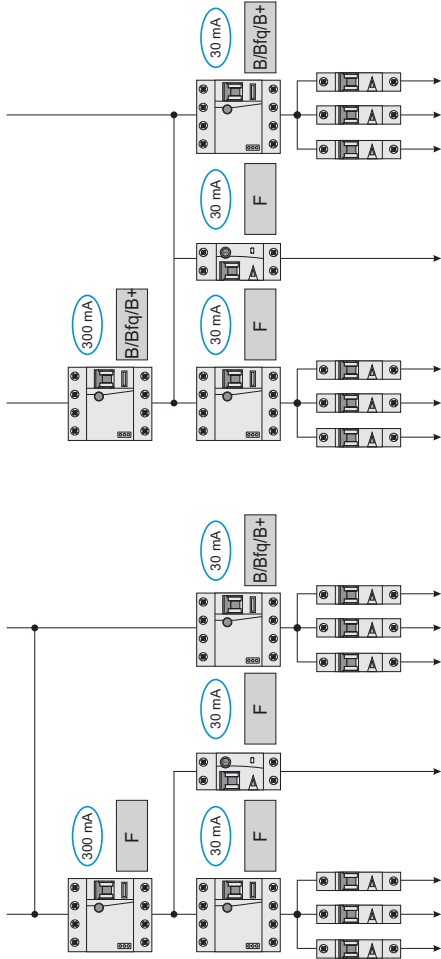
When a fault current crops up, the information is reported to the security center of the industrial plant right away and troubleshooting can start before a plant failure occurs. Thus the cause of the fault current can be determined precisely and the system can be serviced easily.

That way, system availability increases and service is crucially improved by the convenient remote control.

Numerous advantages at a glance

- The difference between harmless and critical fault currents is detected
- Precise switching and reduction of nuisance tripping
- Continuous monitoring of plant/factory status – prompt warning of a change in status quo
- Convenient troubleshooting by precise location of the malfunction
- As easy to install as a conventional RCCB
- Longer intervals between servicing
- Ideal for system monitoring thanks to preventive information
- Warning of tripping at leakage current
- Clear status display of the fault current problem with tri-colored LEDs
- Real contact position indicator
- Indicator for fault current tripping
- Comprehensive range of accessories available
- Can be integrated in several bus systems

Correct installation



Possible residual current waveforms and suitable RCDs

Suitable RCCB - Type	Circuit	Load Current	Residual Current
B, F, A, AC	1		
B, F, A, AC	2		
B, F, A, AC	3		
B, F, A, AC	4		
B, F, A, AC	5		
B, F, A, AC	6		
B, F, A, AC	7		
B, F, A, AC	8		
B, F, A, AC	9		
B, F, A, AC	10		
B, F, A, AC	11		
B, F, A, AC	12		
B, F, A, AC	13		
B, F, A, AC	14		

RCDs type F are designed for applications with 1 phase frequency converters supplied between phase/neutral.

RCDs type F are not suitable for applications that can generate smooth DC residual currents.

They are not suitable for installations in networks with frequencies that deviate from the rated frequency 50/60 Hz (not at the outgoing terminal of a frequency converter).

Electrical loads that can generate smooth DC residual currents in the event of a fault must be assigned to their own circuit with a universal current-sensitive residual current protective device (type B, type Bfq or type B+).

Choose your safety level

Curve Detection characteristics

Additional features to increase system availability



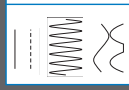

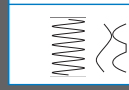
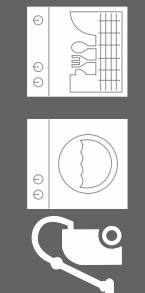



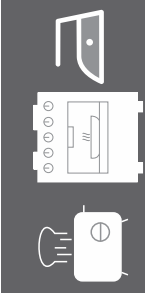


G G-functionality provides time delayed tripping in surge sensitive environment



S Selective type for root applications

Typical loads

 <p>B+ COMPREHENSIVE</p>	<p>Provides an additional protection as higher frequency fault currents can be detected. This contributes to protection against thermal hazards such as electrically ignited fires.</p>	
 <p>B ALLROUND</p>	<p>All current sensitive RCD that detects smooth DC currents which can occur in installations which contain PV-Systems, UPS Units, EV-Charging stations and appliances with 3 phase frequency converts.</p>	
 <p>F ADVANCED</p>	<p>Is a pulse-sensitive RCD that also detects pulsating currents with DC components up to 10 mA and mixed frequencies up to 1 kHz. This provides advanced protection for electronic loads. Recommended for all loads with 1 phase frequency converters.</p>	
 <p>A STANDARD</p>	<p>Improved level of safety as this type can also detect pulsating AC fault currents which are typical in most of today's applications.</p>	
 <p>AC MINIMUM</p>	<p>RCD which detects sinusoidal fault currents only. This RCD type fulfills the minimum requirements. For today's applications a higher level of safety is recommended. Is not allowed anymore in various local wiring regulations.</p>	

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