



FI, NFI



With a residual current circuit breaker (RCCB) the following protective measures are available:

- protection against indirect contact
- fire protection
- additional protection in the event of direct contact

• FEATURES

When designing residual current devices, manufacturing technology and type of routine tests, the IEC/EN 61008 and VDE 0664 standards were considered. Important features are:

- up to date design
- user-friendly connection of conductors and bus bars
- resistance to current surges; unwanted tripping excluded
- simple and solid fixing to a 35 mm mounting rail in compliance with EN 60715
- additional colour display of main contacts position (red: contacts closed, green: contacts open)

• PROTECTION AGAINST INDIRECT CONTACT

Protection level against indirect contact does not depend on the value of residual operating current of RCCB. Only the following condition must be fulfilled:

$$R_e \leq \frac{\text{conventional touch voltage } U_t}{\text{rated residual operating current } I_{\Delta n}}$$

With specified residual current protection as a protective measure against indirect contact the sensitivity of RCCB can be selected regarding rated residual operating current. It is necessary to consider the installation leakage currents. In case of more complex installation it is recommended to envisage more RCCBs in order to prevent cut-out of complete system.

• FIRE PROTECTION

RCCB with rated residual operating currents $I_{\Delta n} \leq 300$ mA provides protection against fire caused by fault currents. In case of fault currents $I_{\Delta} \leq 300$ mA or larger, which are disconnected by a circuit breaker in less than 0,2 seconds, the dissipated heat in the system is not sufficient to ignite materials which are usually used in civil works.

• ADDITIONAL PROTECTION IN THE EVENT OF DIRECT CONTACT

This is the latest protection mode, which is required or recommended for installation in areas with particularly high electric shock hazard (sockets in bathrooms, camping sites, caravans, rooms used for medical purposes etc.) The additional RCCB with rated residual operating current $I_{\Delta n} \leq 30$ mA protects the user also against dangerous effects of electric current if both below stated measures fail:

- protection against direct contact (removed covers, damaged housings, etc.),
- protection against indirect contact (interruption of a protective conductor, accidentally transposed protective and live conductor, damaged installation of electrical device, etc.)

In case of direct contact the fault current flows through the human body and disconnection occurs before the current reaches a dangerous limit. However, additional protection should not - under any circumstances - be regarded as a basic and only protection measure.

• TYPES

RCCBs are manufactured in two versions in compliance with EN 61008 standard:



- Type A - sensitive to alternating and pulsating dc residual operating currents. The RCCBs are marked with a symbol and designated NFI.



- Type AC - sensitive only to alternating residual operating currents of sine form. RCCBs are marked with a symbol and designated FI.

• SPECIAL VERSIONS

Four-pole selective switches NFIS (switches with delayed break-out) are available at customer's request. Their rated currents are 25, 40 or 63 A, and rated differential currents are 0,1 A or 0,3 A. Break out times at different values of differential currents comply with the EN 61008 standard.

At customer's request, special NFIK switches with delayed tripping time (min. inactive period 10 ms) and high resistance to surge currents (up to 3 kA) are also available. Their rated currents are 40 or 63 A, and their rated differential currents are 0,03, 0,1, 0,3 or 0,5 A.

FIR-FIT combinations, in which a detection part (FI-transformer) is separated from the actuating one (FI-relay), are manufactured for the protection in circuits where operational currents exceed rated currents of residual current devices. The function of load switching is in this case performed by the contactor or a power circuit-breaker with an undervoltage release. Rated currents therefore depend on selected switching devices; however, they also depend on cables cross-sections which can be inserted through the hole of the FI -transformer. Rated differential currents are: 0,3 A, 0,5 A, 1 A and 2 A. A combination with a delayed operation - FIRS-FITS selective version - is also available.

RESIDUAL CURRENT CIRCUIT BREAKERS

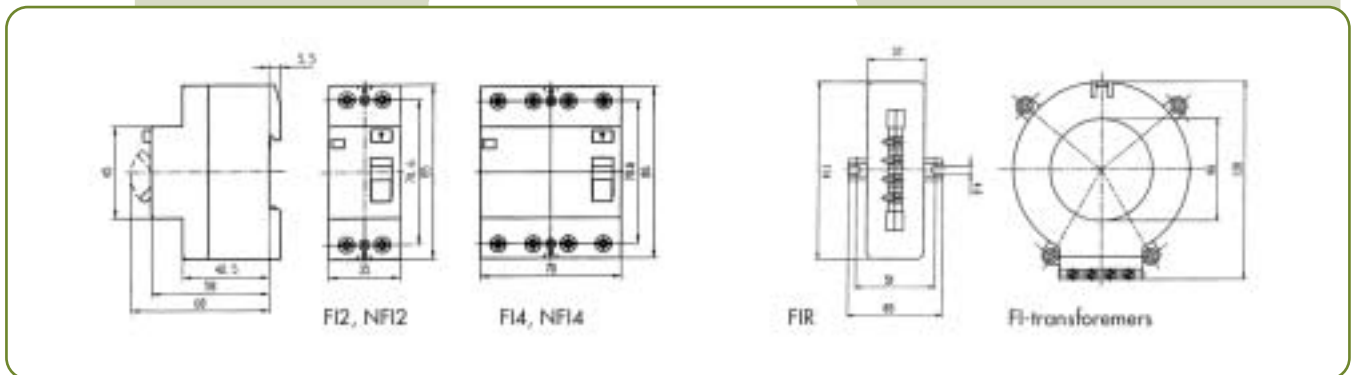
FI, NFI



TECHNICAL DATA

Type	AC		F12-16	F12-25	F12-40	F12-63	F12-80	F12-100	F14-25	F14-40	F14-63	F14-80	F14-100		
	A		NFI2-16	NFI2-25	NFI2-40	NFI2-63	NFI2-80	NFI2-100	NFI4-25	NFI4-40	NFI4-63	NFI4-80	NFI4-100		
Number of poles			2						4						
Rated current	I_n	A	16	25	40	63	80	100	25	40	63	80	100		
Rated residual operating current	$I_{\Delta n}$	A	0.01	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		
			0.03	0.03	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
			0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
			0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
Rated voltage	U_n	V	230						230/400						
Rated frequency		Hz	50/60												
Rated making and breaking capacity I_m			800						1000		800				1000
Rated residual making and breaking capacity $I_{\Delta m}$	$I_m = I_{\Delta m}$	A	800						1000		800				1000
Max. conventional back-up fuses	I_n	gL(A)	63	63	63	80	80	100	63	63	80	80	100		
Rated conditional short-circuit current	I_{cn}	A	10000 for $I_n \leq 80$ A; 6000 for $I_n = 100$ A												
Protection degree			IP20, IP40 after installation												
Mounting position			optional												
Ambient temperature			from -25 °C to +40 °C												
Weight		g	230						390						
Terminal capacity		mm ²							1 to 35						
Tripping times		s	at $1 \times I_{\Delta n} < 0.2$; at $5 \times I_{\Delta n} < 0.04$												
Endurance			> 10.000 operations												

DIMENSIONS:



ORDERING DATA

F12	25	0.03	
NFI4	-	40	/ 0.3

———— rated residual operating current $I_{\Delta n}$ (A)
 ———— rated current I_n (A)
 ———— type of residual current circuit breaker