NFI, NFIK, NFIS, NFIF

Residual current circuit breakers - Type A, F

Residual current circuit breakers (RCBB) are used for protection against indirect contact, fire protection and additional protection against direct contact.

They are sensitive to alternating and pulsating direct residual currents.

Features

- They are suitable for isolation.
- No overload protection or short-circuit protection is built in RCCB.
- Assembly to a 35 mm wide mounting rail in accordance with EN 60715
- Optional operation position
- Degree of protection IP20, degree of protection IP40 after installation in a distribution box
- Additional colour display of the position of main contacts (red - contacts closed, green - contacts open)
- A terminal shape prevents connection of a conductor outside the connection area.

Special Version

- **NFIK - SENSITIVE TO AC AND PULSATING DIRECT RESIDUAL CURRENTS**
  - Short-time delayed RCCBs with minimum non-actuating time 10 ms (type G acc. to ÖVE E 8601)
  - Surge current withstand capability with current waveform 8/20 µs up to 3 kA
  - High immunity against unwanted tripping at current impulses (e.g. a high number of florescent lamps, transient effects) or when istalled in special critical conditions (leakage currents of impulse shape at long cables, the influence of storms, computers, X-ray devices, etc.).
- **NFIS - SENSITIVE TO AC AND PULSATING DIRECT RESIDUAL CURRENTS**
  - Time delayed selective type with minimum non-actuating time 40 ms (type S)
  - Surge current withstand capability with current waveform 8/20 µs up to 3 kA
  - Selectivity regarding a general type and a short-time delayed type is enabled
  - Particulary suitable as the main RCCB
- **NFIF - SENSITIVE TO RESIDUAL CURRENTS AS TYPE A AND IN ADDITION TO RESIDUAL CURRENTS WITH MIXED FREQUENCIES**
  - Sensitive to residual currents as type A and in addition to residual currents with mixed frequencies up to 1 kHz that can result from single-phase electrical loads with frequency inverters (acc. to IEC/EN 62423)
  - Surge current withstand capability with current waveform 8/20 µs up to 3 kA
  - Intended for protection when using washing machines, vacuum cleaners, dishwashers, heating pumps, lighting system ...

Type A - sensitive to AC and pulsating direct residual currents

Type	Rated Current I_n (A)	Rated residual current I_{Dn} (A)	No. of Poles	Ordering No.	Weight (g)	Quantity / Box	Quantity / CTN
NFI2 - type A, instantaneous tripping							
NFI2 16/0.01	16	0.01	2	30.104.260	184	1	
NFI2 25/0.01	25	0.01	2	30.104.264	184	1	
NFI2 16/0.03	16	0.03	2	30.104.238	184	1	
NFI2 25/0.03	25	0.03	2	30.104.239	184	1	
NFI2 40/0.03	40	0.03	2	30.104.240	184	1	
NFI2 63/0.03	63	0.03	2	30.104.241	184	1	
NFI2 80/0.03	80	0.03	2	30.104.357	184	1	
NFI2 100/0.03	100	0.03	2	30.104.553	184	1	
NFI2 16/0.1	16	0.1	2	30.104.261	184	1	
NFI2 25/0.1	25	0.1	2	30.104.265	184	1	
NFI2 40/0.1	40	0.1	2	30.104.268	184	1	
NFI2 63/0.1	63	0.1	2	30.104.271	184	1	
NFI2 80/0.1	80	0.1	2	30.104.644	184	1	
NFI2 100/0.1	100	0.1	2	30.104.554	184	1	
NFI2 16/0.3	16	0.3	2	30.104.262	184	1	
NFI2 25/0.3	25	0.3	2	30.104.266	184	1	
NFI2 40/0.3	40	0.3	2	30.104.269	184	1	
NFI2 63/0.3	63	0.3	2	30.104.272	184	1	
NFI2 80/0.3	80	0.3	2	30.104.450	184	1	
NFI2 100/0.3	100	0.3	2	30.104.555	184	1	
NFI2 16/0.5	16	0.5	2	30.104.263	184	1	
NFI2 25/0.5	25	0.5	2	30.104.267	184	1	
NFI2 40/0.5	40	0.5	2	30.104.270	184	1	
NFI2 63/0.5	63	0.5	2	30.104.273	184	1	
NFI2 80/0.5	80	0.5	2	30.104.645	184	1	
NFI2 100/0.5	100	0.5	2	30.104.556	184	1	

Type A - sensitive to AC and pulsating direct residual currents

Type	Rated Current I_n (A)	Rated residual current I_{Dn} (A)	No. of Poles	Ordering No.	Weight (g)	Quantity / Box	Quantity / CTN
NFI4 - type A, instantaneous tripping							
NFI4 16/0.01	16	0.01	4	30.104.823	316	1	
NFI4 25/0.01	25	0.01	4	30.104.786	316	1	
NFI4 25/0.03	25	0.03	4	30.104.296	316	1	
NFI4 40/0.03	40	0.03	4	30.104.300	316	1	
NFI4 63/0.03	63	0.03	4	30.104.304	316	1	
NFI4 80/0.03	80	0.03	4	30.104.358	316	1	
NFI4 100/0.03	100	0.03	4	30.104.550	360	1	
NFI4 25/0.1	25	0.1	4	30.104.297	316	1	
NFI4 40/0.1	40	0.1	4	30.104.301	316	1	
NFI4 63/0.1	63	0.1	4	30.104.305	316	1	
NFI4 80/0.1	80	0.1	4	30.104.436	316	1	
NFI4 100/0.1	100	0.1	4	30.104.551	360	1	
NFI4 25/0.3	25	0.3	4	30.104.298	316	1	
NFI4 40/0.3	40	0.3	4	30.104.302	316	1	
NFI4 63/0.3	63	0.3	4	30.104.306	316	1	
NFI4 80/0.3	80	0.3	4	30.104.433	316	1	
NFI4 100/0.3	100	0.3	4	30.104.552	360	1	
NFI4 25/0.5	25	0.5	4	30.104.299	316	1	
NFI4 40/0.5	40	0.5	4	30.104.303	316	1	
NFI4 63/0.5	63	0.5	4	30.104.307	316	1	
NFI4 80/0.5	80	0.5	4	30.104.443	316	1	

NOTE: Rated current 32 A on request
Rated voltage 110 V on request

Ordering Data

NFI4 25 / 0.03

- Rated residual operating current $I_{\Delta n}$ (A)
- Rated current I_n(A)
- Number of poles
- Type

Type F - sensitive to residual currents as type a and in addition to residual currents with mixed frequencies

Type	Rated Current I_n (A)	Rated residual current I_{Dn} (A)	No. of Poles	Ordering No.	Weight (g)	Quantity / Box	Quantity / CTN
NFI2F - type F, short-time delayed G							
NFI2F 16/0.03	16	0.03	2	30.104.850	184	1	
NFI2F 25/0.03	25	0.03	2	30.104.851	184	1	
NFI2F 40/0.03	40	0.03	2	30.104.852	184	1	
NFI2F 63/0.03	63	0.03	2	30.104.853	184	1	
NFI2F 80/0.03	80	0.03	2	30.104.854	184	1	
NFI2F 100/0.03	100	0.03	2	30.104.855	184	1	
NFI2F 16/0.1	16	0.1	2	30.104.856	184	1	
NFI2F 25/0.1	25	0.1	2	30.104.857	184	1	
NFI2F 40/0.1	40	0.1	2	30.104.858	184	1	
NFI2F 63/0.1	63	0.1	2	30.104.859	184	1	
NFI2F 80/0.1	80	0.1	2	30.104.860	184	1	
NFI2F 100/0.1	100	0.1	2	30.104.861	184	1	
NFI2F 16/0.3	16	0.3	2	30.104.862	184	1	
NFI2F 25/0.3	25	0.3	2	30.104.863	184	1	
NFI2F 40/0.3	40	0.3	2	30.104.864	184	1	
NFI2F 63/0.3	63	0.3	2	30.104.865	184	1	
NFI2F 80/0.3	80	0.3	2	30.104.866	184	1	
NFI2F 100/0.3	100	0.3	2	30.104.867	184	1	
NFI2F 16/0.5	16	0.5	2	30.104.868	184	1	
NFI2F 25/0.5	25	0.5	2	30.104.869	184	1	
NFI2F 40/0.5	40	0.5	2	30.104.870	184	1	
NFI2F 63/0.5	63	0.5	2	30.104.871	184	1	
NFI2F 80/0.5	80	0.5	2	30.104.872	184	1	
NFI2F 100/0.5	100	0.5	2	30.104.873	184	1	
NFI4F - type F, short-time delayed S							
NFI4F 25/0.03	25	0.03	4	30.104.875	316	1	
NFI4F 40/0.03	40	0.03	4	30.104.876	316	1	
NFI4F 63/0.03	63	0.03	4	30.104.877	316	1	
NFI4F 80/0.03	80	0.03	4	30.104.878	316	1	
NFI4F 100/0.03	100	0.03	4	30.104.879	360	1	
NFI4F 25/0.1	25	0.1	4	30.104.880	316	1	
NFI4F 40/0.1	40	0.1	4	30.104.881	316	1	
NFI4F 63/0.1	63	0.1	4	30.104.882	316	1	
NFI4F 80/0.1	80	0.1	4	30.104.883	316	1	
NFI4F 100/0.1	100	0.1	4	30.104.884	360	1	
NFI4F 25/0.3	25	0.3	4	30.104.885	316	1	
NFI4F 40/0.3	40	0.3	4	30.104.886	316	1	
NFI4F 63/0.3	63	0.3	4	30.104.887	316	1	
NFI4F 80/0.3	80	0.3	4	30.104.888	360	1	
NFI4F 100/0.3	100	0.3	4	30.104.889	360	1	
NFI4F 25/0.5	25	0.5	4	30.104.890	316	1	
NFI4F 40/0.5	40	0.5	4	30.104.891	316	1	
NFI4F 63/0.5	63	0.5	4	30.104.892	316	1	
NFI4F 80/0.5	80	0.5	4	30.104.893	360	1	
NFI4F 100/0.5	100	0.5	4	30.104.894	360	1	

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NOTE: Rated current 32 A on request

Technical Data

Type A G S	Symbol	Unit	NFI2 NFI2K NFI2S	NFI4 NFI4K NFI4S
Standards			IEC/EN 61008, type G acc. to ÖVE E 8601	
Approvals			VDE, EAC	
Module width			2	4
Number of poles			2	4
Rated voltage	U_n	V AC	230	400
Rated insulation voltage	U_i	V	400	
Rated impulse withstand voltage	U_{imp}	kV	4	
Rated frequency	f	Hz	50	
Rated current	I_n	A	16, 25, 32, 40, 63, 80, 100	25, 32, 40, 63, 80, 100
Rated residual current	$I_{\delta n}$	mA	10 (I_n = 16, 25, 32 A), 30, 100, 300, 500	10 (I_n = 25, 32 A), 30, 100, 300, 500
Residual operating current (AC 50 Hz)			0.5 - 1.0 $I_{\Delta n}$	
Rated conditional short-circuit current	I_{nc}	kA	10	
Rated making and breaking capacity Rated residual making and breaking capacity	I_m $I_{\delta m}$	A	800 (I_n = 16 - 80 A) 1000 (I_n = 100 A)	
Max. back-up fuse for short-circuit current gL	I_v	A	63 (I_n = 16 - 40 A) 80 (I_n = 63, 80 A) 100 (I_n = 100 A)	
Surge current withstand capability		A	NFI: 200 (0.5 µs/100 kHz ring wave) NFIK, NFIS: 3000 (8/20 µs surge current)	
Maximum breaking times			NFI, NFIK - 1 x $I_{\Delta n}$: < 300 ms; 5 x $I_{\Delta n}$: < 40 ms NFIS - 1 x $I_{\Delta n}$: < 500 ms; 5 x $I_{\Delta n}$: < 150 ms	
Minimum response time delay			FI, NFI: instantaneous NFIK: 10 ms NFIS: 40 ms	
Mechanical endurance		op. c.	min. 5000	
Electrical endurance		op. c.	min. 2000	
Ambient temperature		°C	-25 ... +40*	
Storage temperature		°C	-35 ... +60	
Resistance to climate			acc. to IEC 60068-2-30: 28 cycles (55 °C, 95 % relative humidity)	
Terminal capacity rigid (solid or stranded)				
rigid (solid or stranded)	S	mm^2	1 ... 35	
flexible			1 ... 35	
Screw			M5	
Screw head			PZ2	
Tightening torque		Nm	2.0	
Lenght of removed conductor insulation		mm	15	
Degree of protection			IP20 (IP40 after installation in a distribution box)	
Pollution degree			2	
Weight		g	184	360

* -35°C on request

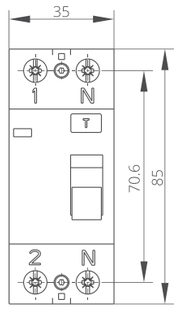
Technical Data

Type F	Symbol	Unit	NFI2F	NFI4F
Standards			IIEC/EN 61008, IEC/EN 62423	
Approvals			VDE	
Module width			2	4
Number of poles			2	4
Rated voltage	U_n	V AC	230	400
Rated insulation voltage	U_i	V	400	
Rated impulse withstand voltage	U_{imp}	kV	4	
Rated frequency	f	Hz	50	
Rated current	I_n	A	16, 25, 32, 40, 63, 80, 100	25, 32, 40, 63, 80, 100
Rated residual current	$I_{\delta n}$	mA	30, 100, 300, 500	
Residual operating current (AC 50 Hz)			0.5 - 1.0 $I_{\Delta n}$	
Rated conditional short-circuit current	I_{nc}	kA	10	
Rated making and breaking capacity Rated residual making and breaking capacity	I_m $I_{\delta m}$	A	800 (I_n = 16 - 80 A) 1000 (I_n = 100 A)	
Max. back-up fuse for short-circuit current gL	I_v	A	63 (I_n = 16 - 40 A) 80 (I_n = 63, 80 A) 100 (I_n = 100 A)	
Surge current withstand capability		A	3 (8/20 µs surge current)	
Maximum breaking times			1 x $I_{\Delta n}$: < 300 ms; 5 x $I_{\Delta n}$: < 40 ms	
Minimum response time delay			10 ms	
Mechanical endurance		op. c.	min. 5000	
Electrical endurance		op. c.	min. 2000	
Ambient temperature		°C	-25 ... +40	
Storage temperature		°C	-35 ... +60	
Resistance to climate			acc. to IEC 60068-2-30: 28 cycles (55 °C, 95 % relative humidity)	
Terminal capacity rigid (solid or stranded)				
rigid (solid or stranded)	S	mm^2	1 ... 35	
flexible			1 ... 35	
Screw			M5	
Screw head			PZ2	
Tightening torque		Nm	2.0	
Lenght of removed conductor insulation		mm	15	
Degree of protection			IP20 (IP40 after installation in a distribution box)	
Pollution degree			2	
Weight		g	184	360

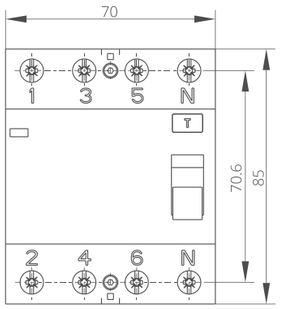
Dimensions

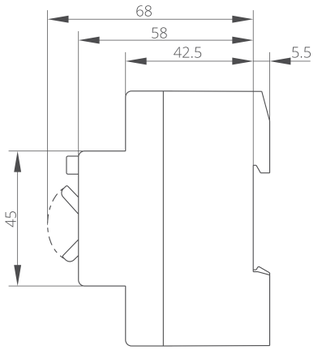
(mm)

NFI2, NFI2K
NFI2S, NFI2F



NFI4, NFI4K
NFI4S, NFI4F

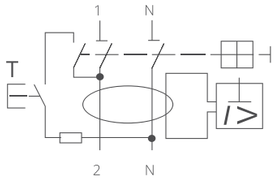




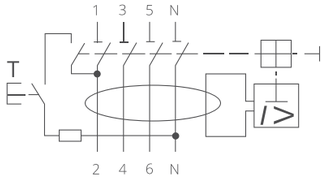
Schematics

NFI, NFIK, NFIS, NFIF

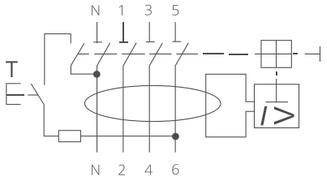
Two-pole



Four-pole, N-pole right



Four-pole, N-pole left



NFIB

Residual current circuit breakers - type B

NFIB are type B residual current circuit breakers (RCCBs) for which tripping is ensured as for type a and in addition for smooth DC residual currents, residual DC currents which may result from rectifying circuits, and high frequency AC residual currents.

Features

- Intended for use in applications with frequency inverters, medical devices, UPS, mobile installations, elevators.
- The type B residual current circuit breakers are not intended for use in d.c. systems and networks with operating frequencies other than 50 or 60 Hz.
- For type B tripping conditions for frequencies up to 1 kHz are defined.
- Functions of detection, evaluation and interruption for type A residual currents do not depend on the line voltage.
- For evaluation of smooth d.c. residual currents supply voltage is required.
- Versions:
  - NFIBK: short-time delayed
  - NFIBS: selective type
- Surge current withstand capability with current waveform 8/20 µs is 3 kA.
- When designing and installing electrical installations, electrical loads that can generate d.c. residual currents in the event
- of fault, must be assigned a separate electrical circuit.
- Optional operating position
- Degree of protection IP20; after installation in a distribution box IP40
- Assembly to a 35 mm wide mounting rail in accordance with EN 60715

Type b - sensitive to residual currents as type f and in addition to smooth DC residual currents, residual dc currents which may result from rectifying circuits, and high frequency ac residual currents

Type	Rated Current I_n (A)	Rated residual current I_{Dn} (A)	No. of Poles	Ordering No.	Weight (g)	Quantity / Box	Quantity / CTN
NFI2BK - type B, short-time delayed G							
NFI2BK 25/0.03	25	0.03	2	30.105.110	310	1	
NFI2BK 40/0.03	40	0.03	2	30.105.046	310	1	
NFI2BK 63/0.03	63	0.03	2	30.105.035	310	1	
NFI2BK 80/0.03	80	0.03	2	30.105.175	310	1	
NFI2BK 25/0.1	25	0.1	2	30.105.176	310	1	
NFI2BK 40/0.1	40	0.1	2	30.105.177	310	1	
NFI2BK 63/0.1	63	0.1	2	30.105.178	310	1	
NFI2BK 80/0.1	80	0.1	2	30.105.179	310	1	
NFI2BK 25/0.3	25	0.3	2	30.105.180	310	1	
NFI2BK 40/0.3	40	0.3	2	30.105.148	310	1	
NFI2BK 63/0.3	63	0.3	2	30.105.181	310	1	
NFI2BK 80/0.3	80	0.3	2	30.105.182	310	1	
NFI2BK 25/0.5	25	0.5	2	30.105.183	310	1	
NFI2BK 40/0.5	40	0.5	2	30.105.184	310	1	
NFI2BK 63/0.5	63	0.5	2	30.105.185	310	1	
NFI2BK 80/0.5	80	0.5	2	30.105.186	310	1	
NFI4BK - type B, short-time delayed G							
NFI4BK 25/0.03	25	0.03	4	30.104.898	350	1	
NFI4BK 40/0.03	40	0.03	4	30.104.899	350	1	
NFI4BK 63/0.03	63	0.03	4	30.104.806	350	1	
NFI4BK 80/0.03	80	0.03	4	30.104.902	350	1	
NFI4BK 25/0.1	25	0.1	4	30.104.929	350	1	
NFI4BK 40/0.1	40	0.1	4	30.104.930	350	1	
NFI4BK 63/0.1	63	0.1	4	30.104.807	350	1	
NFI4BK 80/0.1	80	0.1	4	30.104.903	350	1	
NFI4BK 25/0.3	25	0.3	4	30.104.931	350	1	
NFI4BK 40/0.3	40	0.3	4	30.104.932	350	1	
NFI4BK 63/0.3	63	0.3	4	30.104.808	350	1	
NFI4BK 80/0.3	80	0.3	4	30.104.904	350	1	
NFI4BK 25/0.5	25	0.5	4	30.104.909	350	1	
NFI4BK 40/0.5	40	0.5	4	30.104.933	350	1	
NFI4BK 63/0.5	63	0.5	4	30.104.809	350	1	
NFI4BK 80/0.5	80	0.5	4	30.104.905	350	1	
NFI4BS - type B, selective S							
NFI4BS 25/0.1	25	0.1	4	30.104.934	350	1	
NFI4BS 40/0.1	40	0.1	4	30.104.935	350	1	
NFI4BS 63/0.1	63	0.1	4	30.104.810	350	1	
NFI4BS 80/0.1	80	0.1	4	30.104.906	350	1	
NFI4BS 25/0.3	25	0.3	4	30.104.936	350	1	
NFI4BS 40/0.3	40	0.3	4	30.104.937	350	1	
NFI4BS 63/0.3	63	0.3	4	30.104.811	350	1	
NFI4BS 80/0.3	80	0.3	4	30.104.907	350	1	
NFI4BS 25/0.5	25	0.5	4	30.104.910	350	1	
NFI4BS 40/0.5	40	0.5	4	30.104.938	350	1	
NFI4BS 63/0.5	63	0.5	4	30.104.812	350	1	
NFI4BS 80/0.5	80	0.5	4	30.104.908	350	1	

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NOTE: Rated current 32 A on request

Ordering Data

NFI4BK 25 / 0.03

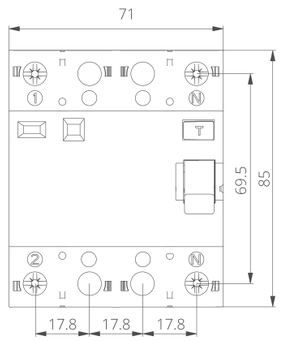
- 0.03 — Rated residual operating current $I_{\Delta n}$ (A)
- 25 — Rated current I_n(A)
- NFI4BK — Type

Technical Data

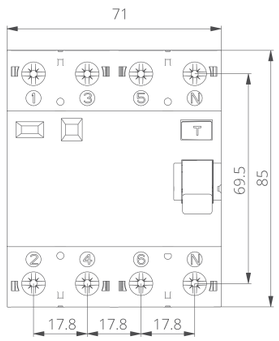
Type B	Symbol	Unit	NFI2BK	NFI4BK NFI4BS
Standards			IEC/EN 61008, IEC/EN 62423	
Approvals			VDE, EAC	
Module width			4	
Number of poles			2	4
Rated voltage	U_n	V AC	230	400
Min. required operating voltage				
- for detecting type A residual currents			0 V (mains voltage independent)	
- for detecting type B residual currents			80 V AC	50 V AC
Rated insulation voltage	U_i	V	400	
Rated impulse withstand voltage	U_{imp}	kV	4 (1.2/50 µs)	
Rated frequency	f	Hz	50/60	
Rated current	I_n	A	25, 32, 40, 63, 80	
Rated residual current	$I_{\delta n}$	mA	NFI2BK, NFI4BK: 30, 100, 300, 500 NFI4BS: 100, 300, 500	
Residual operating current			AC (50 Hz): 0.5 - 1.0 $I_{\Delta n}$ DC: 0.5 - 2.0 $I_{\Delta n}$	
Frequency respons range		Hz	0 - 1000	
Rated conditional short-circuit current	I_{nc}	kA	10	
Rated making and breaking capacity Rated residual making and breaking capacity	I_m $I_{\delta m}$	A	800	
Max. back-up fuse for short-circuit current gL	I_v	A	63 (In = 16 - 40 A) 80 (In = 63, 80 A)	
Surge current withstand capability		kA	3 (8/20 µs surge current)	
Maximum breaking times			NFI2BK, NFI4BK - 1 x $I_{\Delta n}$: < 300 ms; 5 x $I_{\Delta n}$: < 40 ms NFI4BS - 1 x $I_{\Delta n}$: < 500 ms; 5 x $I_{\Delta n}$: < 150 ms	
Minimum response time delay			NFI2BK, NFI4BK: 10 ms NFI4BS: 40 ms	
Mechanical endurance		op. c.	min. 5000	
Electrical endurance		op. c.	min. 2000	
Ambient temperature		°C	-25 ... +40	
Storage temperature		°C	-35 ... +60	
Resistance to climate			acc. to IEC 60068-2-30: 28 cycles (55 °C, 95 % relative humidity)	
Terminal capacity rigid (solid or stranded)				
rigid (solid or stranded)	S	mm^2	1 ... 25	
flexible			1 ... 25	
Screw			M5	
Screw head			PZ2	
Tightening torque		Nm	2.0	
Lenght of removed conductor insulation		mm	15	
Degree of protection			IP20 (IP40 after installation in a distribution box)	
Pollution degree			2	
Weight		g	310	350

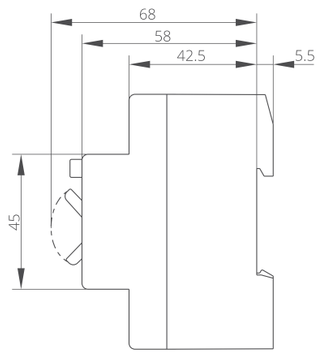
Dimensions
(mm)

NFI2BK



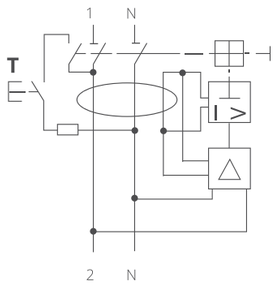
NFI4BK, NFI4BS



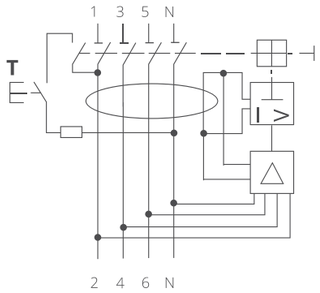


Schematics

NFI2BK



NFI4BK, NFI4BS



RFIE A
Residual
Current
Circuit
Breakers

Features

- Single module size with switched neutral line
- Protection against sinusoidal AC and pulsation DC leakage current
- 6 kA breaking capacity
- Simple replace MCB with RCBO in the same place
- Functionality on minimum supply voltage 90 V
- The terminals provide to use also time saving busbars
- Method of DIN rail mounting enables an easy removal of
- single RCBO without disconnecting units from busbars

Technical data	Symbol	Unit	RFIE A
Standards			IEC 61009-1
Approvals			SEMKO
Number of poles			2
Rated current	I_n	A	6, 10, 16, 20, 25, 32
Tripping characteristic			B, C
Rated voltage	U_n	V	230
Rated frequency	f	Hz	50
Rated residual operating current	$I_{\Delta n}$	mA	30
Rated insulation voltage		V	500
Type of residual current			A, AC
Residual tripping time		ms	< 100
Short circuit breaking capacity		kA	6
Selection category		kA	3
Electrical endurance		op.c.	4000
Back-up fuse gL/gG		A	100
Mechanical endurance		op.c.	10.000
Connecting clamps			Lug type
Connecting wires		mm2	1 ... 10
Mounting			DIN rail EN 60715
Ambient air temperature		°C	-25 ... +40
Protection degree			IP20
Width		mm	18 (1-module)