RCBO

Residual current circuit breakers with overcurrent protection

Types

RFI1E A
KAFI2
KAFI4
KAFI Accessories

RFI1E 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

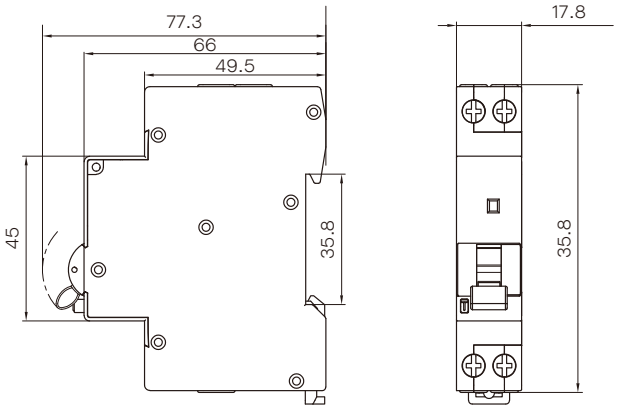
Technical data	Symbol	Unit	RFI1E A
Standards			IEC 61009-1
Approvals			SEMKO
Number of poles			2
Rated current	I_n	A	6, 10, 16, 20, 25, 32, 40
Tripping characteristic			B, C
Rated voltage	U_n	V	230
Rated frequency	f	Hz	50
Rated residual operating current	$I_{\Delta n}$	mA	30
Rated insulation voltage		V	500
Type of residual current			A
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		mm^2	1 ... 10
Mounting			DIN rail EN 60715
Ambient air temperature		°C	-25 ... +40
Protection degree			IP20
Width		mm	18 (1-module)

RFI1E A characteristics

Curve	Rated Current I_n (A)	Rated Voltage U_n (V)	UPC	Ordering No.	Weight (g)
B curve					
6 A	6	230	RFI1E A B6/0.03	786.101.982	0.122
10 A	10	230	RFI1E A B10/0.03	786.101.983	0.122
16 A	16	230	RFI1E A B16/0.03	786.101.984	0.122
20 A	20	230	RFI1E A B20/0.03	786.101.985	0.122
25 A	25	230	RFI1E A B25/0.03	786.101.986	0.122
32 A	32	230	RFI1E A B32/0.03	786.101.987	0.122
40 A	40	230	RFI1E A B40/0.03	786.101.015	0.122
C curve					
6 A	6	230	RFI1E A C 6/0.03	786.101.988	0.122
10 A	10	230	RFI1E A C10/0.03	786.101.989	0.122
16 A	16	230	RFI1E A C16/0.03	786.101.990	0.122
20 A	20	230	RFI1E A C20/0.03	786.101.991	0.122
25 A	25	230	RFI1E A C25/0.03	786.101.992	0.122
32 A	32	230	RFI1E A C32/0.03	786.101.993	0.122
40 A	40	230	RFI1E A C40/0.03	786.101.014	0.122

Dimensions

(mm)



KAFI2

Residual current circuit breakers with overcurrent protection

Types

Type A
Type AC

Applications

RCBOs are used in applications where there is the need to combine protection against overcurrents (overload and short-circuit) and protection against earth leakage currents.
They are used in circuits with an increased requirements regarding touch voltage (bathrooms, event halls, schools, hospitals, swimming pools, marinas, distribution cabinets, mobile houses, etc.)

Features

- Trip free mechanisms
- Earth fault indication window
- Wide range of breaking capacities for application from residential to industrial field
- Connection capacity 25mm² rigid and 16mm² flexible wire
- 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

Standards

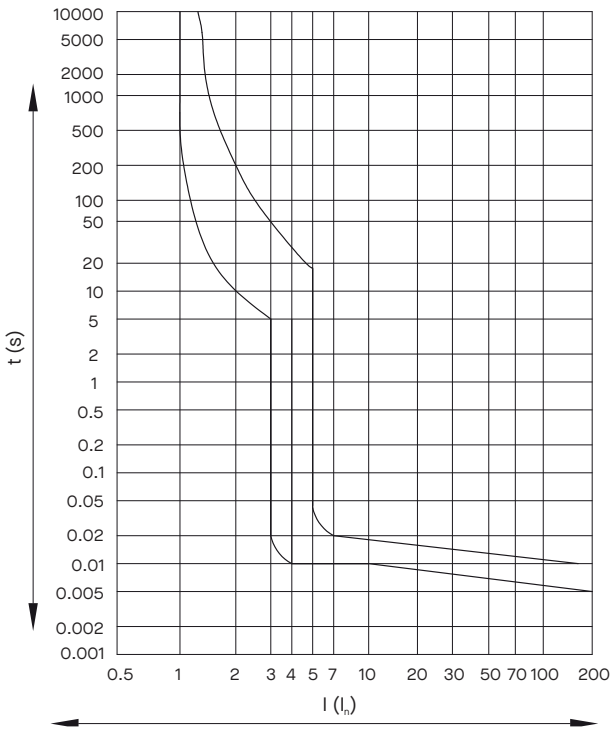
- IEC 61009-1

KAFI2 characteristics

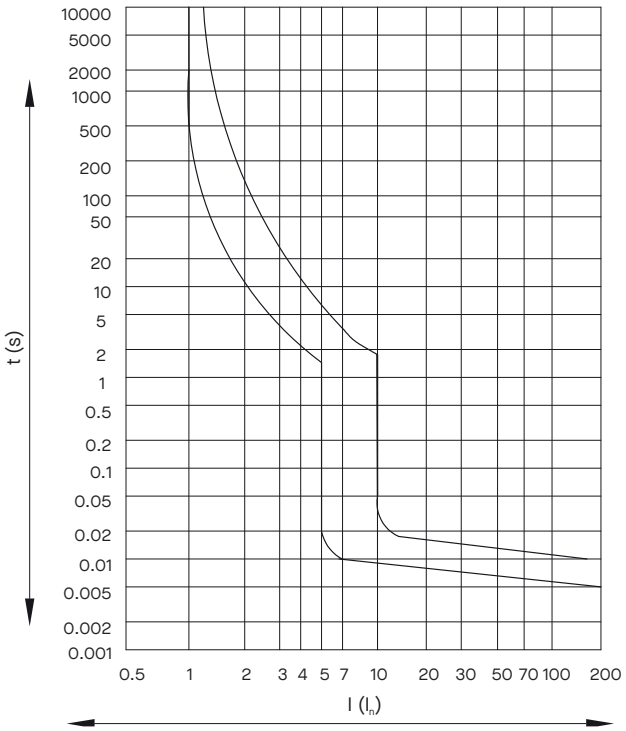
Technical data	Symbol	Unit	KAFI2
Standards			IEC 61009-1
Approvals			KEMA, CE
Module width			2
Number of poles			2
Rated voltage	U_n	V	240
Rated insulation voltage	U_i	V	415
Rated impulse withstand voltage	U_{imp}	kV	4
Tripping characteristics			B, C
Rated frequency	f	Hz	50/60
Rated current	I_n	A	6, 10, 16, 20, 25, 32, 40 (50, 63, only AC)
Rated residual current	$I_{\Delta n}$	mA	30, 100, 300
Type of residual current			A, AC
Residual tripping time		ms	<100
Rated short circuit capacity	I_{cn}	A	10.000
Rated residual making and breaking capacity	$I_{\Delta m}$	A	630
Electrical endurance		op. c.	4000
Back-up fuse gL/gG		A	40 (63)
Mechanical endurance		op. c.	10 000
Connecting clamps			lug type
Connecting wires		mm^2	1 ... 25
Mounting			DIN rail acc. to EN 60715
Ambient temperature		°C	-25 ... +40
Storage temperature		°C	-35 ... +60
Tightening torque			2
Protection degree		Nm	IP20

Tripping characteristics

Characteristics B acc. to EN 60 898



Characteristics C acc. to EN 60 898



KAFI2 — Characteristics

Type	Rated Current I_n (A)	Rated Residual Current $I_{\Delta n}$ (A)	Number of Poles	Ordering No.	Weight (g)	Packaging (pcs)
A characteristic C						
KAFI2 A C6/0.03	6	0.03	2	786.100.884	210	1
KAFI2 A C10/0.03	10	0.03	2	786.100.885	210	1
KAFI2 A C16/0.03	16	0.03	2	786.100.886	210	1
KAFI2 A C20/0.03	20	0.03	2	786.100.887	210	1
KAFI2 A C25/0.03	25	0.03	2	786.100.888	210	1
KAFI2 A C32/0.03	32	0.03	2	786.100.889	210	1
KAFI2 A C40/0.03	40	0.03	2	786.100.890	210	1
A characteristic B						
KAFI2 A B6/0.03	6	0.03	2	786.100.891	210	1
KAFI2 A B10/0.03	10	0.03	2	786.100.892	210	1
KAFI2 A B16/0.03	16	0.03	2	786.100.893	210	1
KAFI2 A B20/0.03	20	0.03	2	786.100.894	210	1
KAFI2 A B25/0.03	25	0.03	2	786.100.895	210	1
KAFI2 A B32/0.03	32	0.03	2	786.100.896	210	1
KAFI2 A B40/0.03	40	0.03	2	786.100.897	210	1
KAFI2 A B16/0.1	16	0.1	2	786.101.212	210	1
KAFI2 A B20/0.1	20	0.1	2	786.101.213	210	1
KAFI2 A B25/0.1	25	0.1	2	786.101.214	210	1
KAFI2 A B25/0.3	25	0.3	2	786.101.215	210	1
AC characteristic C						
KAFI2 AC C6/0.03	6	0.03	2	786.100.996	210	1
KAFI2 AC C10/0.03	10	0.03	2	786.100.997	210	1
KAFI2 AC C16/0.03	16	0.03	2	786.100.998	210	1
KAFI2 AC C20/0.03	20	0.03	2	786.100.999	210	1
KAFI2 AC C25/0.03	25	0.03	2	786.101.004	210	1
KAFI2 AC C32/0.03	32	0.03	2	786.101.005	210	1
KAFI2 AC C40/0.03	40	0.03	2	786.101.006	210	1
AC characteristic B						
KAFI2 AC B6/0.03	6	0.03	2	786.101.007	210	1
KAFI2 AC B10/0.03	10	0.03	2	786.101.008	210	1
KAFI2 AC B16/0.03	16	0.03	2	786.101.009	210	1
KAFI2 AC B20/0.03	20	0.03	2	786.101.010	210	1
KAFI2 AC B25/0.03	25	0.03	2	786.101.011	210	1
KAFI2 AC B32/0.03	32	0.03	2	786.101.012	210	1
KAFI2 AC B40/0.03	40	0.03	2	786.101.013	210	1

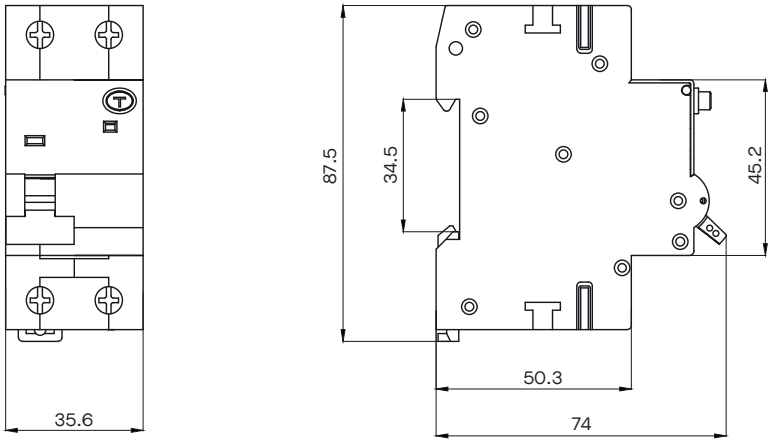
Ordering data

KAFI2 B - 16 - 0.03

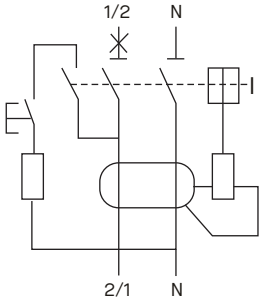
- 0.03 — Rated residual operating current $I_{\Delta n}$ (A)
- 16 — Rated current I_n (A)
- B — Tripping characteristics
- KAFI2 — Type

Dimensions

(mm)



Wiring diagram



KAFI4

Residual current circuit breakers with overcurrent protection

Types

Type A

Applications

RCBOs are used in applications where there is the need to combine protection against overcurrents (overload and short-circuit) and protection against earth leakage currents.
They are used in circuits with an increased requirements regarding touch voltage (bathrooms, event halls, schools, hospitals, swimming pools, marinas, distribution cabinets, mobile houses, etc.)

Features

- Trip free mechanisms
- Earth fault indication window
- Wide range of breaking capacities for application from residential to industrial field
- Connection capacity 25mm² rigid and 16mm² flexible wire
- 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

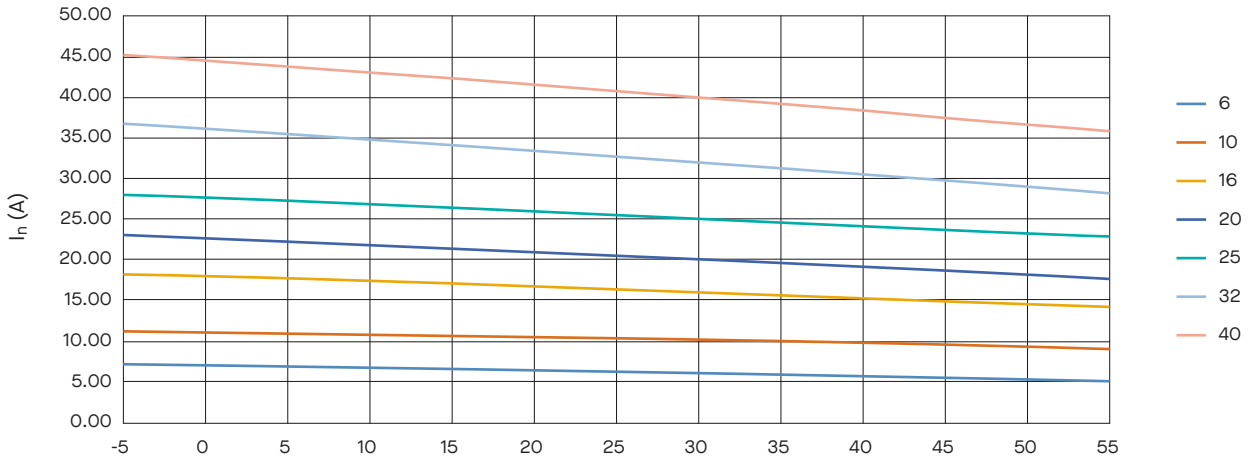
Standards

- IEC 61009-1

KAFI4 Type A

Technical data	Symbol	Unit	KAFI4
Standards			IEC 61009-1
Approvals			CE
Module width			4
Number of poles			4
Rated voltage	U_n	V	415
Rated insulation voltage	U_i	V	415
Rated impulse withstand voltage	U_{imp}	kV	4
Tripping characteristics			B, C
Rated frequency	f	Hz	50 / 60
Rated current	I_n	A	6, 10, 16, 20, 25, 32, 40
Rated residual current	$I_{\Delta n}$	mA	30, 100, 300
Surge current strength		A	200 (0.5 µs / 100 kHz ring wave)
Type of residual current			A
Residual tripping time		ms	< 100
Rated short circuit capacity	I_{cn}	A	10.000
Rated residual making and breaking capacity	$I_{\Delta m}$	A	630
Electrical endurance		op. c.	4000
Back-up fuse gL/gG		A	40 (63)
Mechanical endurance		op. c.	10 000
Connecting clamps			lug type
Connecting wires		mm^2	1 ... 25
Mounting			DIN rail acc. to EN 60715
Ambient temperature		°C	-25 ... +40
Storage temperature		°C	-35 ... +60
Tightening torque			2.5
Protection degree		Nm	IP20

Derating temperature



Max operating current depending on the ambient temperature (°C)

Temperature °C		-5	0	5	10	15	20	25	30	35	40	45	50	55
I_n (A)	6	7.08	6.94	6.79	6.65	6.49	6.33	6.16	6.00	5.80	5.61	5.48	5.29	5.10
	10	11.15	10.99	10.85	10.68	10.52	10.35	10.18	10.00	9.82	9.64	9.46	9.24	9.06
	16	18.26	17.98	17.68	17.33	17.12	16.58	16.33	16.00	15.68	15.26	14.91	14.52	14.16
	20	22.98	22.49	22.09	21.68	21.26	20.86	20.43	20.00	19.58	19.11	18.68	18.12	17.58
	25	27.95	27.58	27.19	26.82	26.31	25.95	25.46	25.00	24.56	24.08	23.54	23.18	22.66
	32	36.68	36.02	35.42	34.78	34.15	33.45	32.73	32.00	31.28	30.55	29.81	28.98	28.12
	40	45.22	44.56	43.78	43.05	42.33	41.56	40.77	40.00	39.19	38.35	37.46	36.66	35.74

KAFI4 — Characteristics

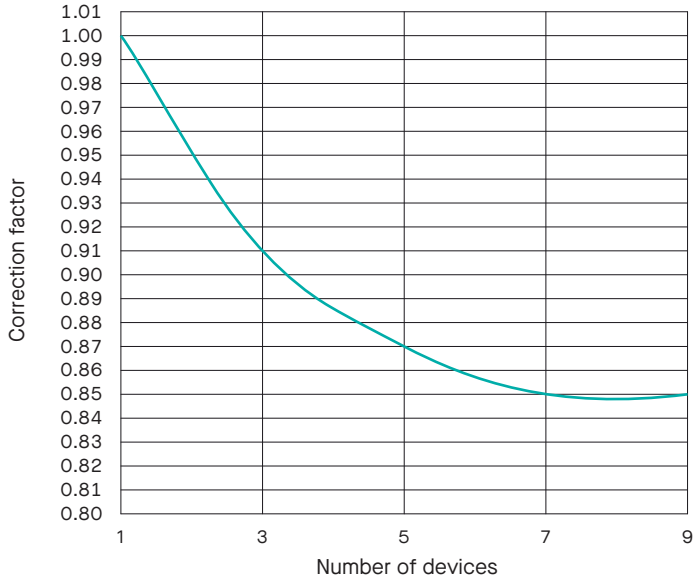
Type	Rated Current I_n (A)	Rated Residual Current $I_{\Delta n}$ (A)	Number of Poles	Ordering No.	Weight (g)	Packaging (pcs)
KAFI4 characteristic B						
KAFI4 A B16/0.1	16	0,1	4	786.101.216	465	1
KAFI4 A B20/0.1	20	0,1	4	786.101.217	465	1
KAFI4 A B25/0.1	25	0,1	4	786.101.218	465	1
KAFI4 A B32/0.1	32	0,1	4	786.101.219	465	1
KAFI4 A B6/0,03	6	0,03	4	786.100.898	465	1
KAFI4 A B10/0,03	10	0,03	4	786.100.899	465	1
KAFI4 A B16/0,03	16	0,03	4	786.100.900	465	1
KAFI4 A B20/0,03	20	0,03	4	786.100.901	465	1
KAFI4 A B25/0,03	25	0,03	4	786.100.902	465	1
KAFI4 A B32/0,03	32	0,03	4	786.100.903	465	1
KAFI4 A B40/0,03	40	0,03	4	786.100.904	465	1
KAFI4 A B6/0,3	6	0,03	4	786.100.905	465	1
KAFI4 A B10/0,3	10	0,03	4	786.100.906	465	1
KAFI4 A B16/0,3	16	0,03	4	786.100.907	465	1
KAFI4 A B20/0,3	20	0,03	4	786.100.908	465	1
KAFI4 A B25/0,3	25	0,03	4	786.100.909	465	1
KAFI4 A B32/0,3	32	0,03	4	786.100.910	465	1
KAFI4 A B40/0,3	40	0,03	4	786.100.911	465	1
KAFI4 characteristic C						
KAFI4 A C6/0,03	6	0.03	4	786.100.929	465	1
KAFI4 A C10/0,03	10	0.03	4	786.100.930	465	1
KAFI4 A C16/0,03	16	0.03	4	786.100.931	465	1
KAFI4 A C20/0,03	20	0.03	4	786.100.932	465	1
KAFI4 A C25/0,03	25	0.03	4	786.100.933	465	1
KAFI4 A C32/0,03	32	0.03	4	786.100.934	465	1
KAFI4 A C40/0,03	40	0.03	4	786.100.935	465	1
KAFI4 A C6/0,3	6	0,3	4	786.100.936	465	1
KAFI4 A C10/0,3	10	0,3	4	786.100.937	465	1
KAFI4 A C16/0,3	16	0,3	4	786.100.938	465	1
KAFI4 A C20/0,3	20	0,3	4	786.100.939	465	1
KAFI4 A C25/0,3	25	0,3	4	786.100.955	465	1
KAFI4 A C32/0,3	32	0,3	4	786.100.956	465	1
KAFI4 A C40/0,3	40	0,3	4	786.100.957	465	1

Ordering data

KAFI4 B - 16 - 0.03

- 0.03 — Rated residual operating current $I_{\Delta n}$ (A)
- 16 — Rated current I_n (A)
- B — Tripping characteristics
- KAFI4 — Type

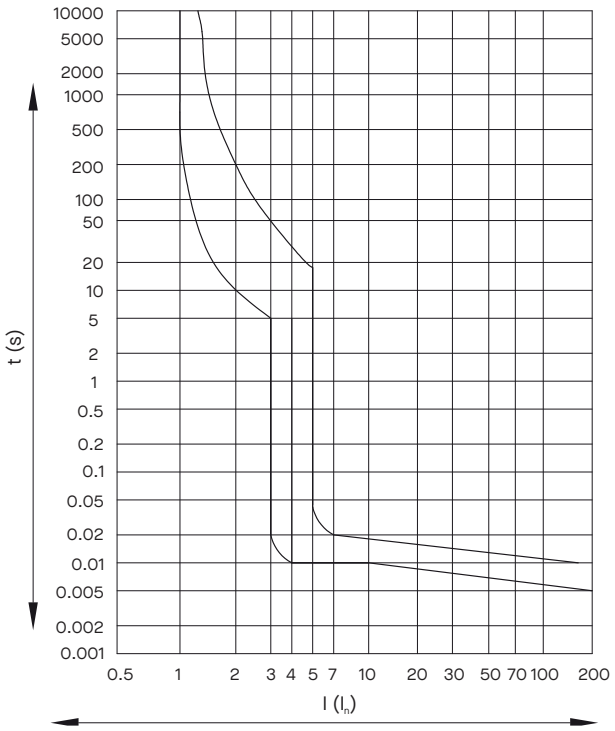
Influence of adjacent devices



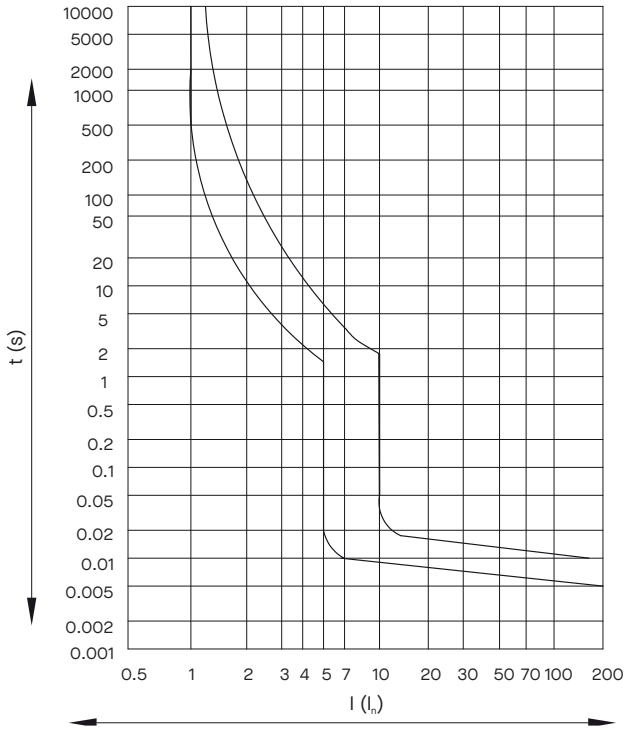
Number of adjacent devices	Correction factor K
1	1
3	0.91
5	0.87
7	0.85
9	0.85

Tripping characteristics

Characteristics B acc. to EN 60 898

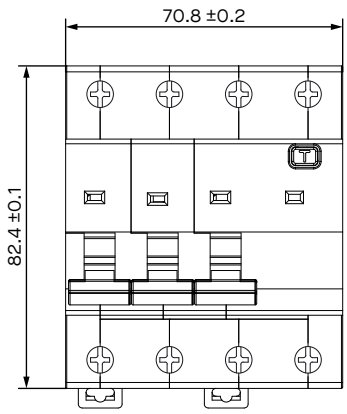


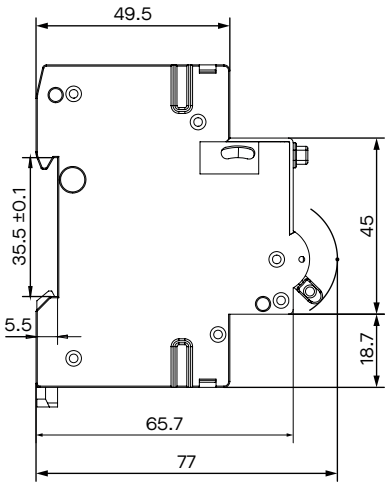
Characteristics C acc. to EN 60 898



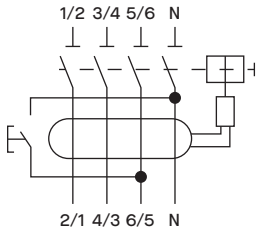
Dimensions

(mm)

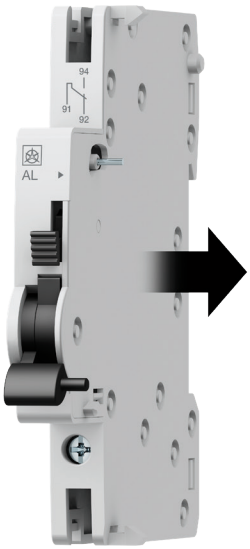


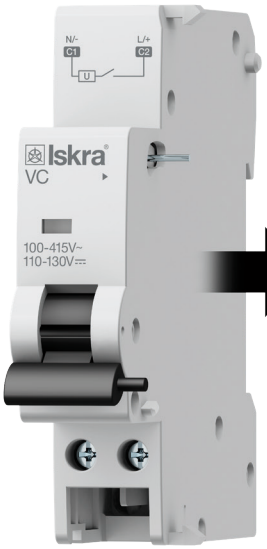


Wiring diagram



Accessories for KAFI

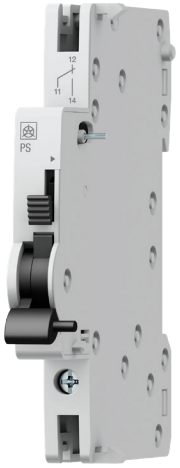




Types

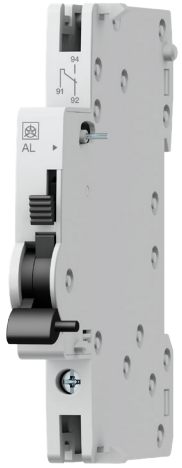
Type	Description	Ordering No.	Quantity / box
PS	Auxiliary contact KAFI	786.091.504	10 / 100
AL	Alarm switch KAFI	786.091.505	10 / 100
VC	Shunt release KAFI	786.091.506	10 / 100
PC	Overvoltage and under-voltage release KAFI	786.091.507	10 / 100

PS KAFI
Auxiliary Contact



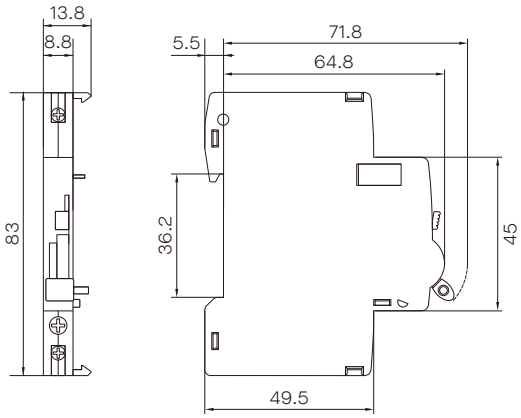
Model	Symbol	Unit	Data
Rated current	I_n	A	3 A (400 VAC) 6 A (240 VAC) 1 A (110 VDC)
Terminal		mm²	0.5 - 4
Dielectric strength		V/1min	2000
Operating AC frequency		Hz	50 / 60
Electro-mechanical endurance			≥ 10.000 times
Mode of connection			Tunnel-type terminal block
Terminal wiring cross-section area			Below cable 4mm²
Mounting			Din rail

AL KAFI
Alarm Switch



Model	Symbol	Unit	Data
Contact capacity	I_n	A	3 A (400VAC) 6 A (230VAC) 9 A (125VDC)
Rated power voltage	U_s	V	400, 230, 125
Operating voltage range	U_s		70 - 100 %
Dielectric strength		V/1min	2000
Operating AC frequency		Hz	50 / 60
Rated insulating voltage	U_i	V	500
Electro-mechanical endurance			≥ 3.000 times
Mode of connection			Tunnel-type terminal block
Terminal wiring cross-section area			Below cable 4mm²
Mounting			Din rail

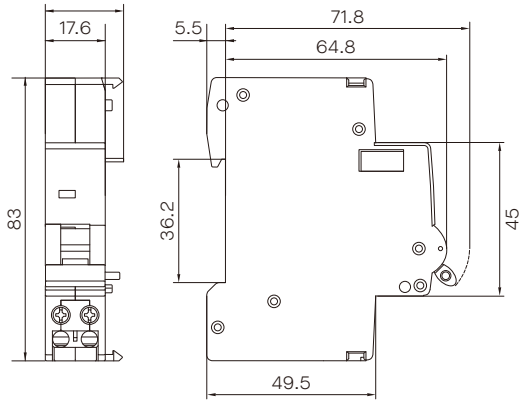
Dimensions
(mm)



VC KAFI
Shunt Release

Model	Symbol	Unit	Data
Nominal voltage	U_s	VAC	110 ~ 415
Max inrush current	I_n		3 A (415 VAC) 6 A (230 VAC) 9 A (110 VAC)
Dielectric strength		V/1min	2000
Release range		VAC	110 ~ 415
Electro-mechanical endurance			≥ 4000 times

PC KAFI
Overvoltage and undervoltage release

Model	Symbol	Unit	Data
Rated voltage	U_e	VAC	230
Max tripping voltage		V	280
Min tripping voltage		VAC	170
Electro-mechanical endurance			≥ 4000 times

Dimensions
(mm)