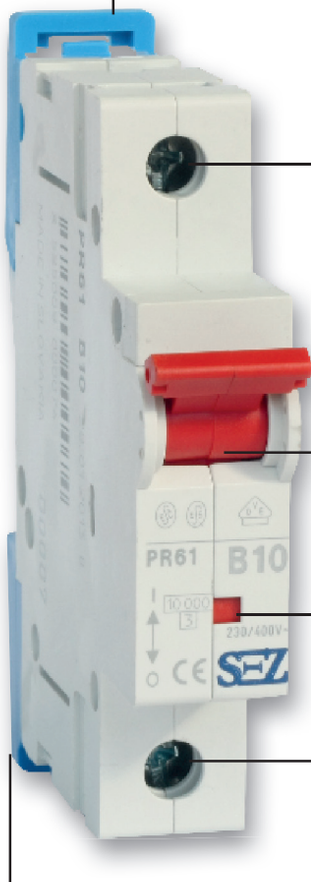
Modular DIN – rail equipment

Notes

- Circuit breakers PR series are mechanical switching devices able to switch, conduct and switch-off the current under normal conditions and able to switch, conduct and automatically switch-off the current under abnormal circuit conditions such as short circuit.
- They are used to protect house installations and industrial electric distributions and devices against overcurrents.
- They are designed to be operated by untrained persons and they are maintenance-free.
- Handles of circuit breakers characteristic B, C, D are coloured like the rated currents of designation of the threaded fuse cartridges: 0,5-4 A - brown, 6-8 A - red, 16 A - gray, 20 A blue, 25 A - yellow, 32 and 35 A - violet, 40 A - black, 50 A - white, 63 A - orange, M - characteristic circuit breakers have black handles
- There is optical state indicator on the front side of the circuit breaker indicating operation state of the device (green target visible = closed contacts, red target visible = opened contacts). The state indicator is directly connected to the device contact system and it does not depend on the handle position (circuit breaker also can switch-off when the handle is sealed - it is corresponding with safe switch-off conditions)
- MCBs are commonly delivered with identification label of grey colour RAL 7035, placed on the front side above the operating handle intended for direct description. **There is a possibility to order following identification labels:**
  - of grey colour with text (lights, sockets, boilers, heating, main MCB, etc.)
  - of blue colour
  - transparent, under which there is a possibility to put paper labels with dimensions 4,3 x 9,5 mm
- **Simple assembly:**
  - lower flexible clip for fastening to the rail 35 x 7,5 in accordance with EN 60 715 - it allows also to take out circuit breaker from the line of devices together connected by lower busbar strip without interrupting of adjacent current circuits.
  - upper fixed clip - it allows to take out circuit breaker from the line of devices connected together by upper busbar strip
- with two clips for mounting on panel fixed with screws M5.
- Sealable in ON and OFF position.
- There is a possibility to use throughout covers for both terminals (the modular width 17,5 mm) which can be sealed by blinder.
- Connection:
  - conductors 1 – 25 mm^2
  - busbar strip – top and low terminal allows connecting of pin and fork busbar strip.
  - simultaneous connection of conductors and busbars
- Method of connection: for AC MCBs optional, that means that input and output terminals can be changed. , for DC MCBs, the polarity of terminals has to be observed.



Upper fixed clip makes it possible to withdraw a miniature circuit breaker from a row of devices interconnected on the top by a busbar without interruption of adjacent current circuits.

Combined terminal with a secured screw on both sides of the miniature circuit breaker makes it possible to connect the busbar and conductor. The busbar and conductor can be connected by a single screw.

Control handle colour unambiguously indicates the rated of the device (the control lever colours are in of the device (the control lever colours are in accordance with the colours of the fuses with screw base)

Position indicator indicates optically the operating status of the device. It is directly connected with the contact system of the device and is independent on the control lever position (the device trips and indicates operating status even at the control lever locking. So it meets the requirement for safe disconnection.

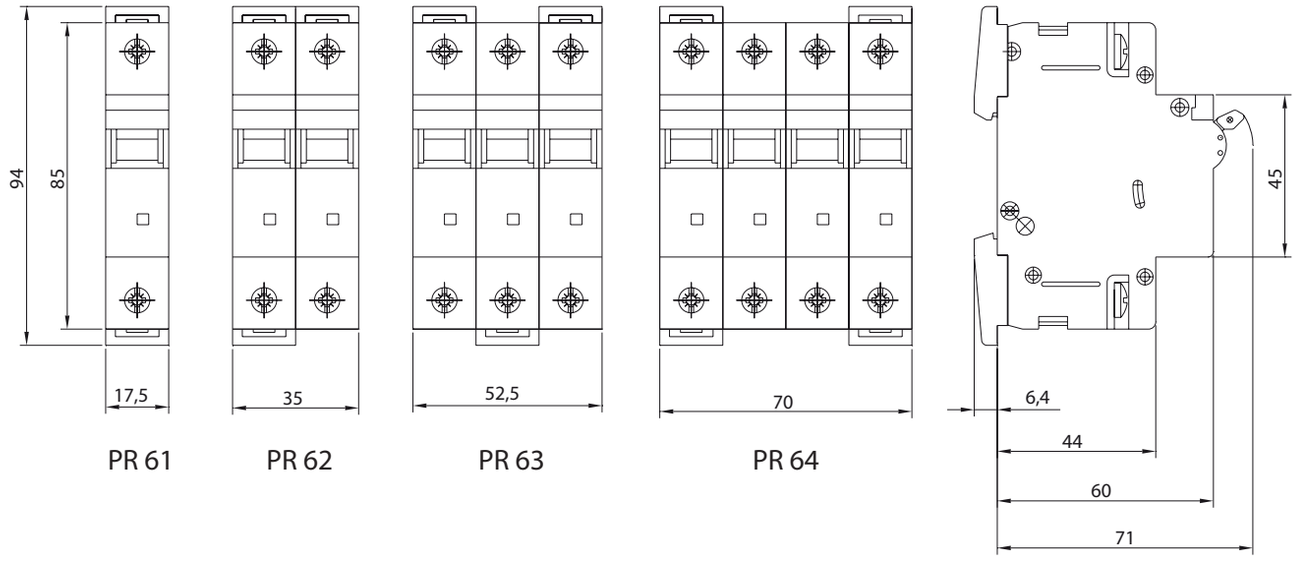
Indicator colour	Device status
red	ON
green	OFF

Lower flexible clip enables mounting on the rail DIN EN 50 022, width 35 mm. In the fixed withdrawn position it facilitates the side shift on the instrument board.

Technical data

Standards		EN 60898-1	EN 60947-2
Pole configuration		1, 1+N, 2, 3, 3+N, 4	
Tripping characteristics		B, C, D	M
Rated current In	A	0,5 - 63	0,2 - 63
Rated voltage Un	V	230; 230/400; 400	230; 400
Rated insulation voltage Ui	V	400	
Rated impulse withstand voltage Uimp	V	4 000	
Rated DC voltage Un	V	max.40 - (for one pole τ = 15ms)	
Rated frequency	Hz	50 - 60	
Short circuit breaking capacity	kA	10	
Selection category		3	
Ultimate short circuit breaking capacity Icu	kA		10
Service short circuit breaking capacity Ics	kA		7,5
Utilization category			A
Electrical endurance		4 000 cycles	
Mechanical endurance		100 000 cycles	
Terminal capacity	mm^2	1 - 25 for Cu wires 2,5 - 25 for Al wires - special Type	
Mounting		on rail DIN 35x7,5 EN 60 715; on panel	
Degree of protection		IP 20 IP 40 front	
Ambient temperature	°C	-25 up to +55	
Mounting position		optional	
Vibration resistance		3g (8 - 50 Hz)	
Approvals		ESS, ESČ, VDE	ESS
Accessories		Auxiliary and signal contacts - PKJ, 2PKJ, PKJ+SKJ Shunt trips – VC , undervoltage trip	

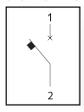
Dimensional drawing of PR 60



PR 61 PR 62 PR 63 PR 64

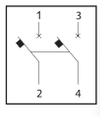
Rated current I_n, A	Characteristics B Type	Ordering number	Characteristics C Type	Ordering number	Characteristics D Type	Ordering number
0,5	PR 61-B 0,5	0099100	PR 61-C 0,5	0099200	PR 61-D 0,5	0099300
1	PR 61-B 1	0099101	PR 61-C 1	0099201	PR 61-D 1	0099301
2	PR 61-B 2	0099102	PR 61-C 2	0099202	PR 61-D 2	0099302
3	PR 61-B 3	0099103	PR 61-C 3	0099203	PR 61-D 3	0099303
4	PR 61-B 4	0099104	PR 61-C 4	0099204	PR 61-D 4	0099304
6	PR 61-B 6	0099105	PR 61-C 6	0099205	PR 61-D6	0099305
8	PR 61-B 8	0099106	PR 61-C 8	0099206	PR 61-D 8	0099306
10	PR 61-B 10	0099107	PR 61-C 10	0099207	PR 61-D 10	0099307
13	PR 61-B 13	0099108	PR 61-C 13	0099208	PR 61-D 13	0099308
16	PR 61-B 16	0099109	PR 61-C 16	0099209	PR 61-D 16	0099309
20	PR 61-B 20	0099110	PR 61-C 20	0099210	PR 61-D 20	0099310
25	PR 61-B 25	0099111	PR 61-C 25	0099211	PR 61-D 25	0099311
32	PR 61-B 32	0099112	PR 61-C 32	0099212	PR 61-D 32	0099312
35	PR 61-B 35	0099116	PR 61-C 35	0099216	PR 61-D 35	0099316
40	PR 61-B 40	0099113	PR 61-C 40	0099213	PR 61-D 40	0099313
50	PR 61-B 50	0099114	PR 61-C 50	0099214	PR 61-D 50	0099314
63	PR 61-B 63	0099115	PR 61-C 63	0099215	PR 61-D 63	0099315
0,5	PR 62-B 0,5	0099120	PR 62-C 0,5	0099220	PR 62-D 0,5	0099320
1	PR 62-B 1	0099121	PR 62-C 1	0099221	PR 62-D 1	0099321
2	PR 62-B 2	0099122	PR 62-C 2	0099222	PR 62-D 2	0099322
3	PR 62-B 3	0099123	PR 62-C 3	0099223	PR 62-D 3	0099323
4	PR 62-B 4	0099124	PR 62-C 4	0099224	PR 62-D 4	0099324
6	PR 62-B 6	0099125	PR 62-C 6	0099225	PR 62-D 6	0099325
8	PR 62-B 8	0099126	PR 62-C 8	0099226	PR 62-D 8	0099326
10	PR 62-B 10	0099127	PR 62-C 10	0099227	PR 62-D 10	0099327
13	PR 62-B 13	0099128	PR 62-C 13	0099228	PR 62-D 13	0099328
16	PR 62-B 16	0099129	PR 62-C 16	0099229	PR 62-D 16	0099329
20	PR 62-B 20	0099130	PR 62-C 20	0099230	PR 62-D 20	0099330
25	PR 62-B 25	0099131	PR 62-C 25	0099231	PR 62-D 25	0099331
32	PR 62-B 32	0099132	PR 62-C 32	0099232	PR 62-D 32	0099332
35	PR 62-B 35	0099136	PR 62-C 35	0099236	PR 62 -D 35	0099336
40	PR 62-B 40	0099133	PR 62-C 40	0099233	PR 62-D 40	0099333
50	PR 62-B 50	0099134	PR 62-C 50	0099234	PR 62-D 50	0099334
63	PR 62-B 63	0099135	PR 62-C 63	0099235	PR 62-D 63	0099335
0,5	PR 63-B 0,5	0099140	PR 63-C 0,5	0099240	PR 63-D 0,5	0099340
1	PR 63-B 1	0099141	PR 63-C 1	0099241	PR 63-D 1	0099341
2	PR 63-B 2	0099142	PR 63-C 2	0099242	PR 63-D 2	0099342
3	PR 63-B 3	0099143	PR 63-C 3	0099243	PR 63-D 3	0099343
4	PR 63-B 4	0099144	PR 63-C 4	0099244	PR 63-D 4	0099344
6	PR 63-B 6	0099145	PR 63-C 6	0099245	PR 63-D 6	0099345
8	PR 63-B 8	0099146	PR 63-C 8	0099246	PR 63-D 8	0099346
10	PR 63-B 10	0099147	PR 63-C 10	0099247	PR 63-D 10	0099347
13	PR 63-B 13	0099148	PR 63-C 13	0099248	PR 63-D 13	0099348
16	PR 63-B 16	0099149	PR 63-C 16	0099249	PR 63-D 16	0099349
20	PR 63-B 20	0099150	PR 63-C 20	0099250	PR 63-D 20	0099350
25	PR 63-B 25	0099151	PR 63-C 25	0099251	PR 63-D 25	0099351
32	PR 63-B 32	0099152	PR 63-C 32	0099252	PR 63-D 32	0099352
35	PR 63-B 35	0099156	PR 63-C 35	0099256	PR 63 -D 35	0099356
40	PR 63-B 40	0099153	PR 63-C 40	0099253	PR 63-D 40	0099353
50	PR 63-B 50	0099154	PR 63-C 50	0099254	PR 63-D 50	0099354
63	PR 63-B 63	0099155	PR 63-C 63	0099255	PR 63-D 63	0099355
0,5	PR 64-B 0,5	0099700	PR 64-C 0,5	0099720	PR 64-D 0,5	0099740
1	PR 64-B 1	0099701	PR 64-C 1	0099721	PR 64-D 1	0099741
2	PR 64-B 2	0099702	PR 64-C 2	0099722	PR 64-D 2	0099742
3	PR 64-B 3	0099703	PR 64-C 3	0099723	PR 64-D 3	0099743
4	PR 64-B 4	0099704	PR 64-C 4	0099724	PR 64-D 4	0099744
6	PR 64-B 6	0099705	PR 64-C 6	0099725	PR 64-D 6	0099745
8	PR 64-B 8	0099706	PR 64-C 8	0099726	PR 64-D 8	0099746
10	PR 64-B 10	0099707	PR 64-C 10	0099727	PR 64-D 10	0099747
13	PR 64-B 13	0099708	PR 64-C 13	0099728	PR 64-D 13	0099748
16	PR 64-B 16	0099709	PR 64-C 16	0099729	PR 64-D 16	0099749
20	PR 64-B 20	0099710	PR 64-C 20	0099730	PR 64-D 20	0099750
25	PR 64-B 25	0099711	PR 64-C 25	0099731	PR 64-D 25	0099751
32	PR 64-B 32	0099712	PR 64-C 32	0099732	PR 64-D 32	0099752
35	PR 64-B 35	0099716	PR 64-C 35	0099736	PR 64-D 35	0099756
40	PR 64-B 40	0099713	PR 64-C 40	0099733	PR 64-D 40	0099753
50	PR 64-B 50	0099714	PR 64-C 50	0099734	PR 64-D 50	0099754
63	PR 64-B 63	0099715	PR 64-C 63	0099735	PR 64-D 63	0099755

Scheme



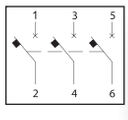
1 - pole

Scheme



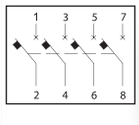
2 - pole

Scheme



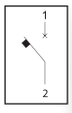
3 - pole

Scheme



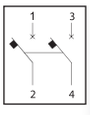
4 - pole

Scheme



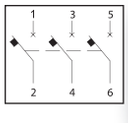
1 - pole

Scheme



2 - pole

Scheme



3 - pole

Characteristics M

Rated current I_n, A	Type	Ordering code
0,2	PR 61-M 0,2	0099400
0,3	PR 61-M 0,3	0099401
0,4	PR 61-M 0,4	0099402
0,6	PR 61-M 0,6	0099403
0,8	PR 61-M 0,8	0099404
1,2	PR 61-M 1,2	0099405
2	PR 61-M 2	0099406
3	PR 61-M 3	0099407
4,2	PR 61-M 4,2	0099408
6	PR 61-M 6	0099409
8	PR 61-M 8	0099410
10	PR 61-M 10	0099411
12	PR 61-M 12	0099412
14	PR 61-M 14	0099413
17	PR 61-M 17	0099414
21	PR 61-M 21	0099415
25	PR 61-M 25	0099416
32	PR 61-M 32	0099417
40	PR 61-M 40	0099418
50	PR 61-M 50	0099419
63	PR 61-M 63	0099420
0,2	PR 62-M 0,2	0099425
0,3	PR 62-M 0,3	0099426
0,4	PR 62-M 0,4	0099427
0,6	PR 62-M 0,6	0099428
0,8	PR 62-M 0,8	0099429
1,2	PR 62-M 1,2	0099430
2	PR 62-M 2	0099431
3	PR 62-M 3	0099432
4,2	PR 62-M 4,2	0099433
6	PR 62-M 6	0099434
8	PR 62-M 8	0099435
10	PR 62-M 10	0099436
12	PR 62-M 12	0099437
14	PR 62-M 14	0099438
17	PR 62-M 17	0099439
21	PR 62-M 21	0099440
25	PR 62-M 25	0099441
32	PR 62-M 32	0099442
40	PR 62-M 40	0099443
50	PR 62-M 50	0099444
63	PR 62-M 63	0099445
0,2	PR 63-M 0,2	0099450
0,3	PR 63-M 0,3	0099451
0,4	PR 63-M 0,4	0099452
0,6	PR 63-M 0,6	0099453
0,8	PR 63-M 0,8	0099454
1,2	PR 63-M 1,2	0099455
2	PR 63-M 2	0099456
3	PR 63-M 3	0099457
4,2	PR 63-M 4,2	0099458
6	PR 63-M 6	0099459
8	PR 63-M 8	0099460
10	PR 63-M 10	0099461
12	PR 63-M 12	0099462
14	PR 63-M 14	0099463
17	PR 63-M 17	0099464
21	PR 63-M 21	0099465
25	PR 63-M 25	0099466
32	PR 63-M 32	0099467
40	PR 63-M 40	0099468
50	PR 63-M 50	0099469
63	PR 63-M 63	0099470

Internal impedances, power losses, loop impedances and rated currents corrections of the PR60 circuit-breakers.

R. curr.	Internal impedance		Power losses		Maximum impedance of fault loop			Rated currents correction at the ambient air temperature from -20°C to +60°C.								
I_n (A)	Z (mΩ)	Z (mΩ)	P (W)	P (W)	Z (Ω)			I_{kor} (A)								
	char.B,C,D	char.M	char.B,C,D	char.M	char.B	char.C	char.D,M	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
0,2		45100		1,8	230,0	127,8	71,9	0,24	0,24	0,23	0,22	0,21	0,2	0,19	0,18	0,17
0,3		19500		1,8	153,3	85,2	47,9	0,36	0,35	0,34	0,33	0,32	0,3	0,28	0,26	0,25
0,4		10650		1,7	115,0	63,9	35,9	0,48	0,47	0,46	0,44	0,42	0,4	0,37	0,35	0,33
0,5	6600		1,7		92,0	51,1	28,8	0,61	0,59	0,57	0,55	0,53	0,5	0,47	0,44	0,42
0,6		4300		1,5	76,7	42,6	24,0	0,73	0,71	0,68	0,66	0,63	0,6	0,56	0,53	0,50
0,8		3100	2,0		57,5	31,9	18,0	0,97	0,94	0,91	0,88	0,84	0,8	0,74	0,70	0,67
1	1650		1,7		46,0	25,6	14,4	1,21	1,18	1,14	1,10	1,05	1,0	0,93	0,88	0,83
1,2		1350		1,9	38,3	21,3	12,0	1,45	1,42	1,37	1,32	1,26	1,2	1,12	1,06	1,00
2	370	490	1,5	2,0	23,0	12,8	7,2	2,42	2,36	2,28	2,20	2,10	2,0	1,86	1,76	1,67
3	210	230	1,9	2,1	15,3	8,5	4,8	3,63	3,54	3,42	3,30	3,15	3,0	2,79	2,64	2,50
4	126		2,0		11,5	6,4	3,6	4,84	4,72	4,56	4,40	4,20	4,0	3,72	3,52	3,33
4,2		120		2,1	11,0	6,1	3,4	5,1	5,0	4,8	4,6	4,4	4,2	3,9	3,7	3,5
6	51	69	1,8	2,5	7,7	4,3	2,4	7,3	7,1	6,8	6,6	6,3	6	5,6	5,3	5,0
8	21	35	1,3	2,2	5,8	3,2	1,8	9,7	9,4	9,1	8,8	8,4	8	7,4	7,0	6,7
10	14,8	23,5	1,5	2,4	4,6	2,6	1,4	12,1	11,8	11,4	11,0	10,5	10	9,3	8,8	8,3
12		18,7		2,7	3,8	2,1	1,2	14,5	14,2	13,7	13,2	12,6	12	11,2	10,6	10,0
13	11,3		1,9		3,5	2,0	1,1	15,7	15,3	14,8	14,3	13,7	13	12,1	11,5	10,8
14		12,4		2,4	3,3	1,8	1,0	16,9	16,5	16,0	15,4	14,7	14	13,0	12,3	11,7
16	7,5		1,9		2,9	1,6	0,9	19,4	18,9	18,2	17,6	16,8	16	14,9	14,1	13,3
17		8,6		2,5	2,7	1,5	0,8	20,6	20,1	19,4	18,7	17,9	17	15,8	15,0	14,2
20	6,3		2,5		2,3	1,3	0,7	24,2	23,6	22,8	22,0	21,0	20	18,6	17,6	16,7
21		7,1		3,1	2,2	1,2	0,7	25,4	24,8	23,9	23,1	22,1	21	19,5	18,5	17,5
25	4,4	4,6	2,8	2,9	1,8	1,0	0,6	30,3	29,5	28,5	27,5	26,3	25	23,3	22,0	20,8
32	3,1	3,6	3,2	3,7	1,4	0,8	0,4	38,7	37,8	36,5	35,2	33,6	32	29,8	28,2	26,7
35	3,1	3,6	3,8	4,4	1,3	0,7	0,4	42,3	41,3	39,9	38,5	36,8	35	32,6	30,8	29,2
40	2,5	3	4,0	4,8	1,2	0,6	0,4	48,4	47,2	45,6	44,0	42,0	40	37,2	35,2	33,3
50	2,2	2,4	5,5	6,0	0,9	0,5	0,3	60,5	59,0	57,0	55,0	52,5	50	46,5	44,1	41,7
63	1,6	1,8	6,4	7,1	0,7	0,4	0,2	76,2	74,3	71,8	69,3	66,2	63	58,6	55,5	52,5

Instantaneous tripping characteristics

(according to EN 60 898-1, EN 60 947-2)

B - for protection of electrical circuits with equipment, which do not cause currents surges (protection of lines)
C - for protection of electrical circuits with equipment, which cause currents surges (illuminaires grups, instalations with motors)
D - for protection of electrical circuits with equipment, which cause high currents surges (installations comprising motors, tramsformers and inductances)
M - for protection of motors in relation to current rating

Instantaneous tripping characteristics	thermal release test current		tripping time	electromagnetic release test current		tripping time
	I1	I2	t	I4	I5	t
B	$1,13.I_n$		≥ 1	$3.I_n$		≥ 0,1s
		$1,45.I_n$	< 1		$5.I_n$	< 0,1 s
C	$1,13.I_n$		≥ 1	$5.I_n$		≥ 0,1 s
		$1,45.I_n$	< 1		$10.I_n$	< 0,1 s
D	$1,13.I_n$		≥ 1	$10.I_n$		≥ 0,1 s
		$1,45.I_n$	< 1		$20.I_n$	< 0,1 s
M	$1,05.I_n$		≥ 1	$10.I_n$		≥ 0,1 s
		$1,3.I_n$	< 1		$16.I_n$	< 0,1 s

Characteristics B, C, D:	For I3 = $2,55.I_n$ is:	for $I_n \leq 32$ A	1s < t < 60 s	for $I_n > 32$ A	1s < t < 120 s
Characteristics M:	For I3 = $7.I_n$ is:	for $I_n < 10$ A	2s < t < 8 s	for $I_n \geq 10$ A	0,3 s < t < 4 s

Influence of frequency on magnetic trip:

Frequency Hz	16	50	400
Coeficient	1	1	1,45

Corresponding amper rates, at which the magnetic trip starts to work, has to be multiplied by this coeficient.

Selectivity of miniature circuit breakers PR 60

Selectivity of miniature circuit breakers PR 60 of characteristic B with backup fuses [kA]

PR 60	NH gG							
I_n(A)	20	25	32	40	50	63	80	100
≤1	0,5	1,1	5	10	10	10	10	10
2	0,5	0,9	2,5	10	10	10	10	10
4	0,5	0,8	1,3	4,8	6	10	10	10
6	0,5	0,8	1,1	2,5	3,5	5	8	10
8	0,5	0,7	1	2	2,3	3	6	10
10	0,5	0,7	0,9	1,8	2,1	2,7	5	8,5
13	0,5	0,6	0,8	1,6	2	2,6	4,2	7
16		0,6	0,8	1,5	1,9	2,5	3,8	6,5
20		0,5	0,7	1,4	1,8	2,4	3,6	6,1
25			0,7	1,3	1,8	2,3	3,4	5,8
32				1,2	1,7	2,2	3,3	5,3
40						2,1	3,2	5,1
50						2	3	4,8
63								4,5

PR 60	PV gG							
I_n(A)	20	25	32	40	50	63	80	100
≤1	0,5	7	10	10	10	10	10	10
2		3	9	10	10	10	10	10
4		2	6	6,5	8	10	10	10
6		1,8	4,5	5,1	6,2	10	10	10
8		1,5	3,6	4,4	5,3	10	10	10
10		1	3	3,8	4,7	8,5	10	10
13			2,2	3,5	4,1	6,8	7,8	10
16			1,4	3,1	3,7	5,5	6,6	10
20				2,9	3,4	4,7	5,9	8,8
25					3,1	4,3	5,4	7,8
32						4	5	7
40						3,8	4,6	6,3
50						1,2	4,4	6
63							4,2	5,6

Selectivity of miniature circuit breakers PR 60 of characteristic C with backup fuses [kA]

PR 60	NH gG							
I_n(A)	20	25	32	40	50	63	80	100
≤1	0,5	1,3	10	10	10	10	10	10
2	0,5	0,9	3,5	10	10	10	10	10
4	0,5	0,8	2,5	3	3,5	5	10	10
6	0,5	0,8	1	2	2,3	3	8	10
8	0,5	0,8	0,9	1,6	2	2,7	6	8,5
10		0,7	0,8	1,5	1,9	2,6	5	7
13			0,8	1,4	1,8	2,5	4,2	6,5
16				1,3	1,7	2,4	3,8	6,1
20				1,2	1,6	2,3	3,6	5,8
25					1,5	2,2	3,4	5,3
32						2,1	3,3	5,1
40						2	3,1	4,8
50								4,5
63								

PR 60	PV gG							
I_n(A)	20	25	32	40	50	63	80	100
≤1	0,5	7	10	10	10	10	10	10
2	0,5	4	7	10	10	10	10	10
4		2,5	5	6,5	10	10	10	10
6		1,8	4,2	5,1	7	10	10	10
8		1,2	3,6	4,4	5,6	10	10	10
10			3	3,8	4,7	10	10	10
13			2,2	3,5	4,1	7	10	10
16			1,4	3,1	3,7	5,5	10	10
20				2,9	3,4	4,7	10	10
25					3,1	4,3	10	10
32						4	6	10
40							4,6	10
50							4,4	7
63								5,6

Selectivity of miniature circuit breakers PR 60 of characteristic D with backup fuses [kA]

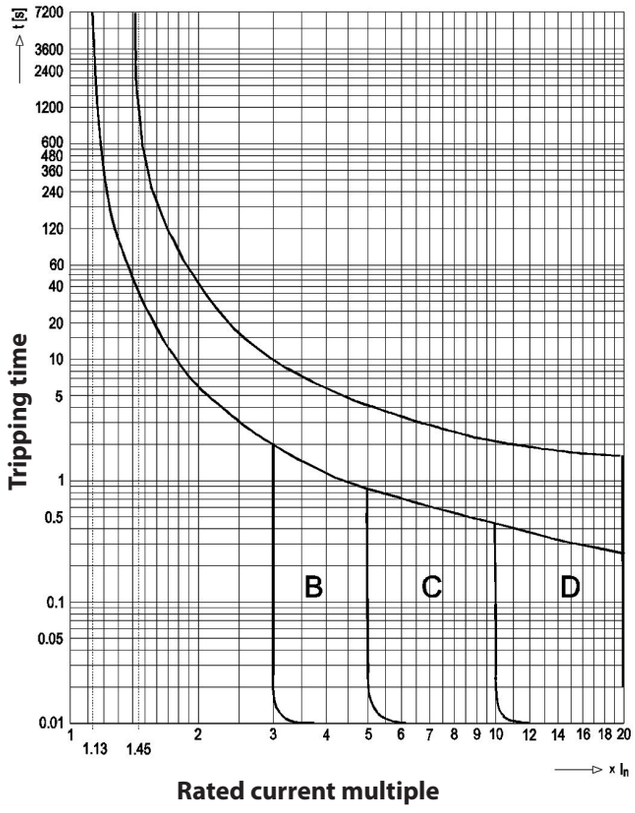
PR 60	NH gG							
I_n(A)	20	25	32	40	50	63	80	100
≤1	5	8	10	10	10	10	10	10
2	1,7	2	5	10	10	10	10	10
4	0,7	1,1	2	3	3,5	5,1	10	10
6	0,6	1	1,4	2	2,4	3,5	7,5	10
8	0,5	0,9	1,2	1,6	2,1	2,7	5	10
10	0,5	0,8	1	1,5	2	2,6	4,5	10
13		0,7	0,9	1,4	1,9	2,5	4,1	8
16		0,6	0,8	1,3	1,7	2,4	3,8	6,1
20			0,5	1,2	1,6	2,3	3,6	5,8
25				1,1	1,5	2,2	3,4	5,3
32					1,4	2,1	3,3	5,1
40						1,9	3,1	4,8
50							2,5	4,5
63								4

PR 60	PV gG							
I_n(A)	20	25	32	40	50	63	80	100
≤1	0,5	7	10	10	10	10	10	10
2	0,5	4	8	10	10	10	10	10
4		2,5	5	7	10	10	10	10
6		1,8	3	5	7	10	10	10
8		1,2	1,5	2,5	5,6	10	10	10
10					4,7	10	10	10
13					3,8	7	10	10
16					2,6	6	10	10
20						5,5	10	10
25						5	10	10
32							6	10
40								10
50								
63								

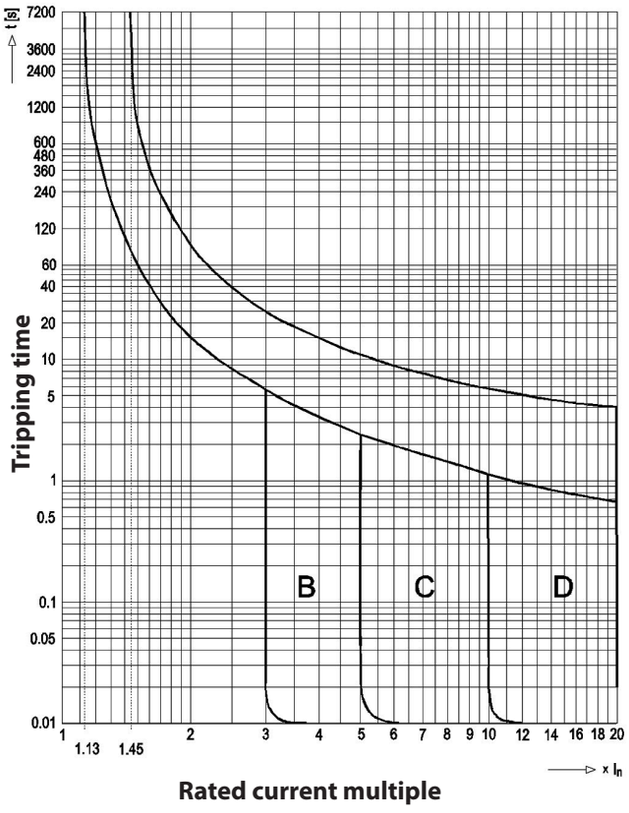
In case of short-circuit after the circuit breaker PR 60 with backup fuse, selectivity of particular combination is guaranteed up to the value of the short-circuit current Ik" stated in the tables.

Instantaneous tripping characteristics of circuit breakers PR 60

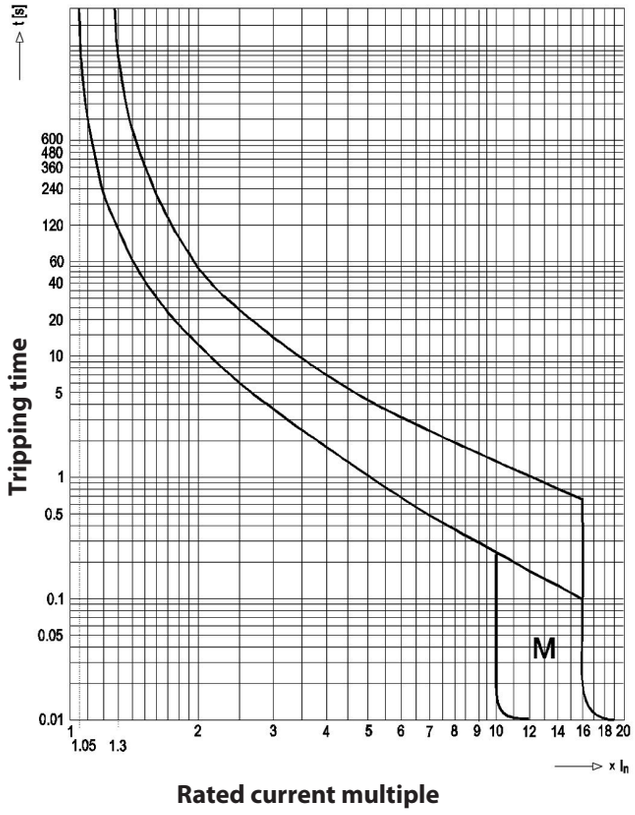
$I_n \geq 10$ A Characteristics B, C, D EN 60 898



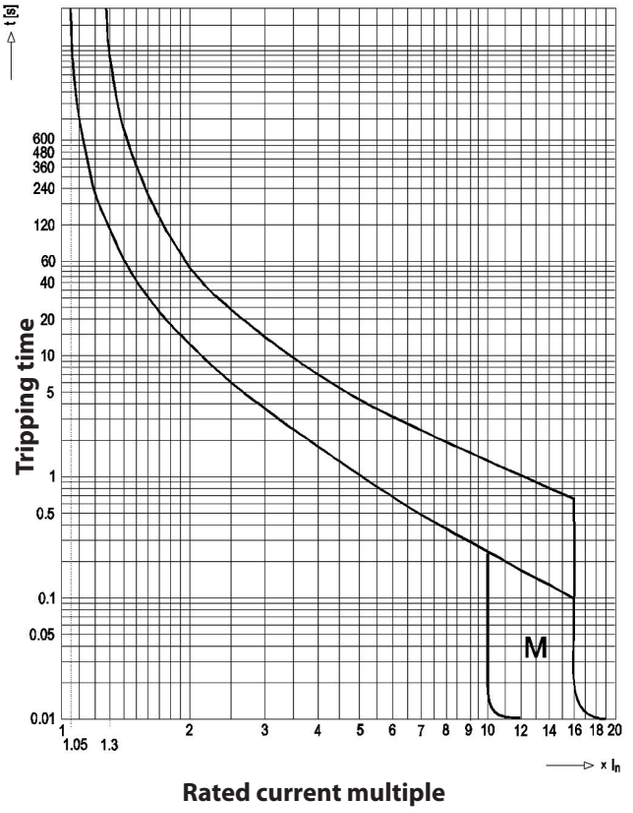
$I_n < 10$ A Characteristics B, C, D EN 60 898



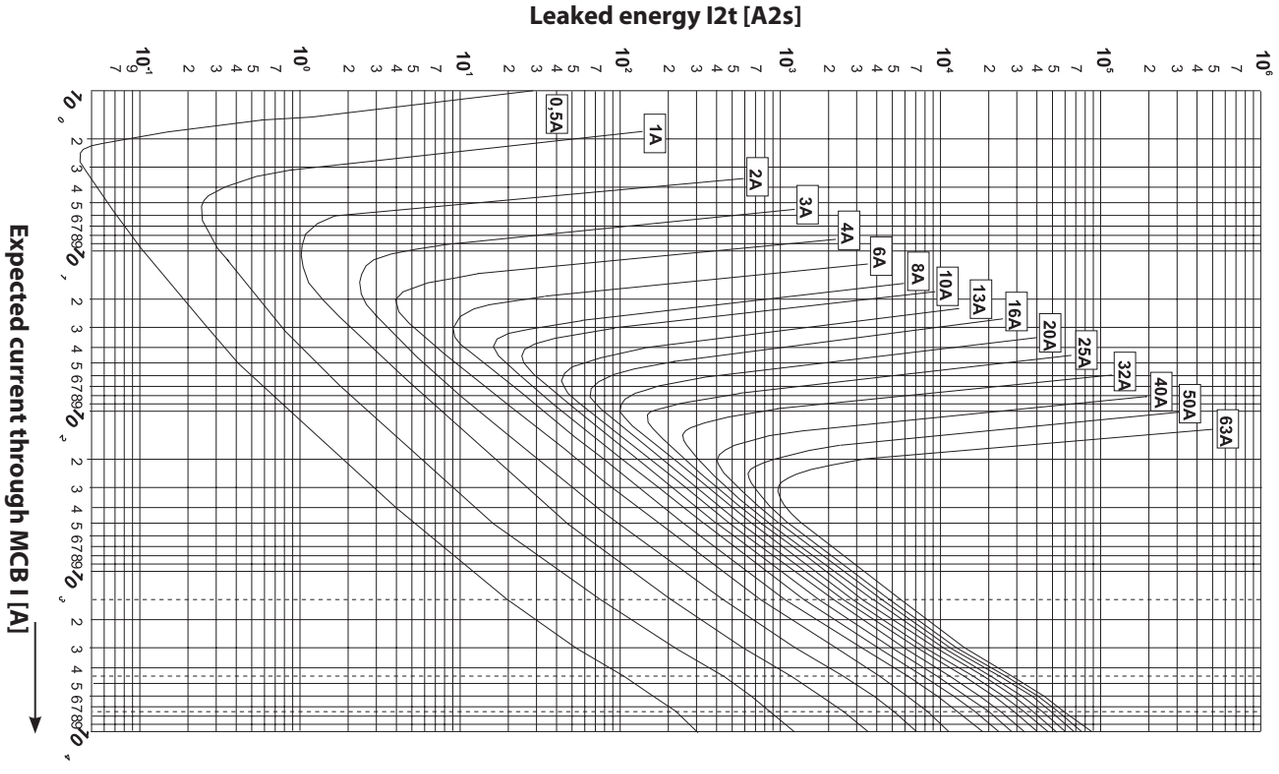
$I_n > 10$ A Characteristics M EN 60 947-2



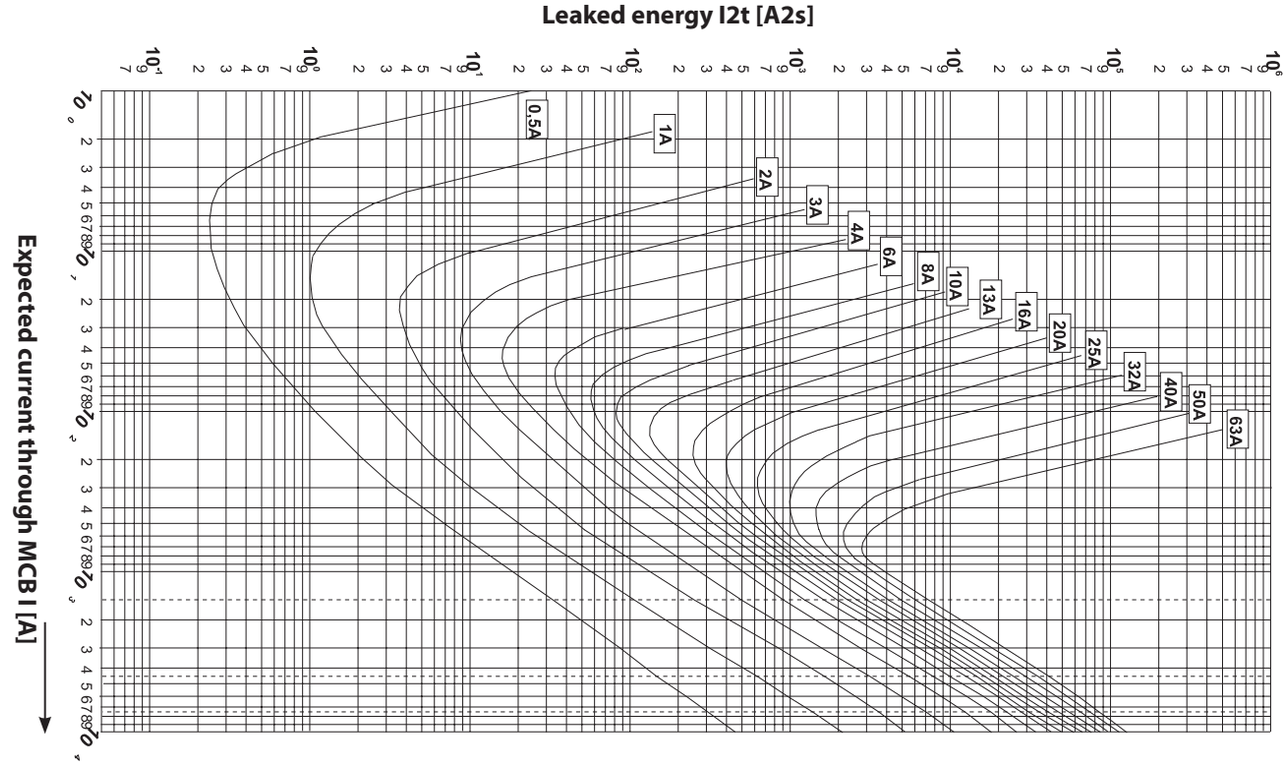
$I_n \leq 10$ A Characteristics M EN 60 947-2



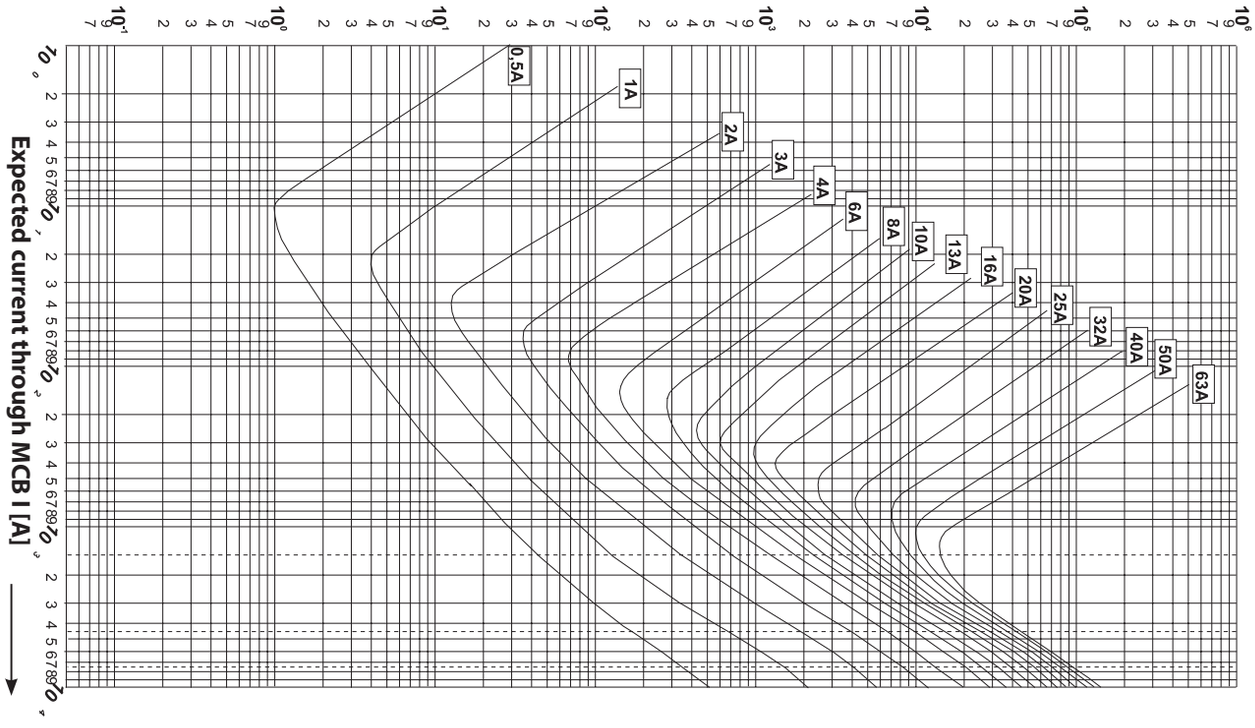
Charts of leaked energy I²t of MCBS PR 60 with tripping characteristic B



Charts of leaked energy I²t of MCBS PR 60 with tripping characteristic C

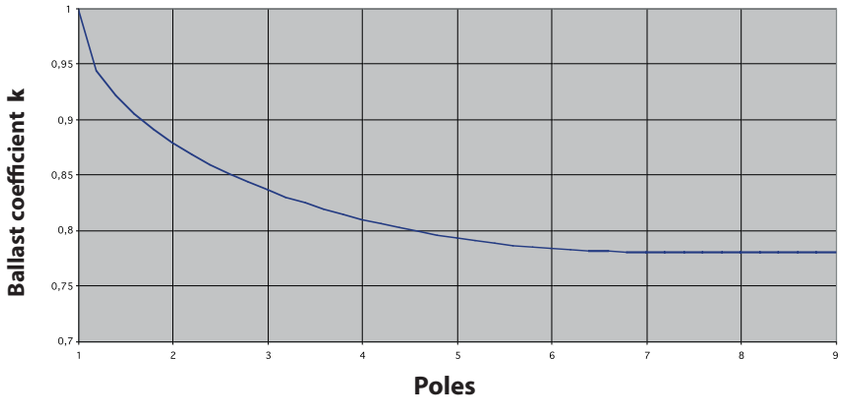


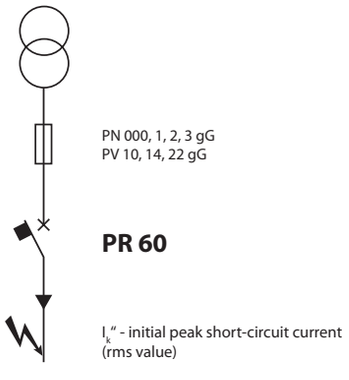
Charts of leaked energy I²t of MCBS PR 60 with tripping characteristic D



Correction of rated currents of miniature circuit breakers PR 60

Correction of rated currents of miniature circuit breakers installed side by side (A)
Valid for reference temperature 30°C.





Technical data PR 60 J – DC

Standards		EN 60898-1	EN 60947-2
Pole configuration		1,2	
Tripping characteristics		C	M
Rated current I_n	A	0,5 - 63	
Rated DC voltage U_n	V	220 – 1 pole, 440 – 2 poles, τ = min. 3ms	
Rated insulation voltage U_i	V	400	
Rated impulse withstand voltage U_{imp}	V	4 000	
Short circuit breaking capacity	kA	4,5	
Ultimate short circuit breaking capacity I_{cu}	kA		4,5
Service short circuit breaking capacity I_{cs}	kA		4,5
Utilization category			A
Electrical endurance		4 000 cycles	
Mechanical endurance		100 000 cycles	
Terminal capacity	mm^2	1 - 25 for Cu wires 2,5 - 25 for Al wires - special type	
Mounting		on rail DIN 35x7,5 EN 60 715; on panel	
Degree of protection		IP 20; IP 40 front	
Ambient temperature	°C	-25 up to +55	
Mounting position		optional	
Vibration resistance		3g (8 - 50 Hz)	
Approvals		ESS	
Accessories		Auxiliary and signal contacts - PKJ, 2PKJ, PKJ+SKJ Shunt trips – VC	

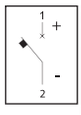
Characteristics C

Rated current I_n, A	Type designation	Ordering number
0,5	PR 61J-C 0,5	0099510
1	PR 61 J-C 1	0099511
2	PR 61 J-C 2	0099512
3	PR 61 J-C 3	0099513
4	PR 61 J-C 4	0099514
6	PR 61 J-C 6	0099515
8	PR 61 J-C 8	0099516
10	PR 61 J-C 10	0099517
13	PR 61 J-C 13	0099518
16	PR 61 J-C 16	0099519
20	PR 61 J-C 20	0099520
25	PR 61 J-C 25	0099521
32	PR 61 J-C 32	0099522
40	PR 61 J-C 40	0099523
50	PR 61 J-C 50	0099524
63	PR 61 J-C 63	0099525
0,5	PR 62 J-C 0,5	0099550
1	PR 62 J-C 1	0099551
2	PR 62 J-C 2	0099552
3	PR 62 J-C 3	0099553
4	PR 62 J-C 4	0099554
6	PR 62 J-C 6	0099555
8	PR 62 J-C 8	0099556
10	PR 62 J-C 10	0099557
13	PR 62 J-C 13	0099558
16	PR 62 J-C 16	0099559
20	PR 62 J-C 20	0099560
25	PR 62 J-C 25	0099561
32	PR 62 J-C 32	0099562
40	PR 62 J-C 40	0099563
50	PR 62 J-C 50	0099564
63	PR 62 J-C 63	0099565

Characteristics M

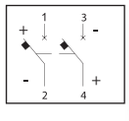
Rated current I_n, A	Type designation	Ordering number
0,8	PR 61J-M 0,8	0099530
1,2	PR 61J-M 1,2	0099531
2	PR 61 J-M 2	0099532
3	PR 61 J-M 3	0099533
4,2	PR 61 J-M 4,2	0099534
6	PR 61 J-M 6	0099535
8	PR 61 J-M 8	0099536
10	PR 61 J-M 10	0099537
12	PR 61 J-M 12	0099538
14	PR 61 J-M 14	0099539
17	PR 61 J-M 17	0099540
21	PR 61 J-M 21	0099541
25	PR 61 J-M 25	0099542
32	PR 61 J-M 32	0099543
40	PR 61 J-M 40	0099544
50	PR 61 J-M 50	0099545
63	PR 61 J-M 63	0099546
0,8	PR 62 J-M 0,8	0099570
1,2	PR 62 J-M 1,2	0099571
2	PR 62 J-M 2	0099572
3	PR 62 J-M 3	0099573
4,2	PR 62 J-M 4,2	0099574
6	PR 62 J-M 6	0099575
8	PR 62 J-M 8	0099576
10	PR 62 J-M 10	0099577
12	PR 62 J-M 12	0099578
14	PR 62 J-M 14	0099579
17	PR 62 J-M 17	0099580
21	PR 62 J-M 21	0099581
25	PR 62 J-M 25	0099582
32	PR 62 J-M 32	0099583
40	PR 62 J-M 40	0099584
50	PR 62 J-M 50	0099585
63	PR 62 J-M 63	0099586

Scheme



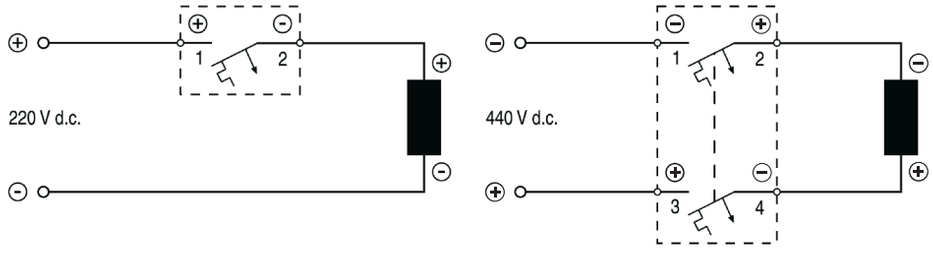
1 - pole

Scheme



2 - poles

Protection of DC circuits



It is possible to use both PR 60 and PR 60 J miniature circuit breakers for protection of DC circuits depending on voltage.

For voltage U_n up to:

- 40 V d.c. use miniature circuit breakers PR 60. Source poles (+) and (-) can be connected to the circuit breaker terminals arbitrarily.
- 220 V d.c. or 440 V d.c., use miniature circuit breakers PR 61J or PR 62J. As these miniature circuit breakers are equipped with permanent magnets, source poles (+) and (-) must be connected to identically marked terminals of the circuit breakers (see connection example).

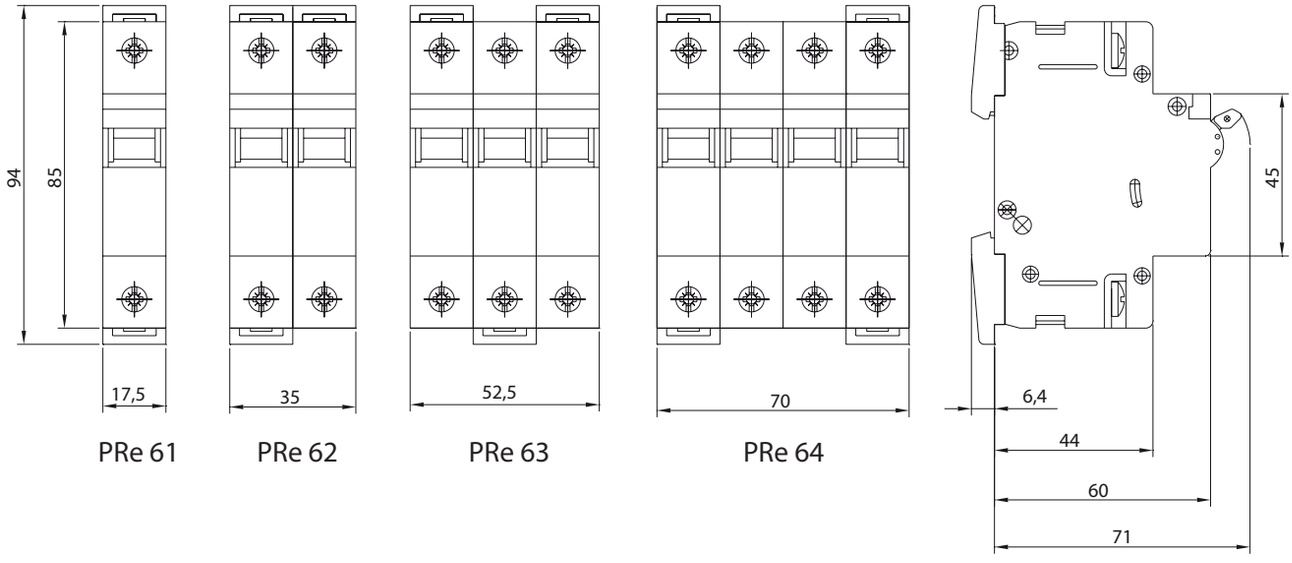
Circuit breakers PRe 60

- circuit breakers PRe series are mechanical switching devices able to switch on, conduct and switch off the current under standard conditions and able to switch on, conduct and switch off the current under abnormal circuit conditions such as short-circuit.
- they are used to protect house and similar installations against overcurrents
- they are designed to be handled by untrained persons and they are maintenance free
- tripping characteristics B,C,D
- simple assembly-lower clip for fastening to the rail 35x7,5 EN 60 715 enables taking the circuit breaker out from the device line connected by lower busbar without breaking the current circuit
- sealable in ON and OFF position of a lever
- there is a possibility to use throught covers for both terminals, that are sealed with sealing blind
- **connection:** - conductors 1 -25 mm^2
  - connection busbars (pin or fork Type)
  - connection of conductors and busbars at the same time
  - optional way of connection
  - possibility to mount additional accessories

Technical data

Standards		EN 60898-1
Pole configuration		1, 1+N, 2, 3, 3+N, 4
Tripping characteristics		B, C ,D
Rated current In	A	0,5 - 63
Rated voltage Un	V	230; 230/400; 400
Rated insulation voltage Ui	V	400
Rated impulse withstand voltage Uimp	V	4 000
Rated DC voltage Un	V	max. 40 - (for one pole τ = 15ms)
Rated frquency	Hz	50 - 60
Short circuit breaking capacity	kA	6
Selection category		3
Electrical endurance		4 000 cycles
Mechanical endurance		100 000 cycles
Terminal capacity	mm^2	1 - 25 for Cu wires 2,5 - 25 for Al wires - special type
Mounting		on rail DIN 35x7,5 EN 60 715; on panel
Degree of protection		IP 20, IP 40 front
Ambient temperature	°C	-25 up to +55
Mounting position		optional
Vibrations resistance		3g (8 - 50 Hz)
Approved		ESS
Accessories		Auxiliary and signal contacts - PKJ, 2PKJ, PKJ+SKJ Shunt trips – VC

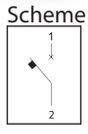
Dimensional drawing of PRe 60



Rated current I_n, A	Characteristics B		Characteristics C		Characteristics D	
	Type	Ordering code	Type	Ordering code	Type	Ordering code
0,5	PRe 61-B 0,5	0098456	PRe 61-C 0,5	0098475	PRe 61-D 0,5	0098000
1	PRe 61-B 1	0098457	PRe 61-C 1	0098476	PRe 61-D 1	0098001
2	PRe 61-B 2	0098458	PRe 61-C 2	0098477	PRe 61-D 2	0098002
3	PRe 61-B 3	0098455	PRe 61-C 3	0098478	PRe 61-D 3	0098003
4	PRe 61-B 4	0098459	PRe 61-C 4	0098479	PRe 61-D 4	0098004
6	PRe 61-B 6	0098460	PRe 61-C 6	0098480	PRe 61-D6	0098005
8	PRe 61-B 8	0098461	PRe 61-C 8	0098481	PRe 61-D 8	0098006
10	PRe 61-B 10	0098462	PRe 61-C 10	0098482	PRe 61-D 10	0098007
13	PRe 61-B 13	0098463	PRe 61-C 13	0098483	PRe 61-D 13	0098008
16	PRe 61-B 16	0098464	PRe 61-C 16	0098484	PRe 61-D 16	0098009
20	PRe 61-B 20	0098465	PRe 61-C 20	0098485	PRe 61-D 20	0098010
25	PRe 61-B 25	0098466	PRe 61-C 25	0098486	PRe 61-D 25	0098011
32	PRe 61-B 32	0098467	PRe 61-C 32	0098487	PRe 61-D 32	0098012
35	PRe 61-B 35	0098454	PRe 61-C 35	0098504	PRe 61-D 35	0098524
40	PRe 61-B 40	0098468	PRe 61-C 40	0098488	PRe 61-D 40	0098013
50	PRe 61-B 50	0098469	PRe 61-C 50	0098489	PRe 61-D 50	0098014
63	PRe 61-B 63	0098470	PRe 61-C 63	0098490	PRe 61-D 63	0098015
0,5	PRe 62-B 0,5	0098506	PRe 62-C 0,5	0098400	PRe 62-D 0,5	0098020
1	PRe 62-B 1	0098507	PRe 62-C 1	0098401	PRe 62-D 1	0098021
2	PRe 62-B 2	0098508	PRe 62-C 2	0098402	PRe 62-D 2	0098022
3	PRe 62-B 3	0098509	PRe 62-C 3	0098403	PRe 62-D 3	0098023
4	PRe 62-B 4	0098510	PRe 62-C 4	0098404	PRe 62-D 4	0098024
6	PRe 62-B 6	0098513	PRe 62-C 6	0098491	PRe 62-D 6	0098025
8	PRe 62-B 8	0098511	PRe 62-C 8	0098405	PRe 62-D 8	0098026
10	PRe 62-B 10	0098514	PRe 62-C 10	0098492	PRe 62-D 10	0098027
13	PRe 62-B 13	0098512	PRe 62-C 13	0098406	PRe 62-D 13	0098028
16	PRe 62-B 16	0098515	PRe 62-C 16	0098494	PRe 62-D 16	0098029
20	PRe 62-B 20	0098516	PRe 62-C 20	0098495	PRe 62-D 20	0098030
25	PRe 62-B 25	0098517	PRe 62-C 25	0098496	PRe 62-D 25	0098031
32	PRe 62-B 32	0098518	PRe 62-C 32	0098497	PRe 62-D 32	0098032
35	PRe 62-B 35	0098501	PRe 62-C 35	0098505	PRe 62 -D 35	0098525
40	PRe 62-B 40	0098519	PRe 62-C 40	0098498	PRe 62-D 40	0098033
50	PRe 62-B 50	0098520	PRe 62-C 50	0098499	PRe 62-D 50	0098034
63	PRe 62-B 63	0098521	PRe 62-C 63	0098500	PRe 62-D 63	0098035
0,5	PRe 63-B 0,5	0098410	PRe 63-C 0,5	0098415	PRe 63-D 0,5	0098040
1	PRe 63-B 1	0098411	PRe 63-C 1	0098416	PRe 63-D 1	0098041
2	PRe 63-B 2	0098412	PRe 63-C 2	0098417	PRe 63-D 2	0098042
3	PRe 63-B 3	0098413	PRe 63-C 3	0098418	PRe 63-D 3	0098043
4	PRe 63-B 4	0098639	PRe 63-C 4	0098659	PRe 63-D 4	0098044
6	PRe 63-B 6	0098640	PRe 63-C 6	0098660	PRe 63-D 6	0098045
8	PRe 63-B 8	0098641	PRe 63-C 8	0098661	PRe 63-D 8	0098046
10	PRe 63-B 10	0098642	PRe 63-C 10	0098662	PRe 63-D 10	0098047
13	PRe 63-B 13	0098643	PRe 63-C 13	0098663	PRe 63-D 13	0098048
16	PRe 63-B 16	0098644	PRe 63-C 16	0098664	PRe 63-D 16	0098049
20	PRe 63-B 20	0098645	PRe 63-C 20	0098665	PRe 63-D 20	0098050
25	PRe 63-B 25	0098646	PRe 63-C 25	0098666	PRe 63-D 25	0098051
32	PRe 63-B 32	0098647	PRe 63-C 32	0098667	PRe 63-D 32	0098052
35	PRe 63-B 35	0098502	PRe 63-C 35	0098522	PRe 63 -D 35	0098526
40	PRe 63-B 40	0098648	PRe 63-C 40	0098668	PRe 63-D 40	0098053
50	PRe 63-B 50	0098649	PRe 63-C 50	0098669	PRe 63-D 50	0098054
63	PRe 63-B 63	0098650	PRe 63-C 63	0098670	PRe 63-D 63	0098055
0,5	PRe 64-B 0,5	0098420	PRe 64-C 0,5	0098427	PRe 64-D 0,5	0098060
1	PRe 64-B 1	0098421	PRe 64-C 1	0098428	PRe 64-D 1	0098061
2	PRe 64-B 2	0098422	PRe 64-C 2	0098429	PRe 64-D 2	0098062
3	PRe 64-B 3	0098423	PRe 64-C 3	0098430	PRe 64-D 3	0098063
4	PRe 64-B 4	0098424	PRe 64-C 4	0098431	PRe 64-D 4	0098064
6	PRe 64-B 6	0098688	PRe 64-C 6	0098678	PRe 64-D 6	0098065
8	PRe 64-B 8	0098425	PRe 64-C 8	0098432	PRe 64-D 8	0098066
10	PRe 64-B 10	0098689	PRe 64-C 10	0098679	PRe 64-D 10	0098067
13	PRe 64-B 13	0098426	PRe 64-C 13	0098433	PRe 64-D 13	0098068
16	PRe 64-B 16	0098690	PRe 64-C 16	0098680	PRe 64-D 16	0098069
20	PRe 64-B 20	0098691	PRe 64-C 20	0098681	PRe 64-D 20	0098070
25	PRe 64-B 25	0098692	PRe 64-C 25	0098682	PRe 64-D 25	0098071
32	PRe 64-B 32	0098693	PRe 64-C 32	0098683	PRe 64-D 32	0098072
35	PRe 64-B 35	0098503	PRe 64-C 35	0098523	PRe 64-D 35	0098527
40	PRe 64-B 40	0098694	PRe 64-C 40	0098684	PRe 64-D 40	0098073
50	PRe 64-B 50	0098695	PRe 64-C 50	0098685	PRe 64-D 50	0098074
63	PRe 64-B 63	0098696	PRe 64-C 63	0098687	PRe 64-D 63	0098075

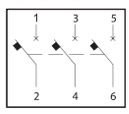
1 - pole

Scheme



3 - poles

Scheme



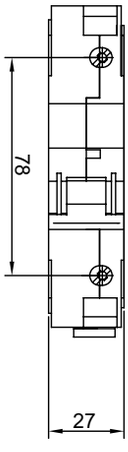
- circuit breakers PR 120 series are mechanical switching devices able to switch, conduct and switch – off the current under normal conditions and able to switch, conduct and automatically switch – off the current under abnormal conditions such as short circuit.
- they are used to protect house installations and industrial electric distributions
- they are designed to be operated by untrained persons and they are maintenance – free
- tripping characteristic B, C, D
- mounting on rail 35 x 7,5 in accordance with EN 60 715
- sealable in ON and OFF position
- conductors 1 – 50 mm^2
- breaking capacity 15kA

Technical data

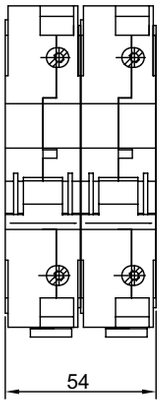
Standards			EN 60 898 - 1
Pole configurations			1; 1+N; 2; 3; 3+N; 4
Rated current	I_n	A	16, 20, 25, 32, 40, 50, 63, 80, 100, 125
Tripping chracteristics			B, C, D
Rated voltage	U_n	V	230, 230/400, 400
Rated frequency		Hz	50
Breaking capacity	I_{cn}	kA	15
Electrical endurance			4 000 cycles
Conductors		mm2	1 - 50
Mounting			on rail DIN 35x7,5 EN 60 715
Protection degree			IP 20, IP 40 front
Ambient temperature			-5°C up to +40°C
Approved			according to label
Rated DC			max 110DC (for one pole, τ=4ms)
Accesories			shunt trips VC, auxiliary contacts PK120, 2PK120

Dimensional drawing

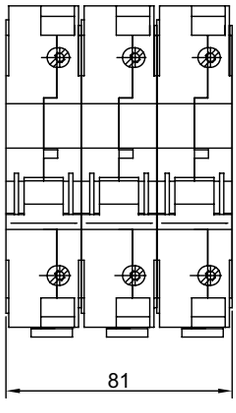
PR 121



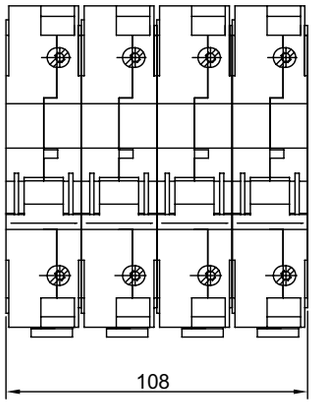
PR 122
PR 121+N

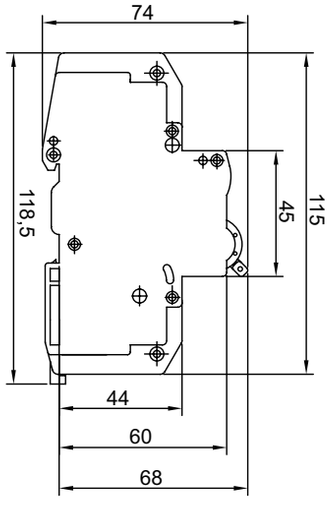


PR 123



PR 124
PR 123+N





Characteristics B

Ord. code	Type	Ord. code	Type	Ord. code	Type	Ord. code	Type
0097000	PR 121 B 16	0097010	PR 122 B 16	0097020	PR 123 B 16	0097030	PR 124 B 16
0097001	PR 121 B 20	0097011	PR 122 B 20	0097021	PR 123 B 20	0097031	PR 124 B 20
0097002	PR 121 B 25	0097012	PR 122 B 25	0097022	PR 123 B 25	0097032	PR 124 B 25
0097003	PR 121 B 32	0097013	PR 122 B 32	0097023	PR 123 B 32	0097033	PR 124 B 32
0097004	PR 121 B 40	0097014	PR 122 B 40	0097024	PR 123 B 40	0097034	PR 124 B 40
0097005	PR 121 B 50	0097015	PR 122 B 50	0097025	PR 123 B 50	0097035	PR 124 B 50
0097006	PR 121 B 63	0097016	PR 122 B 63	0097026	PR 123 B 63	0097036	PR 124 B 63
0097007	PR 121 B 80	0097017	PR 122 B 80	0097027	PR 123 B 80	0097037	PR 124 B 80
0097008	PR 121 B 100	0097018	PR 122 B 100	0097028	PR 123 B 100	0097038	PR 124 B 100
0097009	PR 121 B 125	0097019	PR 122 B 125	0097029	PR 123 B 125	0097039	PR 124 B 125

Characteristics C

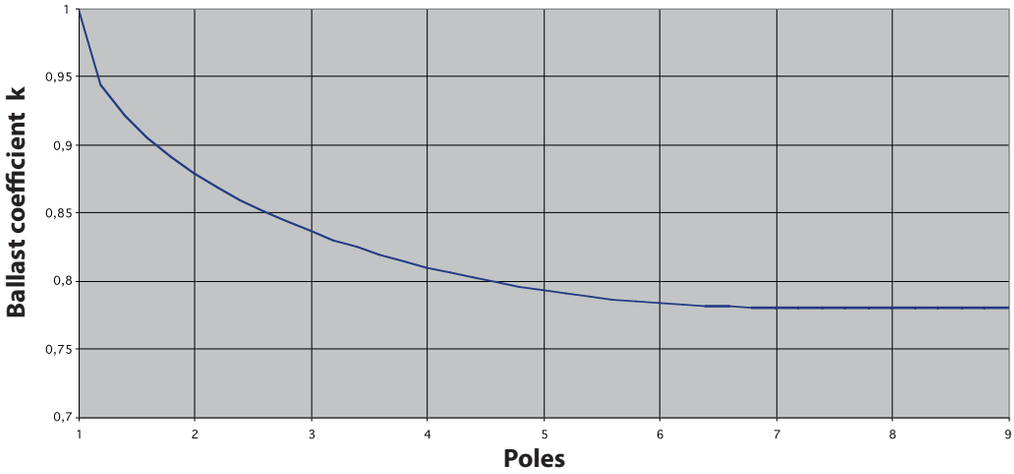
Ord. code	Type	Ord. code	Type	Ord. code	Type	Ord. code	Type
0097100	PR 121 C 16	0097110	PR 122 C 16	0097120	PR 123 C 16	0097130	PR 124 C 16
0097101	PR 121 C 20	0097111	PR 122 C 20	0097121	PR 123 C 20	0097131	PR 124 C 20
0097102	PR 121 C 25	0097112	PR 122 C 25	0097122	PR 123 C 25	0097132	PR 124 C 25
0097103	PR 121 C 32	0097113	PR 122 C 32	0097123	PR 123 C 32	0097133	PR 124 C 32
0097104	PR 121 C 40	0097114	PR 122 C 40	0097124	PR 123 C 40	0097134	PR 124 C 40
0097105	PR 121 C 50	0097115	PR 122 C 50	0097125	PR 123 C 50	0097135	PR 124 C 50
0097106	PR 121 C 63	0097116	PR 122 C 63	0097126	PR 123 C 63	0097136	PR 124 C 63
0097107	PR 121 C 80	0097117	PR 122 C 80	0097127	PR 123 C 80	0097137	PR 124 C 80
0097108	PR 121 C 100	0097118	PR 122 C 100	0097128	PR 123 C 100	0097138	PR 124 C 100
0097109	PR 121 C 125	0097119	PR 122 C 125	0097129	PR 123 C 125	0097139	PR 124 C 125

Characteristics D

Ord. code	Type	Ord. code	Type	Ord. code	Type	Ord. code	Type
0097200	PR 121 D 16	0097210	PR 122 D 16	0097220	PR 123 D 16	0097230	PR 124 D 16
0097201	PR 121 D 20	0097211	PR 122 D 20	0097221	PR 123 D 20	0097231	PR 124 D 20
0097202	PR 121 D 25	0097212	PR 122 D 25	0097222	PR 123 D 25	0097232	PR 124 D 25
0097203	PR 121 D 32	0097213	PR 122 D 32	0097223	PR 123 D 32	0097233	PR 124 D 32
0097204	PR 121 D 40	0097214	PR 122 D 40	0097224	PR 123 D 40	0097234	PR 124 D 40
0097205	PR 121 D 50	0097215	PR 122 D 50	0097225	PR 123 D 50	0097235	PR 124 D 50
0097206	PR 121 D 63	0097216	PR 122 D 63	0097226	PR 123 D 63	0097236	PR 124 D 63
0097207	PR 121 D 80	0097217	PR 122 D 80	0097227	PR 123 D 80	0097237	PR 124 D 80
0097208	PR 121 D 100	0097218	PR 122 D 100	0097228	PR 123 D 100	0097238	PR 124 D 100
0097209	PR 121 D 125	0097219	PR 122 D 125	0097229	PR 123 D 125	0097239	PR 124 D 125

Correction of rated currents of miniature circuit breakers PR 120

Correction of rated currents of miniature circuit breakers installed side by side (A) Valid for reference temperature 30°C.

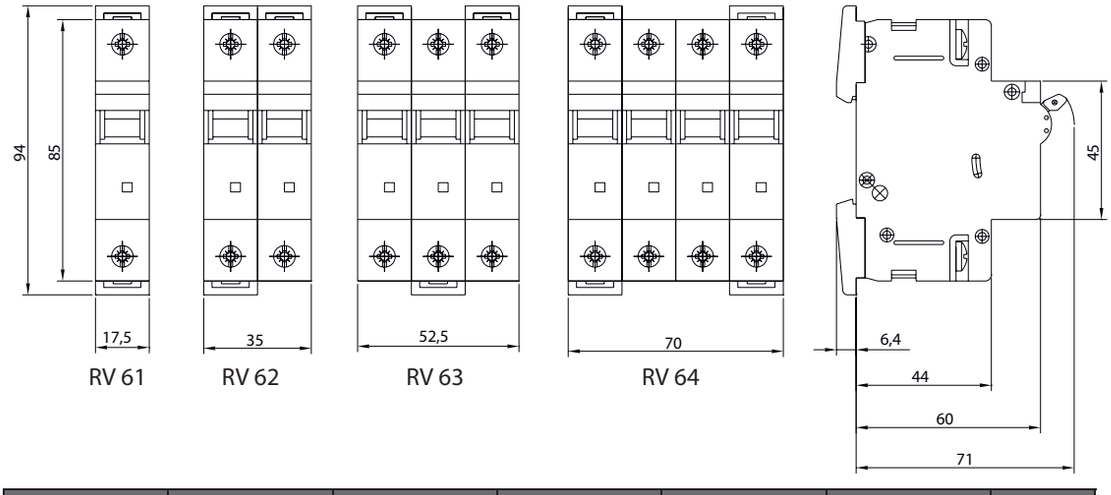


- modular switches RV 60 are mechanical devices used for switching of electrical circuits
- they are used in house, commercial and industrial distributions

Technical data

Standards		EN 60947-3					
Pole configuration		1; 1+N; 2; 3; 3+N					
Rated insulation voltage U_i	V	400V					
Rated impulse withstand voltage U_{imp}	V	6 000					
Rated operational voltage U_e	V	230; 400					
Rated frequency	Hz	50 - 60					
Rated thermal current I_{th}	A	10	16	25	32	40	63
Utilization category		AC 22A					
Rated operational currents I_e	A	10	16	25	32	40	63
Rated conditional short circuit current	kA	10	10	10	6	6	3
with fuse gG	A	10	16	25	35	40	63
Electrical endurance		1 500 cycles					
Mechanical endurance		100 000 cycles					
Terminal capacity	mm^2	1 – 25 for Cu wires; 2,5 – 25 for Al wires					
Mounting		on rail DIN 35x7,5 EN 60 715; on panel					
Degree of protection		IP 20, IP 40 front					
Ambient temperature	°C	-25 up to +55					
Mounting position		optional					
Vibration resistance		3g (8 - 50 Hz)					
Approvals		according to label					
Accessories		Auxiliary and signal contacts - PKJ, 2PKJ, PKJ+SKJ Shunt trips – VC , undervoltage trip					

Dimensional drawing RV 60



RV 61 RV 62 RV 63 RV 64

Current	Type	Ordering Code	Current	Type	Ordering Code	Poles
10 A	RV 61 10A	0099856	16 A	RV 61 16A	0099857	1
10 A	RV 61+N 10A	0099859	16 A	RV 61+N 16A	0099873	1+N
10 A	RV 62 10A	0099875	16 A	RV 62 16A	0099876	2
10 A	RV 63 10A	0099878	16 A	RV 63 16A	0099879	3
10 A	RV 63+N 10A	0099929	16 A	RV 63+N 16A	0099930	3+N
25 A	RV 61 25A	0099830	32 A	RV 61 32A	0099858	1
25 A	RV 61+N 25A	0099840	32 A	RV 61+N 32A	0099874	1+N
25 A	RV 62 25A	0099842	32 A	RV 62 32A	0099877	2
25 A	RV 63 25A	0099844	32 A	RV 63 32A	0099928	3
25 A	RV 63+N 25A	0099846	32 A	RV 63+N 32A	0099938	3+N
			63 A	RV 61 63A	0099831	1
			63 A	RV 61+N 63A	0099841	1+N
			63 A	RV 62 63A	0099843	2
			63 A	RV 63 63A	0099845	3
			63 A	RV 63+N 63A	0099847	3+N

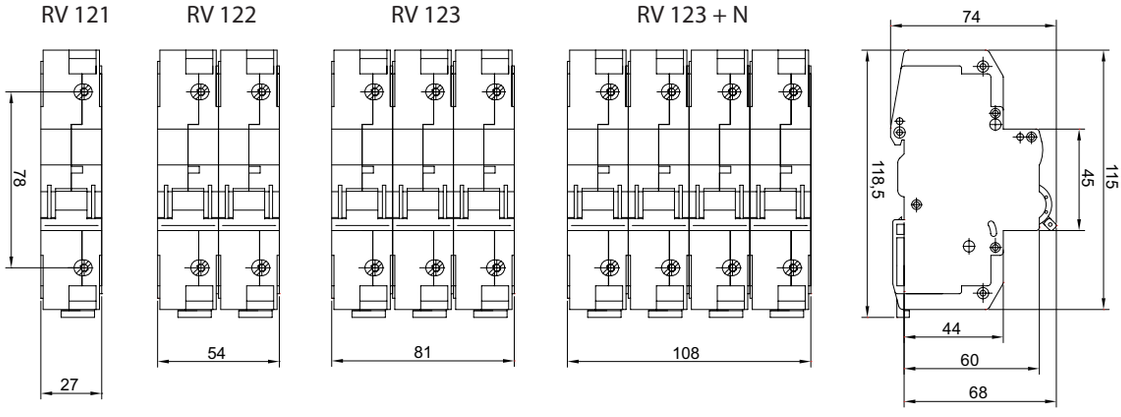
- modular switches RV 120 are mechanical devices used for switching of electrical circuits
- they are used in house, commercial and industrial distributions
- conductors 1 – 50 mm^2

Ord. code	Type
0089200	RV 121 125A
0089201	RV 122 125A
0089202	RV 123 125A
0089203	RV 124 125A
0089204	RV 121N 125A + N-Pole
0089205	RV 123N 125A + N-Pole
0089210	RV 123 125A + VC230VAC

Technical data RV 120

Standards	EN 60947 – 3
Number of poles	1, 1+N, 2, 3, 3+N
Rated thermal current (A)	125
Rated voltage U_n (V)	230, 400
Rated insulation voltage U_i (V)	690
Rated discharge voltage U_{imp} (V)	6000
Rated frequency (Hz)	50
Rated operational current I_e (A)	100 for category AC 22A
	40 for category AC 23
Rated conditional short-circuit current (kA)	3 with fuses 100 A gG
	6 with fuses 63 A gG
Electrical endurance (switching cycles)	1500
Mechanical endurance (switching cycles)	10000
Connecting wires (mm^2)	1 - 50
Mounting	on rail DIN 35 x 7,5 EN 60 715
Degree of protection	IP 20 – clamps
	IP 40 – from the front panel
Ambient temperature (°C)	- 25 up to + 55
Operating position	optional
Resistance against vibrations	3g (8 – 50 Hz)
Accessories	shunt trips VC, auxiliary contacts PK120, 2PK120

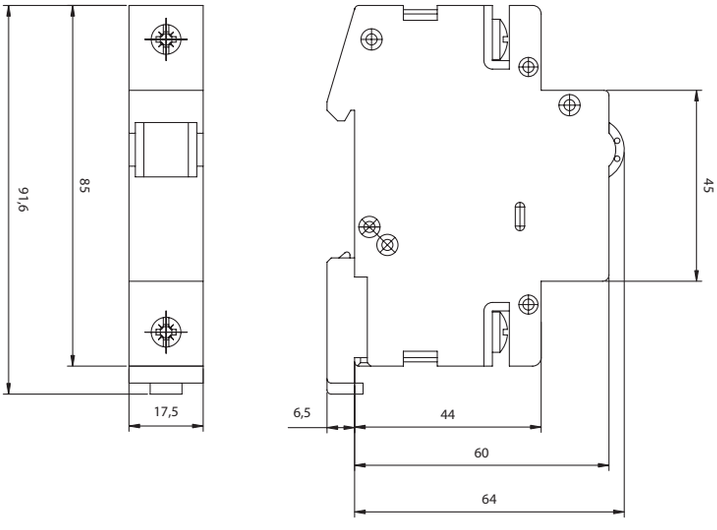
Dimensional drawing RV 120



Technical data RS, RSB

Standards		EN 60 947-5-1
Number of poles		1
Rated voltage U_n	V	AC 24, 48, 110, 230
		DC 24, 48, 110, 220
Light source		high capacity LED diode
Light source capacity	W	0,8
Colours		green - G, red - R, blue - B, transparent - T, yellow - Y
Illumination		constant - RS
		blinking - RSB
Terminal capacity	mm^2	0,75 - 6 for Cu conductors
Mounting		on rail DIN 35x7,5 EN 60 715
		on board
Degree of protection		IP 20
		IP 40 from the front panel
Ambient air temperature	°C	from -25 to +55
Working positions		optional

Dimensional drawing of RS, RSB



Colour	Voltage	Type	Ordering number	Type	Ordering number
T	24 V	RST24	0025725	RSBT24	0025705
R	24 V	RSR24	0025726	RSBR24	0025706
B	24 V	RSB24	0025727	RSBB24	0025707
G	24 V	RSG24	0025728	RSBG24	0025708
Y	24 V	RSY24	0025729	RSBY24	0025709
T	48 V	RST48	0025720	RSBT48	0025745
R	48 V	RSR48	0025721	RSBR48	0025746
B	48 V	RSB48	0025722	RSBB48	0025747
G	48 V	RSG48	0025723	RSBG48	0025748
Y	24 V	RSY48	0025724	RSBY48	0025749
T	110 V	RST110	0025710	RSBT110	0025735
R	110 V	RSR110	0025711	RSBR110	0025736
B	110 V	RSB110	0025712	RSBB110	0025737
G	110 V	RSG110	0025713	RSBG110	0025738
Y	24 V	RSY110	0025714	RSBY110	0025739
T	230 V	RST230	0025740	RSBT230	0025730
R	230 V	RSR230	0025741	RSBR230	0025731
B	230 V	RSB230	0025742	RSBB230	0025732
G	230 V	RSG230	0025743	RSBG230	0025733
Y	24 V	RSY230	0025744	RSBY230	0025734

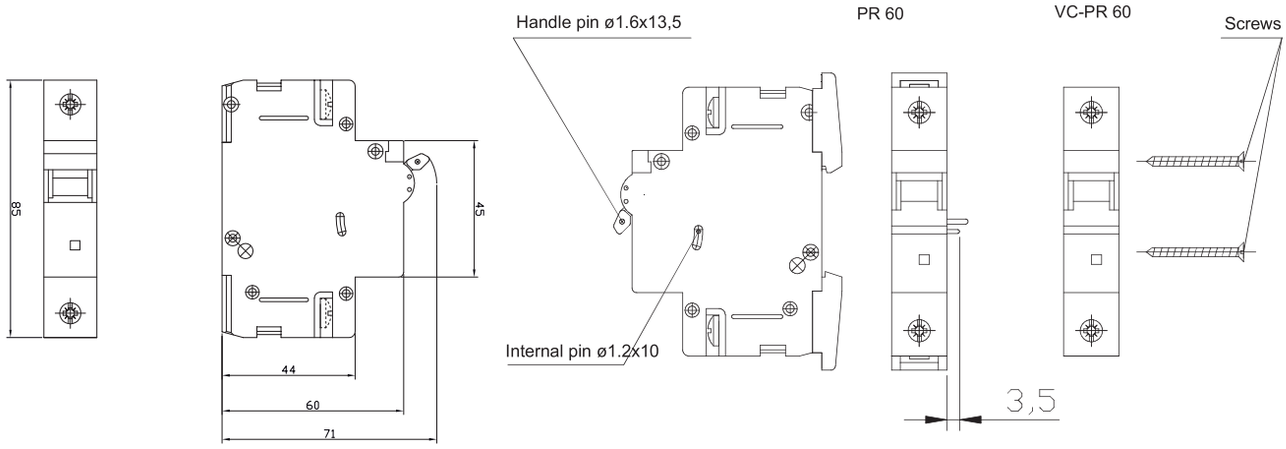
Shunt trip – VC

- accessories to the circuit-breaker PR 60, PR 60J, PRe 60, modular switches RV 60 and residual current devices
- utilized for the tripping of circuit-breaker (modular switch) by means of outer source of voltage in instantaneous tripping of the circuit
- it is delivered as separate unit or assembled together with circuit-breaker (modular switch)
- it is mounted on right hand side of the circuit-breaker (switch), left side of residual current devices

Technical data

Standards		EN 60 947-1 (IEC 60947-1)
Rated voltage	V	AC: 400, 230, 110, 60, 48, 24, 12 DC: 110, 48, 24
Rated insulation voltage	V	400
Max. switching off current (voltage of VC)	A (V)	AC:0,5(400);0,6(230; 0,5(110);0,9(60); 0,8(48); 2,8(24; 6(12) DC:0,6(110);2(48);3(24)
Rated impulse withstand voltage	kV	4
Rated making overvoltage	kV	4
range of activity voltage	%	70-110
Tripping time	ms	max. 50
Rated frequency	Hz	50
Mounting		on right side of circuit breaker (switch), left side of residual current device
Degree of protection		IP 20
Terminal capacity	mm^2	1 - 6 Cu

Dimensional drawing VC - PR 60



Operational voltage	Type	Ordering code
12 V ~	VC 12 V ~	0099860
24 V ~	VC 24 V ~	0099861
48 V ~	VC 48 V ~	0099862
60 V ~	VC 60 V ~	0099863
110 V ~	VC 110 V ~	0099864

Operational voltage	Type	Ordering code
230 V ~	VC 230 V ~	0099865
400 V ~	VC 400 V ~	0099866
24 V =	VC 24 V =	0099867
48 V =	VC 48 V =	0099868
110 V =	VC 110 V =	0099869

Instructions guide for the mounting of a shunt trip VC-PR 60

- on right side of all executions PR 60, PR 60J, PRe 60 and modular switches RV 60
- circuit breaker and shunt trip have to be in switch-off position
- insert pin Ø 1,6 mm into aperture of operating lever and into aperture of switching system Ø 1,2 mm (pins are part of delivery)
- approach shunt trip to the circuit breaker in order to achieve engagement of pins into appropriate parts of circuit breaker and switching system of VC-PR 60
- into free holes in shunt trip VC-PR60 enter stainless steel screws and slightly tight the screws to attach it to the PR60
- check the function of VC-RI60 with PR60 by switching on the the MCB and pushing the mechanizm through the hole for pin Ø 1,2 mm with appropriate tool.

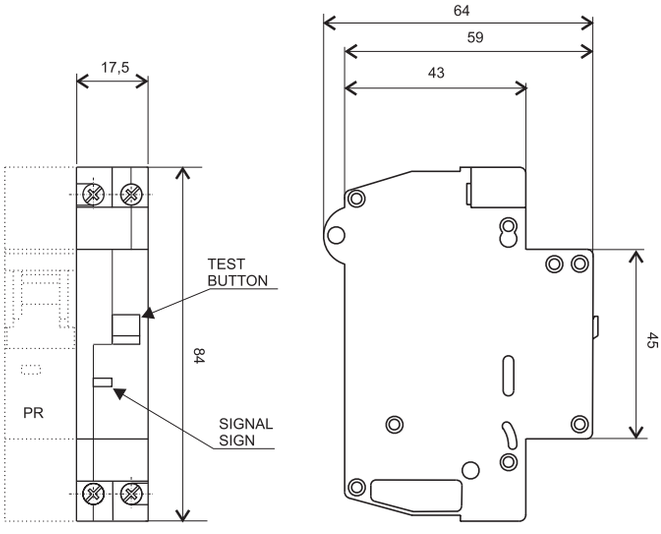
Undervoltage trip PC

- accessories to PR 60, PR 120, RV 60, RV 120
- they are using to protection against rerun-up of motor by failure in mains
- signalisation of release position green/red
- auxiliary button for correct function control
- mounting to circuit breakers in mill

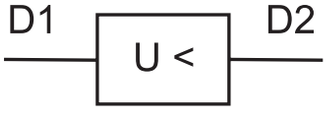
Technical data

Standards	EN 60947 – 1
Rated voltage	24, 48, 120, 230, 400 V AC
Rated frequency	50 Hz
Maximal using	3 W
Attachment	on the right side
Connecting wires	0,75 – 2,5 mm^2
Degree of protection	IP 20
Turn on limit	up 85 % from U_n
	down 35 % from U_n

Dimensional drawing of PC



Connecting scheme



Type	Ordering designation
PC 24 V~	0090550
PC 48 V~	0090551
PC 120 V~	0090552
PC 230 V~	0090553
PC 400 V~	0090554

Auxiliary and signal contacts PKJ, 2PKJ,PKJ+SKJ (TEST)

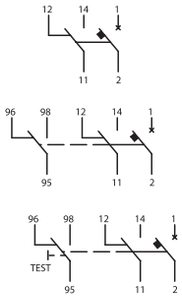
- these are accessories to circuit-breakers PR 60, PR 60J, PRe 60, modular switches RV 60, residual current devices
- can be obtained as separate units or mounted together with circuit-breaker (modular switch)
- they are mounted on the left hand side of the circuit-breaker (modular switch) by means of pins and screws
- serve for signalling of contact position of circuit-breaker

Types:
- PKJ, 2PKJ: single or double auxiliary changeover contacts; position of contacts correspond to the position of the main contacts of circuit-breaker (modular switch)
- PKJ + SKJ: auxiliary changeover contact plus signal changeover contact; position of auxiliary contact correspond to the position of the main contacts of circuit-breaker (modular switch); signal changeover contact indicate opening of circuit breaker by operating means; signal contact do not changes his position
- PKJ+SKJ+TEST: functions of PKJ and SKJ are identical with functions stated in previous paragraph; TEST button has two functions:
- signalling the position of signal contacts;
- testing of control circuit (non-stable change of position of the contacts) by slight move of push-button upwards or downwards without change of contact position of circuit-breaker

Technical data

Standards		EN 60947-5-1 (IEC 60947-5-1)
Rated insulation voltage U_i	V	400
Rated operational voltage U_e	V	230
Rated thermal current I_{th}	A	16
Rated operational current I_e	A	4 (AC 15 at U_e = 230 V) 0,5 (DC 13 at U_e = 110 V)
Conditional short circuit current with fuse 16A I_k	A	800
Max. conventional back-up fuses	A	16 gL
Rated frequency	Hz	50 - 60
Mounting		on left side of device
Degree of protection		IP 20
Terminal capacity	mm^2	0,5 - 2,5 Cu

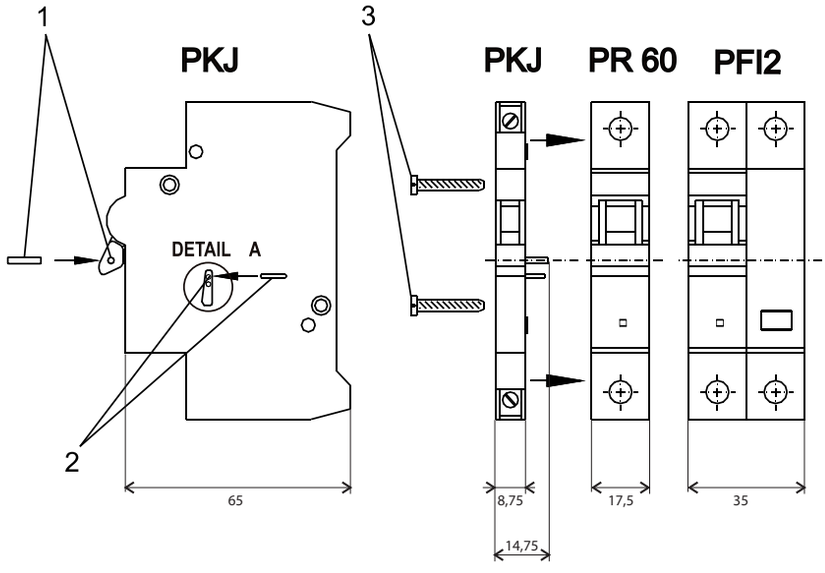
Contacts scheme



Type	Ordering code
PKJ	0099010
2 PKJ	0099011
PKJ + SKJ	0099012
PKJ + SKJ + TEST	0099013

INSERT PINS

CONNECT WITH 2 SCREWS



1. Pin of handle Ø 1,6 mm
2. Pin Ø 1,2 mm, l=10 mm
3. Screws

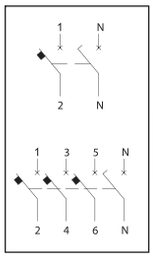
Instructions guide for the mounting of auxiliary contacts

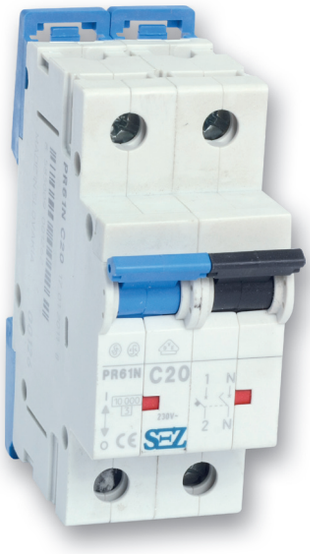
1. In the block of auxilitary contacts insert into handle the pin of ø1,6 mm and into the opening of the switching system the pin ø1,2 mm.
2. Approach contacts block to PR 60 (PFI2) to let the pins snap into relevant device pieces. During the assembly must be both handles the PR 60 (PFI2) and the contact block handle OFF.
3. Insert into free openings in the contact block the tapping screw and attach freely to PR 60 (PFI2).
4. Verify mechanical function of auxiliary contact with PR 60 (PFI2) by pushing through the device opening ø1,2 mm with appropriate device the mechanical part (pin, needle etc.)

N-POLE

- assembling with circuit breaker at manufacturer's site according to the requirement of the customer
- neutral pole can be assembled to all AC circuit breakers PR 61 and PR 63(current ratings, tripping characteristics)
- neutral pole is without release, on making of circuit breaker it makes before the other contacts and during breaking it breakes after the other poles
- on ordering of neutral pole please state type and ordering number of the circuit breaker and type and ordering number of the neutral pole

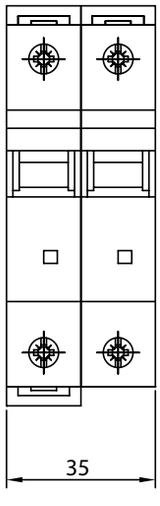
Scheme



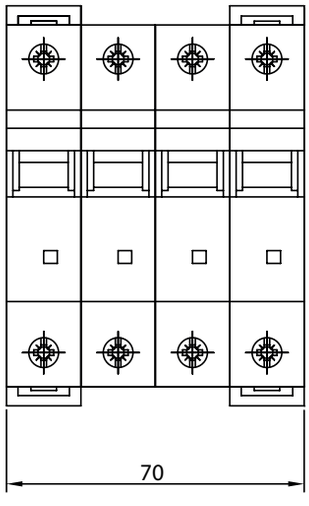


Type	Ordering Nr.
N-pole of circuit breaker PR 60 0,2 - 25 A	0099600
N-pole of circuit breaker PR 60 32 - 63 A	0099601

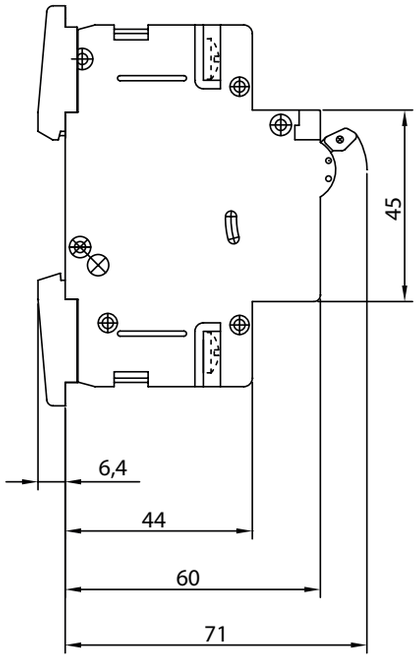
Dimensional drawing of PR 60 + N



PR 61 + N



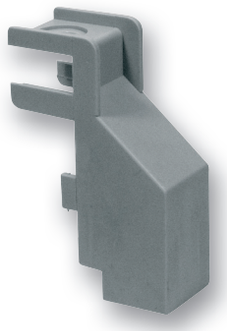
PR 63 + N



Covers of terminal – KSP 1, KSP 3

- accessories to the circuit-breaker PR 60, PR 60J, PRe 60, PRe 40 and modular switches RV 60…
- used for the improving of degree of protection to value IP 30 and together with sealing blind also for sealing of terminals
- single pole cover of terminals KSP 1 do not increase width of module of circuit breaker (modular switch); for the protection of both terminals two covers are needed
- three pole cover of terminals KSP 3 is applicable only for PR 63 and RV 63; the width of three pole module will change from 52,5 to 57 mm. For the fixing of cover to circuit-breaker (modular switch) there is necessary sealing blind PZ

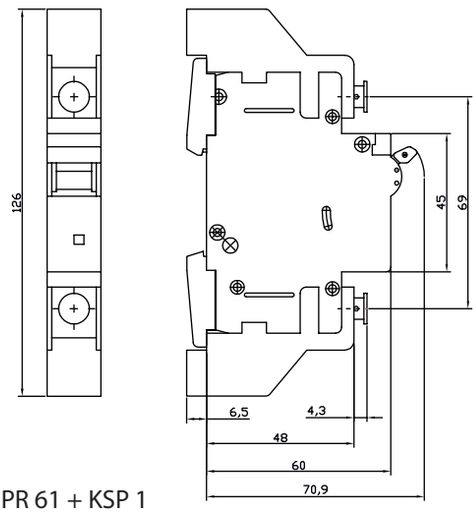
KSP 1



Type	Ordering Nr.
KSP 1	1990354
KSP 3	1990353

Dimensional drawing of KSP 1, KSP 3

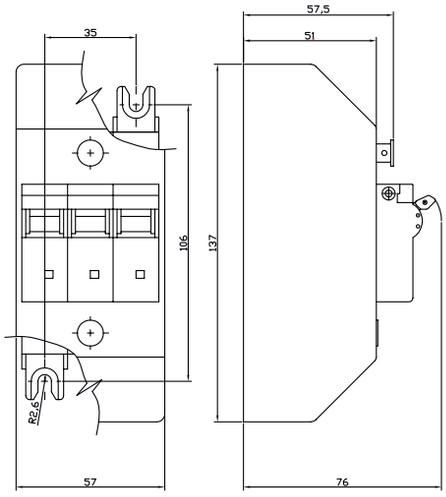
PR 61, PR 61 J, PRe 61, RV 61
with single pole cover of terminals (KSP 1)



PR 61 + KSP 1

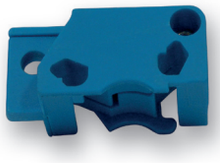
KSP 3

PR 63, PRe 63 and RV 63 with clips for mounting on board
and with three pole cover of terminals (KSP 3)
Incorporating sealing blind (PZ)



PR 63 + KSP 3

Locking of operating means – UP



- accessories to the circuit-breaker PR60, PR60J, PRe 60, RV 60…
- utilized for the safety locking of operating means in closed or open position of circuit breaker (modular switch) by means of padlock with maximum diameter of shank Ø 4,5 mm

Type	Ordering Nr.
UP blue	0099025
UP yellow	0099026
UP black	0099027
UP grey	0099028

Sealing blind – PZ

- accessories to the circuit-breaker PR 60, PR 60J, PRe 60 and modular switches RV 60…
- utilized for sealing of single pole covers KSP 1 and three pole covers KSP 3 and for mounting three pole covers KSP 3 too
- for sealing can be used sealing wire with maximum diameter Ø 1,5 mm

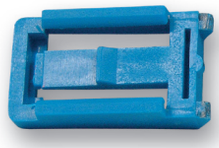
Type	Ordering code
PZ	1990356

Clips – PPL, PL, PP

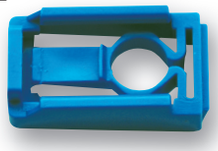
- accessories to the circuit-breaker PR 60, PR 60J and modular switches RV 60…
- flexible clip on rail PPL and clip on rail PL are utilized for the fixing of circuit-breakers (modular switches) on DIN rail 35 x 7,5 mm;
- clip on board is utilize for fixing of circuit-breakers (switches) on board by means of screws M4 or M5. For one device 2 slips are necessary;
- standard circuit-breaker (modular switch) is delivered with clip PL and flexible clip PPL
- clips can be replaced by simple withdrawal and insertion

Type	Ordering code
PL	1990350
PPL	1990351
PP	1990352

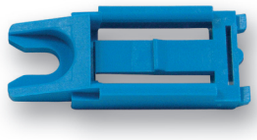
PL



PPL



PP



WITH A RESIDUAL CURRENT CIRCUIT BREAKER (RCCB) THE FOLLOWING PROTECTIVE MEASURES ARE AVAILABLE:

- protection in cases of indirect contact
- protection in cases of direct contact
- prevention of fires caused by ground-fault currents

FEATURES

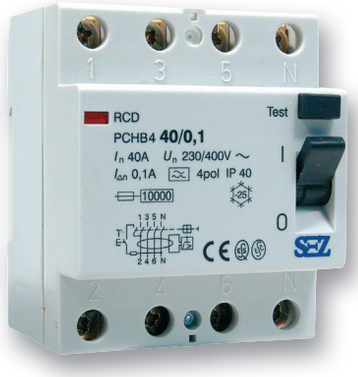
- suitable for protection of electrical circuits in residential buildings, non-residential buildings or industrial applications
- PFB and PCHB devices are working according IEC 61008-1 / EN 61008-1
- simple and solid fixing to 35 mm mounting rail in compliance to EN 6071
- range of rated residual operating currents I 10, 30, 100, 300, 500 mA (I = 10mA is for devices with rated current up to 25A include)
- optical indicator, on the front side indicating operating state of device (green target visible closed contacts, red target visible opened contacts)
- connected clamp headed/stirrupted range of connecting wires 1 - 25 mm^2
- working position optional
- there is possibility to use auxiliary contacts for type PFB
- PFB devices are compatible with circuit breakers PR 60, PRe 60, RV 60, PFI dimensions

PFB2

PFB4

PCHB2

PCHB4



TYPES

RCCBs are manufactured in compliance with EN 61008 standard:

- type A - sensitive to alternating and pulsating dc residual operating currents.
- type AC - sensitive only to alternating residual operating currents of sine form.

SPECIAL VERSIONS

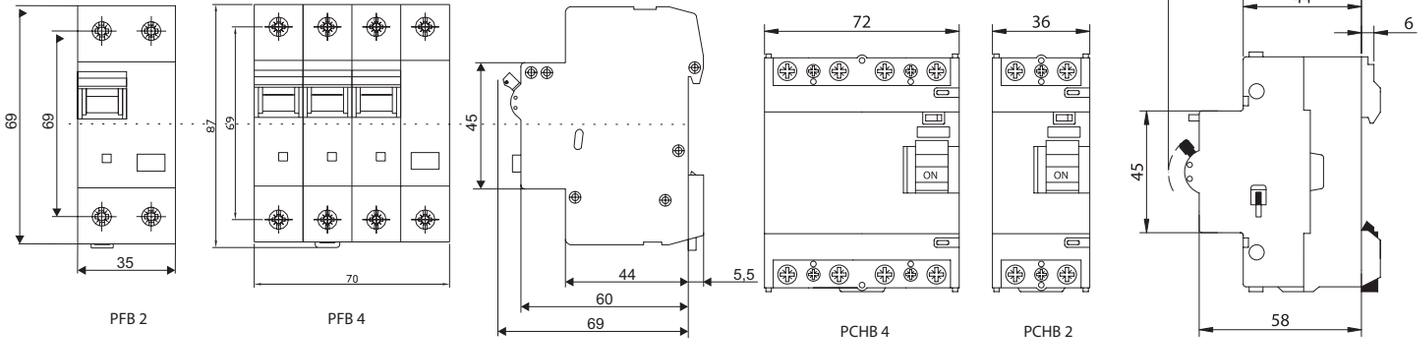
Four-pole selective switches (switches with delayed break-out) are available at customer's request. Their rated currents are 25, 40 or 63A, and rated differential currents are 0,1 A or 0,3 A. Break out times at different values of differential currents comply with the EN 61008 standard.

At customers's request, special K 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.

Technical data

Versions			PFB2	PFB4	PCHB2	PCHB4
Types			A, AC			
Number of poles			2	4	2	4
Rated current	I_n	A	16 - 63	16 - 63	16 - 100	16 - 100
Rated residual operating current	I_{Dn}	A	0,01 - 0,5	0,03 - 0,5	0,01 - 0,5	0,03 - 0,5
Rated voltage	U_n	V	230	230/400	230	230/400
Rated frequency		Hz	50	50	50/60	50/60
Rated res. making and						
breaking capacity	I_m	$I_{\Delta m}$	630	630	800; 1000 for In=100A	
Rated res. making and						
breaking capacity	$I_{\Delta m}$					
Max. conventional						
back-up fuses GL	I_n	A	63; 80 for In=63 and 80A; 100 for In=100A			
Rated conditional						
short-circuit current	I_{nc}	A	10000; 6000 for In=100A			
Protection degree			IP 20; IP40 after installation			
Mounting position			optional			
Ambient temperature		°C	from -25°C to +40°C			
Weight		g	250	435	230	390
Terminal capacity		mm^2	1 to 25		1 to 35	
Accessories			auxiliary and signal contacts		sealing covers	

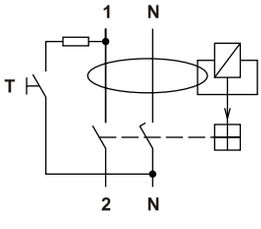
Dimensional drawings of PFB and PCHB



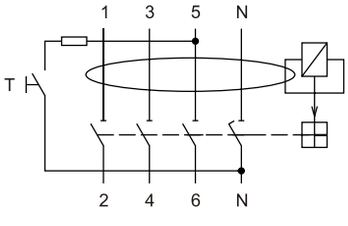
PFB 2 PFB 4 PCHB 4 PCHB 2

Contacts scheme

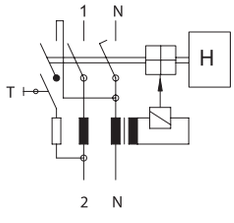
PFB - 2



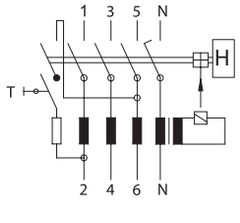
PFB - 4



PCHB - 2



PCHB - 4



PFB - 2

2 pole version	Ordering Nr.	
	Type A	Type AC
$I_{\Delta n}$ = 0,01 A		
PFB2 - 16/0,01	0090660	0090660AC
PFB2 - 25/0,01	0090661	0090661AC
$I_{\Delta n}$ = 0,03 A		
PFB2 - 16/0,03	0090662	0090662AC
PFB2 - 25/0,03	0090663	0090663AC
PFB2 - 40/0,03	0090664	0090664AC
PFB2 - 63/0,03	0090665	0090665AC
$I_{\Delta n}$ = 0,1 A		
PFB2 - 16/0,1	0090666	0090666AC
PFB2 - 25/0,1	0090667	0090667AC
PFB2 - 40/0,1	0090668	0090668AC
PFB2 - 63/0,1	0090669	0090669AC
$I_{\Delta n}$ = 0,3 A		
PFB2 - 16/0,3	0090670	0090670AC
PFB2 - 25/0,3	0090671	0090671AC
PFB2 - 40/0,3	0090672	0090672AC
PFB2 - 63/0,3	0090673	0090673AC
$I_{\Delta n}$ = 0,5 A		
PFB2 - 16/0,5	0090674	0090674AC
PFB2 - 25/0,5	0090675	0090675AC
PFB2 - 40/0,5	0090676	0090676AC
PFB2 - 63/0,5	0090677	0090677AC

PCHB - 2

2 pole version	Ordering Nr.
	Type A
$I_{\Delta n}$ = 0,01 A	
PCHB2 - 16/0,01	PCHB2/721011
PCHB2 - 25/0,01	PCHB2/722011
$I_{\Delta n}$ = 0,03 A	
PCHB2 - 16/0,03	PCHB2/721031
PCHB2 - 25/0,03	PCHB2/722031
PCHB2 - 40/0,03	PCHB2/724031
PCHB2 - 63/0,03	PCHB2/726031
PCHB2 - 80/0,03	PCHB2/728031
PCHB2 - 100/0,03	PCHB2/7210031
$I_{\Delta n}$ = 0,1 A	
PCHB2 - 16/0,1	PCHB2/721101
PCHB2 - 25/0,1	PCHB2/722101
PCHB2 - 40/0,1	PCHB2/724101
PCHB2 - 63/0,1	PCHB2/726101
PCHB2 - 80/0,1	PCHB2/728101
PCHB2 - 100/0,1	PCHB2/7210101
$I_{\Delta n}$ = 0,3 A	
PCHB2 - 16/0,3	PCHB2/721301
PCHB2 - 25/0,3	PCHB2/721301
PCHB2 - 40/0,3	PCHB2/724301
PCHB2 - 63/0,3	PCHB2/726301
PCHB2 - 80/0,3	PCHB2/728301
PCHB2 - 100/0,3	PCHB2/7210301

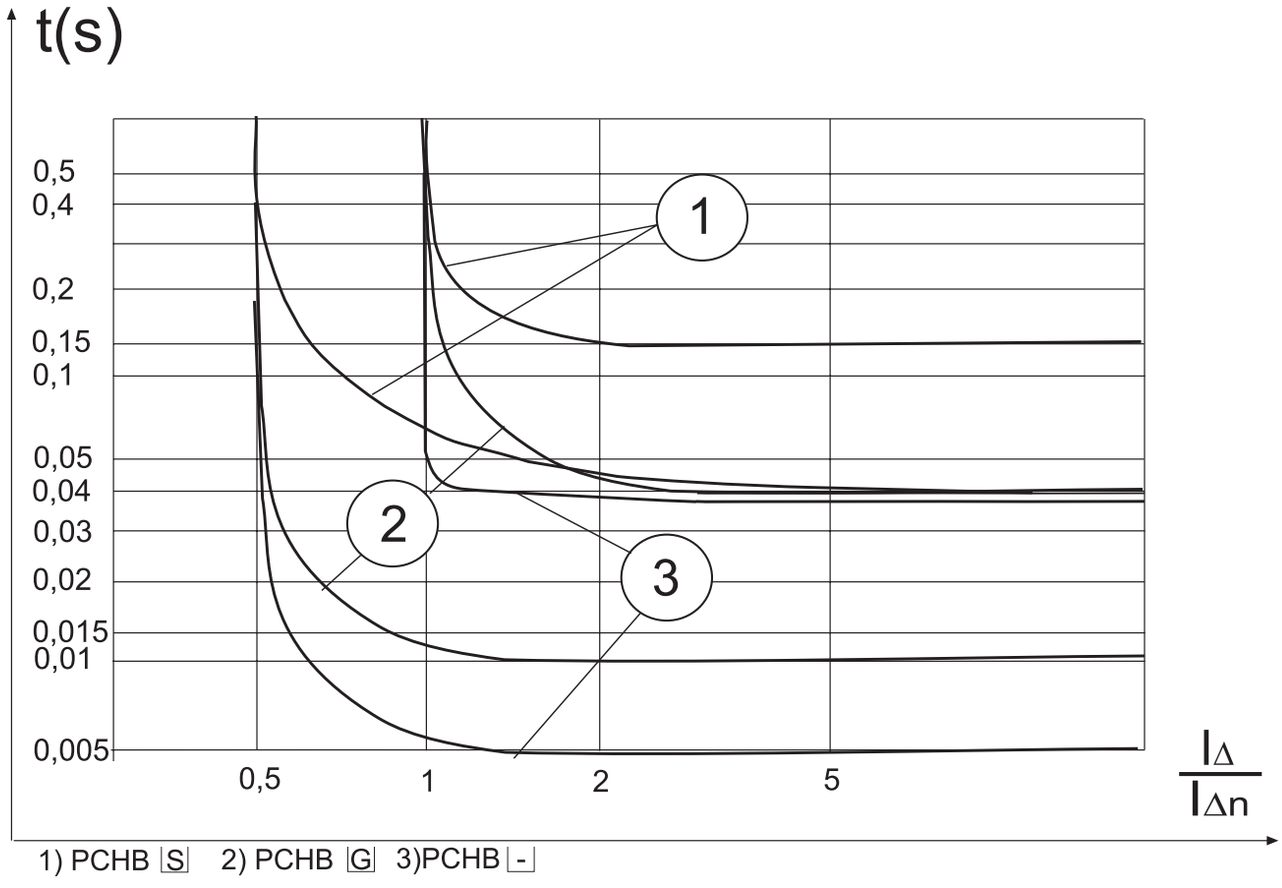
PFB - 4

4 pole version	Ordering Nr.	
	Type A	Type AC
$I_{\Delta n}$ = 0,03 A		
PFB4 - 16/0,03	0090682	0090682AC
PFB4 - 25/0,03	0090683	0090683AC
PFB4 - 40/0,03	0090684	0090684AC
PFB4 - 63/0,03	0090685	0090685AC
$I_{\Delta n}$ = 0,1 A		
PFB4 - 16/0,1	0090686	0090686AC
PFB4 - 25/0,1	0090687	0090687AC
PFB4 - 40/0,1	0090688	0090688AC
PFB4 - 63/0,1	0090689	0090689AC
$I_{\Delta n}$ = 0,3 A		
PFB4 - 16/0,3	0090690	0090690AC
PFB4 - 25/0,3	0090691	0090691AC
PFB4 - 40/0,3	0090692	0090692AC
PFB4 - 63/0,3	0090693	0090693AC
$I_{\Delta n}$ = 0,5 A		
PFB4 - 16/0,5	0090694	0090694AC
PFB4 - 25/0,5	0090695	0090695AC
PFB4 - 40/0,5	0090696	0090696AC
PFB4 - 63/0,5	0090697	0090697AC

PCHB - 4

4 pole version	Ordering Nr.
	Type A
$I_{\Delta n}$ = 0,03 A	
PCHB4 - 25/0,03	PCHB4/742031
PCHB4 - 40/0,03	PCHB4/744031
PCHB4 - 63/0,03	PCHB4/746031
PCHB4 - 80/0,03	PCHB4/748031
PCHB4 - 100/0,03	PCHB4/7410031
$I_{\Delta n}$ = 0,1 A	
PCHB4 - 25/0,1	PCHB4/742101
PCHB4 - 40/0,1	PCHB4/744101
PCHB4 - 63/0,1	PCHB4/746101
PCHB4 - 80/0,1	PCHB4/748101
PCHB4 - 100/0,1	PCHB4/7410101
$I_{\Delta n}$ = 0,3 A	
PCHB4 - 25/0,3	PCHB4/742301
PCHB4 - 40/0,3	PCHB4/744301
PCHB4 - 63/0,3	PCHB4/746301
PCHB4 - 80/0,3	PCHB4/748301
PCHB4 - 100/0,3	PCHB4/7410301
$I_{\Delta n}$ = 0,5 A	
PCHB4 - 40/0,5	PCHB4/744501

Instantaneous tripping characteristics PCHB

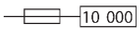


1) PCHB S 2) PCHB G 3)PCHB -

BASIC TERMS AND SYMBOLS

•**Rated residual current $I_{\Delta n}$** is the value of residual current $I_{\Delta n}$ specified by the manufacturer at which the residual current circuit breaker must switch out under specified conditions. Alternating residual current must release the residual current circuit breaker within (0.5 ÷ 1) $I_{\Delta n}$

•**Rated conditional short-circuit current I_{nc}** – short-circuit strength. The function and design principle does not allow for the residual current circuit breaker use for protection against short-circuit. For circuit protection it is necessary to use a circuit breaker or a fuse. These elements cut the short-circuited circuit safely off . The residual current circuit breaker must only withstand the through-going short-circuit current. The amplitude of the maximum through current is defined as rated conditional short-circuit current I_{nc}. The short-circuit strength is then expressed by the current Inc. For example, on the rating plate, I_{nc} = 10 kA is expressed by the following symbol:



•**Residual current circuit breaker – type AC** – reacts to sine-wave residual current – it is used in conventional AC networks.

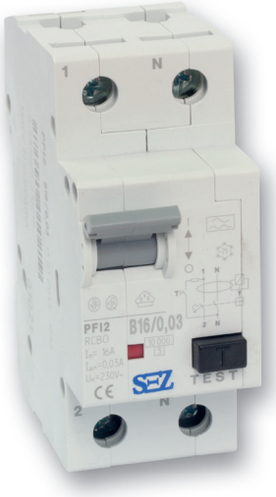
•**Residual current circuit breaker – type A** – reacts to sine-wave alternating and pulsating direct residual currents - it is used in conventional AC networks and the networks with phase power regulation etc.

•**Residual current circuit breaker – type G** – special residual current circuit breaker reducing the number of undesirable releases. It is mainly installed before the devices causing short-time (up to 10 ms) stray currents.
Identifi cation: G
Release delay: 10 ms

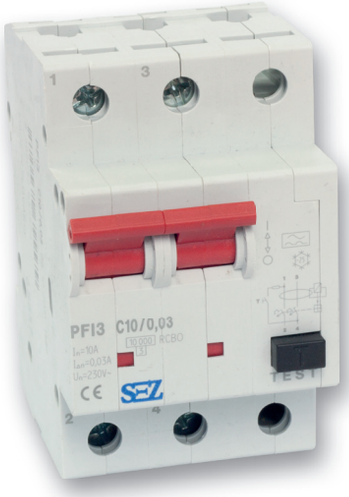
•**Residual current circuit breaker – type S** – special residual current circuit breaker, which is mainly intended for selective switching of residual current circuit breakers and reduction of undesirable releases. It is installed before the devices causing short-time (up to 40 ms) stray currents. Identification: S release delay: 40 ms Selective (discriminating) switching means that if the residual current circuit breakers are connected in series, only the device in which circuit a failure occurs will release. More specifically, only the device in which the release residual current appears due to a failure in the protected circuit will release. The advantage consists in maintaining the power supply in the other circuits not aff ected by the failure. Such function of the protected circuit is achieved by connection of the selective residual current circuit breaker before the standard or G type residual current circuit breaker, with the following ratio of rated residual currents: $I_{\Delta n\,S} \geq 3 \times I_{\Delta n\,\text{-},G}$ $I_{\Delta nS}$ rated residual of the selective residual current circuit breaker $I_{\Delta n\,\text{-},G}$ maximum rated residual current of G type residual current circuit breaker. The main reason of selective switching is higher time delay of the selective residual current circuit breakers in releasing (compared to standard or G type ones).

- device is a combination of residual current circuit breaker and circuit breaker for rated current 6, 10, 13, 16, 20, 25, 32, 40 A
- they are used in house and similar installations
- protection against: - additional protection in the even direct contact
  - indirect contact
  - fire
  - overcurrents
  - short circuit (breaking capacity 10 kA)
- range of rated residual operating current $I_{\Delta n}$ is 10, 30, 100, 300, 500 mA ($I_{\Delta n}$= 10 mA for devices with rated current up to 25 A including)
- tripping characteristics B,C according STN EN 61 009-1
- simple assembly with spring clamps to the strip 35 x 7,5 EN 60 715
- sealable in on and off position
- optical state indicator on the front side indicating operation state of device (green target visible – closed contacts, red target visible – opened contacts)
- connected clamp headed/stirrupted range of connecting wires 1 - 25 mm^2
- working position optional
- there is a possibility to use auxiliary contacts
- Type K - special version with delayed tripping min. 10ms

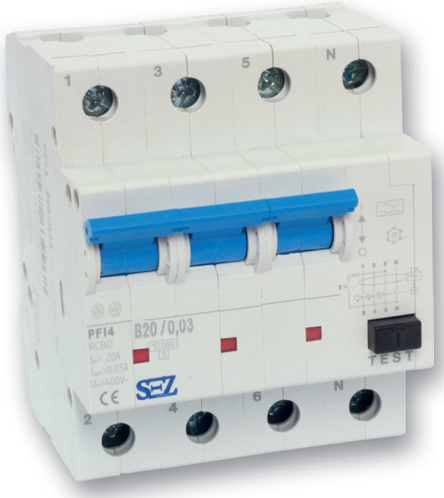
PFI 2



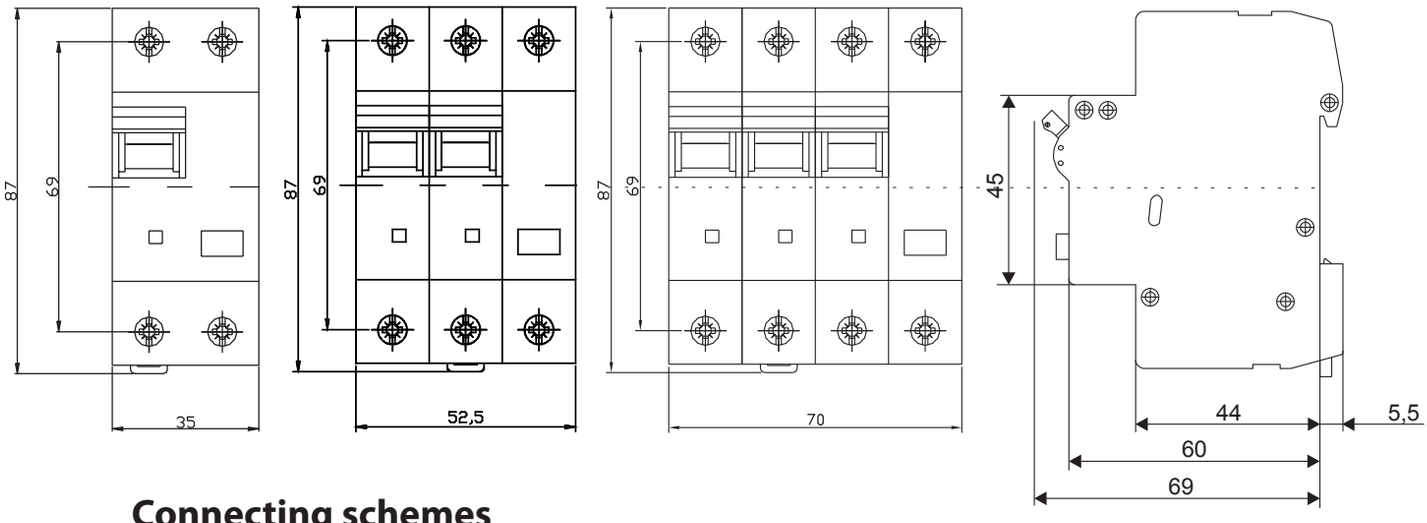
PFI 3



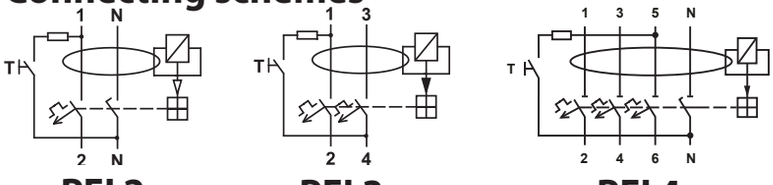
PFI 4



Dimensional drawing



Connecting schemes

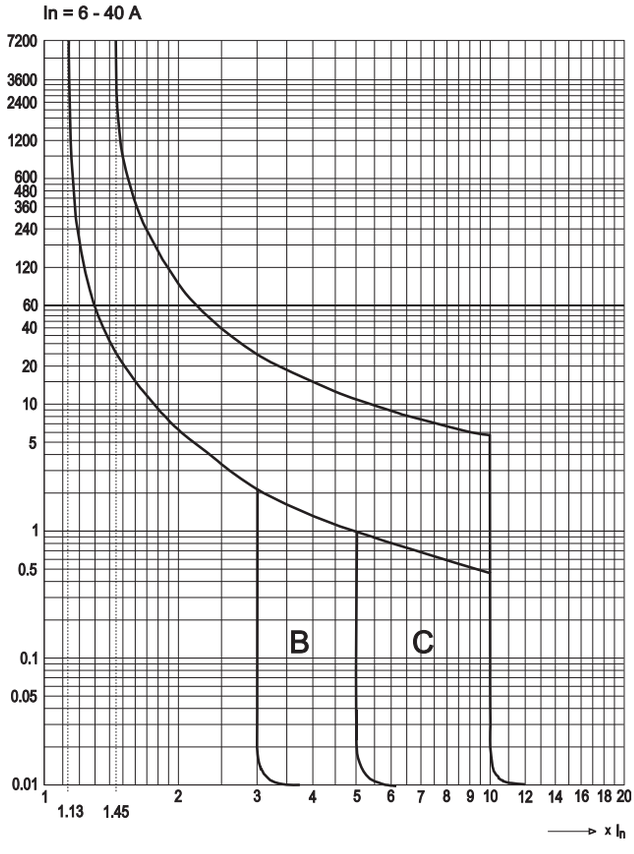


PFI 2 PFI 3 PFI 4

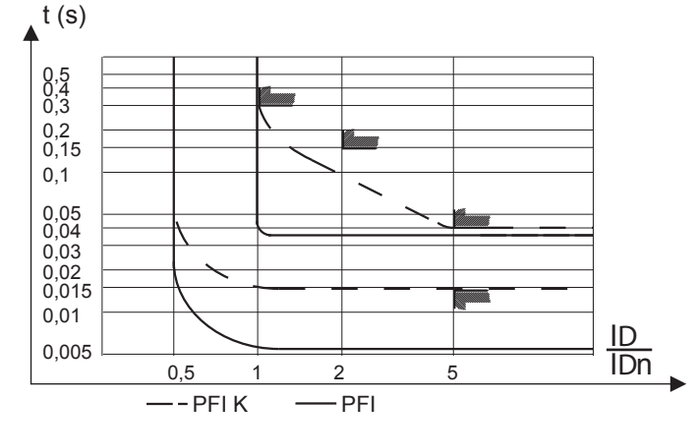
Technical data

		PFI 2	PFI 3	PFI 4
No of poles		2	2	4
No of modules		2	3	4
Tripping characteristics		B, C		
Rated current I_n	A	6,10,13,16, 25,32,40		
Rated residual current $I_{\Delta n}$	A	0,01-0,5 up to 25 A	0,03-0,5 from 25 A	0,03; 0,1 ; 0,3; 0,5
Rated voltage U_n	V	230	230	400
Rated frequency	Hz	50		
Rated short circuit capacity I_{cn}	A	10 000		
Selection class		3		
Residual operating current		type A – AC and pulsating DC current		
Electrical endurance		4000		
Mechanical endurance		10000		
Degree of protection		IP20, IP40 front		
Mounting position		optional		
Ambient temperature	°C	-25 up to +40		
Connecting clamps		Headed/stirrupted		
Terminal capacity	mm2	1-25		
Accessories		Auxiliary contacts, shunt trips VC		

Tripping characteristics



Tripping characteristics



PFI 2

Characteristics B		Characteristics C	
Ord. code	Type	Ord. code	Type
0090600	PFI2 B6/0,01	0090700	PFI2 C6/0,01
0090601	PFI2 B10/0,01	0090701	PFI2 C10/0,01
0090619	PFI2 B13/0,01	0090705	PFI2 C13/0,01
0090602	PFI2 B16/0,01	0090702	PFI2 C16/0,01
0090603	PFI2 B20/0,01	0090703	PFI2 C20/0,01
0090604	PFI2 B25/0,01	0090704	PFI2 C25/0,01
0090610	PFI2 B6/0,03	0090710	PFI2 C6/0,03
0090611	PFI2 B10/0,03	0090711	PFI2 C10/0,03
0090618	PFI2 B13/0,03	0090718	PFI2 C13/0,03
0090612	PFI2 B16/0,03	0090712	PFI2 C16/0,03
0090613	PFI2 B20/0,03	0090713	PFI2 C20/0,03
0090614	PFI2 B25/0,03	0090714	PFI2 C25/0,03
0090615	PFI2 B32/0,03	0090715	PFI2 C32/0,03
0090616	PFI2 B40/0,03	0090716	PFI2 C40/0,03
0090620	PFI2 B6/0,1	0090720	PFI2 C6/0,1
0090621	PFI2 B10/0,1	0090721	PFI2 C10/0,1
0090622	PFI2 B16/0,1	0090722	PFI2 C16/0,1
0090623	PFI2 B20/0,1	0090723	PFI2 C20/0,1
0090624	PFI2 B25/0,1	0090724	PFI2 C25/0,1
0090625	PFI2 B32/0,1	0090725	PFI2 C32/0,1
0090626	PFI2 B40/0,1	0090726	PFI2 C40/0,1
0090630	PFI2 B6/0,3	0090730	PFI2 C6/0,3
0090631	PFI2 B10/0,3	0090731	PFI2 C10/0,3
0090632	PFI2 B16/0,3	0090732	PFI2 C16/0,3
0090633	PFI2 B20/0,3	0090733	PFI2 C20/0,3
0090634	PFI2 B25/0,3	0090734	PFI2 C25/0,3
0090635	PFI2 B32/0,3	0090735	PFI2 C32/0,3
0090636	PFI2 B40/0,3	0090736	PFI2 C40/0,3
0090640	PFI2 B6/0,5	0090740	PFI2 C6/0,5
0090641	PFI2 B10/0,5	0090741	PFI2 C10/0,5
0090642	PFI2 B16/0,5	0090742	PFI2 C16/0,5
0090643	PFI2 B20/0,5	0090743	PFI2 C20/0,5
0090644	PFI2 B25/0,5	0090744	PFI2 C25/0,5
0090645	PFI2 B32/0,5	0090745	PFI2 C32/0,5
0090646	PFI2 B40/0,5	0090746	PFI2 C40/0,5

PFI 4

Characteristics B

Ord. code	Type	Ord. code	Type	Ord. code	Type	Ord. code	Type
0090900	PFI4 B6/0,03	0090940	PFI4 B6/0,1	0090950	PFI4 B6/0,3	0090910	PFI4 B6/0,5
0090901	PFI4 B10/0,03	0090941	PFI4 B10/0,1	0090951	PFI4 B10/0,3	0090911	PFI4 B10/0,5
0090902	PFI4 B13/0,03	0090942	PFI4 B13/0,1	0090952	PFI4 B13/0,3	0090912	PFI4 B13/0,5
0090903	PFI4 B16/0,03	0090943	PFI4 B16/0,1	0090953	PFI4 B16/0,3	0090913	PFI4 B16/0,5
0090904	PFI4 B20/0,03	0090944	PFI4 B20/0,1	0090954	PFI4 B20/0,3	0090914	PFI4 B20/0,5
0090905	PFI4 B25/0,03	0090945	PFI4 B25/0,1	0090955	PFI4 B25/0,3	0090915	PFI4 B25/0,5
0090906	PFI4 B32/0,03	0090946	PFI4 B32/0,1	0090956	PFI4 B32/0,3	0090916	PFI4 B32/0,5
0090907	PFI4 B40/0,03	0090947	PFI4 B40/0,1	0090957	PFI4 B40/0,3	0090917	PFI4 B40/0,5

Characteristics C

Ord. code	Type	Ord. code	Type	Ord. code	Type	Ord. code	Type
0090920	PFI4 C6/0,03	0090960	PFI4 C6/0,1	0091220	PFI4 C6/0,3	0090930	PFI4 C6/0,5
0090921	PFI4 C10/0,03	0090961	PFI4 C10/0,1	0091221	PFI4 C10/0,3	0090931	PFI4 C10/0,5
0090922	PFI4 C13/0,03	0090962	PFI4 C13/0,1	0091222	PFI4 C13/0,3	0090932	PFI4 C13/0,5
0090923	PFI4 C16/0,03	0090963	PFI4 C16/0,1	0091223	PFI4 C16/0,3	0090933	PFI4 C16/0,5
0090924	PFI4 C20/0,03	0090964	PFI4 C20/0,1	0091224	PFI4 C20/0,3	0090934	PFI4 C20/0,5
0090925	PFI4 C25/0,03	0090965	PFI4 C25/0,1	0091225	PFI4 C25/0,3	0090935	PFI4 C25/0,5
0090926	PFI4 C32/0,03	0090966	PFI4 C32/0,1	0091226	PFI4 C32/0,3	0090936	PFI4 C32/0,5
0090927	PFI4 C40/0,03	0090967	PFI4 C40/0,1	0091227	PFI4 C40/0,3	0090937	PFI4 C40/0,5

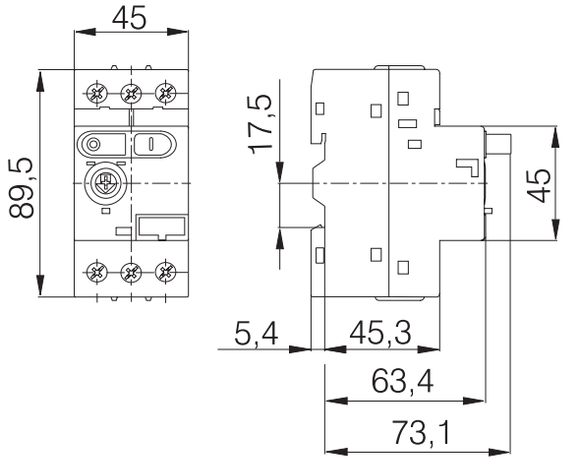
MIS – motor protection switch with thermal and magnetic short-circuit release.

- reacts to phase failure in compliance with EN 60947-4-1, IEC 947-4-1, VDE 0660/102
- reliable protection especially at overloads and in certain cases also at short circuits
- simple and fast mounting by snap fitting on 35 mm wide mounting rail in compliance with EN 60715; fixing with two screws is also possible
- they are convenient also for mounting in an installation distribution box
- main application field: control (start-up, protection and switch-off) of AC electric motors with powers up to 11 kW (380/400 V) or other consumers up to 32 A; it can also be used as the main switch according to EN 60204 or VDE 0113 standards
- numerous accessories make the application field wider and enable the fulfillment of the majority of user's demands

Technical data

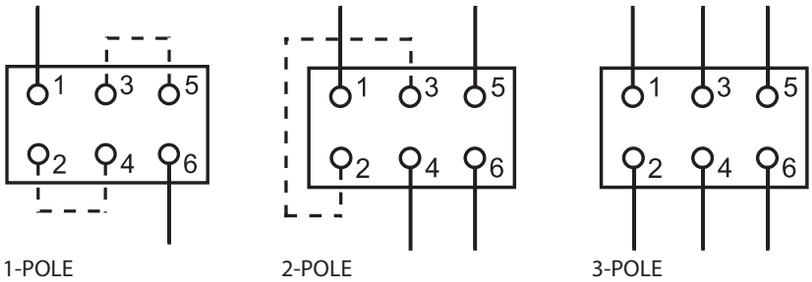
Type	Setting range (A)	Operating current (A)	Rated ultimate short-circuit breaking of short-circuit capacity (IEC 947-2, EN 60947-2) Icu (kA								Max. Back-up fuses (GL,M) if short-circuit current exceeds breaking capacity MIS			
			230 V		400 V		500 V		690 V		230 V	400 V	500 V	690 V
			I_{cu}	I_s	I_{cu}	I_s	I_{cu}	I_s	I_{cu}	I_s				
MIS 32-0,16	0,1...0,16	2	Switches are short-circuit proof for any value of prospective short-circuit current Icc.								No back-up fuses required. Breaking capacity > Icc			
MIS 32-0,25	0,16...0,25	3												
MIS 32-0,4	0,25...0,4	5												
MIS 32-0,63	0,4...0,63	8												
MIS 32-1	0,63...1	12												
MIS 32-1,6	1...1,6	20												
MIS 32-2,5	1,6...2,5	33							5	5				16
MIS 32-4	2,5...4	44							3	3				25
MIS 32-6,3	4...6,3	75					6	4,5	3	2			35	35
MIS 32-10	6,3...10	120					6	4,5	3	2			50	35
MIS 32-14	9...14	160	25	12,5	25	12,5	6	4,5	3	2	80	63	50	50
MIS 32-18	13...18	230	25	12,5	25	12,5	6	4,5	3	2	80	63	50	50
MIS 32-23	17...23	270	25	12,5	25	12,5	4	3	3	2	80	80	50	50
MIS 32-27	20...27	360	25	12,5	25	12,5	4	3	3	2	80	80	50	50
MIS 32-32	25...32	400	25	12,5	25	12,5	4	3	3	2	80	80	50	50

Dimensional drawing of MIS



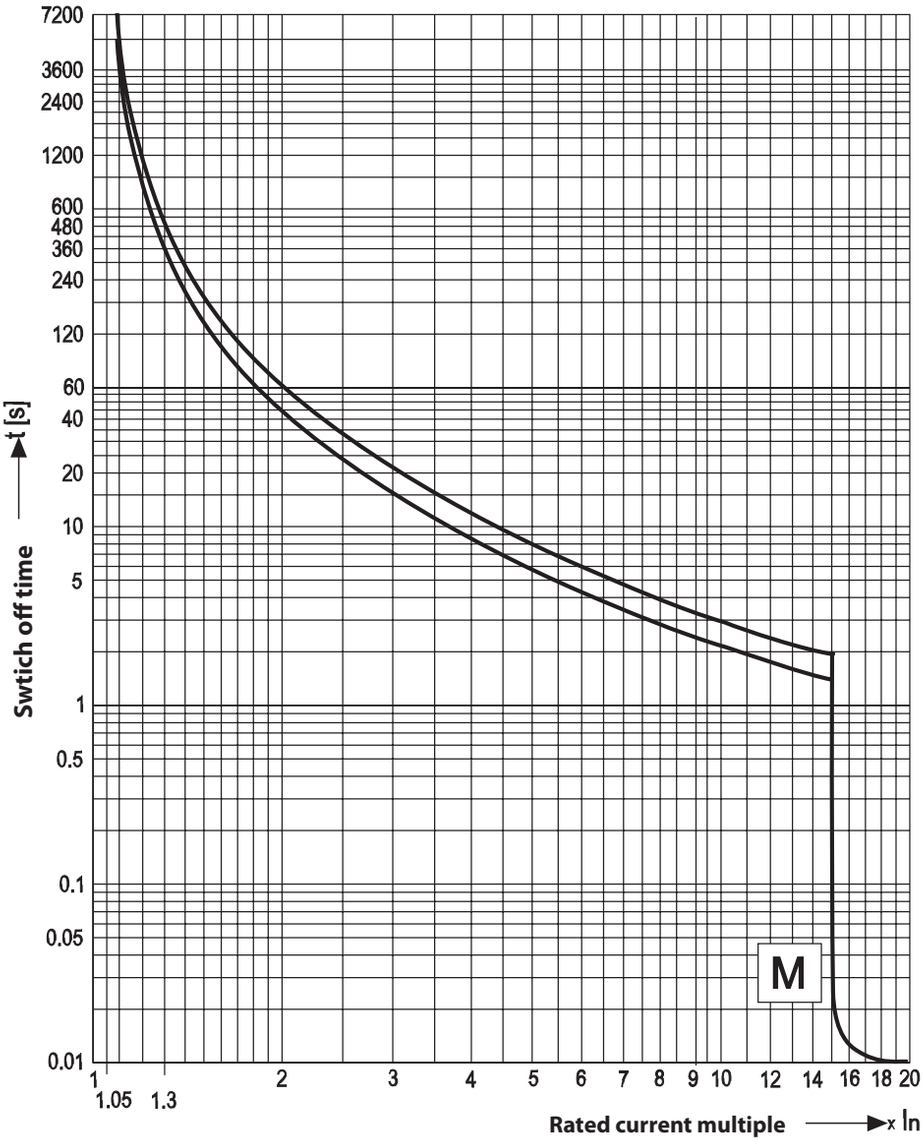
Type	Ordering number	Setting scale
MIS - 0,16	MIS32 - 0,16	0,1 – 0,16
MIS - 0,25	MIS32 - 0,25	0,16 – 0,25
MIS - 0,4	MIS32 - 0,4	0,25 – 0,4
MIS - 0,63	MIS32 - 0,63	0,4 – 0,63
MIS - 1	MIS32 - 1	0,63 – 1
MIS - 1,6	MIS32 - 1,6	1 – 1,6
MIS - 2,5	MIS32 - 2,5	1,6 – 2,5
MIS - 4	MIS32 - 4	2,5 – 4
MIS - 6,3	MIS32 - 6,3	4 – 6,3
MIS - 10	MIS32 - 10	6,3 – 10
MIS - 14	MIS32 - 14	9 – 14
MIS - 18	MIS32 - 18	13 - 18
MIS - 23	MIS32 - 23	17 - 23
MIS - 27	MIS32 - 27	20 - 27
MIS - 32	MIS32 - 32	25 – 32

Connection diagram



1-POLE 2-POLE 3-POLE

Instantaneous tripping characteristics of MIS

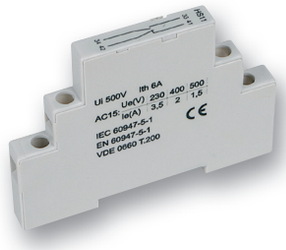


Selection MIS to electromotor

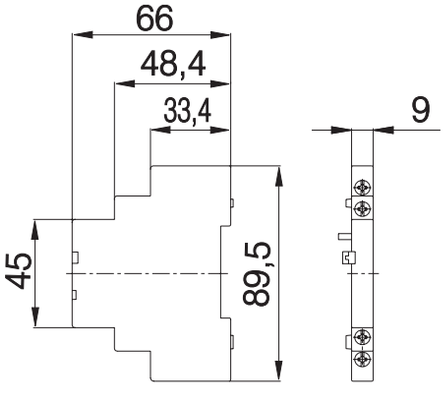
1-pole	3-pole					
220 V 230 V 240 V	220 V 230 V 240 V	380 V 400 V 415 V	440 V	500 V	660 V 690 V	Setting range of thermal release
(kW)						(A)
-	-	-	-	-	0,06	0,1...0,16
-	-	0,06	0,06	0,06...0,09	0,06...0,12	0,16...0,25
-	0,06	0,09	0,09...0,12	0,09...0,12	0,18	0,25...0,4
-	0,09	0,12...0,18	0,18	0,18	0,25	0,4...0,63
0,06...0,09	0,09...0,12	0,18...0,25	0,25...0,37	0,25...0,37	0,37...0,55	0,63...1
0,12	0,18...0,25	0,37...0,55	0,37...0,55	0,55...0,75	0,75...1,1	1...1,6
0,18...0,25	0,37	0,75	0,75...1,1	1,1	1,5	1,6...2,5
0,37	0,55...0,75	1,1...1,5	1,5	1,5...2,2	2,2...3	2,5...4
0,55...0,75	1,1...1,5	2,2	2,2...3	2,2...3	4	4...6,3
1,1...1,5	1,5...2,2	3...4	4	4...5,5	5,5...7,5	6,3...10
2,2	2,2...3	5,5	5,5...7,5	5,5...7,5	9...11	9...14
3	4	7,5	7,5...9	9...11	15	13...18
-	5,5	9...11	11	11	15...18,5	17...23
-	5,5...7,5	11	11	15	18,5...22	20...27
-	7,5	15	15	18,5	22	25...32

AUXILIARY CONTACTS HS 20, HS 10, HS11

Type	Ordering No.
HS20	MIS32 - HS20
HS10	MIS32 - HS10
HS11	MIS32 - HS11

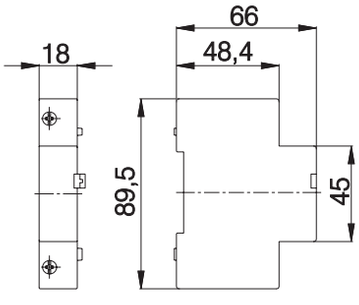


Dimensional drawing of HS



UNDER-VOLTAGE RELEASE UR, SHUNT RELEASE AR, 24 – 400 V; 50, 60 HZ

Type	Ordering No.
UR ...	MIS32 - UR
AR ...	MIS32 - AR



PADLOCK FEATURE HZ

Type	Ordering No.
HZ	MIS32 - HZ

PUSH-BUTTON DIAPHRAGM M

The manufacturer supplies also an enclosure and a front plate with protection degree IP 55 (O-55, CP-55); in this case the diaphragm is already mounted. However, it should be removed, if a lock or the emergency stop push-buttons are built-in.

Type	Ordering No.
M	MIS32 - M

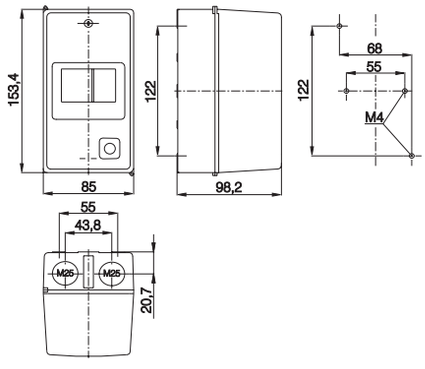
Enclosure IP 41/55, HO-41/55, front plate IP 41/55, FP-41/55

The MIS or MIST motor protection switch with all accessories can be built into an enclosure or in a front plate.
One N/PE neutral link is usually built in the enclosure or front plate. A place to mount additional neutral link is also available.

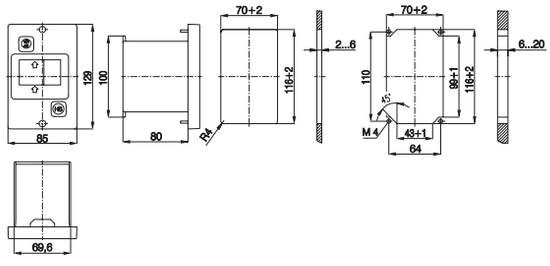
Type	Ordering No.
HO-55	MIS32 - HO-55
HO-41	MIS32 - HO-41
FP-55	MIS32 - FP-55

Dimensional drawing HO, FP

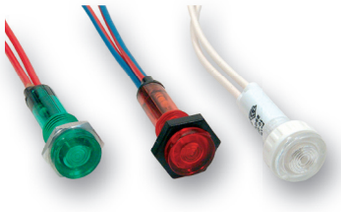
ENCLOSURE IP 41/55, HO-41/55



FRONT PLATE IP 41/55, FP-41/55



Signal lamp SS… 220,240,400V (B- white, R- red, Z- green)



Type	Ordering No.
SSB	MIS32 - SSB
SSR	MIS32 - SSR
SSZ	MIS32 - SSZ

Possibility ordering

- Relative auxiliary switch HRS, auxiliary flush type switch HSV
  VERSION: HRS 01, HRS 10, HSV 01, HSV 10

- EMERGENCY STOP PUSH-BUTTON NAT,
  is available also with a key.

- NEUTRAL LINK N/PE
  One N/PE neutral link is usually built in the enclosure or front plate. A place to mount additional neutral link is also available.

Multifunction time relay CRM - 91H - UNI

Universal supply voltage 10 functions:

- 5 time functions controlled via supply voltage
- 4 time functions controlled via control input
- 1 function of memory (latching) relay

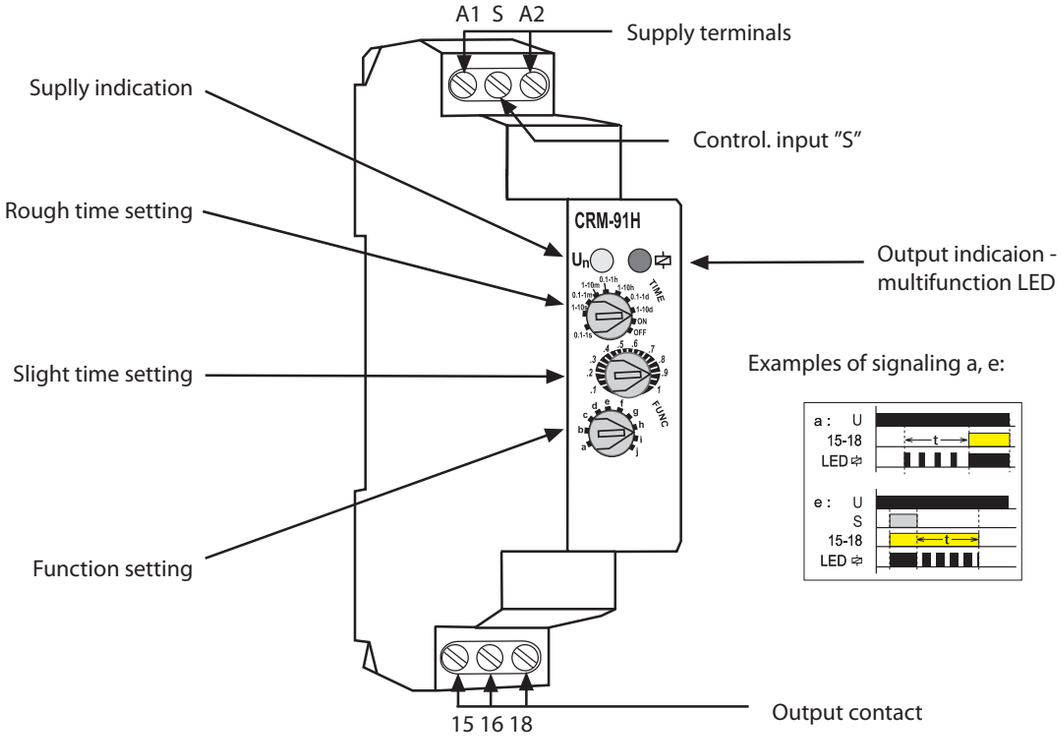
Time scale 0,1 s - 10 days devided into 10 ranges: (0,1s – 1s / 1s – 10s / 0,1min – 1 min / 1 min – 10min / 0,1h – 1 h / 1h – 10h / 0,1day – 1 day / 1day – 10days / only ON / only OFF). Output contact: 1 x 16A changeover.
Output indication:multifunction red LED flashing at certain states.

Technical data

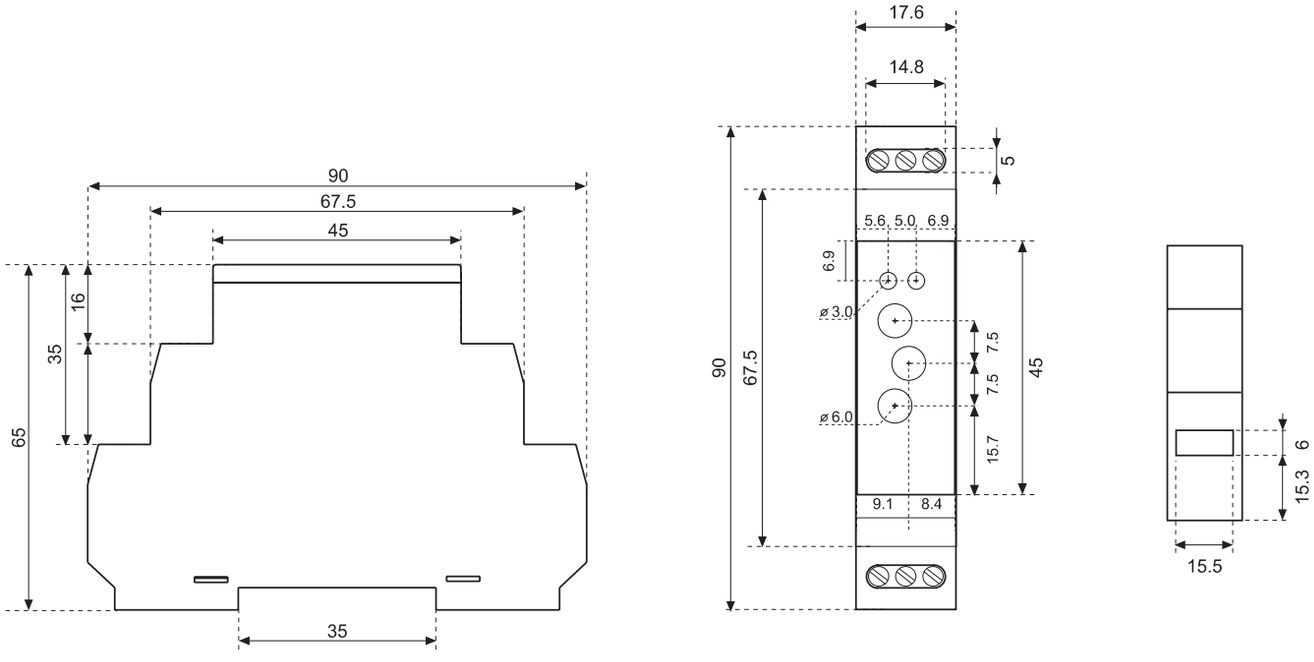
Number of functions	10
Supply	A1 - A2
Supply voltage	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Consumption	AC 0.7 3 VA / DC 0.5 1.7 W
Supply voltage tolerance	-15% ; +10%
Supply Indication	green LED
Time ranges	0,1 s - 10 Days
Time setting	rotary switch
Time deviation	5% mechanical setting
Repeat accuracy	0,2% - set value stability
Temperature coefficient	0,01% / °C, at 20°C
Output	
Changeover contacts	1
Rated current	16A / AC1
Breaking capacity	4000VA / AC1, 384 W/DC
Inrush current	30A / <3s
Switching voltage	250V AC1 / 24V DC
Min.breaking capacity DC	500 mW
Output indication	multifunction red LED
Mechanical life	3 x 107
Electrical life	0,7 x 105
Controlling	
Control voltage	AC/DC 12 - 240V
Consumption of input	AC 0,025 - 0,2VA / DC 0,1 - 0,7W
Load between S-A2	yes
Glow tubes	no
Control terminals	A1 - S
Impulse lenght	min. 25 ms / max. unlimited
Reset time	max. 150 ms
Operating temperature	-20 ... +55°C
Storing temperature	-30 ... +70°C
Electrical strenght	2,5kV
Operation position	optional
Mounting	EN 60715
Protection degree	IP40
Overvoltage cathegory	III.
Pollutiondegree	2
Max. cable size	2,5 mm^2
Dimension	90 x 17,6 x 65 mm
Weight	68 g
Standards	EN 61812-1, EN 50081, EN 61010-1

Order number	CRM91H0

Description



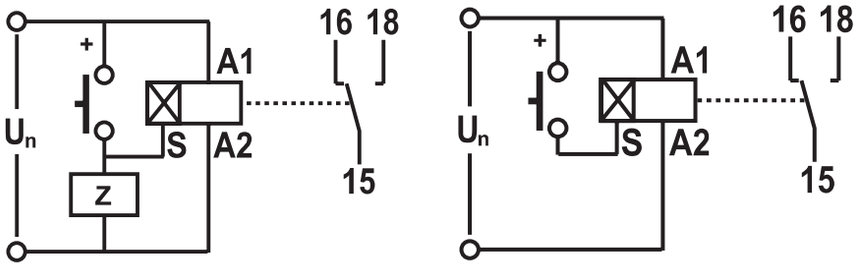
Dimensional drawing of CRM 91 H UNI

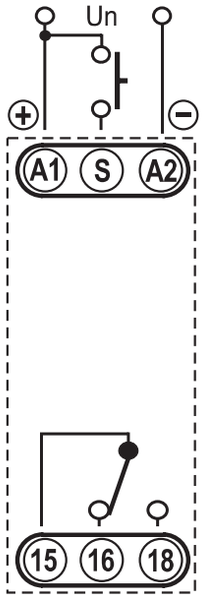


Connection scheme

Load with control. Input possible.

Load between S-A2 possible to connect in parallel way, without disturbing of proper operation of the relay.

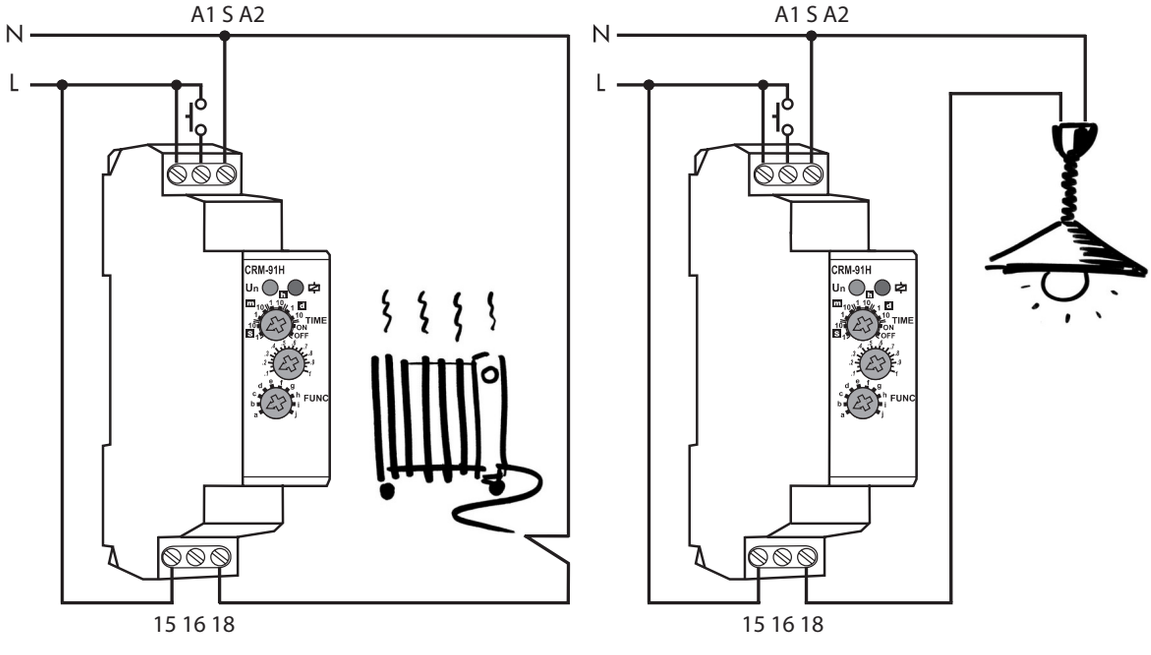




Examples of application:

For electrical appliances with the need
to change status by the exact timing:

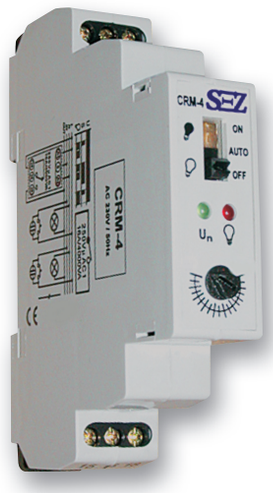
- lighting
- heating
- motors, pumps
- machines, mechanisms …



Supply voltage: AC 230V. Function delay OFF responding to make of control button – protection against fixing of button (for example with match).
Time range: 0,5 – 10 min. Operation switch: AUTO – normal function acc. to set time
OFF – permanent off (e.g. service of lights)
ON – permanent on (e.g. service)
Time setting via potentiometer. Output contact relay 16 Amp: load up tp 4000 VA / AC1. Glow-lamps in button possible.

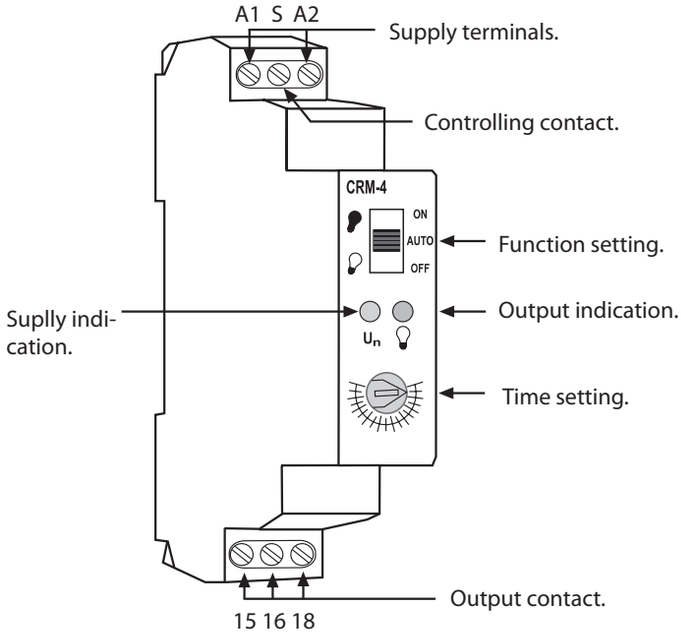
Technical data

Function	delay off
Supply	A1 - A2
Supply voltage	AC 230V / 50 60Hz
Consmption	AC max. 12VA / 1,8W
Supply voltage tolerance	-15%; +10%
Supply indication	green LED
Time ranges	0,5 - 10 min
Time setting	potentiometer
Time deviation	10% mechanical setting
Repeat accurancy	5% - set value stability
Temperature coeficient	0,05%/°C, at 20°C
Output	
Number of contacts	1 x changeover
Rated current	16A/AC1
Breaking capacity	4000VA/AC1, 384W/DC
Inrush current	30A/ <3s
Switching voltage	250V AC1 / 24V DC
Min. breaking capacity DC	500mW
Output indication	red LED
Mechanical life	3 x 107
Elektrical life	0,7 x 105
Controlling	
Control. voltage	AC 230V
Consumption of input	AC 0,53VA
Load between S-A2	yes
Glow tubes	yes, max. 20 pcs at 1mA
Control. terminals	A1 - S
Impulse length	min. 25 ms / max. unlimited
Reset time	max. 150 ms
Operating temperature	-20 ... +55°C
Storage temperature	-30 ... +70°C
Electrical strength	2,5kV
Operating position	optional
Mounting	DIN rail EN 60715
Protection degree	IP40 from the front panel
Overvoltage cathegory	III.
Pollution degree	2
Max. cable size	2,5 mm^2
Dimensions	90 x 17,6 x 65 mm
Weight	53 g
Standards	EN 61812-1, EN 50081, EN 61010-1

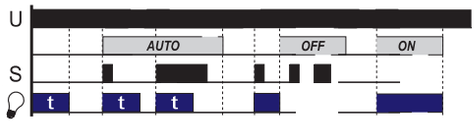


Ordering code	CRM4000

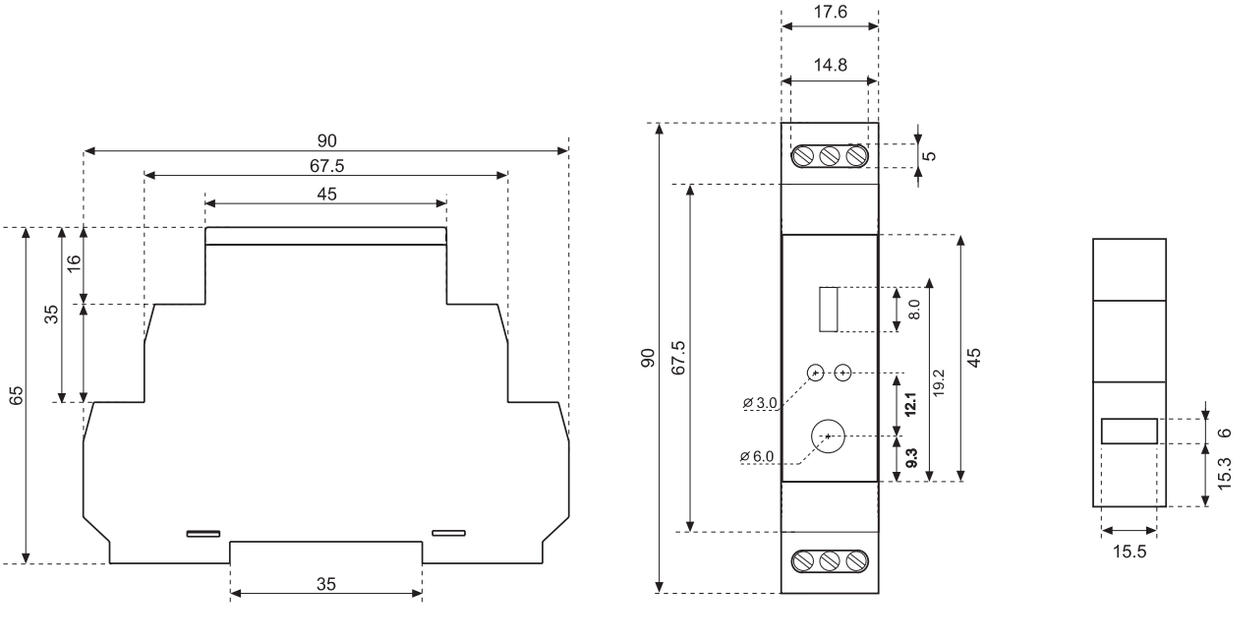
Description



Operation diagram

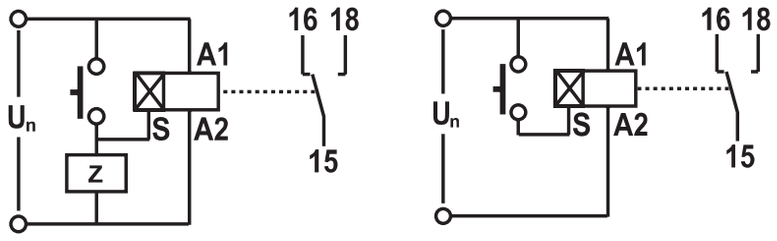


Dimensional drawing of CRM-4

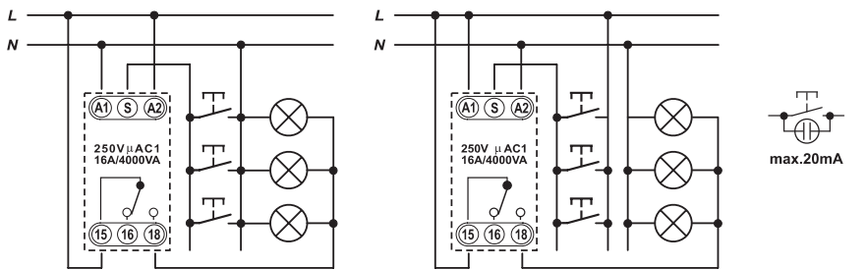


Connection scheme

Load between S-A2possible
(e.g. contactor, relay, signal lamps)

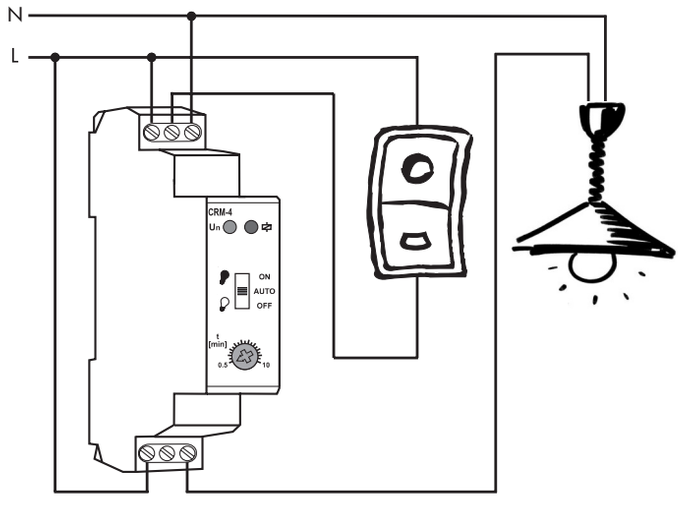


Circuit connection



Examples of application

- for multiway control on staicases, vestibules ...
- simple setting with possibility of permanent ON/OFF by the changeover switch on the front side of the device



Digital time switch SHT - 1/2

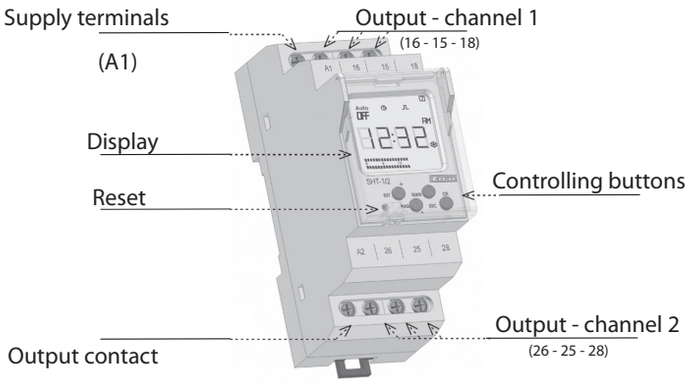
Digital time switch can be used for operating appliances in real time. You can easily set reqired program by using four buttons. You can use up to 100 memory places. Big illuminated display will enable you to quickly check the state of device and setting. Sealable cover will protect your setting agains undesirable manipulation.
Daily, weekly program in one device
Automatic conversion summer / winter time
Switching: according the program (AUTO)/constantly manually/manually to next program change/random (CUBE)
Supply voltage: AC 230 V or AC/DC 12 - 240 V
High accuracy due to special calibration in production
Sealable cover of frontal panel
„Holiday program": season selection option, when the device will not switch according the standart program, but will be blocked
Easy controlling via 4 buttons, clear LCD display, min. interval 1 s
Pulse/cyclic output, output contact: 1x changeover 16 A
2-MODULE, DIN rail mounting

Technical data

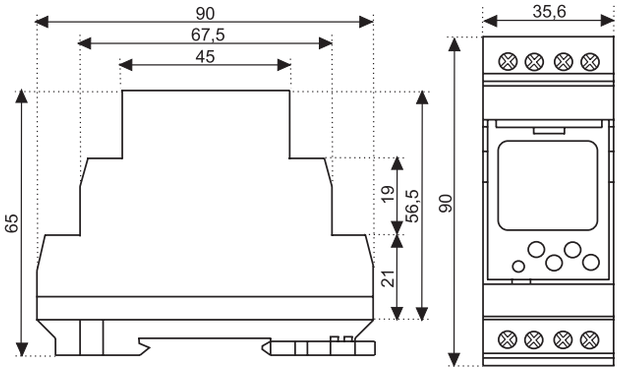
Supply terminals:	A1 - A2
Supply voltage (UNI):	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Consumption (UNI):	AC 0,5 - 2 VA / DC 0,4 - 2 W
Supply voltage (230):	AC 230 V / 50 - 60 Hz
Consumption (230):	AC max. 14 VA / 2 W
Supply voltage tolerance:	-15 %; +10 %
Back-up supply:	yes
Summer/winter time:	automatical
Output	
Number of contacts:	2x ($AgSnO_2$)
Rated current:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	30 A / <3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Mechanical life	> 3 x 107
Electrical life (AC1):	> 0,7 x 105
Time circuit	
Power back-up:	3 years
Accuracy:	max. +/- 1 s daily by 23 0C
Minimum interval:	1 min
Data stored for:	min. 10 years
Cyclic output:	1-99s
Fluctuating output:	1-99s
Program circuit:	
Number of data memory:	100
Program:	daily, weekly
Data readout:	LCD display, podsvietený
Display color:	orange
Other information	
Operating temperature:	-20 .. +60 0C
Storage temperature:	-30 .. +70 0C
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 20
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size:	without cavern max. 2 x 1,5 mm^2, 2 x 2,5 mm^2
	with cavern max. 2 x 1,5 mm^2, 1 x 2,5 mm^2
Dimensions:	90 x 35,6 x 64 mm
Weight:	UNI - 143 g, 230 - 125 g
Standards:	ČSN EN 61812-1, ČSN EN 61010-1

Ordering number	SHT - 1/2

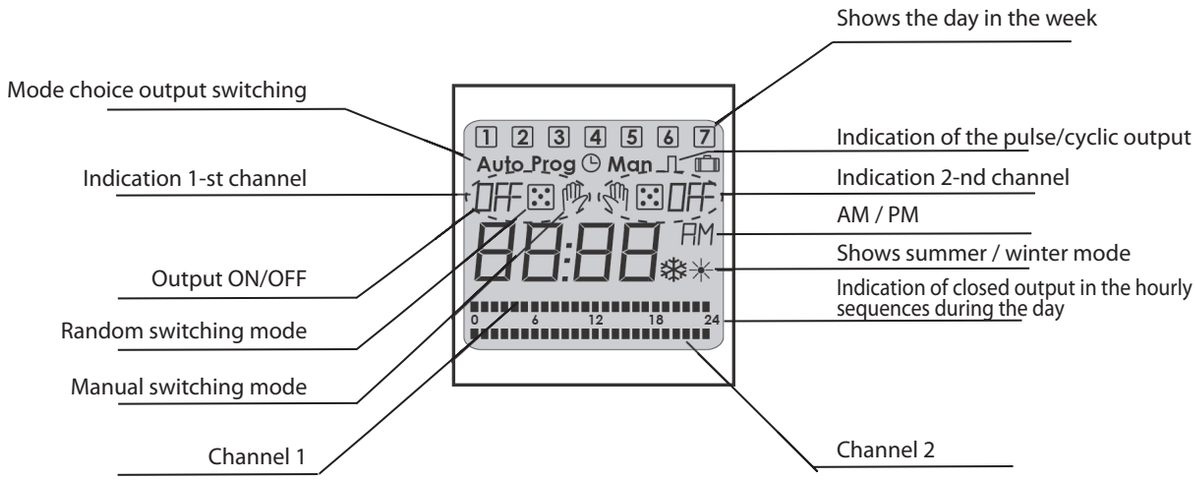
Description



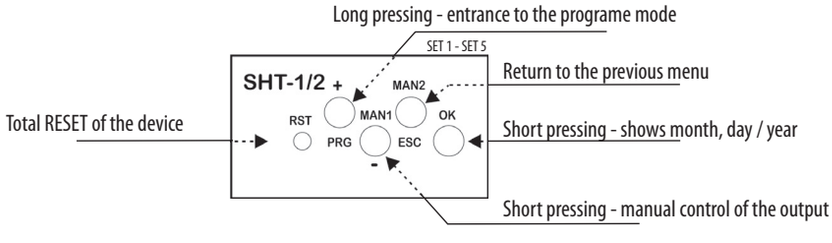
Dimensional drawing of SHT 1/2



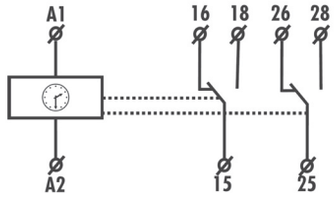
Description



Description of the control buttons and modes



Connection scheme



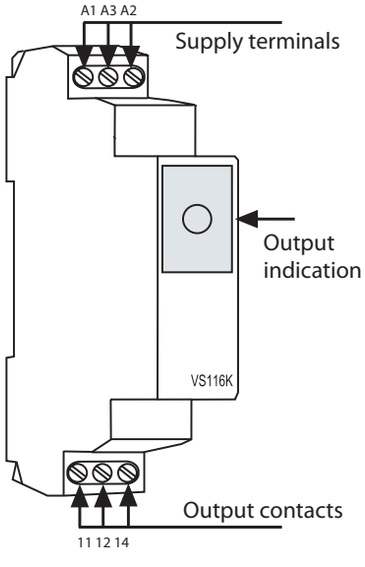
Power relay VS 116 K

Supply voltage: AC 230V and AC/DC 24V. Noiseless switching. Output contact: 1x 16A changeover. Highly luminous LED output indication. The possibility to choose the colour of output indication: red, green, yellow or white.

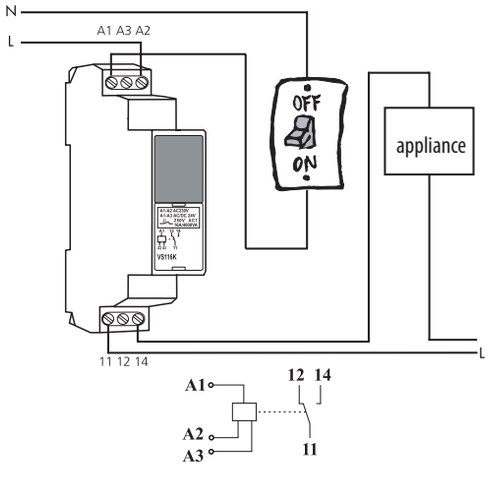
Technical data

Supply		A1 - A2
Supply voltage	230V	AC 230V / 50 - 60Hz
Consumption		AC max. 7,5VA / 1W
Supply	24V	A1 - A3
Supply voltage		AC/DC 24V (50-60Hz)
Consumption		AC 1VA/DC 1W
Supply voltage tolerance		-15%; +10%
Output		
Number of contacts		1 x changeover
Rated current		16A/AC1
Breaking capacity		4000VA/AC1, 384W/DC
Inrush current		30A/ <3s
Switching voltage		250V AC1 / 24V DC
Min. breaking capacity DC		500mW
Output indication		high intensity of LED
Mechanical life		3 x 107
Electrical life		0,7 x 105
Time between switches		min. 2s
Operating temperature		-20 ... +55°C
Storage temperature		-30 ... +70°C
Electrical strength		2,5kV
Operating position		optional
Mounting		DIN rail EN 60715
Protection degree		IP40 from the front panel
Overvoltage cathegory		III.
Pollution degree		2
Max. cable size		2,5 mm^2
Dimensiones		90 x 17,6 x 65 mm
Weight		58 g
Standards		EN 60669-2-2, EN 50081, EN 61010-1
Ordering code		VS116K0

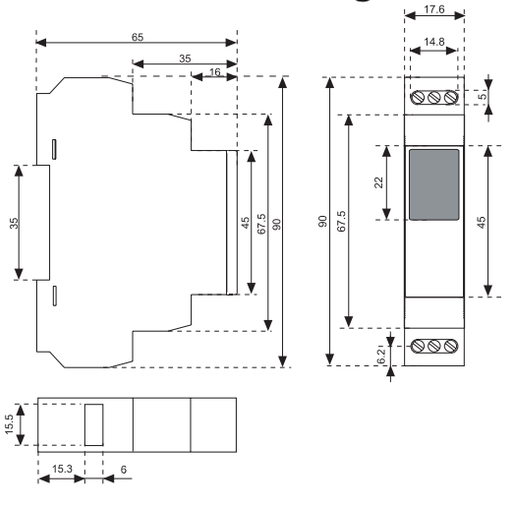
Description



Connection scheme



Dimensional drawing of VS 116 K



IKA 20, IKD 20, IKA 25, IKD 25, IK 40, IK 63

Installation contactors are applied for automatic control of eletric devices in installations of dwellings, offices shops and hospitals. They are particullary suitable for switching lighting, heat pumps, air-conditioning and similar equipment and are also intended for switching single phase and three phase electric motors. They excel in silent operation. Contactors can be built in electric distribution panels on 35 mm mounting rails (in compliance with EN 60715). Sealing of contactors cover is also possible. Coils of contactors IK22, IK24, IK40 and IK63 are DC driven with rectifier that enables DC or AC voltage control. Four-pole make contacts of a contactor can be applied as main or auxiliary contacts.

An auxiliary switch with two contacts can be attached:

- version 11 is provided with one make and one brake contact - 1NO+1NC
- version 20 is provided with two make contacts - 2NO

Technical data

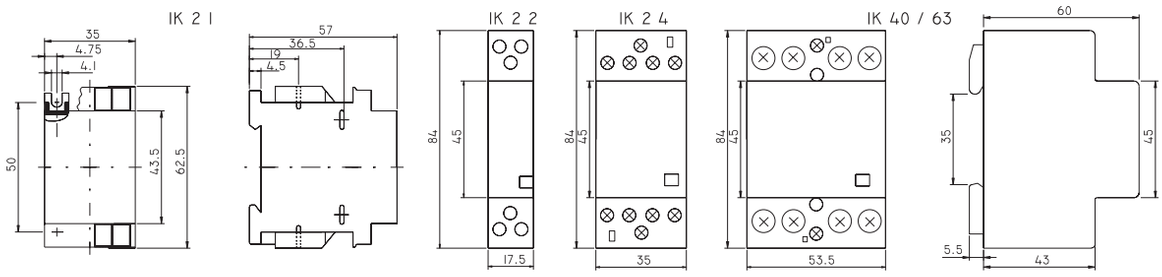
Type							IKA 20	IKD 20	IK 21	IKA 25	IKD 25	IK 40	IK 63	Aux. switch IKN ②
General	Standards						IEC 947-4-1, IEC 947-5-1, IEC 1095, EN 60 947-4-1, EN 60 947-5-1, EN 61 095, VDE 0660, VDE 0637							
	Permissible ambient temperature					°C	-5 ... +55						-5 ... +40	-5 ... +55
	Storage temperature					°C	+30 ... +80							
	Overvoltage protection					V	-	430	-	-	430	430	430	-
	Mechanical endurance (switching cycles)						3×10^6							
	Protection class to DIN 40 050, IEC 529						IP 20							
	Side-by-side assembly at υ_{0k}					40°C	no limitation							-
						55°C	no limitation						max. 3 contacts	-
Main contacts	Rated insulation voltage				U_i	V	440	440	415	440	440	500	500	440
					U_{imp}	kV	4	4	4	4	4	4	4	4
	Rated thermal current				I_{th}	A	20	20	20	25	25	40	63	6
	AC1	Rated operational current			I_e	A	20	20	20	25	25	40	63	-
		Operational power rating		230V		kW	4	4	7,5	9	9	16	40	-
	AC7a			400V			-	-	13	16	16	26	40	-
	AC3	Operational power rating		230V		kW	1,3 only for NO	1,3 only for NO	1,1	2,2	2,2	5,5	8,5	-
	AC7b			400V			-	-	2,2	4	4	11	15	-
	DC1	Rated operational current at:	1 pole	U_e=24V	I_e	A	20	20	20	25	25	40	63	-
				U_e=110V			1	1	2	2	2	4	4	-
				U_e=220V			0,5	0,5	0,5	0,5	0,5	0,8	0,8	-
			2 poles connected in series	U_e=24V			-	20	20	-	-	40	63	-
				U_e=110V			3	3	4	4	4	10	10	-
				U_e=220V			1,5	1,5	1,5	1,5	1,5	6	6	-
			3 poles connected in series	U_e=24V			-	-	20	-	-	40	63	-
				U_e=110V			-	-	6	6	6	40	35	-
				U_e=220V			-	-	2,5	2,5	2,5	20	30	-
			4 poles connected in series	U_e=24V			-	-	20	25	25	40	63	-
				U_e=110V			-	-	6	6	6	40	63	-
				U_e=220V			-	-	3,5	3,5	3,5	40	63	-
	Electrical endurance at 230/400V	AC1				working cycles	200.000	200.000	200.000	200.000	200.000	100.000	100.000	-
		AC3					300.000	300.000	300.000	500.000	500.000	150.000	150.000	-
		AC5a High pressure vapour lamps					100.000 at 32 µF	100.000 at 32 µF	100.000 at 32 µF	100.000 at 32 µF	100.000 at 32 µF	100.000 at 32 µF	100.000 at 32 µF	-
		AC5b Incandescent lamps					-	-	50.000 at 1,5 kW	50.000 at 1,5 kW	20.000 at 1,5 kW	100.000 at 4 kW	100.000 at 6 kW	-
		AC7a Resistive household devices					200.000	100.000	200.000	200.000	200.000	100.000	100.000	-
		AC7b Inductive household devices					300.000	300.000	300.000	500.000	500.000	150.000	150.000	-
	Maximum operating frequency					p.c/h	600	600	360	600	600	120	120	600
	Stray power per current path					W	1,7	1,7	2	2,2	2,2	4	8	-
	Back-up fuse gL max. rating					A	20	20	25	35	35	63	80	6

Maximum number of lamps per pole

Type		IKA 20	IKD 20	IK 21	IKA 25	IKD 25	IK 40	IK 63
Light bulbs	60 W	21	21	25	25	25	65	85
	100 W	13	13	15	15	15	40	50
	200 W	7	7	7	7	7	20	25
	500 W	3	3	3	3	3	8	10
	1 000 W	1	1	1	1	1	4	5
Energy staring lamps	7 W	10	10	15	15	15	100	150
	11 W	10	10	15	15	15	100	150
	15 W	5	5	15	15	15	100	150
	20 W	3	3	10	10	10	70	70
Halide discharge lamp	200 W	-	-	5	5	5	15	20
	300 W	-	-	3	3	3	10	13
	500 W	-	-	2	2	2	6	8
	1 000 W	-	-	1	1	1	3	4
Low-pressure sodium discharge lamp (noncompensated)	35 W	5	5	6	6	6	13	20
	55 W	5	5	6	6	6	13	20
	90 W	3	3	4	4	4	9	14
	135 W	2	2	3	3	3	6	9
	180 W	3	3	3	3	3	6	9
High-pressure sodium discharge lamp (noncompensated)	50 W	12	12	12	12	12	24	38
	70 W	10	10	10	10	10	20	30
	110 W	8	8	7	7	7	16	25
	150 W	6	6	5	5	5	10	16
	250 W	3	3	3	3	3	6	10
	400 W	2	2	2	2	2	4	6
	1 000 W	1	1	-	-	-	2	3
Low-pressure sodium discharge lamp (compensated)	35 W	1	1	1	1	1	10	16
	55 W	1	1	1	1	1	10	16
	90 W	-	-	1	1	1	8	12
	135 W	-	-	-	-	-	4	7
	180 W	-	-	-	-	-	4	7
High-pressure sodium discharge lamp (compensated)	50 W	3	3	3	3	3	22	33
	70 W	2	2	2	2	2	18	27
	110 W	2	2	2	2	2	18	27
	150 W	1	1	1	1	1	10	16
	250 W	-	-	1	1	1	6	9
	400 W	-	-	-	-	-	4	7
	1 000 W	-	-	-	-	-	2	3
Fluorescent tubes (non-compensated)	18 W	24	24	24	24	24	45	70
	36 W	17	17	20	20	20	45	70
	58 W	10	10	13	13	13	25	43
Fluorescent tubes (compensated)	18 W	6	6	8	8	8	45	70
	36 W	6	6	8	8	8	45	70
	58 W	4	4	5	5	5	25	43
Fluorescent tubes (duo-connection)	18 W	2x22	2x22	2x48	2x48	2x48	2x100	2x150
	36 W	2x17	2x17	2x24	2x24	2x24	2x65	2x95
	58 W	2x10	2x10	2x15	2x15	2x15	2x40	2x60
Fluorescent tubes with electronic ballast	1x18 W	22	22	30	15	15	60	80
	1x36 W	12	12	16	14	14	30	42
	1x58 W	8	8	12	12	12	22	30
	2x18 W	23	23	32	13	13	40	48
	2x36 W	12	12	16	9	9	20	26
	2x58 W	7	7	10	7	7	10	18

IKA 20, IKD 20, IKA 25, IKD 25, IK 40, IK 63

Dimensional drawing of IK



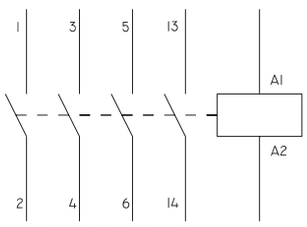
Type	Ordering Nr.
IKA20, 20/220/230V, 50/60	IKA20020
IKA25, 40/220/230V, 50/60	IKA25020
IKD20, 02/220/230V, 50/60	IKD20002
IKD20, 10/220/230V, 50/60	IKD20010
IKD20, 11/220/230V, 50/60	IKD20011
IKD20, 20/24	IKD2002/24
IKD20, 20/220/230V, 50/60	IKD20020
IKD25, 04/220/230V, 50/60	IKD25004
IKD25, 22/220/230V, 50/60	IKD25022
IKD25, 31/220/230V, 50/60	IKD25031
IKD25, 40/220/230V, 50/60	IKD25040
IK21, 10/220/230V, 50	IK21010
IK21, 01/220/230V, 50	IK21001
IK40, 40/220/230V, 50/60	IK40040
IK40, 31/220/230V, 50/60	IK40031
IK40, 22/220/230V, 50/60	IK40022
IK40, 04/220/230V, 50/60	IK40004
IK63, 40/220/230V, 50/60	IK63040
IK63, 31/220/230V, 50/60	IK63031
IK63, 22/220/230V, 50/60	IK63022

Ordering data

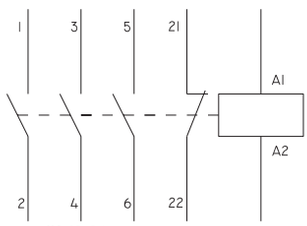
IK63 - 40 / 220

- Control voltage
- Arrangement of contacts
- Amper value
- Type

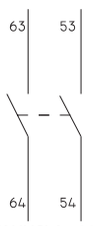
Contacts scheme



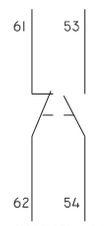
IKD 25-40 IK 24-40
IK 63-40
IKA 25-40



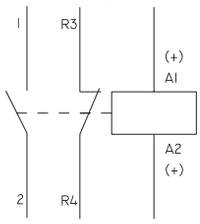
IK 63-31



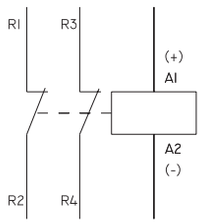
IK HHSLA - 20



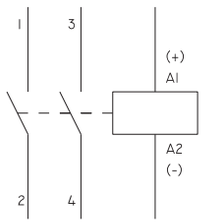
IK HHSL - 20



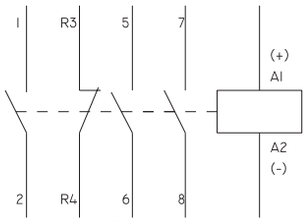
IKD 20 - 11



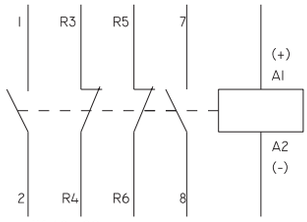
IKD 20 - 02



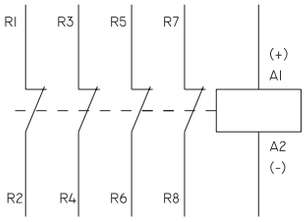
IKD 20 - 20
IKA 20 - 20



IKD 25 - 31
IK 40 - 31
IK 63 - 31



IK 40 - 22
IK 63 - 22



IKA 25 - 40
IK 40 - 04
IKD 25 - 04

Ensure protection of electrical components against surge voltages generated by:

- induced lightning surges
- commutation of transformers (in power supply companies)
- surges due to switching of high loads (motors, mechanisms)

Transient high voltages may damage, degrade or even destroy electronic components. They may disturb correct function of data transmissions and cause nuisance tripping of devices.

Action: Electronic components take very high voltages (≥ 1kV) with very low resistance. The components are built-in in a differential way (between the lines) and in common (between line and earth).

Failure indication:

- either by tripping of the upstream circuit breaker (short circuit caused by the device)
- or by tripping of the main RCD (earth leakage current generated by the device

In both cases, the surgeguard has to be replaced.

PROTEC B, B2

Class (IEC):	I, II
Usage:	Protection against partial direct and indirect atmospheric discharges. As a protective element a varistor is used. Therefore, no follow current (IF) is present. It is intended for protection in zones 0A – 1.
Location of use:	Main distribution boards.
Thermal protection:	In case of arrester damage, the thermal protection disconnect it from the line (no interruption of power supply), PROTEC B consists of 2 separate disconnecting devices, which optically signalizes failure of one or both varistor couplings. This solution enables, that in spite of one varistor coupling failure, the other coupling is still in function.
Varistor mod. replacement:	PROTEC B2. A base remains on a DIN rail.
Tested to:	IEC – 61643 – 1

PROTEC C

Class (IEC):	II
Usage:	Protection against overvoltages. As a protective element a varistor is used. Therefore, also at this module no follow current (IF) is present. It is intended for building-in in zones 0B – 1. But it has to be coordinated with lightning conductors.
Location of use:	Sub-distribution boards or as close to the protected device as possible.
Thermal protection:	In case of arrester damage, the thermal protection disconnect it from the line (no interruption of power supply). PROTEC C contains a disconnecting device, which optically signalizes a varistor failure.
Varistor mod. replacement:	Yes. A base remains on a DIN rail.
Tested to:	IEC – 61643 – 1

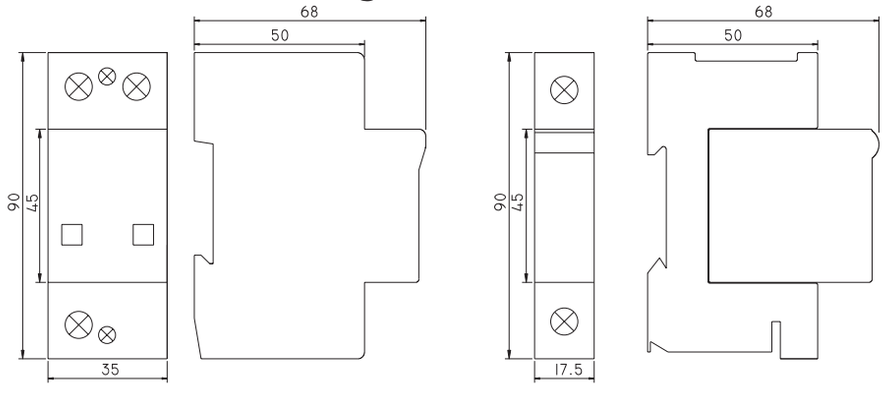
PROTEC D

Class (IEC):	III
Usage:	Protection against overvoltages in induction loops. As a protective element a varistor is used. It is intended for building-in in zones 1 – 2 next to protected device.
Location of use:	As close as possible to the protected device.
Thermal protection:	In case of arrester damage the thermal protection disconnect it from the line (no interruption of power supply). PROTEC D contains a decoupling device, which optically signalizes a varistor failure.
Varistor mod. replacement:	Yes. A base remains on a DIN rail.
Tested to:	IEC – 61643 – 1

Technical data

Type		PROTEC B 150/320	PROTEC B2 60/320	PROTEC C 40/320	PROTEC D 10/320	PROBLOC 10/350
Max. permitted operating voltage	U_c	320/420 V	320/420 V	320/420 V	320/420 V	320/420 V
Nominal discharge current (8/20)	I_n	70 kA	30 kA	15 kA	3 kA	40 kA
Max. discharge current (8/20)	I_{max}	150 kA	60 kA	30 kA (1 x 40 kA)	6 kA (1 x 10 kA)	80 kA
Max. discharge current (10/350)	I_{imp}	25 kA	10 kA	–	–	12,5 kA
Protection level U_p	at I_n (8/20)	1,8 kV	≤ 1,4 kV	≤ 1,4 kV	1 kV	< 1,6 kV
	at I_{imp} (10/350)	1,1 kV	–	–	–	< 1,2 kV
Response time	t_A	< 25 ns				
Back-up fuse (if mains > 100A)		250 AgL	160 AgL	100 AgL	100 AgL	250 AgL
Short-circuit capability to		25kA / 50Hz				
Temperature		- 40°C ... + 80°C				
Cross-section of connection		single-strand – 35 mm², multistrand – 25 mm²				
Protection degree		IP20				
Casing material		termoplastic, exting.degree 5VA	thermoplastic, extinguishing degree V- 0			
Ordering code		PCB150320	PCB260320	PCB040320	PCB010320	PROBLOC/B

Dimensional drawing of Protec

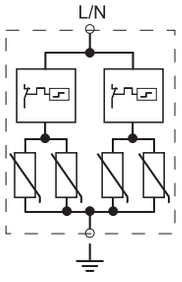


Protec B

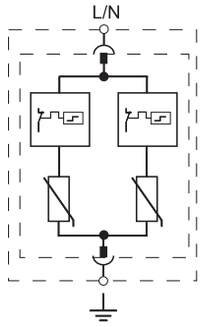
Protec B2, C, D

Circuit diagram

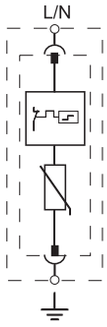
Protec B 150/320



Protec B2 60/320

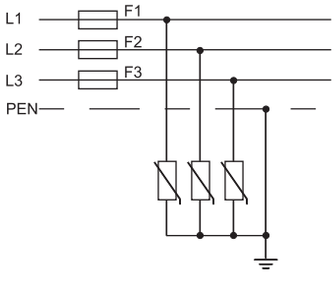


Protec C 40/320,
Protec D 10/320

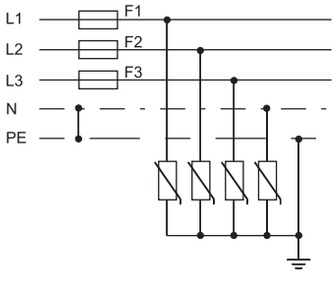


Connection in LW networks

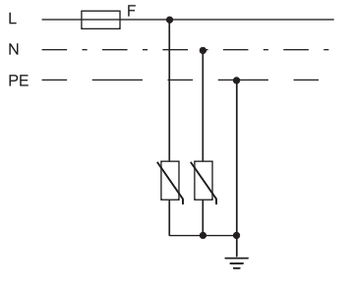
TN-C network 230/400 V



TN-S network 230/400 V



TN-S network 230 V



RECOMMENDATIONS TO DESIGN, INSTALLATION AND MEASUREMENT

General

- Potection of buildings and electrical equipment against lightning effects and overvoltage is carried out both outside and inside the building. External protection devices include lightning traps, conductor arresters, earthing systems, discharge arresters etc. Internal protection measures include equipotential bonding, screening etc.
- The basis of internal protection against lightning effects and overvoltage is protective equipotential bonding i.e. connection of all metallic wiring to an equipotential EP busbar (EP – equipotential point). This eliminates potential differences in the wiring over a permissible limit with subsequent damaging discharge.
- Lightning current arresters and surge voltage arresters are the elements of internal protection. They connect power cables to the EP busbar indirectly through arrester gaps and varistors and thus reduce overvoltage. The overvoltage reduction is normally carried out in 3 stages. Each stage shall reduce overvoltage to a level defined by IEC 664-1 for overvoltage categories. The arresters of stages 1 to 3 are installed on the interface of individual overvoltage categories.

• **Stage 1 – coarse protection – type 1**
This protection is provided lightning current arresters, which arrest the biggest part of the overvoltage wave, and must be able without damage to divert lightning currents or their substantial parts. It is possible to deduct from IEC 61312-1 and IEC 61024-1 that in the most adverse case with 2 or 4-wire power lead the lightning current arresters must arrest 50 kA per pole or 25 kA per pole of impulse current with the waveform 10/350 µs. Such parameters can only be achieved with the devices designed on the arrester gap basis.
• **Stage 2 – medium protection – type 2**
This protection is provided by varistor-based surge voltage arresters, which must be able to divert without damage atmospheric surges or overvoltage from switching processes in the network with waveform 8/20 µs. Under corresponding conditions they can be installed without the front-end 1st stage e.g. in the main switchboard. However in most cases they are installed after the lightning current arresters, which reduce overvoltage and "cut down" the energy of the overvoltage wave. Surge voltage arresters are rated at a specific heat output. If there is high power or too frequent overvoltage in the network, the heat output can be exceeded and the surge voltage arrester is disconnected by its disconnecting device. After disconnection the surge voltage arresters are nonfunctional and must be replaced. The disconnection is indicated both optically and remotely. In insulation measurement it is necessary to disconnect the arresters from the earth to get undistorted results.
• **Stage 3 – fine protection – type 3**
To ensure really reliable protection it is necessary to complement the above types 1 and 2 by the last one – type 3. The basic elements of the fine protection are varistors and suppressor diodes able to divert the overvoltage with waveform 8/20 µs. It is recommended to install this protection directly at the protected appliance, without a long cable between the arrester and the appliance. Otherwise, when a long cable is installed between the last stage and the appliance, voltage may rise in the conductors over a permissible level (e.g. due to induction).

RECOMMENDATIONS TO DESIGN, INSTALLATION AND MEASUREMENT
INSTALLATION OF OVERVOLTAGE PROTECTIONS

1. Installation of lightning current arresters – T1
Lightning current arresters, i.e. the arresters of type 1, are installed above all in the main switchboard on the DIN rail. Installation of the lightning current arresters in metering switchboards shall be approved by relevant power distribution companies.

2. Installation of surge voltage arresters – T2
Surge voltage arresters T2 are installed on the DIN in:
- subdistribution switchboard after the lightning current arrester at the length of the line between T1 and T2 ≥ 10 m: it is possible to use any surge voltage arrester of type 2
- main switchboard together with the lightning current arrester or in the subdistribution switchboard after the lightning current arreste.
- main switchboard separately under corresponding conditions (without backup lightning current arrester)

3. Installation of surge voltage arresters – T3
The arresters are installed either on the DIN rail or in a wiring box or raceway. If the length of the line between T2 and T3 < 5 m, it is not necessary to use T3 – protection is suffi ciently provided by the surge voltage arrester T2. Surge voltage arresters of 3rd stage can be connected to the line both continuously (see wiring diagram example 3b) and transversely (see wiring diagram example 3a). Transverse connection to the line is advantageous in particular if the current flowing through the line is higher than the permitted loading current IL of the surge voltage arrester T3.

PROTECTION OF OVERVOLTAGE PROTECTIONS

1. Protection of lightning current arresters – T1
Protection can be implemented in two ways:

- Protection only by fuses F1 in service box, if F1 correspond to the values stated in the table of technical parameters of given type. However if in such wiring there are leakages and follow short-circuit currents, though the arresters are able to quench the follow short-circuit current, F1 may blow with subsequent interruption of the power supply in the building.
- Use of fuses F2 in addition to F1 if the latter are too big or if you do not want to interrupt the power supply so frequently. In this case selectivity must be ensured between F1 and F2 i.e. InF1 ≥ 1.6xInF2 In these ratios of rated currents the fuse F2 will cut out sooner than F1, and the power supply will not be interrupted so frequently. However the values InF2 may be low, and F2 will blow more frequently. For this reason it is recommended to equip the fuse F2 with a signalling device.

2. Protection of surge voltage arresters – T2
The previous paragraph applies also to the protection of surge voltage arresters. The surge voltage arresters however do not quench the follow current; the varistor increases its resistance after the conduction of the current impulse into the earth until earth-leakage current ceases to flow through the surge voltage arrester due to big resistance of the varistor.

3. Protection of surge voltage arresters – T3
Surge voltage arresters shall be protected by circuit breakers or fuses gG/gL max. 20 A and 16 A respectively.

4. Protection of arresters for connection "3+1"
Arresters for connection between N and PE conductors, i.e. the arrester for the first stage andfor the second stage are not protected separately, because their protection is already provided by the fuses F1, F2 and F3.

Selection of the number of protection stages and types

BUILDING EXPOSURE

BIG	MEDIUM	SMALL
power plants, hospitals, industrial buildings, public buildings with high number of visitors etc.	individual housing units, family houses in highdensity development etc.	individual housing units, family houses in highdensity development etc.
or	and at the same time	and at the same time
buildings in mountain regions, free-standing buildings, buildings close to HV and EHV lines etc.	buildings in high-density development comparable with or not exceeding the other buildings	buildings in high-density development enclosed by many higher buildings
or	and at the same time	and at the same time
buildings with external lightning protection (lightning conductor), with outdoor power supply, grounded roof superstructure (aerial) etc.	buildings with connection by a short overhead line from power supply transformer (tens of meters)	buildings in high - density development with buried cable supply lead

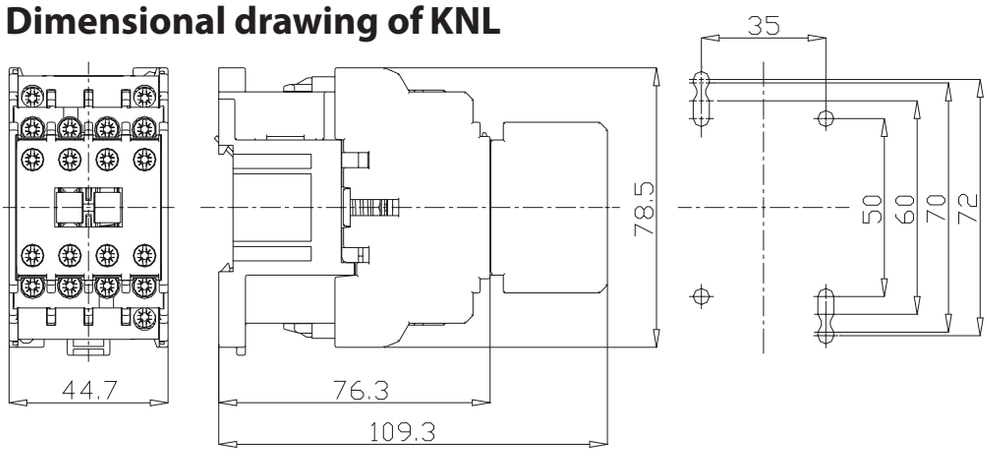
Appliance sensitivity to overvoltage

BIG - PC, TV, Hi-Fi system etc. T1 + T2 + T3 T2 + T3 T2 + T3
MEDIUM – washing machines, refrigerators etc. T1 + T2 + T3 T2 T2
SMALL – motors, fans etc. T1 +T 2 T2 T2

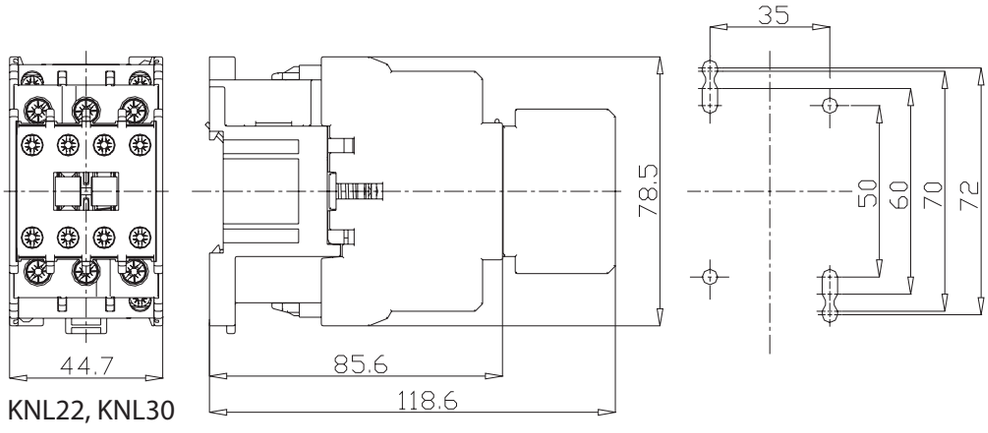
KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

- Adaptable to various control requirements with ability of mounting from one to four additional auxiliary contacts.
- Versatile product capable of adaptation to different control requirements with capability of mounting from one to four additional auxiliary contacts (just for KNL6).
- Capability of incorporating RC suppressor to prevent voltage peaks at switch-off of control coil.
- Uniform marking of connection terminals in compliance with EN 50005 and EN 50011.
- Covered terminals - finger protection according to VDE 0106 and BGA 2.
- Capability of quick fitting to 35 mm wide mounting rail according to EN 60715.
- Open and funnel-shaped connection terminals - providing fast and simple connection.
- Combination head screws; standard or posidrive screwdrivers can be used.
- Specially shaped contact surfaces - high contact reliability even at low voltages (just for KNL6 and auxiliary contacts for KNL9 - KNL30).
- Uniform and easily exchangeable coils for the whole system.
- Mechanical interlock is possible for KNL9 - KNL30.
- Possibility of individual marking on a special plate - simple identification of a contactor in the circuit.
- Auxiliary contacts make or break which also serve as pushbuttons (just for KNL9 - KNL30).
- Uniform contactor width - 45 mm.
- Third coil terminal.

Dimensional drawing of KNL

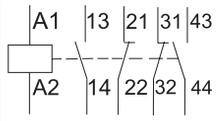
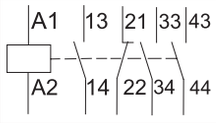
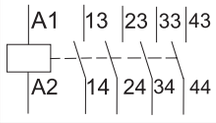


KNL6, KNL9, KNL12, KNL16, KNL18



KNL22, KNL30

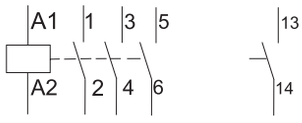
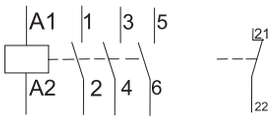
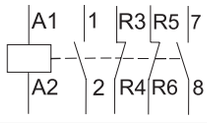
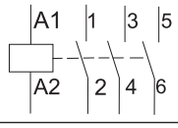
Contactor relays

Type / Ord. Nr.	Arrangement of contacts and terminal designation	AC-15 Rated operational current I_e				Conventional thermal current I_{th}
		230V	400V	500V	690V	
KNL6-22		6A	4A	2A	1A	20A
KNL6-31						
KNL6-40						

Contactor relays

Standards	VDE 0660, IEC/EN 60947-5-1					
Approvals	UL					
Climatic class	Damp heat, constant, acc. to IEC 60068-2-78					
Ambient temperature	open	°C	- 25 . . . + 55			
	enclosed	°C	- 25 . . . + 40			
Weight		g	300			
Rated insulation voltage	U_i	V	690			
Conventional thermal current I_{th} = rated						
Operating current Ie at AC-1	I_{th}	A	20			
Rated operating current AC-15	U_e	V	230	400	500	690
	I_e	A	6	4	2	1
Rated operating current DC-13	U_e	V	24	60	110	220
	I_e	A	10	4	0,9	0,4
Short-circuit protection - max. current of fuse	I_v	A	20			
Coil consumption	switch-on	VA	66			
	P_c	W	48			
	operation	VA	8			
		W	2,5			
Standard AC control voltages 50/60 Hz			24			
	U_c	V	110/125			
			220/224			
			380/415			
Operating range	U_c	%	85 . . . 110			
Operating position	Mounting to vertical or horizontal level, permitted deviation ±20°					
Maximum operating frequency		op. c./h	6000			
Endurance	mechanical	op. c.	10 x 106			
	electrical	op. c.	see diagram 1			
Terminal capacity	flexible S	mm^2	0,75 . . . 4			
	flexible S	mm^2	0,5 . . . 2,5			

MOTOR CONTACTORS

Type Conventional	Arrangement of contacts and terminal designation	Auxiliary contacts	AC-3 Rated power of threephase motors - normal load Pm (kW)				thermal current I_{th}
			230V	400V	500V	690V	
KNL9-10 KNL12-10 KNL16-10 KNL-18-10			2,2	4	5,5	5,5	
			3	5,5	5,5	5,5	25
			4	7,5	7,5	7,5	
			4	9	9	9	32
KNL9-01 KNL12-01 KNL16-01 KNL18-01			2,2	4	5,5	5,5	
			3	5,5	5,5	5,5	25
			4	7,5	7,5	7,5	
			4	9	9	9	32
KNL9-22sp41 KNL12-22sp41 KNL16-22sp41			1,5	-	-	-	
			1,5	-	-	-	25
			2,2	-	-	-	
KNL22-00 KNL30-00			5,5	11	11	11	35
			7,5	15	15	15	35

1 Single phase
Special versions of KNL9-10sp4, KNL12-10sp4 and KNL16-10sp4 are also available (4 main contacts).

Standard AC control voltages:

Volts	24	42	48	110/125	220/240	380/415	440	480/520
50/60 Hz	B7	D7	E7	F7	M7	Q7	R7	S7

MOTOR CONTACTORS

Type				KNL9	KNL12	KNL16	KNL18	KNL22	KNL30
Standards				IEC/EN 60947-4-1, VDE 0660					
Approvals				UL, CSA					
Climatic class				Damp heat, constant, acc. to IEC 60068-2-78					
				Damp heat, cyclic, acc. to IEC 60068-2-30					
Ambient temperature		open	°C	- 25 . . . + 55					
		enclosed	°C	- 25 . . . + 40					
Weight			g	300				320	
Rated insulation voltage		U_i	V	690					
Conventional thermal current		I_{th}	A	25	25	25	32	35	35
AC-3 Rated power of threephase				2,2	3	4	4	5,5	7,5
motors - normal load		P_m	kW	4	5,5	7,5	9	11	15
	500 V			5,5	5,5	7,5	9	11	15
	690 V			5,5	7,5	7,5	9	11	15
AC-4 Rated power of threephase				0,75	1,1	1,5	1,5	2,2	4
motors - heavy load		P_m	kW	1,5	2,2	3	3	4	6,5
	500 V			1,5	2,2	3	3	4	6,5
	690 V			1,5	2,2	3	3	4	6,5
Electrical endurance of contacts	AC-3			see diagram 2					
	AC-4			see diagram 3					
Rated operational current DC-1	1			15 / 6 / 4				28 / 7 / 4	
at: 24/110/220 V	2			18 / 12 / 8				30 / 23 / 13	
DC-2, DC-3	3		A	20 / 15 / 10				30 / 25 / 20	
	1			12 / 2 / 0,75				18 / 2 / 1	
1) numbers of poles in series DC-4	2			15 / 8 / 1,5				23 / 13 / 2	
DC-5	3			18 / 12 / 6				28 / 18 / 9	
Mechanical endurance			op. c.	107					
Short-circuit protection - max. fuse rating gL		I_v	A	25	25	35	35	50	50
Terminal capacity	rigid	S	mm^2	0,75 . . . 4				2,5 . . . 10	
	flexible	S	mm^2	0,5 . . . 2,5				1,5 . . . 6	

KNL6, KNL9, KNL12, KNL16, KNL18, KNL22, KNL30

Type					KNL9	KNL12	KNL16	KNL18	KNL22	KNL30
AUXILIARY CONTACTS	Rated insulation voltage		U_i	V	690					-
	Conventional thermal current									
	I_{th} = rated operational current I_e at AC-1		I_{th}	A	20					-
	AC-15 Rated operational current	230 V	I_e	A	6					-
		400 V			4					-
		500 V			2					-
		690 V			1					-
	DC-13 Rated operational current	24 V	I_e	A	10					-
		60 V			4					
		110 V			0.9					-
		220 V			0.4					-
	Short-circuit protection - max. fuse rating gL		I_v	A	20					-
	Terminal capacity	rigid	S	mm^2	0,75 . . . 4					
		flexible	S	mm^2	0,5 . . .2,5					
MAGNETIC SYSTEM	Coil consumption	switch-on	P_c	VA	66					
				W	48					
		operation	P_c	VA	8					
				W	2.5					
	Standard AC control voltages 50/60 Hz				24					
			U_c	V	110/125					
					220/224					
	Operating range		U_c	%	80...110					
	frequency - max.			op. c./h	3000					
	Operating position				Mounting on vertical or horizontal level, permitted deviation ± 20°					

Diagram 1

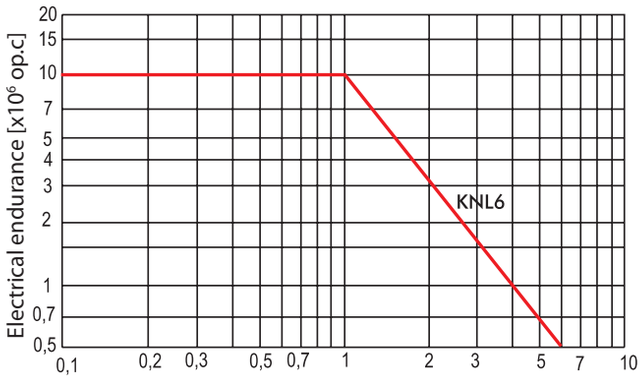


Diagram 2

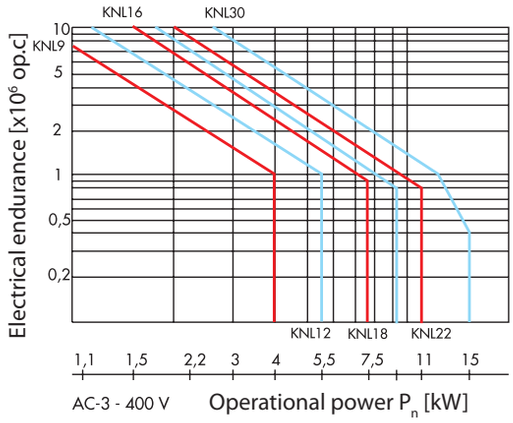
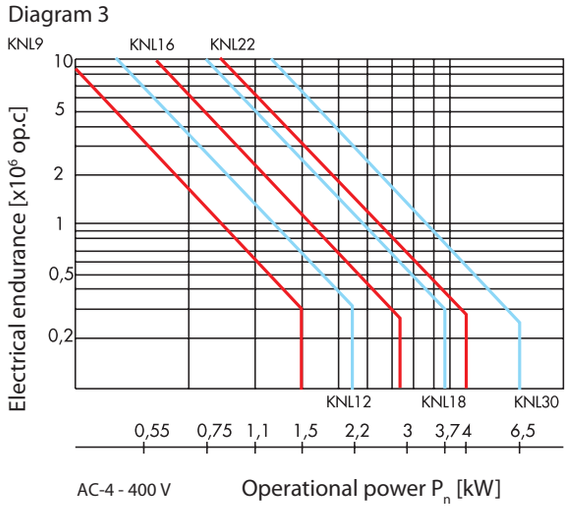


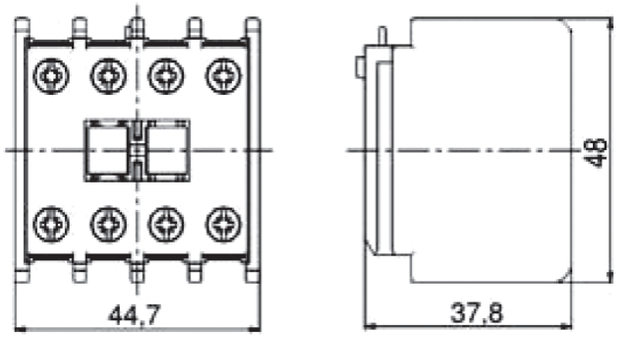
Diagram 3



Auxiliary contact NDL

Two- and four-pole auxiliary contact modules
(mounting on basic contactor) NDL1, NDL2, NDL3

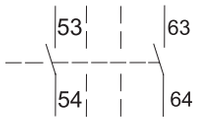
Dimensional drawing NDL



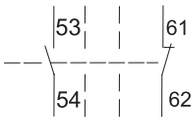
Type / Ord. Nr.	Version	AC 15 Rated operational current I_e (A)			
NDL1 (for KNL6)	20, 11, 02, 40, 31, 22, 13, 04	230 V	400 V	500 V	690 V
NDL2 (for KNL9, KNL12,KNL16, KNL18)	11, 02, 22, 31, 13, 40, 04	6	4	2	1
NDL3 (for KNL22, KNL30)	11, 02, 22, 31, 13	6	4	2	1

Connecting programs

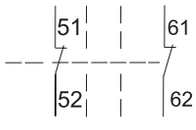
NDL1-20



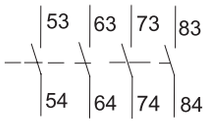
NDL1-11



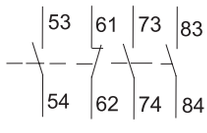
NDL1-02



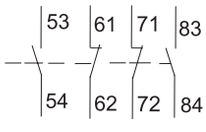
NDL1-40



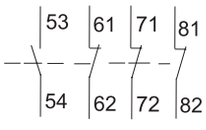
NDL1-31



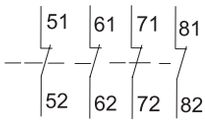
NDL1-22



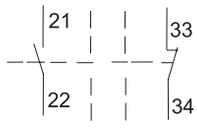
NDL1-13



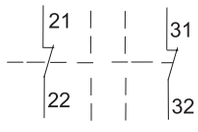
NDL1-04



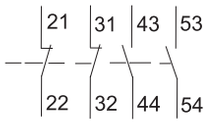
NDL2-11



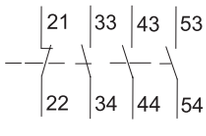
NDL2-02



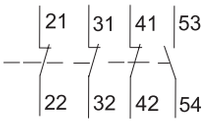
NDL2-22



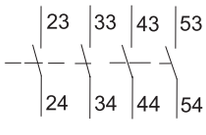
NDL2-31



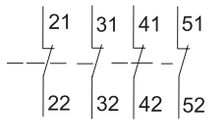
NDL2-13



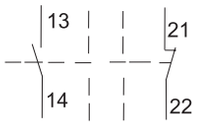
NDL2-40



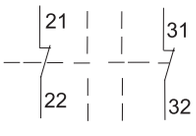
NDL2-04



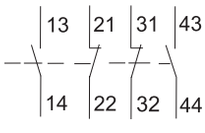
NDL3-11



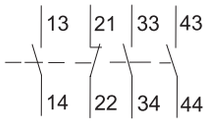
NDL3-02



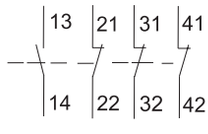
NDL3-22



NDL3-31

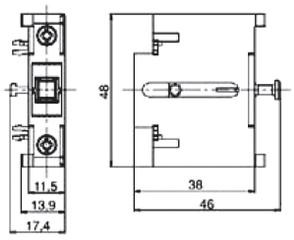


NDL3-13

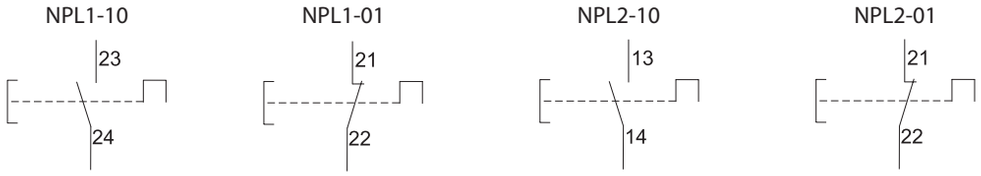


Auxiliary contact NPL

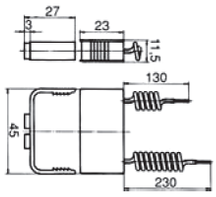
Single-pole auxiliary contact for
side mounting + push button
NPL1, NPL2



Type / Ord. Nr.	Version	AC 15 Rated operational current I_e (A)			
NPL1 (just for KNL9, KNL12, KNL16, KNL18)	10, 01	230 V	400 V	500 V	690 V
NPL2 (just for KNL22, KNL30)	10, 01	6	4	2	1

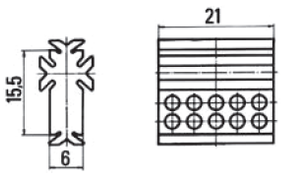


RC suppressor

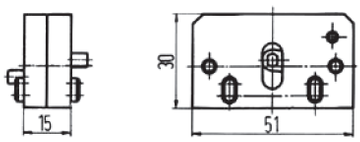


Type		RC1	RC2	RC3	RC4
Control voltage range	U_e (V)	24 … 48	48 … 250	250 … 380	380 … 500

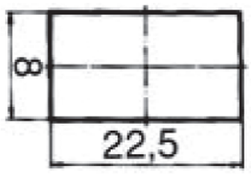
Distance spacer DZ

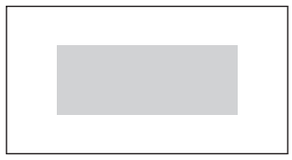


Mechanical interlock MBL



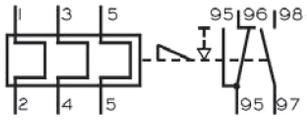
Identification plate NT



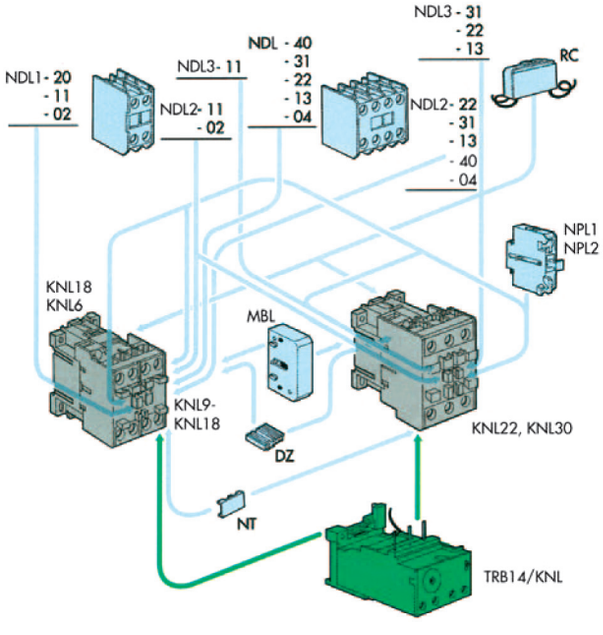


Thermal overload relay TRB14/KNL

Connection diagram



Type / Ord. Nr.	AC-15 Rated operational current I_e (A)			Relay setting range (A)
	230 V	400 V	500 V	0,15 - 0,25 0,24 - 0,4 0,38 - 0,63 0,6 - 1,0 0,96 - 1,6 1,5 - 2,5
TRB14 / KNL	3 A	2 A	1 A	2,4 - 4,0 3,8 - 6,3 6,0 - 10,0 9,6 - 16,0 (TRB14 / KNL16)
				9,6 - 16,0 15 - 25 24 - 40 (TRB40 / KNL16)



ORDERING DATA

Type designation and height of control voltages should be given when ordering.

KNL16 -10 - M7

control voltage, frequency

Type

KNL6G, KNL9G, KNL12G, KNL16G, KNL22G, KNL30G

KNLG contactors are for DC control voltage.

Application

KNL6G contactors relays are applied for switching control, signal and measuring circuits. KNL9G - KNL30G motor contactors are used for switching motors. Of course, both can be used for switching other ohmic, inductive and capacitive consumers. Protection class is IP20, which means that contactors must be mounted in dry and clean ambient. If the ambient is damp or dusty, they must be mounted in a suitable box. Contactors can be built in electric distribution panels on 35 mm mounting rails (in compliance with EN 60 715) or they are fixed with screws on a vertical level (permitted deviation ±20°).

Technical data

Type				KNL6G	KNL9G	KNL12G	KNL16G	KNL22G	KNL30G
Standards				IEC/EN 60947-4-1, IEC/EN 60947-5-1					
Rated insulation voltage		U_i	V	690					
Conventional thermal current		I_{th}	A	20	25	25	25	35	35
Back-up fuse gL max. rating		I_n	A	20	25	25	25	50	50
Ambient temperature	open		°C	- 25 . . . + 60					
	In box		°C	- 25...+ 40					
Ambient temperature	in rush	P_c	W	110					
	holding		W	3					
Range of control voltage		U_c	V	24 … 240					
Range of activity		U_c	%	85 … 110					
Maximum operating frequency			op. c./h	3000					
Mechanical endurance			op. c.	5 x 106					
Terminal capacity	single standed		mm^2	0,75 … 4			2,5 … 10		
	fine standed			0,5 … 2,5			1,5 … 6		

Standard DC control voltages

Volts	12	24	48	60	72	110	125	220	240
	JD	BD	ED	ND	SD	FD	GD	MD	MUD

Auxiliary contacts

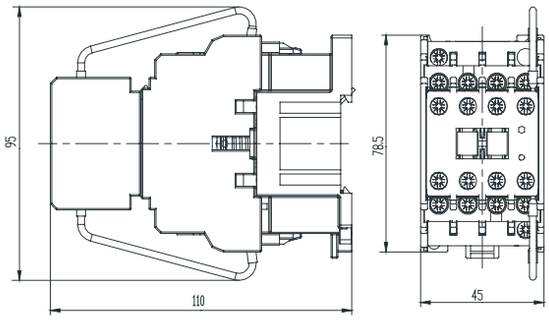
AC15 - Rated operational current	U_e	V	230	400	500	690
	I_e	A	6	4	2	1
DC13 - Rated operational current	U_e	V	24	60	110	220
	I_e	A	10	4	0.9	0.4

Motor contactors KNL9G - KNL30G

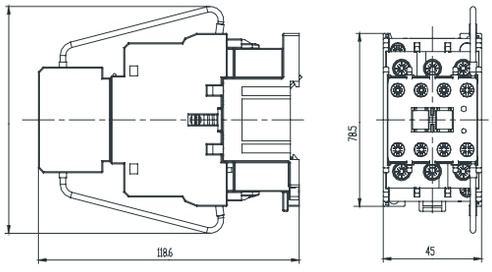
Type			KNL9G	KNL12G	KNL16G	KNL22G	KNL30G
AC-3-Rated power of three-phase - motors - normal load	230 V	kW	2.2	3	4	5.5	7.5
	400 V		4	5.5	7.5	11	15
	500 V		5.5	5.5	7.5	11	15
	690 V		5.5	7.5	7.5	11	15
AC-4- Rated power of three-phase - motors - heavy load	230 V	kW	0.75	1.1	1.5	2.2	4
	400 V		1.5	2.2	3	4	6.5
	500 V		1.5	2.2	3	4	6.5
	690 V		1.5	2.2	3	4	6.5

Dimensional drawing of KNLG

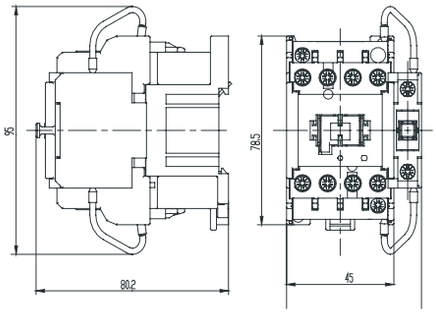
KNL6G + NDL - KNL16G + NDL



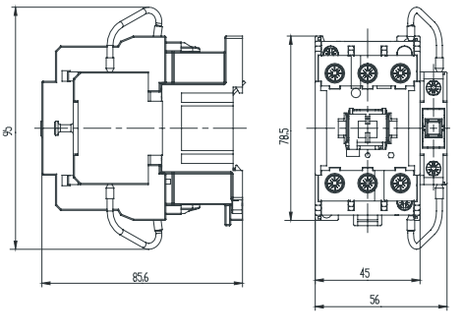
KNL22G + NDL, KNL30G + NDL



KNL6G + NPL - KNL16G + NPL

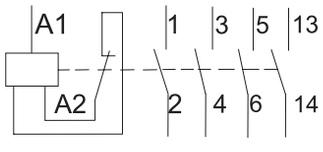


KNL22G + NPL, KNL30G + NPL

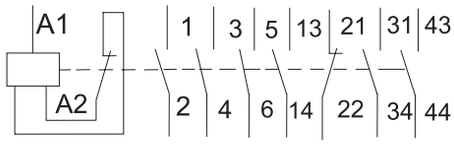


Contacts scheme

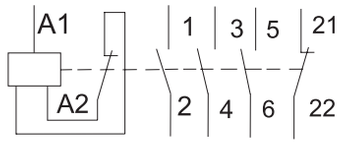
KNL6G-10, KNL9G-10+NPL1
KNL12G-10+NPL1
KNL16G-10+NPL1



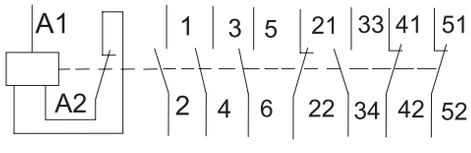
KNL6G-10 + NDL1-21
KNL9G-10 + NDL2-21
KNL12G-10 + NDL2-21
KNL16G-10 + NDL2-21



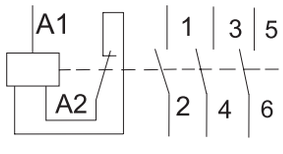
KNL6G-01
KNL9G-01 + NPL1
KNL12G-01 + NPL1
KNL16G-01 + NPL1



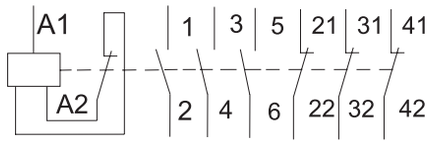
KNL6G-01 + NDL1-12
KNL9G-01 + NDL2-12
KNL12G-01 + NDL2-12
KNL16G-01 + NDL2-12



KNL22G-00 + NPL2
KNL30G-00 + NPL2



KNL22G-00 + NDL3-03
KNL30G-00 + NDL3-03



Contactors in combination with NDL may have number of auxiliary contacts: -30, -21, -12, -03, -10, -01

Ordering data

Type designation and height of control voltages should be given when ordering.

KNLG + NDL
KNL16G -10 / 21 – BD

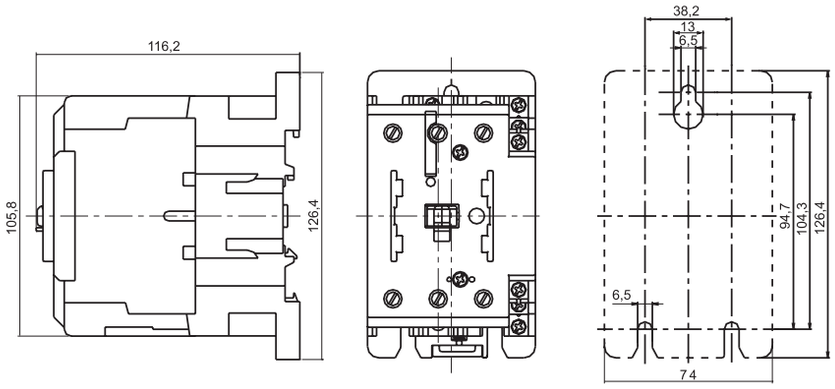
- control voltage
- auxiliary contact modul (NDL1, NDL2, NDL3)
- Type

KNLG + NPL
KNL16G - 10 / 01 - BD

- control voltage
- single-pole auxiliary contact (NPL1, NPL2)
- Type

KNL40, KNL65

Dimensional drawing KNL 40, 65

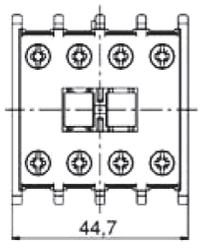


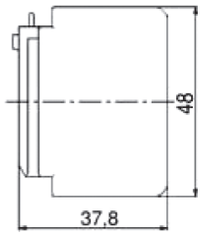
Technical data

Type					KNL40	KNL65
MAIN CONTACTS	Standards				IEC/EN 60947-4-1, IEC/EN 60947-5-1 VDE 0660	
	Mechanical endurance operations				8 x 106	
	Ambient temperature	open		°C	-5 … +55	
		enclosed		°C	-5 … +40	
	Rated insulation voltage		U_i	V	690	
	Short-circuit protection - max. fuse ratinggL			A	63	80
	AC-1 Rated thermal current		I_{th}	A	60	80
	AC-3/AC-4 Rated operating current I_e	400 V		A	40/18,5	65/28
		690 V			34/9	42/14
	Rated motor powers	230 V		kW	11	18.5
		400 V			18.5	30
		690 V			30	37
	Terminal capacity	rigid		mm^2	25	25
		flexible			25	25
AUXILIARY CONTACTS	Rated thermal current		I_{th}	A	10	
	AC-15 Rated operating current I_e	230 V		A	6	
		400 V			4	
		500 V			2	
		690 V			1	
	DC-13 Rated operating curent I_e	24 V		A	4	
		110 V			0,25	
		220 V			0,1	
	Contact arrangement				11	
	Terminal capacity	rigid		mm^2	1 … 2,5	
		flexible			1 … 2,5	
MAGNETIC SYSTEM	Rated control voltage U_c	min.		V	12	
		max.			520	
	Standard control voltages U_c			V	24, 110/115, 220/240, 380/400 (50/60Hz)	
	Range of control voltage				85 … 110	
	Coil consumption	in rush		VA	200	
				VA	20	
		holding		W	6 - 10	

Auxiliary contact NDL 5

Two- and four-pole auxiliary contact modules NDL5
(mounting on basic contactor)

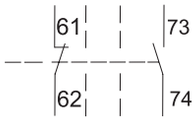




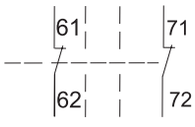
Type / Ord. Nr.	Contacts arrangement	AC 15 Rated operational current I_e (A)			
		230 V	400 V	500 V	690 V
NDL5	11, 02, 20, 22, 31, 13, 40, 04	6	4	2	1

Contacts scheme

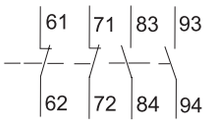
NDL5-11



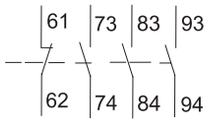
NDL5-02



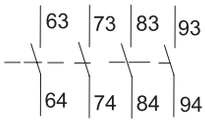
NDL5-22



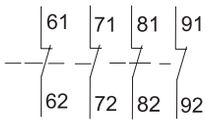
NDL5-31



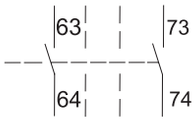
NDL5-40



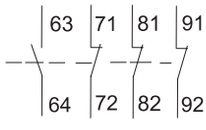
NDL5-04



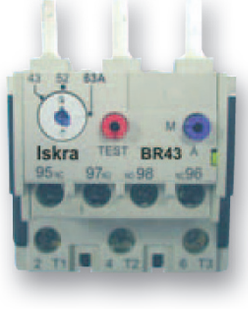
NDL5-20

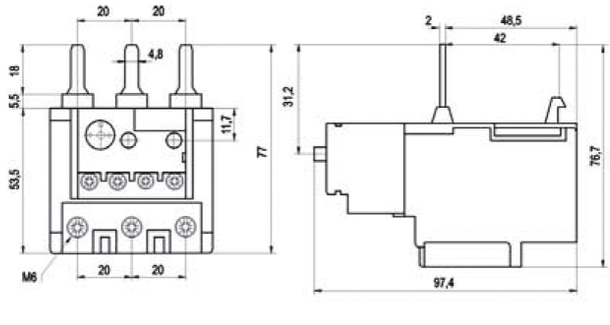


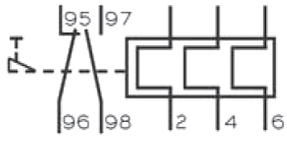
NDL5-13



Thermal overload relay BR43







Type / Ord. Nr.	AC 15 Rated operational current I_e 50/60 Hz		Relay setting range (A)			
	230 V	400 V				
BR43	4 A	2 A	14,5 - 21	21 - 30	30 - 43	43 - 63

Mechanical interlock MBL40

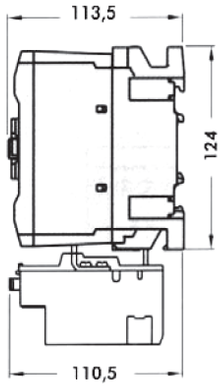
Ordering data

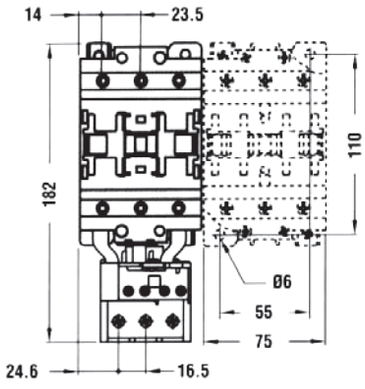
Type designation and control voltage of contactors should be given when ordering.

KNL40/65 - 11 - 220/240 - 50/60

- 50/60 — frequency
- 220/240 — control voltage
- 11 — arrangement of contacts
- KNL40/65 — Type

Dimensional drawing





Typ				KNL80	KNL90	KNL110
OPERATING CONDITIONS						
Ambient temperature	operation		°C	-50 to +70		
	storage			-60 to +80		
Operation mode	normal			on vertical plane		
	allowable			± 30°		
Fixing				Screw or DIN rail 35 mm and 75 mm (EN 60 715)		
Correspondance to standards				IEC/EN 60947- 4 - 1		
POLE CHARACTERISTICS						
Rated insulation voltage		U_i	V	690		
Conventional thermal current at (<40°C)			I_{th}	125	125	125
Rated operational current at	AC-3 (380/400)	I_e	A	80	95	110
Rated operational current at	AC-4 (380/400)[1]	I_e	A	38	43	50
Short-time allowable current for (IEC/EN 60947-1) - 10s		I_{cu}	A	480	760	880
Short – circuit protection fuse	gG		A	160	160	160
	aM		A	80	100	125
Making capacity (RMS value)			a	1200		
Breaking capacity at voltage	< 440V			1200	1200	1200
	500V		A	1050	1050	1050
	690V			800	800	800
Resistance at I_e for AC-3			mΩ	0.6	0.6	0.6
Consumption per pole at I_{th}			W	9.4	9.4	9.4
(average values)			W	3.8	5.4	7.3
Terminals	Type			lug clamp[2]		
	A			12.3		
	B			12		
	screw			M6		
Min.-max. tightening torque for contact terminals			Nm	4 - 5		
Min.-Max. tightening torque for coil terminals			Nm	0,8 - 1		
Max. cable section connectable	AWG		An°	2		
with 1 conductor	Flexible lug (min.-max.)		mm^2	6 - 50		
Power terminal protection according to EN 60529				IP20		

Standard AC control voltages: 24, 48, 110, 220/230, 240, 380/400 V

[1] current values guarantee an electrical life of about 200.000 cycles

[2] in addition the main terminal, the following dimensions refer to the second entry of flexible bars: 12,3 x 3,8 mm

Type				KNL80	KNL90	KNL110
AC CONTROL						
Rated control voltage at 50/60 Hz	from		V		24	
	to				500	
Average coil consumption	50 Hz	in-rush	VA		210	
		holding			18	
	60 Hz	in-rush	VA		252	
		holding			21.6	
Power dissipation at 50 Hz			W	6	6	6
OPERATING TIMES						
With control AC		closing NO	ms	31-25	31-25	31-25
		opening NO		8-12	8-12	8-12
LIFE (millions)						
Mechanical AC - control			op. c.	15	15	15
Electrical I_e at 400 V and AC-3			op. c.	1.3	1.2	0.8
MAXIMUM OPERATING FREQUENCY						
Mechanical operations			op. c./h		3600	
Electromagnet			op. c./h		3600	
Pole			op. c./h		3600	

Utilisation category AC-3
Maximum operational power at ambient temperature < 55°C

Type / Ord. Nr.	Operational current (U_e < 440 V)	Operational power						
	A	220/230 V kW	380/400 V kW	415 V kW	440 V kW	500 V kW	660/690 V kW	1000 V kW
KNL80	80	23	41	46	46	56	74	37
KNL90	95	27.6	50	55	55	56	74	45
KNL110	110	33	61	66	70	59	80	45