

Technical Catalogue

MCB, RCD, RCBO & DB



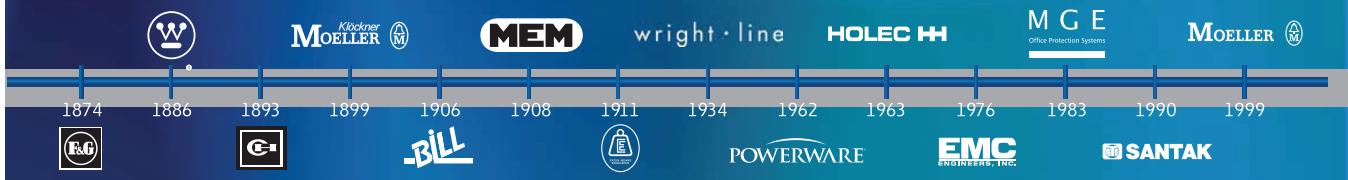
EATON
Powering Business Worldwide

Celebrating
100 YEARS
Ideals that Endure

EAT•N

The power of fusion.

Brand inception dates:



EAT•N
Powering Business Worldwide

There's a certain energy at Eaton. It's the power of uniting some of the world's most respected names to build a brand you can trust to meet your every power management need. The energy created supports our commitment to powering business worldwide.

From power distribution to power quality and control, Eaton allows you to proactively manage your complete power system by providing electrical solutions that make your applications more reliable, efficient and safe. Visit Eaton.com/electrical.

All of the above are trademarks of Eaton Corporation or its affiliates. Eaton has a license to use the Westinghouse name in Asia Pacific. ©2010 Eaton Corporation.

Moeller is now Eaton



A winning fusion

Miniature Circuit Breakers

■ PLSM Range:

- Rated current: 0.5 A to 63 A
- Rated voltage AC: 230/415V, DC: 48V (per pole)
- Rated breaking capacity:
 - 10kA acc. to IEC/EN 60898
 - 15kA acc. to IEC/EN 60947-2
- Tripping Characteristics B, C, D
- Meets the requirements of insulation co-ordination, distance between contacts ≥ 4 mm, for secure isolation
- Low let-through energy
- Bi connect optionally on load or line
- Device height 80 mm
- Endurance: 20,000 operations
- Full range of accessories: shunt, UV, auxiliary switch, trip contact, remote operator.
- Width: 17.5mm



■ PLHT Range



- Rated current up to 125A
- Rated Voltage AC: 230/415V, DC: 60V (per pole)
- Rated breaking capacity up to 25kA according to IEC/EN 60947-2
- Tripping characteristics B, C, D
- Accessories: shunt trip, auxiliary switch, anti-tamper device.
- Peak with stand voltage U_{imp} 4kV
- Meets the requirements of insulation co-ordination, distance between contacts ≥ 4 mm, for secure isolation
- Endurance: 20,000 operations
- Terminal Capacity: 2.5 - 50 mm²

■ PLS6 DC Range

- Rated current up to 50A
- Rated voltage DC: 250V per pole, t=4 ms
2 poles connected in series DC: 500V
- Rated breaking capacity 10kA acc. to IEC/EN 60947-2
- Tripping Characteristics C
- Connections as per polarity marking on the product



Protective Devices

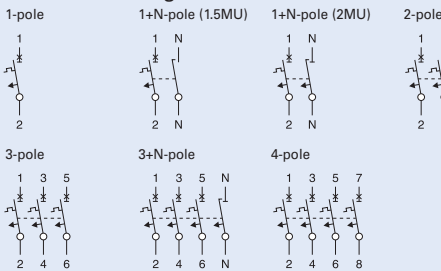
Miniature Circuit Breakers PLS..., PLZ...

- High selectivity between MCB and back-up fuse due to low let-through energy
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Meets the requirements of insulation co-ordination, distance between contacts ≥ 4 mm, for secure isolation
- Suitable for applications up to 48 V DC (use PLS6-DC for higher DC voltages)

Accessories:

Auxiliary switch for subsequent installation	ZP-IHK	286052
Tripping signal contact for subsequent installation	ZP-NHK	248437
Remote control and automatic switching device	Z-FW/LP	248296
Shunt trip release	Z-ASA/..	248438, 248439
Undervoltage release	Z-USA/..	248288-248291
Compact enclosure	KLV-TC-2	276240
	KLV-TC-4	276241
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	Z-IS/SPE-1TE	274418

Connection diagrams



Technical Data

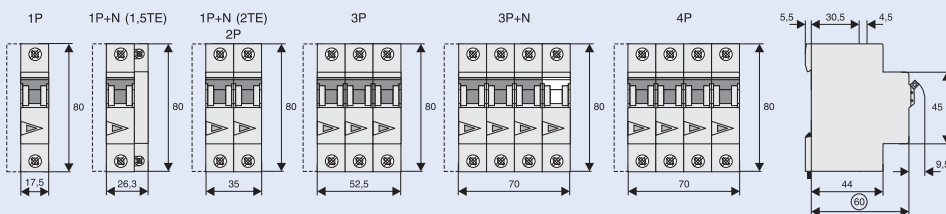
Electrical

Design according to	IEC/EN 60898-1
Current test marks as printed onto the device	
Rated voltage	
PLS., PLZ.	AC: 230/400V
PLS., PLZ.	DC: 48V (per pole)
Rated frequency	50/60 Hz
Rated breaking capacity according to IEC/EN 60898-1	
PLSM, PLZM	10 kA
PLS6, PLZ6	6 kA
PLS4, PLZ4	4.5 kA
Characteristic	B, C, D
Back-up fuse	
PLSM	max. 125 A gL
PLS6	max. 100 A gL
PLS4	max. 80 A gL
Selectivity class	3
Rated peak withstand voltage U_{imp}	4 kV (1.2/50 μ s)
Endurance	
electrical comp.	$\geq 4,000$ operating cycles
mechanical comp.	$\geq 20,000$ operating cycles
Line voltage connection	optional (above/below)

Mechanical

Frame size	45 mm
Device height	80 mm
Device width	17.5 mm per pole (1MU) 26.3 mm: device 1P+N (1.5MU)
Mounting	quick fastening with 3 lock-in positions on DIN rail IEC/EN 60715
Degree of protection	IP20
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1-25 mm ² (1p+N, 1.5MU)
Terminal fastening torque	1-2.4 Nm (1p+N, 1.5MU)
Busbar thickness	0.8 - 2 mm (except N 0.5 MU)
Mounting	independent of position

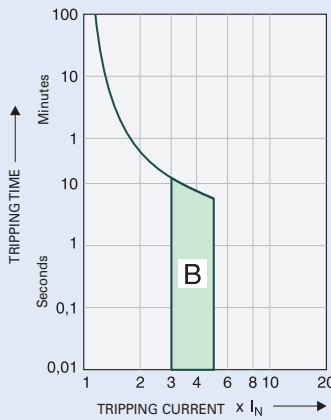
Dimensions (mm)



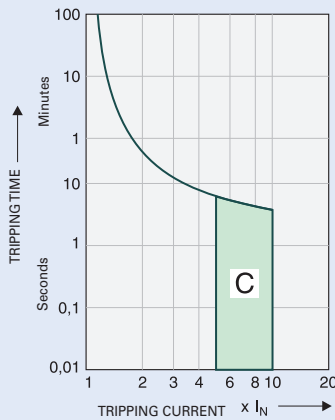
Protective Devices

Tripping Characteristics (IEC/EN 60898-1)

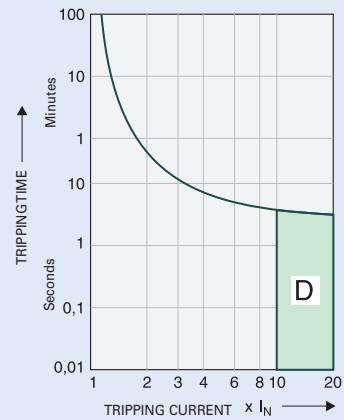
Tripping characteristic B



Tripping characteristic C



Tripping characteristic D



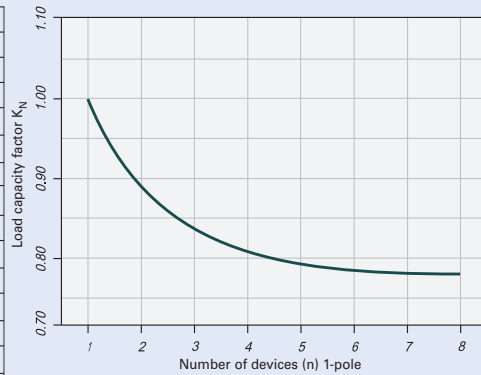
Quick-acting (B), slow (C), very slow (D)

Effect of the Ambient Temperature on Thermal Tripping Behaviour

Adjusted rated current values according to the ambient temperature

I _n [A]	Ambient temperature T [°C]															
	-25	-20	-10	0	10	20	30	35	40	45	50	55	60	65	70	75
0.16	0.20	0.19	0.19	0.18	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13
0.25	0.31	0.30	0.29	0.28	0.27	0.26	0.25	0.25	0.24	0.24	0.23	0.23	0.22	0.22	0.21	0.21
0.5	0.61	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.48	0.47	0.46	0.45	0.44	0.43	0.42	0.41
0.75	0.92	0.90	0.87	0.84	0.81	0.78	0.75	0.74	0.73	0.71	0.69	0.68	0.66	0.65	0.64	0.62
1	1.2	1.2	1.2	1.1	1.1	1.0	1.0	0.99	0.97	0.95	0.93	0.90	0.89	0.87	0.85	0.83
1.5	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2
1.6	2.0	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
2	2.4	2.4	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7
2.5	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1
3	3.7	3.6	3.5	3.4	3.3	3.1	3.0	3.0	2.9	2.8	2.8	2.7	2.7	2.6	2.5	2.5
3.5	4.3	4.2	4.1	3.9	3.8	3.7	3.5	3.4	3.4	3.3	3.2	3.2	3.1	3.0	3.0	2.9
4	4.9	4.8	4.7	4.5	4.3	4.2	4.0	3.9	3.9	3.8	3.7	3.6	3.5	3.5	3.4	3.3
5	6.1	6.0	5.8	5.6	5.4	5.2	5.0	4.9	4.8	4.7	4.6	4.5	4.4	4.3	4.2	4.1
6	7.3	7.2	7.0	6.7	6.5	6.3	6.0	5.9	5.8	5.7	5.6	5.4	5.3	5.2	5.1	5.0
8	9.8	9.6	9.3	9.0	8.7	8.4	8.0	7.9	7.7	7.6	7.4	7.2	7.1	6.9	6.8	6.6
10	12	12	12	11	11	10	10	9.9	9.7	9.5	9.3	9.0	8.9	8.7	8.5	8.3
12	15	14	14	13	13	13	12	12	12	11	11	11	11	10	10	10
13	16	16	15	15	14	14	13	13	13	12	12	12	12	11	11	11
15	18	18	17	17	16	16	15	15	15	14	14	14	13	13	13	12
16	20	19	19	18	17	17	16	16	15	15	15	14	14	14	14	13
20	24	24	23	22	22	21	20	20	19	19	19	18	18	17	17	17
25	31	30	29	28	27	26	25	25	24	24	23	23	22	22	21	21
32	39	38	37	36	35	33	32	32	31	30	30	29	28	28	27	26
40	49	48	47	45	43	42	40	39	39	38	37	36	35	35	34	33
50	61	60	58	56	54	52	50	49	48	47	46	45	44	43	42	41
63	77	76	73	71	68	66	63	62	61	60	58	57	56	55	53	52

Load Capacity of Series Connected Miniature Circuit Breakers



Effect of Power Frequency

Effect of power frequency on the tripping behaviour I_{MA} of the quick release

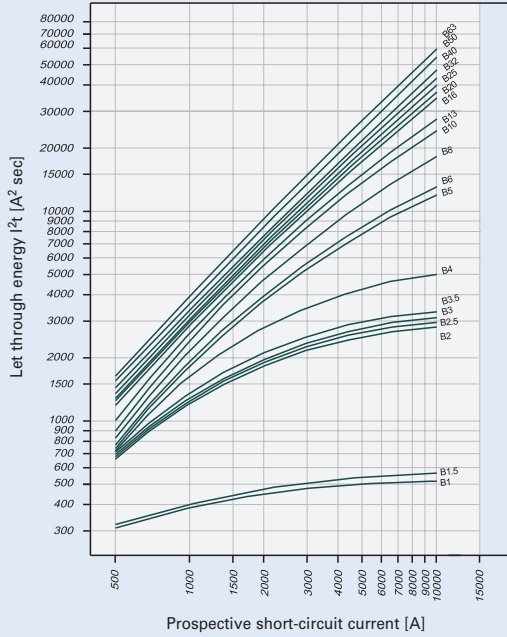
I _{MA} (f)/I _{MA} (50Hz) [%]	Power frequency f [Hz]						
	16 ^{2/3} ₃	50	60	100	200	300	400
	91	100	101	106	115	134	141

xPole

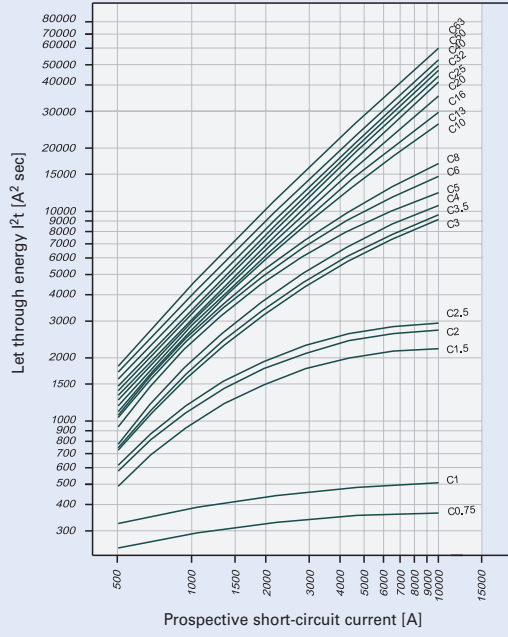
Protective Devices

Let-through Energy PLSM

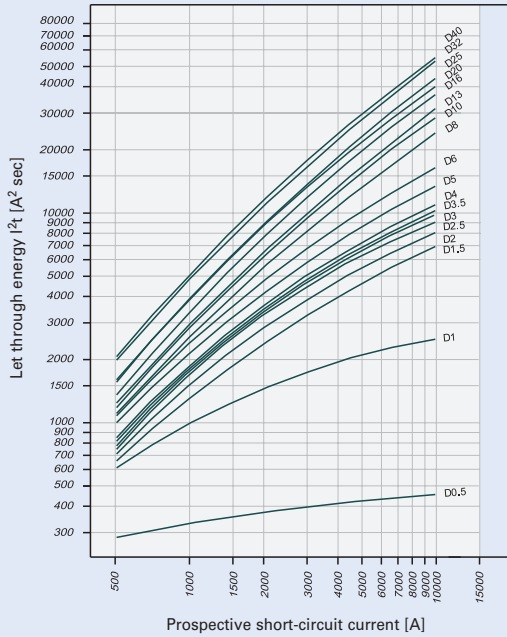
Let-through energy PLSM, characteristic B, 1-pole



Let-through energy PLSM, characteristic C, 1-pole



Let-through energy PLSM, characteristic D, 1-pole



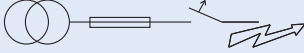
xPole

Protective Devices

Short Circuit Selectivity PLSM towards DII-DIV fuse link

In case of short circuit, there is selectivity between the miniature circuit breakers PLSM and the upstream fuses up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond).

*) basically in accordance with EN 60898-1 D.5.2.b



Short circuit selectivity **characteristic B** towards fuse link **DII-DIV***)

PLSM	DII-DIV gL/gG								
I_n [A]	10	16	20	25	35	50	63	80	100
1.0	<0.5 ¹⁾	1.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	<0.5 ¹⁾	1.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.4	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.0	3.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.9	2.0	3.5	8.5	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	0.6	0.9	1.8	3.2	7.4	10.0 ²⁾	10.0 ²⁾
8		<0.5 ¹⁾	0.5	0.8	1.6	2.6	5.2	8.3	10.0 ²⁾
10			0.5	0.8	1.4	2.2	3.9	6.0	10.0 ²⁾
13			0.5	0.7	1.3	2.0	3.6	5.4	10.0 ²⁾
16				0.6	1.2	1.9	3.2	4.6	8.4
20					1.2	1.8	3.1	4.4	7.8
25					1.2	1.8	3.0	4.2	7.3
32						1.7	2.8	3.9	6.8
40							2.7	3.8	6.5
50							2.5	3.5	5.7
63									5.3

Short circuit selectivity **characteristic C** towards fuse link **DII-DIV***)

PLSM	DII-DIV gL/gG								
I_n [A]	10	16	20	25	35	50	63	80	100
0.75	1.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.0	<0.5 ¹⁾	1.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	<0.5 ¹⁾	<0.5 ¹⁾	1.0	2.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.4	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	<0.5 ¹⁾	0.8	0.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.9	2.2	4.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.8	1.8	3.6	9.7	10.0 ²⁾	10.0 ²⁾
5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.7	1.5	2.7	7.3	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	0.5	0.6	1.4	2.4	5.5	10.0 ²⁾	10.0 ²⁾
8		<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.3	2.2	4.7	8.7	10.0 ²⁾
10			<0.5 ¹⁾	0.6	1.3	2.0	3.6	5.4	10.0 ²⁾
13					1.3	1.9	3.3	5.0	9.4
16					1.2	1.8	3.2	4.4	8.0
20					1.2	1.8	3.1	4.1	7.0
25						1.7	2.8	3.8	6.5
32							2.7	3.7	6.2
40								3.5	5.9
50									5.5
63									

Short circuit selectivity **characteristic D** towards fuse link **DII-DIV***)

PLSM	DII-DIV gL/gG								
I_n [A]	10	16	20	25	35	50	63	80	100
0.5	0.5	3.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.0	<0.5 ¹⁾	<0.5 ¹⁾	1.0	2.4	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.2	3.5	7.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.0	2.8	5.8	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.4	2.3	4.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.9	2.3	4.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.9	2.1	4.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4		<0.5 ¹⁾	0.6	0.9	2.0	3.8	9.5	10.0 ²⁾	10.0 ²⁾
5		<0.5 ¹⁾	0.5	0.7	1.7	3.1	7.0	10.0 ²⁾	10.0 ²⁾
6			0.5	0.7	1.5	2.6	5.3	9.1	10.0 ²⁾
8			<0.5 ¹⁾	0.7	1.4	2.2	3.9	6.0	10.0 ²⁾
10				0.7	1.2	1.9	3.4	5.0	9.5
13					1.2	1.8	3.2	4.6	8.6
16						1.6	2.7	4.0	7.4
20						1.5	2.5	3.5	6.7
25							2.4	3.4	6.2
32								2.8	5.0
40									4.8

¹⁾ Selectivity limit current I_s under 0.5 kA

²⁾ Selectivity limit current I_s = rated breaking capacity I_{cn} of the MCB

no selectivity

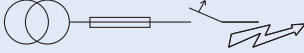
xPole

Protective Devices

Short Circuit Selectivity PLSM towards D01-D03 fuse link

In case of short circuit, there is selectivity between the miniature circuit breakers PLSM and the upstream fuses up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond).

*) basically in accordance with EN 60898-1 D.5.2.b



Short circuit selectivity **characteristic B** towards fuse link **D01-D03***)

PLSM	D01-D03 gL/gG									
I_n [A]	10	16	20	25	35	50	63	80	100	
1.0	<0.5 ¹⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	<0.5 ¹⁾	4.1	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	<0.5 ¹⁾	0.5	1.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.9	7.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.9	2.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5		<0.5 ¹⁾	0.5	0.8	1.7	4.0	7.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	0.5	0.8	1.6	3.6	6.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8			0.5	0.8	1.4	2.8	4.3	8.2	10.0 ²⁾	10.0 ²⁾
10			0.5	0.7	1.3	2.4	3.4	6.0	10.0 ²⁾	10.0 ²⁾
13			<0.5 ¹⁾	0.7	1.2	2.3	3.2	5.3	10.0 ²⁾	10.0 ²⁾
16				0.6	1.1	2.2	2.9	4.6	10.0	10.0
20					1.1	2.1	2.8	4.4	9.3	9.3
25					1.1	2.0	2.7	4.2	8.7	8.7
32						2.0	2.6	4.0	8.0	8.0
40							2.5	3.8	7.5	7.5
50							2.3	3.4	6.7	6.7
63									6.2	6.2

Short circuit selectivity **characteristic C** towards fuse link **D01-D03***)

PLSM	D01-D03 gL/gG									
I_n [A]	10	16	20	25	35	50	63	80	100	
0.75	<0.5 ¹⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.0	<0.5 ¹⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	<0.5 ¹⁾	0.5	0.6	0.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.9	5.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.8	4.7	9.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.6	4.0	7.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5		<0.5 ¹⁾	<0.5 ¹⁾	0.5	1.3	3.1	5.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	<0.5 ¹⁾	<0.5 ¹⁾	1.2	2.7	4.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8		<0.5 ¹⁾	<0.5 ¹⁾	<0.5 ¹⁾	1.2	2.5	4.0	8.6	10.0 ²⁾	10.0 ²⁾
10			<0.5 ¹⁾	<0.5 ¹⁾	1.2	2.3	3.1	5.4	10.0 ²⁾	10.0 ²⁾
13					1.1	2.2	3.0	4.9	10.0 ²⁾	10.0 ²⁾
16					1.1	2.1	2.8	4.4	9.5	9.5
20					1.0	2.0	2.6	4.0	8.3	8.3
25						1.9	2.5	3.8	7.8	7.8
32							2.5	3.7	7.3	7.3
40								3.5	7.0	7.0
50									6.5	6.5
63										

Short circuit selectivity **characteristic D** towards fuse link **D01-D03***)

PLSM	D01-D03 gL/gG									
I_n [A]	10	16	20	25	35	50	63	80	100	
0.5	<0.5 ¹⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.0	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.9	2.8	9.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.8	2.2	6.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.7	1.9	5.4	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.7	1.8	4.8	9.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.7	1.7	4.7	8.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4		<0.5 ¹⁾	0.5	0.7	1.7	4.6	7.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5		<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.5	3.5	5.8	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6			<0.5 ¹⁾	0.5	1.3	2.9	4.5	9.0	10.0 ²⁾	10.0 ²⁾
8			<0.5 ¹⁾	0.5	1.2	2.4	3.5	6.0	10.0 ²⁾	10.0 ²⁾
10				0.5	1.1	2.2	3.0	5.0	10.0 ²⁾	10.0 ²⁾
13					1.1	2.1	2.9	4.6	10.0 ²⁾	10.0 ²⁾
16						1.9	2.6	3.9	9.0	9.0
20						1.7	2.3	3.5	8.0	8.0
25							2.2	3.4	7.5	7.5
32								2.9	6.0	6.0
40									5.7	5.7

¹⁾ Selectivity limit current I_s under 0.5 kA

²⁾ Selectivity limit current I_s = rated breaking capacity I_{cn} of the MCB

no selectivity

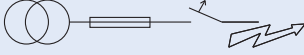
xPole

Protective Devices

Short Circuit Selectivity PLSM towards NH-00 Fuses

In case of short circuit, there is selectivity between the miniature circuit breakers PLSM and the upstream fuses up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond).

*) basically in accordance with EN 60898-1 D.5.2.b



Short circuit selectivity **characteristic B** towards fuse link **NH-00***

PLSM	NH-00 gL/gG											
I_n [A]	16	20	25	32	35	40	50	63	80	100	125	160
1.0	0.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	0.8	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	0.5	1.0	2.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	0.5	1.0	2.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	0.5	0.9	2.1	8.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	0.5	0.9	1.8	5.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.3	2.3	4.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.1	1.6	2.2	3.6	4.8	8.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.1	1.5	2.0	3.3	4.3	7.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.0	1.3	1.7	2.6	3.3	5.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
10		<0.5 ¹⁾	0.6	0.9	1.2	1.5	2.2	2.7	4.0	9.0	10.0 ²⁾	10.0 ²⁾
13		<0.5 ¹⁾	0.6	0.8	1.1	1.4	2.1	2.6	3.8	7.9	10.0 ²⁾	10.0 ²⁾
16			0.5	0.7	1.0	1.3	1.9	2.4	3.4	6.4	9.3	10.0 ²⁾
20				0.7	1.0	1.3	1.9	2.4	3.3	6.0	8.7	10.0 ²⁾
25				0.7	1.0	1.3	1.8	2.3	3.2	5.7	8.0	10.0 ²⁾
32					0.9	1.2	1.7	2.2	3.1	5.4	7.6	10.0 ²⁾
40								2.1	3.0	5.1	7.2	10.0 ²⁾
50								1.9	2.8	4.7	6.6	9.5
63									4.4	6.3	8.6	

Short circuit selectivity **characteristic D** towards fuse link **NH-00***

PLSM	NH-00 gL/gG											
I_n [A]	16	20	25	32	35	40	50	63	80	100	125	160
0.5	2.1	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.0	<0.5 ¹⁾	0.6	1.4	4.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
1.5	<0.5 ¹⁾	<0.5 ¹⁾	0.9	1.6	2.7	4.0	8.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.0	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.3	2.1	3.1	6.0	8.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
2.5	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.2	1.8	2.6	4.8	6.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.0	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.1	1.7	2.4	4.3	6.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
3.5	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.1	1.7	2.4	4.2	5.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.0	1.6	2.2	3.8	5.2	10.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5		<0.5 ¹⁾	0.6	0.9	1.4	1.9	3.2	4.1	7.1	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	0.5	0.8	1.2	1.6	2.6	3.3	5.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8			0.5	0.8	1.1	1.5	2.2	2.7	4.1	8.7	10.0 ²⁾	10.0 ²⁾
10			0.5	0.7	1.0	1.3	1.9	2.5	3.6	7.2	10.0 ²⁾	10.0 ²⁾
13				1.0	1.3	1.9	2.3	3.4	6.5	9.5	10.0 ²⁾	
16					1.1	1.6	2.0	3.0	5.5	8.0	10.0 ²⁾	
20						1.4	1.8	2.8	5.0	7.5	10.0 ²⁾	
25							1.8	2.7	4.8	7.0	10.0 ²⁾	
32								2.4	4.1	6.2	9.3	
40									4.0	6.0	9.0	

Short circuit selectivity **characteristic C** towards fuse link **NH-00***

PLSM	NH-00 gL/gG													
I_n [A]	16	20	25	32	35	40	50	63	80	100	125	160		
0.75	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
1.0	0.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
1.5	<0.5 ¹⁾	0.6	1.3	4.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
2.0	<0.5 ¹⁾	0.6	1.0	2.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
2.5	<0.5 ¹⁾	0.5	1.0	2.1	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
3.0	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.2	1.8	2.6	4.7	6.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
3.5	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.1	1.7	2.4	4.2	6.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
4	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.0	1.5	2.1	3.6	5.0	10.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.8	1.2	1.7	2.8	3.8	8.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
6	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.8	1.2	1.5	2.5	3.3	5.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
8	<0.5 ¹⁾	<0.5 ¹⁾	0.5	0.8	1.1	1.5	2.3	2.9	4.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾		
10			0.5	0.7	1.0	1.4	2.0	2.5	3.8	8.0	10.0 ²⁾	10.0 ²⁾		
13					1.0	1.3	1.9	2.4	3.6	7.0	10.0 ²⁾	10.0 ²⁾		
16						1.0	1.3	1.8	2.3	3.3	6.0	8.8	10.0 ²⁾	
20							1.0	1.2	1.7	2.2	3.2	5.5	7.7	10.0 ²⁾
25								1.6	2.1	3.0	5.2	7.3	10.0 ²⁾	
32									2.1	2.9	5.0	7.0	10.0 ²⁾	
40										2.8	4.8	6.7	10.0	
50											4.5	6.3	9.5	
63												5.9	8.4	

1) Selectivity limit current I_s under 0.5 kA

2) Selectivity limit current I_s = rated breaking capacity I_{cn} of the MCB

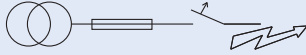
no selectivity

Protective Devices

Short Circuit Selectivity PLSM towards cylindrical fuse links

In case of short circuit, there is selectivity between the miniature circuit breakers PLSM and the upstream fuses up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond).

*) basically in accordance with EN 60898-1 D.5.2.b



Short circuit selectivity **characteristic B** towards fuse links **CH10x38 gG, CH14x51 gG, CH22x58 gG***)

PLSM	CH10x38 gG				CH15x51 gG					CH22x58 gG								
	16	20	25	32	20	25	32	40	50	16	20	25	32	40	50	63	80	100
1	0.5	>10	>10	>10	>10	>10	>10	>10	>10	1.2	>10	>10	>10	>10	>10	>10	>10	>10
2	<0.5	0.6	1.2	3.6	0.5	1.0	5.2	>10	>10	<0.5	0.5	1.1	>10	>10	>10	>10	>10	>10
3	<0.5	0.5	0.8	1.4	0.5	0.9	3.7	>10	>10	<0.5	0.5	1.0	8.0	>10	>10	>10	>10	>10
4	<0.5	<0.5	0.7	1.2	<0.5	0.7	1.7	4.0	>10	<0.5	<0.5	0.8	2.3	5.1	>10	>10	>10	>10
6	<0.5	<0.5	0.6	0.9	<0.5	0.7	1.3	2.0	2.7	<0.5	<0.5	0.7	1.5	2.2	2.6	5.6	10	>10
10	<0.5	<0.5	0.6	0.9	<0.5	0.6	1.1	1.5	2.0	<0.5	<0.5	0.6	1.2	1.6	1.9	3.2	4.8	9.0
13	<0.5	<0.5	0.6	0.8	<0.5	0.6	1.0	1.4	1.9	<0.5	<0.5	0.6	1.2	1.5	1.7	3.0	4.3	7.7
16		<0.5	0.5	0.8	<0.5	0.5	1.0	1.4	1.8		<0.5	0.5	1.1	1.4	1.6	2.7	3.8	6.3
20			0.5	0.8		<0.5	0.9	1.3	1.6			0.5	1.1	1.4	1.6	2.6	3.7	6.0
25				0.7			0.9	1.3	1.6				1.0	1.3	1.5	2.5	3.5	5.6
32								1.2	1.5					1.3	1.5	2.4	3.3	5.2
40									1.5						1.4	2.3	3.2	5.0
50																2.1	2.9	4.5
63																	2.8	4.2

no selectivity

Short circuit selectivity **characteristic C** towards fuse links **CH10x38 gG, CH14x51 gG, CH22x58 gG***)

PLSM	CH10x38 gG				CH15x51 gG					CH22x58 gG								
	16	20	25	32	20	25	32	40	50	16	20	25	32	40	50	63	80	100
0.5	1.9	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10
1	<0.5	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10
2	<0.5	0.6	1.2	3.6	0.5	1.0	4.5	>10	>10	<0.5	0.6	1.1	>10	>10	>10	>10	>10	>10
3	<0.5	0.5	0.8	1.4	<0.5	0.7	1.4	2.4	3.7	<0.5	<0.5	0.8	1.8	2.7	3.5	9.3	>10	>10
4	<0.5	<0.5	0.7	1.2	<0.5	0.7	1.2	2.0	2.9	<0.5	<0.5	0.7	1.5	2.2	2.7	6.7	>10	>10
6	<0.5	<0.5	0.6	0.9	<0.5	<0.5	1.0	1.4	2.0	<0.5	<0.5	0.6	1.1	1.6	1.9	4.2	7.0	>10
10	<0.5	<0.5	0.5	0.8	<0.5	<0.5	0.9	1.3	1.7	<0.5	<0.5	0.6	1.1	1.5	1.8	2.9	4.1	7.5
13	<0.5	<0.5	0.5	0.8	<0.5	<0.5	0.9	1.3	1.7	<0.5	<0.5	0.5	1.0	1.4	1.7	2.7	3.8	6.5
16		<0.5	0.5	0.8	<0.5	<0.5	0.8	1.2	1.6		<0.5	<0.5	1.0	1.3	1.5	2.6	3.5	5.8
20			<0.5	0.7		<0.5	0.8	1.2	1.5			<0.5	0.9	1.2	1.4	2.5	3.3	5.4
25				0.7			0.8	1.1	1.4				0.9	1.2	1.4	2.3	3.2	5.0
32								1.1	1.4					1.1	1.3	2.2	3.0	4.8
40									1.3						1.2	2.0	2.8	4.6
50																1.9	2.6	4.2
63																	2.3	3.7


no selectivity

xPole

Protective Devices

Short circuit selectivity **characteristic D** towards fuse links **CH10x38 gG, CH14x51 gG, CH22x58 gG***)

PLSM	CH10x38 gG				CH15x51 gG					CH22x58 gG									
	16	20	25	32	20	25	32	40	50	16	20	25	32	40	50	63	80	100	
I_n [A]	16	20	25	32	20	25	32	40	50	16	20	25	32	40	50	63	80	100	
0.5	0.9	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	
1	<0.5	>10	>10	>10	>10	>10	>10	>10	>10	<0.5	0.6	1.5	>10	>10	>10	>10	>10	>10	
2	<0.5	0.5	0.6	1.6	<0.5	1.0	1.7	>10	>10	<0.5	0.5	0.8	2.1	3.3	4.3	>10	>10	>10	
3	<0.5	<0.5	0.8	1.3	<0.5	0.7	1.4	2.4	3.4	<0.5	<0.5	0.7	1.7	2.5	3.2	8.2	>10	>10	
4	<0.5	<0.5	0.7	1.2	<0.5	0.7	1.3	2.0	3.1	<0.5	<0.5	0.7	1.6	2.3	3.0	7.0	>10	>10	
6	<0.5	<0.5	0.6	1.0	<0.5	<0.5	1.0	1.6	2.0	<0.5	<0.5	0.6	1.3	1.7	2.1	4.2	7.0	>10	
10	<0.5	<0.5	0.6	0.8	<0.5	<0.5	0.9	1.3	1.7	<0.5	<0.5	0.5	1.1	1.4	1.6	2.8	4.1	7.1	
13	<0.5	<0.5	0.5	0.8	<0.5	<0.5	0.9	1.3	1.6	<0.5	<0.5	0.5	1.0	1.4	1.6	2.7	3.8	6.5	
16		<0.5	0.5	0.7	<0.5	<0.5	0.8	1.1	1.4		<0.5	<0.5	1.0	1.2	1.4	2.3	3.2	5.5	
20			<0.5	0.7		<0.5	0.7	1.0	1.3			<0.5	0.8	1.1	1.3	2.1	2.9	4.6	
25				0.7			0.7	1.0	1.2				0.8	1.0	1.2	2.0	2.8	4.0	
32														0.9	1.0	1.7	2.3	3.8	
40															1.0	2.0	2.2	3.6	

 no selectivity

xPole

Protective Devices

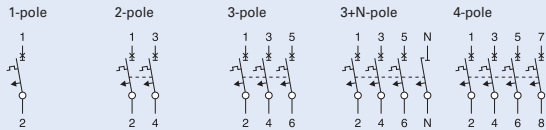
Miniature Circuit Breakers PLHT

- Independent switching contacts
- With isolator function, meets the requirements of insulation co-ordination, distance between contacts ≥ 4 mm, for secure isolation

Accessories:

Auxiliary switch for subsequent installation (0.5 MU)	Z-LHK	248440
Shunt trip release for subsequent installation (1.5 MU)	Z-LHASA/230 Z-LHASA/24	248442 248441
Anti-tamper device	LH-SPL	850000870
Busbar see capter busbar system		

Connection diagrams



Technical Data

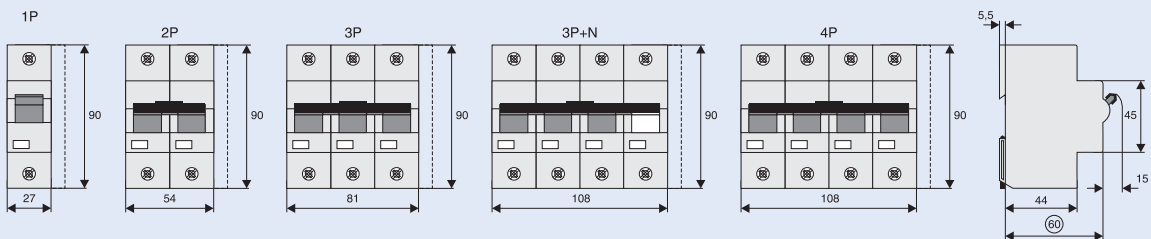
Electrical

Design according to	EN 60947-2
Current test marks as printed onto the device	
Rated voltage	
AC	230/400V
DC	60V (per pole)
Ultimate short circuit breaking capacity acc. to IEC/EN 60947-2	
Characteristics B, C	$I_n = 20-63$ A 25 kA $I_n = 80-100$ A 20 kA $I_n = 125$ A 15 kA
Characteristic D	$I_n = 20-63$ A 25 kA $I_n = 80$ A 20 kA $I_n = 100$ A 15 kA
Rated short circuit breaking capacity acc. to IEC/EN 60898-1	
Characteristics B, C (1-, 2-, 3-, 3N-pole)	$I_n = 20-63$ A 20 kA $I_n = 80-100$ A 15 kA
Characteristic	in accordance with characteristics B, C, D
Back-up fuse	max. 200 A gL
Rated insulation voltage	440 V
Peak withstand voltage U_{imp}	4 kV
Selectivity class	in acc. with class 3
Endurance	$\geq 20,000$ operations

Mechanical

Frame size	45 mm
Device height	90 mm
Device width	27 mm (1.5MU) per pole
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Upper and lower terminals	lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	2.5-50 mm ²

Dimensions (mm)

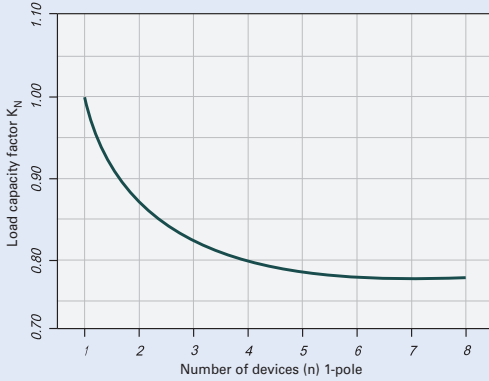


xPole

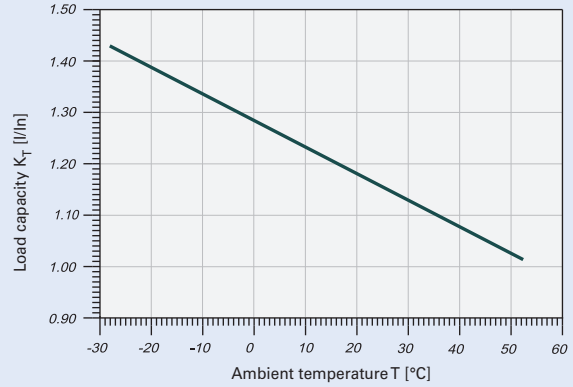
Protective Devices

Load Capacity

Load capacity in case of block installation



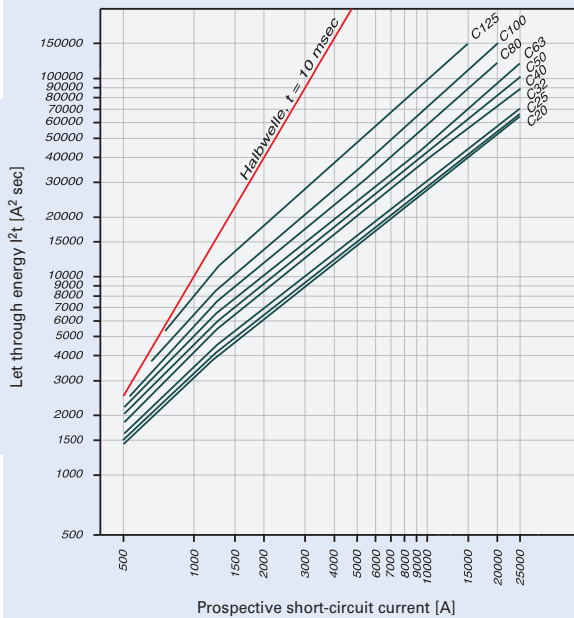
Effect of ambient temperature



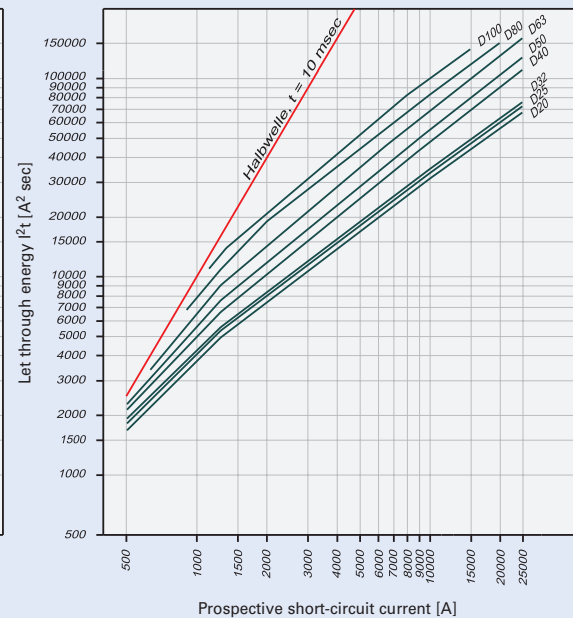
Permitted permanent load at ambient temperature T [°C] with n devices: $I_{DL} = I_n K_T(T) K_N(N)$.

Let-through Energy

Maximum let-through energy PLHT, characteristic C, 1-pole



Maximum let-through energy PLHT, characteristic D, 1-pole



Determined according to EN 60898-1.

Protective Devices

Short Circuit Selectivity

- Short circuit selectivity (in kA) between PLHT and upstream fuse D0 or NH, operating class gL/gG
- 1,4 . . . selectivity up to 1.4 kA; . . . no selectivity

Selectivity towards back-up fuses D01, D02, D03

Rated current I_n PLHT in A	Rated current of the back-up fuse in A						
	25	35	50	63	80	100	
C- Characteristic	20	0,5	1,0	2,0	2,9	3,9	7,6
	25		1,0	1,9	2,8	3,8	7,3
	32		1,0	1,8	2,7	3,6	7,0
	40			1,6	2,2	3,0	5,6
	50				2,1	2,8	5,2
	63					2,7	4,8
	80						4,3
	100						
	125						
D- Characteristic	20	0,5	0,9	1,7	2,5	3,4	6,7
	25		0,9	1,6	2,3	3,2	6,2
	32		0,9	1,5	2,3	3,0	6,0
	40			1,4	2,0	2,6	4,7
	50				1,8	2,3	4,3
	63					2,1	3,7
	80						3,1
	100						
	125						

Selectivity towards back-up fuses NH Gr. 00

Rated current I_n PLHT in A	Rated current of the back-up fuse in A										
	25	35	40	50	63	80	100	125	160	200	
C- Characteristic	20	0,5	1,0	1,3	1,9	2,7	3,7	6,7	17,0	25,0	25,0
	25		0,9	1,3	1,8	2,6	3,5	6,5	17,0	25,0	25,0
	32		0,9	1,2	1,7	2,4	3,3	6,0	15,0	23,0	25,0
	40				1,4	2,1	2,9	4,8	12,0	18,0	25,0
	50					1,9	2,7	4,5	11,0	17,0	25,0
	63							4,2	10,0	15,0	25,0
	80							3,8	8,5	12,0	25,0
	100								7,0	10,0	25,0
	125									7,5	25,0
D- Characteristic	20	<0,5	0,8	1,1	1,5	2,3	3,1	5,6	16,0	25,0	25,0
	25		0,7	1,0	1,4	2,1	3,0	5,3	14,0	23,0	25,0
	32		0,7	1,0	1,3	2,1	2,9	5,0	13,0	22,0	25,0
	40				1,1	1,8	2,5	4,2	10,0	15,0	25,0
	50					1,6	2,3	3,8	8,5	13,0	22,0
	63						2,1	3,2	7,0	10,5	18,0
	80							2,8	5,5	8,4	15,0
	100								4,8	7,5	12,5
	125										

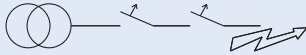
xPole

Protective Devices

Short Circuit Selectivity PLHT towards NZM 1

In case of short circuit, there is selectivity between the miniature circuit breakers PLHT and the upstream NZM up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond). Overload and short-circuit release unit NZM at max. value.

*) basically in accordance with EN 60898-1 D.5.2.b



Short circuit selectivity **characteristic C** towards **NZM***)

PLHT	NZM...1-A gL/gG					
I_n [A]	40	50	63	80	100	125
20	0.3	0.4	0.5	0.75	0.9	1.25
25	0.3	0.4	0.5	0.7	0.9	1.2
32		0.4	0.5	0.7	0.85	1.2
40			0.5	0.6	0.85	1.1
50				0.6	0.85	1.1
63					0.8	1
80						1
100						
125						

Short circuit selectivity **characteristic D** towards **NZM***)

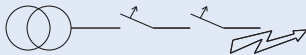
PLHT	NZM...1-A gL/gG					
I_n [A]	40	50	63	80	100	125
50						
63						
80						
100						

no selectivity

Short Circuit Selectivity PLHT towards NZM 2

In case of short circuit, there is selectivity between the miniature circuit breakers PLHT and the upstream NZM up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond). Overload and short-circuit release unit NZM at max. value.

*) basically in accordance with EN 60898-1 D.5.2.b



Short circuit selectivity **characteristic C** towards **NZM***)

PLHT	NZM...2-A gL/gG								
I_n [A]	40	50	63	80	100	125	160	200	250
20	0.3	0.4	0.5	0.75	0.9	1.25	1.8	2.5	3.5
25	0.3	0.4	0.5	0.7	0.9	1.2	1.7	2.4	3.3
32		0.4	0.5	0.7	0.85	1.2	1.65	2.3	3.2
40			0.5	0.6	0.85	1.1	1.5	2.1	2.9
50				0.6	0.85	1.1	1.5	2	2.8
63					0.8	1	1.4	1.8	2.5
80						1	1.4	1.8	2.4
100							1.3	1.7	2.3
125								1.6	2.1

Short circuit selectivity **characteristic D** towards **NZM***)

PLHT	NZM...2-A gL/gG								
I_n [A]	40	50	63	80	100	125	160	200	250
50							1	1.4	2.6
63							1	1.3	2.3
80									2.1
100									

no selectivity

xPole

Protective Devices

Miniature Circuit Breakers PLHT-V

- Special type of miniature circuit breaker PLHT for trade and industry applications upstream of the meter
- Independent switching contacts
- High current limit
- With isolator function, meets the requirements of insulation co-ordination, distance between contacts ≥ 4 mm, for secure isolation
- Anti-Tamper device and Switchoff interlock available

Accessories:

Auxiliary switch for subsequent installation (0.5 MU)	Z-LHK	248440
Shunt trip release for subsequent installation (1.5 MU)	Z-LHASA/230 Z-LHASA/24	248442 248441
Busbar see chapter busbar systems		

Connection diagram



Technical Data

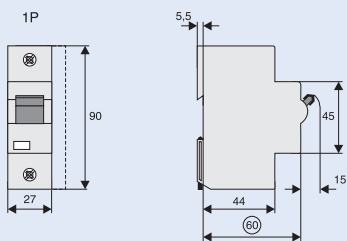
Electrical

Design according to	EN 60947-2
Current test marks as printed onto the device	
Rated voltage	
AC	230/400V
DC	60V (per pole)
Rated frequency	50/60 Hz
Ultimate short circuit breaking capacity according to IEC/EN 60947-2	25 kA
Service short circuit breaking capacity	20 kA
Rated breaking capacity	
DC	max. 60V, 1-pole
Characteristic	similar to D
Back-up fuse	max. 200 A gL (>20 kA)
Rated insulation voltage	440 V
Peak withstand voltage U_{imp}	4 kV
Selectivity class	in acc. with class 3
Endurance	$\geq 20,000$ operating cycles

Mechanical

Frame size	45 mm
Device height	90 mm
Device width	27 mm (1.5MU) per pole 30 mm per pole PLHT-V with interlock
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Upper and lower terminals	lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	2.5-50 mm ²

Dimensions (mm)



xPole

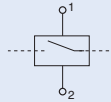
Protective Devices

Accessories for PLHT, PLHT-V

Shunt Trip Release Z-LHASA

- Can be mounted subsequently
- Contact position indicator red - green
- Marking labels can be fitted
- Wide operational voltage range
- Sufficient power of extra low voltage source must be ensured
Z-LHASA/24: min. 90 VA

Connection diagram



Technical Data

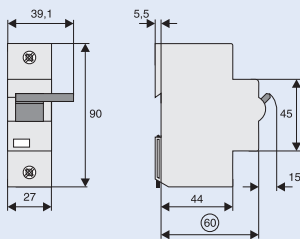
Electrical

Operational voltage range	
Z-LHASA/230:	110-415 V~
Z-LHASA/24:	12-60 V~
Operational frequency	50-60 Hz
Max. current consumption at point of switching on at U_n	
Z-LHASA/230:	2 A
Z-LHASA/24:	18 A

Mechanical

Frame size	45 mm
Device height	90 mm
Device width	27 mm
Mounting	quick fastening on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Upper and lower terminals	lift terminals

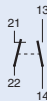
Dimensions (mm)



Auxiliary Switch Z-LHK

- Auxiliary switch according to IEC 947-5-1
- Can be mounted subsequently

Connection diagram



Technical Data

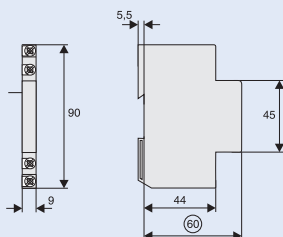
Electrical

Rated operational current	(250 V~) 6A/AC13
Minimum operational voltage	24V each line
Rated thermal current	8 A
Rated insulation voltage	440 V~
Maximum back-up fuse	6 A gL or CLS6-4./B-HS
Contacts	1NO+1NC
Utilisation category AC13	6A/250VAC 2A/440VAC
Utilisation category DC13	4A/60VDC 2A/110VDC 0.5A/230VDC

Mechanical

Frame size	45 mm
Device height	90 mm
Device width	9 mm
Mounting	mounted onto protective devices
Degree of protection, built-in	IP40
Upper and lower terminals	lift terminals
Terminal capacity	1 x 1mm ² to 2 x 2.5mm ²

Dimensions (mm)



Protective Devices

Accessories for PLHT-V

Anti-Tamper Device LH-SPE, LH-SPL

- prevents undesired switching ON or OFF

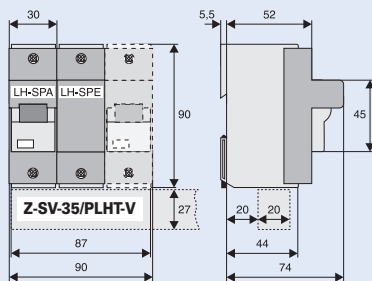
Switchoff Interlock LH-SPA

- prevents undesired switch-OFF

Busbar Block 35 mm² Z-SV-35/PLHT-V, 3-pole (see chapter busbar systems)

- 110/220 A
- Step distance 30 mm

Dimensions (mm)

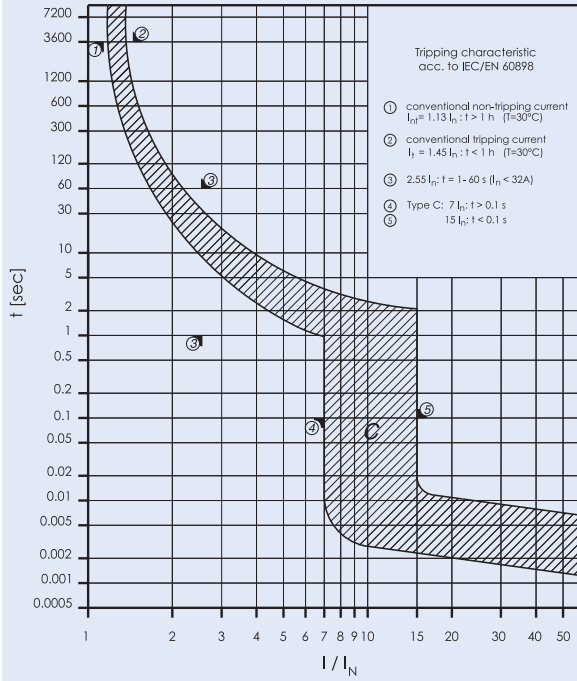


xPole

Protective Devices

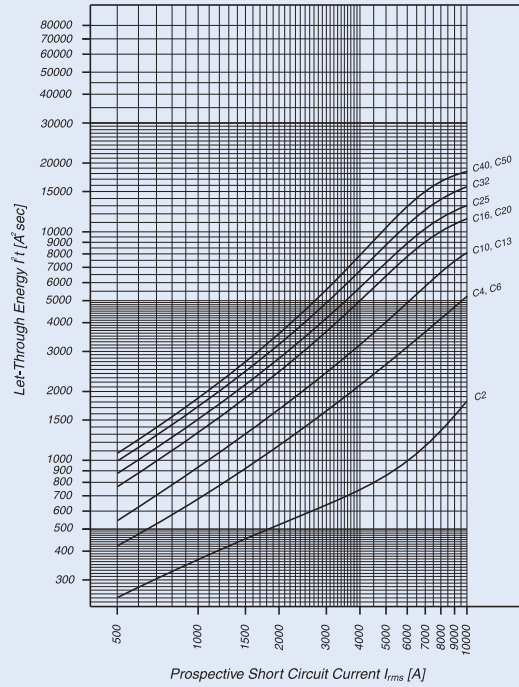
Tripping characteristic PLS6-DC

Type C



Let-through Energy PLS6-DC

Type C, 250 V d.c., $\tau = 5 \text{ ms}$ (acc. to IEC/EN 60947-2)



xPole

Protective Devices

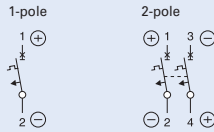
Miniature Circuit Breakers PLS6-DC

- High selectivity between MCB and back-up fuse due to low let-through energy
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Meets the requirements of insulation co-ordination, distance between contacts ≥ 4 mm, for secure isolation
- Rated breaking capacity 10 kA according to IEC/EN 60947-2
- Rated voltage up to 250 V (per pole), $\tau = 4$ ms
- Take into account polarity!

Accessories:

Auxiliary switch for subsequent installation	ZP-IHK	286052
Tripping signal contact for subsequent installation	ZP-NHK	248437
Remote control and automatic switching device	Z-FW/LP	248296
Shunt trip release	ZP-ASA/..	248438, 248439
Undervoltage release	Z-USA/..	248288-248291
Compact enclosure	KLV-TC-2	276240
	KLV-TC-4	276241
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	Z-IS/SPE-1TE	274418

Connection diagrams



Technical Data

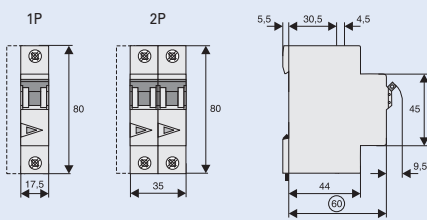
Electrical

Design according to	IEC/EN 60947-2
Current test marks as printed onto the device	
Rated voltage	
DC	1 A type: 220V (per pole) 2-50 A types: 250V (per pole)
Rated breaking capacity according to IEC/EN 60947-2	10 kA
Characteristic	C
Back-up fuse	max. 100 A gL
Selectivity class	3
Rated peak withstand voltage U_{imp}	4 kV (1.2/50 μ s)
Endurance electrical comp.	$\geq 4,000$ operating cycles
mechanical comp.	$\geq 20,000$ operating cycles
Line voltage connection	optional (above/below)

Mechanical

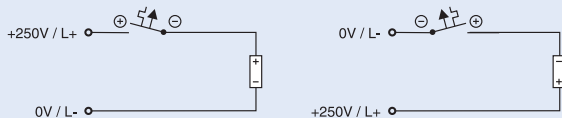
Frame size	45 mm
Device height	80 mm
Device width	17.5 mm per pole (1MU)
Mounting	quick fastening with 3 lock-in positions on DIN rail IEC/EN 60715
Degree of protection	IP20
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1-25 mm ²
Terminal fastening torque	2-2.4 Nm
Busbar thickness	0.8 - 2 mm
Mounting	independent of position

Dimensions (mm)

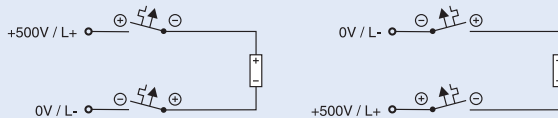


Connection examples

Connection example at 250V=, 1-pole



Connection example at 500V=, 2-pole



■ Residual Current Devices: RCD Type PFIM

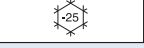

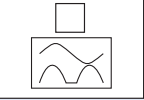
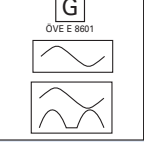
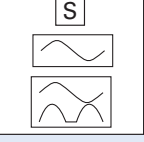

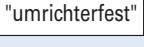




- Design according to IEC/EN 61008
- Rated current: 16-100A
- Rated tripping current: 10,30,100,300,500mA
- Rated voltage: 230/415V, 50 Hz
- Rated short circuit strength: 4-10 kA
- Sensitivity: AC & pulsating DC
- Type: AC, A,G, G/A, R, S, S/A, U,X
- PFIM-U for frequency converter proof applications
- PFIM-X for backup protection
- Contact position flag indicator
- Automatic re-setting possible
- IP 40/IP 54 degree of protection
- Comprehensive range of accessories
- Endurance: 20,000 operation

Protective Devices

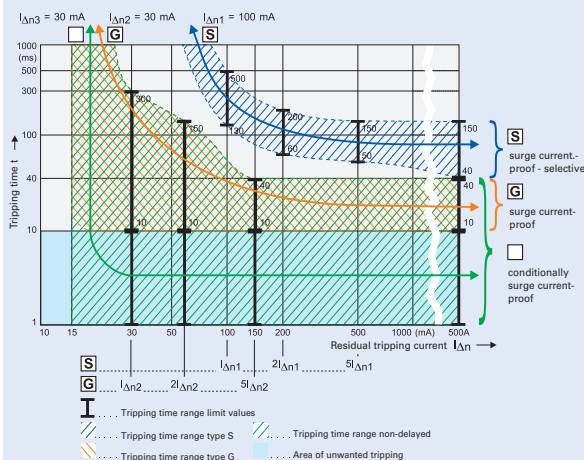
Residual Current Devices - General Data

Short description of the most important RCD types:

Symbol	Description
	Eaton/Moeller standard. Suitable for outdoor installation (distribution boxes for outdoor installation and building sites) up to -25° C.
	Conditionally surge-current proof (>250 A, 8/20 μs) for general application.
	RCD sensitive to pulsating DC for application where residual pulsating DC may occur. Non-selective, instantaneous. Protects only against special forms of residual pulsating DC which have not been smoothed.
	RCD of type G (min 10 ms time delay) surge current-proof up to 3 kA. For system components where protection against unwanted tripping is compulsory to avoid personal injury and damage to property (§ 12.1.6 of ÖVE/ÖNORM E 8001-1). Also for systems involving long lines and high line capacity. Some versions are sensitive to pulsating DC.
	RCD of type S (selective, min 40 ms time delay) surge current-proof up to 5 kA. Mainly used as main switch according to ÖVE/ÖNORM E 8001-1 § 12.1.5, as well as in combination with surge arresters. This is the only RCD suitable for series connection with other types if the rated tripping current of the downstream RCD does not exceed one third of the rated tripping current of the device of type S. Some versions are sensitive to pulsating DC.
	"X-ray-proof", for avoiding unwanted tripping caused by x-ray devices.
	"Frequency converter-proof", for avoiding unwanted tripping caused by frequency converters, speed-controlled drives, etc.
	Integrated overload protection. Calculating and rating of the back-up temperature fuse to avoid overload on the RCD is not required. Overload fuse = short circuit back-up fuse.
	Press service key when putting the device into operation, and subsequently approximately once per year. Pressing the key once per month is not required any more and can be omitted unless shorter testing intervals are required under any applicable regulations (e.g. on building sites).

Tripping Characteristics (IEC/EN 61008)

Tripping characteristics, tripping time range and selectivity of instantaneous, surge current-proof "G" and surge current-proof - selective "S" residual current devices.



§ 6.1.1 of ÖVE/ÖNORM E 8001-1/A1 deals with **additional protection** and provides essentially the following:

In circuits with **sockets up to 16 A** with fault current/residual current protection by protective earthing, protective multiple earthing or residual current devices (RCDs), additional residual current protection devices with a rated tripping current of **0.03 A** must be installed. **This means when using RCDs for fault current/residual current protection two RCDs must be connected in series.**

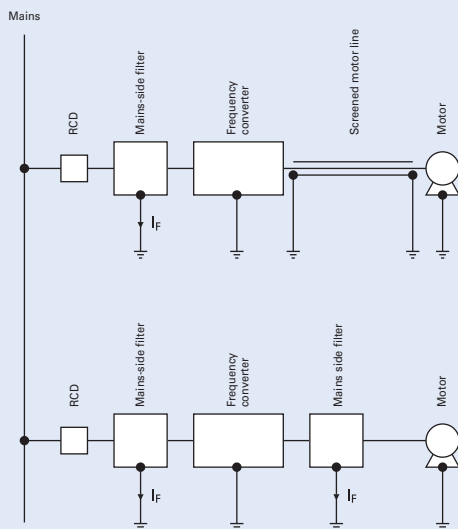
Testing:

RCDs with tripping time delay (Types -G and -S) may be function tested with conventional testing equipment which must be set according to the instructions for operation of the testing device. Due to reasons inherent in the measuring process, the tripping time determined in this way may be longer than expected in accordance with the specifications of the manufacturer of the measuring instrument. However, the device is ok if the result of measurement is within the time range specified by the manufacturer of the measuring instrument.

Protective Devices

Hints for the application of our frequency converter-proof RCDs:

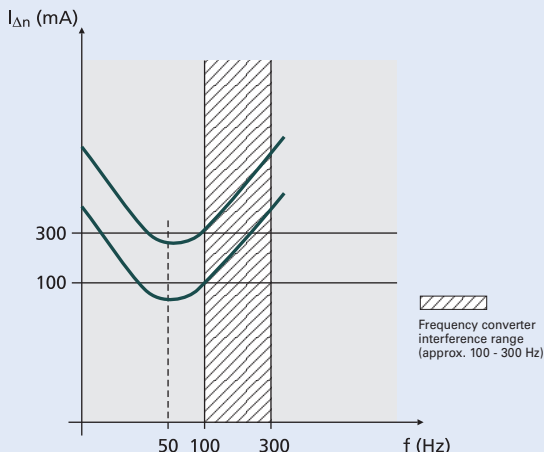
Due to the currents flowing off through the filters (designated I_F), the sum of currents through the RCD is not exactly zero, which causes unwanted tripping.



Frequency converters are used in a wide variety of systems and equipment requiring variable speed, such as lifts, escalators, conveyor belts, and large washing machines. Using them for such purposes in circuits with conventional residual current devices causes frequent problems with unwanted tripping.

The technical root cause of this phenomenon is the following: Fast switching operations involving high voltages cause high interference levels which propagate through the lines on the one hand, and in the form of interfering radiation on the other. In order to eliminate this problem, a mains-side filter (also referred to as input filter or EMC-filter) is connected between the RCD and frequency converter. The anti-interference capacitors in the filters produce discharge currents against earth which may cause unwanted tripping of the RCD due to the apparent residual currents. Connecting a filter on the output side between frequency converter and 3-phase AC motor results in the same behaviour.

Tripping characteristic



This sample tripping characteristic of a 100 mA RCD and a 300 mA RCD shows the following: In the frequency range around 50 Hz, the RCDs trip as required (50 - 100 % of the indicated $I_{\Delta n}$).

In the range shown hatched in the diagram, i. e. from approx. 100 to 300 Hz, unwanted tripping occurs frequently due to the use of frequency converters. Frequency converter-proof residual current devices are much less sensitive in this frequency range than in the 50 - 60 Hz range, which leads to an enormous increase in the reliability of systems.

Therefore, we recommend to use frequency converter-proof RCDs!

These special residual current devices can be recognised by an extension of the type designation ("U"). They meet the requirements of compatibility between RCDs and frequency converters with respect to unwanted tripping.

These are **NOT AC/DC-sensitive** RCDs of type B !!!

Our RCDs of type "U" are characterised by **SENSITIVITY TO RESIDUAL PULSATING DC** and **SELECTIVITY** or **SHORT-TIME DELAY** .

Protective Measures

The following rules for the application of RCDs of type "U" are only applicable in those cases where an RCD of type "B" is not explicitly demanded in the instructions of the manufacturer of the frequency converter.

How can you make sure that the required protective measures are in place when using RCDs type "U" and frequency converters in one system?

In Austria, the ÖVE Decision EN 219 is applicable.

In Germany, VDE 0100 is applicable, in Switzerland SEV 1000.

Under this standard

In case of application in any **other country** than those mentioned take into account national rules and recommendations.

- frequency converters must be equipped with current limiting devices in order to ensure disconnection in cause of faults or overload, and
- the installer of a system is obliged to make sure that additional equipotential bonding is provided (additional inclusion of all metal components, such as frequency converters, mains filters, motor filters, etc. into the existing equipotential bonding), in order to ensure that the permissible touch voltage of 50 V AC or 120 V DC is not exceeded. (In ÖVE/ÖNORM E 8001-1 the term "touch voltage" has been omitted. There is only a fault voltage limit of 65 V AC or 120 V DC which must not be exceeded).

Protective Devices

Residual Current Devices PFIM

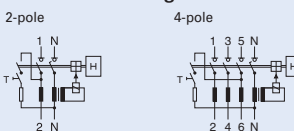
- Residual current devices
- Shape compatible with and suitable for standard busbar connection to other devices of the P-series
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Universal tripping signal switch, also suitable for PLS., PKN., Z-A. can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Contact position indicator red - green
- Delayed types suitable for being used with standard fluorescent tubes with or without electronical ballast (30mA-RCD: 30 units per phase conductor, 100mA-RCD: 90 units per phase conductor)
- Notes: Depending of the fluorescent lamp ballast manufacturer partly more possible. Symmetrical allocation of the fluorescent lamp ballasts on all phases favourably. Shifting references of the fluorescent lamp ballast manufacturer consider.
- The device functions irrespective of the position of installation
- Tripping is line voltage-independent. Consequently, the RCD is suitable for "fault current/residual current protection" and "additional protection" within the meaning of the applicable installation rules
- Mains connection at either side
- The 4-pole device can also be used for 3-pole connection. For this purpose use terminals 1-2, 3-4, and 5-6 (+ cable link).
- The 4-pole device can also be used for 2-pole connection. For this purpose use terminals 5-6 and N-N.
- The test key "T" must be pressed every month. The system operator must be informed of this obligation and his responsibility in a way that can be proven (self-adhesive RCD-label enclosed)
- Pressing the test key "T" serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (R_E), or proper checking of the earth conductor condition redundant, which must be performed separately.
- Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed
- Type -G:** High reliability against unwanted tripping. Compulsory for any circuit where personal injury or damage to property may occur in case of unwanted tripping (ÖVE/ÖNORM E 8001-1 § 12.1.6).

- Type -G/A:** Additionally protects against special forms of residual pulsating DC which have not been smoothed. Special types for X-ray application PFIM-...-R
- Type -R:** To avoid unwanted tripping due to X-ray devices.
- Type -S:** Selective residual current device sensitive to AC, type -S. Compulsory for systems with surge arresters downstream of the RCD (ÖVE/ÖNORM E 8001-1 § 12.1.5).
- Type -S/A:** Additionally protects against special forms of residual pulsating DC which have not been smoothed.
- Type -U:** Suitable for speed-controlled drives with frequency converters in household, trade, and industry. Unwanted tripping is avoided thanks to a tripping characteristic designed particularly for frequency converters. See also explanation "Frequency Converter-Proof RCDs - What for?" Application according to ÖVE/ÖNORM E 8001-1 and Decision EN 219 (1989), VDE 0100, SEV 1000.

Accessories:

Auxiliary switch for subsequent installation to the left	Z-HK	248432
Tripping signal contact for subsequent installation to the right	Z-NHK	248434
Remote control and automatic switching device	Z-FW/LP	248296
Compact enclosure	KLV-TC-2	276240
	KLV-TC-4	276241
Sealing cover set	Z-RC/AK-2TE	285385
	Z-RC/AK-4TE	101062
Switching interlock	IS/SPE-1TE	101911

Connection diagrams



Technical Data

Electrical

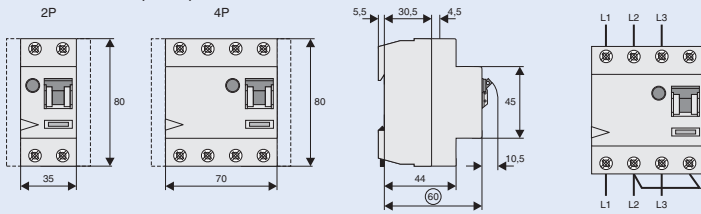
Design according to	IEC/EN 61008
	Type G acc. to ÖVE E 8601
Current test marks as printed onto the device	
Tripping	instantaneous
Type G, R	10 ms delay
Type S	40 ms delay - with selective disconnecting function
Type U (only 30 mA)	10 ms delay
Type U (without 30 mA)	40 ms delay - with selective disconnecting function
Rated voltage U_n	230/400 V, 50 Hz
Rated tripping current $I_{\Delta n}$	10, 30, 100, 300, 500 mA
Sensitivity	AC and pulsating DC
Rated insulation voltage U_i	440 V
Rated impulse withstand voltage U_{imp}	4 kV
Rated short circuit strength I_{nc}	10 kA
Maximum back-up fuse	Short circuit
$I_n = 16-63A$	63 A gG/gL
$I_n = 80A$	80 A gG/gL
$I_n = 100A$	100 A gG/gL
Rated breaking capacity I_m or	
Rated fault breaking capacity $I_{\Delta m}$	
$I_n = 16-40A$	500 A
$I_n = 63A$	630 A
$I_n = 80A$	800 A
$I_n = 100A$	1,000 A
Voltage range of test button	2-pole 184 - 250 V~
	4-pole 184 - 440 V~
Endurance	
electrical comp.	≥ 4,000 operating cycles
mechanical comp.	≥ 20,000 operating cycles

Mechanical

Frame size	45 mm
Device height	80 mm
Device width	35 mm (2MU), 70 mm (4MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Deg. of prot. in moisture-proof encl.	IP54
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1.5 - 35 mm ² single wire
	2 x 16 mm ² multi wire
Busbar thickness	0.8 - 2 mm
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61008

Protective Devices

Dimensions (mm)



RCD PFIM in a Three-Phase AC Network without Neutral Conductor

The N-terminal must be connected by a cable link with the phase L2 (or L1), so that the test loop is supplied with current and the RCD is tested correctly.

Influence of the ambient temperature to the maximum continuous current (A)

Ambient temperature	16A		25A		40A		63A		80A		100A	
	2p	4p	2p	4p	2p	4p	2p	4p	2p	4p	2p	4p
40°	16	16	25	25	40	40	63	63	80	80	100	100
45°	14	14	21	22	37	37	59	59	76	76	95	95
50°	11	11	18	19	33	34	55	55	72	72	90	90
55°	9	9	14	16	30	31	50	50	68	68	85	85
60°	- *)	-	-	-	26	27	45	45	64	64	80	80

Annotation: It has to be ensured that the values in the table are not exceeded and the back-up fuse/thermal protection works properly

*) not applicable

Protective Devices

Residual Current Relays PFR., Core Balance Transformers Z-WFR.

- Residual current relays
- Shape compatible with and suitable for standard busbar connection to other devices of the P-series
- Universal tripping signal switch, also suitable for PLS., PKN., Z-A. can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Contact position indicator red - green
- Delayed types suitable for being used with standard fluorescent tubes with or without electronic ballast (30mA-RCD: 30 units per phase conductor, 100mA-RCD: 90 units per phase conductor)

Notes: Depending of the fluorescent lamp ballast manufacturer partly more possible. Symmetrical allocation of the fluorescent lamp ballasts on all phases favourably. Shifting references of the fluorescent lamp ballast manufacturer consider.

- The test key "T" must be pressed every month. The system operator must be informed of this obligation and his responsibility in a way that can be proven (self-adhesive RCD-label enclosed)
- Type -U:** Suitable for speed-controlled drives with frequency converters in household, trade, and industry.

Unwanted tripping is avoided thanks to a tripping characteristic designed particularly for frequency converters.

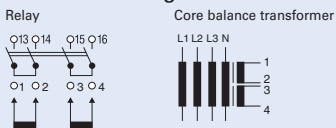
See also explanation "Frequency Converter-Proof RCDs - What for?"

Application according to ÖVE/ÖNORM E 8001 and Decision EN 219 (1989), VDE 0100, SEV 1000.

Accessories:

Auxiliary switch for subsequent installation to the left	Z-HK	248432
Tripping signal contact for subsequent installation to the right	Z-NHK	248434
Compact enclosure	KLV-TC-4	276241
Sealing cover set	Z-RC/AK-4TE	101062
Switching interlock	IS/SPE-1TE	101911

Connection diagrams



Technical Data

Electrical

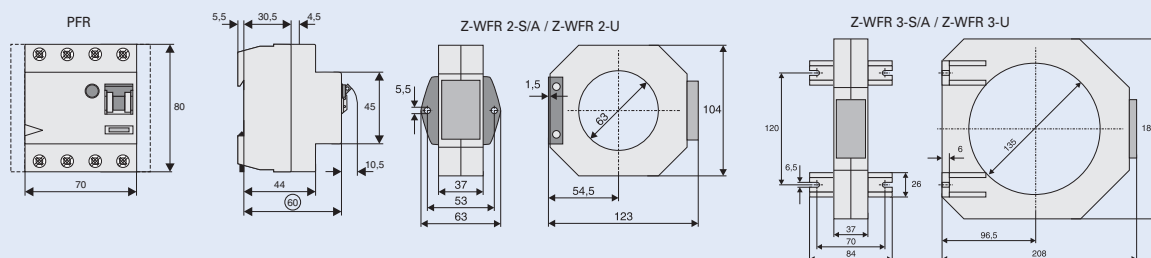
Design according to	IEC/EN 61008
Current test marks as printed onto the device	
Tripping	40 ms delay with selective disconnecting function
Rated voltage U_n	230/400 V; 50 Hz
Rated tripping current $I_{\Delta n}$	(0.1) ^{*)} , 0.3 and 1 A
Rated current of relay contacts	25 A / 400 V~, 16 A / 230 V AC 15
Maximum nominal current	400 A
Sensitivity	pulsating DC
Rated peak withstand voltage U_{imp}	4 kV (1.2/50 μ s)
Voltage range of test button	184 - 440 V~
Endurance electrical comp.	\geq 4,000 operating cycles
mechanical comp.	\geq 20,000 operating cycles

Mechanical

Frame size	45 mm
Device height	80 mm
Device width	70 mm (4MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1.5 - 35 mm ² single wire 2 x 16 mm ² multi wire
Busbar thickness	0.8 - 2 mm
Control line	1.5 - 2.5 mm ²
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61008

^{*)} see Important Information for Installation

Dimensions (mm)

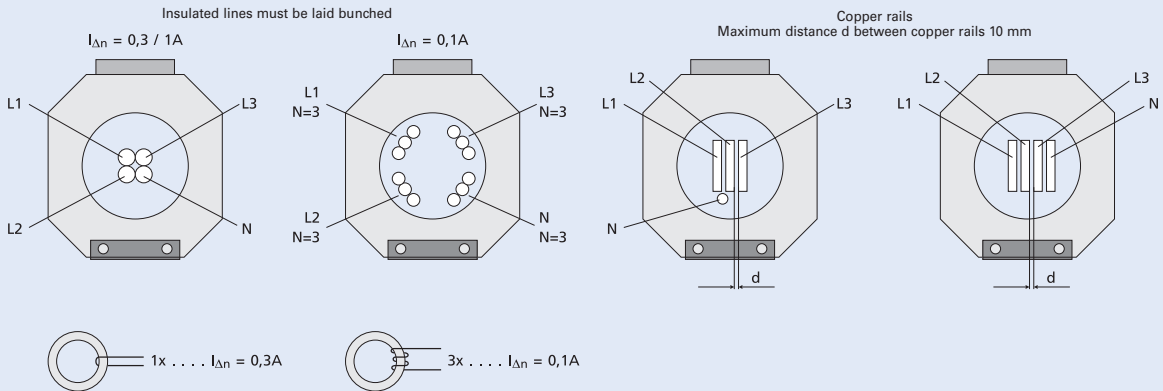


xPole

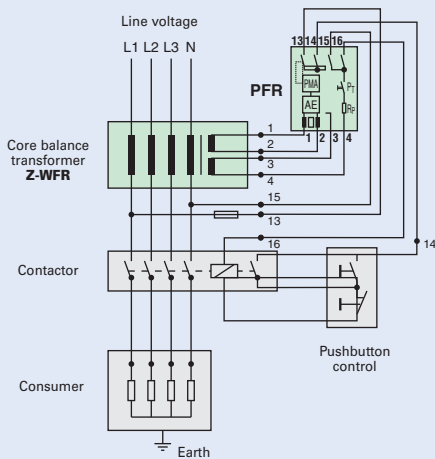
Protective Devices

Important Information for Installation

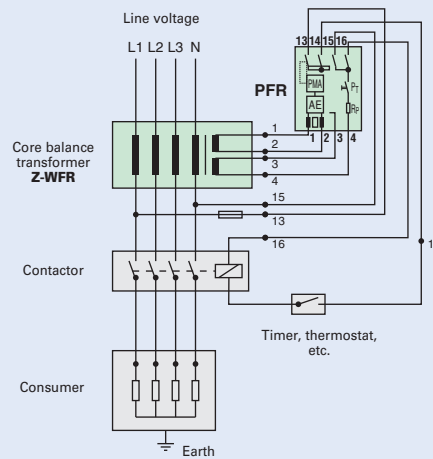
All lines required for operation, L1, L2, and L3 including neutral N, must be routed through the transformer as follows:



Impulse Contact Control



Continuous Contact Control



Two possible switching examples.

- Attention:**
- Connect terminals 1-4 of the relay to the terminals 1-4 of the transformer (see switching examples)!
1+2: secondary winding; 3+4: test winding
 - Supply terminals 13 and 15 as shown, so that the test circuit can work correctly!

Rated Tripping Current Matching

Matching of the rated tripping current, 0.1 or 0.3 A, is achieved by the number of turns in the primary winding of the transformer (in PFR2-03-S/A, PFR3-03-S/A, PFR2-03-U and PFR3-03-U).

Residual Current Relay	Transformer	Rated tripping current $I_{\Delta n}$ (A)	Number of primary turns	Maximum cable diameter (mm)	Maximum primary current (A)
PFR2-03-U (S/A)	Z-WFR2	0,1	3	60	150
		0,3	1	60	400
PFR3-03-U (S/A)	Z-WFR3	0,1	3	130	65
		0,3	1	130	400
PFR2-1-U (S/A)	Z-WFR2	1,0	1	60	400
PFR3-1-U (S/A)	Z-WFR3	1,0	1	130	400

Protective Devices

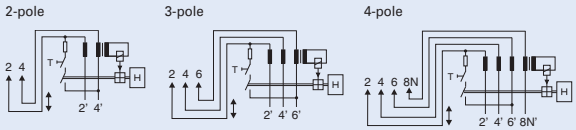
Add-on Residual Current Protection Unit PBSM

- Add-on residual current unit
- Line voltage-independent tripping
- By combining this device with a top-quality miniature circuit breaker type PLS. (except PLSN.) a top-quality RCBO unit (combined RCD/MCB device) is formed.
- Rated current 40 and 63 A
- Permits combinations with a variety of characteristics thanks to the different rated currents and characteristics of the PLS.-miniature circuit breakers which can be connected
- Comprehensive range of accessories suitable for subsequent installation onto PLS.
- **Type -A:** Protect against special forms of residual pulsating DC which have not been smoothed.
- **Type -G:** High reliability against unwanted tripping. Compulsory for any circuit where personal injury or damage to property may occur in case of unwanted tripping (ÖVE-EN1, Part1, §12.14).
- **Type -S:** Selective residual current device, either sensitive to AC, type -S, or sensitive to pulsating DC, type -S/A, for protection against special forms of residual pulsating DC which have not been smoothed. Compulsory for systems with surge arresters downstream of the RCD (ÖVE-EN1, Part 1, §12.15).

Accessories (on PLS.):

Auxiliary switch for subsequent installation	ZP-IHK	286052
	ZP-WHK	286053
Tripping signal contact for subsequent installation	ZP-NHK	248437
Remote control and automatic switching device	Z-FW/LP	248296
Shunt trip release	ZP-ASA/..	248438, 248439
Undervoltage release	Z-USA/..	248288-248291
Compact enclosure	KLV-TC-2	276240
	KLV-TC-4	276241
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	IS/SPE-1TE	101911

Connection diagrams



Accessories :

Cover cap for draw-out connection bar	included
Slotted one-way cheese head screw	included

Technical Data

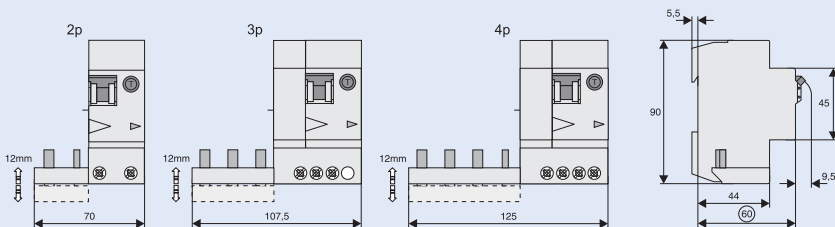
Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Tripping	instantaneous 250A (8/20µs), surge current-proof
	Type G 10 ms delay 3kA (8/20µs), surge current-proof
	Type S 40 ms delay 6kA - with selective disconnecting function
Rated voltage U_n	230/400 V AC
Operational voltage range	196 - 440 V
Rated frequency	50 Hz
Use at 16 $\frac{2}{3}$ Hz	Recesses time between the single switchings increases to 88 s, I_n max. 63 A
Use at 400 Hz	I_n max. 40 A
Rated current I_n	≤ 40 A, ≤ 63 A
Rated tripping current $I_{\Delta n}$	30, 100, 300, 500, 1000 mA
Rated non-tripping current $I_{\Delta no}$	$0.5 I_{\Delta n}$
Sensitivity	AC and pulsating DC
Service short circuit breaking capacity I_{cs}	same as connected PLS. (7.5 kA)
Rated breaking capacity I_{cn}	same as connected PLS. (10 kA)
Rated fault breaking capacity $I_{\Delta m}$	6 kA ($U_n = 230V$) 3 kA ($U_n = 400V$)

Mechanical

Frame-size	45 mm
Device height	90 mm
Device width	70 mm (2p), 107.5 mm (3p), 125 mm (4p)
Mounting	fix mounted onto PLS.
Degree of protection installed device	IP40
Fastening screw	M 2.5 (slotted one-way cheese head screw;
Screw head breaking torque	> 0.6 Nm
Upper and lower terminals	lift terminals
Terminal screws	M 5 (combined Philips/standard head screws according to DIN7962-Z2, Pozidrive)
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	
Rigid conductors	1 x (1 - 25) mm ²
Flexible conductors (with wire end sleeve)	1 x (0.75 - 16) mm ²
Busbar thickness	0.8 - 2 mm
Permitted ambient temperature range	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 60068-2 (25..55°C/90..95% relative humidity)

Dimensions (mm)



Protective Devices

Add-on Residual Current Protection Unit PBHT

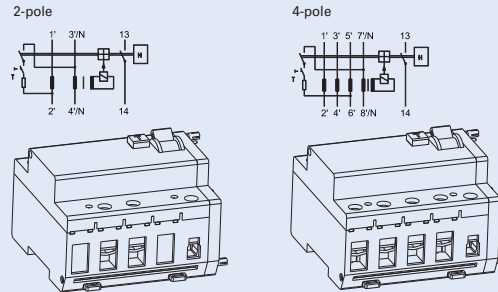
- By combination with miniature circuit breaker PLHT => RCBO-Unit (MCCB)
- Add-on residual current unit (screw connection) for 80 or 125 A (2-pole and 4-pole)
- High flexibility and ease of installation thanks to variable wiring (400 mm flexible connection wires 2p = 2 units, 4p = 4 units included in the set)
- Free selection of main power supply
- Auxiliary switch 1 NO included as standard in all PBHT versions
- Permits combinations with a variety of characteristics thanks to the different rated currents and characteristics of the miniature circuit breakers PLHT which can be connected
- For trade and industry applications
- For subsequent mounting onto 2, 3, 3+N and 4-pole-miniature circuit breakers PLHT
- Toggle (serves as switch position- and tripping indicator)
- The screw connection to the PLHT-device can be unscrewed at any time. Consequently, in case of modifications of the systems to be protected, the installation can be adapted to new requirements at any time.

Accessories:

Flexible connection wires (connection to PLHT) are included in the standard set:

2-pole	80A	2 x 16mm ² (400mm each)
4-pole	80A	4 x 16mm ² (400mm each)
2-pole	125A	2 x 35mm ² (400mm each)
4-pole	125A	4 x 35mm ² (400mm each)

Connection diagrams



Technical Data

Electrical

Design according to IEC/EN 60947-2
Current test marks as printed onto the device

Current flow paths

Rated voltage U_e	230/400 V AC
Operational voltage range	196-440 V
Rated frequency	50 Hz
Rated current I_n	80 A, 125 A
Rated tripping current $I_{\Delta n}$	30, 300, 500, 1000 mA
Rated non-tripping current $I_{\Delta no}$	$0.5 I_{\Delta n}$
Sensitivity	AC and pulsating DC
Tripping characteristic	instantaneous 250A (8/20 μ s), surge current-proof;
	Type S 40 ms delay 6kA (8/20 μ s) with selective disconnecting function, surge current-proof

Rated service short circuit breaking capacity I_{cn} same as connected PLHT
Rated ultimate circuit breaking capacity I_{cu} same as connected PLHT
Rated fault short circuit breaking capacity $I_{\Delta n} = I_{cu}$
Rated peak withstand voltage U_{imp} 4 kV (1.2/50 μ s)

Endurance mechanical comp.
PBHT-80 >10000
PBHT-125 >8000

Endurance electrical comp.
PBHT-80 >1500
PBHT-125 >1000

Auxiliary Contact

Utilisation category AC15

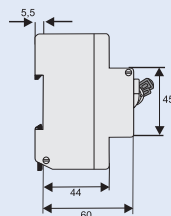
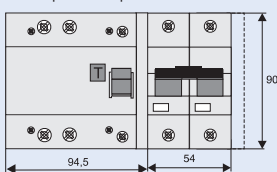
Rated voltage U_e	250 V AC
Rated operational current I_e	16 A AC

Mechanical

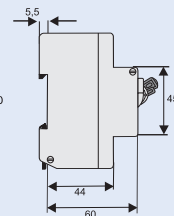
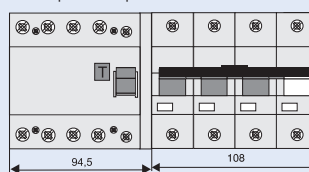
Frame size	45 mm
Device height	90 mm
Device width	95 mm (5.5MU)
Depth of central body	60 mm
Mounting	screwed onto PLHT
Upper and lower terminals	2-, 3-, 4-pole; PBHT-ASA lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	
Main conductor	2.5 - 50 mm ²
Auxiliary switch	1 - 25 mm ²
Degree of protection, built-in	IP40
Permissible ambient temperature range	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC 60068-2 (25...55°C/90...95% relative humidity)

Dimensions (mm)

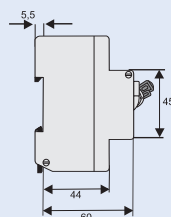
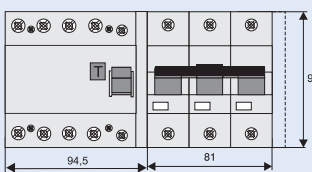
PBHT/2p + PLHT/2p



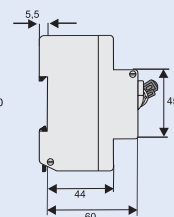
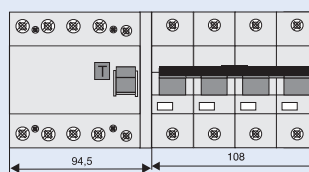
PBHT/4p + PLHT/3p+N



PBHT/4p + PLHT/3p

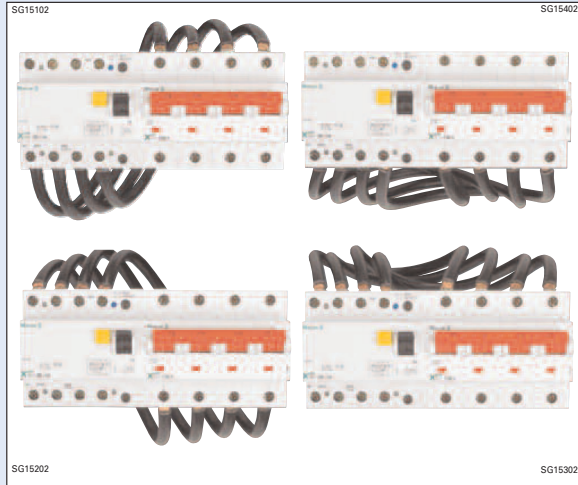


PBHT/4p + PLHT/4p

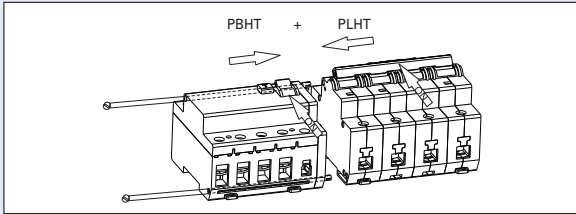


Protective Devices

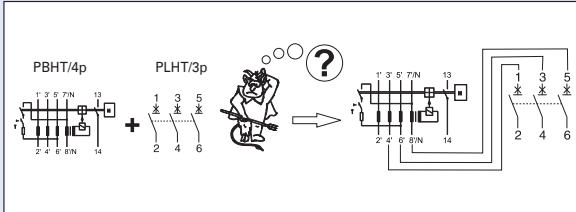
Wiring options



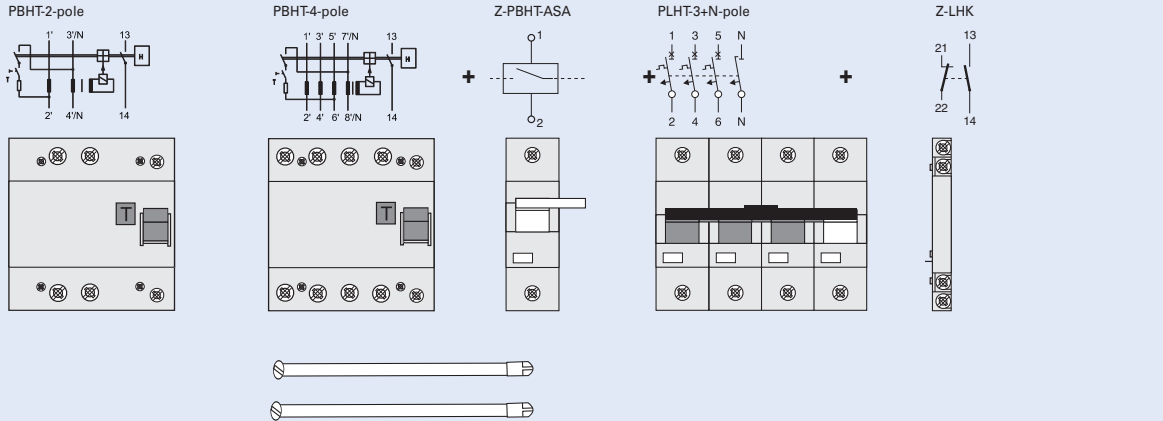
Mounting PBHT + PLHT



Connection PBHT/4p + PLHT/3p



Mounting arrangement residual current protection unit - shunt trip release - miniature circuit breaker - auxiliary contact



xPole

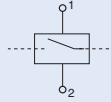
Protective Devices

Accessories for PBHT

Shunt Trip Release Z-BHASA

- Can be mounted subsequently
- Contact position indicator red - green
- Marking labels can be fitted
- Wide operational voltage range
- Sufficient power of extra low voltage source must be ensured
PBHT-ASA/24: min. 90 VA
- Screws for mounting included PBHT => BHASA => PLHT

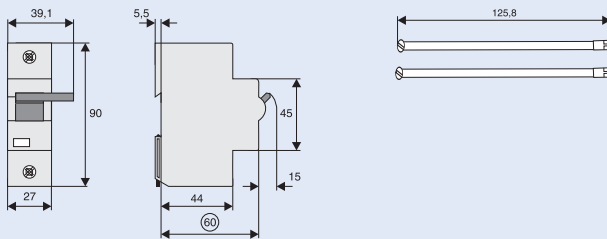
Connection diagram



Technical Data

	Z-BHASA/24	Z-BHASA/230
Electrical		
Minimum pulse duration	15 ms	10 ms
Internal resistance	2 Ω	130 Ω
Duty	100%	100%
Tripping time	< 20 ms	< 20 ms
Peak withstand voltage (1.2/50μs)	2 kV	2 kV
Endurance	>4,000 operating cycles	>4,000 operating cycles
AC voltage range:		
Responding limit	8 V	70 V
Operational voltage range	12-60 V	110-415 V
Maximum current consumption during switch-on	1.4-7 A	3.4 A (at 230V)
Current flow time at max. current consumption	4.0 ms	4.5 ms
DC voltage range:		
Responding limit	11 V	90 V
Operational voltage range	12-60 V	110-230 V
Maximum current consumption during switch-on	1.7 A typ.	1.7 A typ.
Current flow time at max. current consumption	2 ms	4 ms
Mechanical		
Frame size	45 mm	45 mm
Device height	90 mm	90 mm
Device width	27 mm	27 mm
Mounting	quick fastening on DIN rail IEC/EN 60715	
Degree of protection, built-in	IP40	IP40
Upper and lower terminal screws	lift terminals	lift terminals
Terminal capacity	2.5-30 mm ²	2.5-30 mm ²
Fastening torque of terminal screws	4 Nm	4 Nm

Dimensions (mm)



■ RCBO (RCD + MCB) Type PKNM

- Rated breaking capacity: 6kA & 10kA
- Design according to IEC/EN 61009
- Rated current: 2A-40A
- Characteristics: B,C
- Sensitivity: 10, 30, 100, 300mA
- Rated Voltage AC: 230 V, 50 Hz
- Type: AC, A, G, S
- Operational voltage range: 196 - 253 V
- 3 position DIN rail clip, permits easy removal from existing busbar
- Terminal capacity: 1 - 25mm²
- IP 20/40 degree of protection
- Endurance: 20,000 operations



Protective Devices

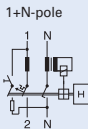
Combined RCD/MCB Devices PKNM, 1+N-pole

- Combined RCD/MCB device
- Line voltage-independent tripping
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Guide for secure terminal connection
- Switching toggle (MCB component) in colour designating the rated current
- Contact position indicator red - green
- Comprehensive range of accessories suitable for subsequent installation
- **Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed
- **Type -G:** 10 ms time delay in order to avoid unwanted tripping (e.g. during thunderstorms).
Compulsory in Austria for any circuit where personal injury or damage to property may occur in case of unwanted tripping (§12.1.6 ÖVE/ÖNORM E 8001-1).

Accessories:

Auxiliary switch for subsequent installation	ZP-IHK	286052
	ZP-WHK	286053
Tripping signal switch for subsequent installation	ZP-NHK	248437
Shunt trip release	ZP-ASA/..	248438, 248439
Tripping module	Z-KAM	248294
Terminal cover cap	KLV-TC-2	276240
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	IS/SPE-1TE	101911

Connection diagram



Technical Data

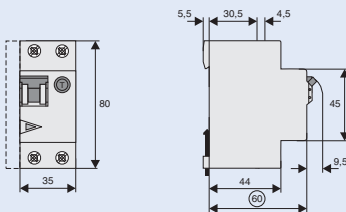
Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Tripping	
line voltage-independent	instantaneous 250A (8/20µs) surge current-proof;
	Type G 10 ms delay 3kA (8/20µs) surge current-proof
Rated voltage U_e	230 V; 50 Hz
Operational voltage range	196-253 V
Rated tripping current $I_{\Delta n}$	10, 30, 100, 300 mA
Rated non-tripping current $I_{\Delta no}$	$0.5 I_{\Delta n}$
Sensitivity	AC and pulsating DC
Selectivity class	3
Rated breaking capacity	10 kA
Rated current	2 - 40 A
Rated peak withstand voltage U_{imp}	4 kV (1.2/50µs)
Characteristic	B, C
Maximum back-up fuse (short circuit)	100 A gL (>10 kA)
Endurance	
electrical comp.	≥ 4,000 operating cycles
mechanical comp.	≥ 20,000 operating cycles

Mechanical

Frame size	45 mm
Device height	80 mm
Device width	35 mm (2MU)
Mounting	3-position DIN rail clip, permits removal from existing busbar system
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1 - 25 mm ²
Busbar thickness	0.8 - 2 mm
Degree of protection switch	IP20
Degree of protection, built-in	IP40
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61009

Dimensions (mm)



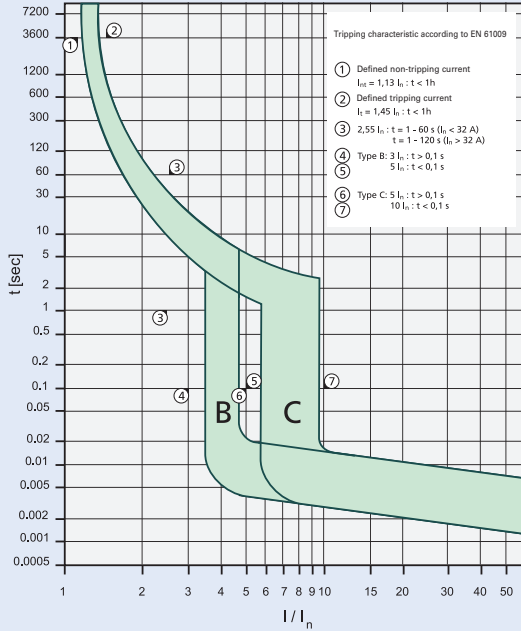
Protective Devices

Load Capacity PKNM-../1N/

Effect of ambient temperature (MCB component)

I _n [A]	Ambient temperature T [°C]								
	-25	-20	-10	0	10	20	30	35	40
2	2.5	2.4	2.3	2.2	2.2	2.1	2.0	2.0	1.9
4	4.9	4.8	4.7	4.5	4.3	4.2	4.0	3.9	3.9
5	6.2	6.0	5.8	5.6	5.4	5.2	5.0	4.9	4.8
6	7.4	7.2	7.0	6.7	6.5	6.3	6.0	5.9	5.8
8	9.9	9.6	9.3	9.0	8.7	8.4	8.0	7.9	7.7
10	12	12	12	11	11	10	10	9.9	9.7
12	15	14	14	13	13	13	12	12	12
13	16	16	15	15	14	14	13	13	13
15	19	18	17	17	16	16	15	15	15
16	20	19	19	18	17	17	16	16	15
20	25	24	23	22	22	21	20	20	19
25	31	30	29	28	27	26	25	25	24
32	40	38	37	36	35	33	32	32	31
40	49	48	47	45	43	42	40	39	39

Tripping Characteristic PKNM-../1N/, Characteristics B a. C



Short Circuit Selectivity PKNM-../1N/ towards DII-DIV fuse link

In case of short circuit, there is selectivity between the combined RCD/MCB devices PKNM-../1N/ and the upstream fuses up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond).

*) basically in accordance with EN 60898-1 D.5.2.b

Short circuit selectivity **characteristic B** towards fuse link **DII-DIV***

PKNM I _n [A]	DII-DIV gL/gG								
	10	16	20	25	35	50	63	80	100
2	<0.5 ¹⁾	<0.5 ¹⁾	2.2	8.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.2	3.7	10.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	0.7	1.0	2.9	6.9	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8		<0.5 ¹⁾	0.6	1.0	2.4	5.1	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
10			0.6	0.9	1.9	3.3	7.0	10.0 ²⁾	10.0 ²⁾
13			0.5	0.7	1.6	2.8	5.7	9.0	10.0 ²⁾
16				0.7	1.4	2.4	4.4	7.0	10.0 ²⁾
20					1.3	2.2	4.0	6.3	10.0 ²⁾
25					1.3	2.1	3.8	5.8	10.0 ²⁾
32						2.0	3.5	5.2	9.5
40							3.1	4.5	8.1

Short circuit selectivity **characteristic C** towards fuse link **DII-DIV***

PKNM I _n [A]	DII-DIV gL/gG								
	10	16	20	25	35	50	63	80	100
2	<0.5 ¹⁾	<0.5 ¹⁾	1.7	6.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.3	4.2	8.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.1	3.6	7.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	0.6	1.0	2.9	5.8	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8		<0.5 ¹⁾	<0.5	0.9	2.5	4.8	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
10			<0.5	0.7	1.5	2.6	5.3	9.0	10.0 ²⁾
13					1.4	2.3	4.6	7.6	10.0 ²⁾
16					1.2	1.8	3.4	5.5	10.0 ²⁾
20					1.2	1.7	3.1	5.0	10.0 ²⁾
25						1.6	2.9	4.6	10.0 ²⁾
32							2.3	3.4	7.7
40								2.9	6.2

1) Selectivity limit current I_s under 0.5 kA

2) Selectivity limit current I_s = rated breaking capacity I_{cn} of the RCD/MCB device

Darker areas: no selectivity



Protective Devices

Short Circuit Selectivity PKNM-../1N/ towards D01-D03 fuse link

In case of short circuit, there is selectivity between the combined RCD/MCB devices PKNM-../1N/ and the upstream fuses up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond).

*) basically in accordance with EN 60898-1 D.5.2.b

Short circuit selectivity **characteristic B** towards fuse link **D01-D03***)

PKNM	D01-D03 gL/gG									
I_n [A]	10	16	20	25	35	50	63	80	100	
2	<0.5 ¹⁾	0.7	1.6	3.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.6	0.9	2.9	10.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	0.5	0.8	2.4	8.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8			0.6	0.8	2.0	6.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
10			0.5	0.8	1.6	3.7	6.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
13			0.6	0.7	1.4	3.0	4.7	9.0	10.0 ²⁾	10.0 ²⁾
16				0.6	1.2	2.6	3.9	7.0	10.0 ²⁾	10.0 ²⁾
20					1.2	2.5	3.6	6.2	10.0 ²⁾	10.0 ²⁾
25					1.2	2.3	3.3	5.7	10.0 ²⁾	10.0 ²⁾
32						2.3	3.1	5.1	10.0 ²⁾	10.0 ²⁾
40							2.8	4.5	9.5	10.0 ²⁾

Short circuit selectivity **characteristic C** towards fuse link **D01-D03***)

PKNM	D01-D03 gL/gG									
I_n [A]	10	16	20	25	35	50	63	80	100	
2	<0.5 ¹⁾	0.5	0.5	2.4	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	<0.5 ¹⁾	0.9	3.4	9.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5	<0.5 ¹⁾	<0.5 ¹⁾	<0.5 ¹⁾	0.9	2.9	8.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6		<0.5 ¹⁾	<0.5 ¹⁾	0.8	2.3	6.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8			<0.5	0.7	2.1	5.5	9.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
10			<0.5	0.6	1.3	2.9	4.5	8.9	10.0 ²⁾	10.0 ²⁾
13					1.2	2.5	3.9	7.6	10.0 ²⁾	10.0 ²⁾
16					1.0	2.1	3.0	5.5	10.0 ²⁾	10.0 ²⁾
20					1.0	2.0	2.7	5.0	10.0 ²⁾	10.0 ²⁾
25						1.9	2.6	4.5	10.0 ²⁾	10.0 ²⁾
32							2.1	3.4	10.0 ²⁾	10.0 ²⁾
40								3.0	8.7	10.0 ²⁾

xPole

Short Circuit Selectivity PKNM-../1N/ towards NH-00 fuse link

In case of short circuit, there is selectivity between the combined RCD/MCB devices PKNM-../1N/ and the upstream fuses up to the specified values of the selectivity limit current I_s [kA] (i. e. in case of short-circuit currents I_{ks} under I_s , only the MCB will trip, in case of short circuit currents above this value both protective devices will respond).

*) basically in accordance with EN 60898-1 D.5.2.b

Short circuit selectivity **characteristic B** towards fuse link **NH-00***)

PKNM	NH-00 gL/gG											
I_n [A]	16	20	25	32	35	40	50	63	80	100	125	160
2	<0.5 ¹⁾	1.1	3.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	0.5	0.9	1.6	2.8	4.4	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6	<0.5 ¹⁾	0.5	0.8	1.4	2.2	3.3	7.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.0	1.9	2.8	5.3	7.8	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
10		<0.5 ¹⁾	0.7	0.9	1.5	2.1	3.4	4.3	7.3	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
13		<0.5 ¹⁾	0.6	0.8	1.4	1.8	2.8	3.6	5.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
16			0.6	0.7	1.2	1.5	2.4	3.0	4.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
20				0.7	1.1	1.5	2.2	2.8	4.2	9.2	10.0 ²⁾	10.0 ²⁾
25				0.7	1.1	1.4	2.1	2.6	4.0	8.2	10.0 ²⁾	10.0 ²⁾
32					1.0	1.4	2.0	2.5	3.7	7.1	10.0 ²⁾	10.0 ²⁾
40						2.3	3.4	6.2	8.8	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾

Short circuit selectivity **characteristic C** towards fuse link **NH-00***)

PKNM	NH-00 gL/gG											
I_n [A]	16	20	25	32	35	40	50	63	80	100	125	160
2	<0.5 ¹⁾	0.6	2.6	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
4	<0.5 ¹⁾	<0.5 ¹⁾	0.9	1.8	3.2	4.8	8.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
5	<0.5 ¹⁾	<0.5 ¹⁾	0.8	1.6	2.7	4.1	7.2	9.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
6	<0.5 ¹⁾	<0.5 ¹⁾	0.7	1.3	2.2	3.3	5.9	8.0	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
8	<0.5 ¹⁾	<0.5 ¹⁾	0.6	1.1	1.9	2.8	5.0	6.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
10			0.5	0.8	1.2	1.7	2.7	3.4	5.5	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
13					1.1	1.5	2.3	2.9	4.7	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
16					1.0	1.3	1.8	2.3	3.7	8.7	10.0 ²⁾	10.0 ²⁾
20					0.9	1.1	1.7	2.2	3.4	8.0	10.0 ²⁾	10.0 ²⁾
25						1.6	2.1	3.2	7.2	10.0 ²⁾	10.0 ²⁾	10.0 ²⁾
32							1.7	2.6	5.3	9.0	10.0 ²⁾	10.0 ²⁾
40								2.4	4.5	7.5	10.0 ²⁾	10.0 ²⁾

¹⁾ Selectivity limit current I_s under 0.5 kA

²⁾ Selectivity limit current I_s = rated breaking capacity I_{cn} of the RCD/MCB device

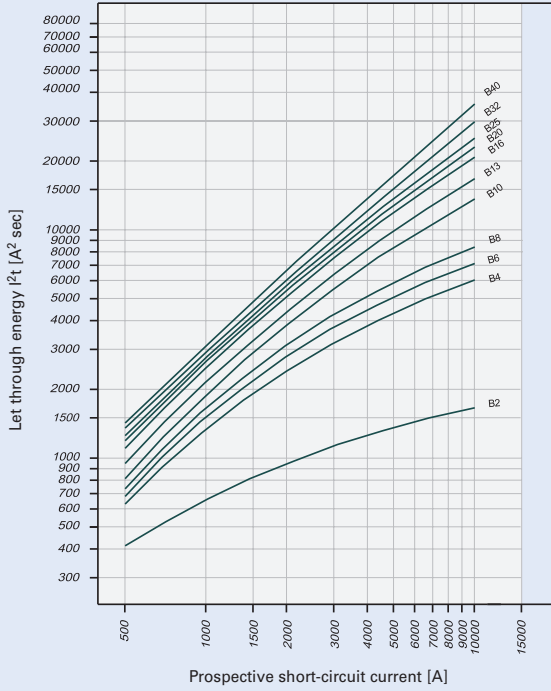
Darker areas: no selectivity



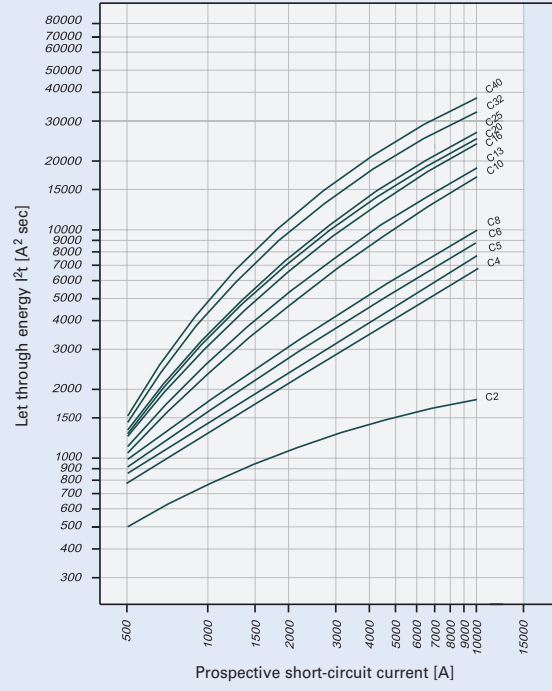
Protective Devices

Let-through Energy PKNM-../1N/

Let-through energy PKNM, characteristic B, 1+N-pole



Let-through energy PKNM, characteristic C, 1+N-pole



xPole

Protective Devices

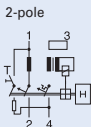
Combined RCD/MCB Devices PKNM, 2-pole

- Combined RCD/MCB device
- Line voltage-independent tripping
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Contact position indicator red - green
- Colour coding of the rated tripping currents
- Comprehensive range of accessories suitable for subsequent installation
- **Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed
- **Typ -G:** 10 ms time delay in order to avoid unwanted tripping (e.g. during thunderstorms) according to ÖVE E 8601. Compulsory in Austria for any circuit where personal injury or damage to property may occur in case of unwanted tripping (ÖVE-EN1, Part 1, §12.14).
- For fault current/residual current protection and line protection, particularly, for insulated network systems -IT, without defined neutral conductor

Accessories:

Auxiliary switch for subsequent installation	Z-AHK	248433
Tripping signal switch for subsequent installation	Z-NHK	248434
Shunt trip release	ZP-ASA	248438, 248439
Tripping module	Z-KAM	248294
Terminal cover cap	KLV-TC-2	276240
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	IS/SPE-1TE	101911

Connection diagram



Technical Data

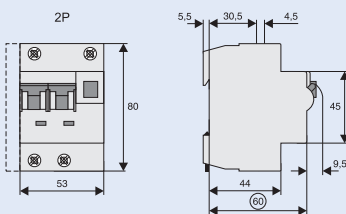
Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Tripping line voltage-independent	instantaneous 250A (8/20µs)
	surge current-proof;
	Type G 10 ms delay 3kA (8/20µs)
	surge current-proof
Rated voltage	230 V; 50 Hz
Operational voltage range	196-253 V
Rated tripping current	30, 300 mA
Rated non-tripping current $I_{\Delta no}$	$0.5 I_{\Delta n}$
Sensitivity	AC and pulsating DC
Selectivity class	3
Rated breaking capacity	10 kA
Rated current	6 - 32 A
Rated peak withstand voltage U_{imp}	4 kV (1.2/50µs)
Characteristic	B, C
Maximum back-up fuse (short circuit)	100 A gL (>10 kA)
Endurance electrical comp.	$\geq 4,000$ operating cycles
mechanical comp.	$\geq 20,000$ operating cycles

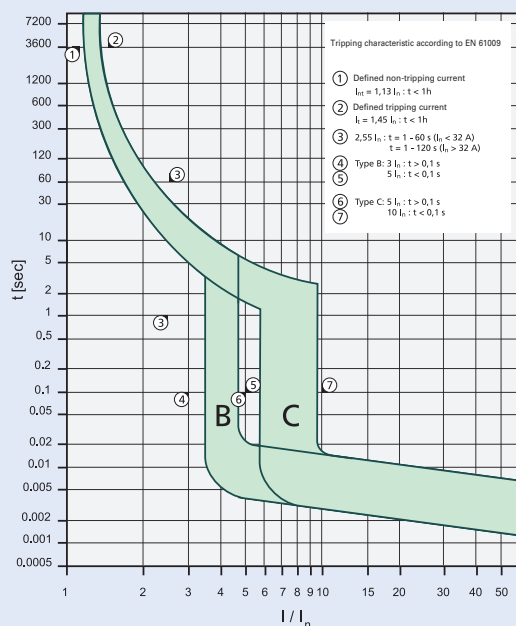
Mechanical

Frame size	45 mm
Device height	80 mm
Device width	52,5 mm (3MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1 - 25 mm ²
Busbar thickness	0.8 - 2 mm
Degree of protection, built-in	IP40
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61009

Dimensions (mm)



Tripping Characteristic PKNM-../2/.., Characteristics B and C



Protective Devices

Combined RCD/MCB Devices PKN6, 2-pole

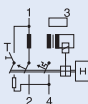
- Combined RCD/MCB device
- Line voltage-independent tripping
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Contact position indicator red - green
- Colour coding of the rated tripping currents
- Comprehensive range of accessories suitable for subsequent installation
- **Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed
- For fault current/residual current protection and line protection, particularly, for insulated network systems -IT, without defined neutral conductor

Accessories:

Auxiliary switch for subsequent installation	Z-AHK	248433
Tripping signal switch for subsequent installation	Z-NHK	248434
Shunt trip release	ZP-ASA	248438, 248439
Tripping module	Z-KAM	248294
Terminal cover cap	KLV-TC-2	276240
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	IS/SPE-1TE	101911

Connection diagram

2-pole



Technical Data

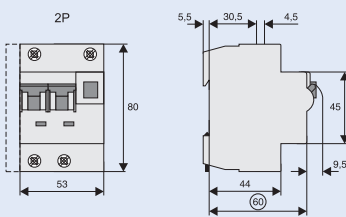
Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Tripping	
line voltage-independent	instantaneous 250A (8/20µs) surge current-proof
Rated voltage	230 V; 50 Hz
Operational voltage range	196-253 V
Rated tripping current	30, 300 mA
Rated non-tripping current $I_{\Delta no}$	$0.5 I_{\Delta n}$
Sensitivity	AC and pulsating DC
Selectivity class	3
Rated breaking capacity	6 kA
Rated current	6 - 32 A
Rated peak withstand voltage U_{imp}	4 kV (1.2/50µs)
Characteristic	B, C
Maximum back-up fuse (short circuit)	100 A gL (>6 kA)
Endurance	electrical comp. $\geq 4,000$ operating cycles mechanical comp. $\geq 20,000$ operating cycles

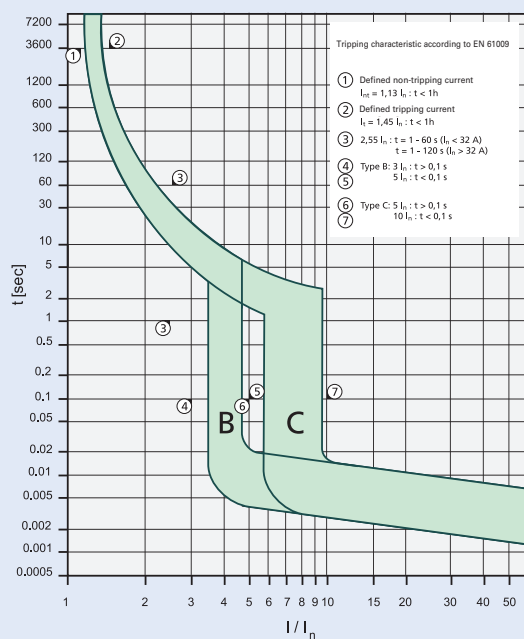
Mechanical

Frame size	45 mm
Device height	80 mm
Device width	52,5 mm (3MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1 - 25 mm ²
Busbar thickness	0.8 - 2 mm
Degree of protection, built-in	IP40
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61009

Dimensions (mm)



Tripping Characteristic PKN6-./2/.., Characteristics B and C



Protective Devices

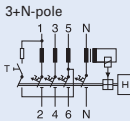
Combined RCD/MCB Devices mRB, 3+N-pole

- Combined RCD/MCB device
- Line voltage-independent tripping
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Guide for secure terminal connection
- Switching toggle (MCB component) in colour designating the rated current
- Contact position indicator red - green
- Fault current tripping indicator white - blue
- Comprehensive range of accessories suitable for subsequent installation
- **Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed

Accessories:

Auxiliary switch for subsequent installation	ZP-IHK	286052
	ZP-NHK	248437
	ZP-WHK	286053
Shunt trip release	ZP-ASA/..	248438, 248439
Switching interlock	IS/SPE-1TE	101911

Connection diagram



Technical Data

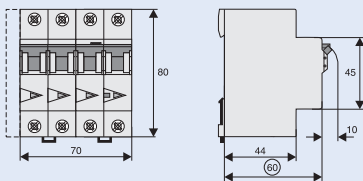
Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Tripping	
line voltage-independent	instantaneous 250A (8/20μs) surge current-proof
Rated voltage U_e	230/400V; 50Hz
Rated tripping current $I_{\Delta n}$	30, 100, 300 mA
Rated non-tripping current $I_{\Delta no}$	$0.5 I_{\Delta n}$
Sensitivity	AC and pulsating DC
Selectivity class	3
Rated breaking capacity	
mRB6	6 kA
mRB4	4.5 kA
Rated current	6 - 25 A
Rated peak withstand voltage U_{imp}	4 kV (1.2/50μs)
Characteristic	B, C, D
Maximum back-up fuse (short circuit)	100 A gL/gG
Endurance	
electrical comp.	$\geq 4,000$ operating cycles
mechanical comp.	$\geq 20,000$ operating cycles

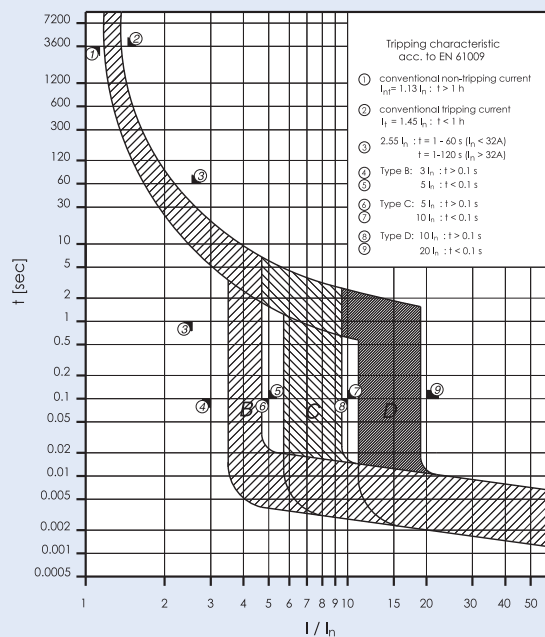
Mechanical

Frame size	45 mm
Device height	80 mm
Device width	70 mm (4MU)
Mounting	3-position DIN rail clip, permits removal from existing busbar system
Upper and lower terminals	open mouthed/lift terminals finger and hand touch safe, VBG4, ÖVE-EN 6
Terminal protection	
Terminal capacity	1 - 25 mm ²
Busbar thickness	0.8 - 2 mm
Degree of protection switch	IP20
Degree of protection, built-in	IP40
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC 68-2 (25...55°C / 90...95% RH)

Dimensions (mm)



Tripping Characteristic mRB, Characteristics B, C and D



Protective Devices

Electronic Combined RCD/MCB Devices PKDM, 1+N-pole, 2 Module Units

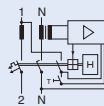
- Electronic residual current device / miniature circuit breaker combination
- Tripping line voltage dependent
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Contact position indicator red - green
- Protects against special forms of residual pulsating DC which have not been smoothed
- Comprehensive range of accessories suitable for subsequent installation

Accessories:

Auxiliary switch for subsequent installation	Z-AHK	248433
Tripping signal switch for subsequent installation	Z-NHK	248434
Shunt trip release	Z-ASA/..	248286, 248287
Tripping module	Z-KAM	248294
Terminal cover cap	KLV-TC-2	276240
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	IS/SPE-1TE	101911

Connection diagram

1+N-pole



Technical Data

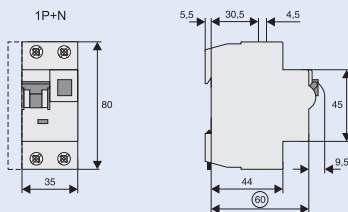
Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Tripping line voltage-dependent	instantaneous 250A (8/20µs) surge current-proof
Rated voltage	230 V; 50 Hz
Voltage range for protective function	60 - 250 V~
Rated tripping current	30, 300 mA
Rated non-tripping current $I_{\Delta no}$	$0.5 I_{\Delta n}$
Sensitivity	pulsating DC
Selectivity class	3
Rated breaking capacity	10 kA
Rated current	2 - 40 A
Characteristic	B, C, D
Maximum back-up fuse (short circuit)	100 A gL (>10 kA)
Ultimate short circuit breaking capacity I_{cn}	10 kA
Rated short circuit breaking capacity I_{cg}	7.5 kA
Rated fault breaking capacity $I_{\Delta m}$	10 kA
Endurance electrical comp.	≥ 4,000 operating cycles
mechanical comp.	≥ 20,000 operating cycles

Mechanical

Frame size	45 mm
Device height	80 mm
Device width	35 mm (2MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1 - 25 mm ²
Busbar thickness	0.8 - 2 mm
Degree of protection, built-in	IP40
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61009

Dimensions (mm)



xPole

Protective Devices

Electronic Combined RCD/MCB Devices PKS6, 1+N-pole, 1 Module Unit

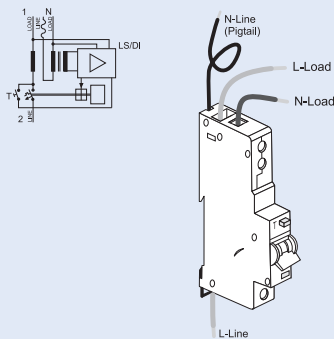
- Electronic residual current device / miniature circuit breaker combination in only 1MU
- Tripping line voltage dependent
- Contact position indicator red - green
- Can be sealed with leads in the on and off position
- Colour coded switching toggle (designating the rated current)
- Permanently connected neutral conductor (950 mm long)
- Special application in British-Standard-Distribution Boxes
- Can be connected to standard busbar (at the lower side)
- Comprehensive range of accessories suitable for subsequent installation

Accessories:

Auxiliary switch for subsequent installation	Z-AHK	248433
Tripping signal switch for subsequent installation	Z-NHK	248434
Shunt trip release	Z-ASA/..	248286, 248287
Tripping module	Z-KAM	248294

Connection diagram

1+N-pole



Technical Data

Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Number of poles	1+N-pole Pole switched, N led through (solid neutral)
Rated voltage U_n	240 VAC
Rated frequency	50/60 Hz
Rated current I_n	6 - 40 A
Rated tripping current $I_{\Delta n}$	10, 30, 100, 300 mA
Sensitivity	AC
Endurance	electrical comp. $\geq 4,000$ operating cycles mechanical comp. $\geq 20,000$ operating cycles

Tripping Characteristic RCD component:

Tripping	line voltage-dependent	instantaneous
Peak withstand current		250A (8/20 μ s)
Rated non-tripping current $I_{\Delta no}$		$0.5 I_{\Delta n}$
Voltage range for protective function		184 - 264 V~

Tripping Characteristic MCB component

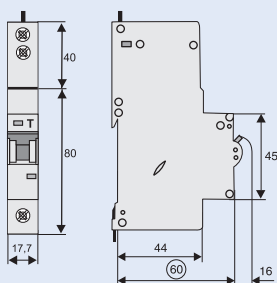
Conventional non-tripping current	$1.13 I_n$
Conventional tripping current	$1.45 I_n$
Reference temperature	30°C
Selectivity class	3
Maximum back-up fuse > 6 kA	100 A gL

Ultimate short circuit breaking capacity I_{mt}	Type B $3 I_n < I_{mt} \leq 5 I_n; t(I_{mt}) < 0,1s$ Type C $5 I_n < I_{mt} \leq 10 I_n; t(I_{mt}) < 0,1s$ Type D $10 I_n < I_{mt} \leq 20 I_n; t(I_{mt}) < 0,1s$
Ultimate short circuit breaking capacity I_{cn}	6 kA
Rated short circuit breaking capacity I_{nc}	6 kA
Rated fault breaking capacity $I_{\Delta m}$	6 kA

Mechanical

Frame size	45 mm
Device height	120 mm
Device width	17.5 mm (1MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Upper terminals	lift terminals
Lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1 - 25 mm ²
Busbar thickness below	0.8 - 2 mm
Degree of protection, built-in	IP40
Perm. ambient temperature range	-25°C to +40°C
Resistance to climatic conditions	25-55°C/90-95% relative humidity acc. to IEC 60068-2

Dimensions (mm)



xPole

Protective Devices

Combined RCD/MCB Devices PKNM-PT, 1+N-pole

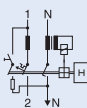
- Combined RCD/MCB device
- Line voltage-independent tripping
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above
- Busbar positioning optionally above or below
- Contact position indicator red - green
- Comprehensive range of accessories suitable for subsequent installation
- This compact protective device is specific for applications in the BS-distributor produced. Permanently connected neutral conductors (l = 550 mm, $\varnothing = 6 \text{ mm}^2$).

Accessories:

Auxiliary switch for subsequent installation	Z-AHK	248433
Tripping signal switch for subsequent installation	Z-NHK	248434
Shunt trip release	ZP-ASA	248438, 248439
Tripping module	Z-KAM	248294
Terminal cover cap	KLV-TC-2	276240
Additional terminal 35mm ²	Z-HA-EK/35	263960
Switching interlock	IS/SPE-1TE	101911

Connection diagram

1+N-pole



Technical Data

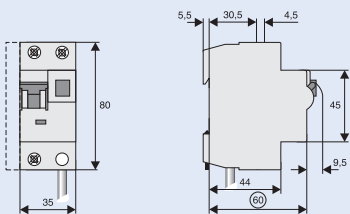
Electrical

Design according to	IEC/EN 61009
Current test marks as printed onto the device	
Tripping	
line voltage-independent	instantaneous 250A (8/20 μ s) surge current-proof
Rated voltage	230 V; 50 Hz
Operational voltage range	196-253 V
Rated tripping current	30 mA
Rated non-tripping current $I_{\Delta no}$	0.5 $I_{\Delta n}$
Sensitivity	AC
Selectivity class	3
Rated breaking capacity	10 kA
Rated current	6 - 40 A
Rated peak withstand voltage U_{imp}	4 kV (1.2/50 μ s)
Characteristic	B, C
Maximum back-up fuse (short circuit)	100 A gL (>6 kA)
Endurance electrical comp.	$\geq 4,000$ operating cycles
mechanical comp.	$\geq 20,000$ operating cycles

Mechanical

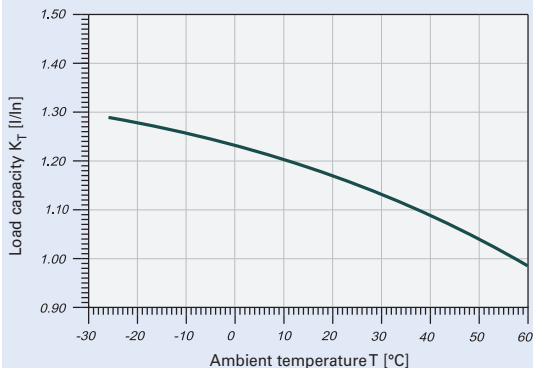
Frame size	45 mm
Device height	80 mm
Device width	35 mm (2MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Upper terminals	2 x open mouthed/lift terminals
Lower terminals	1 x open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1 - 25 mm ²
Busbar thickness above	0.8 - 2 mm
Degree of protection, built-in	IP40
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61009

Dimensions (mm)



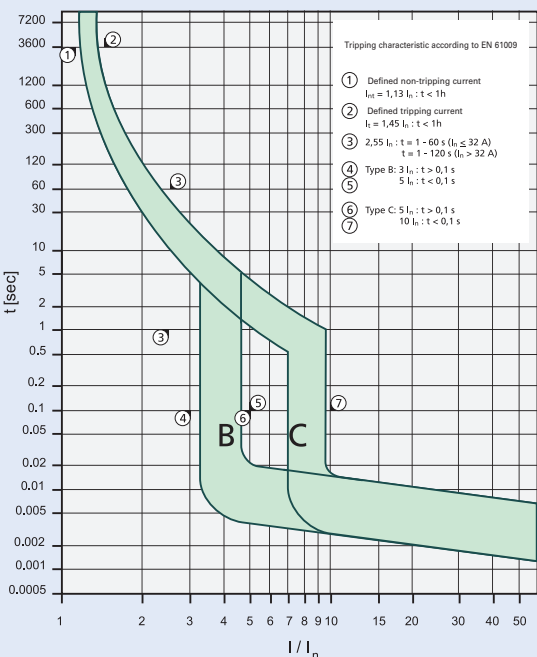
Load Capacity

Effect of ambient temperature (MCB component)



Valid for combined RCD/MCB devices 1+N-pole

Tripping Characteristic PKNM-./1N/..-PT, Characteristics B and C



xPole



Digital RCD

- **System Monitoring:** provides preventive information/warning before RCD trips on leakage current - **Reduces unwanted tripping**
- Rated Current: 16 A-100 A
- Rated operational Voltage: 50-254 V AC
- Sensitivity: 30,300mA
- Suitable for Isolation
- Delayed and instantaneous version
- Local LED indication on status of leakage current in the system
- Potential free, NO contact in parallel with yellow LED, upto 1A ohmic of load 230 V for extended pre warning function
- The green LED becomes active at 0-30% of the preset $I_{\Delta n}$
The yellow LED becomes active at 30-50% of the preset $I_{\Delta n}$
The red LED becomes active at >50% of the preset $I_{\Delta n}$
- Fault current tripping indicator - white/blue
- Real contact position indicator - red/green
- Add-on Trip contact / Auxiliary switch
- Main connection at either side
- Application specific versions available G,R,S,U,G/A,S/A

Protective Devices

Residual Current Devices dRCM - digital

- Residual current devices
- Shape compatible with and suitable for standard busbar connection to other devices of the P-series
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Universal tripping signal switch, also suitable for PLS., PKN., ZP-A. can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Contact position indicator red - green
- Tripping indicator white - blue
- Additional Safety
 - possibility to seal
 - possibility to lock in ON and OFF position
- Delayed types suitable for being used with standard fluorescent tubes with or without electronical ballast (30mA-RCD: 30 units per phase conductor, 100mA-RCD: 90 units per phase conductor)

Notes: Depending of the fluorescent lamp ballast manufacturer partly more possible. Symmetrical allocation of the fluorescent lamp ballasts on all phases favourably. Shifting references of the fluorescent lamp ballast manufacturer consider.
- The device functions irrespective of the position of installation
- Tripping is line voltage-independent. Consequently, the RCD is suitable for "fault current/residual current protection" and "additional protection" within the meaning of the applicable installation rules
- Mains connection at either side
- The 4-pole device can also be used for 3-pole connection: See connection possibilities.
- The 4-pole device can also be used for 2-pole connection: See connection possibilities.
- The test key "T" must be pressed every year. The system operator must be informed of this obligation and his responsibility in a way that can be proven. The yearly test interval is only valid for residential and similar applications. Under all other conditions (e.g. damply or dusty environment), it's recommended to test in shorter intervals (e.g. monthly). A test is further needed if red and yellow LED are on together.
- Pressing the test key "T" serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (R_E), or proper checking of the earth conductor condition redundant, which must be performed separately.
- Functioning**
 - The green LED becomes active at 0-30% $I_{\Delta n}$
 - The yellow LED becomes active at 30-50% $I_{\Delta n}$
 - The red LED becomes active at >50% $I_{\Delta n}$

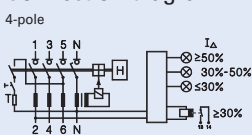
- Potential-free relay (NO contact, in parallel with the yellow LED, up to 1 A ohmic load / 230 V~) for external prewarning function. Bistabile, means the warning stays on also when the breaker trips, until reset.
- Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed
- Type -G:** High reliability against unwanted tripping. Compulsory for any circuit where personal injury or damage to property may occur in case of unwanted tripping (ÖVE/ÖNORM E 8001-1 § 12.1.6).
- Type -G/A:** Additionally protects against special forms of residual pulsating DC which have not been smoothed.
- Type -R:** To avoid unwanted tripping due to X-ray devices.
- Type -S:** Selective residual current device sensitive to AC, type -S. Compulsory for systems with surge arresters downstream of the RCD (ÖVE/ÖNORM E 8001-1 § 12.1.5).
- Type -S/A:** Additionally protects against special forms of residual pulsating pulsating DC which have not been smoothed.
- Type -U:** Suitable for speed-controlled drives with frequency converters in household, trade, and industry. Unwanted tripping is avoided thanks to a tripping characteristic designed particularly for frequency converters. See also explanation "Frequency Converter-Proof RCDs - What for?" Application according to ÖVE/ÖNORM E 8001-1 and Decision EN 219 (1989), VDE 0100, SEV 1000.

xPole

Accessories:

Auxiliary switch for subsequent installation to the left	Z-HK	248432
Tripping signal contact for subsequent installation to the right	Z-NHK	248434
Remote control and automatic switching device	Z-FW/LP	248296
Compact enclosure	KLV-TC-4	276241
Sealing cover set	Z-RC/AK-4TE	101062
Switching interlock	IS/SPE-1TE	101911

Connection diagram



Technical Data

Electrical

Design according to	IEC/EN 61008 Type G and G/A acc. to ÖVE E 8601
Current test marks as printed onto the device	
Tripping	instantaneous
Type G, R	10 ms delay
Type S	40 ms delay - with selective disconnecting function
Type U (only 30 mA)	10 ms delay
Type U (without 30 mA)	40 ms delay - with selective disconnecting function
Rated voltage U_n	230/400 and 240/415 V AC, 50/60 Hz
Operation voltage electronic	50 - 254V AC
Operation voltage test circuit	184 - 440V AC
Rated tripping current $I_{\Delta n}$	30, 300 mA
Sensitivity	AC and pulsating DC
Rated insulation voltage U_i	440 V
Rated impulse withstand voltage U_{imp}	4 kV (1.2/50 μ s)
Rated short circuit capacity I_{nc}	10 kA
Peak withstand current	
Type G, G/A, R, U (30mA)	3 kA (8/20 μ s) surge current proof
Type S/A, U (except 30mA)	typ. 5 kA (8/20 μ s) selective + surge current proof
Electrical isolation	> 4 mm contact space

Maximum back-up fuse	Short circuit and overload protection
$I_n = 16-63A$	63 A gG/gL
$I_n = 80A$	80 A gG/gL
$I_n = 100A$	100 A gG/gL
Endurance	
electrical comp.	$\geq 4,000$ operating cycles
mechanical comp.	$\geq 20,000$ operating cycles
Mechanical	
Frame size	45 mm
Device height	80 mm
Device width	70 mm (4MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Deg. of prot. in moisture-proof encl.	IP54
Upper and lower terminals	open mouthed/lift terminals
Terminal protection	finger and hand touch safe, BGV A3, ÖVE-EN 6
Terminal capacity	1.5 - 35 mm ² single wire 2 x 16 mm ² multi wire
Terminal screw	M5 (Pozidriv PZ2)
Terminal capacity warning contact(s)	0.25-1.5 mm ² (plug in terminals)
Terminal torque	2 - 2.4 Nm
Busbar thickness	0.8 - 2 mm
Tripping temperature	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61008
Contact position indicator	red / green
Tripping indicator	white / blue

Protective Devices

Local Indication RCCB

Status indication LED

Permanent light green



red / yellow / green

Normal operation

Permanent light yellow



The measured residual current is bigger than 30% of the nominal tripping value.

Permanent light red



The measured residual current is bigger than 50% of the nominal tripping value.

Remote Indication

Standard Version:

1 contact NO up to 230V AC, 2 terminals, 1 A ohmic load

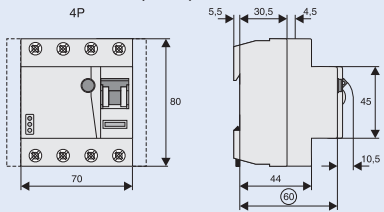
Optional Version: (available upon request)

1 NO + 1 NC up to 110V AC/contact, 2x2 terminals, 1 A ohmic load

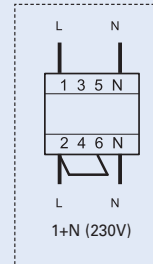
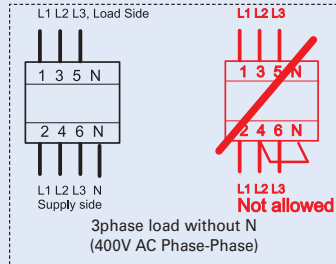
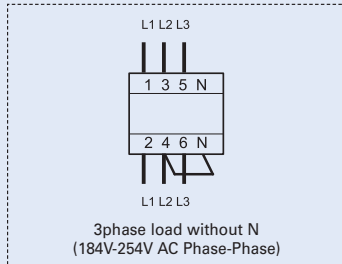
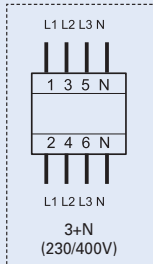
Terminal capacity of contacts:

0.25 - 1.5 mm²

Dimensions (mm)



Correct connection



Test button works within 184V – 440V AC !, Electronic works within 50-254V AC !

xPole

Protective Devices

PDIM Leakage Current Monitor

- Shape compatible with and suitable for standard busbar connection to other devices of the P-series
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Power supply via 'OR' disjunction of the 4 conductors
- Electronic functioning (line-voltage independent)
- The device works irrespective of the position of installation
- Mains connection at either side
- The 4-pole device can also be used for 3-pole connection. For this purpose use terminals 1-2, 3-4, and 5-6.
- The 4-pole device can also be used for 2-pole connection. For this purpose use terminals 5-6 and N-N.
- 2 potential-free relays (make contact, in parallel with the yellow and red LED) (up to 10 A / 230 V~)

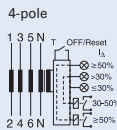
Functioning

- The green LED becomes active at 0-30% of the preset $I_{\Delta n}$. The yellow LED becomes active at 30-50% of the preset $I_{\Delta n}$. The red LED becomes active at >50% of the preset $I_{\Delta n}$.
- The yellow LED turns off again when the identified residual current is <30% of the preset $I_{\Delta n}$.
- The red LED stays on even if the identified residual current is <50% of the preset $I_{\Delta n}$.
- The red LED will only turn off after pressing the reset button.
- Only one LED will be active at a time.
- An output relay will always be switched simultaneously with the yellow or red LED
- Depending on the setting of the type of RCD (instantaneous, G, S), the residual current needs to flow a sufficiently long time before an action is triggered.

Test function

- The rotary coding switch for the RCD switch function is to be set to "TEST". The device then alternately simulates residual currents of 30% and 50% of the $I_{\Delta n}$. In this process, the yellow and red LED flash alternately (1 Hz), both output relays remain permanently energised.

Connection diagram



Technical Data

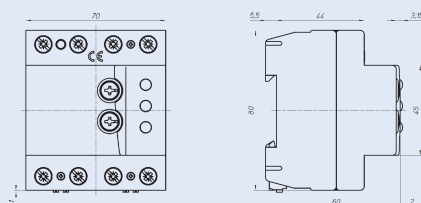
Electrical

Design similar to	DIN/EN 62020
Current test marks as printed onto the device	
Rated current I_n	40 A, 100 A
Tripping behaviour (adjustable)	instantaneous
Type G	10 ms delay
Type S	40 ms delay - selective
Rated voltage U_n	230/400 V, 50/60 Hz 240/415 V, 50/60 Hz
Rated tripping current $I_{\Delta n}$ (adjustable)	30, 100, 300, 500, 1000 mA
Sensitivity	AC and pulsating DC
Rated insulation voltage U_i	440 V
Rated short circuit resistance I_{nc}	10 kA
Max. back-up fuse admitted	Short-circuit Overload
$I_n = 40A$	63 A gG/gL 40 A gG/gL
$I_n = 100A$	100 A gG/gL 63 A gG/gL
Switching contacts	potential-free 10 A / 230 V~
Tripping behaviour of the contacts	1: 30-50% $I_{\Delta n}$ 2: >50% $I_{\Delta n}$
Endurance	electrical comp. $\geq 4,000$ operating cycles mechanical comp. $\geq 20,000$ operating cycles

Mechanical

Frame size	45 mm
Device height	80 mm
Device width	70 mm (4MU)
Mounting	Quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in	IP40
Degree of prot. in splash-proof encl.	IP54
Upper and lower terminals	Open-mouthed/lift terminals
Terminal protection	Protection against accidental contact according to BGV A3, ÖVE-EN 6
Terminal capacity (1, 2, 3, 4, 5, 6, N, N)	1.5 - 35 mm ² single-wired 2 x 16 mm ² multi-wired
Terminal capacity of switching contacts	0.25 - 1.5 mm ²
Busbar thickness	0.8 - 2 mm
Admitted ambient temperature range	-25°C to +40°C
Resistance to climatic conditions	acc. to IEC/EN 61008

Dimensions (mm)





■ Distribution Board

- Application standard BS EN: 60439-3/ EN: 50298/IS 13032 : 91
- Sheet steel construction powder coated to RAL: 7035
- IP 42 degree of protection for double door & IP 20 for single door
- Aesthetically designed distribution boards that blends with all interior
- Optimized dimensions with ample wiring space
- Incoming options: Isolator, RCD, RCBO. MCCB for direct connections or Isolator with RCCB in one line
- Provided with Earth Bar Neutral Bar & DIN Channel
- Adequate numbers of knockouts, detachable plates of various sizes are provided both at the top and the bottom to enable easy installation and connection of conduits of all sizes.
- Single piece copper busbar to eliminate potential hotspots
- Door earthing to ensure total safety
- Single Phase with 125A Busbar
- Three Phase with 250A Busbar

Distribution Boards



Door Earthing



Captive Screws



Safe Corners



Metal / Plastic Enclosure



MCB Distribution Boards

Single Phase with 125A Busbar, Type - A

General

- Incoming options:
2 Pole Isolator, 2 Pole RCD,
100A Direct Connection Terminal Block
- Applicable standard BS EN 60439-3 / EN 50298 / IS 13032 : 91

Technical Data

Electrical Data

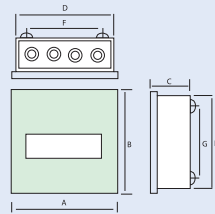
Busbar nominal rating	125A
Busbar short circuit withstand	16kA fuse
Rated voltage	240V AC 50/60Hz
Maximum incomer rating	100A
Maximum outgoing device	63A

Mechanical Data

Ingress protection rating	IP42 when the door is closed IP20 when the door is open
Paint finish	RAL 7035 Glossy, epoxy polyester coated
Limits of operation	40°C ambient 50% RH
Enclosure steel gauge	1.2mm
Gland plate	Sufficient knockouts
Maximum cable capacity:	
Neutral bar	16mm ²
Earth bar	16mm ²
Main earth termination	16mm ²
Incomers and outgoers:	
RCBO	25mm ²
RCD	63A: 25mm ² , 80-100A: 50mm ²
MCB	25mm ²

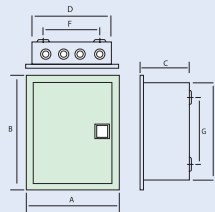
Dimensions (mm)

Single Door



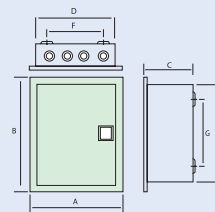
MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MRHSPNSD04	154	224	63	140	210	90	160
6	MRHSPNSD06	189	224	63	175	210	125	160
8	MRHSPNSD08	224	224	63	210	210	160	160
12	MRHSPNSD12	294	224	63	280	210	230	160
16	MRHSPNSD16	364	224	63	350	210	300	160

Double Door (Metal)



MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MRHSPNDD04	165	235	86	140	210	90	160
6	MRHSPNDD06	200	235	86	175	210	125	160
8	MRHSPNDD08	235	235	86	210	210	160	160
12	MRHSPNDD12	305	235	86	280	210	230	160
16	MRHSPNDD16	375	235	86	350	210	300	160

Double Door (Acrylic)



MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MAHSPNDD04	165	235	86	140	210	90	160
6	MAHSPNDD06	200	235	86	175	210	125	160
8	MAHSPNDD08	235	235	86	210	210	160	160
12	MAHSPNDD12	305	235	86	280	210	230	160
16	MAHSPNDD16	375	235	86	350	210	300	160

Note : Dimensions are subject to change due to continuous improvement. Please contact sales office for further details.

MCB Distribution Boards

Three Phase with 250A Busbar, Type - B

General

- Incoming options:
3 or 4 Pole Isolator, 4 Pole RCD or combination of 4 pole Isolator & RCCB or 4 pole MCCB
- Applicable standard BS EN 60439-1 and 3 / EN 50298 / IS 13032 : 91

Technical Data

Electrical Data

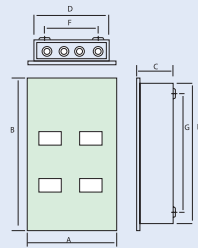
Busbar nominal rating	250A
Busbar Short circuit withstand	16kA ... 1.2 sec. 22kA ... 0.5 sec.
Rated voltage	415V AC 50/60Hz
Maximum incomer rating	Internal device - 125A External device - 250A
Maximum feeder rating	63A

Mechanical Data

Ingress protection rating	IP42 when the door is closed and IP20 when the door is open
Paint finish	RAL 7035 Glossy, epoxy polyester coated
Limits of operation	40°C ambient 50% RH
Enclosure steel gauge	1.2mm
Gland plates	sufficient knockouts
Maximum cable capacity:	
Neutral bar	25mm ²
Earth bar	25mm ²
Main earth termination	25mm ²
Incomers and outgoers:	
RCBO	25mm ²
RCD	63A: 25mm ² , 80-100A: 50mm ²
MCB	25mm ²

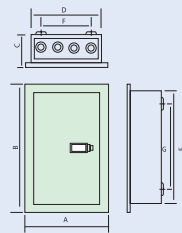
Dimensions (mm)

Single Door



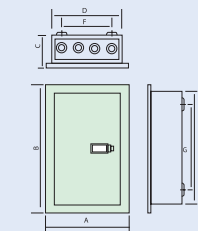
MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MRHTPNSD04	309	459	86	295	445	225	375
6	MRHTPNSD06	344	459	86	330	445	260	375
8	MRHTPNSD08	414	459	86	400	445	330	375
12	MRHTPNSD12	554	459	86	540	445	470	375

Double Door (Metal)



MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MRHTPNDD04	315	470	86	295	445	225	375
6	MRHTPNDD06	355	470	86	330	445	260	375
8	MRHTPNDD08	425	470	86	400	445	330	375
12	MRHTPNDD12	565	470	86	540	445	470	375

Double Door (Acrylic)



MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MAHTPNDD04	315	470	86	295	445	225	375
6	MAHTPNDD06	355	470	86	330	445	260	375
8	MAHTPNDD08	425	470	86	400	445	330	375
12	MAHTPNDD12	565	470	86	540	445	470	375

Note : Dimensions are subject to change due to continuous improvement. Please contact sales office for further details.

MCB Distribution Boards

Three Phase(Vertical) with 250A Busbar, C-Type

General

- Incoming options:
3 Pole MCCB / 4 Pole Isolator / 4 Pole MCB
- Applicable standard BS EN 60439-1 and 3 / EN 50298 / IS 13032 : 91

Technical Data

Electrical Data

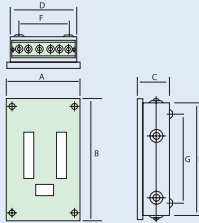
Busbar nominal rating	250A
Busbar Short circuit withstand	16kA ... 1.2 sec. 22kA ... 0.5 sec.
Rated voltage	415V AC 50/60Hz
Maximum incomer rating	Internal device - 125A External device - 250A
Maximum feeder rating	100A

Mechanical Data

Ingress protection rating	IP42 when the door is closed and IP20 when the door is open
Paint finish	RAL 7035 Glossy, epoxy polyester coated
Limits of operation	40°C ambient 50% RH
Enclosure steel gauge	1.2mm
Gland plates	Sufficient knockouts
Maximum cable capacity:	
Neutral bar	25mm ²
Earth bar	25mm ²
Main earth termination	25mm ²
Incomers and outgoers:	
RCBO	25mm ²
MCB	63A: 25mm ² , 80-100A: 50mm ² 25mm ²

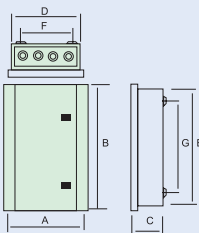
Dimensions (mm)

Single Door



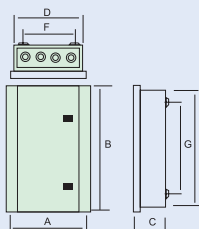
MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MRVTPNSD04	384	509	90	370	495	300	425
8	MRVTPNSD08	384	614	90	370	600	300	530
12	MRVTPNSD12	384	719	90	370	705	300	635

Double Door (Metal)



MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MRVTPNDD04	395	520	110	370	495	300	425
8	MRVTPNDD08	395	625	110	370	600	300	530
12	MRVTPNDD12	395	730	110	370	709	300	635

Double Door (Acrylic)



MCBs Ways	Type Designation	A	B	C	D	E	F	G
4	MAVTPNDD04	395	520	110	370	495	300	425
8	MAVTPNDD08	395	625	110	370	600	300	530
12	MAVTPNDD12	395	730	110	370	709	300	635

Note : Dimensions are subject to change due to continuous improvement. Please contact sales office for further details.

MCB Distribution Boards

Three Phase(Per Phase Isolation) with 250A Busbar, D-Type

General

- Incoming options:
4 Pole Isolator+ RCCB or 4 Pole MCB + RCCB
- Outgoing options:
2 Pole RCCB in each phase and SP MCB
- Applicable standard BS EN 60439-1 and 3 / EN 50298 / IS 13032 : 91

Technical Data

Electrical Data

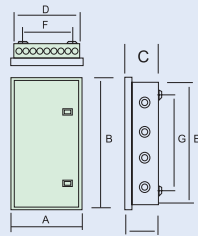
Busbar nominal rating	250A
Busbar Short circuit withstand	16kA ... 1.2 sec. 22kA ... 0.5 sec.
Rated voltage	415V AC 50/60Hz
Maximum incomer rating	Internal device - 125A External device - 250A
Maximum feeder rating	63A

Mechanical Data

Ingress protection rating	IP42 when the door is closed and IP20 when the door is open
Paint finish	RAL 7035 Glossy, epoxy polyester coated
Limits of operation	40°C ambient 50% RH
Enclosure steel gauge	1.2mm
Gland plates	Sufficient knockouts
Maximum cable capacity:	
Neutral bar	25mm ²
Earth bar	25mm ²
Main earth termination	25mm ²
Incomers and outgoers:	
RCBO	25mm ²
RCD	63A: 25mm ² , 80-100A: 50mm ²
MCB	25mm ²

Dimensions (mm)

Double Door



MCBs Ways	Type Designation	A	B	C	D	E	F	G
2 + 4	MRHPPIDD04	353	748	92	325	720	250	645
2 + 6	MRHPPIDD06	353	748	92	325	720	250	645
2 + 8	MRHPPIDD08	423	748	92	395	720	320	645
2 + 10	MRHPPIDD10	423	748	92	395	720	320	645
2 + 12	MRHPPIDD12	453	748	92	425	720	350	645

Note : Dimensions are subject to change due to continuous improvement. Please contact sales office for further details.

Consumer Unit

MCBs Ways	Type Designation	A	B	C	D	E	F	G
04	MAHSPNCU04	224	224	63	210	210	160	160
06	MAHSPNCU06	259	224	63	245	210	195	160
08	MAHSPNCU08	294	224	63	280	210	230	160
10	MAHSPNCU10	329	224	63	315	210	265	160
12	MAHSPNCU12	364	224	63	350	210	300	160

MCB Enclosure

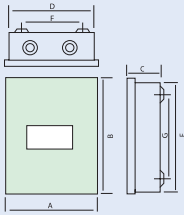
Type - E

General

- Incoming options:
2 / 4 Pole MCB
- Applicable standard BS EN 60439-3 / EN 50298 / IS 13032 : 91

Dimensions (mm)

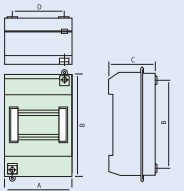
Type - Sheet Steel



MCBs Ways	Type Designation	A	B	C	D	E	F	G
1 / 2	MRME02	85	155	63	75	145	35	105
3 / 4	MRME04	115	155	63	105	145	65	105

Dimensions (mm)

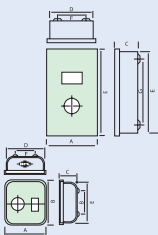
Type - Plastic



MCBs Ways	Type Designation	A	B	C	D	E
2	MRPE02	52	131	60	36	113
4	MRPE04	87	131	60	71	113

Dimensions (mm)

Type - AC Box



Single Phase

MCBs Ways	Type Designation	A	B	C	D	E	F	DIA
2	MRPSS1P10	122	160	63	112	150	80	105
4	MRPSS1P20	122	160	63	112	150	80	105

Three Phase

MCBs Ways	Type Designation	A	B	C	D	E	F	DIA
2	MRPSS3P20	130	290	63	115	275	65	225
4	MRPSS3P30	130	290	63	115	275	65	225

Note : Dimensions are subject to change due to continuous improvement. Please contact sales office for further details.

Eaton Corporation is a diversified power management company ranked among the largest fortune 500 companies with annual revenues of \$13.7 Billion and presence in more than 150 countries worldwide. Eaton's Electrical business is a global leader in Power Distribution, Power Quality, Control, Automation Solutions and Services. Eaton's electrical solutions are a powerful combination of some of the most respected global products lines including Moeller®, Westinghouse®, Cutler-Hammer®, Holec®, MEM® MGE Office Protections Systems™ and Powerware® to meet every power management needs of the Industrial, Utility, Commercial & Residential Buildings, IT, Mission critical, Alternate Energy and OEM markets worldwide.

Eaton Power Quality Pvt. Ltd. is a 100% subsidiary of Eaton Corporation with head office at New Delhi and a network of sales & service offices spread across India providing industry leading electrical solutions to enable our customers manage electrical power more efficiently, reliably and safely.



Powering Business Worldwide

Headquarters

Eaton's Electrical Sector

Americas Region

8609 Six Forks Road Raleigh, NC 27615 U.S.A

South Asia Office

Eaton's Electrical Sector

Asia Pacific Region

Eaton Power Quality Pvt. Ltd.

Unit No. 1, Second Floor, TDI Centre, Jasola

New Delhi-110 044, India. Tel: +91 11 4223 2300

Sales Hotline : +91 11 4223 23 6 4

E-mail : EatonPowerQualityIndia@eaton.com

www.eaton.com

www.moeller.net

©2011 Eaton Corporation • All Rights Reserved • India

Offices Across India

Mumbai

EL Floor, 'VITS' Luxury Business Hotel

Andheri Kurla Road, Andheri (E)

Mumbai - 400059

Mobile : +91 9323432237

Chennai

No. 22, Chamier's Road

Block "D" Ashika Chambers

Teynampet, Chennai-600 018, India

Tel : +91 9382525656

Bangalore

8th Floor, Unity Building, J. C. Road

Bangalore-560 002, India

Mobile : +91 9886303226

Pune

144, Off. Mumbai-Pune Road,

Pimpri Pune-411018

Tel: 91 29 30611886

Kolkata

Matrix Tower,

DN-24, 2 nd floor

Room No 203

Sector -V, Salt Lake City

Kolkata-70091

Tel: 91 33 32931395