DC Miniature Circuit Breakers **Ex9BP**



- DC Miniature Circuit Breakers
- Non-polarized, suitable for photovoltaic applications
- Tested according to IEC / EN 60947-2
- Rated short circuit breaking capacity I_{cu} 10 kA
- Rated operating voltage U_e of 150 V DC per pole
- Width 1 up to 4 modules
- Tripping characteristics C, K
- Rated current up to 63 A
- Wide range of accessories

DC miniature circuit breakers Ex9BP are designed for direct current applications. Thanks to their polarity iinde-pendence, they are suitable for photovoltaic aplications.

It can be combined with wide range of accessories including auxiliary and signal contacts, shunt trip release and undervoltage release. It is possible to create diversed combination of accessories. These combinations are only limited by total number, not by the type of accessories - all components fit together. It can be used up to three units of auxiliary or alarm contacts plus up to two units for release units.

Type Key

Ex9	BP	3P	DC 450 V	C	16
Product family	Product	Poles	Rated voltage	Tripping curve	Rated current
Ex9	Non-polarized DC MCBs	1, 2, 3, 4	DC 150 V DC 300 V DC 450 V DC 600 V	C, K	1 — 63 A

Certification marks

CE

Accessories



Aux. or signal contacts **AX, AL, AXL** Up to 3 units	Voltage or trip releases **SHT, UVT** Up to 2 units	Miniature Circuit Breaker **Ex9BP** 1, 2, 3, 4-module width

Auxiliary contacts AX31

Alarm contact AL3

Auxiliary and alarm contact AXL31

Shunt trip releases SHT31

Undervoltage releases UVT31

All accessories are mounted to the MCBs Ex9BP from the left. The undervoltage release UVT in PV system is intended e.g. for safe remote disconnection of DC part from installation.

DC Miniature Circuit Breakers **Ex9BP**

C-Characteristic, 1-pole, 150 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	1 MU	C	109962	Ex9BP 1P DC150V C1	1/12/144
2 A	1 MU	C	109963	Ex9BP 1P DC150V C2	1/12/144
3 A	1 MU	C	109964	Ex9BP 1P DC150V C3	1/12/144
4 A	1 MU	C	109965	Ex9BP 1P DC150V C4	1/12/144
6 A	1 MU	C	109966	Ex9BP 1P DC150V C6	1/12/144
10 A	1 MU	C	109967	Ex9BP 1P DC150V C10	1/12/144
16 A	1 MU	C	109968	Ex9BP 1P DC150V C16	1/12/144
20 A	1 MU	C	109969	Ex9BP 1P DC150V C20	1/12/144
25 A	1 MU	C	109970	Ex9BP 1P DC150V C25	1/12/144
32 A	1 MU	C	109971	Ex9BP 1P DC150V C32	1/12/144
40 A	1 MU	C	109972	Ex9BP 1P DC150V C40	1/12/144
50 A	1 MU	C	109973	Ex9BP 1P DC150V C50	1/12/144
63 A	1 MU	C	109974	Ex9BP 1P DC150V C63	1/12/144

C-Characteristic, 2-pole, 300 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	2 MU	C	109975	Ex9BP 2P DC300V C1	1/6/72
2 A	2 MU	C	109976	Ex9BP 2P DC300V C2	1/6/72
3 A	2 MU	C	109977	Ex9BP 2P DC300V C3	1/6/72
4 A	2 MU	C	109978	Ex9BP 2P DC300V C4	1/6/72
6 A	2 MU	C	109979	Ex9BP 2P DC300V C6	1/6/72
10 A	2 MU	C	109980	Ex9BP 2P DC300V C10	1/6/72
16 A	2 MU	C	109981	Ex9BP 2P DC300V C16	1/6/72
20 A	2 MU	C	109982	Ex9BP 2P DC300V C20	1/6/72
25 A	2 MU	C	109983	Ex9BP 2P DC300V C25	1/6/72
32 A	2 MU	C	109984	Ex9BP 2P DC300V C32	1/6/72
40 A	2 MU	C	109985	Ex9BP 2P DC300V C40	1/6/72
50 A	2 MU	C	109986	Ex9BP 2P DC300V C50	1/6/72
63 A	2 MU	C	109987	Ex9BP 2P DC300V C63	1/6/72

C-Characteristic, 3-pole, 450 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	3 MU	C	109988	Ex9BP 3P DC450V C1	1/4/48
2 A	3 MU	C	109989	Ex9BP 3P DC450V C2	1/4/48
3 A	3 MU	C	109990	Ex9BP 3P DC450V C3	1/4/48
4 A	3 MU	C	109991	Ex9BP 3P DC450V C4	1/4/48
6 A	3 MU	C	109992	Ex9BP 3P DC450V C6	1/4/48
10 A	3 MU	C	109993	Ex9BP 3P DC450V C10	1/4/48
16 A	3 MU	C	109994	Ex9BP 3P DC450V C16	1/4/48
20 A	3 MU	C	109995	Ex9BP 3P DC450V C20	1/4/48
25 A	3 MU	C	109996	Ex9BP 3P DC450V C25	1/4/48
32 A	3 MU	C	109997	Ex9BP 3P DC450V C32	1/4/48
40 A	3 MU	C	109998	Ex9BP 3P DC450V C40	1/4/48
50 A	3 MU	C	109999	Ex9BP 3P DC450V C50	1/4/48
63 A	3 MU	C	110000	Ex9BP 3P DC450V C63	1/4/48

DC Miniature Circuit Breakers **Ex9BP**

C-Characteristic, 4-pole, 600 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	4 MU	C	110001	Ex9BP 4P DC600V C1	1/3/36
2 A	4 MU	C	110002	Ex9BP 4P DC600V C2	1/3/36
3 A	4 MU	C	110003	Ex9BP 4P DC600V C3	1/3/36
4 A	4 MU	C	110004	Ex9BP 4P DC600V C4	1/3/36
6 A	4 MU	C	110005	Ex9BP 4P DC600V C6	1/3/36
10 A	4 MU	C	110006	Ex9BP 4P DC600V C10	1/3/36
16 A	4 MU	C	110007	Ex9BP 4P DC600V C16	1/3/36
20 A	4 MU	C	110008	Ex9BP 4P DC600V C20	1/3/36
25 A	4 MU	C	110009	Ex9BP 4P DC600V C25	1/3/36
32 A	4 MU	C	110010	Ex9BP 4P DC600V C32	1/3/36
40 A	4 MU	C	110011	Ex9BP 4P DC600V C40	1/3/36
50 A	4 MU	C	110012	Ex9BP 4P DC600V C50	1/3/36
63 A	4 MU	C	110013	Ex9BP 4P DC600V C63	1/3/36

DC Miniature Circuit Breakers **Ex9BP**

K-Characteristic, 1-pole, 150 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	1 MU	K	110015	Ex9BP 1P DC150V K1	1/12/144
2 A	1 MU	K	110016	Ex9BP 1P DC150V K2	1/12/144
3 A	1 MU	K	110017	Ex9BP 1P DC150V K3	1/12/144
4 A	1 MU	K	110018	Ex9BP 1P DC150V K4	1/12/144
6 A	1 MU	K	110019	Ex9BP 1P DC150V K6	1/12/144
10 A	1 MU	K	110020	Ex9BP 1P DC150V K10	1/12/144
16 A	1 MU	K	110021	Ex9BP 1P DC150V K16	1/12/144
20 A	1 MU	K	110022	Ex9BP 1P DC150V K20	1/12/144
25 A	1 MU	K	110023	Ex9BP 1P DC150V K25	1/12/144
32 A	1 MU	K	110024	Ex9BP 1P DC150V K32	1/12/144
40 A	1 MU	K	110025	Ex9BP 1P DC150V K40	1/12/144
50 A	1 MU	K	110026	Ex9BP 1P DC150V K50	1/12/144
63 A	1 MU	K	110027	Ex9BP 1P DC150V K63	1/12/144

K-Characteristic, 2-pole, 300 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	2 MU	K	110028	Ex9BP 2P DC300V K1	1/6/72
2 A	2 MU	K	110029	Ex9BP 2P DC300V K2	1/6/72
3 A	2 MU	K	110030	Ex9BP 2P DC300V K3	1/6/72
4 A	2 MU	K	110031	Ex9BP 2P DC300V K4	1/6/72
6 A	2 MU	K	110032	Ex9BP 2P DC300V K6	1/6/72
10 A	2 MU	K	110033	Ex9BP 2P DC300V K10	1/6/72
16 A	2 MU	K	110034	Ex9BP 2P DC300V K16	1/6/72
20 A	2 MU	K	110035	Ex9BP 2P DC300V K20	1/6/72
25 A	2 MU	K	110036	Ex9BP 2P DC300V K25	1/6/72
32 A	2 MU	K	110037	Ex9BP 2P DC300V K32	1/6/72
40 A	2 MU	K	110038	Ex9BP 2P DC300V K40	1/6/72
50 A	2 MU	K	110039	Ex9BP 2P DC300V K50	1/6/72
63 A	2 MU	K	110040	Ex9BP 2P DC300V K63	1/6/72

K-Characteristic, 3-pole, 450 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	3 MU	K	110041	Ex9BP 3P DC450V K1	1/4/48
2 A	3 MU	K	110042	Ex9BP 3P DC450V K2	1/4/48
3 A	3 MU	K	110043	Ex9BP 3P DC450V K3	1/4/48
4 A	3 MU	K	110044	Ex9BP 3P DC450V K4	1/4/48
6 A	3 MU	K	110045	Ex9BP 3P DC450V K6	1/4/48
10 A	3 MU	K	110046	Ex9BP 3P DC450V K10	1/4/48
16 A	3 MU	K	110047	Ex9BP 3P DC450V K16	1/4/48
20 A	3 MU	K	110048	Ex9BP 3P DC450V K20	1/4/48
25 A	3 MU	K	110049	Ex9BP 3P DC450V K25	1/4/48
32 A	3 MU	K	110050	Ex9BP 3P DC450V K32	1/4/48
40 A	3 MU	K	110051	Ex9BP 3P DC450V K40	1/4/48
50 A	3 MU	K	110052	Ex9BP 3P DC450V K50	1/4/48
63 A	3 MU	K	110053	Ex9BP 3P DC450V K63	1/4/48

DC Miniature Circuit Breakers **Ex9BP**

K-Characteristic, 4-pole, 600 V DC



Rated current	Width	Char.	Article No.	Type	Packing
1 A	4 MU	K	110054	Ex9BP 4P DC600V K1	1/3/36
2 A	4 MU	K	110055	Ex9BP 4P DC600V K2	1/3/36
3 A	4 MU	K	110056	Ex9BP 4P DC600V K3	1/3/36
4 A	4 MU	K	110057	Ex9BP 4P DC600V K4	1/3/36
6 A	4 MU	K	110058	Ex9BP 4P DC600V K6	1/3/36
10 A	4 MU	K	110059	Ex9BP 4P DC600V K10	1/3/36
16 A	4 MU	K	110060	Ex9BP 4P DC600V K16	1/3/36
20 A	4 MU	K	110061	Ex9BP 4P DC600V K20	1/3/36
25 A	4 MU	K	110062	Ex9BP 4P DC600V K25	1/3/36
32 A	4 MU	K	110063	Ex9BP 4P DC600V K32	1/3/36
40 A	4 MU	K	110064	Ex9BP 4P DC600V K40	1/3/36
50 A	4 MU	K	110065	Ex9BP 4P DC600V K50	1/3/36
63 A	4 MU	K	110066	Ex9BP 4P DC600V K63	1/3/36

DC Miniature Circuit Breakers up to 63 A

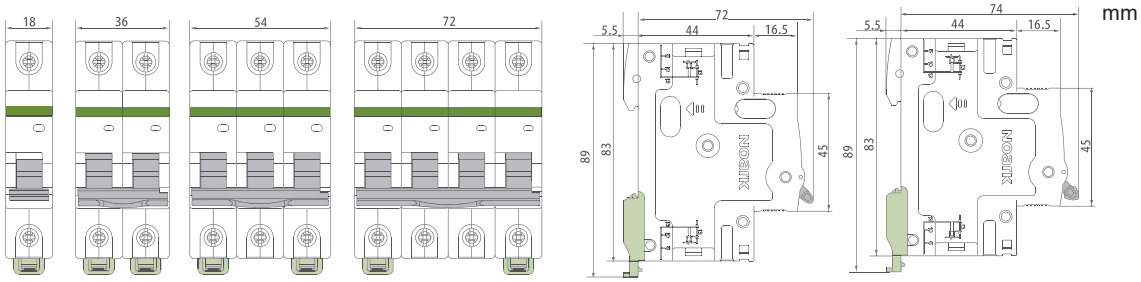
General parameters		
Non-polarized, suitable for general DC as well as Photovoltaic applications		
Accessories		
Auxiliary contacts	AX3111, AX3122	100540, 100542
Alarm contact	AL3111	100541
Auxiliary and alarm contact	AXL31	100543
Shunt trip releases	SHT31, SHT3111	100544-100546, 100547-100549
Undervoltage releases	UVT31, UVT3101, UVT3110	100550-100551, 100552-100553, 100554-100555
Max. number of installed accessories is 3 pcs of one contact units (AX3111, AL3111) or 2 pcs of two contact units (AX3122, AXL31) and 2 pcs of releases (SHT31, UVT31)		

Electrical parameters	
Tested according to	IEC / EN 60947-2
Rated operating voltage U_e	150 (1P), 300 (2P), 450 (3P), 600 (4P) V DC
Rated breaking capacity I_{cu}	10 kA
Rated current I_n	1 — 63 A
Tripping characteristics	C, K
Rated impulse withstand voltage U_{imp}	4 kV
Rated insulation voltage U_i	1 000 V DC
Mechanical service life	20 000 operation cycles
Electrical service life	2 500 operation cycles
Line voltage connection	arbitrary above or below

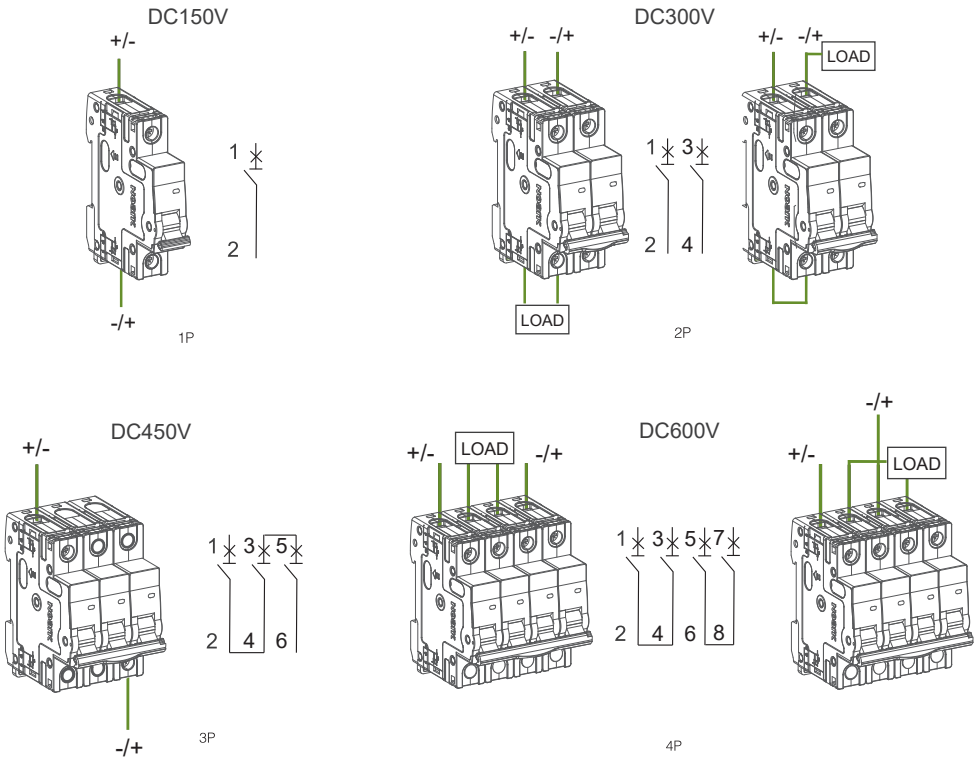
Mechanical parameters	
Device width	18 mm (per pole/module)
Device height	83 mm (89 mm including rail clip)
Frame size	45 mm
Mounting	easy fastening onto 35 mm device rail (DIN)
Degree of protection	IP40, IP20 terminals
Terminals	combined lift + open mouthed
Terminal capacity	1 — 35 mm^2
Fastening torque of terminals	3.5 Nm
Busbar thickness	0.8 — 2 mm
Ambient temperature	-35 — +70 °C
Altitude	≤ 2 000 m
Relative humidity	≤ 95 % at 20°C, ≤ 50 % at 40°C
Resistance to humidity and heat	class 2
Pollution degree	3
Installation class	III
Weight	0.12 kg (per pole/module)

DC Miniature Circuit Breakers up to 63 A

Dimensions

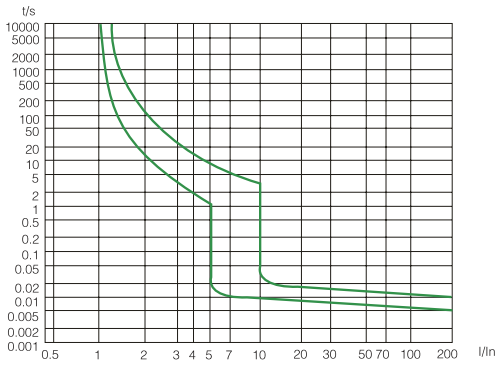


Wiring diagrams

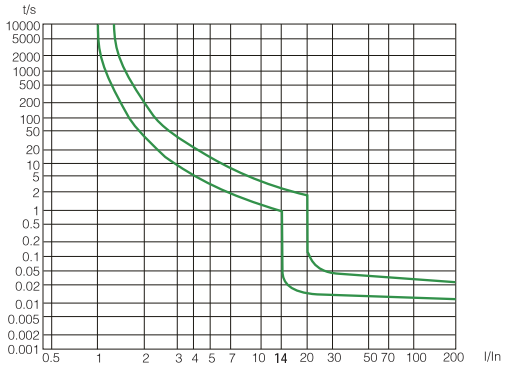


Tripping characteristics

Characteristic C



Characteristic K



DC Miniature Circuit Breaker up to 63 A

Dependence of tripping characteristics on ambient temperature													
T [°C]	**I_n (T) [A]**												
	1A	**2A**	**3A**	**4A**	**6A**	**10 A**	**16 A**	**20 A**	**25 A**	**32 A**	**40 A**	**50 A**	**63 A**
-20	1.2	2.4	3.6	4.8	7.3	13.5	20.0	24.5	29.8	39.5	50.5	60.0	77.5
-15	1.2	2.4	3.5	4.8	7.2	13.3	19.8	24.3	29.7	39.3	50.4	59.8	76.3
-10	1.2	2.3	3.5	4.7	7.1	13.0	19.5	24.0	29.5	39.0	50.2	59.5	75.0
-5	1.2	2.3	3.4	4.7	7	12.7	19.2	23.8	29.3	38.8	50.0	59.2	73.0
0	1.1	2.2	3.4	4.5	6.8	12.5	19.1	23.7	29.2	38.6	48.8	59.0	71.8
5	1.1	2.2	3.3	4.4	6.6	12.3	18.8	23.5	29.0	38.4	48.6	58.8	70.6
10	1.1	2.1	3.3	4.3	6.5	12.1	18.6	23.3	28.8	38.2	48.4	56.5	69.0
15	1.1	2.1	3.2	4.3	6.4	12.0	18.5	23.1	28.6	38.0	48.1	55.0	67.5
20	1	2.1	3.2	4.2	6.3	11.8	18.3	22.8	28.4	37.8	47.8	54.5	66.2
25	1	2	3	4.1	6.2	11.5	18.0	22.6	28.2	37.5	47.0	52.5	64.5
30	1	2	3	4	6	10	16	20	25	32	40	50	63
35	0.99	2	3	3.9	5.9	9.9	15.7	19.7	24.6	31.5	39.2	48.8	61.5
40	0.97	1.9	2.9	3.9	5.8	9.8	15.4	19.3	24.3	31.1	38.8	47.0	58.7
45	0.95	1.9	2.8	3.8	5.7	9.8	15.1	18.8	24.0	30.8	38.3	45.5	55.8
50	0.93	1.9	2.8	3.7	5.6	9.6	14.9	18.5	23.8	30.1	38.0	44.0	53.5
55	0.91	1.8	2.8	3.6	5.5	9.5	14.7	18.2	23.5	29.5	36.5	42.5	51.7
60	0.91	1.8	2.7	3.5	5.4	9.0	14.5	17.8	23.0	28.5	35.0	41.5	49.2
65	0.91	1.8	2.7	3.5	5.3	8.6	14.0	17.5	22.0	27.5	34.0	40.5	47.9
70	0.91	1.8	2.7	3.5	5.3	8.0	13.8	17.3	21.5	27.0	32.5	38.0	46.8

Power loss per pole													
I_n [A]	**1 A**	**2 A**	**3 A**	**4 A**	**6 A**	**10 A**	**16 A**	**20 A**	**25 A**	**32 A**	**40 A**	**50 A**	**63 A**
P [W]	1.5	2.0	1.8	2.0	2.2	1.5	1.8	2.0	2.2	2.6	2.9	3.8	4.4