



Universal Current Miniature Circuit Breakers 5SY5 and 5SP5

BETA Low-Voltage Circuit Protection



Universal current miniature circuit breakers, also referred to as UC miniature circuit breakers are ideal for use in AC/DC networks.

■ Ideal protection

The 5SY5 and 5SP5 UC miniature circuit breaker series are available from 0.3 A to 125 A in the characteristics B and C. They are the ideal protection for DC systems in buildings and for industrial applications, such as electroplating plants, charging stations, fuel cells and photovoltaic plants. A separate series is available for railway applications.

■ Good combination options

They can also be combined with additional components from the 5SY series, such as auxiliary switches, fault signal contacts, shunt trips, undervoltage releases and remote controlled mechanisms.

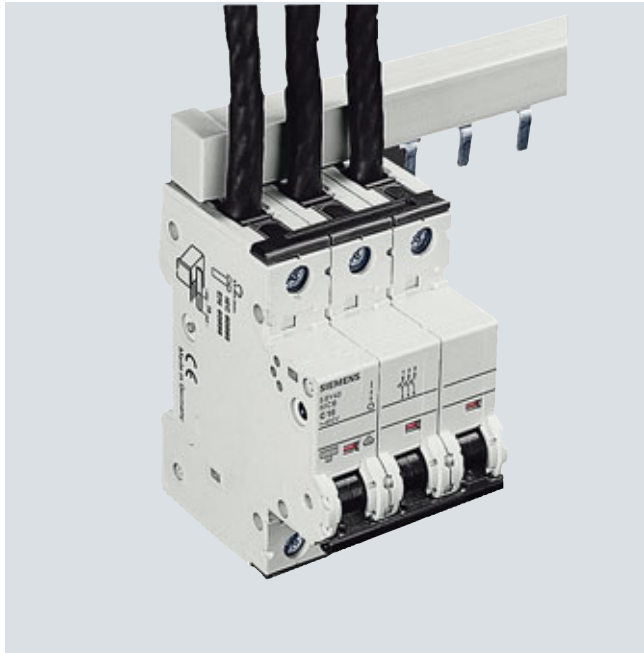
Highlights

- UC miniature circuit breakers can be used for 250/440 V AC, as well as for DC up to a maximum of 250 V per pole
- 4-pole 5SY5 version up to max. 1000 V DC
- Available from 0.3 to 125 A
- Approved acc. to EN 60898-2

Miniature Circuit Breakers

5SY and 5SP miniature circuit breakers

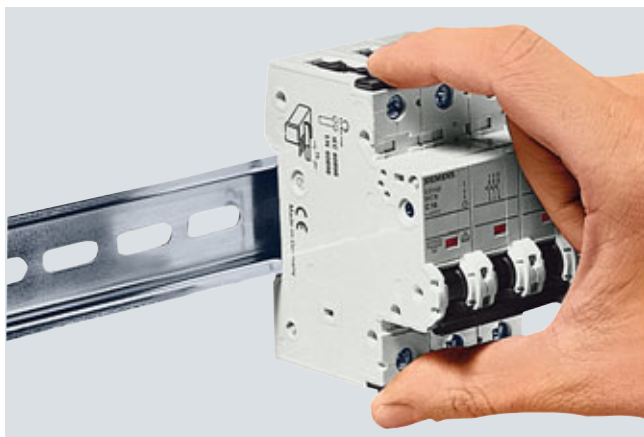
Benefits



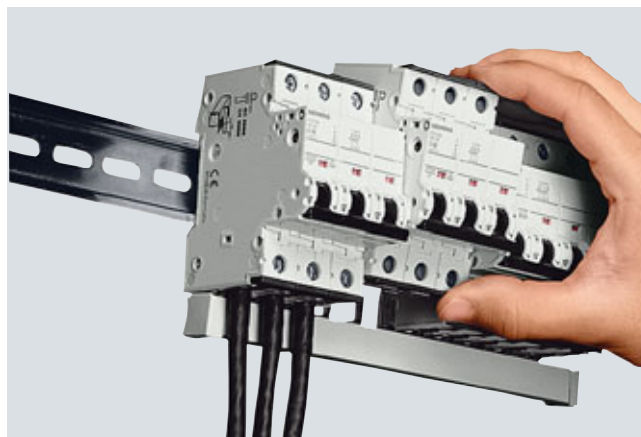
- Optional top or bottom infeed as the terminals are identical
- Clear and visible conductor connection in front of the busbar facilitates controls
- Large and easily accessible wiring space enables easy insertion of conductor in the terminal.



- Integrated movable terminal covers located at the cable entries ensure the terminals are fully insulated when the screws are tightened
- The effective touch protection when grasping the device considerably exceeds the requirements of VBG 4/BGV A3.



- Manual snap-on fixing and release systems that require no tools enable fast assembly and disassembly of MCBs
- Marked labeling field on all modular installation devices for uniform, quick and easy identification.



- Quick and easy manual removal of MCBs from the busbar assembly if connections need to be changed
- Time-saving replacement of parts as busbars no longer need to be freed from adjacent devices.

Technical specifications

			5SY5 1..	5SY5 2..	5SY5 4..	5SP5
Standards			EN 60898-2, GB14048.2		EN 60898-2	EN 60898-2
Approvals			VDE, CCC			VDE
Operational voltage		V AC V DC	230/400 220/440	440	880	230/400 220/440
Acc. to EN 60898	Min.	V AC/DC	24			24
	Max.	V DC/pole	250			250
	Max.	V AC	250/440			250/440
Rated switching capacity						
• I _{CN} acc. to IEC/EN 60898-1		kA AC	10			3
• I _{CN} acc. to IEC/EN 60898-2		kA DC	10			10
• I _{CU} acc. to IEC/EN 60947-2		kA DC	20			20
Insulation coordination						
• Rated insulation voltage		V AC V DC/pole	250/440 250			250/440 250
Degree of pollution for overvoltage category			3/III			
Touch protection		Acc. to EN 50274	Yes			
Handle end position, sealable			Yes			
Degree of protection		Acc. to EN 60529	IP20, with connected conductors			
CFC and silicone-free			Yes			
Mounting						
• Snap-on fixing system			Yes			--
• Standard mounting rail and screw fixing			--			Yes
Terminals						
• Tunnel terminals at both ends			--			Yes
• Combined terminals at both ends			Yes			--
• Terminal tightening torque		Nm lb.in	2.5 ... 3 22 ... 26			2.5 ... 3.5 22 ... 31
Conductor cross-sections						
• Solid and stranded		mm ²	0.75 ... 35			0.75 ... 50
• Finely stranded, with end sleeve		mm ²	0.75 ... 25			0.75 ... 35
• AWG cables		AWG	14 ... 4			14 ... 2
Mains connection						
• AC			Any			
• DC			1)			
Mounting position			Any			
Service life		Actuations	20 000			
On average, with rated load		Actuations	For 5SY5 at 40 A, 50 A and 63 A 10 000			
Ambient temperature		°C	-25 ... +45, occasionally +55, max. 95 % humidity			
Storage temperature		°C	-40 ... +75			
Resistance to climate		Acc. to IEC 60068-2-30	6 cycles			
Resistance to vibrations		Acc. to IEC 60068-2-6	m/s ²	50 at 10 Hz ... 150 Hz		

1) Ensure compliance with the specified polarity when connecting DC.

Selection and ordering data (Dated 04/2010)

10 000 3	I_n	Moun- ting width MW ¹⁾	DT	Characteristic B Order No.	PG DT	Characteristic C Order No.	PU Unit(s)	PS*/ P. unit Unit(s)	PG	Weight per PU approx. kg
	MCBs 10 000 A, universal current									
	1P, 230/400 V AC, 220 V DC									
	0.3	1		--	C	5SY5 114-7	1	1	003	0.165
	0.5			--	B	5SY5 105-7	1	1	003	0.165
	1			--	A	5SY5 101-7	1	1	003	0.147
	1.6			--	A	5SY5 115-7	1	1	003	0.165
	2		C	5SY5 102-6	002 A	5SY5 102-7	1	1	003	0.165
	3			--	A	5SY5 103-7	1	1	003	0.165
	4		B	5SY5 104-6	002 A	5SY5 104-7	1	1	003	0.165
	6		A	5SY5 106-6	002 ▶	5SY5 106-7	1	1	003	0.165
	8			--	A	5SY5 108-7	1	1	003	0.165
	10		A	5SY5 110-6	002 ▶	5SY5 110-7	1	1	003	0.165
	13		C	5SY5 113-6	002 B	5SY5 113-7	1	1	003	0.165
	16		A	5SY5 116-6	002 A	5SY5 116-7	1	1	003	0.165
	20		C	5SY5 120-6	002 A	5SY5 120-7	1	1	003	0.165
	25		C	5SY5 125-6	002 B	5SY5 125-7	1	1	003	0.165
	32		C	5SY5 132-6	002 B	5SY5 132-7	1	1	003	0.165
	40		C	5SY5 140-6	002 C	5SY5 140-7	1	1	003	0.165
	50		C	5SY5 150-6	002 C	5SY5 150-7	1	1	003	0.165
	63		C	5SY5 163-6	002 C	5SY5 163-7	1	1	003	0.165
	1P, 230/400 V AC, 220 V DC									
	80	1.5		--	B	5SP5 180-7	1	1	003	0.258
	100			--	B	5SP5 191-7	1	1	003	0.258
	125			--	B	5SP5 192-7	1	1	003	0.258
	2P, 400 V AC, 440 V DC									
	0.3	2		--	C	5SY5 214-7	1	1	003	0.330
	0.5			--	B	5SY5 205-7	1	1	003	0.330
	1			--	A	5SY5 201-7	1	1	003	0.330
	1.6			--	B	5SY5 215-7	1	1	003	0.330
	2			--	▶	5SY5 202-7	1	1	003	0.330
	3			--	▶	5SY5 203-7	1	1	003	0.330
	4			--	A	5SY5 204-7	1	1	003	0.330
	6		A	5SY5 206-6	002 ▶	5SY5 206-7	1	1/6	003	0.330
	8			--	B	5SY5 208-7	1	1	003	0.330
	10		A	5SY5 210-6	002 ▶	5SY5 210-7	1	1	003	0.330
	13		C	5SY5 213-6	002 B	5SY5 213-7	1	1	003	0.330
	16		A	5SY5 216-6	002 ▶	5SY5 216-7	1	1	003	0.330
	20		A	5SY5 220-6	002 A	5SY5 220-7	1	1	003	0.330
	25		C	5SY5 225-6	002 A	5SY5 225-7	1	1	003	0.330
	32		B	5SY5 232-6	002 B	5SY5 232-7	1	1	003	0.330
	40		C	5SY5 240-6	002 B	5SY5 240-7	1	1	003	0.330
	50		C	5SY5 250-6	002 A	5SY5 250-7	1	1	003	0.330
	63		C	5SY5 263-6	002 A	5SY5 263-7	1	1	003	0.330
		2P, 400 V AC, 440 V DC								
80		3		--	B	5SP5 280-7	1	1	003	0.516
100				--	B	5SP5 291-7	1	1	003	0.516
125				--	B	5SP5 292-7	1	1	003	0.516

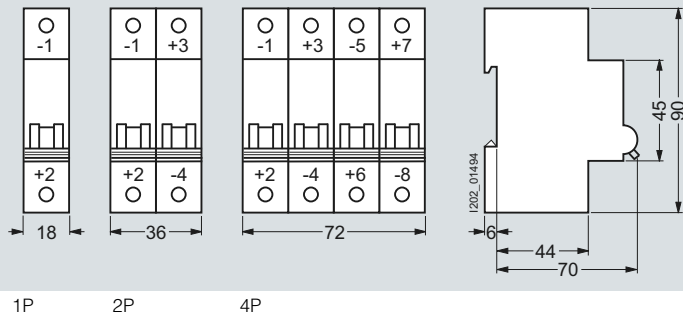
10 000 3	I_n	Moun- ting width MW ¹⁾	DT	Characteristic B Order No.	PG DT	Characteristic C Order No.	PU Unit(s)	PS*/ P. unit Unit(s)	PG	Weight per PU approx. kg
	A									
 MCBs 10 000 A, universal current 4P, 400 V AC, 880 V DC 										
	0.3	4		--	C	5SY5 414-7	1	1	003	0.660
	0.5			--	C	5SY5 405-7	1	1	003	0.660
	1			--	C	5SY5 401-7	1	1	003	0.660
	1.6			--	C	5SY5 415-7	1	1	003	0.660
	2			--	C	5SY5 402-7	1	1	003	0.660
	3			--	C	5SY5 403-7	1	1	003	0.660
	4			--	C	5SY5 404-7	1	1	003	0.660
	6		C	5SY5 406-6	002 C	5SY5 406-7	1	1	003	0.660
	8			--	C	5SY5 408-7	1	1	003	0.660
	10		C	5SY5 410-6	002 C	5SY5 410-7	1	1	003	0.660
	13		C	5SY5 413-6	002 C	5SY5 413-7	1	1	003	0.660
	16		C	5SY5 416-6	002 C	5SY5 416-7	1	1	003	0.660
	20		C	5SY5 420-6	002 C	5SY5 420-7	1	1	003	0.660
	25		C	5SY5 425-6	002 C	5SY5 425-7	1	1	003	0.660
	32		C	5SY5 432-6	002 C	5SY5 432-7	1	1	003	0.660
	40		C	5SY5 440-6	002 C	5SY5 440-7	1	1	003	0.660
	50		C	5SY5 450-6	002 C	5SY5 450-7	1	1	003	0.660
	63		C	5SY5 463-6	002 C	5SY5 463-7	1	1	003	0.660

¹⁾ 1 MW (modular width) = 18 mm.

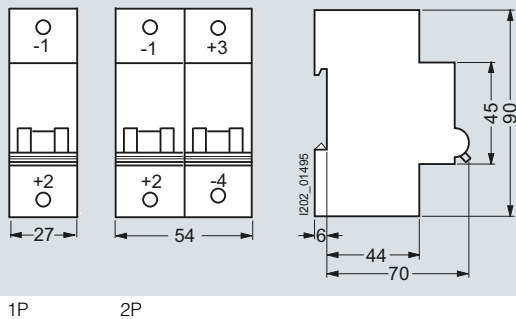
* You can order this quantity or a multiple thereof.

Dimensional drawings

5SY5



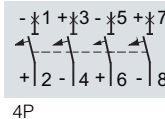
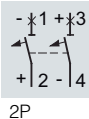
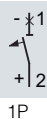
5SP5



Schematics

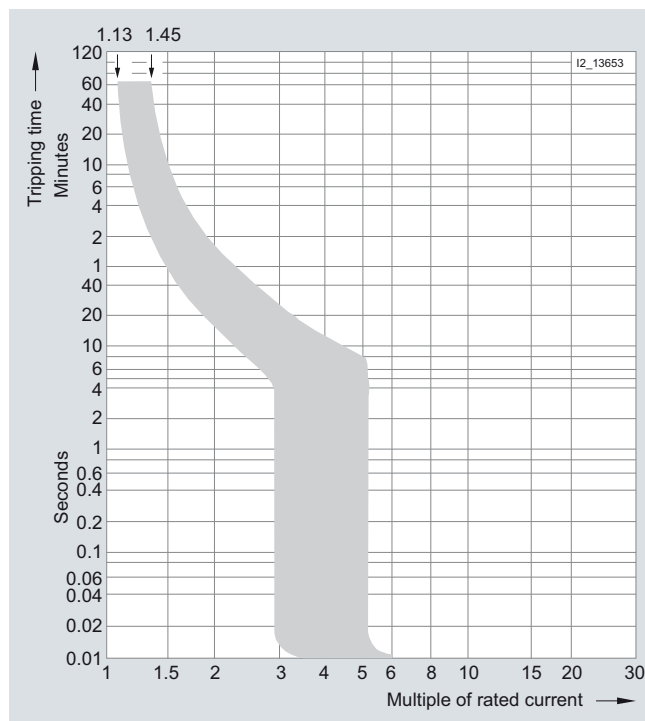
Symbols

5SY5, 5SP5



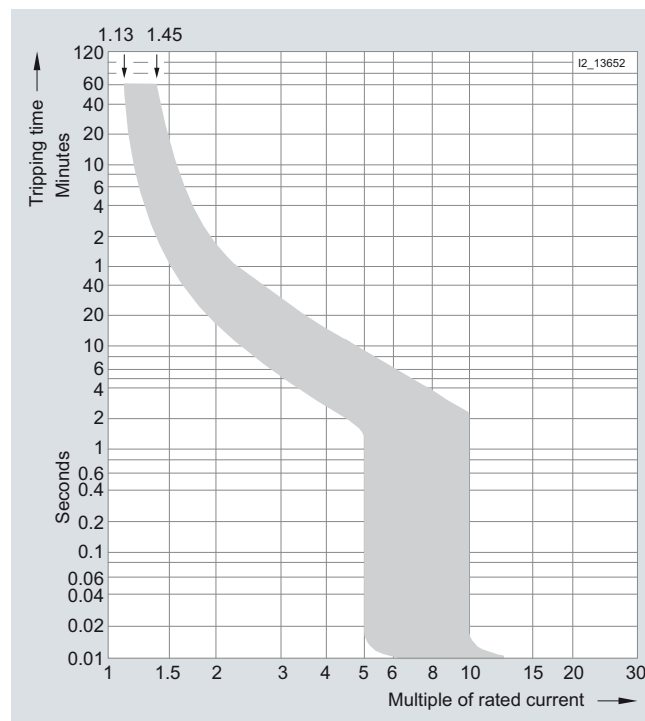
Characteristic curves

Tripping characteristics acc. to IEC/EN 60898, DIN VDE 0641-11



Tripping characteristic B

MCBs with this tripping characteristic are designed for universal use in socket outlet and lighting circuits. Proof of personal safety acc. to DIN VDE 0100-410 is not required.



Tripping characteristic C

In lamp and motor circuits with higher starting currents, MCBs with tripping characteristic C are generally used.

Correction factors for rated current if bundling

If more than one electrical circuit is loaded in a series of miniature circuit breakers, the resulting increase in ambient temperature affects the characteristic curve. In this case, you need to include an additional correction factor, which is specific to the rated current of the MCB(s).

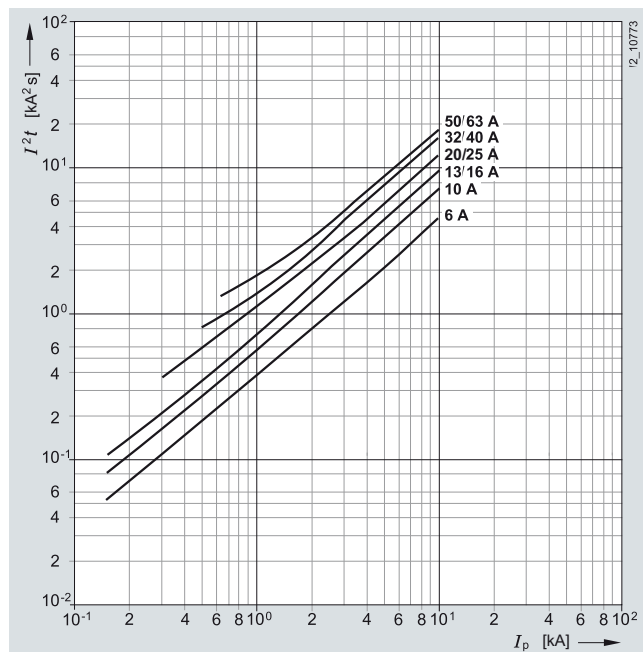
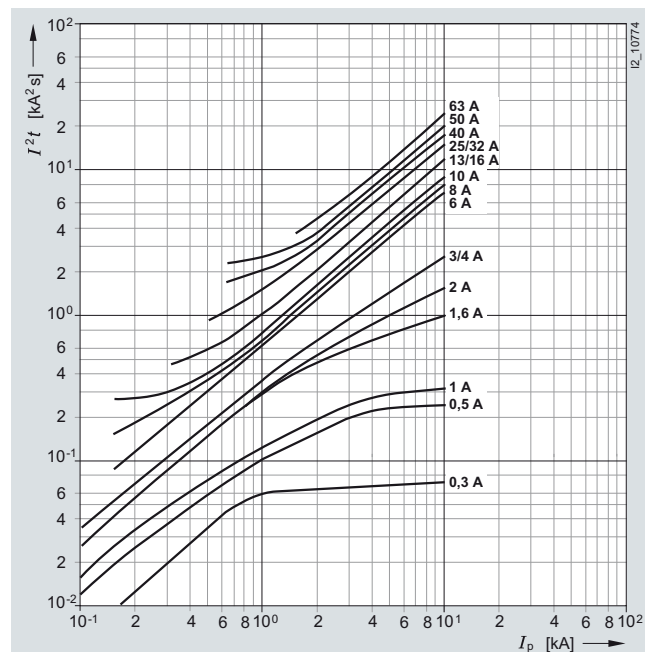
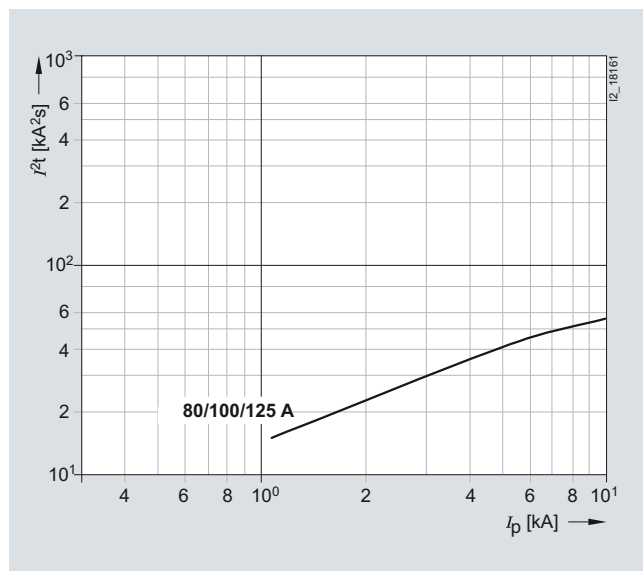
Number of MCBs	1	2 ... 3	4 ... 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

Thermal tripping operation

	Rated current I_n (A)	Correction factor for					
		0 Hz	16 2/3 Hz	50 Hz	125 Hz	400 Hz	1000 Hz
5SY5	0.3 ... 10	1	1	1	1	0.99	0.97
	1 ... 40	1	1	1	0.98	0.97	0.93
	50 ... 63	1	1	1	0.98	0.94	0.86
5SP5	80 ... 125	1	1	1	0.97	0.92	0.85

Magnetic tripping operation

	Rated current I_n (A)	Correction factor for					
		0 Hz	16 2/3 Hz	50 Hz	125 Hz	400 Hz	1000 Hz
5SY5	0.3 ... 63	1.4	1	1	1.2	1.4	1.7
5SP5	80 ... 125	1.5	1	1	1.05	1.3	1.8

Let-through I^2t values 5SY5 (DC)**Characteristic B****Characteristic C****Let-through I^2t values 5SP5 (DC)****Characteristic C**

Internal resistance and power lossData per pole (with I_n)

	I_n A	Characteristic B		Characteristic C	
		R_1 mΩ	P_v W	R_1 mΩ	P_v W
5SY5					
	0.3	--	--	10500	0.9
	0.5	--	--	3400	0.9
	1	--	--	1210	1.2
	1.6	--	--	459	1.2
	2	375	1.5	295	1.2
	3	--	--	137	1.2
	4	91	1.45	81	1.3
	6	55	2.0	44	1.6
	8	--	--	14	0.9
	10	13	1.3	10	1.0
	13	9.5	1.6	8.0	1.4
	16	6.6	1.7	5.9	1.5
	20	5.2	2.1	4.0	1.6
	25	3.4	2.2	3.3	2.1
	32	2.3	2.4	2.4	2.5
	35	--	--	2.0	2.4
	40	2.1	3.4	2.1	3.3
	50	1.5	3.8	1.4	3.5
	63	1.4	5.4	1.1	4.4
	80	1.0	6.4	1.0	6.4
5SP5					
	80	--	--	1.1	6.7
	100	--	--	0.88	8.0
	125	--	--	0.7	10.8

Direct current, universal current

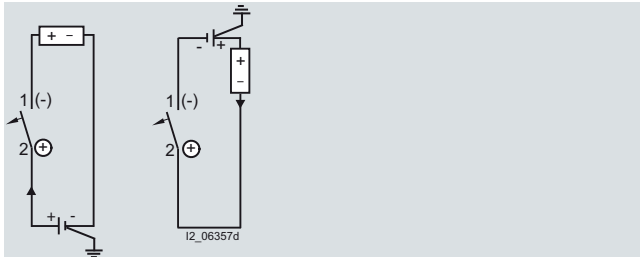
All 5SY and 5SP4 miniature circuit breakers are suitable for use in direct current systems up to 60 V¹⁾ (1-pole) or 120 V (2-pole – series connection of two poles). The infeed can be from either the top or the bottom.

For higher voltages, you will require UC (UC = Universal Current) miniature circuit breakers from the 5SY5 and 5SP5 series, which can be used for both AC and DC applications.

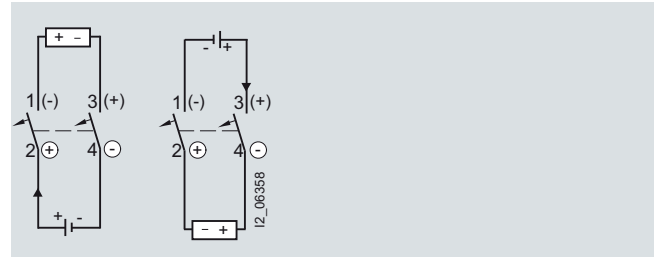
The maximum voltage for DC per pole is 250 V. The series connection of individual poles enables 4-pole devices (for example) to be used up to a maximum of 1000 V DC.

The arcing chamber area of the 5SY5 and 5SP5 miniature circuit breakers is equipped with an additional permanent magnet to support the positive quenching of the electric arc.

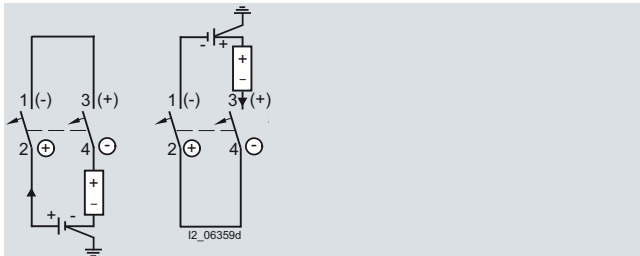
This is why the polarity of the switch is coded and it is essential to pay attention to the conduction direction when connecting the conductor. Suitable precautions should be taken during plant configuration to ensure there can be no polarity reversal in DC operation (e. g. photovoltaic plants).



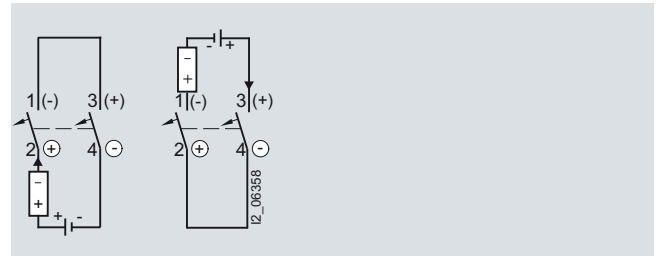
Miniature circuit breaker for single-pole tripping
Grounded system (left: - pole grounded, right: + pole grounded)
Rated voltage of miniature circuit breaker: 220 V



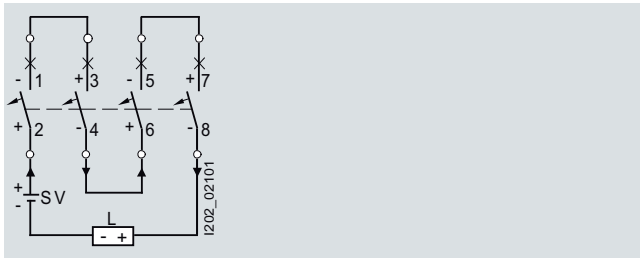
Miniature circuit breaker, two-pole for two-pole tripping
Non-grounded system (left: bottom infeed, right: top infeed)
Rated voltage of miniature circuit breaker: 220 V



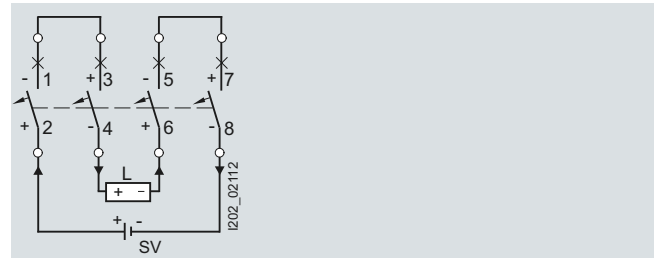
Miniature circuit breaker, two-pole for single-pole tripping
Grounded system (left: - pole grounded and bottom infeed, right: + pole grounded and top infeed)
Rated voltage of miniature circuit breaker: 440 V



Miniature circuit breaker, two-pole for single-pole tripping
Non-grounded system (left: bottom infeed, right: top infeed)
Rated voltage of miniature circuit breaker: 440 V



Miniature circuit breaker, four-pole for single-pole tripping
Non-grounded system (bottom infeed)
Rated voltage of miniature circuit breaker: 880 V



Miniature circuit breaker, four-pole for two-pole tripping
Non-grounded system (bottom infeed)
Rated voltage of miniature circuit breaker: 880 V

L: Load (e. g. inverter)

SV: Power supply (e. g. solar module or battery)

¹⁾ The operational voltage 60 V DC/pole takes into account a battery charging voltage with a peak value of 72 V.

The information provided in this brochure contains descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.

All product designations may be registered trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes may violate the rights of the owner.

© Siemens AG 2010 • PDF only: (E10003-E38-10T-G2211-7600) • PI 0410 En