

Miniature Circuit-Breakers (MCBs)

General Data

Product overview

Design	Tripping characteristic	Rated currents I_n	Rated breaking capacity	Energy limitation class
Power supply company product range				
5SP3	E	16 - 100 A	25 000	
Standard product range				
5SX2	A	1 - 40 A	6 000	
	B	6 - 50 A	3	
	C	0.3 - 63 A		
	D	0.5 - 50 A		
5SX4	B	6 - 50 A	10 000	
	C	0.5 - 50 A	3	
AC/DC product range				
5SX5	B	6 - 32 A	4 500	10 000 T4
	C	0.5 - 32 A	3	
Industry guard product range				
5SY4	A	1 - 63 A	10 000	
	B	6 - 63 A	3	
	C	0.3 - 63 A		
	D	0.3 - 63 A		
5SY7	B	6 - 63 A	15 000	
	C	0.3 - 63 A	3	
	D	0.3 - 63 A		
High-current product range				
5SP4	B	80 - 125 A	10 000	
	C	80 - 125 A		
	D	80 - 100 A		

Definitions

1 MW = Modular width of
18 mm

N-type = 55 mm device
mounting depth

Depth 70 mm =
Device mounting depth of
70 mm

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Summary of technical data

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			5SX2	5SX4	5SX5	5SY4	5SY7	5SP4
Tripping characteristics			A, B, C, D	B, C	B, C	A, B, C, D	B, C, D	B, C, D
No. of poles	1		•	•	•	•	•	•
	2		•	•	•	•	•	•
	3		•	•	•	•	•	•
	4		•	•	•	•	•	•
	1 + N		•	•	•	•	•	•
	3 + N		•	•	•	•	•	•
Rated voltage	V AC		230/400					
	V DC		-		220/440	-		
Operating voltage	min. AC/DC	V	24					
	max. DC	V/Pol	60 ¹⁾		220	60 ¹⁾		
	max. AC	V	440					
Rated breaking capacity acc. to DIN VDE 0641, EN 60 898	AC	kA	6	10	4.5	10	15	10
	DC	kA	-		10	-		
Insulation coordination	Rated insulation voltage	AC V	250/440					
	Degree of pollution for overvoltage category III		2					3
Degree of protection • 5SX., 5SP. • 5SY.			IP 00 according to DIN 40 050, IP 40 when mounted in distribution boards IP 20 according to DIN 40 050, IP 40 when mounted in distribution boards					
Flammability			Category IIb according to DIN VDE 0304 Part 3					
Mounting			To be snapped onto a 35 mm standard mounting rail (DIN EN 50 022); with • 5SY4, 5SY7: rapid mounting system, no tools required • 5SP4: also screw mounting					
Terminals			5SX2, 5SX4, 5SX5 combined terminals below for simultaneous connection to bus-bars (fork-type) and feeder cables 5SY4, 5SY7 combined terminals on both ends for simultaneous connection to bus-bars (pin-type) and feeder cables 5SP4 tunnel terminals on both ends					
Conductor cross sections								
Solid and stranded, max. • Upper terminal • Lower terminal	mm ²		16		35		50	
	mm ²		25		35		50	
Finely stranded with end sleeves, max. • Upper terminal • Lower terminal	mm ²		10		25		35	
	mm ²		16		25		35	
Terminal tightening torque	recommended	Nm	2.5 - 3					3 - 4
Supply connection			As required, observe the polarity for DC applications					
Mounting position			As required					
Service life			On the average 20,000 operations at rated load					
Ambient temperature			°C -25 to +45, occasionally +55, max. 95 % humidity, storage temperature: -40 to +75					
Resistance to climate			According to IEC 60 068-2-30, 6 cycles					
Resistance to vibration			m/s ² 60 at 10 Hz up to 150 Hz according to IEC 60 068-2-6					

Further technical data on request or see next page.

1) ≙ Battery charging voltage 72 V.

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Areas of application

MCBs of the *N System* primarily protect cables and conductors against overload and short circuit. Thus, they also protect electrical equipment against overheating according to DIN VDE 0100 Part 430.

Under certain conditions, MCBs also protect against shock currents caused by excessive touch voltage due to insulation failure according to DIN VDE 0100 Part 410.

Further, due to the fixed rated current settings of MCBs, it is also possible to protect motors in a limited form.

For the respective application, there are different tripping characteristics available which will be individually described in the catalog I 2.1 in detail.

The standards EN 60 898, DIN VDE 0641 Part 11 and IEC 60 898 form the basis for the design and approval of the MCBs.

For applications in industry and in system and plant engineering where MCBs of the *N System* are used, additional components are available, such as auxiliary switches, fault signal contacts, shunt trips, undervoltage releases, RCCB modules as well as add-on accessories such as busbar systems and mounting parts.

Functional design, mode of operation

MCBs of the *N System* operate using a delayed overload current/time-dependent thermal release (thermal bimetal) for low overcurrents and an instantaneous electromagnetic release for higher overload and short-circuit currents.

The special contact materials used assure a long service life and offer a high level of protection against contact welding.

MCBs of the *N System* significantly limit the let-through current when a fault occurs due to the ultra-fast contact separation and the quick quenching of the arc in the arc-chamber.

Thus, generally, they fall below the permissible limiting I^2t values of energy limiting class 3, specified in DIN VDE 0641 Part 11 by 50%. This guarantees excellent selectivity with the upstream overcurrent protective devices.

Features

- High rated breaking capacity up to 15,000 A according to EN 60 898
- Excellent current limiting and selectivity
- Tripping characteristics A, B, C and D
- Terminals are safe from finger touch and touch by the back of the hand
- Combined terminal allows busbar and feeder cable to be simultaneously connected
- Uniform additional components, quick mounting using snap-on and snap-in mechanism on site
- Handle locking device effectively prevents unauthorized operation of the handle

Features of 5SX

- Especially suitable for mounting in flat distribution boards for building installations

Features of 5SY. ... :

- Safe and rapid connection of the feeder cable by moving the busbar to the back
- Identical terminals on both ends for optional infeed from the top or the bottom
- Mounting and dismounting without tools
- Rapid and comfortable removal from the assembly
- Variable labeling system
- Separate switch position indication

Features of 5SP4 ... :

- Disconnecter characteristics acc. to DIN VDE 0660 Part 107
- Main switch characteristics acc. to EN 60 204
- Variable labeling system
- Can be screwed on base
- Separate switch position indicator

Application examples for 5SX miniature circuit-breakers.



Feeder cables from below with cross sections up to 25 mm² and 3-pole 5ST2 144 busbars can be simultaneously connected at the combined terminal of the MCB.



Feeder cables from below with cross sections up to 35 mm² and 2-pole 5ST2 143 busbars can be simultaneously connected using the 5ST2 166 terminal.

Cables connected from the top use the same principle.



Feeder cables from above with cross sections up to 35 mm² can be connected to 5ST2 144 busbars using the 5ST2 157 supplementary terminal.



Feeder cables with cross sections up to 25 mm² and 5ST2 165 busbars can be simultaneously connected at the combined terminal of the MCB using the auxiliary contacts mounted on site.

[A description of the busbars and terminals is available on page 2/41.](#)

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Features of 5SY miniature circuit-breakers



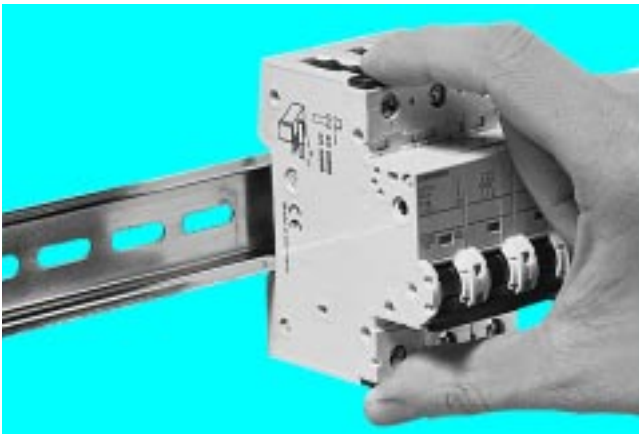
Easier, faster, more wiring space

- Identical terminals at the top and bottom
- Connection of the feeder cable in front of the busbar
- Larger and easier accessible wiring space for the feeder cable
- Comfortable insertion of the feeder cables into the busbar
- Clear, visible and controllable terminal of the feeder cables
- Universal infeed with busbar mounting at the top or bottom



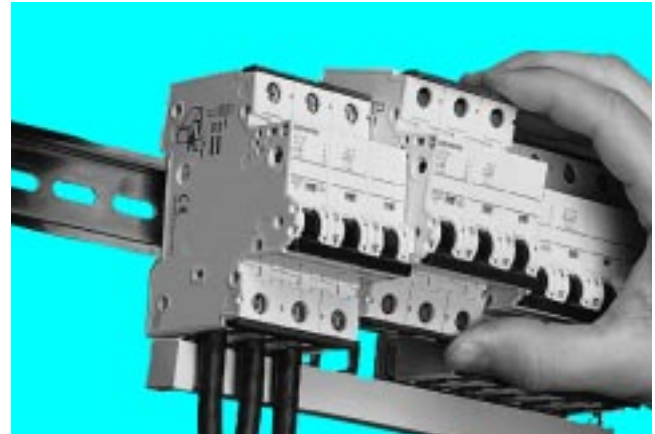
Shock-hazard protection with clear advantages

- Integrated, movable terminal covers in the area of the feeder cable entries
- With tightened screws, the terminals are completely enclosed
- Effective shock-hazard protection even if fully grabbed
- VBG 4/BGV A2 requirements are exceeded by far



Flexible and without tools

- Manually and without tools operable rapid mounting and dismantling system
- Rapid mounting and dismantling of the 5SY MCB onto and from the standard mounting rails acc. to DIN EN 50 022
- Devices can be replaced easily and comfortably at any time



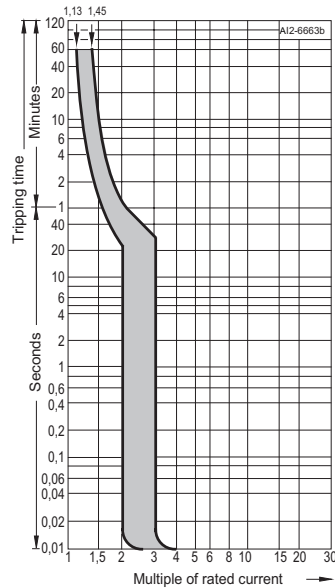
Removal from the assembly

As a result of the combination of the various features, the 5SY MCBs can easily and rapidly be removed from the assembly if circuits have to be changed: It is no longer necessary to remove the busbar.

Tripping characteristics acc. to EN 60 898, DIN VDE 0641 Part 11

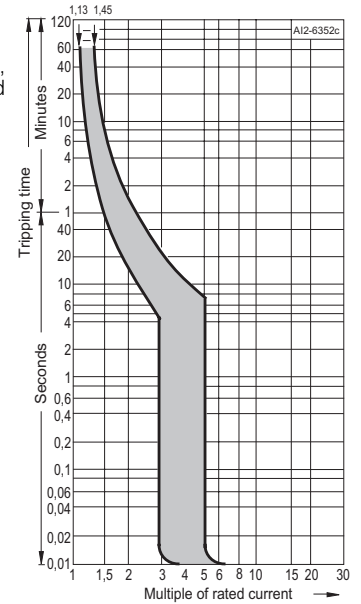
Tripping characteristic A

- For limited semiconductor protection
- Protection of measuring circuits with transformers
- Protection of circuits with long cable lengths which will require tripping within 0.4 s acc. to DIN VDE 0100 Part 410



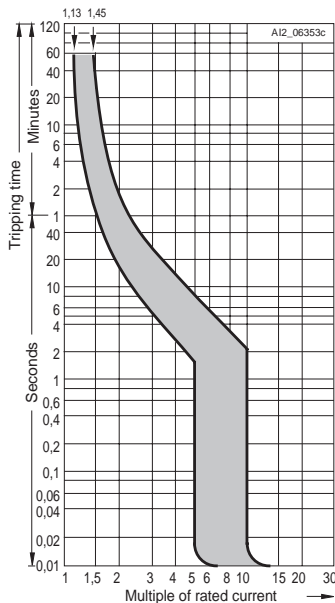
Tripping characteristic B

- Cable and line protection mainly in residential buildings, proof regarding shock-hazard protection is not necessary



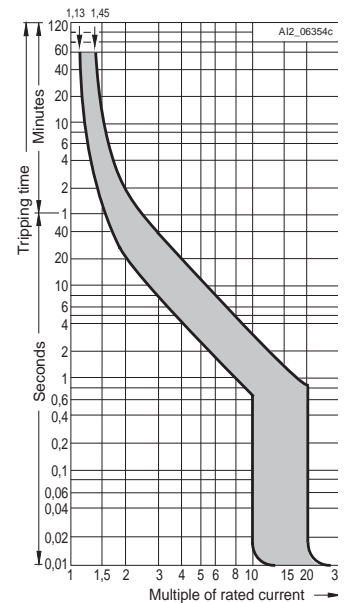
Tripping characteristic C

- Cable and line protection, advantageous in case of higher inrush currents, e.g. lamps, motors etc.



Tripping characteristic D

- The tripping range has been matched to applications involving equipment generating significant pulses (transformers, solenoid valves)



At other ambient temperatures, the currents of the delayed tripping change by approximately 5 % for each 10 K temperature difference. More specifically they increase for temperatures below 30°C and decrease for temperatures above 30°C. For DC, the limit currents of the instantaneous tripping increase by a factor of 1.2.

If more than one circuit in a series of MCBs is loaded, this has an impact on the characteristic as a result of an increased ambient temperature. In this case, an additional correction factor must be applied, referred to the rated miniature circuit-breaker current.

Number	1	2 - 3	4 - 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

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Tripping characteristics

Tripping performance at an ambient temperature of 30 °C

Tripping characteristic	Standards	Thermal release Test currents:				Electromagnetic release Test currents:		
		low test current I_1	high test current I_2	tripping time $63 A \leq I_n \leq 125 A$ t		hold I_4	trips at the latest at I_5	tripping time t
A		$1.13 \times I_n$	$1.45 \times I_n$	$> 1 h$	$> 2 h$	$2 \times I_n$	$3 \times I_n$	$\geq 0.1 s$
				$< 1 h$	$< 2 h$			$< 0.1 s$
B	IEC 60 898/EN 60 898 DIN VDE 0641 Part 11	$1.13 \times I_n$	$1.45 \times I_n$	$> 1 h$	$> 2 h$	$3 \times I_n$	$5 \times I_n$	$\geq 0.1 s$
				$< 1 h$	$< 2 h$			$< 0.1 s$
C		$1.13 \times I_n$	$1.45 \times I_n$	$> 1 h$	$> 2 h$	$5 \times I_n$	$10 \times I_n$	$\geq 0.1 s$
				$< 1 h$	$< 2 h$			$< 0.1 s$
D		$1.13 \times I_n$	$1.45 \times I_n$	$> 1 h$	$> 2 h$	$10 \times I_n$	$20 \times I_n$	$\geq 0.1 s$
				$< 1 h$	$< 2 h$			$< 0.1 s$

(IEC 60 898: $50 \times I_n$)

Breaking capacity

For MCBs, there are special requirements with regard to the breaking capacity.

The values are standardized and determined according to the testing conditions of EN 60 898 and DIN VDE 0641 Part 11.

The most usual values are **6 000** and **10 000**.

For other test conditions, other values can be specified which lie above those of EN 60 898 and DIN VDE 0641 Part 11.

An example of another standard is EN 60 947-2 or DIN VDE 0660 Part 101 for MCBs.

Detailed information on breaking capacity depending on the rated current and other operating voltages is available on request.

Rated breaking capacity

Rated current	I_n [A]	EN 60 898 (IEC 60 898)		EN 60 947-2 (IEC 60 947-2)	
		1-pole 230 V AC I_{cn} [kA]	2-, 3-, 4-pole 400 V AC I_{cn} [kA]	1-pole 230 V AC I_{cu} [kA]	2-, 3-, 4-pole 400 V AC I_{cu} [kA]
5SX2	0.5 - 63	6	6	$10^{1)}$	$10^{1)}$
5SX4	0.5 - 50	10	10	$15^{2)}$	$15^{2)}$
5SP4	40 - 125	10	10	15	15
5SY4	0.3 - 63	10	10	15	15
5SY7	0.3 - 63	15	15	20	20

Rated current	I_n [A]	E DIN VDE 0641 T 12		E DIN VDE 0641 T 12	
		1-pole 230 V AC I_{cn} [kA]	2-pole 400 V AC I_{cn} [kA]	1-pole 220 V DC I_{cn} [kA]	2-pole 440 V DC I_{cn} [kA]
5SX5	0.5 - 32	4.5	4.5	$10^{1)}$	$10^{1)}$

1) $I_n = 63 A$ corresponds to $I_{cu} = 6 kA$

2) $I_n = 40 A$ and $50 A$ corresponds to $I_{cu} = 10 kA$

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Selectivity of miniature circuit-breakers/fuses

Generally, distribution networks are configured as radial networks. An overcurrent device must be provided at each reduction of the conductor cross section. This results in a cascade graded according to the rated current, which should, where possible, provide selectivity.

Selectivity means, that in the event of a fault, only the protective device in the vicinity of the fault trips. Thus, parallel current paths can continue to provide the necessary power. For MCBs with upstream fuses, the selectivity limit essentially depends on the current limits and tripping characteristics of

the MCB as well as on the pre-arcing I^2t value of the fuse. Therefore, MCBs with different characteristics and rated breaking capacities also have different selectivity limits. The subsequent tables show the currents up to which selectivity is provided between MCBs and upstream fuses according

to DIN VDE 0636 Part 21. The values specified in kA are limit values which have been determined under unfavorable test conditions. In practice, better values can be obtained, depending on the type of the upstream fuse.

Limit values of the MCBs/fuses selectivity in kA

Downstream MCBs	I_n [A]	Upstream fuses							
		16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A
5SX2									
Characteristic A	≤ 2	0.4	0.7	2.0	•	•	•	•	•
	3	0.3	0.6	1.6	2.0	•	•	•	•
	4	0.3	0.6	0.9	1.6	•	•	•	•
	6	0.2	0.4	0.8	1.2	3.0	3.2	•	•
	10	-	0.4	0.6	1.1	2.2	3.0	•	•
	16	-	-	0.5	1.0	2.0	2.6	4.5	•
	20	-	-	-	1.0	2.0	2.4	4.1	•
	25	-	-	-	-	1.5	2.0	3.7	•
	32	-	-	-	-	1.2	1.8	3.0	5.0
	40	-	-	-	-	-	1.7	2.5	4.0
Characteristic B	6	0.3	0.4	0.7	1.2	3.0	3.2	•	•
	10	-	0.4	0.6	1.0	2.2	3.0	5.0	•
	13	-	-	0.5	1.0	2.2	3.0	5.0	•
	16	-	-	-	1.0	2.0	2.4	4.0	•
	20	-	-	-	-	2.0	2.4	4.0	•
	25	-	-	-	-	-	2.0	3.5	•
	32	-	-	-	-	-	1.7	2.9	•
	40	-	-	-	-	-	-	2.0	4.0
	50	-	-	-	-	-	-	-	4.0
Characteristic C	≤ 2	0.3	0.5	1.2	1.7	•	•	•	•
	3	0.3	0.4	0.8	1.4	4.0	5.0	•	•
	4	0.3	0.4	0.6	1.1	3.0	4.0	•	•
	6	-	0.4	0.6	1.0	2.4	3.2	•	•
	8	-	-	0.5	0.9	1.4	2.6	3.1	•
	10	-	-	0.5	0.9	1.4	2.1	3.1	•
	13	-	-	-	0.8	1.3	2.0	3.0	•
	16	-	-	-	0.8	1.3	2.0	3.0	•
	20	-	-	-	-	1.3	2.0	2.7	•
	25	-	-	-	-	-	2.0	2.4	5.0
	32	-	-	-	-	-	-	2.2	4.0
	40	-	-	-	-	-	-	-	3.5
	50	-	-	-	-	-	-	-	3.0
63	-	-	-	-	-	-	-	3.0	
Characteristic D	≤ 2	0.3	0.4	0.7	1.3	3.0	•	•	•
	3	0.3	0.4	0.7	1.2	3.0	•	•	•
	4	-	0.4	0.6	1.0	2.5	4.0	•	•
	6	-	-	0.5	0.9	2.0	3.0	•	•
	8	-	-	-	0.7	1.4	2.0	3.1	•
	10	-	-	-	-	1.4	2.0	3.1	•
	13	-	-	-	-	-	1.7	3.0	•
	16	-	-	-	-	-	1.7	3.0	•
	20	-	-	-	-	-	-	2.4	5.0
	25	-	-	-	-	-	-	-	5.0
	32	-	-	-	-	-	-	-	4.0
	40	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-

• $\hat{=}$ Rated breaking capacity 5SX2 acc. to EN 60 898 6 000

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Selectivity of MCBs/fuses

In the event of a short circuit, when using the 5SX4, 5SY4,

5SP4 MCBs and fuses according to DIN VDE 0636 Part 21,

selectivity is provided up to the indicated values in kA.

Limit values of the MCBs/fuses selectivity in kA

Downstream MCBs	I_n [A]	Upstream fuses								
		16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	125 A
5SX4, 5SY4										
Characteristics A, B	6	0.3	0.4	0.8	1.4	3.2	4.5	9.0	•	•
	10	-	0.4	0.7	1.2	2.5	3.5	5.0	•	•
	13	-	-	0.7	1.2	2.5	3.5	5.0	•	•
	16	-	-	-	1.0	2.0	2.8	4.2	9.0	•
	20	-	-	-	1.0	2.0	2.6	4.2	9.0	•
	25	-	-	-	-	1.7	2.2	3.7	7.0	•
	32	-	-	-	-	1.7	2.2	3.7	7.0	•
	40	-	-	-	-	-	1.6	2.2	4.0	6.0
	50	-	-	-	-	-	-	2.2	4.0	6.0
	63	-	-	-	-	-	-	-	3.0	5.0
	Characteristic C	≤ 2	0.3	0.5	1.5	2.0	9.0	•	•	•
3		0.3	0.4	1.1	1.6	5.0	6.0	•	•	•
4		0.3	0.4	0.9	1.4	3.5	5.0	9.0	•	•
6		-	0.4	0.8	1.4	2.7	4.5	6.0	•	•
8		-	-	0.6	1.2	2.2	3.5	5.0	7.0	•
10		-	-	0.5	1.2	2.0	3.0	4.2	7.0	•
13		-	-	-	1.0	1.6	2.4	3.4	6.0	•
16		-	-	-	1.0	1.5	2.2	3.0	6.0	•
20		-	-	-	-	1.3	2.2	3.0	6.0	•
25		-	-	-	-	-	2.2	2.9	5.0	9.0
32		-	-	-	-	-	-	2.4	4.0	7.0
40	-	-	-	-	-	-	2.0	3.5	4.0	
50	-	-	-	-	-	-	-	3.0	4.0	
63	-	-	-	-	-	-	-	-	-	
Characteristic D	≤ 2	0.3	0.4	1.0	1.8	5.0	7.0	•	•	•
	3	0.3	0.4	0.9	1.5	4.0	5.0	8.0	•	•
	4	-	0.4	0.8	1.2	3.0	3.8	5.5	•	•
	6	-	-	0.7	1.1	2.5	3.1	4.4	8.1	•
	8	-	-	-	0.9	2.1	2.5	3.5	6.2	9.3
	10	-	-	-	-	2.1	2.5	3.5	6.2	9.3
	13	-	-	-	-	-	2.5	3.5	6.2	9.3
	16	-	-	-	-	-	2.2	3.1	5.1	7.5
	20	-	-	-	-	-	-	2.7	4.3	6.3
	32	-	-	-	-	-	-	-	4.0	5.5
	40	-	-	-	-	-	-	-	3.5	4.8
50	-	-	-	-	-	-	-	-	4.0	
63	-	-	-	-	-	-	-	-	-	

• \geq Rated breaking capacity 5SX4, 5SY4 acc. to EN 60 898 10 000

Limit values of the MCBs/fuses selectivity in kA

Downstream MCBs	I_n [A]	Upstream fuses					
		100 A	125 A	160 A	200 A	224 A	250 A
5SP4							
Characteristic B	80	2.8	3.8	5.7	8.1	•	•
	100	-	3.5	5.2	7.0	•	•
	125	-	-	5.2	7.0	•	•
Characteristic C	80	2.5	3.5	5.1	7.5	9.2	•
	100	-	3.3	4.5	6.5	8.0	•
	125	-	-	4.5	6.5	8.0	•
Characteristic D	80	2.3	3.3	4.6	6.9	8.1	•
	100	-	2.8	4.3	6.2	7.5	9.2

• \geq Rated breaking capacity 5SP4 acc. to EN 60 898 10 000

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Selectivity of MCBs/circuit-breakers

Distribution networks can also be configured without any fuses. In these cases, a circuit-breaker acts like an upstream protective device.

In this case, the selectivity limit depends on the level of the peak current I of the miniature circuit breaker and on the tripping current of the circuit-breaker. The following tables specify

the short-circuit currents in kA up to which selectivity is provided between the MCBs and upstream circuit-breakers according to IEC 60 947-2 and DIN VDE 0660, Part 101

at 230/400 V AC, 50 Hz.

Limit values of the MCBs/circuit-breakers selectivity in kA												
Downstream MCBs	I_n [A]	$I > [A]$	I_{cn} [kA]	Upstream circuit-breakers								
				3RV1.1			3RV1.2					
				10	12	8	10	12.5	16	20	22	25
				120	144	96	120	150	192	240	264	300
				50	50	100	100	100	50	50	50	50
Selectivity limits [kA] ¹⁾												
5SX2/5SY4 ...-5												
Characteristic A	2	6	6	0.2	0.2	-	-	0.2	0.2	0.6	1.2	1.5
	10	30	6	-	-	-	-	-	-	0.3	0.5	0.5
	16	48	6	-	-	-	-	-	-	0.3	0.4	0.5
	32	96	6	-	-	-	-	-	-	-	-	-
	40	120	6	-	-	-	-	-	-	-	-	-
5SX2/5SX4/5SY4/5SY7 ...-6												
Characteristic B	6	30	6/10	0.2	0.2	-	-	0.2	0.2	0.3	0.5	0.5
	10	50	6/10	-	0.2	-	-	0.2	0.2	0.3	0.4	0.5
	13	65	6/10	-	-	-	-	-	0.2	0.2	0.4	0.4
	16	80	6/10	-	-	-	-	-	-	0.2	0.4	0.4
	20	100	6/10	-	-	-	-	-	-	-	-	0.4
	25	125	6/10	-	-	-	-	-	-	-	-	-
	32	160	6/10	-	-	-	-	-	-	-	-	-
	40	200	6/10	-	-	-	-	-	-	-	-	-
	50	250	6/10	-	-	-	-	-	-	-	-	-
5SX2/5SX4/5SY4/5SY7 ...-7												
Characteristic C	0.5	5	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1	10	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1.6	16	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	2	20	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	3	30	6/10	-	0.2	-	-	0.2	0.2	0.3	0.4	0.5
	4	40	6/10	-	0.2	-	-	0.2	0.2	0.3	0.4	0.5
	6	60	6/10	-	0.2	-	-	0.2	0.2	0.3	0.4	0.5
	8	80	6/10	-	0.2	-	-	0.2	0.2	0.2	0.4	0.4
	10	100	6/10	-	0.2	-	-	0.2	0.2	0.2	0.4	0.4
	13	130	6/10	-	-	-	-	-	0.2	0.2	0.4	0.4
	16	160	6/10	-	-	-	-	-	-	0.2	0.4	0.4
	20	200	6/10	-	-	-	-	-	-	-	-	0.4
	25	250	6/10	-	-	-	-	-	-	-	-	-
	32	320	6/10	-	-	-	-	-	-	-	-	-
	40	400	6/10	-	-	-	-	-	-	-	-	-
	50	500	6/10	-	-	-	-	-	-	-	-	-
	63	630	6	-	-	-	-	-	-	-	-	-
5SX2/5SY4/5SY7 ...-8												
Characteristic D	2	40	6	-	-	-	-	0.2	0.2	0.4	0.6	0.6
	6	120	6	-	-	-	-	-	-	0.3	0.4	0.4
	10	200	6	-	-	-	-	-	-	0.2	0.4	0.4
	16	320	6	-	-	-	-	-	-	-	-	-
	32	640	6	-	-	-	-	-	-	-	-	-
	40	800	6	-	-	-	-	-	-	-	-	-
	50	1,000	6	-	-	-	-	-	-	-	-	-

1) In 240/415 V, 50 Hz networks, the selectivity limits must be reduced by 10 %.
 $I > =$ Tripping current.

Miniature Circuit-Breakers (MCBs)

General Data

Description

Selectivity of MCBs/circuit-breakers

Under short-circuit conditions, selectivity is provided between the MCBs and circuit-breakers acc. to IEC 60 947-2 and DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of the MCBs/fuses selectivity in kA

Downstream MCBs	I_n [A]	$I > [A]$	I_{cn} [kA]	Upstream circuit-breakers						
				3RV1.3						
				16	20	25	32	40	45	50
				192	240	300	384	480	540	600
				50	50	50	50	50	50	50
				Selectivity limits [kA] ¹⁾						
5SX2/5SY4...-5										
Characteristic A	2	6	6	0.2	0.8	1.2	2.5	3	6	6
	10	30	6	0.2	0.4	0.5	0.6	0.8	1	1.2
	16	48	6	-	0.3	0.4	0.6	0.8	0.8	1
	32	96	6	-	-	-	-	0.6	0.8	0.8
	40	120	6	-	-	-	-	-	-	0.8
5SX2/5SX4/5SY4/5SY7...-6										
Characteristic B	6	30	6/10	0.2	0.3	0.5	0.6	0.8	1	1.2
	10	50	6/10	0.2	0.3	0.4	0.6	0.8	1	1.2
	13	65	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	16	80	6/10	-	0.3	0.4	0.6	0.8	1	1
	20	100	6/10	-	-	0.4	0.6	0.8	1	1
	25	125	6/10	-	-	-	0.5	0.6	0.8	0.8
	32	160	6/10	-	-	-	-	0.6	0.8	0.8
	40	200	6/10	-	-	-	-	-	-	0.8
	50	250	6/10	-	-	-	-	-	-	-
5SX2/5SX4/5SY4/5SY7...-7										
Characteristic C	0.5	5	6/10	0.3	0.5	0.6	1	1	1.5	3
	1	10	6/10	0.3	0.5	0.6	1	1	1.5	3
	1.6	16	6/10	0.3	0.5	0.6	1	1	1.5	3
	2	20	6/10	0.3	0.5	0.6	1	1	1.5	3
	3	30	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	4	40	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	6	60	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	8	80	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	10	100	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	13	130	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	16	160	6/10	-	0.2	0.4	0.6	0.6	0.8	1
	20	200	6/10	-	-	0.4	0.6	0.6	0.8	1
	25	250	6/10	-	-	-	0.5	0.6	0.8	0.8
	32	320	6/10	-	-	-	-	0.6	0.8	0.8
	40	400	6/10	-	-	-	-	-	-	0.8
	50	500	6/10	-	-	-	-	-	-	-
	63	630	6	-	-	-	-	-	-	-
5SX2/5SY4/5SY7...-8										
Characteristic D	2	40	6	0.3	0.5	0.6	0.8	1.2	1.5	1.5
	6	120	6	0.2	0.3	0.4	0.6	0.8	1	1
	10	200	6	-	0.3	0.4	0.5	0.6	0.8	0.8
	16	320	6	-	-	-	0.5	0.6	0.6	0.8
	32	640	6	-	-	-	-	-	0.6	0.6
	40	800	6	-	-	-	-	-	-	-
	50	1,000	6	-	-	-	-	-	-	-

1) In 240/415 V, 50 Hz networks, the selectivity limits must be reduced by 10 %.
 $I >$ = Tripping current.

Miniature Circuit-Breakers (MCBs) General Data

Description

2

Selectivity of MCBs/circuit-breakers

Under short-circuit conditions, selectivity is provided between the MCBs and circuit-breakers acc. to IEC 60 947-2 and DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of the MCBs/circuit-breakers selectivity in kA

Downstream MCBs				Upstream circuit-breakers 3RV1.4									
Characteristic	I_n [A]	$I > [A]$	I_{cn} [kA]	16	20	25	32	40	50	63	75	90	100
				192	240	300	384	480	600	756	900	1 080	1 140
Selectivity limits [kA] ¹⁾													
5SX2/5SY4...-5													
Characteristic A	2	6	6/10	0.5	0.8	1.5	2.5	3	6/7.5	6/10	6/10	6/10	6/10
	10	30	6/10	0.3	0.4	0.5	0.6	0.8	1.2	1.5	2.5	3	4
	16	48	6/10	-	0.3	0.5	0.6	0.6	1	1.5	2	3	3
	32	96	6/10	-	-	-	-	0.6	0.8	1.5	2	2.5	3
	40	120	6/10	-	-	-	-	-	0.8	1.2	1.5	2	2
5SX2/5SX4, 5SY4/5SY7...-6													
Characteristic B	6	30	6/10/15	0.2	0.4	0.5	0.6	0.8	1.2	2	3	6/10/15	6/10/15
	10	50	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.5	2.5	4	4
	13	65	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	16	80	6/10/15	-	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	20	100	6/10/15	-	-	0.5	0.6	0.8	1	1.5	2	3	3
	25	125	6/10/15	-	-	-	0.5	0.8	0.8	1.5	2	3	3
	32	160	6/10/15	-	-	-	-	0.6	0.8	1.5	2	3	3
	40	200	6/10/15	-	-	-	-	0.6	0.8	1.2	1.5	2.5	2.5
	50	250	6/10/15	-	-	-	-	-	-	1.2	1.5	2.5	2.5
5SX2/5SX4, 5SY4/5SY7...-7													
Characteristic C	0.5	5	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	1	10	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	1.6	16	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	2	20	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	3	30	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	4	40	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	6	60	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	8	80	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	10	100	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	13	130	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	16	160	6/10/15	-	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	20	200	6/10/15	-	-	0.4	0.6	0.6	1	1.5	2	3	3
	25	250	6/10/15	-	-	-	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	320	6/10/15	-	-	-	-	0.6	0.8	1.2	1.5	2.5	2.5
	40	400	6/10/15	-	-	-	-	-	0.6	1	1.5	2	2
	50	500	6/10/15	-	-	-	-	-	-	1	1.2	1.5	2
63	630	6/10/15	-	-	-	-	-	-	-	-	1.5	1.5	
5SX2/5SY4/5SY7...-8													
Characteristic D	2	40	6/10/15	0.4	0.5	0.6	0.8	1	1.5	3	4	6/10/15	6/10/15
	6	120	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2.5	3	3
	10	200	6/10/15	-	0.3	0.4	0.5	0.6	0.8	1.5	2	3	3
	16	320	6/10/15	-	-	-	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	640	6/10/15	-	-	-	-	-	0.6	1	1.5	2	2
	40	800	6/10/15	-	-	-	-	-	-	1	1.2	1.5	1.5
	50	1,000	6/10/15	-	-	-	-	-	-	1	1.2	1.5	1.5
5SP4...-7													
Characteristic C	80	1,600	6/10	-	-	-	-	-	-	-	-	-	1.2
	100	2,000	6/10	-	-	-	-	-	-	-	-	-	-
5SP4...-8													
Characteristic D	80	1,600	6/10	-	-	-	-	-	-	-	-	-	-
	100	2,000	6/10	-	-	-	-	-	-	-	-	-	-

1) In 240/415 V, 50 Hz networks, the selectivity limits must be reduced by 10%.
 $I > =$ Tripping current.

Miniature Circuit-Breakers (MCBs)

General Data

Description

Selectivity of MCBs/circuit-breakers

Under short-circuit conditions, selectivity is provided between the MCBs and circuit-breakers according to IEC 60 947-2 and DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of the MCBs/circuit-breakers selectivity in kA

Downstream MCBs	I_n [A]	$I > [A]$	I_{cn} [kA]	Upstream circuit-breakers														
				3VF3 adjustable						3VF3 fixed setting								
				50	63	80	100	125	160	50	63	80	100	125	160			
				40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100
				Selectivity limits [kA] ¹⁾														
5SX2/5SX4																		
Characteristic A	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	10	30	6	1.6	4.7	6	6	6	6	6	2.5	4	4	4.5	4.9	6	6	6
	16	48	6	1.4	4.7	6	6	6	6	6	2.3	3.7	3.7	4.4	5	6	6	6
	32	96	6	1.2	3.6	4.6	6	6	6	6	1.8	3	3	3.5	3.7	6	6	6
	40	120	6	1	2.5	3.1	6	6	6	6	1.5	2	2	2.4	2.7	3.2	3.2	3.2
Characteristic B	6	30	6/10	2.1	6/10	6/10	6/10	6/10	6/10	6/10	3.2	6/10	6/9.7	6/10	6/10	6/10	6/10	6/10
	10	50	6/10	1.8	6/6.6	6/10	6/10	6/10	6/10	6/10	2.5	6/6.2	4.8	6/6.2	6/6.5	6/10	6/10	6/10
	13	65	6/10	1.6	5.1	8.2	6/10	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	6/8.9	6/8.9	6/8.9
	16	80	6/10	1.6	5.1	8.2	6/10	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	6/8.9	6/8.9	6/8.9
	20	100	6/10	1.6	5.1	8.2	6/10	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	6/8.9	6/8.9	6/8.9
	25	125	6/10	1.4	3.5	4.6	5.5	6	6/10	6/10	2.1	3.4	3	3.4	3.7	5.2	5.2	5.2
	32	160	6/10	1.4	3.5	4.6	5.5	6	6/10	6/10	2.1	3.4	3	3.4	3.7	5.2	5.2	5.2
	40	200	6/10	1.3	2.4	2.8	3.3	4.5	6.7	6/10	1.8	2.3	2.2	2.4	2.7	3.6	3.6	3.6
	50	250	6/10	-	2.4	2.8	3.3	4.3	5.8	6/10	-	2.3	2.2	2.4	2.7	3.6	3.6	3.6
	Characteristic C	0.5	5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
1		10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
1.5		15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
2		20	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
3		30	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10	6/10	6/10
4		40	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10	6/10	6/10
6		60	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10	6/10	6/10
8		80	6/10	1.7	4.2	6/7.9	6/10	6/10	6/10	6/10	2.3	3.7	3.8	3.8	4.6	6/9.4	6/9.4	6/9.4
10		100	6/10	1.7	4.2	6/7.9	6/10	6/10	6/10	6/10	2.3	3.7	3.8	3.8	4.6	6/9.4	6/9.4	6/9.4
13		130	6/10	1.5	4.2	5.5	6/10	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	6/7.5	6/7.5	6/7.5
16		160	6/10	1.5	4.2	5.5	6/10	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	6/7.5	6/7.5	6/7.5
20		200	6/10	1.5	4.2	5.5	6/10	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	6/7.5	6/7.5	6/7.5
25		250	6/10	1.1	3.4	4.5	5.4	5.7	6/8.8	6/10	1.9	3	3	3	3.6	4.9	4.9	4.9
32	320	6/10	1.1	3.4	4.5	5.4	5.7	6/8.8	6/10	1.9	3	3	3	3.6	4.9	4.9	4.9	
40	400	6/10	0.9	2.2	2.6	2.8	3.1	4.8	6/10	1.4	2.1	2.2	2.2	2.3	2.9	2.9	2.9	
50	500	6/10	-	2.1	2.5	2.8	3.1	4.8	6/10	-	-	2.1	2.1	2.2	2.9	2.9	2.9	
Characteristic D	2	40	6	2.4	6	6	6	6	6	4.2	6	6	6	6	6	6	6	
	6	120	6	1.4	4.2	4.8	6	6	6	2.3	4.1	4.2	4.2	4.3	6	6	6	
	10	200	6	1.3	3.9	5.5	6	6	6	1.9	3.7	3.7	3.7	4	6	6	6	
	16	320	6	1.1	3.5	4.2	4.9	6	6	1.7	3.3	3.7	3.3	3.5	4.7	4.7	4.7	
	32	640	6	-	-	3.3	3.9	4.2	6	-	-	-	2.4	2.7	3.7	3.7	3.7	
	40	800	6	-	-	-	3.1	3.3	4.9	-	-	-	-	1.5	3	3	3	
	50	1,000	6	-	-	-	-	2.9	4.8	-	-	-	-	-	2.6	2.6	2.6	
5SP4																		
Characteristic C	80	800	10	-	-	-	1.5	1.5	2.5	-	-	-	-	1.2	1.5	1.5	1.5	1.5
	100	1,000	10	-	-	-	-	1.5	2	-	-	-	-	-	-	-	-	-
Characteristic D	80	1,600	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	100	1,200	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Further values for 5SP4 and 5SY on request.

1) In 240/415 V, 50 Hz, the selectivity limits must be reduced by 10 %.
The selectivity limits are valid for adjustable releases for the maximum value, I_n = rated current.
 $I >$ = Tripping current.

Miniature Circuit-Breakers (MCBs) General Data

Description

2

Selectivity of MCBs/circuit-breakers

Under short-circuit conditions, selectivity is provided between the MCBs and circuit-breakers according to IEC 60 947-2 and DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of the MCBs/circuit-breakers selectivity in kA

Downstream MCBs	I_n [A]	$I > [A]$	I_{cn} [kA]	Upstream circuit-breakers													
				3VF4				3VF5				3VF6		3VF7	3VF8	3WN1	3WN6
				125	160	200	250	200	250	315	400	315	400-800	400-1250	800-2500	315-6300	315-3200
				1250	1600	2000	2500	2000	2500	3150	4000	3200	1575-6400	15000	20000	3780-75600	3780-48000
				40/70/100	40/70/100	40/70/100	40/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	50/70/100	70/100	65/80/100	65/75
				Selectivity limits [kA] ¹⁾													
5SX2/5SX4																	
Characteristic A	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	10	30	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	16	48	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	32	96	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	40	120	6	3.9	4.6	6	6	6	6	6	6	6	6	6	6	6	6
Characteristic B	6	30	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	10	50	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	13	65	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	16	80	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	20	100	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	25	125	6/10	6/9.6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	32	160	6/10	6/9.6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	40	200	6/10	6	6	6	6	6	6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	50	250	6/10	5.1	5.9	6	6	6	6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	Characteristic C	0.5	5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
1		10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
1.5		15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
2		20	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
3		30	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
4		40	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
6		60	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
8		80	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
10		100	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
13		130	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
16		160	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
20		200	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
25		250	6/10	6/8	6/9.1	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
32		320	6/10	6/8	6/9.1	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
40		400	6/10	3.6	4.8	6/6.5	6/6.5	6/6.5	6/6.5	6/6.5	6/10	6/10	6/10	6/10	6/10	6/10	6/10
50	500	6/10	3.6	4.8	6/6.2	6/6.2	6/6.2	6/6.3	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
Characteristic D	2	40	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	6	120	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	10	200	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	16	320	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	32	640	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	40	800	6	4	4.9	6	6	6	6	6	6	6	6	6	6	6	6
	50	1,000	6	4	4.8	6	6	6	6	6	6	6	6	6	6	6	6
5SP4																	
Characteristic C	80	800	10	1.5	2	3	3	3	3	3	6	8	10	10	10	10	10
	100	1,000	10	1.5	2	3	3	3	3	3	5	6	10	10	10	10	10
Characteristic D	80	1,600	10	-	-	3	3	2.5	3	3	5	6	10	10	10	10	10
	100	2,000	10	-	-	-	2.5	-	3	3	5	6	10	10	10	10	10

Further values for 5SP4 and 5SY on request.

1) In 240/415 V, 50 Hz, the selectivity limits must be reduced by 10 %.
The selectivity limits are valid for adjustable releases for the maximum value, I_n = rated current.
 $I >$ = Tripping current.

Miniature Circuit-Breakers (MCBs)

General Data

Description

Selectivity of MCBs/circuit-breakers

In distribution networks without any fuses, MCBs provide selectivity between themselves within close limits.

This depends on the peak current I of the downstream MCB and on the tripping current of the upstream MCB.

The following table specifies the short-circuit currents in kA up to which selectivity is provided between MCBs connected in series at 230 V AC.

Limit values of the MCBs/circuit-breakers selectivity in kA													
Downstream MCBs				Upstream circuit-breakers									
				5SX4 7 Characteristic C					5SP4 7 Characteristic C		5SP4 8 Characteristic D		
I_n [A]	$I > [A]$	I_{cn} [kA]		20	25	32	40	50	80	100	80	100	
				200	250	320	400	500	800	1,000	1,200	1,500	
				10	10	10	10	10	10	10	10	10	
				Selectivity limits [kA] ¹⁾									
5SX2/5SX4													
Characteristic B				0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	5	
	6	30	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.2	3	4	
	10	50	6/10	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3	
	13	65	6/10	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3	
	16	80	6/10	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3	
	20	100	6/10	-	0.2	0.3	0.4	0.5	0.8	1.2	2	3	
	25	125	6/10	-	-	-	0.4	0.4	0.6	1.2	1.5	3	
	32	160	6/10	-	-	-	0.4	0.4	0.6	1.2	1.5	3	
	40	200	6/10	-	-	-	-	0.4	0.6	1.2	1.5	2.5	
	50	250	6/10	-	-	-	-	-	0.6	1	1.5	2.5	
Characteristic C				0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10	
	0.5	5	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10	
	1	10	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10	
	1.5	15	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10	
	2	20	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10	
	3	30	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4	
	4	40	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4	
	6	60	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4	
	8	80	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3	
	10	100	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3	
	13	130	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3	
	16	160	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3	
	20	200	6/10	-	0.2	0.3	0.4	0.4	0.6	1.2	2	3	
	25	250	6/10	-	-	-	0.3	0.4	0.6	1	1.5	2.5	
	32	320	6/10	-	-	-	0.3	0.4	0.6	1	1.5	2.5	
	40	400	6/10	-	-	-	-	-	-	0.8	1.5	2	
	50	500	6/10	-	-	-	-	-	-	0.8	1.5	2	
	63	630	6	-	-	-	-	-	-	0.8	1.2	1.5	

Values for 5SY on request.

Miniature Circuit-Breakers (MCBs) General Data

Description

2

Back-up protection, MCBs/fuses



If the level of the maximum short-circuit current flowing at the MCB location is unknown, or if the specified rated breaking

capacity is exceeded, an additional protective device must be connected upstream as back-up protection. This prevents

excessive stressing of the MCB. Generally, a fuse is used for this purpose.

The following table specifies the short-circuit currents in kA up to which back-up protection is ensured if fuses are used acc. to DIN VDE 0636 Part 21.

Limit values of the MCBs/fuses back-up protection in kA

Downstream MCBs	I_n [A]	Upstream fuses					
		50 A	63 A	80 A	100 A	125 A	160 A
5SX2/5SX4		no back-up protection required up to 50 kA					
	0.3-4	no back-up protection required up to 50 kA					
	6	50	50	50	50	50	35
	8	50	50	50	50	50	35
	10	50	50	50	50	50	35
	13	50	50	50	35	35	30
	16	50	50	50	35	30	30
	20	50	50	50	35	25	25
	25	50	50	50	35	30	25
	32	50	50	50	35	30	25
	40	50	50	50	50	25	15
	50	50	50	50	50	25	15
	63	50	50	35	25	25	15
5SY4/5SY7		no back-up protection required					
	0.3-6	no back-up protection required					
	8	50	50	50	50	45	45
	10	50	50	50	50	45	45
	13	50	50	50	45	40	35
	16	50	50	50	45	40	35
	20	50	50	50	40	35	30
	25	50	50	50	40	35	30
	32	50	50	50	45	40	30
	40	50	50	50	45	40	30
	50	50	50	50	40	35	25
	63	50	50	45	40	35	25

Test circuit data:

$U_D = 250$ V
 $\cos \varphi = 0.3$ to 0.5

Test cycle:

Acc. to EN 60 947 - 2 (0 - C0)

Miniature Circuit-Breakers (MCBs)

General Data

Description

Back-up protection MCBs/circuit-breakers

If MCBs are used in fuseless distribution boards, circuit-breakers are to be provided as

back-up protection according to EN 60 947-2 and DIN VDE 0660 Part 101.

The following table shows the short-circuit currents in kA up to which back-up protection is

guaranteed if circuit-breakers are used.

Limit values of the MCBs/circuit-breakers back-up protection in kA



Downstream MCBs			Upstream circuit-breakers												
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF3 adjustable						3VF3 fixed setting						
			50	63	80	100	125	1 60	50	63	80	100	125	160	
			back-up-protection up to kA												
5SX2/5SX4			no back-up protection required up to 50 kA												
Characteristic A, <small>IZ_003560</small>	0.3-4	6/10	50	50	50	50	50	50	50	50	50	50	50	50	50
Characteristic B	6	6/10	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic C	8-20	6/10	20	20	20	20	20	20	20	20	20	20	20	20	20
Characteristic D	25	6/10	20	20	20	20	20	20	20	20	20	20	20	20	20
	32	6/10	20	20	20	20	20	20	20	20	20	20	20	20	20
	40	6/10	20	20	20	20	20	20	20	20	20	20	20	20	20
	50	6/10	10	10	10	10	10	10	10	10	10	10	10	10	10
	63	6	10	10	10	10	10	10	10	10	10	10	10	10	10
5SY4/5SY7			no back-up protection required up to 50 kA												
Characteristic A	0.3-6	10/15	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic B	8-10	10/15	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic C	13-16	10/15	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D	20-25	10/15	25	25	25	25	25	25	25	25	25	25	25	25	25
	32-40	10/15	25	25	25	25	25	25	25	25	25	25	25	25	25
	50-63	10/15	20	20	20	20	20	20	20	20	20	20	20	20	20
Downstream MCBs			Upstream circuit-breakers												
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF4				3VF5		3VF6		3VF7	3VF8	3WN1/3WS1		
			125	160	200	250	200	250	315	400	315-630	400-1,250	1,600-2,000	315-6,300	
			40/70/100	40/70/100	40/70/100	40/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	50/70/100	70/100	75,600-65-100	
			back-up-protection up to kA												
5SX2/5SX4			no back-up protection required up to 50 kA												
Characteristic A	0.3-4	6/10	50	50	50	50	50	50	50	50	50	50	50	50	
Characteristic B	6	6/10	25	25	25	25	25	25	25	25	25	25	25	25	
Characteristic C	8-20	6/10	20	20	20	20	20	20	20	20	20	20	20	20	
Characteristic D	25	6/10	20	20	20	20	20	20	20	20	20	20	20	20	
	32	6/10	20	20	20	20	20	20	20	20	20	20	20	20	
	40	6/10	20	20	20	20	20	20	20	20	20	20	20	20	
	50	6/10	10	10	10	10	10	10	10	10	10	10	10	10	
	63	6	10	10	10	10	10	10	10	10	10	10	10	10	
5SY4/5SY7			no back-up protection required up to 50 kA												
Characteristic A	0.3-6	10/15	35	35	35	35	35	35	35	35	35	35	35	35	
Characteristic B	8-10	10/15	35	35	35	35	35	35	35	35	35	35	35	35	
Characteristic C	13-16	10/15	25	25	25	25	25	25	25	25	25	25	25	25	
Characteristic D	20-25	10/15	25	25	25	25	25	25	25	25	25	25	25	25	
	32-40	10/15	25	25	25	25	25	25	25	25	25	25	25	25	
	50-63	10/15	20	20	20	20	20	20	20	20	20	20	20	20	

Miniature Circuit-Breakers (MCBs) General Data

Description

2

Internal resistances and power losses		Data is per pole (with load I_n)							
I_n [A]	Type A		Type B		Type C		Type D		
	R_1 mΩ	P_V W	R_1 mΩ	P_V W	R_1 mΩ	P_V W	R_1 mΩ	P_V W	
5SX2, 5SX4, 5SX5									
0.5	-	-	-	-	10,500	0.95	-	-	
-	-	-	-	-	3,000	0.75	3,000	0.75	
1	1,400	1.4	-	-	640	0.64	650	0.65	
1.6	540	1.4	-	-	312	0.80	270	0.7	
2	380	1.5	-	-	212	0.85	165	0.66	
3	170	1.5	-	-	82	0.74	77	0.7	
4	120	1.9	-	-	53	0.85	60	1	
6	43	1.5	39	1.4	30	1.10	20	0.7	
8	-	-	-	-	15	0.96	14	0.9	
10	18	1.8	16.5	1.65	12.5	1.25	12	1.2	
13	-	-	11.5	1.94	9	1.52	10	1.7	
16	10	2.5	8.5	1.17	7.8	2	7	1.8	
20	7.5	3	6.5	2.6	6	2.4	5.6	2.2	
25	4.7	2.9	4.8	3	4.5	2.8	4.5	2.8	
32	3.1	3.6	4	4.1	3.7	3.8	2.9	3	
40	2.6	4.2	2.7	4.3	2.5	4	2.4	3.8	
50	-	-	2	5	1.9	4.7	1.8	4.5	
63	-	-	-	-	1.6	6.6	-	-	
5SY4, 5SY7									
0.3	-	-	-	-	11,000	1.0	-	-	
0.5	-	-	-	-	3,340	0.8	3,220	0.8	
1	1983	2.0	-	-	1,760	1.8	1,560	1.6	
1.6	854	2.2	-	-	710	1.8	670	1.7	
2	554	2.2	-	-	470	1.9	465	1.9	
3	218	2.0	-	-	210	1.9	205	1.8	
4	127	2.0	-	-	110	1.8	100	1.6	
6	65	2.3	70	2.5	50	1.8	50	1.8	
8	29.6	1.9	-	-	14	0.9	12	0.8	
10	20.2	2.0	13	1.3	11	1.1	8.8	0.9	
13	11.7	2.0	9.7	1.6	8.5	1.4	8.5	1.4	
16	10.1	2.6	7.2	1.8	6.3	1.6	6.3	1.6	
20	6.2	2.5	4.7	1.9	3.7	1.5	3.7	1.5	
25	5.1	3.2	3.7	2.3	3.6	2.2	3.6	2.2	
32	3.1	3.2	3.0	3.0	3.0	3.0	3.0	3.0	
40	2.5	4.0	2.3	3.7	2.3	3.7	2.3	3.7	
50	1.9	4.8	1.9	4.8	1.9	4.8	1.9	4.8	
63	1.3	5.2	1.3	5.2	1.3	5.2	1.3	5.2	
5SP4									
80	-	-	-	-	0.9	5.8	0.9	5.8	
100	-	-	-	-	0.88	8	0.8	8	
125	-	-	-	-	0.7	10.9	-	-	

Correction factors for power losses

- DC and AC up to 60 Hz x 1.0
- AC
 - 200 Hz x 1.1
 - 400 Hz x 1.15
 - 1,100 Hz x 1.3

Miniature Circuit-Breakers (MCBs)

General Data

Description

Personnel protection using MCBs

According to DIN VDE 0100 Part 410, to provide protection against hazardous shock currents in TN supply networks, the dimensioning of the cross sections of conductors and/or their lengths after the protective

device must ensure that a fault with negligible impedance (i.e. a short circuit) at an arbitrary position between an external and a protective conductor or a connected exposed conductive part causes an automatic

disconnection within the specified times of 0.4 s or 5 s.

This requirement is met by the following condition:

$$Z_s \times I_a \leq U_o$$

Z_s $\hat{=}$ Impedance of the entire fault loop circuit

I_a $\hat{=}$ Current, which causes the disconnection within the specified times

U_o $\hat{=}$ Voltage to ground

Maximum permissible impedance of the fault loop at $U_o = 230 \text{ V AC}$ to comply with the disconnection condition according to DIN VDE 0100 Part 410.

	$I_n \text{ [A]}$	Characteristic A		Characteristic B		Characteristic C		Characteristic D	
		$t_a \leq 0.4 \text{ s}$	$\leq 5 \text{ s}$	$t_a \leq 0.4 \text{ s}$	$\leq 5 \text{ s}$	$t_a \leq 5 \text{ s}$	$\leq 5 \text{ s}$	$t_a \leq 0.4 \text{ s}$	$\leq 5 \text{ s}$
		Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω
5SX, 5SY, 5SP4									
	0.3	-	-	-	-	76.6	153	-	-
	0.5	-	-	-	-	46	92	-	92
	1.0	76.6	76.6	-	-	23	46	15.3	46
	1.6	47.9	47.9	-	-	14.4	28.8	9.6	28.8
	2	38.3	38.3	-	-	11.5	23	7.6	23
	3	25.5	25.5	-	-	7.7	15.4	5.1	15.4
	4	19.1	19.1	-	-	5.8	11.6	3.8	11.6
	6	12.7	12.7	7.6	7.6	3.8	7.6	2.5	7.6
	8	-	-	-	-	2.8	5.7	1.9	5.7
	10	7.6	7.6	4.6	4.6	2.3	4.6	1.1	4.6
	13	-	-	-	3.57	1.7	3.4	0.9	3.4
	16	4.7	4.7	2.9	2.9	1.4	2.8	0.7	2.8
	20	3.8	3.8	2.3	2.3	1.1	2.2	0.5	2.2
	25	3.0	3.0	1.8	1.8	0.9	1.8	0.4	1.8
	32	2.4	2.4	1.4	1.4	0.7	1.4	0.3	1.4
	40	1.9	1.9	1.1	1.1	0.6	1.2	0.28	1.2
	50	-	-	0.9	0.9	0.5	1.0	0.23	1.0
	63	-	-	0.7	0.7	0.4	0.8	0.2	0.8
	80	-	-	-	-	0.3	0.6	0.14	0.6
	100	-	-	-	-	0.2	0.4	0.1	0.4
	125	-	-	-	-	0.16	0.3	0.1	0.3

For $U_o = 240 \text{ V AC}$, $Z_s \times 1.04$.

For $U_o = \text{AC } 127 \text{ V}$, $Z_s \times 0.55$.

Miniature Circuit-Breakers (MCBs) General Data

Description

2

Protecting luminaire circuits

Maximum permissible lamp load for miniature circuit-breaker when feeding fluorescent lamps L 18 W, L 36 W, L 38 W, L 58 W.

Max. number of fluorescent lamps

I _n [A]	Lamp	Conventional controlgear		Electronic controlgear							
		single lamp uncomp.	parallel comp.	full circuit single lamp			two lamps	group circuit single lamp two lamps			
5SX2, 5SX4, 5SX5											
Characteristic		all	all	B	C	D	B	C	D	all	all
10	L 18 W	27	33	25	51	100	34	70	116	100	116
	L 36 W	23	33	25	51	58	34	60	60	58	60
	L 38 W	23	33	25	51	55	34	58	58	55	58
	L 58 W	14	21	17	35	38	16	32	38	38	38
13	L 18 W	35	43	33	66	130	44	90	152	130	152
	L 36 W	30	43	33	66	76	44	78	78	76	78
	L 38 W	30	43	33	66	72	44	76	76	72	76
	L 58 W	19	27	22	45	50	20	42	50	50	50
16	L 18 W	43	53	41	82	160	56	112	188	160	188
	L 36 W	37	53	41	82	94	56	96	96	94	96
	L 38 W	37	53	41	82	88	56	94	94	88	94
	L 58 W	23	34	28	56	61	26	52	62	61	62
20	L 18 W	54	66	51	102	200	70	140	234	200	234
	L 36 W	46	66	51	102	117	70	120	120	117	120
	L 38 W	46	66	51	102	111	70	116	116	111	116
	L 58 W	29	42	35	70	76	32	66	78	76	78
25	L 18 W	67	83	64	128	250	86	174	294	250	294
	L 36 W	58	83	64	128	147	86	150	150	147	150
	L 38 W	58	83	64	128	138	86	146	146	138	146
	L 58 W	37	53	43	87	96	40	82	98	96	98
32	L 18 W	86	106	82	164	320	112	224	376	320	376
	L 36 W	74	106	82	164	188	112	192	192	188	192
	L 38 W	74	106	82	164	177	112	188	188	177	188
	L 58 W	47	68	56	112	123	52	106	124	123	124

Comment:

MCB version:

The specified lamp load values are valid for single-pole MCBs. When using multi-pole MCBs, the permissible number of lamps is reduced by 20 %.

Circuit impedance:

The specified lamp load values are valid, taking into account a cable impedance of 800 mΩ. For 400 mΩ the permissible values are reduced by 10 %, for 200 mΩ by 20 %.

DC operation:

The values in the table are also valid for DC operation for 5SX5 MCBs in conjunction with electronic controlgear.

Maximum number of 12 V low-voltage halogen lamps

I _n [A]	Lamp 20 W		Lamp 50 W		
	transf.	5NZ5 071	5NZ5 081	5NZ5 072	5NZ5 081
5SX4					
Characteristic B	6	14	42	12	21
	10	23	70	20	35
	16	38	112	32	57
	20	47	141	40	71
	25	59	176	50	89
	32	76	225	65	114
	40	95	282	81	142
	50	102	302	87	153
Characteristic C	6	28	54	23	25
	10	47	90	38	41
	16	76	145	61	66
	20	95	181	76	83
	25	119	227	96	104
	32	153	290	123	133
	40	191	363	153	166
	50	239	454	192	208

Miniature Circuit-Breakers (MCBs)

General Data

Description

Protecting luminaire circuits

Max. number of fluorescent lamps

I_n [A]	Lamp	Electronic controlgear											
		full circuit 230 V single lamp ¹⁾						group circuit 230 V single lamp ²⁾					
		two lamps			two lamps			two lamps			two lamps		
5SY4, 5SY7		B	C	D	B	C	D	B	C	D	B	C	D
6	L 18 W	17	37	66	17	35	35	66	66	66	35	35	35
	L 36 W	17	37	37	17	19	19	37	37	37	19	19	19
	L 58 W	17	19	19	12	12	12	19	19	19	12	12	12
8	L 18 W	-	50	88	-	47	47	-	88	88	-	-	47
	L 36 W	-	50	50	-	25	25	-	50	50	-	-	25
	L 58 W	-	25	25	-	16	16	-	25	25	-	-	16
10	L 18 W	36	67	111	36	58	58	111	111	111	58	58	58
	L 36 W	36	62	62	32	32	32	62	62	62	32	32	32
	L 58 W	32	32	32	20	20	20	32	32	32	20	20	20
13	L 18 W	44	81	144	44	76	76	144	144	144	76	76	76
	L 36 W	44	81	81	41	41	41	81	81	81	41	41	41
	L 58 W	41	41	41	26	26	26	41	41	41	26	26	26
16	L 18 W	56	100	177	56	94	94	177	177	177	94	94	94
	L 36 W	56	100	100	51	51	51	100	100	100	51	51	51
	L 58 W	51	51	51	32	32	32	51	51	51	32	32	32
20	L 18 W	70	117	222	70	117	117	222	222	222	117	117	117
	L 36 W	70	117	125	64	64	64	125	125	125	64	64	64
	L 58 W	64	64	64	40	40	40	64	64	64	40	40	40
25	L 18 W	85	157	277	85	147	147	277	277	277	147	147	147
	L 36 W	85	156	156	80	80	80	156	156	156	80	80	80
	L 58 W	80	80	80	51	51	51	80	80	80	51	51	51
32	L 18 W	100	144	355	100	144	188	355	355	355	188	188	188
	L 36 W	100	144	200	100	103	103	200	200	200	103	103	103
	L 58 W	100	103	103	65	65	65	103	103	103	65	65	65
40	L 18 W	126	216	444	126	216	235	444	444	444	235	235	235
	L 36 W	126	216	250	126	129	129	250	250	250	129	129	129
	L 58 W	126	129	129	81	81	81	129	129	129	81	81	81
50	L 18 W	180	247	555	180	247	294	555	555	555	294	294	294
	L 36 W	180	247	312	161	161	161	312	312	312	161	161	161
	L 58 W	161	161	161	102	102	102	161	161	161	102	102	102
63	L 18 W	170	340	567	170	340	370	700	700	700	370	370	370
	L 36 W	170	340	393	170	203	203	393	393	393	203	203	203
	L 58 W	170	203	203	128	128	128	203	203	203	128	128	128

1) All electronic controlgear are switched on simultaneously.

2) The electronic controlgear are one after another switched on in groups.

Circuit impedance: The specified lamp load values are valid taking into account a cable impedance of 800 mΩ.
At 400 mΩ the permissible values are reduced by 10 %.

Reduction factors for MCBs for a simultaneous switch-on of an incandescent lamp load referred to the rated current of the MCB and the total operating current of the lamps

	Reduction factor	
	switching using MCBs	switching using a separate switch
5SQ, 5SX, 5SY, 5SP4		
Characteristic A	0.3	0.35
Characteristic B	0.5	0.6
Characteristic C	1	1
Characteristic D	1	1

Miniature Circuit-Breakers (MCBs) General Data

Description

2

Load capacity of MCBs with compensated and non-compensated HQ, HQI and NAV lamps (number)

		Lamp rating [W]							
		35	70	150	250	400	1,000	2,000	3,500
Lamp current	[A]	0.5	1	1.8	3	3.5	9.5	10.3	18
Comp. lamp current	[A]	0.3	0.5	1	1.5	2	6	5.5	9.8
Inrush	[A]	10	18	36	60	70	120	125	220

I_n [A]	Lamp rating [W]							
	35	70	150	250	400	1,000	2,000	3,500

5SX2, 5SX4									
Characteristic B	6	3	1	0	0	0	0	0	0
	10	5	2	1	0	0	0	0	0
	13	6	3	1	1	1	0	0	0
	16	8	4	2	1	1	0	0	0
	20	10	5	2	1	1	0	0	0
	25	13	7	3	2	1	1	1	0
	32	16	8	4	2	2	1	1	0
	40	20	11	5	3	3	1	1	1
	50	21	12	6	3	3	1	1	1
	Characteristic C	1	1	0	0	0	0	0	0
1.6		1	1	0	0	0	0	0	0
2		2	1	0	0	0	0	0	0
3		3	1	0	0	0	0	0	0
4		4	2	1	0	0	0	0	0
6		6	3	1	1	0	0	0	0
8		8	4	2	1	1	0	0	0
10		10	5	2	1	1	0	0	0
13		13	7	3	2	1	1	1	0
16		16	9	4	2	2	1	1	0
20		20	11	5	3	2	1	1	0
25		25	14	7	4	3	2	1	1
32		32	17	8	5	4	2	2	1
40		40	22	11	6	5	3	3	1
50		50	27	13	8	7	4	3	2
Characteristic D	1	1	0	0	0	0	0	0	0
	1.6	2	1	0	0	0	0	0	0
	2	2	1	0	0	0	0	0	0
	3	3	2	1	0	0	0	0	0
	4	5	2	1	1	0	0	0	0
	6	8	4	2	1	1	0	0	0
	8	11	5	3	2	1	0	0	0
	10	14	7	4	2	2	0	0	0
	13	18	9	5	3	2	1	1	0
	16	22	11	6	3	3	1	1	0
	20	28	14	7	4	4	1	1	0
	25	35	17	9	5	5	2	1	1
	32	44	22	12	7	6	2	2	1
	40	56	28	15	9	8	3	3	1
	50	70	35	19	11	10	4	3	2

Miniature Circuit-Breakers (MCBs)

General Data

Description

Load capacity of MCBs with compensated and non-compensated HQ, HQI and NAV lamps (number)

		Lamp rating [W]							
		35	70	150	250	400	1,000	2,000	3,500
Lamp current	[A]	0.5	1	1.8	3	3.5	9.5	10.3	18
Comp. lamp current	[A]	0.3	0.5	1	1.5	2	6	5.5	9.8
Inrush	[A]	10	18	36	60	70	120	125	220

		Lamp rating [W]							
I_n [A]		35	70	150	250	400	1,000	2,000	3,500
5SY4, 5SY7									
Characteristic B	6	2	1	0	0	0	0	0	0
	10	5	3	1	1	0	0	0	0
	13	7	4	2	1	1	0	0	0
	16	8	5	2	1	1	0	0	0
	20	11	6	3	1	1	1	1	0
	25	13	7	3	2	2	1	1	0
	32	16	8	4	2	2	1	1	0
	40	20	11	5	3	3	1	1	1
	50	28	15	7	4	4	2	2	1
	63	26	14	7	4	3	2	2	1
Characteristic C	6	6	3	1	1	0	0	0	0
	8	8	4	2	1	1	0	0	0
	10	10	6	3	1	1	0	0	0
	13	13	7	3	2	1	1	1	0
	16	16	9	4	2	2	1	1	0
	20	18	10	5	3	2	1	1	0
	25	25	14	7	4	3	2	1	1
	32	22	12	6	3	3	2	1	1
	40	33	18	9	5	4	2	2	1
	50	38	21	10	6	5	3	3	1
63	53	29	14	9	7	4	4	2	
Characteristic D	6	8	4	2	1	1	0	0	0
	8	11	5	3	2	1	0	0	0
	10	14	7	4	2	2	0	0	0
	13	18	9	5	3	2	1	1	0
	16	22	11	6	3	3	1	1	0
	20	28	14	7	4	4	1	1	0
	25	35	17	9	5	5	2	1	1
	32	44	22	12	7	6	2	2	1
	40	56	28	15	9	8	3	2	1
	50	70	35	19	11	10	4	3	2
63	88	44	24	14	12	4	4	2	
5SP4									
Characteristic C	80	76	42	21	12	11	6	6/5	3
	100	98	54	27	16	14	8/7	8/6	4
	125	116	64	32	19	16	9	9/8	5
Characteristic D	80	143/112	80/56	40/31	24/18	20/16	9/6	10/5	5/3
	100	186/140	103/70	51/39	31/23	26/20	11/7	12/6	7/4
	125	186/175	103/87	51/48	31/29	26/25	14/9	15/8	8/5

Compensated/non-compensated lamps are subject to different values.

Voltage-independent, selective main miniature circuit-breakers (SHU)

According to DIN VDE 0645 Selective main miniature circuit-breakers are essentially based on the mode of operation of conventional MCBs and have a delayed thermal release for overload protection and an electromagnetic fast release with an impact armature for short-circuit protection. Further, a selectivity device is included which identifies whether the downstream MCB in the load circuit can handle the short circuit by itself or not. For situations where the MCB cannot handle the short circuit, the selective main miniature circuit-breaker trips.

Independent of its rated current, the selective main miniature circuit-breaker guarantees a selectivity with regard to the downstream MCBs acc. to EN 60 898 and DIN VDE 0641 Part 11 up to their rated breaking capacity. 6 000
3

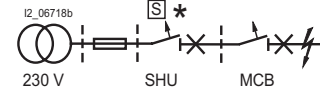
Further, the selective main miniature circuit-breaker provides back-up protection up to 25 kA for all downstream MCBs. In the past, sealed fuses were generally used at the meter panel to prevent power theft. As a result of various modes of operation and therefore different characteristics only a limited short-circuit selectivity can be achieved in a cascade of upstream fuses and downstream MCBs. This selectivity depends on the difference of the particular rated currents. If a meter fuse was blown due to an overcurrent or a short circuit, the power supply company service department had to be called-in to replace the sealed fuse because this could not be done by a non-specialist. The selective main miniature circuit-breaker, however, can be reclosed by non-specialists.

The new selective main miniature circuit-breaker offers the following advantages for the system/plant operator:

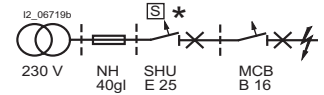
- Improved current limiting by supporting the downstream MCB using the selective main miniature circuit-breaker
- System-compatibility, as, with the exception of the downstream MCB, the operating characteristics of other devices are not influenced
- High and reliable selectivity between the sub-distribution and meter panel
- Safe, fast and economical reclosure by non-specialists
- Reclosure is not possible as long as the cause of the short circuit has not been removed
- A tariff monitoring function ensures that power taken from the line is registered
- Isolator characteristics with contact position indication according to EN 60 204.

Application examples

Selectivity with regard to downstream MCBs up to the rated breaking capacity 6 000
3



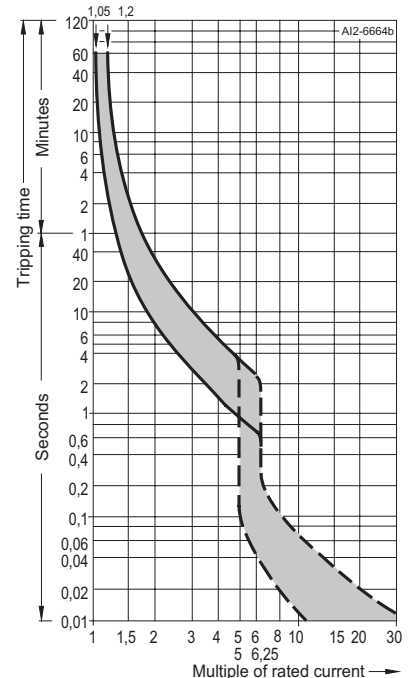
Selectivity with regard to upstream fuses up to 2 000 A



Summary of technical data

		Selective main miniature circuit-breaker
Standards		DIN VDE 0645
Tripping characteristic		E
Rated voltage	V AC	230/400
Rated breaking capacity	kA	25
Size acc. to DIN 43 880		5 when mounted on standard mounting rails acc. to DIN EN 50 022 6 when mounted on busbars using an adapter
Insulation coordination		
• Rated insulation voltage	V AC	690
• Degree of pollution for overvoltage class IV		3
Connection		Individual connection or group connection using busbars
Terminals		Saddle terminals on both ends
Cross sections		On both ends
• Stranded, max.	mm ²	70
• Finely stranded, max.	mm ²	50

Tripping characteristic E



Miniature Circuit-Breakers (MCBs)

General Data

Description

DC, AC/DC

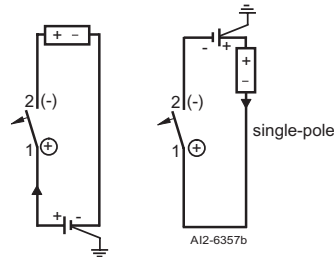
In DC networks up to 60 V or 120 V, all MCBs of the N System, are suitable for single-pole and double-pole application.

The 5SX5 design is required for higher voltages. Contrary to the standard product range, the 5SX5 are equipped with

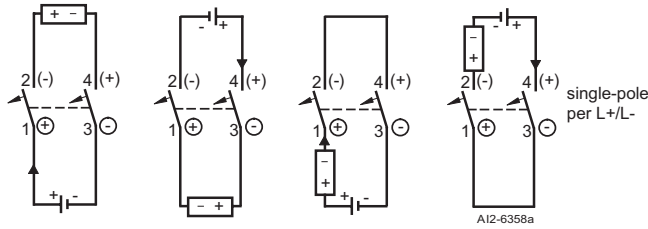
additional permanent magnets in the quenching chamber to support arc suppression.

For this reason, the polarity of the MCB is clearly marked and must be observed when connecting the cables and conductors.

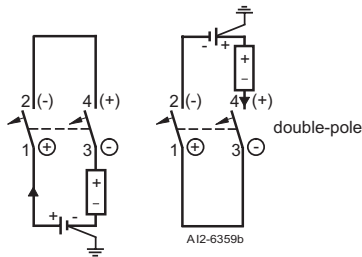
Up to max. 220 V DC battery voltage



Up to max. 220 V DC battery voltage



Up to max. 440 V DC battery voltage



Miniature Circuit-Breakers (MCBs) Power Supply Company Product Range

5SP3 selective main miniature circuit-breakers (SHU), 25 kA

2

Features

- U_n : 230/400 V, 50-60 Hz can be used in supply networks up to 250/440 V AC
- Standards: DIN VDE 0645
- 91 mm device mounting depth.


Applications

- As main miniature circuit-breaker in meter panels.
- As group miniature circuit-breaker in distribution boards.
- Characteristic E: Adapted to the special application conditions encountered in cascade circuit configurations between fuses and MCBs.




Advantages

- Protects insulated cables against overcurrents
- Isolates loads
- Power drawn from the supply is registered
- Non-specialists can reclose the circuit
- Meets defined selectivity requirements with respect to upstream and downstream overcurrent protective devices
- Can be screwed to mounting panels
- Can be clipped onto busbars using an adapter
- Can be snapped onto mounting rails in accordance with DIN EN 50 022 using the mounting plate.

Selection and ordering data

	I_n	MW	Characteristic E	Price	Weight 1 item	Pack. unit
	A		Order No.	1 item	kg	Items
Selective main miniature circuit-breaker 	16	2	5SP3 716		0.55	3
	20		5SP3 720			
	25		5SP3 725			
	32		5SP3 732			
	35		5SP3 735			
	40		5SP3 740			
	50		5SP3 750			
	63		5SP3 763			
	80		5SP3 780			
	100		5SP3 791			

Accessories

		Order No.	Price	Weight 1 item	Pack. unit
			1 item	kg	Items
For selective main miniature circuit-breakers (SHU)   	Breaker-blocking cover prevents manual tripping of the breaker	5ST1 318		0.001	10
	Operation-blocking cover, gray prevents the manual tripping and resetting of the breaker	5ST1 320		0.002	10
	Operating protective cover, transparent several possibilities against accidental and deliberate actuation <ul style="list-style-type: none"> • with padlock • using crosstip screwdrivers • using special wrenches (Antilux) can be provided by operators and the power supply companies	5ST1 323		0.012	3

For dimension drawings see page 2/64.

Miniature Circuit-Breakers (MCBs) Power Supply Company Product Range

Accessories

General accessories



Mounting plates

for mounting onto standard mounting rails acc. to DIN EN 50 022
for 1 or 2 standard mounting rails universally applicable, 125 mm clearance

Order No.	Price	Weight 1 item	Pack. unit
	1 item	kg	Items

5ST1 322

0.021 10



Busbar adapters

suitable for 40 mm clearance to accept 3 selective main miniature circuit-breakers

5ST1 314

0.35 1



with integrated terminals 50 mm² for infeed

5ST1 315

0.65



to accept 1 selective main miniature circuit-breaker

5ST1 321

0.105



Terminals

for CU busbars 12 mm x 5 mm, for connection of N and PE conductors up to 10 mm²

8GR5 487

0.14 1



Terminal covers

2 are required per device to cover envelopes within the overall dimensions acc. to DIN 43 880

5ST1 316

0.001 6

For covering terminals and cut-out of meter panels with 125 mm clearance

5ST1 317

0.01