General Data

Product Overview

Design	Tripping characteristics	Rated current I_n	Rated breaking capacity Energy limitation class
Power supply company product range			
5SP3	E	16 - 100 A	25 000
Standard product range			
5SQ2	B C	6 - 40 A 0.5 - 63 A	3 000
5SQ3	C	0.5 - 50 A	4 500 3
5SX2	A B C D	1 - 40 A 6 - 50 A 0.3 - 63 A 0.5 - 50 A	6 000 3
5SX4	B C	6 - 50 A 0.5 - 50 A	10 000 3
AC/DC product range			
5SX5	B C	6 - 32 A 0.5 - 32 A	4 500 3 — 10 000 T4
High current product range			
5SX7	B C D	40 - 63 A 40 - 125 A 40 - 100 A	10 000

Definitions

1 MW = Modular width of 18 mm

N-type = Device mounting depth of 55 mm

Depth 70 mm = Device mounting depth 70 mm

Back-up protection, MCBs/fuses

If the level of the maximum short-circuit current flowing at the MCB location is unkown, 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 guaranteed 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							
Characteristic C	0.3-4	No back-up protection required up to 50 kA					
Characteristic B/C	6	50	50	50	50	50	35
Characteristic C	8	50	50	50	50	50	35
Characteristic B/C	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
Characteristic C	63	50	50	35	25	25	15

Test circuit data:

U_p = 250 V
cos φ = 0.27 to 0.49

Test cycle:

0 (60°) - t - 0 (60°), t = 3 min
(2 trips at 60° electrical)

Series connection circuit-breakers – miniature circuit-breakers AC 380-420 V, 50 Hz

Downstream miniature circuit-breakers			Upstream circuit-breakers 3VF2 for line protection										
	I_n (A)		16	20	25	32	40	45	50	63	70	80	90	100
		$I >$ (A)	350	450	500	600	750	750	800	800	900	900	1000	1000
		I_{cn} (kA)	18	18	18	18	18	18	18	18	18	18	18	18
			Discrimination limits (kA)											
5SX2 ...-5 A-Charakteristics	2	6	0.7	1.2	1.5	2.8	6	6	6	6	6	6	6	6
	10	6	0.3	0.5	0.6	0.6	0.8	0.8	1	1	1.2	1.2	1.5	1.5
	16	6		0.4	0.6	0.6	0.8	0.8	1	1	1.2	1.2	1.2	1.2
	32	6					0.8	0.8	0.8	0.8	1	1	1.2	1.2
	40	6							0.8	0.8	0.8	0.8	1	1
5SX4 1..-6 B-Charakteristics	6	6/10	0.3	0.5	0.6	0.8	1	1	1	1	1.2	1.2	1.5	1.5
	10	6/10	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	13	6/10	0.3	0.4	0.5	0.6	0.8	0.8	1	1	1.2	1.2	1.2	1.2
	16	6/10		0.4	0.5	0.6	0.8	0.8	1	1	1.2	1.2	1.2	1.2
	20	6/10			0.5	0.6	0.8	0.8	1	1	1.2	1.2	1.2	1.2
	25	6/10				0.5	0.8	0.8	0.8	0.8	1	1	1.2	1.2
	32	6/10					0.8	0.8	0.8	0.8	1	1	1.2	1.2
	40	6/10							0.8	0.8	1	1	1.2	1.2
	50	6/10								0.8	1	1	1	1
5SX4 ...-7 C-Charakteristics	0.5	6/10	0.5	0.7	0.8	1	1.5	1.5	1.5	1.5	3	3	4.8	4.8
	1	6/10	0.5	0.7	0.8	1	1.5	1.5	1.5	1.5	3	3	4.8	4.8
	1.6	6/10	0.5	0.7	0.8	1	1.5	1.5	1.5	1.5	3	3	4.8	4.8
	2	6/10	0.5	0.7	0.8	1	1.5	1.5	1.5	1.5	3	3	4.8	4.8
	3	6/10	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	4	6/10	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	6	6/10	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	8	6/10	0.2	0.4	0.5	0.6	0.8	0.8	0.8	0.8	1	1	1.2	1.2
	10	6/10	0.2	0.4	0.5	0.6	0.8	0.8	0.8	0.8	1	1	1.2	1.2
	13	6/10	0.2	0.4	0.5	0.6	0.8	0.8	0.8	0.8	1	1	1.2	1.2
	16	6/10		0.4	0.5	0.6	0.8	0.8	0.8	0.8	1	1	1.2	1.2
	20	6/10			0.5	0.6	0.8	0.8	0.8	0.8	1	1	1.2	1.2
	25	6/10				0.5	0.7	0.7	0.8	0.8	0.8	0.8	1	1
	32	6/10					0.7	0.7	0.8	0.8	0.8	0.8	1	1
	40	6/10							0.7	0.7	0.8	0.8	1	1
	50	6/10								0.7	0.8	0.8	0.8	0.8
	63	6											0.8	0.8
5SX2 ...-8 D-Charakteristics	2	6	0.5	0.6	0.6	0.8	1.2	1.2	1.5	1.5	1.5	1.5	2.3	2.3
	6	6	0.3	0.4	0.5	0.6	0.8	0.8	1	1	1.2	1.2	1.5	1.5
	10	6	0.3	0.4	0.4	0.6	0.8	0.8	0.8	0.8	1	1	1.2	1.2
	16	6				0.5	0.6	0.6	0.7	0.7	0.8	0.8	1	1
	32	6							0.7	0.7	0.8	0.8	0.8	0.8
	40	6												
	50	6												
5SQ2 B-Charakteristics	6	3	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	10	3	0.2	0.3	0.4	0.5	0.7	0.7	0.7	0.7	0.8	0.8	1	1
	16	3		0.3	0.3	0.4	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8
	20	3			0.3	0.4	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8
	25	3				0.4	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8
	32	3					0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8
5SQ2 C-Charakteristics	0.5	3	2.9	3	3	3	3	3	3	3	3	3	3	3
	1	3	2.9	3	3	3	3	3	3	3	3	3	3	3
	1.6	3	2.9	3	3	3	3	3	3	3	3	3	3	3
	2	3	2.9	3	3	3	3	3	3	3	3	3	3	3
	3	3	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	4	3	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	6	3	0.3	0.4	0.5	0.7	1	1	1	1	1.2	1.2	1.5	1.5
	8	3	0.2	0.4	0.4	0.5	0.7	0.7	0.7	0.7	0.8	0.8	1	1
	10	3	0.2	0.3	0.4	0.5	0.7	0.7	0.7	0.7	0.8	0.8	1	1
	16	3		0.3	0.3	0.4	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8
	20	3			0.3	0.4	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8
	25	3				0.4	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8
	32	3					0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.7
	40	3									0.7	0.7	0.7	0.7
	50	3									0.7	0.7	0.7	0.7
	63	3										0.7	0.7	0.7

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 in accordance with 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	I_n [A]	I >[A] / I_{cn} [kA]	Upstream circuit-breakers 3VF3 Adjustable						3VF3 Fixed setting					
			50	63	80	100	125	1 60	50	63	80	100	125	160
			500	630	800	1 000	1 250	1 600	400	500	630	800	1 000	1 280
			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
			Back-up protection up to kA											
5SX2/5SX4														
 Characteristic A, Characteristic B, Characteristic C, Characteristic D,	0.3-4	6/10	No back-up protection required up to 50 kA											
	6	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	8	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	10	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	13	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	16	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	20	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	25	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	32	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	40	6/10	10	10	10	10	10	10	10	10	10	10	10	10
	50	6/10	-	10	10	10	10	10	-	10	10	10	10	10
5SQ2														
Characteristic B, Characteristic C	0.5-2	3	6											
	3	3	4.5									4		
	4	3	4.5									4		
	6	3	4.5										4	
	8	3	4.5			4			4.5				4	
	10	3	4.5			4			4.5				4	
	13	3	4.5			4			4.5				4	
	16	3	4.5			4			4.5				4	
	20	3	4.5			4			4.5				4	
	25	3	4.5			4			4.5				4	
	32	3	4.5			4			4.5				4	
	40	3	4.5			4			4.5				4	
	50	3	-	4.5		4			-	4.5			4	
	63	3	-		4.5	4			-	4.5			4	

Back-up protection, MCBs/circuit-breakers

When a short circuit develops, back-up protection is provided between the downstream MCB and the upstream circuit-breakers up to the values specified in kA.

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

Downstream MCBs			Upstream circuit-breakers											
			3VF4				3VF5				3VF6	3VF7	3VF8	3WN1/ 3WS1
	I_n [A]		125	160	200	250	200	250	315	400	315-630	400-1 250	1600-2 000	315-6 300
		I >[A]	1 250	1 600	2 000	2 500	2 000	2 500	3 150	4 000	3 200-6 300	15 000	20 000	3 780-75 600
		I_{cn} [kA]	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	65-100
			Back-up protection up to [kA]											
5SX2/5SX4														
Characteristic A, Characteristic B, Characteristic C, Characteristic D	0.3 - 4	6/10	No back-up protection required up to 50 kA											
	6	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	8	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	10	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	13	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	16	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	20	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	25	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	32	6/10	15	15	15	15	15	15	15	15	15	15	15	15
	40	6/10	8	8	8	8	8	8	8	8	8	8	8	8
	50	6/10	8	8	8	8	8	8	8	8	8	8	8	8
5SQ2														
Characteristic B, Characteristic C	0.5 - 2	3	6											
	3	3	4											
	4	3	4											
	6	3	3											
	8	3	3											
	10	3	3											
	13	3	3											
	16	3	3											
	20	3	3											
	25	3	3											
	32	3	3											
	40	3	3											
	50	3	3											
	63	3	3											

Configuration and dimensioning

Back-up protection of miniature circuit breakers/fuses

If the maximum short-circuit current of the miniature circuit breaker at the installation location is unknown, or if the specified rated switching capacity is exceeded, an additional protective device must be connected upstream as back-up protection to prevent overloading of the miniature circuit breaker. This is usually a fuse.

The following table shows the short-circuit currents in kA up to which back-up protection is guaranteed when using fuses according to DIN VDE 0636-21.

Back-up protection limit values of miniature circuit breakers/fuses in kA

Downstream miniature circuit breakers	I_n [A]	Upstream fuses 50 A	63 A	80 A	100 A	125 A	160 A	>160 A
5SY6 (without 5SY60)								
	0.3 ... 4	No back-up protection required[1]						
	6	50	50	50	50	50	35	30
	8	50	50	50	50	50	35	15
	10	50	50	50	50	50	35	15
	13	50	50	50	35	35	30	15
	16	50	50	50	35	30	30	15
	20	50	50	50	35	25	25	15
	25	50	50	50	35	30	25	15
	32	50	50	50	35	30	25	15
	40	50	50	50	50	25	15	10
	50	50	50	50	50	25	15	10
	63	50	50	35	25	25	15	10
5SY4, 5SY7, 5SY8, 5SJ4...-.HG..[2]								
	0.3 ... 6	No back-up protection required[1]						
	8	50	50	50	50	45	45	40
	10	50	50	50	50	45	45	40
	13	50	50	50	45	40	35	30
	16	50	50	50	45	40	35	30
	20	50	50	50	40	35	30	30
	25	50	50	50	40	35	30	30
	32	50	50	50	45	40	30	30
	40	50	50	50	45	40	30	20
	50	50	50	50	40	35	25	20
	63	50	50	45	40	35	25	20

Test circuit data:

U_e = 250 V
p.f. = 0.3 ... 0.5

Test cycle:

Acc. to EN 60947-2 (0 - C0)

[1] Up to the respective I_{cu} according to the table "Rated switching capacity" on page 28.

[2] The values specified for 5SJ4...-.HG.. are not according to UL but are the manufacturer's specifications according to EN 60947-2 and apply for voltage U_e= 230 V ~. For available rated currents, see Catalog LV 10.

Back-up protection of miniature circuit breakers/circuit breakers

If miniature circuit breakers are installed in fuseless distribution boards, circuit breakers according to IEC/EN 60947-2 must be used as back-up protection.

The following tables show the short-circuit currents in kA up to which back-up protection is guaranteed when using circuit breakers.

Back-up protection limit values of miniature circuit breakers/circuit breakers in kA

Downstream miniature circuit breakers			Upstream circuit breakers																	
			3VL1 Non-adjustable											3VL2 Adjustable						
	I_n [A]		16	20	25	32	40	50	63	80	100	125	160	50	63	80	100	125	160
	I_i [A]		160	200	250	320	400	500	630	800	1000	1250	1600	400	500	630	800	1000	1280
	I_{cu} [kA]		40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100
	I_n [A]	I_{cn} [kA]	Back-up protection up to kA																	
5SY6 (without 5SY60)																				
Characteristic B, C	0.3 ... 6	6	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
	8 ... 32	6	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	40 ... 63	6	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
5SY4, 5SJ4...-.HG..[1]																				
Characteristic A, B, C, D	0.3 ... 6	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	8 ... 32	10	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	40 ... 63	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
5SY7																				
Characteristic B, C	0.3 ... 2	15	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	3 ... 10	15	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	15	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40 ... 63	15	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic D	0.3 ... 2	15	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	3 ... 10	15	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	15	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40	15	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
	50 ... 63	15	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
5SY8																				
Characteristic C	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	40 ... 63	25	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Characteristic D	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	40	25	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	50 ... 63	25	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
5SP4																				
Characteristic B, C	80 ... 125	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D	80 ... 100	10	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

[1] The values specified for 5SJ4...-.HG.. are not according to UL but are the manufacturer's specifications according to EN 60947-2 and apply for voltage U_e= 230 V ~. For available rated currents, see Catalog LV 10.

Configuration and dimensioning

Downstream miniature circuit breakers			Upstream circuit breakers													
			3VL3		3VL4				3VL5				3VL6	3VL7	3VL8	3WN1/ 3WS1
		I_n [A]	200	250	200	250	315	400	250 ... 315	315 ... 400	400 ... 500	500 ... 630	320 ... 800	400 ... 1250	1600 ... 2000	315 ... 6300
		I_i [A]	2000	2500	2000	2500	3150	4000	2500 ... 3150	3150 ... 4000	4000 ... 5000	5000 ... 6300	3200 ... 6300	15000	20000	3780 ...7560 0
		I_{cn} [kA]	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	55/70/ 100	50/70/ 100	70/100	65 ... 100
	I_n [A]	I_{cn} [kA]	Back-up protection up to kA													
5SY6 (without 5SY60)																
Characteristic B, C	0.3 ... 6	6	35	35	35	35	35	35	35	35	35	35	35	35	35	35
	8 ... 32	6	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	40 ... 63	6	20	20	20	20	20	20	20	20	20	20	20	20	20	20
5SY4, 5SJ4...-.HG..[1)]																
Characteristic A, B, C, D	0.3 ... 6	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	8 ... 32	10	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	40 ... 63	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25
5SY7																
Characteristic B, C	0.3 ... 2	15	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	3 ... 10	15	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	15	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40 ... 63	15	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic D	0.3 ... 2	15	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	3 ... 10	15	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	15	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40	15	35	35	35	35	35	35	35	35	35	35	35	35	35	35
	50 ... 63	15	30	30	30	30	30	30	30	30	30	30	30	30	30	30
5SY8																
Characteristic C	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	--	--	--
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	--	--	--
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	--	--	--
	40 ... 63	25	40	40	40	40	40	40	40	40	40	40	40	--	--	--
Characteristic D	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	--	--	--
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	--	--	--
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	--	--	--
	40	25	40	40	40	40	40	40	40	40	40	40	40	--	--	--
	50 ... 63	25	35	35	35	35	35	35	35	35	35	35	35	--	--	--
5SP4																
Characteristic B, C	80 ... 125	10	25	25	25	25	25	25	25	25	25	25	25	--	--	--
Characteristic D	80 ... 100	10	20	20	20	20	20	20	20	20	20	20	20	--	--	--

[1)] The values specified for 5SJ4...-.HG.. are not according to UL but are the manufacturer's specifications according to EN 60947-2 and apply for voltage U_e= 230 V ~. For available rated currents, see Catalog LV 10.