

Heavy Duty Circuit Breakers S500

Technical Data

power dissipation/internal resistance per pole

Fixed version

Rated current I_n (A)	S500-B S500-C S500UC-B R_i (Ω)	Power loss P_V (W)	S500-D R_i (Ω)	Power loss P_V (W)	Rated current I_n (A)	S500-KM R_i (Ω)	Power loss P_V (W)
6	0.0550	1.98	-	-	1.6	0.018	0.05
10	0.0152	1.52	0.0200	2.00	2.5	0.018	0.11
13	0.0120	2.03	0.0100	1.69	4	0.009	0.14
16	0.0084	2.15	0.0071	1.82	6	0.009	0.32
20	0.0065	2.60	0.0050	2.00	9	0.009	0.65
25	0.0045	2.81	0.0035	2.19	20	0.0045	1.80
32	0.0035	3.58	0.0030	3.07	32	0.0018	1.84
40	0.0021	3.36	0.0019	3.04	52	0.0015	4.06
50	0.0017	4.25	0.0017	4.25	63	0.0014	5.56
63	0.0017	6.75	0.0017	6.75	75	0.0014	7.88

Rated current I_n (A)	F500-C R_i (Ω)	Power loss P_V (W)	F500-D R_i (Ω)	Power loss P_V (W)	Rated current I_n (A)	S500X-AG0084 R_i (Ω)	Power loss P_V (W)
10	0.0159	1.59	-	-	1.6	0.95	2.43
13	0.0127	2.15	-	-	2.5	0.50	3.13
16	0.0091	2.33	-	-	4	0.195	3.12
20	0.0072	2.88	-	-	6	0.090	3.24
25	0.0052	3.25	0.0042	2.63	9	0.045	3.65
40	0.0028	4.48	0.0026	4.16	20	0.012	4.80
50	0.0022	5.50	-	-	32	0.0055	5.63
63	0.0022	8.73	0.0022	8.73	52	0.0017	4.60
					63	0.0017	6.75

Adjustable version

Rated current I_n (A)	S500-K R_i (Ω)	Power loss P_{Vmax} (W)	S500UC-K R_i (Ω)	Power loss P_{Vmax} (W)	Rated current I_n (A)	F500-K R_i (Ω)	Power loss P_V (W)
0.1 - 0.15	78	1.76	84	1.89	0.28 - 0.42	12.4	2.19
0.14 - 0.21	48	2.12	51	2.25	0.38 - 0.58	6.7	2.25
0.2 - 0.3	23.5	2.12	25.5	2.30	0.53 - 0.8	3.6	2.30
0.28 - 0.42	12.3	2.17	12.8	2.26	0.73 - 1.1	2.1	2.54
0.38 - 0.58	6.6	2.22	7.0	2.35	1 - 1.5	1.1	2.48
0.53 - 0.8	3.5	2.24	3.6	2.30	1.4 - 2.1	0.73	3.22
0.73 - 1.1	2.0	2.42	2.04	2.47	2 - 3	0.3507	3.16
1 - 1.5	1.05	2.36	1.08	2.43	2.8 - 4.2	0.1757	3.10
1.4 - 2.1	0.68	3.00	0.68	3.00	3.8 - 5.8	0.0957	3.22
2 - 3	0.35	3.15	0.35	3.15	5.3 - 8	0.0557	3.56
2.8 - 4.2	0.175	3.09	0.175	3.09	7.3 - 11	0.0357	4.32
3.8 - 5.8	0.095	3.20	0.095	3.20	10 - 15	0.0237	5.33
5.3 - 8	0.055	3.52	0.055	3.52	14 - 20	0.0127	5.08
7.3 - 11	0.035	4.24	0.035	4.24	18 - 26	0.0087	5.88
10 - 15	0.023	5.18	0.023	5.18	23 - 32	0.0062	6.35
14 - 20	0.012	4.80	0.012	4.80	29 - 37	0.0042	5.75
18 - 26	0.008	5.41	0.008	5.41	34 - 41	0.0032	5.38
23 - 32	0.0055	5.63	0.005	5.12	38 - 45	0.0024	4.86
29 - 37	0.0035	4.79	0.0035	4.79			
34 - 41	0.0025	4.20	0.0025	4.20			
38 - 45	0.0017	3.44	0.0017	3.44			

Weights

	Type	
1-pole, with/without separating neutral conductor N/ switched neutral NA	S501... S501N... S501NA...	= 250 g = 320 g = 460 g
2-pole, with/without separating neutral conductor N/ switched neutral NA	S502... S502N... S502NA... F502...	= 500 g = 570 g = 710 g = 820 g
3-pole, with/without separating neutral N conductor/ switched neutral NA	S503... S503N... S503NA... F503...	= 710 g = 780 g = 920 g = 1070 g
4-pole	S504... F504...	= 920 g = 1400 g
Auxiliary contact H Signal contact S	S500-H... S500-S...	= 60 g = 60 g
RCD + RCD-trip signal contact T10	F504+T10	= 1650 g
Undervoltage trip UA Shunt trip AL	S500+UA S500+AL	= 160 g = 170 g

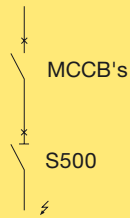
Heavy Duty Circuit Breakers S500

Selectivity 230 V/400 VAC

Selectivity with S500 circuit breaker

In a low voltage distribution system, it is desirable that two or more overcurrent devices connected in series disconnect selectively in the event of a short-circuit to ensure continuity of the power supply. Selectivity is achieved when only that part of the facility which contains the fault is disconnected. Selectivity always exists between circuit breakers connected in series in the event of a short-circuit if the energy which the downstream circuit breaker lets through is insufficient to trip the upstream circuit breaker.

Circuit breakers (MCCB's) upstream S500 Heavy Duty Circuit Breakers downstream



The S500 Heavy Duty Circuit Breaker has a very good selectivity behaviour with respect to the upstream circuit breaker owing to its low let-through energy and rapid breaking. The following table shows the max. short-circuit currents I_{sc} at which the S500 Heavy Duty Circuit Breaker functions selectively with the upstream SACE circuit breaker.

Upstream			Tmax T1 B, C, N TM 160																
Version	Trip	Rated current (A)	Electromagnetic trip (A)																
			16	20	25	32	40	50	63	80	100	125	160						
Downstream	I _{cu} [kA]	Rated current (A)	Max. short-circuit (kA)																
S500-B, S500-C, S500-D	50	6	5.5	5.5	5.5	5.5	5.5	5.5	10.5	15	20	25	T						
	50	10			4.5	4.5	4.5	4.5	8	10	20	25	T						
	50	13				4.5	4.5	4.5	7.5	10	15	25	T						
	50	16					4.5	4.5	7.5	10	15	25	T						
	50	20						4.5	7.5	10	15	25	T						
	50	25							6	10	15	20	T						
	50	32								7.5	10	20	T						
	50	40									10	20	T						
	50	50										15	T						
	50	63											T						
S500-K	50	≤ 5.8	36	36	T	T	T	T	T	T	T	T	T						
	50	5.3..8	5.5	5.5	5.5	5.5	5.5	5.5	10.5	T	T	T	T						
	50	7.3..11			4.5	4.5	4.5	4.5	8	T	T	T	T						
	30	10..15				4.5	4.5	4.5	7.5	10	15	T	T						
	30	14..20					4.5	4.5	7.5	10	15	T	T						
	30	18..26						4.5	7.5	10	15	T	T						
	30	23..32							6	10	15	20	T						
	30	29..37								7.5	10	20	T						
	30	34..41									10	20	T						
	30	38..45										15	T						
Upstream			Tmax T2 N, S, H, L TM, M 160 EL																
Version	Trip	Rated current (A)	Electromagnetic trip (A)																
			12.5	16	20	25	32	40	50	63	80	100	125	160	10	25	63	100	160
Downstream	I _{cu} [kA]	Rated current (A)	Max. short-circuit (kA)																
S500-B, S500-C, S500-D	50	6	4.5	5.5	5.5	5.5	5.5	5.5	5.5	10.5	15	20	25	36			36	36	36
	50	10				4.5	4.5	4.5	4.5	8	10	20	25	36			36	36	36
	50	13				4.5		4.5	4.5	4.5	7.5	10	15	25	36		36	36	36
	50	16					4.5	4.5	4.5	7.5	10	15	25	36			36	36	36
	50	20						4.5		4.5	7.5	10	15	25	36		36	36	36
	50	25							4.5	6	10	15	20	36			36	36	36
	50	32							4.5		7.5	10	20	36			36	36	36
	50	40									5	10	20	36			36	36	36
	50	50										5	7.5	15	36			36	36
	50	63											5		36				36
S500-K	50	≤ 5.8	36	36	36	36	36	36	36	36	36	36	36	50	50	50	50	50	50
	50	5.3..8	4.5	5.5	5.5	5.5	5.5	5.5	5.5	10.5	36	36	36	50		50	50	50	50
	50	7.3..11			4.5	4.5	4.5	4.5	4.5	8	36	36	36	50		50	50	50	50
	30	10..15				4.5		4.5	4.5	4.5	7.5	10	15	T		T	T	T	T
	30	14..20					4.5	4.5	4.5	7.5	10	15	T	T		T	T	T	T
	30	18..26						4.5		7.5	10	15	T	T		T	T	T	T
	30	23..32							4.5	6	10	15	20	T		T	T	T	T
	30	29..37							4.5		7.5	10	20	T			T	T	T
	30	34..41									5	10	20	T			T	T	T
	30	38..45										5	7.5	15	T			T	T

Heavy Duty Circuit Breakers S500

Selectivity 230 V/400 VAC

Upstream			Tmax T3						
Version			N, S						
Trip			TM, M EL						
Rated current (A)			250						
Electromagnetic trip (A)			63	80	100	125	160	200	250
downstream	I _{cu} [kA]	Rated current (A)	Max. short-circuit (kA)						
S500-B, S500-C, S500-D	50	6	10.5	15	20	25	36	36	36
	50	10	8	10	20	25	36	36	36
	50	13	7.5	10	15	25	36	36	36
	50	16	7.5	10	15	25	36	36	36
	50	20	7.5	10	15	25	36	36	36
	50	25	6	10	15	20	36	36	36
	50	32		7.5	10	20	36	36	36
	50	40			10	20	36	36	36
	50	50			7.5	15	36	36	36
	50	63			5	6	36	36	36
S500-K	50	≤ 5.8	36	36	36	36	T	T	T
	50	5.3..8	10.5	36	36	36	T	T	T
	50	7.3..11	8	36	36	36	T	T	T
	30	10..15	7.5	10	15	T	T	T	T
	30	14..20	7.5	10	15	T	T	T	T
	30	18..26	7.5	10	15	T	T	T	T
	30	23..32	6	10	15	20	T	T	T
	30	29..37		7.5	10	20	T	T	T
	30	34..41			10	20	T	T	T
	30	38..45			7.5	15	T	T	T

Backup fuses upstream

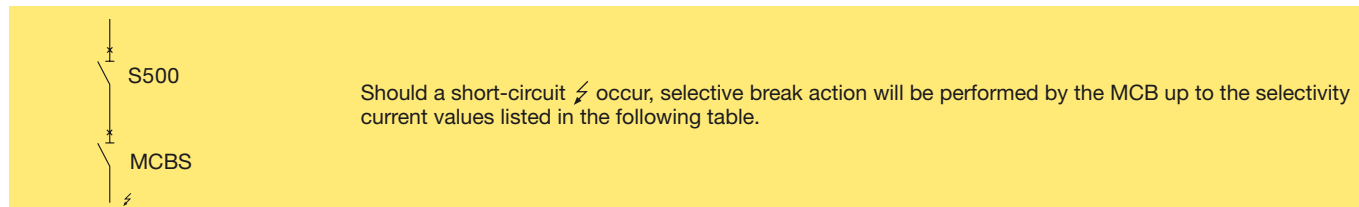
S500 Heavy Duty Circuit Breakers downstream

Upstream		Backup fuses gL/gG							
Electromagnetic trip (A)		25	40	50	63	80	100	125	160
downstream	Rated current (A)	Max. short-circuit (kA)							
S500-B, S500-C, S500-D	≤ 10	1.05	1.85	2.15	2.85	3.7	6.5	50	50
	13	1.1	1.90	2.2	2.9	3.8	6.7	50	50
	16	1.0	1.75	2	2.6	3.5	5.9	23	50
	20	-	1.6	1.8	2.3	3.1	4.8	17	50
	25	-	1.4	1.5	2.1	2.7	4.3	13	50
	32	-	-	1.35	1.9	2.5	4	12.5	50
	40	-	-	-	1.7	2.1	3.3	10	50
	50	-	-	-	-	2	3	8	50
	63	-	-	-	-	-	-	6.4	50
S500-K	≤ 3	9	50	50	50	50	50	50	50
	4.2	6	20	50	50	50	50	50	50
	5.8	1.3	13	23	50	50	50	50	50
	8.0	1.1	6	10	50	50	50	50	50
	11	0.82	1.05	1.2	2	2.8	5.8	50	50
	15	0.6	1	1.1	1.8	2.5	4.2	18	30
	20	-	0.9	1.05	1.7	2	3	9.9	30
	26	-	0.7	1	1.5	1.95	2.8	8.3	30
	32	-	-	0.96	1.4	1.9	2.7	7.4	30
	37	-	-	0.7	1.3	1.8	2.6	7	30
	41	-	-	-	1.2	1.75	2.5	6.6	30
	45	-	-	-	-	1.5	2	6.4	30

Heavy Duty Circuit Breakers S500

Selectivity 230 V/400 VAC

S500 circuit breaker upstream
Circuit breakers (MCBs) downstream



upstream		S500-C, D					
Rated current (A)		C40	D40	C50	D50	C63	D63
downstream	Rated current (A)	Max. short-circuit current (kA)					
B6 / C6	6	0.6	1.2	0.8	1.4	0.95	1.8
B10 / C10	10	0.55	1.1	0.7	1.3	0.85	1.7
B13 / C13	13	0.55	1.1	0.7	1.3	0.85	1.7
B16 / C16	16	0.55	1.1	0.7	1.3	0.85	1.7
B20 / C20	20	0.5	1	0.6	1.2	0.8	1.55
B25 / C25	25	0.45	0.9	0.55	1.1	0.75	1.4
B32 / C32	32	-	0.9	0.55	1.1	0.7	1.4
B40 / C40	40	-	-	-	-	0.7	1.4
B50 / C50	50	-	-	-	-	0.7	1.4

On request

S500 Selectivity and back-up protection, No. 10109/A

Heavy Duty Circuit Breakers S500

Back-up protection 230 V/400 VAC

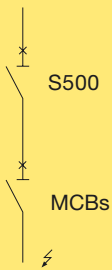
S500 Heavy Duty Circuit Breakers without back-up protection

If the short circuit current in the **3 x 230/400 V** network at the point of installation does not exceed **50/30 kA**, then the S500 Heavy Duty Circuit Breaker may be installed with or without an upstream circuit breaker or backup fuse of any size. This condition is met if the power available to supply the transformer is not greater than **2,000/1,250 kVA** or if – in the case of a larger transformer – the cable between the transformer and the S500 Heavy Duty Circuit Breaker has a minimum length as listed in the table below.

Minimum lengths

Cable cross-section (mm ²)	Transformer capacity (3 x 400 VAC) (m)			
	1,600 kVA	2,000 kVA	2,500 kVA	> 2,500 kVA
240	20	33	40	72
185	18	28	35	62
150	16	25	31	53
120	14	22	27	44
95	12	19	23	36
70	10	15	18	27
50	8	11	13	20
35	6	8	9.5	14
25	4	6	7	10
16	2.5	4	4.5	6.5
10	1.5	2.3	2.9	4.1
6	0.9	1.5	1.8	2.5
4	0.6	1	1.2	1.7
2.5	0.4	0.6	0.8	1
1.5	0.3	0.4	0.5	0.6

S500 Heavy Duty Circuit Breaker upstream Miniature circuit breaker (MCBs) downstream



Due to its high breaking capacity, the short-circuit current seldom exceeds the capacity of the S500 circuit breaker, and thus it can be used in the majority of cases either with no upstream protection, with an upstream circuit breaker or with an upstream backup fuse of any size. Where in doubt, the short-circuit current, which could possibly occur at the location of the S500 circuit breaker, needs to be determined.

If the short-circuit current at the point of installation of the circuit breaker is greater than its breaking capacity, the rated currents of the upstream S500 circuit breaker must not exceed the values in the table (back-up protection for circuit breaker)

upstream		S500-C, D					
Rated current (A)		C40	D40	C50	D50	C63	D63
downstream	Rated current (A)	Max. short-circuit (kA)					
B6 / C6	6	50	50	50	50	50	50
B10 / C10	10	50	50	50	50	50	50
B13 / C13	13	50	50	50	50	50	50
B16 / C16	16	50	50	50	50	50	50
B20 / C20	20	50	50	50	50	50	50
B25 / C25	25	50	50	50	50	50	50
B32 / C32	32	-	50	50	50	50	50
B40 / C40	40	-	-	-	-	50	50
B50 / C50	50	-	-	-	-	50	50

On request

S500 Selectivity and back-up protection, No. 10109/A

Heavy Duty Circuit Breakers S500

Circuit protection S500-B, S500-C, S500-D

General

S500 Heavy Duty Circuit Breakers are current and energy limiting devices with high breaking capacities. They are suitable for domestic installations with no or only very small inrush currents and for commercial and industrial applications with high inrush currents (fluorescent lights, transformers and capacitor banks). The high rated breaking capacity of 50 kA at 400 VAC and rapid breaking time < 2 ms ensure an excellent selectivity behaviour with respect to upstream overcurrent devices.

Major features

- High rated breaking capacity of 50 kA at 230/400 VAC according to IEC 60947-2
- Outstanding current and energy limiting
- Clear contact position indication for all poles
- Back-up protection for downstream circuit breakers (MCBs)
- Wide range of accessories such as undervoltage and shunt trip devices, auxiliary and signal contacts

Order data

Circuit protection

Characteristic **B**

Rated current (A)	Type 1-pole	Module (25 mm)	Type 2-pole	Module (25 mm)	Type 3-pole	Module (25 mm)	Type 4-pole	Module (25 mm)
6	S501-B6	1	S502-B6	2	S503-B6	3	S504-B6	4
10	S501-B10	1	S502-B10	2	S503-B10	3	S504-B10	4
13	S501-B13	1	S502-B13	2	S503-B13	3	S504-B13	4
16	S501-B16	1	S502-B16	2	S503-B16	3	S504-B16	4
20	S501-B20	1	S502-B20	2	S503-B20	3	S504-B20	4
25	S501-B25	1	S502-B25	2	S503-B25	3	S504-B25	4
32	S501-B32	1	S502-B32	2	S503-B32	3	S504-B32	4
40	S501-B40	1	S502-B40	2	S503-B40	3	S504-B40	4
50	S501-B50	1	S502-B50	2	S503-B50	3	S504-B50	4
63	S501-B63	1	S502-B63	2	S503-B63	3	S504-B63	4

Characteristic **C**

6	S501-C6	1	S502-C6	2	S503-C6	3	S504-C6	4
10	S501-C10	1	S502-C10	2	S503-C10	3	S504-C10	4
13	S501-C13	1	S502-C13	2	S503-C13	3	S504-C13	4
16	S501-C16	1	S502-C16	2	S503-C16	3	S504-C16	4
20	S501-C20	1	S502-C20	2	S503-C20	3	S504-C20	4
25	S501-C25	1	S502-C25	2	S503-C25	3	S504-C25	4
32	S501-C32	1	S502-C32	2	S503-C32	3	S504-C32	4
40	S501-C40	1	S502-C40	2	S503-C40	3	S504-C40	4
50	S501-C50	1	S502-C50	2	S503-C50	3	S504-C50	4
63	S501-C63	1	S502-C63	2	S503-C63	3	S504-C63	4

Characteristic **D**

10	S501-D10	1	S502-D10	2	S503-D10	3	S504-D10	4
13	S501-D13	1	S502-D13	2	S503-D13	3	S504-D13	4
16	S501-D16	1	S502-D16	2	S503-D16	3	S504-D16	4
20	S501-D20	1	S502-D20	2	S503-D20	3	S504-D20	4
25	S501-D25	1	S502-D25	2	S503-D25	3	S504-D25	4
32	S501-D32	1	S502-D32	2	S503-D32	3	S504-D32	4
40	S501-D40	1	S502-D40	2	S503-D40	3	S504-D40	4
50	S501-D50	1	S502-D50	2	S503-D50	3	S504-D50	4
63	S501-D63	1	S502-D63	2	S503-D63	3	S504-D63	4

Module $\triangle$ width of a single pole device

