Issued November 2009 12483

DATA SHEET

S–N CONTACTORS

Based on Mitsubishi MS-N Series Datasheet

The Overview (Type designation breakdown)

Frame Size			N10	N11	N12	N18	N20	N21	N25	N35	N50	N65	N80	N95	N125	N150	N180	N220	N300	N400	N600	N800
Spec	Rated capacity	220-240V	2.5	3.5	3.5	4.5	5.5	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	125	190	220
	Category AC-3(kW)	380-440V	4	5.5	5.5	7.5	11	11	15	18.5	22	30	45	55	60	75	90	132	160	220	330	440
	Number of aux. contacts	Standard	1NO	1NO	1NO1NC	—	1NO1NC	← 2NO2NC →														
		Special	1NC	1NC	2NO	—	2NO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACCESSORIES	Additional aux. contact blocks	Front-on[1]	← 2P or 4P →										—	—	—	—	—	—	—	—	—	—
		Side-on	1NO1NC×2(max.)			—	← 1NO1NC×2(max.) →														2NO2NC×1 (max.)	
	Surge absorber[3]		← Attachable →								← Provided as a standard →											
	Mechanical interlock unit		Attachable			—	← Attachable →														—	—
CONTACTORS Open	AC operated	S-□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	DC operated	SD-□	—	○	○	—	—	○	—	○	○	○	○	○	○	○	—	○	○	○	○	○
	Finger protected	S-□CX	○	○	○	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—	—	—
		SD-□CX	—	○	○	—	—	○	—	○	—	—	—	—	—	—	—	—	—	—	—	—
	Mechanically latched	SL(D)-□	—	—	—	—	—	○	—	○	○	○	○	○	○	○	—	○	○	○	○	○
STARTERS Open	AC operated	MSO-□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	DC operated	MSOD-□	—	○	○	—	—	○	—	○	○	○	○	○	○	○	—	○	○	○	—	—
	With phase failure protection	MSO-□KP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	Slow trip type with saturable reactor	MSO-□SR	○	○	○	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	Quick-trip type with 2 heater elements	MSO-□FS	—	—	—	—	○	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—
	with phase failure protection	MSO-□KF	○	○	○	—	○	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—
Enclosed Class IP20	Standard type	MS-□	○	○	○	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	With push button	MS-□PM	○	○	—	—	○	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—
	With phase failure protection	MS-□KP	○	○	○	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—
Mounting on 35mm rail			← Available →										—	—	—	—	—	—	—	—	—	—

Notes: 1. Additional head-on type aux. contact blocks cannot be attached to the enclosed type, mechanically latched type of size N50 & N65.
2. Surge absorber is provided as a standard on ac operated contactors and starters of sizes N50 to N800.

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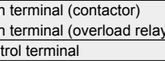
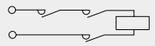
Technical Data of Series S-N Contactors

Contactor		Type	S/SD-S-N10	S/SD-N11, N12	S/SD-S-N18	S/SD-S-N20	S/SD-N21	S/SD-S-N25	S/SD-N35	S/SD-N50	S/SD-N65
Rated insulation voltage		V	690	690	690	690	690	690	690	690	690
Conventional free air thermal current	Ith	A	20	20	25	32	32	50	60	80	100
Rated capacity for resistive loads											
3-ph, Category AC-1	220-240V	kW(A)	7.5(20)	7.5(20)	9.5(25)	12(32)	12(32)	18(50)	20(60)	30(80)	35(100)
	380-440V	kW(A)	7(11)	8.5(13)	13(20)	20(32)	20(32)	30(50)	35(60)	50(80)	65(100)
	500V	kW(A)	7(8)	9.5(11)	13(16)	25(32)	25(32)	40(50)	50(60)	65(80)	85(100)
	690V	kW(A)	7(6)	8(8)	11(10)	30(32)	30(32)	50(50)	60(60)	80(80)	100(100)
Rated operational current											
3-ph, Category AC-3	220-240V	A	11	13	18	22	22	30	40	55	65
	380-440V	A	9	12	16	22	22	30	40	50	65
	500V	A	7	9	13	17	17	24	32	38	60
	690V	A	5	7	9	9	9	12	17	26	38
Rated capacity for jogging of AC motors											
3-ph, category AC-4	220-240V	kW	0.75	1.1	1.5	2.2	2.2	3	3.7	5.5	7.5
Electrical life is ca.	380-440V	kW	1.1	1.5	2.2	3.7	3.7	5.5	5.5	7.5	11
200,000 operations	500V	kW	1.1	1.5	2.2	3.7	3.7	5.5	5.5	7.5	11
	690V	kW	1.1	1.5	2.2	3.7	3.7	5.5	5.5	7.5	11
Max. current for AC-4 duty at 440V		A	6	9	9	13	13	17	24	32	47
Rated current for DC non-inductive loads											
Category DC-1	48V	A	10	12	12	20	20	25	35	50	65
100 operations/hour max.	110V	A	8	12	12	20	20	25	35	50	65
500,000 operations	220V	A	8	12	12	20	20	22	30	40	50
											
Rated Current for DC motors											
Category DC-3 & DC-5	48V	A	6	10	10	20	20	25	30	35	40
100 operations/hour max.	110V	A	4	8	8	15	15	20	20	30	35
500,000operations	220V	A	2	4	4	8	8	10	10	12	15
											
Rated capacity for 3-ph, capacitors[4]											
120 operations/hour max.	220-240V	kvar	2.2	3	4	5.5	5.5	8.5	12	20	20
Electrical durability at maximum load:	380-440V	kvar	3.3	4	6	10	10	14	20	40	40
100,000 operations	550V	kvar	4	5	6	10	10	14	20	30	35
(ambient temperature 40°C)	690V	kvar	3.3	4.5	5.5	10	10	14	20	30	40
Rated insulation voltage		V	690	690	690	690	690	690	690	690	690
Making & breaking											
3-ph, cosΘ=0.35	Making current	A	110/110	130/120	180/180	220/220	220/220	300/300	400/400	550/460	650/620
240V/440V	Breaking current	A	100/72	120/100	180/130	220/220	220/220	300/240	400/320	550/460	650/620
Switching frequency	Category AC-1	operations/hour	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,200	1,200
	Category AC2 & AC-3	operations/hour	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,200	1,200
	Category AC-4	operations/hour	660	660	600	600	600	600	600	600	600
Operating time (at rated coil voltage)											
AC operated	Closing	ms	15	15	15	15	15	15	15	25	25
	Opening	ms	10	10	10	10	10	10	10	53	53
DC operated	Closing	ms	—	45	—	—	33	—	50	57	57
	Opening	ms	—	10	—	—	12	—	13	15	15
Coil consumption (at rated coil voltage)											
AC operated	Inrush	VA	60	60	60	90	90	110	110	132	132
	Sealed	VA	10	10	10	15	15	13	13	17	17
	Watts	W	3.5	3.5	3.5	5.3	5.3	5.3	5.3	2.8	2.8
DC operated	Inrush	VA	—	7	—	—	16	—	18	24	24
	Sealed	VA	—	7	—	—	16	—	18	24	24
Coil voltage tolerance			0.85 to 1.1 times rated coil voltage								
Mechanical endurance (make/break operations)		million	10	10	10	10	10	10	10	5	5
Permissible ambient temperature		°C	–25 to +55								
Vibration (10-55 Hertz)		m/s²	19.6								
Shock (10 ms half sine wave)		m/s²	49								
Conductor size		mm²	1-2.5	1-2.5	1-6	1-6	1-6	2-16	2-16	2-25	2-25
Main terminal (contactor)											
Main terminal (overload relay)		mm²	1-2.5	1-2.5	1-6	1-6	1-6	2-16	2-16	2-25	2-25
Control terminal		mm²	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5
Busbar width		mm	—	—	—	—	—	—	—	—	—

Notes: 1. 660A at ambient temperature 40-55°C. 2. 800A at ambient temperature 40-55°C.
3. Conductor size in parentheses indicate compression terminal style not for bare clamping.
4. The peak value of inrush current should be less than 2000% of the effective value for rated current of capacitors. The selection is invalid for the circuit of parallel capacitors which are controlled individually.

S/SD-N80	S/SD-N95	S/SD-N125	S/SD-N150	S-N180	S/SD-N220	S/SD-N300	S/SD-N400	S/SD-N600	S/SD-N800
690	690	690	690	1000	1000	1000	1000	1000	1000
135	150	150	200	260	260	350	450	800[1]	1000[2]
50(135)	55(150)	55(150)	75(200)	95(260)	95(260)	130(350)	170(450)	250(660)	300(800)
85(135)	90(150)	90(150)	130(200)	170(260)	170(260)	230(350)	290(450)	430(660)	530(800)
110(135)	120(150)	120(150)	170(200)	220(260)	220(260)	300(350)	380(450)	570(660)	700(800)
135(135)	150(150)	150(150)	200(200)	260(260)	260(260)	350(350)	450(450)	660(660)	900(800)
85	105	125	150	180	250	300	400	630	800
85	105	120	150	180	250	300	400	630	800
75	85	90	140	180	200	250	350	500	720
52	65	70	100	120	150	220	300	420	630
7.5	11	15	18.5	22	22	37	45	65	75
15	18.5	22	30	37	45	60	75	110	130
15	18.5	22	37	45	55	60	90	130	150
15	18.5	22	30	50	55	75	90	130	150
62	75	90	110	150	180	220	300	400	630
80	93	120	150	180	220	300	400	630	800
80	93	100	150	180	220	300	400	630	800
60	70	80	150	180	220	300	300	630	800
60	90	90	130	180	220	280	280	630	630
50	80	80	120	150	150	200	200	630	630
20	50	50	80	100	100	150	150	630	630
35	35	38	50	60	60	95	115	190	190
60	60	65	80	120	120	150	200	350	350
48	60	65	80	150	150	200	250	350	350
50	60	65	80	150	150	200	200	400	400
690	690	690	690	1,000	1,000	1,000	1,000	1,000	1,000
850/850	1050/1050	1250/1250	1500/1500	1800/1800	2500/2500	3000/3000	4000/4000	6500/6500	8000/8000
800/750	930/930	1000/1000	1200/1200	1450/1450	2000/2000	2400/2400	3200/3200	5040/5040	6400/6400
1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
600	300	300	300	300	300	300	300	300	300
27	27	25	27	30	30	35	35	65	65
75	75	85	85	100	100	120	120	75	75
75	75	125	135	—	145	175	175	105	105
18	18	22	37	—	40	55	55	80	80
225	225	320	320	480	480	480	480	800	800
22	22	26	26	44	44	54	54	100	100
3.3	3.3	3.5	3.5	5	5	7.3	7.3	15	15
27	27	31	31	—	41	55	55	600	600
27	27	31	31	—	41	55	55	75	75
0.85 to 1.1 times rated coil voltage									
5	5	5	5	5	5	5	5	5	5
–25 to +55									
19.6									
49									
2-50	2-50								
	(2-60)[3]	(6-70)[3]	(6-95)[3]	(10-120)[3]	(10-150)[3]	(25-240)[3]	(25-240)[3]	(70-325)[3]	(70-325)[3]
2-50	2-50	(6-70)[3]	(6-95)[3]	(10-120)[3]	(10-150)[3]	(25-240)[3]	(25-240)[3]	—	—
1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-4	1-4
15	15	15	20	25	25	30	30	35	35

Rated operating current of auxiliary contacts

Conventional free air thermal current		A	16
Rated operating current			
Category	120VAC	A	6
AC-15	240VAC	A	5
	500VAC	A	3
	660VAC	A	1.5
Category	24VDC	A	5
	48VDC	A	3
DC-13	110VDC	A	1.2
		A	0.8[1]
	220VDC	A	0.2

Note: 1 UN-AX2(CX), UN-AX4(CX), UN-AX11(CX).

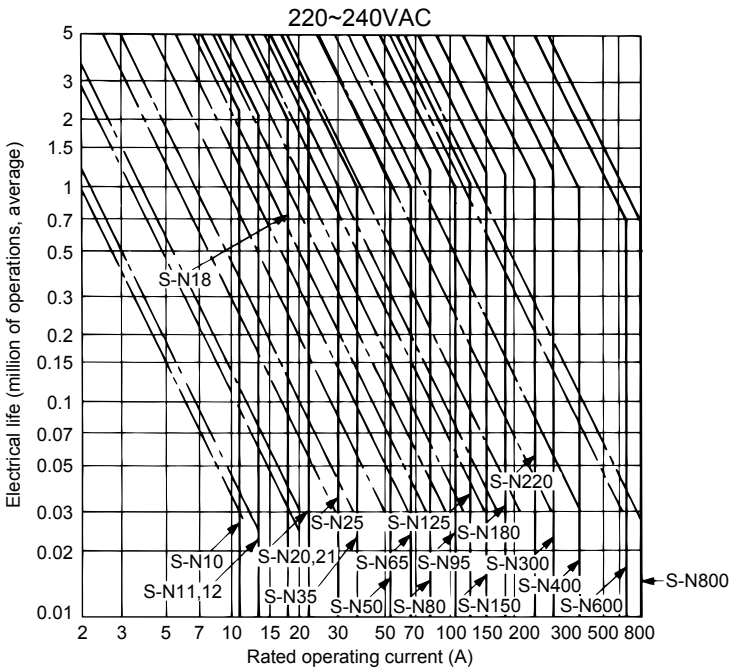
Performance of Series S-N Contactors

Electrical Life

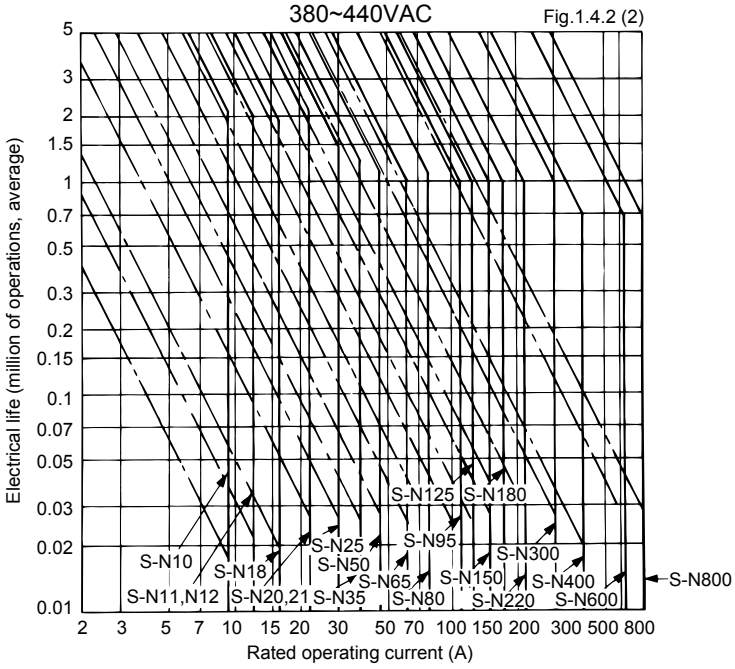
The electrical life of the main contacts of a contactor is determined mainly by the circuit-opening duty it will perform. The relationship between electrical life and rated current of Mitsubishi contactors under normal and jogging duties of squirrel-cage motors is shown in Fig. 1.4.2(1) and 1.4.2(2). In the case of a mixture of normal and jogging duties, the expected contactor life can be determined as follows:

$$N = Nr/1 + \frac{\alpha}{100}(Nr/N_l - 1) \quad \text{..... Eq.1.1}$$

where N : Life in the case of α% jogging duty
Nr : Life in the case of normal duty
N_l : Life in the case of 100% jogging duty
α : Percentage of jogging duty



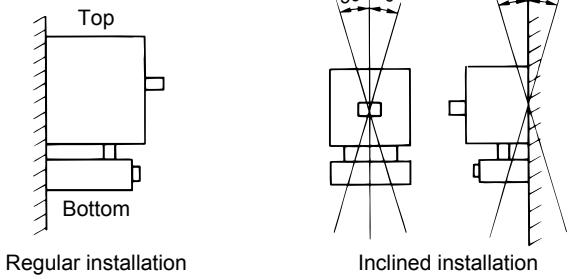
Electrical life versus rated operating current



—— Normal duty, 6Ie on, Ie off, on-load factor 40%, 1200 operations/hour (AC3)
– · – Jogging duty, 6Ie on, 6Ie off, on-load factor 7%, 600 operations/hour (AC4)-S-N10~S-N300 300 operations/hour (AC4)-S-N400~S-N600 150 operations/hour (AC4)-S-N800

1.4.3 Mounting Attitude of Starters and Contactors

To assure proper performance, Mitsubishi magnetic motor starters and contactors should be mounted on a vertical supporting surface with the line terminals upwards and the load terminals downwards. The supporting surface may have a maximum inclination of 30° from the vertical in any direction.



Regular installation Inclined installation

Selection Table of Contactors

Type **S-N□, SD-N□**

Ordering Designation

Model name S-N10
Coil designation (See page 13) AC400V
If required special aux. contact (never specify for standard). 1B

Complete type designation S-N10∗AC400V∗1B

Note: Mark∗indicates a blank space.

Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name		Standard aux. contacts		Finger protection terminal cover	Additional auxiliary contact block					
220 –240V (A)	380 –440V (A)	220 –240V (kW)	380 –440V (kW)	500V (kW)	690V (kW)	AC operated	DC operated	NO	NC		UN-AX2(CX)	UN-AX4(CX)	UN-AX11(CX)	UN-AX80	UN-AX150	UN-AX600
11	9	2.5	4	4	4	S-N10 S-N10CX[1]	—	1	—	– Provided	1		2	—	—	—
						S-N10(1B) S-N10CX[1](1B)	—	—	1	– Provided						
13	12	3.5	5.5	5.5	5.5	S-N11 S-N11CX[1]	SD-N11 SD-N11CX[1]	1	—	– Provided						
						S-N11(1B) S-N11CX[1](1B)	SD-N11(1B) SD-N11CX[1](1B)	—	1	– Provided						
13	12	3.5	5.5	5.5	5.5	S-N12 S-N12CX[1]	SD-N12 SD-N12CX[1]	1	1	– Provided						
						S-N12(2A) S-N12CX[1](2A)	SD-N12(2A) SD-N12CX[1](2A)	2	—	– Provided						
18	16	4.5	7.5	7.5	7.5	S-N18 S-N18CX[1]	—	—	—	– Provided			—	—	—	—
22	22	5.5	11	11	7.5	S-N20 S-N20CX[1]	—	1	1	– Provided			2	—	—	—
						S-N20(2A) S-N20CX[1](2A)	—	2	—	– Provided						
22	22	5.5	11	11	7.5	S-N21 S-N21CX[1]	SD-N21 SD-N21CX[1]	2	2	– Provided						
30	30	7.5	15	15	11	S-N25 S-N25CX[1]	—	2	2	– Provided						
40	40	11	18.5	18.5	15	S-N35 S-N35CX[1]	SD-N35 SD-N35CX[1]	2	2	– Provided						
55	50	15	22	22	22	S-N50 S-N50CX[1]	SD-N50	2	2	– Provided						
65	62	18.5	30	37	30	S-N65 S-N65CX[1]	SD-N65	2	2	– Provided						
85	85	22	45	45	45	S-N80	SD-N80	2	2	—	—	—	—	Max. 2	—	—
105	105	30	55	55	55	S-N95	SD-N95	2	2							
125	120	37	60	60	60	S-N125	SD-N125	2	2							
150	150	45	75	90	90	S-N150	SD-N150	2	2	—	—	—	—	—	Max. 2	—
180	180	55	90	110	110	S-N180	—	2	2							
250	250	75	132	132	132	S-N220	SD-N220	2	2							
300	300	90	160	160	200	S-N300	SD-N300	2	2							
400	400	125	220	225	250	S-N400	SD-N400	2	2							
630	630	190	330	330	330	S-N600	SD-N600	2	2	—	—	—	—	—	—	1
800	800	220	440	500	500	S-N800	SD-N800	2	2							

Note:1 "CX" denotes with finger protection terminal covers.

S-N10CX

S-N21

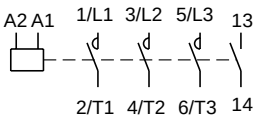
SD-N65

S-N220

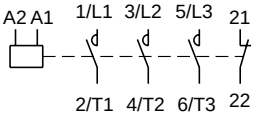
SD-N400

S-N800

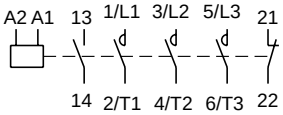
Connections and Contact Arrangement



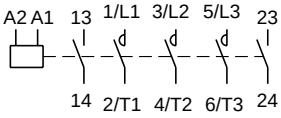
S-N10, N11(1NO)
SD-N11(1NO)



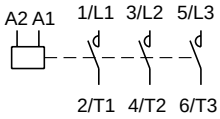
S-N10, N11(INC)
SD-N11(INC)



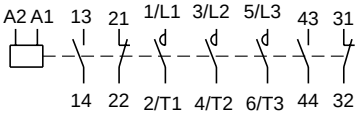
S-N12, N20
SD-N12



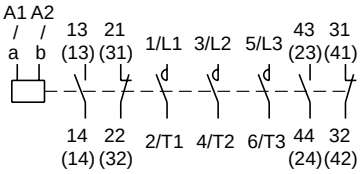
S-N12(2NO)
S-N20(2NO)



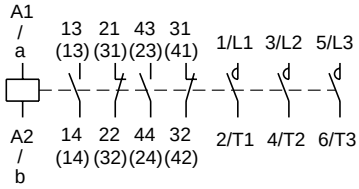
S-N18



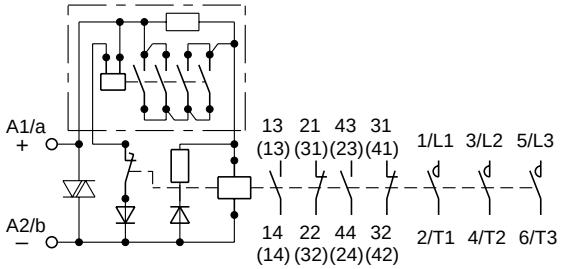
S-N21, N25, N35
SD-N21, N35



S-N50~N400
SD-N50~N400

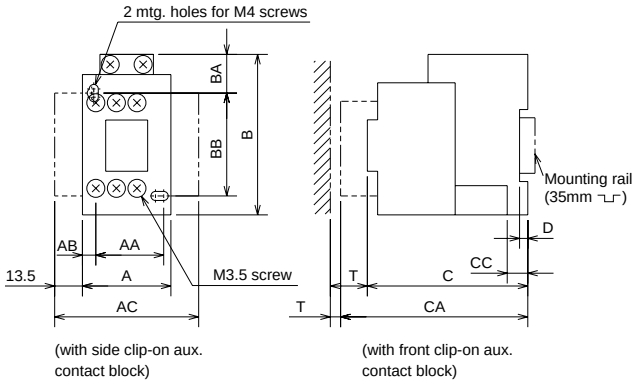


S-N600, N800



SD-N600, N800

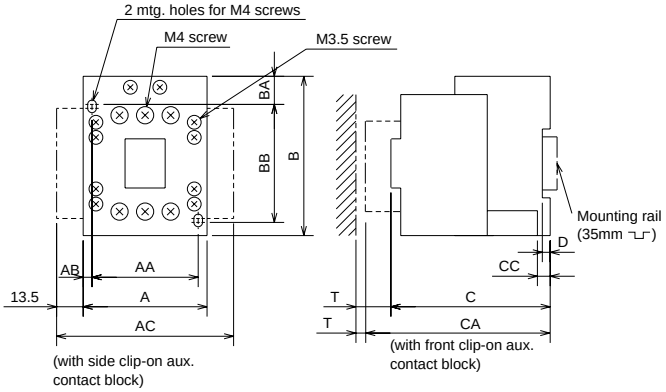
Outline Dimensions



• Dimensions

Type	A	B	C	AA	AB	AC	BB	BA	CC	CA	D	Mass(kg)	T
S-N10(CX),-N11(CX)	43	78	78	35	4.5	70	50	19	10	106	4	0.3	5
S-N12(CX)	53	78	78	40	4.5	—	50	19	10	106	4	0.32	5
S-N18(CX)	43	79	81	30	6	—	60	13	10	109	4	0.33	5
SD-N11(CX)	43	78	110	35	4.5	70	50	19	10	138	4	0.62	5
SD-N12(CX)	53	78	110	40	4.5	—	50	19	10	138	4	0.64	5

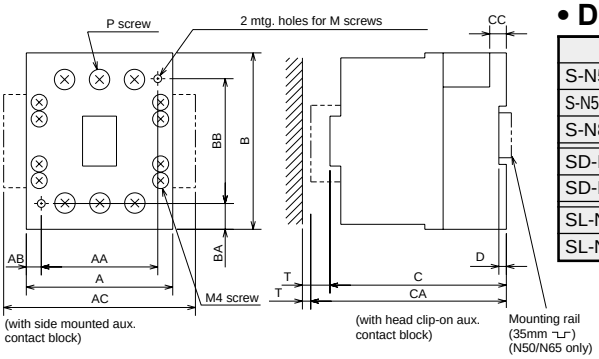
Note: Front clip-on and side clip-on aux. contact blocks should not be mounted both.



• Dimensions

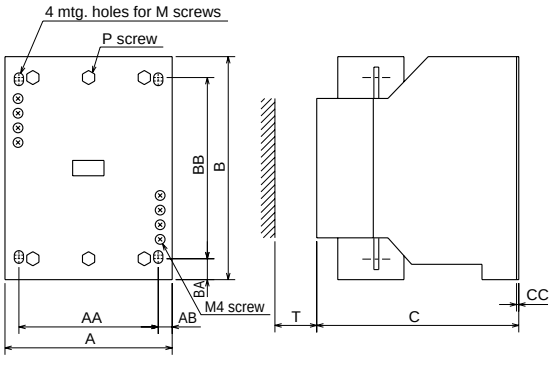
Type	A	B	C	AA	AB	AC	BB	BA	CC	CA	D	Mass(kg)	T
S-N20(CX),-21(CX)	63	81	81	54	4.5	90	60	14	6.5	109	4	0.4	5
S-N25(CX),-N35(CX)	75	89	91	65	5	102	70	13	6.5	119	4	0.52	5
SD-N21(CX)	63	81	113	54	4.5	90	60	14	6.5	141	4	0.72	5
SD-N35(CX)	75	89	123	65	5	102	70	13	6.5	151	4	0.85	5
SLD-N21	63	81	137	54	45	90	60	14	6.5	—	4	0.55	5
SLD-N35	75	89	147	65	5	102	70	13	6.5	—	4	0.67	5

Note: Front clip-on and side clip-on aux. contact blocks should not be mounted both.



• Dimensions

Type	A	B	C	AA	AB	AC	BB	BA	CC	CA	D	M	P	Mass(kg)	T
S-N50,-N65	88	106	106	70	9	—	75	15.5	10	135	4.5	M4	M6	0.75	10
S-N50CX, -N65CX	88	108	106	70	9	—	75	15.5	10	135	4.5	M4	M6	0.77	10
S-N80,-N95	100	124	127	80	10	128	110	7	12	—	—	M5	M6	1.8	10
SD-N50,-N65	88	107.5	133	70	9	—	75	15.5	10	—	—	M4	M6	2.1	10
SD-N80,-N95	100	134	157	80	10	128	110	7	12	—	—	M5	M6	3.3	10
SL-N50,-N65	88	106	135.5	70	9	—	75	15.5	10	—	—	M4	M6	1.3	10
SL-N80,-N95	100	172	127	80	10	128	110	7	12	—	—	M5	M6	2.1	10



• Dimensions

Type	A	B	C	AA	AB	BB	BA	CC	CA	D	M	P	Mass(kg)	T
S-N125	100	150	137	90	5	125	12.5	1.6	—	—	M4	M8	2.5	10
S-N150	120	160	145	100	10	125	17.5	1.6	—	—	M5	M8	3.2	10
S-N180,-N220	138	204	175	120	9	190	7	1.6	—	—	M6	M10	5.5	10
S-N300,-N400	163	243	195	145	9	225	9	2.3	—	—	M8	M12	9.5	10
S-N600,-N800	290	310	235	250	20	250	30	10.5	—	—	M10	M16	27	10
SD-N125	102	150	162	90	5	125	12.5	1.6	—	—	M4	M8	4.3	30
SD-N150	120	160	169.5	100	10	125	17.5	1.6	—	—	M5	M8	4.3	30
SD-N220	138	204	200.5	120	9	190	7	2.0	—	—	M6	M10	7.5	30
SD-N300,-N400	163	243	221	145	9	225	9	2.3	—	—	M8	M12	13.5	50
SD-N600,-N800	375	310	235	250	20	250	30	10.5	—	—	M10	M16	28	10
SL(D)-N125	100	191	137	90	5	125	12.5	1.6	—	—	M4	M8	3.0	30
SL(D)-N150	120	201	145	100	10	125	17.5	1.6	—	—	M5	M8	3.6	30
SL(D)-N220	138	224	175	120	9	190	7	1.6	—	—	M6	M10	6.0	30
SL(D)-N300,-N400	163	259	195	145	9	225	9	2.3	—	—	M8	M12	10	50
SL(D)-N600,-N800	290	390	235	250	20	250	30	10.5	—	—	M10	M16	27	10