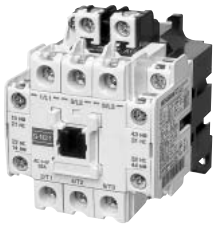
1.2 Selection Guide

S-N11CX

S-2xN11

MSO-N12



S-N21CX

MSO-N35

Three-phase motor ratings IEC category AC-3 kW(hp)	220-240V	2.5(3-1/4)	3.5(4-1/2)	3.5(4-1/2)	4.5(6)	5.5(7-1/2)	5.5(7-1/2)	7.5(10)	11(15)
	380-440V	4(5-1/2)	5.5(7-1/2)	5.5(7-1/2)	7.5(10)	11(15)	11(15)	15(20)	18.5(25)
	500V	4(5-1/2)	5.5(7-1/2)	5.5(7-1/2)	7.5(10)	11(15)	11(15)	15(20)	18.5(25)
	690V	4(5-1/2)	5.5(7-1/2)	5.5(7-1/2)	7.5(10)	7.5(10)	7.5(10)	11(15)	15(20)
Conventional free air thermal current Ith A		20	20	20	25	32	32	50	60
Auxiliary contacts[1]	(standard)	1NO	1NO	1NO+1NC	–[2]	1NO+1NC	2NO+2NC	2NO+2NC	2NO+2NC
	(special)	1NC	1NC	2NO	—	2NO	—	—	—
Number of additional auxiliary contact block for [3]	1NO + 1NC (front)	1	1	1	1	1	1	1	1
	1NO + 1NC (side)	2	2	—	—	2	2	2	2
	2NO + 2NC (front)	1	1	1	1	1	1	1	1
	Low level signal (front) [1NO+1NC (+Standard 1NO + 1NC)]	1	1	1	1	1	1	1	1

Notes: 1. Number of auxiliary contact shows that for non-reversing type. Twice of the auxiliary contacts are provided on reversing type.
2. (2NO + 2NC) × 2 auxiliary contacts are provided on reversing type and no additional contact can be mounted.
3. Front clip-on and side clip-on block should not be mounted both.

Contactors

AC operated models	Non-reversing	**S-N10(CX)**	**S-N11(CX)**	**S-N12(CX)**	**S-N18(CX)**	**S-N20(CX)**	**S-N21(CX)**	**S-N25(CX)**	**S-N35(CX)**
	Reversing	**S-2xN10(CX)**	**S-2xN11(CX)**	—	**S-2xN18(CX)**	**S-2xN20(CX)**	**S-2xN21(CX)**	**S-2xN25(CX)**	**S-2XxN35(CX)**
DC operated models		—	**SD-N11(CX)**	**SD-N12(CX)**	—	—	**SD-N21(CX)**	—	**SD-N35(CX)**

Note: 1. Products which model names are provided with suffix "CX" are provided with finger protection. (N10~N65)
Especially N10~N35 with suffix "CX" are provided with CAN terminals.

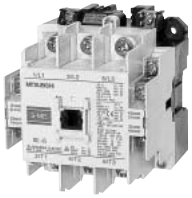
Staters (AC operated)

Enclosed type	(IP20)	**MS-N10 (KP)**	**MS-N11 (KP)**	**MS-N12 (KP)**	—	**MS-N20 (KP)**	**MS-N21 (KP)**	**MS-N25 (KP)**	**MS-N35 (KP)**
Open type	(IP00)	**MSO-N10 (KP)(CX)**	**MSO-N11 (KP)(CX)**	**MSO-N12 (KP)(CX)**	**MSO-N18 (KP)(CX)**	**MSO-N20 (KP)(CX)**	**MSO-N21 (KP)(CX)**	**MSO-N25 (KP)(CX)**	**MSO-N35 (KP)(CX)**

Thermal Overload Relays[1]

Three heater type with phase failure protection	TH-N12KP(CX)	TH-N18KP(CX)	TH-N20KP(CX)	TH-N20TAKP(CX)
Two heater type	TH-N12(CX)	TH-N18(CX)	TH-N20(CX)	TH-N20TA(CX)
				
Heater setting range A (Ordering designation)	0.1~0.16**(0.12A)** 0.14~0.22**(0.17A)** 0.2~0.32**(0.24A)** 0.28~0.42**(0.35A)** 0.4~0.6**(0.5A)** 0.55~0.85**(0.7A)** 0.7~1.1**(0.9A)** 1~1.6**(1.3A)** 1.4~2**(1.7A)** 1.7~2.5**(2.1A)** 2~3**(2.5A)** 2.8~4.4**(3.6A)** 4~6**(5A)** 5.2~8**(6.6A)** 7~11**(9A)** 9~13**(11A)**[2]	1~1.6**(1.3A)** 1.4~2**(1.7A)** 1.7~2.5**(2.1A)** 2~3**(2.5A)** 2.8~4.4**(3.6A)** 4~6**(5A)** 5.2~8**(6.6A)** 7~11**(9A)** 9~13**(11A)** 12~18**(15A)**	0.2~0.32**(0.24A)** 0.28~0.42**(0.35A)** 0.4~0.6**(0.5A)** 0.55~0.85**(0.7A)** 0.7~1.1**(0.9A)** 1~1.6**(1.3A)** 1.4~2**(1.7A)** 1.7~2.5**(2.1A)** 2~3**(2.5A)** 2.8~4.4**(3.6A)** 4~6**(5A)** 5.2~8**(6.6A)** 7~11**(9A)** 9~13**(11A)** 12~18**(15A)** 16~22**(19A)**[3]	18~26**(22A)** 24~34**(29A)** 30~40**(35A)**[4]

*Notes: 1. Saturable reactors for thermal overload relays are available as a kit or equipped with the relay. The suffix "SR" following the model name of the relay indicates "with saturable reactor". (ex. TH-N20KPSR*5A) (Except for type TH-N12KP, TH-N18 and TH-N18KP)*
2. Except for size N10. 3. For size N20 & N21 only. 4. For size N35 only.



S-N65

S-N125

S-N400

S-N800

Table 1.2.1

15(20)	18.5(25)	22(30)	30(40)	37(50)	45(60)	55(75)	75(100)	90(125)	125(170)	190(250)	220(300)
22(30)	30(40)	45(60)	55(75)	60(80)	75(100)	90(125)	132(180)	160(210)	220(300)	330(450)	440(600)
25(34)	37(50)	45(60)	55(75)	60(80)	90(125)	110(150)	132(180)	160(210)	225(330)	330(450)	500(670)
22(30)	30(40)	45(60)	55(75)	60(80)	90(125)	110(150)	132(180)	200(270)	250(330)	330(450)	500(670)
80	100	135	150	150	200	260	260	350	450	800	1000
2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	2	2	2	2	2	2	2	2	—	—
1	1	—	—	—	—	—	—	—	—	1	1
—	—	—	—	—	—	—	—	—	—	—	—

S-N50(CX)	**S-N65(CX)**	**S-N80**	**S-N95**	**S-N125**	**S-N150**	**S-N180**	**S-N220**	**S-N300**	**S-N400**	**S-N600**	**S-N800**
S-2×N50(CX)	**S-2×N65(CX)**	**S-2×N80**	**S-2×N95**	**S-2×N125**	**S-2×N150**	**S-2×N180**	**S-2×N220**	**S-2×N300**	**S-2×N400**	**S-2×N600**	**S-2×N800**
SD-N50	**SD-N65**	**SD-N80**	**SD-N95**	**SD-N125**	**SD-N150**	**—**	**SD-N220**	**SD-N300**	**SD-N400**	**SD-N600**	**SD-N800**

MS-N50 (KP)	**MS-N65 (KP)**	**MS-N80 (KP)**	**MS-N95 (KP)**	**MS-N125 (KP)**	**MS-N150 (KP)**	**MS-N180 (KP)**	**MS-N220 (KP)**	**MS-N300 (KP)**	**MS-N400 (KP)**	**—**	**—**
MSO-N50 (KP)(CX)	**MSO-N65 (KP)(CX)**	**MSO-N80 (KP)**	**MSO-N95 (KP)**	**MSO-N125 (KP)**	**MSO-N150 (KP)**	**MSO-N180 (KP)**	**MSO-N220 (KP)**	**MSO-N300 (KP)**	**MSO-N400 (KP)**	**—**	**—**

TH-N60KP(CX)	TH-N60TAKP	TH-N120KP	TH-N120TAKP	TH-N220RHKP	TH-N400RHKP	TH-N600KP[9]
TH-N60(CX)	TH-N60TA	TH-N120	TH-N120TA	TH-N220RH	TH-N400RH	TH-N600[9]
						
12~18**(15A)** 18~26**(22A)** 24~34**(29A)** 30~40**(35A)** 34~50**(42A)** 43~65**(54A)**	54~80 **(67A)** 65~100**(82A)** 85~105**(95A)**[5]	34~50 **(42A)** 43~65 **(54A)** 54~80 **(67A)** 65~100**(82A)**	85~125 **(105A)** 100~150**(125A)**[6]	65~100 **(82A)** 85~125 **(105A)** 100~150**(125A)** 120~180**(150A)** 140~220**(180A)**[7] 170~250**(210A)**[7]	85~125 **(105A)** 100~150**(125A)** 120~180**(150A)** 140~220**(180A)** 200~300**(250A)** 260~400**(330A)**[8]	200~300**(250A)** 260~400**(330A)** 400~600**(500A)** 520~800**(660A)**[10]

5. For size N95 only. *6. For size N150 only.* *7. For size N220 only.* *8. For size N400 only.*
9. TH-N600(KP) must be used with the current transformers (to be supplied by the customer.) See Table 2.1.2.
10. For size N800 only.

1.3 The Overview (Type designation breakdown)

1.3.1 Non-Reversing Types

Table 1.3.1

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.

1.3.2 Reversing Type

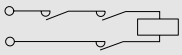
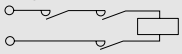
Table 1.3.2

Frame Size			2x N10	2x N11	2x N18	2x N20	2x N21	2x N25	2x N35	2x N50	2x N65	2x N80	2x N95	2x N125	2x N150	2x N180	2x N220	2x N300	2x N400	2x N600	2x N800
Spec	Rated capacity	220-240V	2.5	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	7.5	11	11	15	18.5	22	30	45	55	60	75	90	132	160	220	330	440
	Number of aux. contacts	Standard	1NO1NC×2		2NO2NC ×2	1NO1NC ×2	2NO2NC×2									3NO3NC×2				4NO4NC ×2	
		Special	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACCESSORIES	Additional aux. contact blocks	Front-on[1]	4P×2 2P×2		—	4P×2 2P×2						—	—	—	—	—	—	—	—	—	—
		Side-on	1NO1NC×2		—	1NO1NC×2														—	—
	Surge absorber[2]		Attachable									Provided as a standard									
CONTACTORS Open	AC operated	S-☐	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	DC operated	SD-☐	—	○	—	—	○	—	○	○	○	○	○	○	○	—	○	○	○	○	○
	Finger protected	S-☐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	○	○	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—
Enclosed(IP20)	Quick-trip type with 2 heater elements	MSO-☐FS	—	—	—	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—	—
	with phase failure protection	MSO-☐KF	○	○	—	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—	—
	Standard type	MS-☐	—	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	With phase failure protection	MS-☐KP	○	○	—	○	○	○	○	○	○	○	○	○	○	○	○	—	—	—	—
Mounting on 35mm rail			Available[3]									—	—	—	—	—	—	—	—	—	—

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 2xN50 to 2xN800.
3. Remove a mounting plate for mounting on 35mm rail of sizes 2xN25 to 2xN65.

1.4 Technical Data of Series S-N Contactors

1.4.1 Ratings and Characteristics

Contactor		Type	S-N10	S/SD-N11, N12	S-N18	S-N20	S/SD-N21	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-2 & DC-4	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
											
Applicable standard: JEM-1038 (JAPAN)											
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
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 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	600	600	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	45	45	60	90	90	110	110	115	115
	Sealed	VA	7	7	10	15	15	13	13	20	20
	Watts	W	2.4	2.4	3	4	4	4.3	4.3	2.2	2.2
DC operated	Inrush	VA	—	7	—	—	9	—	9	18	18
	Sealed	VA	—	7	—	—	9	—	9	18	18
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/s^2	19.6								
Shock (10 ms half sine wave)		m/s^2	49								
Conductor size	Main terminal (contactor)	mm^2	1-2.5	1-2.5	1-6	1-6	1-6	2-16	2-16	2-25	2-25
	Main terminal (overload relay)	mm^2	1-2.5	1-2.5	1-6	1-6	1-6	2-16	2-16	2-25	2-25
Control terminal		mm^2	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.

Table 1.4.1 (1)

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	690	690	690	690	690	690
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
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
210	210	270	270	440	440	440	440	790	790
23	23	24	24	40	40	50	50	90	90
2.8	2.8	2.9	2.9	4.2	4.2	6.1	6.1	17	17
24	24	31	31	—	41	55	55	600	600
24	24	31	31	—	41	55	55	72	72
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									
2-60	(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

Table 1.4.1 (2)

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	0.6
		A	0.8[1]
	220VDC	A	0.2

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

1.4.2 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

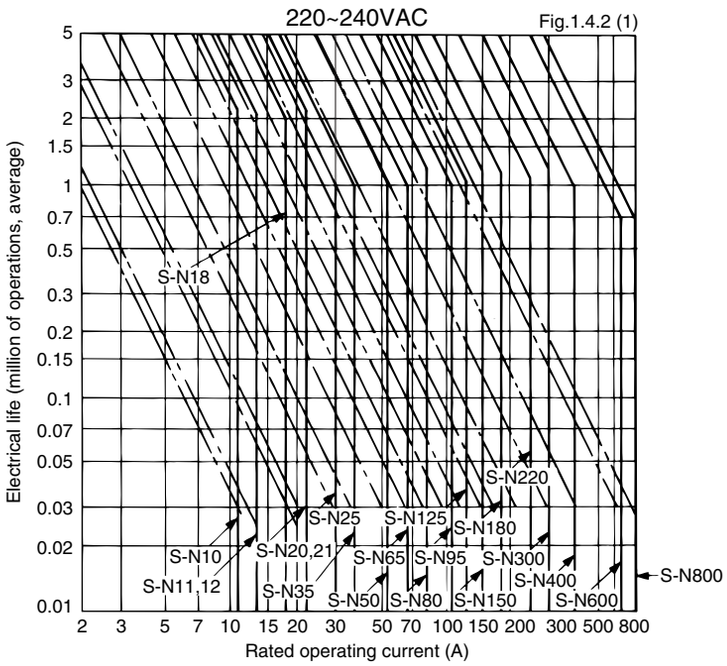


Fig.1.4.2 (1)

Electrical life versus rated operating current

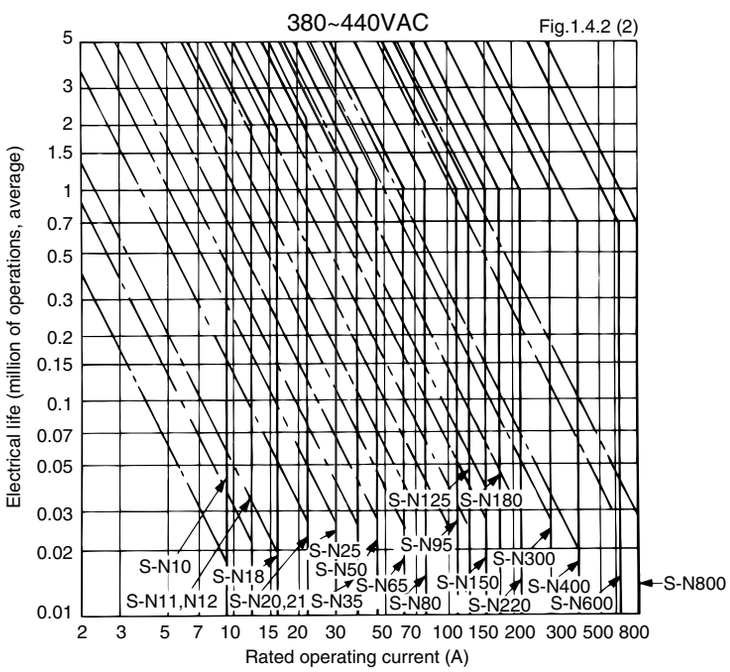
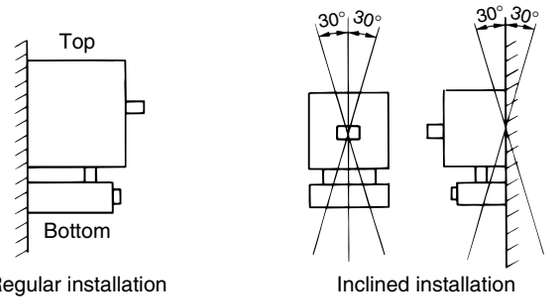


Fig.1.4.2 (2)

—— 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

1.5 When Ordering

Contactors, indicate the model name and the ordering designation of the coil.

Example: **S-N20** ∗**AC230V** (∗ **2A)**

- (∗ 2A) — Code of arrangement, if special aux. contacts, ref. Table 1.5.4
- AC230V — Ordering designation of the coil
- S-N20 — Model name

Overload relays, indicate the model name and the ordering designation of the heater setting range.

Example: **TH-N400RHKP**∗**250A**

- 250A — Ordering designation of the heater setting range
- TH-N400RHKP — Model name

Motor starters, indicate the model name, heater setting range, main circuit voltage, coil designation.

Example: **MSO-N11KP**∗**6.6A**∗**380V**∗**AC230V**

- AC230V — Ordering designation of the coil
- 380V — Main circuit voltage
- 6.6A — Ordering designation of the heater setting range
- MSO-N11KP — Model name

Note: Mark ∗ indicates a blank space.

Coil Ratings and Ordering Designations

for **S-N10(CX), -N11(CX), -N12(CX), -N18(CX), -N20(CX), -N21(CX), -N25(CX), -N35(CX) and SR-N(CX)**

Table 1.5.1

Rated voltage (VAC)		Ordering designation
50Hz	60Hz	
24	24	**AC24V**
48~50	48~50	**AC48V**
100	100~110	**AC100V**
110~120	115~120	**AC120V**
125~127	127	**AC127V**
200	200~220	**AC200V**
208~220	220	**AC220V**
220~240	230~240	**AC230V**
240~260	260~280	**AC260V**
346~380	380	**AC380V**
380~415	400~440	**AC400V**
415~440	460~480	**AC440V**
500	500~550	**AC500V**

for **S-N50(CX)~-N800**

Table 1.5.2

Rated voltage (50/60Hz)	Ordering designation
100~127V	**AC100V**
200~240V	**AC200V**
260~350V	**AC300V**
380~440V	**AC400V**
460~550V	**AC500V**

AC24V,AC48V are available for S-N50(CX)~-N150

for **SD-N, SRD-N**

Table 1.5.3

Rated voltage (VDC)	Ordering designation
24	**DC24V**
48	**DC48V**
100	**DC100V**
110	**DC110V**
120~125	**DC125V**
200	**DC200V**
220	**DC220V**

Code of arrangement for sepcial aux. Contacts

Table 1.5.4

Arrangement	Code
1NC	**1B**
2NO	**2A**

A : Normally Open

B : Normally Closed

1.6 Selection Table of Contactors

1.6.1 Non-Reversing 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.

Table 1.6.1

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	25	22	S-N50 S-N50CX[1]	**SD-N50**	2	2	– Provided						
65	65	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

1.6.2 Reversing Contactors

Type **S-2xN□,SD-2xN□**

Ordering Designation

Model name S-2xN95
Coil designation (See page 13) AC400V

Complete type designation S-2xN95∗AC400V

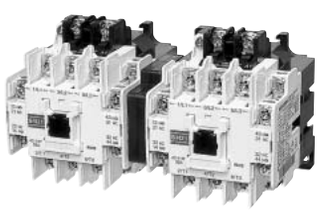
Note: Mark∗indicates a blank space.

Table 1.6.2

Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name		Standard aux. contacts		Additional auxiliary contact block(max).				
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
11	9	2.5	4	4	4	S-2xN10 S-2xN10CX[1]	— —	2	2	2	2	2	—	—
13	12	3.5	5.5	5.5	5.5	S-2xN11 S-2xN11CX[1]	SD-2xN11 SD-2xN11CX[1]	2	2					
18	16	4.5	7.5	7.5	7.5	S-2xN18 S-2xN18CX[1]	—	4	4	—	—	—	—	—
22	22	5.5	11	11	7.5	S-2xN20 S-2xN20CX[1]	—	2	2	2	2	2	—	—
22	22	5.5	11	11	7.5	S-2xN21 S-2xN21CX[1]	SD-2xN21 SD-2xN21CX[1]	4	4					
30	30	7.5	15	15	11	S-2xN25 S-2xN25CX[1]	—	4	4					
40	40	11	18.5	18.5	15	S-2xN35 S-2xN35CX[1]	SD-2xN35 SD-2xN35CX[1]	4	4					
55	50	15	22	25	22	S-2xN50 S-2xN50CX[1]	**SD-2xN50**	4	4					
65	65	18.5	30	37	30	S-2xN65 S-2xN65CX[1]	**SD-2xN65**	4	4					
85	85	22	45	45	45	**S-2xN80**	**SD-2xN80**	4	4	—	—	—	2	—
105	105	30	55	55	55	**S-2xN95**	**SD-2xN95**	4	4					
125	120	37	60	60	60	**S-2xN125**	**SD-2xN125**	4	4					
150	150	45	75	90	90	**S-2xN150**	**SD-2xN150**	6	6	—	—	—	—	2
180	180	55	90	110	110	**S-2xN180**	—	6	6					
250	250	75	132	132	132	**S-2xN220**	**SD-2xN220**	6	6					
300	300	90	160	160	200	**S-2xN300**	**SD-2xN300**	6	6					
400	400	125	220	225	250	**S-2xN400**	**SD-2xN400**	6	6					
630	630	190	330	330	330	**S-2xN600**	**SD-2xN600**	8	8	—	—	—	—	—
800	800	220	440	500	500	**S-2xN800**	**SD-2xN800**	8	8					

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

S-2xN11



S-2xN21

S-2xN150

1.6.3 Non-Reversing Mechanically Latched Contactors Type **SL-N□, SLD-N□**

Ordering Designation

Model name SL-N35
Closing coil designation[1] AC200V
Tripping coil designation[1] DC100V

Complete type designation SL-N35∗MC·AC200V∗MT·DC100V

Note: Mark∗indicates a blank space.
1. See Table1.6.3 (2).

Table 1.6.3 (1)

Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name		Standard free aux. contacts		Additional auxiliary contact block			
220 –240V (A)	380 –440V (A)	220 –240V (kW)	380 –440V (kW)	500V (kW)	690V (kW)	AC operated (closing coil)	DC operated (closing coil)			UN-AX11	UN-AX80	UN-AX150	UN-AX600
22	22	5.5	11	11	7.5	**SL-N21**	**SLD-N21**	2	2	Max.2	—	—	—
40	40	11	18.5	18.5	15	**SL-N35**	**SLD-N35**	2	2				
55	50	15	22	25	22	**SL-N50**	**SLD-N50**	2	2				
65	65	18.5	30	37	30	**SL-N65**	**SLD-N65**	2	2				
85	85	22	45	45	45	**SL-N80**	**SLD-N80**	1	2	—	Max.2	—	—
105	105	30	55	55	55	**SL-N95**	**SLD-N95**	1	2				
125	120	37	60	60	60	**SL-N125**	**SLD-N125**	1	2				
150	150	45	75	90	90	**SL-N150**	**SLD-N150**	1	2	—	—	Max.2	—
250	250	75	132	132	132	**SL-N220**	**SLD-N220**	1	2				
300	300	90	160	160	200	**SL-N300**	**SLD-N300**	1	2				
400	400	125	220	225	250	**SL-N400**	**SLD-N400**	1	2				
630	630	190	330	330	330	**SL-N600**	**SLD-N600**	1	2	—	—	—	1
800	800	220	440	500	500	**SL-N800**	**SLD-N800**	1	2				

• **Coil Ratings** (Closing & Tripping)

Table 1.6.3 (2)

Ordering designation	Applicable voltage
AC100V	100-127VAC 50/60Hz
AC200V	200-240VAC 50/60Hz
AC300V	260-350VAC 50/60Hz
AC400V	380-440VAC 50/60Hz
AC500V	460-550VAC 50/60Hz
DC24V	24VDC
DC48V	48VDC
DC100V	100-110VDC
DC125V	120-125VDC
DC200V	200-220VDC

• **Precautions**

- Minimum energising time, both for closing and tripping must be set longer than the followings.
  SL(D)-N21 to N220 : 0.3 sec.
  SL(D)-N300 to N800 : 0.5 sec.
- Make sure never to over lap the energising time for closing and tripping.

SL-N35

SL-N150

1.6.4 Reversing Mechanically Latched Contactors

(Components for Automatic Transfer Switches) Type **SL-2xN□, SLD-2xN□, SLxS-N□**

Ordering Designation

• Mechanically latched & mechanically latched contactor
Model name SL-2xN35
Closing coil designation in normal left side[1] AC200V
Tripping coil designation in normal left side[1] DC100V
Closing coil designation in standby right side[1] DC100V
Tripping coil designation in standby right side[1] AC200V

Complete type designation SL-2xN35∗MC1-AC200V∗MT1-DC100V∗MC2-DC100V∗MT2-AC200V

• Mechanically latched & normal contactor
Model name SLxS-N150
Closing coil designation in normal left side[1] AC200V
Tripping coil designation in normal left side[1] AC100V
Coil designation in standby right side[2] AC100V

Complete type designation SLxS-N150∗MC1-AC200V∗MT1-AC100V∗AC100V

Notes: Mark∗indicates a blank space.
1. See Table 1.6.3(2) 2. See Table 1.5.2

Table 1.6.4

Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name mechanically latched & mechaniclly latched		Mechanically latched & normal	Additional auxiliary contact block		
220 –240V (A)	380 –440V (A)	220 –240V (kW)	380 –440V (kW)	500V (kW)	690V (kW)	AC operated (closing coil)	DC operated (closing coil)	AC operated (closing coil)	UN-AX11	UA-AX80	UA-AX150
22	22	5.5	11	11	7.5	**SL-2xN21**	**SLD-2xN21**	—	Max.2	—	—
40	40	11	18.5	18.5	15	**SL-2xN35**	**SLD-2xN35**	—			
55	50	15	22	25	22	**SL-2xN50**	**SLD-2xN50**	—			
65	65	18.5	30	37	30	**SL-2xN65**	**SLD-2xN65**	**SLxS-N65**			
85	85	22	45	45	45	**SL-2xN80**	**SLD-2xN80**	—	—	Max.2	—
105	105	30	55	55	55	**SL-2xN95**	**SLD-2xN95**	—			
125	120	37	60	60	60	**SL-2xN125**	**SLD-2xN125**	**SLxS-N125**			
150	150	45	75	90	90	**SL-2xN150**	**SLD-2xN150**	**SLxS-N150**	—	—	Max.2
250	250	75	132	132	132	**SL-2xN220**	**SLD-2xN220**	**SLxS-N220**			
300	300	90	160	160	200	**SL-2xN300**	**SLD-2xN300**	**SLxS-N300**			
400	400	125	220	225	250	**SL-2xN400**	**SLD-2xN400**	**SLxS-N400**			
630	630	190	330	330	330	**SL-2xN600**	**SLD-2xN600**	—	—	—	—
800	800	220	440	500	500	**SL-2xN800**	**SLD-2xN800**	—			

• Precautions

• Minimum energising time both for closing and tripping must be set longer than the followings.
SL(D)-2xN21 to N220, SLxS-N65 to N220 : 0.3 sec.
SL(D)-2xN300 to N800, SLxS-N300 and N400 : 0.5 sec.
Make sure never to overlap the energising time for closing and tripping.

SL-2xN35

1.7 Selection Table of Direct-On-Line Motor Starters

1.7.1 Non-Reversing Motor Starters without Enclosure (IP 00) Type **MSO-N□**

Ordering Designation

Model name MSO-N50KP
Heater designation of overload relay 42A
Main circuit voltage 440V
Coil designation (See page 13) AC200V

Complete type designation MSO-N50KP∗42A∗440V∗AC200V

Note: Mark∗indicates a blank space.

Table 1.7.1

Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name		Aux. contacts		Heater designation of overload relay (ordering designation)	
220 –240V (A)	380 –440V (A)	220 –240V (kW)	380 –440V (kW)	500V (kW)	690V (kW)	Phase failure protection type	Two heater type				
11	9	2.5	4	4	4	MSO-N10KP MSO-N10CXKP[1]	**MSO-N10**	1	—	0.12A, 0.17A, 0.24A, 0.35A, 0.5A, 0.7A 0.9A, 1.3A, 1.7A, 2.1A, 2.5A, 3.6A, 5A 6.6A, 9A	11A
13	12	3.5	5.5	5.5	5.5	MSO-N11KP MSO-N11CXKP[1]	**MSO-N11**	1	—		
13	12	3.5	5.5	5.5	5.5	MSO-N12KP MSO-N12CXKP[1]	**MSO-N12**	1	1		
18	16	4.5	7.5	7.5	7.5	MSO-N18KP MSO-N18CXKP[1]	**MSO-N18**	—	—		15A
22	22	5.5	11	11	7.5	MSO-N20KP MSO-N20CXKP[1]	**MSO-N20**	1	1	0.24A, 0.35, 0.5A, 0.7A, 0.9A, 1.3A, 1.7A, 2.1A, 2.5A, 3.6A, 5A, 6.6A, 9A, 11A, 15A	19A
22	22	5.5	11	11	7.5	MSO-N21KP MSO-N21CXKP[1]	**MSO-N21**	2	2		
30	30	7.5	15	15	11	MSO-N25KP MSO-N25CXKP[1]	**MSO-N25**	2	2		22A
40	40	11	18.5	18.5	15	MSO-N35KP MSO-N35CXKP[1]	**MSO-N35**	2	2		29A 35A
55	50	15	22	25	22	MSO-N50KP MSO-N50CXKP[1]	**MSO-N50**	2	2	15A, 22A, 29A, 35A, 42A, 54A	
65	65	18.5	30	37	30	MSO-N65KP MSO-N65CXKP[1]	**MSO-N65**	2	2		
85	85	22	45	45	45	**MSO-N80KP**	**MSO-N80**	2	2		67A
105	105	30	55	55	55	**MSO-N95KP**	**MSO-N95**	2	2		82A 95A
125	120	37	60	60	60	**MSO-N125KP**	**MSO-N125**	2	2	42A, 54A, 67A, 82A, 105A	
150	150	45	75	90	90	**MSO-N150KP**	**MSO-N150**	2	2		125A
180	180	55	90	110	110	**MSO-N180KP**	**MSO-N180**	2	2	82A, 105A, 125A, 150A	
250	250	75	132	132	132	**MSO-N220KP**	**MSO-N220**	2	2		180A, 210A
300	300	90	160	160	200	**MSO-N300KP**	**MSO-N300**	2	2	105A, 125A, 150A, 180A, 250A	
400	400	125	220	225	250	**MSO-N400KP**	**MSO-N400**	2	2		330A

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

MSO-N11CXKP

MSO-N18KP

MSO-N50

MSO-N125KP

MSO-N220

1.7.2 Reversing Motor Starters without Enclosure (IP 00) Type **MSO-2xN□**

Ordering Designation

Model name MSO-2xN35KP
Heater designation of overload relay 29A
Main circuit voltage 440V
Coil designation (See page 13) AC200V

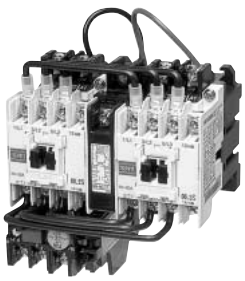
Complete type designation MSO-2xN35KP∗29A∗440V∗AC200V

Note: Mark∗indicates a blank space.

Table 1.7.2

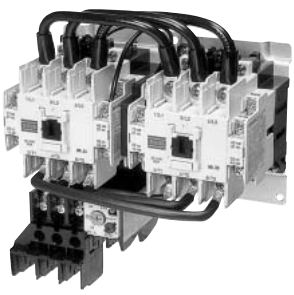
Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name		Free aux. contacts		Heater designation of overload relay	
220 –240V (A)	380 –440V (A)	220 –240V (kW)	380 –440V (kW)	500V (kW)	690V (kW)	Phase failure protection type	Two heater type			(ordering designation)	
11	9	2.5	4	4	4	MSO-2xN10KP MSO-2xN10CXKP[1]	**MSO-2xN10**	2	—	0.12A, 0.17A, 0.24A, 0.35A, 0.5A, 0.7A 0.9A, 1.3A, 1.7A, 2.1A, 2.5A, 3.6A, 5A 6.6A, 9A, 11A	15A
13	12	3.5	5.5	5.5	5.5	MSO-2xN11KP MSO-2xN11CXKP[1]	**MSO-2xN11**	2	—		
18	16	4.5	7.5	7.5	7.5	MSO-2xN18KP MSO-2xN18CXKP[1]	**MSO-2xN18**	4	2		
22	22	5.5	11	11	7.5	MSO-2xN20KP MSO-2xN20CXKP[1]	**MSO-2xN20**	2	—	0.24A, 0.35A, 0.5A, 0.7A, 0.9A, 1.3A, 1.7A, 2.1A, 2.5A, 3.6A, 5A, 6.6A, 9A, 11A, 15A	19A
22	22	5.5	11	11	7.5	MSO-2xN21KP MSO-2xN21CXKP[1]	**MSO-2xN21**	4	2		
30	30	7.5	15	15	11	MSO-2xN25KP MSO-2xN25CXKP[1]	**MSO-2xN25**	4	2		22A
40	40	11	18.5	18.5	15	MSO-2xN35KP MSO-2xN35CXKP[1]	**MSO-2xN35**	4	2		29A / 35A
55	50	15	22	25	22	MSO-2xN50KP MSO-2xN50CXKP[1]	**MSO-2xN50**	4	2	15A, 22A, 29A, 35A, 42A, 54A	
65	65	18.5	30	37	30	MSO-2xN65KP MSO-2xN65CXKP[1]	**MSO-2xN65**	4	2		
85	85	22	45	45	45	**MSO-2xN80KP**	**MSO-2xN80**	4	2		67A
105	105	30	55	55	55	**MSO-2xN95KP**	**MSO-2xN95**	4	2		82A / 95A
125	120	37	60	60	60	**MSO-2xN125KP**	**MSO-2xN125**	4	2	42A, 54A, 67A, 82A, 105A	
150	150	45	75	90	90	**MSO-2xN150KP**	**MSO-2xN150**	6	4		125A
180	180	55	90	110	110	**MSO-2xN180KP**	**MSO-2xN180**	6	4	82A, 105A, 125A, 150A	
250	250	75	132	132	132	**MSO-2xN220KP**	**MSO-2xN220**	6	4		180A, 210A
300	300	90	160	160	200	**MSO-2xN300KP**	**MSO-2xN300**	6	4	105A, 125A, 150A, 180A, 250A	
400	400	125	220	225	250	**MSO-2xN400KP**	**MSO-2xN400**	6	4		330A

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



MSO-2xN11KP

MSO-2xN18



MSO-2xN35

MSO-2xN150KP

1.7.3 Enclosed Non-Reversing Motor Starters (IP 20) Type **MS-N□**

Ordering Designation

Model name MS-N21KP
Heater designation of overload relay 15A
Main circuit voltage 220V
Control circuit voltage and frequency 220V 50Hz

Complete type designation MS-N21KP∗15A∗220V∗220V 50Hz

Note: Mark∗indicates a blank space.

Table 1.7.3

Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name		Free aux. contacts		Heater designation of overload relay (ordering designation)	
220 –240V (A)	380 –440V (A)	220 –240V (kW)	380 –440V (kW)	500V (kW)	690V (kW)	Phase failure protection type	Two heater type				
11	9	2.5	4	4	4	**MS-N10KP**	**MS-N10**	—	—	0.24A, 0.35A, 0.5A, 0.7A, 0.9A, 1.3A 1.7A, 2.1A, 2.5A, 3.6A, 5A, 6.6A, 9A	11A
13	12	3.5	5.5	5.5	5.5	**MS-N11KP**	**MS-N11**	—	—		
13	12	3.5	5.5	5.5	5.5	**MS-N12KP**	**MS-N12**	—	1		
22	22	5.5	11	11	7.5	**MS-N20KP**	**MS-N20**	—	1	0.24A, 0.35A, 0.5A, 0.7A, 0.9A, 1.3A, 1.7A, 2.1A, 2.5A, 3.6A, 5A, 6.6A, 9A, 11A, 15A	19A
22	22	5.5	11	11	7.5	**MS-N21KP**	**MS-N21**	1	2		
30	30	7.5	15	15	11	**MS-N25KP**	**MS-N25**	1	2		22A
40	40	11	18.5	18.5	15	**MS-N35KP**	**MS-N35**	1	2		29A 35A
55	50	15	22	25	22	**MS-N50KP**	**MS-N50**	1	2	15A, 22A, 29A, 35A, 42A, 54A	
65	65	18.5	30	37	30	**MS-N65KP**	**MS-N65**	1	2		
85	85	22	45	45	45	**MS-N80KP**	**MS-N80**	1	2		67A
105	105	30	55	55	55	**MS-N95KP**	**MS-N95**	1	2		82A 95A
125	120	37	60	60	60	**MS-N125KP**	**MS-N125**	1	2	42A, 54A, 67A, 82A, 105A	
150	150	45	75	90	90	**MS-N150KP**	**MS-N150**	1	2		125A
180	180	55	90	110	110	**MS-N180KP**	**MS-N180**	1	2	82A, 105A, 125A, 150A	
250	250	75	132	132	132	**MS-N220KP**	**MS-N220**	1	2		180A, 210A
300	300	90	160	160	200	**MS-N300KP**	**MS-N300**	1	2	105A, 125A, 150A, 180A, 250A	
400	400	125	220	225	250	**MS-N400KP**	**MS-N400**	1	2		330A

Note: 1. Models with finger protection terminal covers are not available.

MS-N10

MS-N21

MS-N65

MS-N220KP

1.7.4 Enclosed Non-Reversing Motor Starters with Pushbutton Switch (IP 20)

Type **MS-N□PM**

When the thermal overload relay is tripped, type MS-N□PM enclosed direct-on-line motor starters can be easily reset by pushing the OFF button on the enclosure (MS-N10 KPPM and -N11 KPPM can be reset by pushing the RESET button).

Ordering Designation

Model name MS-N21KPPM
Heater designation of overload relay 15A
Main circuit voltage 220V
Control circuit voltage and frequency 220V 50Hz

Complete type designation MS-N21KPPM∗15A∗220V∗220V 50Hz

Note: Mark∗indicates a blank space.

Table 1.7.4

Rated operational current AC-3		Rated motor capacity 3-phase AC-2 & AC-3				Model name		Free aux. contacts		Heater designation of overload relay (ordering designation)	
220 –240V (A)	380 –440V (A)	220 –240V (kW)	380 –440V (kW)	500V (kW)	690V (kW)	Phase failure protection type	Two heater type				
11	9	2.5	4	4	4	**MS-N10KPPM**	**MS-N10PM**	1	—	0.24A, 0.35A, 0.5A, 0.7A, 0.9A, 1.3A, 1.7A, 2.1A, 2.5A, 3.6A, 5A, 6.6A, 9A	11A
13	12	3.5	5.5	5.5	5.5	**MS-N11KPPM**	**MS-N11PM**	1	—		
22	22	5.5	11	11	7.5	**MS-N20KPPM**	**MS-N20PM**	—	1	0.24A, 0.35A, 0.5A, 0.7A, 0.9A, 1.3A, 1.7A, 2.1A, 2.5A, 3.6A, 5A, 6.6A, 9A, 11A, 15A	19A
22	22	5.5	11	11	7.5	**MS-N21KPPM**	**MS-N21PM**	1	2		
30	30	7.5	15	15	11	**MS-N25KPPM**	**MS-N25PM**	1	2		22A
40	40	11	18.5	18.5	15	**MS-N35KPPM**	**MS-N35PM**	1	2		29A / 35A
55	50	15	22	25	22	**MS-N50KPPM**	**MS-N50PM**	1	2	15A, 22A, 29A, 35A, 42A, 54A	
65	65	18.5	30	37	30	**MS-N65KPPM**	**MS-N65PM**	1	2		
85	85	22	45	45	45	**MS-N80KPPM**	**MS-N80PM**	1	2		67A
105	105	30	55	55	55	**MS-N95KPPM**	**MS-N95PM**	1	2		82A / 95A

MS-N11PM

MS-N80PMKP

1.8 Optional Parts and Accessories for Contactors

1.8.1 Replacement Coils

Table 1.8.1

AC operated coils				DC operated coils			
Contactor(s)	Part number*		Mass(kg)	Contactor(s)	Part number*		Mass(kg)
S-N10, S-N11, S-N12,	S-N10-COIL	AC□□□V	0.06	SD-N11, SD-N12,	SD-N11-COIL	DC□□□V	0.23
S-N18, SR-N4	SR-N4-COIL	AC□□□V		SRD-N4			
S-N20, S-N21	S-N21-COIL	AC□□□V	0.08	SD-N21	SD-N21-COIL	DC□□□V	0.24
S-N25, S-N35	S-N35-COIL	AC□□□V	0.08	SD-N35	SD-N35-COIL	DC□□□V	0.23
S-N50, S-N65	S-N50-COIL	AC□□□V	0.27	SD-N50, SD-N65	SD-N50-COIL	DC□□□V	0.8
S-N80, S-N95	S-N80-COIL	AC□□□V	0.6	SD-N80, SD-N95	SD-N80-COIL	DC□□□V	0.6
S-N125, S-N150	S-N125-COIL	AC□□□V	0.46	SD-N125, SD-N150	SD-N125-COIL	DC□□□V	0.9
S-N180, S-N220	S-N180-COIL	AC□□□V	0.6	SD-N220	SD-N220-COIL	DC□□□V	1.4
S-N300, S-N400	S-N300-COIL	AC□□□V	0.9	SD-N300, SD-N400	SD-N300-COIL	DC□□□V	2.0
S-N600, S-N800	S-N600-COIL	AC□□□V	2.0	SD-N600, SD-N800	SD-N600-COIL	DC□□□V	6.0

Note: When ordering, please specify the operating voltage according to Table 1.5.1~3.

1.8.2 Replacement Contact Kits

Table 1.8.2 (1)

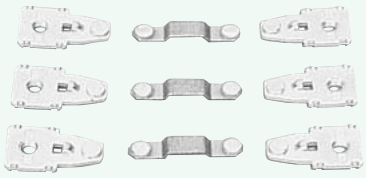
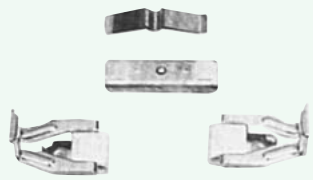
Kits of main contacts for contactors		Contactor	Part number	Mass(kg)
 PARTS BH739N300	Kit consists of 3 moving contacts and 6 stationary contacts (include springs and spring supports also).	S-N10(CX)*, -N11(CX), -N12(CX) SD-N11(CX), -N12(CX)	**PARTS BH719N300**	0.03
		S-N18(CX)	**PARTS BH729N300**	0.05
		S-N20(CX), -N21(CX), SD-N21(CX)	**PARTS BH739N300**	0.05
		S-N25(CX)	**PARTS BH749N300**	0.07
		S-N35(CX)	**PARTS BH749N301**	0.07
		SD-N35(CX)	**PARTS BH749N303**	0.07
		S-N50(CX)	**PARTS BH759N300**	0.11
		SD-N50	**PARTS BH759N302**	0.11
		S-N65(CX)	**PARTS BH759N301**	0.11
		SD-N65	**PARTS BH759N303**	0.11
		S-N80	**PARTS BH769N300**	0.1
		SD-N80	**PARTS BH769N302**	0.1
		S-N95	**PARTS BH769N301**	0.1
		SD-N95	**PARTS BH769N303**	0.1
		S-N125	**PARTS BH779N300**	0.1
		SD-N125	**PARTS BH779N301**	0.1
		S(D)-N150	**PARTS BH789N300**	0.2
		S-N180	**PARTS BH799N300**	0.4
		S(D)-N220	**PARTS BH799N301**	0.4
		S(D)-N300	**PARTS BH609N300**	0.8
		S(D)-N400	**PARTS BH609N301**	0.8
		S(D)-N600	**PARTS BH619N300**	2.5
		S(D)-N800	**PARTS BH619N301**	2.5
 **BH769N300**				
 **B799N300**				

Table 1.8.2 (2)

Kits of auxiliary contacts for contactors		Contactor	For arrangement	Part number	Mass(kg)
 PARTS BH729N310	Kit consists of 1 bifurcated moving contact and 2 stationary contacts.	S-N10(CX), N11(CX), SD-N11(CX)	1NO	**PARTS BH719N310**	0.01
			1NC	**PARTS BH719N311**	0.01
	Kit consists of 2 bifurcated moving contacts and 4 stationary contacts.	S-N12(CX), SD-N12(CX)	1NO+1NC	**PARTS BH729N310**	0.01
		S-N20(CX)	1NO+1NC	**PARTS BH739N310**	0.02
	Kit consists of 4 bifurcated moving contacts and 8 stationary contacts.	S-N21(CX) to S-N35(CX), SD-N21(CX) to SD-N35(CX),	2NO+2NC	**PARTS BH739N311**	0.03
		S-N50(CX) to N95 SD-N50 to N95	2NO+2NC	**PARTS BH539N315**	0.02
		S-N125, SD-N125	2NO+2NC	**PARTS BH579N312**	0.02
		S-N150 to N800 SD-N150 to N800	(Use auxilliary contact blocks, see 1.8.3 “Auxilliary Contact Blocks.”)		

1.8.3 Auxiliary Contact Blocks

Table 1.8.3

UN-AX4

UN-AX11

UN-AX150

Mounting	Contactor/Relay	Type for	Contact arrangement	Part Number
Front clip-on[1,2]	S-N10(CX), -N11(CX), -N12(CX), -N20(CX), -N21(CX), -N25(CX), -N35(CX), -N18(CX), -N28(CX), -N38(CX), -N48(CX), -N50(CX), -N65(CX)	Standard	2NO	**UN-AX2(CX)2A**
			1NO+1NC	**UN-AX2(CX)1A1B**
			2NC	**UN-AX2(CX)2B**
			4NO	**UN-AX4(CX)4A**
			3NO+1NC	**UN-AX4(CX)3A1B**
	SD-N11(CX), -N12(CX), -N21(CX), -N35(CX), -N50, -N65		2NO+2NC	**UN-AX4(CX)2A2B**
	SR-N4(CX)	Low level signal (5Vdc 5mA)	1NO+1NC (low level)	**UN-LL22(CX)**
	SRD-N4(CX)		1NO+1NC (standard)	
Side clip-on[1,3]	S-N10(CX), -N11(CX), -N20(CX), -N21(CX), -N25(CX), -N35(CX) -N50(CX), -N65(CX)	Standard	1NO+1NC	**UN-AX11(CX)**
	SD-N11(CX), -N21(CX), -N35(CX) -N50, -N65			
	SR-N4(CX), SRD-N4(CX)			
Side clip-on[3]	S(D)-N80, -N95, -N125		1NO+1NC	**UN-AX80**
	S(D)-N150, -N220, -N300, -N400, S-N180		1NO+1NC	**UN-AX150**
	S(D)-N600, -N800		2NO+2NC	**UN-AX600**

Notes: 1 Front clip-on and side clip-on should not be mounted both.
2 Maximum 1 piece of aux. contact block can be mounted on a Contactor / Relay.
3 Maximum 2 pieces of aux. contact block can be mounted on a Contactor / Relay.

1.8.4 Mechanical Interlocks

Table 1.8.4

UN-ML11

UN-ML21

Contactor	Part Number
S-N10(CX), -N11(CX), SD-N11(CX)	**UN-ML11(CX)**
S-N20(CX), -N21(CX), -N25(CX), -N35(CX), -N18(CX), -N28(CX), -N38(CX), -N48(CX), -N50(CX), -N65(CX) SD-N21(CX), -N35(CX), -N50, -N65	**UN-ML21**
S(D)-N80, -N95, -N125	**UN-ML80**
S(D)-N150	**UN-ML150**
S-N180, S(D)-N220, -N300, -N400	**UN-ML220**

1.8.5 Connecting Bar Kits

Table 1.8.5

UN-SD50

For connecting reversing contactors	Contactor	Part Number
Kit consists of 3 connecting bars or wires each for source and load side.	S-2×N10(CX), -2×N11(CX)	**UN-SD10CX**
	S-2×N18	**UN-SD18CX**
	S-2×N18CX	**UN-SD18CX**
	S-2×N20, -2×N21	**UN-SD21CX**
	S-2×N20CX, N2×N21CX	**UN-SD21CX**
	S-2×N25, -2×N35	**UN-SD35CX**
	S-2×N25CX, -2×N35CX	**UN-SD35CX**
	S-2×N50(CX), -2×N65(CX)	**UN-SD50**
	S-2×N80, -2×N95	**UN-SD80**
	S-2×N125	**UN-SD125**
	S-2×N150	**UN-SD150**
	S-2×N180, -2×N220	**UN-SD220**
	S-2×N300, -2×N400	**UN-SD300**
	S-2×N600, -2×N800	**UN-SD600**

1.8.6 Surge Absorbers

Table 1.8.6

UN-SA13

	Contactor/Relay	Applicable control voltage	Part Number
Varistor type	S-N10, -N11, -N12, -N18, -N20,	AC24-240V/DC24-250V	**UN-SA21 AC200V**
	-N21, -N25, -N35, -N28, -N38, -N48	AC200-480V	**UN-SA21 AC400V**
	SD-N11, -N12, -N21, -N35, SR(D)-N4		
Varistor type with operating indicator (LED)	S-N10, -N11, -N12, -N18, -N20,	AC50-240V	**UN-SA22 AC200V**
	-N21, -N25, -N35, -N28, -N38, -N48	DC60-250V	
	SD-N11, -N12, -N21, -N35, SR(D)-N4		
Varistor and CR type	S-N10, -N11, -N18, -N20, -N21,	AC24-50V	**UN-SA25 AC48V**
	-N25, -N35, -N28, -N38, -N48	DC24-60V	
	SD-N11, -N12, -N21, -N35	AC100-240V	**UN-SA25 AC200V**
	SR(D)-N4	DC100-250V	
CR type	S-N10, -N11, -N12, -N18, -N20, -N21,	AC24-240V	**UN-SA23 AC200V**
	-N25, -N35, -N28, -N38, -N48, SR-N4		
	SD-N11, -N12, -N21, -N35, SRD-N4	DC24-250V	**UN-SA13 DC200V**

1.8.7 Terminal Covers

Table 1.8.7

S-N50 with 2pcs of UN-CZ500

For contactors	Contactor	Part Number	For starters	Starter (loadside)	Part Number	
	S(D)-N50, -N65[3]	**UN-CZ500[1]**		MSO(D)-N50, -N65[3]	**UN-CZ501[2]**	**(+CZ500)**
	S(D)-N80, -N95	**UN-CZ800[1]**		MSO(D)-N80, -N95	**UN-CZ801[2]**	**(+CZ800)**
	S(D)-N125	**UN-CZ1250[1]**		MSO(D)-N125	**UN-CZ1251[2]**	**(+CZ1250)**
	S(D)-N150	**UN-CZ1500[1]**		MSO(D)-N150	**UN-CZ1501[2]**	**(+CZ1500)**
	S-N180, S(D)-N220	**UN-CZ2200[1]**		MSO-N180, MSO(D)-N220	**UN-CZ2201[2]**	**(+CZ2200)**
	S(D)-N300, -N400	**UN-CZ3000[1]**		MSO(D)-N300, -N400	**UN-CZ3001[2]**	**(+CZ3000)**
	S(D)-2×N50, N65	**UN-CZ502**		MSO(D)-2×N50, N65	**UN-CZ504**	
	S(D)-2×N80, N95	**UN-CZ802**		MSO(D)-2×N80, N95	**UN-CZ804**	
	S(D)-2×N125	**UN-CZ1252**		MSO(D)-2×N125	**UN-CZ1254**	
	S(D)-2×N150	**UN-CZ1502**		MSO(D)-2×N150	**UN-CZ1504**	
	S-2×N180, S(D)-2×N220	**UN-CZ2202**		MSO-2×N180, MSO(D)-2×N220	**UN-CZ2204**	
	S(D)-2×N300, N400	**UN-CZ3002**		MSO(D)-2×N300, N400	**UN-CZ3004**	

Notes : 1. 2pcs are required for one contactor

2. For line side another cover (for contactor) is required.

3. Terminal covers should not be mounted for type S-N50CX, S-N65CX, MSO-N50(KP)CX and MSO-N65(KP)CX.

1.8.8 Pneumatic Time Delay Modules

Table 1.8.8

UN-TR4AN

Contactor/Relay	On delay
S-N10(CX)	**UN-TR4AN(CX)**
S-N11(CX)	
S-N12(CX)	
S-N18(CX)	
SR-N4(CX)	
SD-N11(CX)	
SD-N12(CX)	
SRD-N4(CX)	

For detail see item 4.6.

Note : UN-AX11(CX) (Table 1.8.3) can not be combined to a Contactor / Relay together with UN-TR4AN (CX).

1.8.9 DC Interface Modules

Table 1.8.9

Direct mounting to contactor

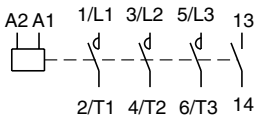
UN-SY21

		Output	
	Contactor/Relay	Solid state	Relay
Direct mounting to contactor	S-N10(CX), -N11(CX), -N12(CX), -N18(CX), -N20(CX), -N21(CX), -N25(CX), -N35(CX), -N28(CX), -N38(CX), -N48(CX) SR-N4(CX)	**UN-SY21(CX)**	**UN-SY22(CX)**
	S-N50 S-N65	**UN-SY31**	**UN-SY32**
Separate mounting	S-N80 to N400	**UN-SY11**	**UN-SY12**

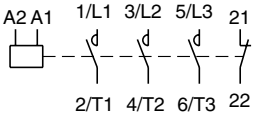
For detail see item 3.8.

1.9 Connections and Contact Arrangement

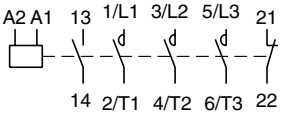
1.9.1 S, SD-N □



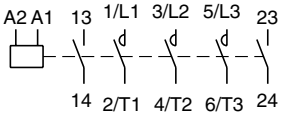
S-N10, N11(1NO)
SD-N11(1NO)



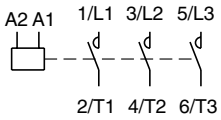
S-N10, N11(INC)
SD-N11(INC)



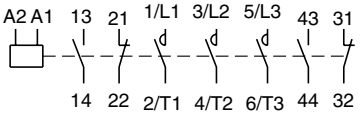
S-N12, N20
SD-N12



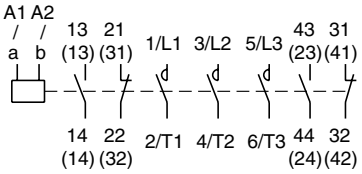
S-N12(2NO)
S-N20(2NO)



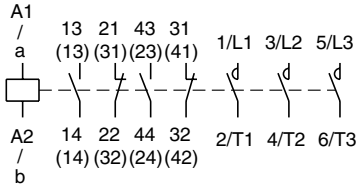
S-N18



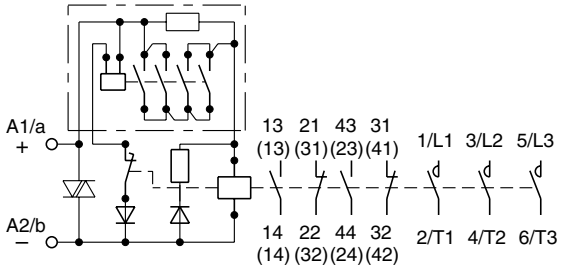
S-N21, N25, N35
SD-N21, N35



S-N50~N400
SD-N50~N400

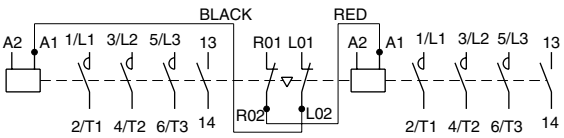


S-N600, N800

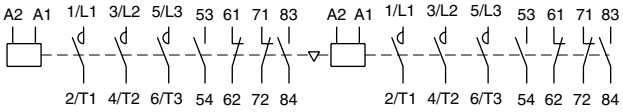


SD-N600, N800

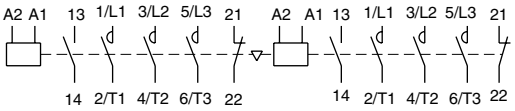
1.9.2 S, SD-2xN □



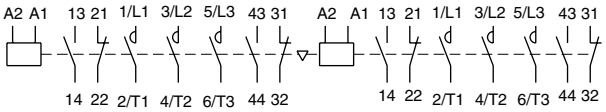
S-2xN10, N11
SD-2xN11



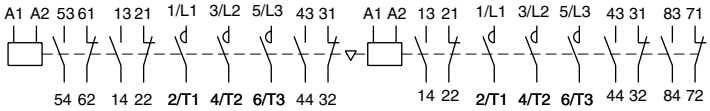
S-2xN18



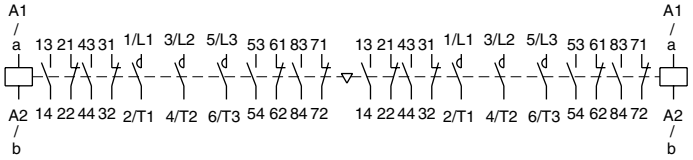
S-2xN20



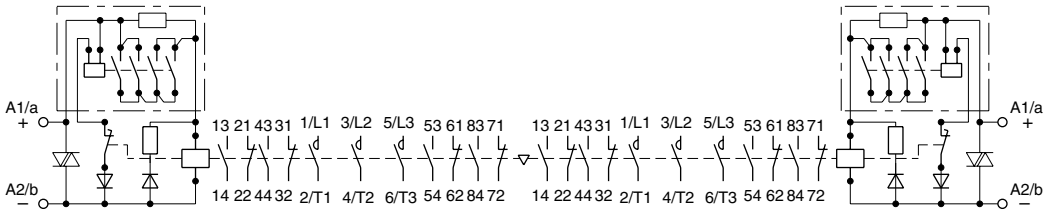
S-2xN21~N35
SD-2xN21, N35



S-2xN50~N400
SD-2xN50~N150, N220~N400

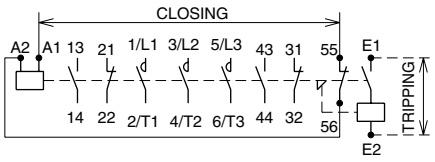


S-2xN600, N800

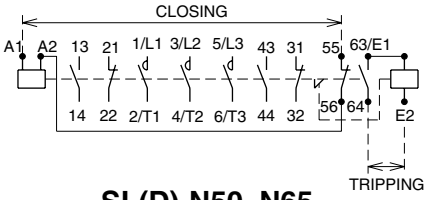


SD-2xN600, N800

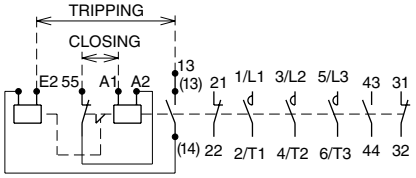
1.9.3 SL, SLD-(2x)N □



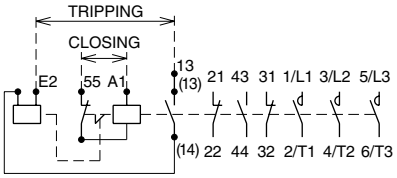
SL(D)-N21, N35



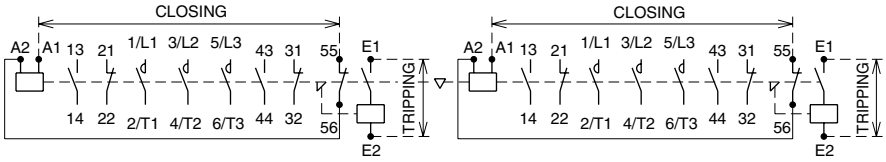
SL(D)-N50, N65



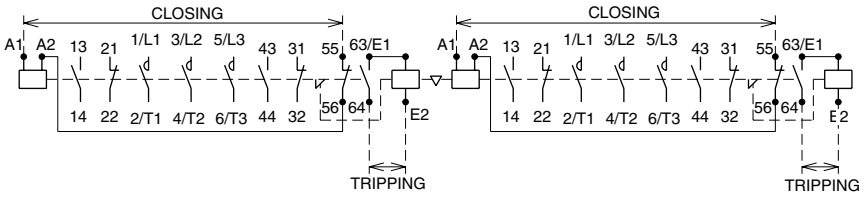
SL(D)-N80~N400



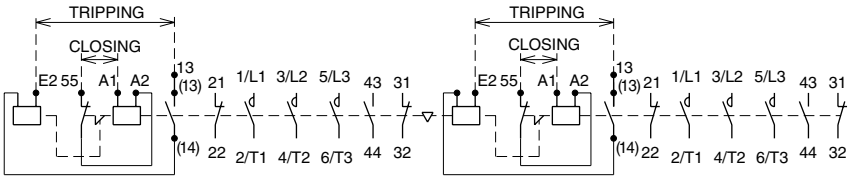
SL(D)-N600, N800



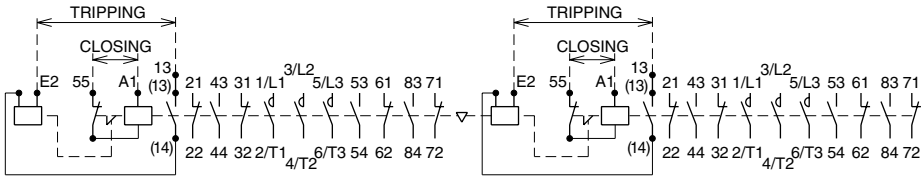
SL(D)-2xN21, N35



SL(D)-2xN50, N65

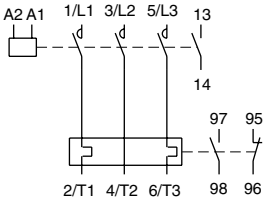


SL(D)-2xN80~N400

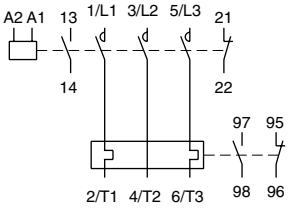


SL(D)-2xN600, N800

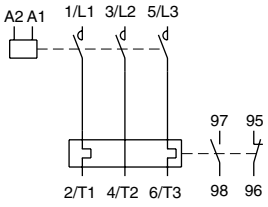
1.9.4 MSO-(2x)N □



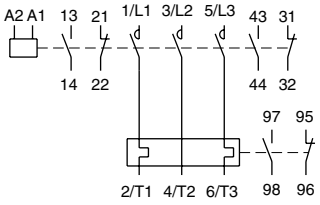
MSO-N10, N11



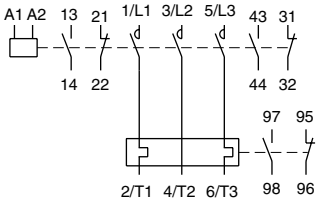
MSO-N12, N20



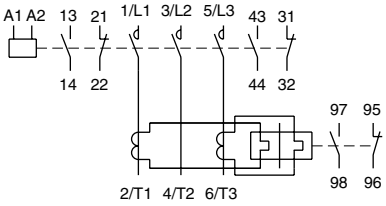
MSO-N18



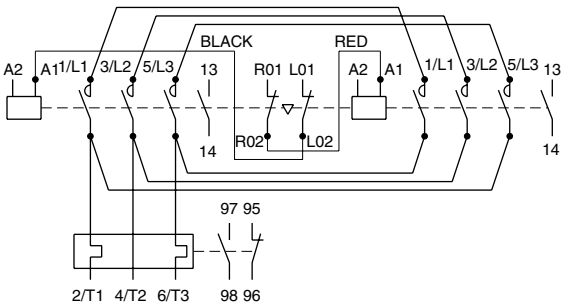
MSO-N21~N35



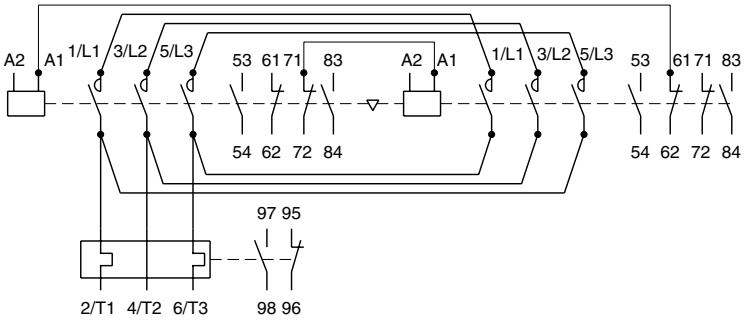
MSO-N50~N150



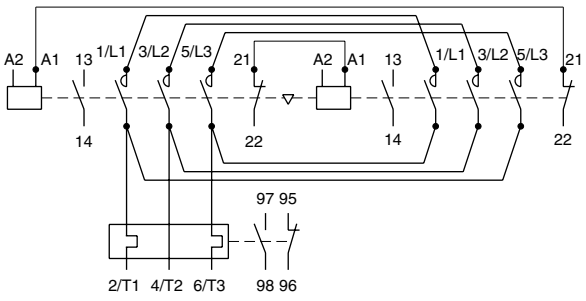
MSO-N180~N400



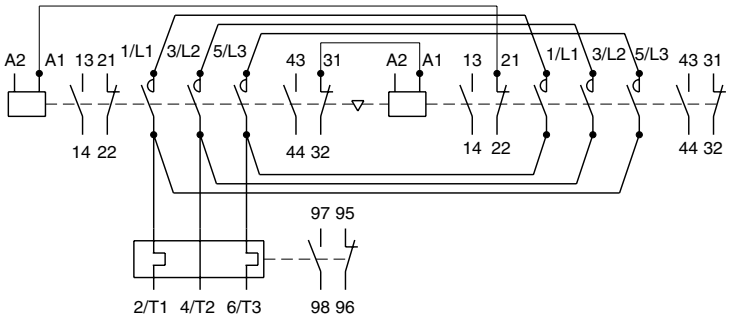
MSO-2xN10, N11



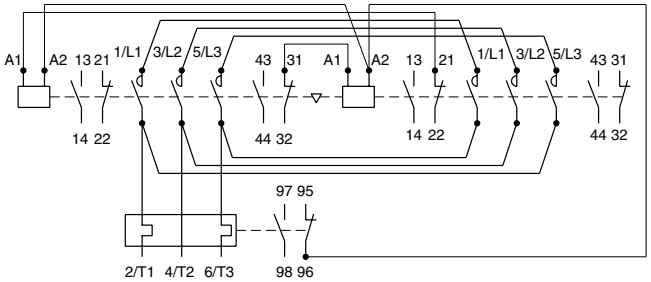
MSO-2xN18



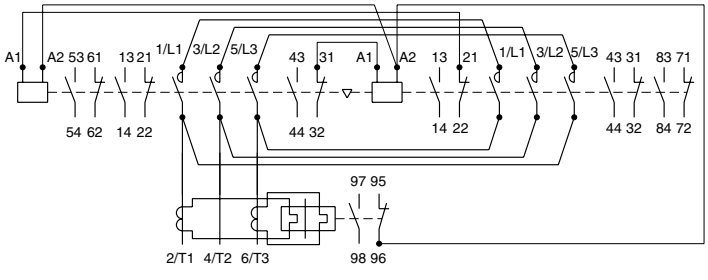
MSO-2xN20



MSO-2xN21~N35

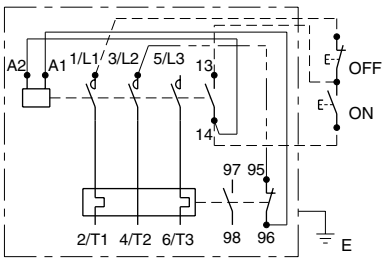


MSO-2xN50~N150

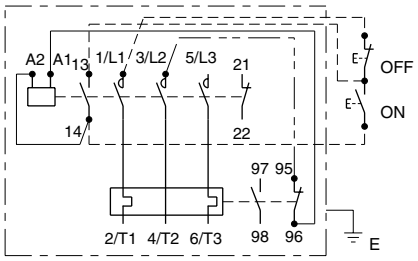


MSO-2xN180~N400

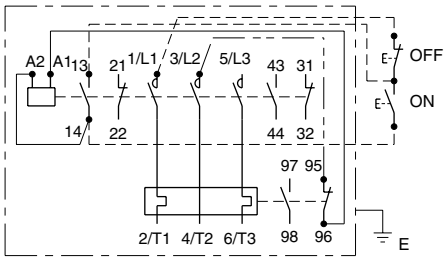
1.9.5 MS-N□



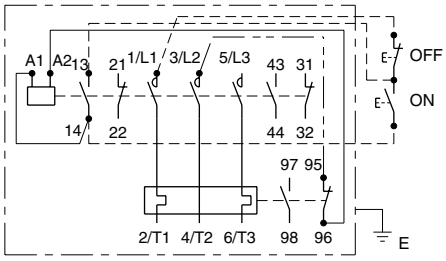
MS-N10, N11



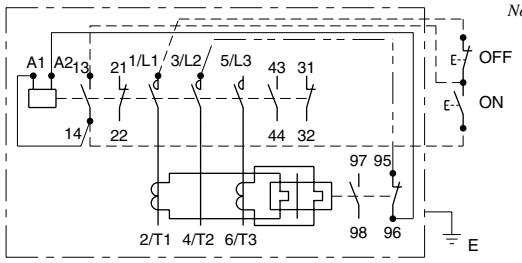
MS-N12, N20



MS-N21, N35



MS-N50～N150



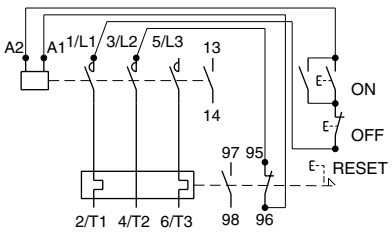
MS-N180～N400

Notes: 1. This shows the state when the same power is used for the main circuit and control circuit. The section shown with a solid line is already wired. The sections shown with a dashed line and a two points of chain line must be wired. (Use the wire enclosed with the product for the two points of chain line section.)

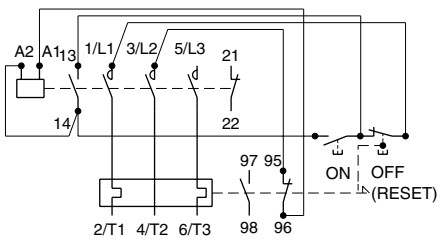
2. If the main circuit and control circuit power differ, do not connect a wire between the dashed line 1/L1-OFF button and the wire between the two points of chain line 3/L2-TH95. Wire to the OFF button and TH95 terminal from a different control circuit's power supply.

1.9.6 MS-N□PM

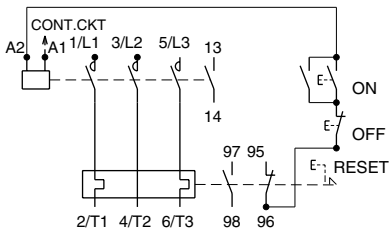
common control



common control

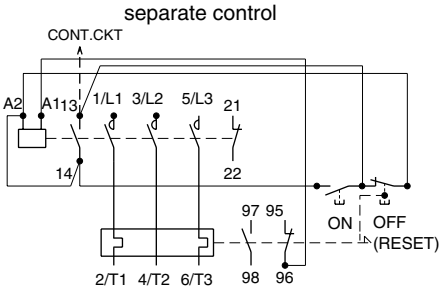


separate control



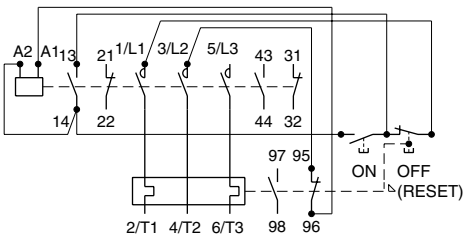
MS-N10, N11PM

separate control

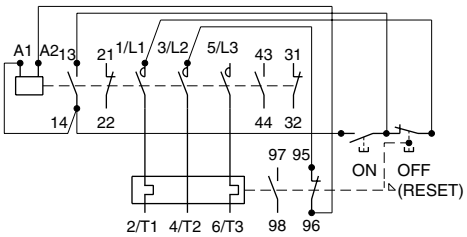


MS-N20PM

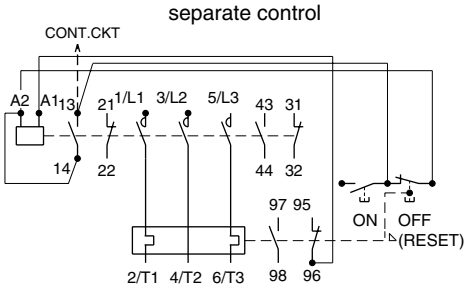
common control



common control

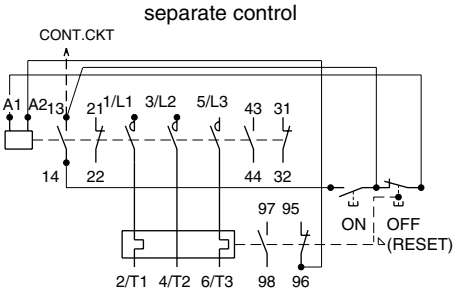


separate control



MS-N21～N35PM

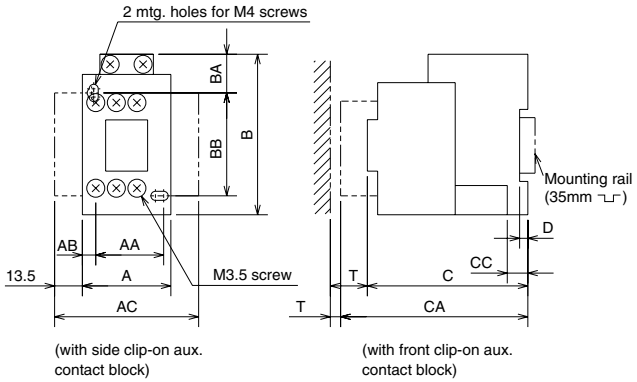
separate control



MS-N50～N95PM

1.10 Outline Dimensions

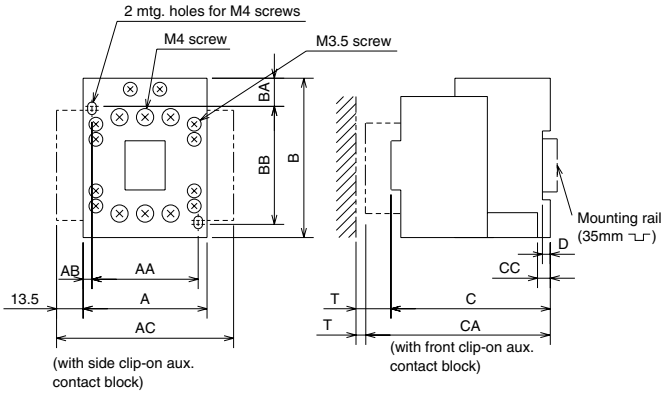
1.10.1 Outline Dimensions of Non-Reversing Contactors



• **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

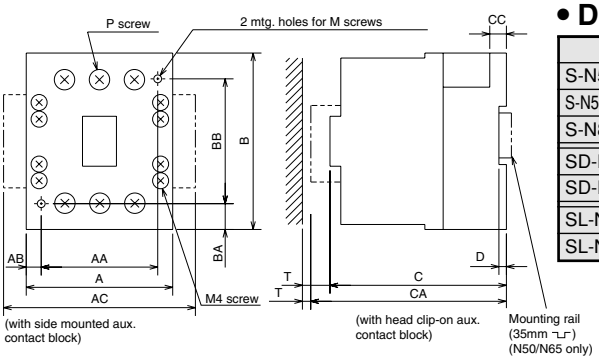
Note: Front clip-on and side clip-on aux. contact blocks should not be mounted both.



• **Dimensions**

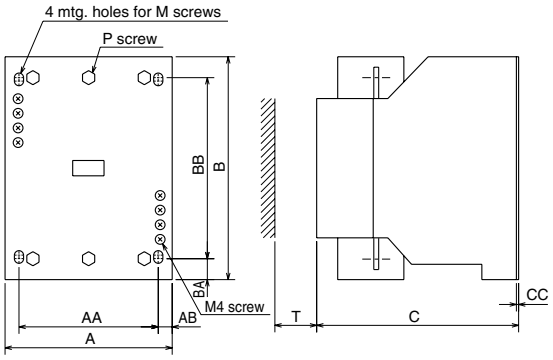
Type	A	B	C	AA	AB	AC	BB	BA	CC	CA	D	Mass(kg)	T
S-N20(CX),-21(CX)	63	81	81	54	4.5	90	60	14	6.5	109	4	0.4	5
S-N25(CX),-N35(CX)	75	89	91	65	5	102	70	13	6.5	119	4	0.52	5
SD-N21(CX)	63	81	113	54	4.5	90	60	14	6.5	141	4	0.72	5
SD-N35(CX)	75	89	123	65	5	102	70	13	6.5	151	4	0.85	5
SLD-N21	63	81	137	54	45	90	60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