

# S-N Series Magnetic Contactors

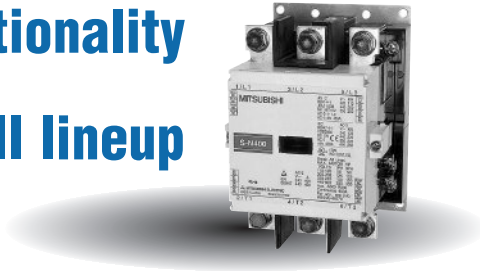


Mitsubishi Electric Automation, Inc.

Discover the Many Facets of Mitsubishi Electric. The Power in Automation Solutions.

# S-N Series

Substantial safety  
and functionality  
with a full lineup



## Incorporation of CAN Terminal for Simple Wiring

By adopting a CAN terminal, there is no need to remove the screws. The integrated terminal screw is set in a plastic screw holder to prevent the loss of the screw. When the screw is loosened, the screw naturally sets in the screw holder. This is Mitsubishi Electric's original CAN terminal. (Patented)

## Unified Design for N Series

The design of the S-N Series has been unified with a white front face brightening the inside of the panel and providing a cleaner image.

## Compatible with International Standards

Most of Mitsubishi Electric's standard products comply with International Standards. Applicable standards: JIS, JEM, IEC, EN, VDE, BS. Approved standards: UL, CSA, LR, BV, NK, KR, TÜV.

## Small-Sized Models S-N10~N35

The S-N Series contactors, starters and relays can be installed on a mounting rail (35mm width). The terminals of these coils are arranged on the contactor with wiring in mind. Furthermore, the distance between the center of the rail and the coil terminals is unified at 38.5mm. (S-N10 to N21, SR-N4)

## Simple Inspections

Contactors can be inspected easily by removing the arc cover.

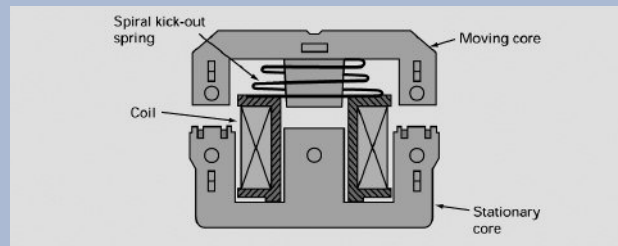
## Built-in Surge Absorber

Models with optional built-in surge absorbers on the coil are available.

## Safe and Speedy Terminal Functions

Models which have finger protection provide a more safe and speedy connection, even when using closed eyelet (ring) terminal lugs. (S/SD-N□□CX, TH-N□□CX, SR/SDR-N4CX)

## Medium and Large-Sized Models: S-N50~S-N800



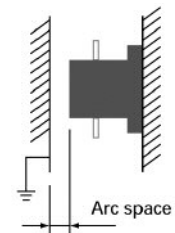
## Improved Magnet

Use of a spiral kick-out spring improves the dynamic balance of the moving parts, extending the core life and generally stabilizing the core movement. Through the use of modern technology, the efficiency of the magnet has been improved. The contactor can withstand a voltage drop of 35% with the contact closed.

## Arc Space Reduced to One-Third!

By developing a new extinguishing mechanism, the arc space has been reduced to approximately one third. (Mitsubishi Electric comparison).

Frame	Arc Space (mm)	
	S-N	S-K
N50/N65	5	10
N80/N95	10	10
N125-N220	10	30
N300/N400	10	50
N600/N800	10	10



## Arc Blowoff Improved for Safety and Space Conservation

The new extinguishing structure eliminates arcing toward the front (in the direction of the control panel door) when current is cut off. This new element improves safety and potentially saves space.





## DC Electromagnet with AC Operation (Patented)

### Lower Power Consumption

Low coil power consumption allows the S-N Series contactors to be controlled by almost any type of relay, even the small output relays of programmable controllers.

### Less Noise or Surge From Coil

When switching a coil, the energy is dissipated within the internal circuit of the electromagnet.

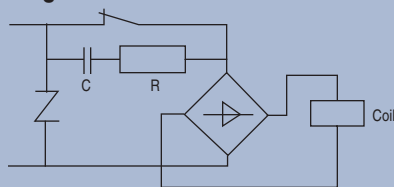
### Humming Completely Eliminated

DC excitation does not cause humming, providing quiet operation.

### Contactors Coils Have Ultra-Wide Range of Ratings

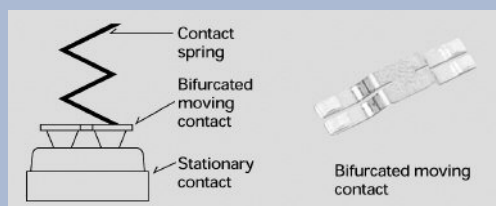
The number of coil types has been cut by two-thirds and there is no need to re-wire for different frequencies. The coil also withstands large voltage drops.

## Electromagnetic Internal Circuit



## Even Greater Contact Reliability

The bifurcated auxiliary moving contact has improved contact reliability.



## One-Touch Surge Absorber

If the magnetic relay coil is opened and closed near an electronic circuit, malfunctioning of the electronic circuit could be induced by a surge voltage. The UN-SA type surge absorber suppresses the surge voltage when the coil is opened and closed. In addition to the general varistor type and the CR type that lays importance on suppressing the induction voltage when starting, the type with operating indicator (varistor type), and the varistor type with CR are available.

## Auxiliary Contact Unit with Low Level Contact

This auxiliary contact unit with low level contact is capable of opening and closing low voltage and minute current of an electronic control circuit. It can be installed with one touch onto the magnetic contactor or magnetic relay that opens and closes the power of the motor, etc. A junction relay for opening and closing the low voltage and minute current is not needed, so this unit is suitable for opening and closing electronic input circuits in programmable logic controllers, etc. A compact microswitch is used for the low level contact, so the unit will not malfunction due to surge voltages from the main circuit current and coil of the magnetic contactor. A 1a1b low level contact and 1a1b standard contact are built-in, so the opening and closing of 200VAC and 24VDC can be handled with one unit.

## Interface Unit

**2 Types of Inputs:** The long life no-contact output type (UN-SY21, SY31) and contact output type (UN-SY22, SY32) are available.

**One Touch Installation:** The UN-SY21, SY22, SY31 and SY32 can be mounted with one touch on to the coil terminal making post-installation work easy.

**Single Stand-Alone Unit:** A single unit installation type (UN-SY11, SY12) is available for the S-N80 to N400 magnetic contactor.



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Note: This mark indicates CE Directive Compliance. Products with the CE mark can be used for European destinations.



## Recent Slice of Mitsubishi Electric Contactors History

Beginning of Manufacture of Legacy Product					Current Product
1968	1976		1982	1996	1999
<b>Non-Reversing Open Type Contactors</b>					
S-8	S-A10(RM)	S-C10(RM)	S-K10	S-N10	S-N10
S-10	S-A11(RM)	S-C11(RM)	S-K11	S-N11	S-N11
S-11	S-A12(RM)	S-C12(RM)	S-K12	S-N12	S-N12
X	S-A16RM	X	S-K18	S-N18	S-N18
S-20	S-A20	S-C20	S-K20	S-N20	S-N20
S-18	S-A21	S-C21	S-K21	S-N21	S-N21
X	S-A25	X	S-K25	S-N25	S-N25
S-25	S-A35	S-C35	S-K35	S-N35	S-N35
S-35	S-A50	S-C50	S-K50	S-K50	S-N50
S-50	S-A60	S-C60	S-K65	S-K65	S-N65
S-65	S-A80	S-C80	S-K80	S-K80	S-N80
S-80	S-A100	S-C100	S-K95	S-K95	S-N95
S-100	S-A120	S-C120	S-K125	S-K125	S-N125
X	S-A150	S-C150	S-K150	S-K150	S-N150
S-150	X	X	S-K180	S-K180	S-N180
S-200	S-A220	S-C220	S-K220	S-K220	S-N220
S-300	S-A300	S-C300	S-K300	S-K300	S-N300
S-400	S-A401	S-C401	S-K400	S-K400	S-N400
S-600	S-A600	S-C600	S-K600	S-K600	S-N600
X	X	X	S-K800	S-K800	S-N800
<b>Reversing Open Type Contactors</b>					
S-2X11MI	S-AR11	S-CR11	S-KR11	S-2XN11	S-2XN11
S-2X20	S-2XA20	S-2XC20	S-2XK20	S-2XN20	S-2XN20
S-2X18	S-2XA21	S-2XC21	S-2XK21	S-2XN21	S-2XN21
X	S-2XA25	S-2XC25	S-2XK25	S-2XN25	S-2XN25
S-2X25	S-2XA35	S-2XC35	S-2XK35	S-2XN35	S-2XN35
S-2X35	S-2XA50	S-2XC50	S-2XK50	S-2XK50	S-2XN50
S-2X50	S-2XA60	S-2XC60	S-2XK65	S-2XK65	S-2XN65
S-2X65	S-2XA80	S-2XC80	S-2XK80	S-2XK80	S-2XN80
S-2X80	S-2XA100	S-2XC100	S-2XK95	S-2XK95	S-2XN95
S-2X100	S-2XA120	S-2XC120	S-2XK125*	S-2XK125*	S-2XN125*
X	S-2XA150	S-2XC150	S-2XK150*	S-2XK150*	S-2XN150*
S-2X150	X	X	S-2XK180*	S-2XK180*	S-2XN180*
S-2X200	S-2XA220	S-2XC220	S-2XK220*	S-2XK220*	S-2XN220*
S-2X300	S-2XA300	S-2XC300	S-2XK300*	S-2XK300*	S-2XN300*
S-2X400	S-2XA401	S-2XC401	S-2XK400*	S-2XK400*	S-2XN400*
S-2X600	S-2XA600	S-2XC600	S-2XK600*	S-2XK600*	S-2XN600*

\* These reversing contactors are made up of: 2 contactors, 1 base plate (if required), 1 connecting bar kit and 1 interlock.  
Please Note – This is just for reference. Above does not imply direct exchangeability. Always check dimensions to ensure fit.  
Type M, MS, & MSO- are contactors with overload relays installed.

## Motor Control Legacy Product Compatibility Chart

Description	Dates	Availability
<b>S- or S-2X Series</b>	(1968 ~ 1976)	No parts are available
<b>S-A or S-2XA Series</b>	(1976 ~ 1982)	No parts are available
<b>S-C or S-2XC Series</b>	(1976 ~ 1982)	No parts are available
<b>S-K, S-KR or S-2XK Series</b>	(1982 ~ 1996)	Limited parts are available
<b>S-N or S-2XN Series</b>	(1996 ~ Present)	

S-K Series Interchangeable parts are listed on next page.

## Recent Slice of Mitsubishi Electric Contactor Relays History

Beginning of Manufacture of Legacy Product			Current Product
1968	1976	1982	1999
<b>Contactor Relays</b>			
SR-4	SR-40(RM)	SR-K4**	SR-N4**
SR-8	SR-80(RM)	SR-K8**	SR-N4** w/UN-AX4**
SR-33	SR-63(RM)	SR-K63**	SR-N4** w/UN-AX4**
SR-633F	SR-60(RM)	SR-K63**	SR-N4** w/UN-AX4**
SR-5	SR-50(RM)	SR-K5**	SR-N4** w/UN-AX4**
SR-10	SR-100	SR-K10**	Consult Factory

\*\* Add additional numbers at end to complete part number.

Please Note: This is just for reference. Above does not imply direct exchangeability. Always check dimensions to ensure fit.

### S-K Series Contactors That Accept S-N Series Parts

Description	Use Interchange Part
<b>S-K10 Contactors</b>	TH-N12 Overload Relay
<b>S-K11 Contactors</b>	TH-N12 Overload Relay
<b>S-K12 Contactors</b>	TH-N12 Overload Relay
<b>S-KR11 Contactors</b>	TH-N12 Overload Relay
<b>S-K25 &amp; S-2XK25 Contactors</b>	TH-N20 Overload Relay*
<b>S-K35 &amp; S-2XK35 Contactors</b>	TH-N20 Overload Relay*
<b>S-K50 &amp; S-2XK50 Contactors</b>	AUXKITBH539N315 Auxiliary Contact Kit TH-N60 Overload Relay
<b>S-K65 &amp; S-2XK65 Contactors</b>	AUXKITBH539N315 Auxiliary Contact Kit TH-N60 Overload Relay
<b>S-K80 &amp; S-2XK80 Contactors</b>	AUXKITBH539N315 Auxiliary Contact Kit S-N80-COILAC...V Coils TH-N60 Overload Relay UN-AX80 Auxiliary Contact Blocks UN-ML80 Mechanical Interlocks UN-SD80 Reversing Connecting Bar Kits
<b>S-K95 &amp; S-2XK95 Contactors</b>	AUXKITBH539N315 Auxiliary Contact Kit S-N80-COILAC...V Coils TH-N60 Overload Relay UN-AX80 Auxiliary Contact Blocks UN-ML80 Mechanical Interlocks UN-SD80 Reversing Connecting Bar Kits
<b>S-K100 Contactors</b>	S-N125-COILAC...V Coils UN-AX80 Auxiliary Contact Blocks UN-ML80 Mechanical Interlocks
<b>S-K125 &amp; S-2XK125 Contactors</b>	AUXKITBH579N312 Auxiliary Contact Kit S-N125-COILAC...V Coils TH-N120 Overload Relay UN-AX80 Auxiliary Contact Blocks UN-ML80 Mechanical Interlocks UN-SD125 Reversing Connecting Bar Kits
<b>S-K150 &amp; S-2XK150 Contactors</b>	UN-AX150 Auxiliary Contact Kit S-N125-COILAC...V Coils TH-N120 Overload Relay UN-AX150 Auxiliary Contact Blocks UN-ML150 Mechanical Interlocks UN-SD150 Reversing Connecting Bar Kits
<b>S-K180 &amp; S-2XK180 Contactors</b>	UN-AX150 Auxiliary Contact Kit S-N220-COILAC...V Coils TH-N220 Overload Relay UN-AX150 Auxiliary Contact Blocks UN-ML220 Mechanical Interlocks UN-SD220 Reversing Connecting Bar Kits
<b>S-K220 &amp; S-2XK220 Contactors</b>	UN-AX150 Auxiliary Contact Kit S-N220-COILAC...V Coils TH-N220 Overload Relay UN-AX150 Auxiliary Contact Blocks UN-ML220 Mechanical Interlocks UN-SD220 Reversing Connecting Bar Kits
<b>S-K300 &amp; S-2XK300 Contactors</b>	UN-AX150 Auxiliary Contact Kit S-N300-COILAC...V Coils TH-N400 Overload Relay UN-AX150 Auxiliary Contact Blocks UN-ML220 Mechanical Interlocks UN-SD300 Reversing Connecting Bar Kits MAINKITBH609N300 Main Contact Kit

\* Must keep connecting kit that is already connecting TH-K20 to S-K contactor for connecting TH-N20 to S-K contactor.

### S-K Series Contactors That Accept S-N Series Parts (continued)

Description	Use Interchange Part
<b>S-K400 &amp; S-2XK400 Contactors</b>	UN-AX150 Auxiliary Contact Kit S-N300-COILAC...V Coils TH-N400 Overload Relay UN-AX150 Auxiliary Contact Blocks UN-ML220 Mechanical Interlocks UN-SD300 Reversing Connecting Bar Kits MAINKITBH609N301 Main Contact Kit
<b>S-K600 &amp; S-2XK600 Contactors</b>	UN-AX600 Auxiliary Contact Kit S-N600-COILAC...V Coils TH-N600 Overload Relay UN-AX600 Auxiliary Contact Blocks UN-SD600 Reversing Connecting Bar Kits MAINKITBH619N300 Main Contact Kit
<b>S-K800 Contactors</b>	UN-AX600 Auxiliary Contact Kit S-N600-COILAC...V Coils TH-N600 Overload Relay UN-AX600 Auxiliary Contact Blocks UN-SD600 Reversing Connecting Bar Kits MAINKITBH619N301 Main Contact Kit









# General Purpose Contactors & Starters

## Series S-N Conformity to International Standards

Mitsubishi Electric magnetic motor starters and contactors are designed to conform to the relevant IEC recommendations and to the standards of as many countries as possible. Specifically, they conform to the following:

VDE0660 Germany  
IEC60947-4-1 International

NEMA-ICS U.S.A.  
EN60947-4-1 Europe

Type	Model Name	Europe		North America / UL				Marine			
		CE Mark 	TÜV 	Listing 		Recognition 		U.K. Lloyd's Register of Shipping	France Bureau Veritas	Korea Korean Register of Shipping	Japan Nippon Kaiji Kyokai
				U.S.A. 	Canada 	U.S.A. 	Canada 				
AC Operated Contactor	S-N10(CX)	■	■	■	■	■	■	●	●	●	■
	S-N11(CX)/N12(CX)										
	S-N18(CX)										
	S-N20(CX)/N21(CX)										
	S-N25(CX)										
	S-N35(CX)										
	S-N38(CX)										
	S-N48(CX)										
	S-N50										
	S-N65										
	S-N80										
	S-N95										
	S-N125										
	S-N150										
	S-N180										
	S-N220										
	S-N300										
S-N400											
S-N600											
S-N800											
Overload Relay	TH-N12(CX)KPUL	■	●	■	■	■	■	●	●	—	—
	TH-N18(CX)KPUL										
	TH-N20(CX)(TA)KPUL										
	TH-N60(TA)KP										
	TH-N120(TA)KPUL										
	TH-N220RHKP/HZKPUL										
	TH-N400RHKP/HZKPUL										
DC Operated Contactor	SD-N11(CX)/N12(CX)	■	■	■	■	■	■	●	●	—	■
	SD-N21(CX)										
	SD-N35(CX)										
	SD-N50										
	SD-N65										
	SD-N80										
	SD-N95										
	SD-N125										
	SD-N150										
	SD-N220										
	SD-N300										
	SD-N400										
	SD-N600										
SD-N800											
AC Operated Contactor Relay	SR-N4(CX)	■	▲	■	■	■	■	●	●	—	—
DC Operated Contactor Relay	SRD-N4(CX)	■	▲	■	■	■	■	●	●	—	—
Auxiliary Contact Block	UN-AX2□ □ (CX)	■	●	■	■	■	■	●	●	—	—
	UN-AX4□ □ (CX)										
	UN-AX11(CX)										
	UN-AX80										
	UN-AX150										

**Notes:**

- CE Mark (Manufacturer's Declaration) == Standard model applicable, marking on the product.
  - UL, TÜV == Standard model applicable, marking on the product.
  - NK == Standard model applicable, Certificate No. on the product.
  - ▲ Standard model applicable, no marking on the product. If marking required, order model name followed by suffix "DZ".
  - Standard model applicable, no marking on the product.
  - ★ Special model applicable, marking on the product. Order model name followed by suffix "UL".
  - ☆ Special model applicable, marking on the product. Order model name followed by suffix "UR".
  - Not applicable to the Standard or not approved.

## CE Marked Type

Standard Contactors Non-Reversing	AC Operated	S-N10, S-N11, S-N12, S-N18, S-N20, S-N21, S-N25, S-N35, S-N38, S-N48, S-N50, S-N65, S-N80, S-N95, S-N125, S-N150, S-N180, S-N220, S-N300, S-N400, S-N600, S-N800
	DC Operated	SD-N11, SD-N12, SD-N21, SD-N35, SD-N50, SD-N65, SD-N80, SD-N95, SD-N125, SD-N150, SD-N220, SD-N300, SD-N400, SD-N600, SD-N800
Standard Contactors Reversing	AC Operated	S-2XN10, S-2XN11, S-2XN20, S-2XN21, S-2XN25, S-2XN35, S-2XN50, S-2XN65, S-2XN80, S-2XN95, S-2XN125, S-2XN150, S-2XN180, S-2XN220, S-2XN300, S-2XN400, S-2XN600, S-2XN800 (*2)
	DC Operated	SD-2XN11, SD-2XN21, SD-2XN35, SD-2XN50, SD-2XN65, SD-2XN80, SD-2XN95, SD-2XN125, SD-2XN150, SD-2XN220, SD-2XN300, SD-2XN400, SD-2XN600, SD-2XN800 (*2)
Additional Auxiliary Contact Blocks		UN-AX2, UN-AX4, UN-AX11, UN-AX80, UN-AX150
Mechanical Interlocks (*1)		UN-ML11, UN-ML21, UN-ML80, UN-ML150, UN-ML220
Thermal Overload Relays		TH-N12KP, TH-N20KP, TH-N20TAKP, TH-N60KP, TH-N60TAKP, TH-N120KP, TH-N120TAKP, TH-N220RHKP, TH-N220HZKP, TH-N400RHKP, TH-N400HZKP, TH-N600KP
Contactor Relays	AC Operated	SR-N4
	DC Operated	SRD-N4
DC Interface Contactors	Non-Reversing	SD-Q11, SD-Q12, SD-Q19
	Reversing	SD-QR11, SD-QR12, SD-QR19

### Notes:

Listed types are representatives and contain standard models.

Applicable product standards: Contactors: EN60947-1, EN60947-4-1, EN60947-5-1; Thermal overload relays: EN60947-1, EN60947-4-1, EN60947-5-1;

Aux. contact blocks: EN60947-1, EN60947-5-1; Mechanical interlocks: EN60947-1, EN60947-4-1, EN60947-5-1

- For mechanical interlocks, no marking on the product. Mechanical interlocks are applicable when used in reversing contactors.
- S-2XN125 - S-2XN800 and SD-2XN125 - 2XN800 are available as components only.

## UL Approval for U.S.A. and Canada

### Contactor and Motor Starter

Contactor Open	Mark		cUL						cRU											
	Model Name		S-N10 (CX)	S(D)-N11(CX) S(D)-N12(CX)	S-N18 (CX)	S-N20 (CX) S(D)-N21 (CX)	S-N25 (CX)	S(D)-N35 (CX)	S(D)-N50	S(D)-N65	S(D)-N80	S(D)-N95*	S(D)-N125*	S(D)-N150*	S-N180*	S(D)-N220*	S(D)-N300*	S(D)-N400*	S-N600*	S-N800**
	Continuous Current (A) Open		13	20	30	30	35	40	80	95	100	100	125	150	220	220	300	400	680	910
HP Rating	Single Phase	120V HP	1/2	1/2	1	1	2	2	3	3	5	7-1/2	10	15	15	15	—	—	—	—
		240V HP	1-1/2	1-1/2	3	3	3	5	7-1/2	10	15	15	20	25	30	40	—	—	—	—
	Three Phase	208V HP	3	3	5	5	7-1/2	10	15	15	20	25	40	40	60	60	100	125	150	250
		240V HP	3	3	5	5	7-1/2	10	15	20	25	30	40	50	60	75	100	150	200	300
		480V HP	5	7-1/2	10	10	15	20	30	40	50	60	75	100	125	150	200	300	400	600
		600V HP	5	7-1/2	10	10	15	20	30	40	50	60	75	100	125	150	200	300	400	600

### Notes:

\*UL listed types for S-N95 to S-N800, SD-N95 to SD-N400 require suffix letters "UL" (eg. S-N95UL) and will have ILSCO lugs installed on line and load side terminals.

\*\*UL recognized type is model S-N800UR

S-N10(CX) to S-N35(CX) and SD-N11(CX) to SD-N35(CX); Mark on the product is UL / cUL.

## Thermal Overload Relay

Model Name	Heater Designation (Rated Current [A])	Contactor to be Coupled	Auxiliary Contact
TH-N12(CX)KPUL	0.12A (0.1-0.16), 0.17A (0.14-0.22), 0.24A (0.2-0.32), 0.35A (0.28-0.42), 0.5A (0.4-0.6), 0.7A (0.55-0.85), 0.9A (0.7-1.1), 1.3A (1-1.6), 1.7A (1.4-2), 2.1A (1.7-2.5), 2.5A (2-3), 3.6A (2.8-4.4), 5.0A (4-6), 6.6A (5.2-8), 9.0A (7-11), 11A (9-13)	S-N10 S-N11 S-N12	Rated Code C600 AC600V max Make: 1800VA (15A max)
TH-N18(CX)KPUL	1.3A (1-1.6), 1.7A (1.4-2), 2.1A (1.7-2.5), 2.5A (2-3), 3.6A (2.8-4.4), 5.0A (4-6), 6.6A (5.2-8), 9.0A (7-11), 11A (9-13), 15A (12-18)	S-N18	Break: 180VA (1.5A max)
TH-N20(CX)KPUL	0.24A (0.2-0.32), 0.35A (0.28-0.42), 0.5A (0.4-0.6), 0.7A (0.55-0.85), 0.9A (0.7-1.1), 1.3A (1-1.6), 1.7A (1.4-2), 2.1A (1.7-2.5), 2.5A (2-3), 3.6A (2.8-4.4), 5.0A (4-6), 6.6A (5.2-8), 9.0A (7-11), 11A (9-13), 15A (12-18)	S-N20, S-N21 S-N25, S-N35	
TH-N20CXTAKPUL	22A (18-26) 29A (24-34)	S-N25, N35 S-N35	
TH-N60KP	15A (12-18), 22A (18-26), 29A (24-34), 35A (30-40), 42A (34-50) 54A (43-65)	S-N50, N65, N80, N95 S-N65, N80, N95	Rated Code B600 AC600V max. Make: 3600VA (30A max.) Break: 360VA (3A max.)
TH-N60TAKP	67A (54-80) 82A (65-100)	S-N80, N95 S-N95	
TH-N120KPUL	42A (34-50), 54A (43-65), 67A (54-80), 82A (65-100)	S-N125, N150	
TH-N120TAKPUL	105A (85-125) 125A (100-150)	S-N125, N150 S-N150	
TH-N220RHKPUL TH-N220HZKPUL	82A (65-100), 105A (85-125), 125A (100-150), 150A (120-180) 180A (140-220)	S-N180, N220 S-N220	
TH-N400RHKPUL TH-N400HZKPUL	105A (85-125), 125A (100-150), 150A (120-180), 180A (140-220), 250A (200-300) 330A (260-400)	S-N300, N400 S-N400	

## Contactor Relay and Auxiliary Contact Block

Type Model Name	Ratings	
Contactor Relay (UL, cUL) SR(D)-N4		
Auxiliary Contact Block (UL, cUL) UN-AX2 □ □ (CX) UN-AX4 □ □ (CX) UN-AX11 (CX)	Rated Code: A600 AC600V max Make: 7200VA Break: 720VA	Rated Code: R300 DC250V max Make: 28VA Break: 28VA
UN-AX80 (RU) UN-AX150 (RU)		



## S-N Selection Guide

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-2XN35(CX)
DC Operated Models		—	SD-N11(CX)	SD-N12(CX)	—	—	SD-N21(CX)	—	SD-N35(CX)
Three-Phase Motor Ratings IEC Category AC3 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)
	660V	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)
Rated Continuous 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

AC Operated Models	Non-Reversing	S-N50	S-N65	S-N80	S-N95	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
	Reversing (*3)	S-2XN50	S-2XN65	S-2XN80	S-2XN95	S-2XN125	S-2XN150	S-2XN180	S-2XN220	S-2XN300	S-2XN400	S-2XN600	S-2XN800
DC Operated Models		SD-N50	SD-N65	SD-N80	SD-N95	SD-N125	SD-N150	—	SD-N220	SD-N300	SD-N400	SD-N600	SD-N800
Three-Phase Motor Ratings IEC Category AC3 kW (hp)	220-240V	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)
	380-440V	22 (30)	30 (40)	45 (60)	55 (75)	60 (80)	75 (100)	90 (125)	132 (180)	160 (210)	220 (300)	330 (450)	440 (600)
	500V	25 (30)	37 (40)	45 (60)	55 (75)	60 (80)	90 (125)	110 (150)	132 (180)	160 (210)	225 (330)	330 (450)	500 (670)
	660V	22 (30)	30 (40)	45 (60)	55 (75)	60 (80)	90 (125)	110 (150)	132 (180)	200 (270)	250 (330)	330 (450)	500 (670)
Rated Continuous Current Ith A		80	100	135	150	150	200	260	260	350	450	800	1000
Auxiliary Contacts (*1)	Standard	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC
Number of Additional Auxiliary Contact Block for (*2)	1NO + 1NC (Side)	—	—	2	2	2	2	2	2	2	2	—	—
	2NO + 2NC (Front)	1	1	—	—	—	—	—	—	—	—	1	1

Notes:

- Number of auxiliary contact shown is for non-reversing type. Twice the auxiliary contacts are provided on reversing type.
- Front clip-on and side clip-on block should not be used on the same unit.
- S-2XN125 - S-2XN800 available as components only.

## Type Designation Breakdown

### Non-Reversing Types

Frame Size	N10	N11	N12	N18	N20	N21	N25	N35	N50	N65	N80	N95	N125	N150	N180	N220	N300	N400	N600	N800	
Access-Orles	Surge Absorber	Attachable								Provided as standard											
	Mechanical Interlock Unit	Attachable	—	Attachable																	—
Din Rail Mounting	Standard											—	—	—	—	—	—	—	—	—	—

### Reversing Types

Frame Size (*1)	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													
Access-Orles	Surge Absorber							Attachable													Provided as standard											
DIN Rail Mounting	Available (*2)																	—	—	—	—	—	—	—	—	—	—					

Notes:

- S-2XN125 - S-2XN800 are available as components only.
- Remove mounting plate for mounting on 35mm rail of sizes 2XN25 to 2XN65.

## S-N Contactors

Model	Three Heater Type with Phase Failure Protection	TH-N12(CX)KPUL			TH-N18 (CX)KPUL	TH-N20(CX)KPUL		TH-N20(CX)KPUL TH-N20CXTAKPUL	
		S-N10(CX)	S-N11(CX)	S-N12(CX)	S-N18(CX)	S-N20(CX)	S-N21(CX)	S-N25(CX)	S-N35(CX)
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-2XN35(CX)
DC Operated Models		—	SD-N11(CX)	SD-N12(CX)	—	—	SD-N21(CX)	—	SD-N35(CX)

Model	Three Heater Type with Phase Failure Protection	TH-N60KP		TH-N60KP TH-N60TAKP		TH-N120KPUL TH-N120TAKPUL		TH-N220RHKPUL		TH-N400RHKP		TH-N600KP (*2)	
		S-N50	S-N65	S-N80	S-N95	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
AC Operated Models	Non-Reversing	S-N50	S-N65	S-N80	S-N95	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
	Reversing (*1)	S-2XN50	S-2XN65	S-2XN80	S-2XN95	S-2XN125	S-2XN150	S-2XN180	S-2XN220	S-2XN300	S-2XN400	S-2XN600	S-2XN800
DC Operated Models		SD-N50	SD-N65	SD-N80	SD-N95	SD-N125	SD-N150	—	SD-N220	SD-N300	SD-N400	SD-N600	SD-N800

**Notes:**

- S-2XN125 – S-2XN800 available as components only.
- TH-N600(KP) must be used with a current transformer (to be supplied by the customer.) See Current Transformers for TH-N600KP on page 21.

## TH-N Thermal Overload Relay

Three Heater Type with Phase Failure Protection	TH-N12(CX)KPUL		TH-N18(CX)KPUL	TH-N20(CX)KPUL		TH-N20CXTAKPUL
Heater Setting Range A (Ordering Designation)	0.1~0.16 (0.12A)		1~1.6 (1.3A)	0.2~0.32 (0.24A)		18~26 (22A) 24~34 (29A)
	0.14~0.22 (0.17A)	1.7~2.5 (2.1A)	1.4~2 (1.7A)	0.28~0.42 (0.35A)	2~3 (2.5A)	
	0.2~0.32 (0.24A)	2~3 (2.5A)	1.7~2.5 (2.1A)	0.4~0.6 (0.5A)	2.8~4.4 (3.6A)	
	0.28~0.42 (0.35A)	2.8~4.4 (3.6A)	2~3 (2.5A)	0.55~0.85 (0.7A)	4~6 (5A)	
	0.4~0.6 (0.5A)	4~6 (5A)	2.8~4.4 (3.6A)	0.7~1.1 (0.9A)	5.2~8 (6.6A)	
	0.55~0.85 (0.7A)	5.2~8 (6.6A)	4~6 (5A)	1~1.6 (1.3A)	7~11 (9A)	
	0.7~1.1 (0.9A)	7~11 (9A)	5.2~8 (6.6A)	1.4~2 (1.7A)	9~13 (11A)	
	1~1.6 (1.3A)	9~13 (11A) (*1)	7~11 (9A)	1.7~2.5 (2.1A)	12~18 (15A)	
	1.4~2 (1.7A)		9~13 (11A)			
			12~18 (15A)			

Three Heater Type With Phase Failure Protection	TH-N60KP	TH-N60TAKP	TH-N120KPUL	TH-N120TAKPUL	TH-N220RHKPUL	TH-N400RHKP	TH-N600KP (*5)
Heater Setting Range A (Ordering Designation)	12~18 (15A)		34~50 (42A)		65~100 (82A)	85~125 (105A)	200~300 (250A)
	18~26 (22A)		43~65 (54A)		85~125 (105A)	100~150 (125A)	260~400 (330A)
	24~34 (29A)	54~80 (67A)	54~80 (67A)	100~150 (125A) (*2)	100~150 (125A)	120~180 (150A)	400~600 (500A)
	30~40 (35A)	65~100 (82A)	65~100 (82A)		120~180 (150A)	140~220 (180A)	520~800 (660A) (*6)
	34~50 (42A)				140~220 (180A) (*3)	200~300 (250A)	
	43~65 (54A)				260~400 (330A) (*4)	260~400 (330A) (*4)	

**Notes:**

- Except for size N10.
- For size N150 only.
- For size N220 only.
- For size N400 only.
- TH-N600(KP) must be used with a current transformer (to be supplied by the customer.) See Current Transformers for TH-N600KP on page 21.
- For size N800 only.

# S-N Contactor Technical Data

## Ratings and Characteristics

Contactor	Type	S-	S/SD-	S-		S/SD-	S-	S/SD-			
		N10	N11, N12	N18	N20	N21	N25	N35	N50	N65	
Rated Insulation Voltage	V	690	690	690	690	690	690	690	690	690	
Rated Continuous 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 Electrical Life is ca. 200,000 Operations	220-240V	kW	0.75	1.1	1.5	2.2	2.2	3	3.7	5.5	7.5
	380-440V	kW	1.1	1.5	2.2	3.7	3.7	5.5	5.5	7.5	11
	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-1 100 Operations/Hour Max. 500,000 Operations	48V	A	10	12	12	20	20	25	35	50	65
	110V	A	8	12	12	20	20	25	35	50	65
	220V	A	8	12	12	20	20	22	30	40	50
Rated Current for DC Motors Category DC-3 & DC-5 100 Operations/Hour Max. 500,000 Operations	48V	A	6	10	10	20	20	25	30	35	40
	110V	A	4	8	8	15	15	20	20	30	35
	220V	A	2	4	4	8	8	10	10	12	15
Rated Capacity for 3-ph, Capacitors (*1) 15 Operations/Hour Max. 100,000 Operations (Ambient Temperature 40°C)	220-240V	kvar	2.2	3	4	5.5	5.5	8.5	12	20	20
	380-440V	kvar	3.3	4	6	10	10	14	20	40	40
	550V	kvar	4	5	6	10	10	14	20	30	35
	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, $\cos\phi=0.35$ 240V/440V	Making Current	A	110/110	130/120	180/180	220/220	220/220	300/300	400/400	550/460	650/620
	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	1800	1800	1800	1800	1800	1800	1800	1200	1200
	Category AC-2 & AC-3	operations/hour	1800	1800	1800	1800	1800	1800	1800	1200	1200
	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	10	5	5
Permissible Ambient Temperature	°C	-25 to +55									
Vibration (10-55 Hertz)	G	2									
Shock (10 ms Half Sine Wave)	G	5									
Conductor Size	mm <sup>2</sup>	1-2.5	1-2.5	1-6	1-6	1-6	1-6	2-16	2-16	2-25	2-25
Main Terminal (Contactor)	mm <sup>2</sup>	1-2.5	1-2.5	1-6	1-6	1-6	1-6	2-16	2-16	2-25	2-25
Main Terminal (Overload Relay)	mm <sup>2</sup>	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	1-2.5
Control Terminal	mm <sup>2</sup>	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	1-2.5
Busbar Width	mm	—	—	—	—	—	—	—	—	—	—

**Note:**

1. 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-N Contactor Technical Data (continued)

## Ratings and Characteristics

Contactor		Type	S/SD-				S-	S/SD-				
			N80	N95	N125	N150	N180	N220	N300	N400	N600	N800
Rated Insulation Voltage		V	690	690	690	690	1000	1000	1000	1000	1000	1000
Rated Continuous Current	lth	A	135	150	150	200	260	260	350	450	800 (*1)	1000 (*2)
	220-240V	kW(A)	50 (135)	55 (150)	55 (150)	75 (200)	95 (260)	95 (260)	130 (350)	170 (450)	250 (660)	300 (800)
Rated Capacity for Resistive Loads 3-ph, Category AC-1	380-440V	kW(A)	85 (135)	90 (150)	90 (150)	130 (200)	170 (260)	170 (260)	230 (350)	290 (450)	430 (660)	530 (800)
	500V	kW(A)	110 (135)	120 (150)	120 (150)	170 (200)	220 (260)	220 (260)	300 (350)	380 (450)	570 (660)	700 (800)
	690V	kW(A)	135 (135)	150 (150)	150 (150)	200 (200)	260 (260)	260 (260)	350 (350)	450 (450)	660 (660)	900 (800)
	220-240V	A	85	105	125	150	180	250	300	400	630	800
Rated Operational Current 3-ph, Category AC-3	380-440V	A	85	105	120	150	180	250	300	400	630	800
	500V	A	75	85	90	140	180	200	250	350	500	720
	690V	A	52	65	70	100	120	150	220	300	420	630
	220-240V	kW	7.5	11	15	18.5	22	22	37	45	65	75
Rated Capacity for Jogging of AC Motors 3-ph, Category AC-4 Electrical Life is ca. 200,000 Operations	380-440V	kW	15	18.5	22	30	37	45	60	75	110	130
	500V	kW	15	18.5	22	37	45	55	60	90	130	150
	690V	kW	15	18.5	22	30	50	55	75	90	130	150
	220-240V	A	62	75	90	110	150	180	220	300	400	630
Max. Current for AC-4 Duty at 440V		A	62	75	90	110	150	180	220	300	400	630
Rated Current for DC Non-Inductive Loads Category DC-1 100 Operations/Hour Max. 500,000 Operations	48V	A	80	93	120	150	180	220	300	400	630	800
	110V	A	80	93	100	150	180	220	300	400	630	800
	220V	A	60	70	80	150	180	220	300	300	630	800
Rated Current for DC Motors Category DC-3 & DC-5 100 Operations/ Hour Max. 500,000 Operations	48V	A	60	90	90	130	180	220	280	280	630	630
	110V	A	50	80	80	120	150	150	200	200	630	630
	220V	A	20	50	50	80	100	100	150	150	630	630
Rated Capacity for 3-ph, Capacitors (*4) 15 Operations/Hour Max. 100,000 Operations (Ambient Temp. 40°C)	220-240V	kvar	35	35	38	50	60	60	95	115	190	190
	380-440V	kvar	60	60	65	80	120	120	150	200	350	350
	550V	kvar	48	60	65	80	150	150	200	250	350	350
	690V	kvar	50	60	65	80	150	150	200	200	400	400
Rated Insulation Voltage		V	690	690	690	690	1000	1000	1000	1000	1000	1000
Making & Breaking 3-ph, cosφ=0.35 240V/440V	Making Current	A	850/850	1050/1050	1250/1250	1500/1500	1800/1800	2500/2500	3000/3000	4000/4000	6500/6500	8000/8000
	Breaking Current	A	800/750	930/930	1000/1000	1200/1200	1450/1450	2000/2000	2400/2400	3200/3200	5040/5040	6400/6400
Switching Frequency (Operations/Hour)	Category AC-1		1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
	Category AC-2 & AC-3		1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
	Category AC-4		600	300	300	300	300	300	300	300	300	300
Operating Time (At Rated Coil Voltage) AC Operated	Closing	ms	27	27	25	27	30	30	35	35	65	65
	Opening	ms	75	75	85	85	100	100	120	120	75	75
DC Operated	Closing	ms	75	75	125	135	—	145	175	175	105	105
	Opening	ms	18	18	22	37	—	40	55	55	80	80
Coil Consumption (At Rated Coil Voltage) AC Operated	Inrush	VA	225	225	320	320	480	480	480	480	800	800
	Sealed	VA	22	22	26	26	44	44	54	54	100	100
DC Operated	Watts	W	3.3	3.3	3.5	3.5	5	5	7.3	7.3	15	15
	Inrush	VA	27	27	31	31	—	41	55	55	600	600
DC Operated	Sealed	VA	27	27	31	31	—	41	55	55	75	75
	Coil Voltage Tolerance	0.85 to 1.1 times rated coil voltage										
Mechanical Endurance (Make/Break Operations)	Million	5	5	5	5	5	5	5	5	5	5	5
Permissible Ambient Temperature	°C	-25 to +55										
Vibration (10-55 Hertz)	G	19.6										
Shock (10 ms Half Sine Wave)	G	49										
Conductor Size	mm <sup>2</sup>	2-50	2-50	—	—	—	—	—	—	—	—	—
Main Terminal (Contactor)	mm <sup>2</sup>	2-50	(2-60) (*3)	(6-70) (*3)	(6-95) (*3)	(10-120) (*3)	(10-150) (*3)	(10-150) (*3)	(25-240) (*3)	(25-240) (*3)	(70-325) (*3)	(70-325) (*3)
Main Terminal (Overload Relay)	mm <sup>2</sup>	2-50	(6-70) (*3)	(6-95) (*3)	(6-95) (*3)	(10-120) (*3)	(10-150) (*3)	(25-240) (*3)	(25-240) (*3)	—	—	—
Control Terminal	mm <sup>2</sup>	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	1-4	1-4
Busbar Width	mm	15	15	15	20	25	25	30	30	35	35	35

**Notes:**

- 660A at ambient temperature 40–55 °C.
- 800A at ambient temperature 40–55 °C.
- Conductor size in parentheses indicates compression terminal style not for bare clamping.
- 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.

## Rated Operating Current of Auxiliary Contacts

Rated Continuous Current	A	16	
Rated Operating Current Category AC-15	120 VAC	A	6
	240 VAC	A	5
	500 VAC	A	3
	660 VAC	A	1.5
Rated Operating Current Category DC-13	24 VDC	A	5
	48 VDC	A	3
	110 VDC	A	0.6
		A	0.8 (*1)
		A	0.2

**Note:**

- UN-AX2(CX), UN-AX4(CX), UN-AX11(CX)

## S-N Contactor Performance

### 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 Electric contactors under normal and jogging duties of squirrel-cage motors is shown in figures at right. In the case of a mixture of normal and jogging duties, the expected contactor life can be determined as follows:

$$N = Nr/1 + a /100 (Nr/Ni - 1)$$

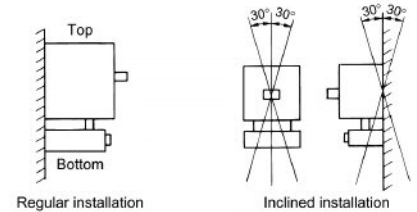
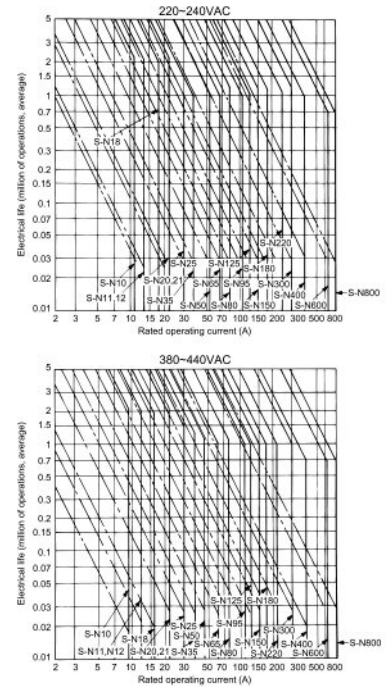
where: N : Life in the case of a% jogging duty  
 Nr : Life in the case of normal duty  
 Ni : Life in the case of 100% jogging duty  
 a : Percentage of jogging duty

### Electrical life versus rated operating current

— Normal duty, 6le on, 1e off, on-load factor 40%,  
 -- --1200 operations/hour (AC3)  
 Jogging duty, 6le on, 6le 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

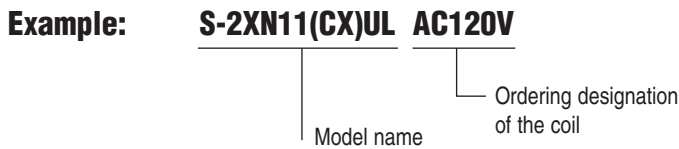
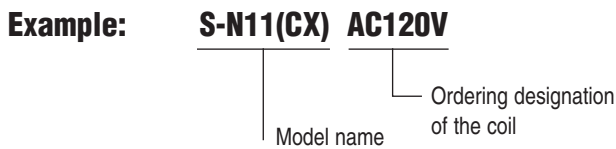
### Mounting Attitude of Starters and Contactors

To assure proper performance, Mitsubishi Electric 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.

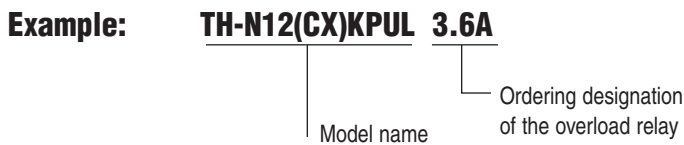


## Ordering Information

Contactors – Indicate the model name and the ordering designation of the coil:



Overload Relays – Indicate the model name and the ordering designation of the heater setting range:



### Coil Ratings and Ordering Designations for S-N10(CX)~S-N48(CX) (as well as reversing versions) and SR-N

Rated Operating Voltage (VAC)		Ordering Designation
50Hz	60Hz	
24	24	AC24V
100	100~110	AC100V
110~120	115~120	AC120V
200	200~220	AC200V
—	208~230	AC208V
220~240	230~240	AC230V
380~415	400~440	AC400V
415~440	460~480	AC440V
500	500~550	AC500V

### Coil Ratings and Ordering Designations for S-N50~S-N800 (as well as reversing versions)

Rated Operating Voltage at 50/60Hz (VAC)	Ordering Designation
100~127	AC100V
200~240	AC200V
380~440	AC400V
460~550	AC500V

### Coil Ratings and Ordering Designations For All SD-N and SRD-N

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

## Contact Selection Guide

### Non-Reversing Type S-N, SD-N

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(CX)	—	1	—	Provided	1	—	—	—	—	—						
						S-N10 (CX-01)	—	—	1	Provided												
13	12	3.5	5.5	5.5	5.5	S-N11(CX)	SD-N11(CX)	1	—	Provided							2	—	—	—	—	—
						S-N11 (CX-01)	SD-N11 (CX-01)	—	1	Provided												
13	12	3.5	5.5	5.5	5.5	S-N12(CX)	SD-N12(CX)	1	1	Provided							2	—	—	—	—	—
						S-N12 (CX-20)	SD-N12 (CX-20)	2	—	Provided												
18	16	4.5	7.5	7.5	7.5	S-N18(CX)	—	—	—	Provided							2	—	—	—	—	—
22	22	5.5	11	11	7.5	S-N20(CX)	—	1	1	Provided												
22	22	5.5	11	11	7.5	S-N20(CX-20)	—	2	—	Provided							2	—	—	—	—	—
22	22	5.5	11	11	7.5	S-N21(CX)	SD-N21(CX)	2	2	Provided												
30	30	7.5	15	15	11	S-N25(CX)	—	2	2	Provided							2	—	—	—	—	—
40	40	11	18.5	18.5	15	S-N35(CX)	SD-N35(CX)	2	2	Provided												
55	50	15	22	22	22	S-N50	SD-N50	2	2	—	2	—	—	—	—	—						
65	62	18.5	30	30	30	S-N65	SD-N65	2	2	—												
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	—	—	—	—	Max. 2	—	—						
150	150	45	75	90	90	S-N150	SD-N150	2	2	—												
180	180	55	90	110	110	S-N180	—	2	2	—	—	—	—	Max. 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	—												

## Contact Selection Guide

### Reversing Type S-2XN, SD-2XN

Rated Operational Current AC-3		Rated Motor Capacity 3-Phase AC-2 & AC-3				Model Name		Standard Aux. Contacts		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
11	9	2.5	4	4	4	S-2XN10(CX)	—	2	2	2	2	2	—	—
13	12	3.5	5.5	5.5	5.5	S-2XN11(CX)	SD-2XN11(CX)	2	2					
18	16	4.5	7.5	7.5	7.5	S-2XN18(CX)	—	4	4	—	—	—	—	—
22	22	5.5	11	11	7.5	S-2XN20(CX)	—	2	2	2	2	2	—	—
22	22	5.5	11	11	7.5	S-2XN21(CX)	SD-2XN21(CX)	4	4					
30	30	7.5	15	15	11	S-2XN25(CX)	—	4	4	2	2	2	—	—
40	40	11	18.5	18.5	15	S-2XN35(CX)	SD-2XN35(CX)	4	4					
55	50	15	22	22	22	S-2XN50	SD-2XN50	4	4	—	—	—	2	—
65	62	18.5	30	30	30	S-2XN65	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					



S-N10



S-N21



SD-N65



S-N220



SD-N400



S-N800



S-2xN11



S-2xN21

# Optional Parts and Accessories for Contactors

## S-N, SD-N Replacement Coils


AC Operated Coils		DC Operated Coils	
Contactors	Model Number	Contactors	Model Number
S-N10, S-N11, S-N12, S-N18 & SR-N	S-N11-COILAC□□□V	SD-N11, SD-N12 & SRD-N	SD-N11-COILDC□□□V
S-N20 & S-N21	S-N21-COILAC□□□V	SD-N21	SD-N21-COILDC□□□V
S-N25, S-N35, S-N38 & S-N48	S-N35-COILAC□□□V	SD-N35	SD-N35-COILDC□□□V
S-N50 & S-N65	S-N50-COILAC□□□V	SD-N50 & SD-N65	SD-N50-COILDC□□□V
S-N80 & S-N95	S-N80-COILAC□□□V	SD-N80 & SD-N95	SD-N80-COILDC□□□V
S-N125 & S-N150	S-N125-COILAC□□□V	SD-N125 & SD-N150	SD-N125-COILDC□□□V
S-N180 & S-N220	S-N220-COILAC□□□V	SD-N220	SD-N220-COILDC□□□V
S-N300 & S-N400	S-N300-COILAC□□□V	SD-N300 & SD-N400	SD-N300-COILDC□□□V
S-N600 & S-N800	S-N600-COILAC□□□V		

Note: When ordering replacement coils, please replace □□□ with appropriate voltage from coil ratings table on page 13.



## S-N, SD-N Replacement Main Contact Kits

	Contactors	Model Number
<p>Each kit consists of 3 moving and 6 stationary contacts (includes springs and spring supports on S-N125 and below)</p>  <p>MAINKITBH739N300</p>  <p>MAINKITBH769N300</p>  <p>MAINKITBH799N300</p>	S-N10, S-N11, S-N12, SD-N11 & SD-N12	MAINKITBH719N300
	S-N18	MAINKITBH729N300
	S-N20, S-N21 & SD-N21	MAINKITBH739N300
	S-N25	MAINKITBH749N300
	S-N35	MAINKITBH749N301
	SD-N35	MAINKITBH749N303
	S-N38 & S-N48	MAINKITBH749N302
	S-N50	MAINKITBH759N300
	SD-N50	MAINKITBH759N302
	S-N65	MAINKITBH759N301
	SD-N65	MAINKITBH759N303
	S-N80	MAINKITBH769N300
	SD-N80	MAINKITBH769N302
	S-N95	MAINKITBH769N301
	SD-N95	MAINKITBH769N303
	S-N125	MAINKITBH779N300
	SD-N125	MAINKITBH779N301
	S-N150 & SD-N150	MAINKITBH789N300
	S-N180	MAINKITBH799N300
	S-N220 & SD-N220	MAINKITBH799N301
S-N300 & SD-N300	MAINKITBH609N300	
S-N400 & SD-N400	MAINKITBH609N301	
S-N600 & SD-N600	MAINKITBH619N300	
S-N800 & SD-N800	MAINKITBH619N301	

## S-N, SD-N Replacement Auxiliary Contact Kits

	Description	Contactors	Arrangement	Model Number
 <p>AUXKITBH729N310</p>	Kit consists of bifurcated contacts – 1 moving and 2 stationary	S-N10, S-N11 & SD-N11	1 NO	AUXKITBH719N310
			1 NC	AUXKITBH719N311
	Kit consists of bifurcated contacts – 2 moving and 4 stationary	S-N12 & SD-N12	1 NO & 1 NC	AUXKITBH729N310
		S-N20	1 NO & 1 NC	AUXKITBH739N310
	Kit consists of bifurcated contacts – 4 moving and 8 stationary	S-N21, SD-N21, S-N25, S-N35 & SD-N35	2 NO & 2 NC	AUXKITBH739N311
		S-N50 to S-N95	2 NO & 2 NC	AUXKITBH539N315
		S-N125	2 NO & 2 NC	AUXKITBH579N312
	S-N150 to S-N800	Use Aux. Blocks from table on next page		


## S-N, SD-N Auxiliary Contact Blocks

	Mounting	Contactors/Relay	Type	Contact Arrangement	Model Number	
 	Front Clip-On (*1, *2)	S-N10(CX), N11(CX), N12(CX), N18(CX), N20(CX), N21(CX), N25(CX), N35(CX), N38(CX), N48(CX), N50, N65 SD-N11(CX), N12(CX), N21(CX), N35(CX), N50, N65 SR-N4□□, SRD-N4□□	Standard	2 NO & 0 NC	UN-AX220(CX)	
				1 NO & 1 NC	UN-AX211(CX)	
				0 NO & 2 NC	UN-AX202(CX)	
				4 NO & 0 NC	UN-AX440(CX)	
				3 NO & 1 NC	UN-AX431(CX)	
				2 NO & 2 NC	UN-AX422(CX)	
				Low Level Signal (5 VDC 5mA)	1 NO & 1 NC (low level) 1 NO & 1 NC (standard)	UN-LL22
	Side Clip-On (*1, *3)	S-N10(CX), N11(CX), N20(CX), N21(CX), N25(CX), N35(CX), N50, N65 SD-N11(CX), N21(CX), N35(CX), N50, N65 SR-N4□□, SRD-N4□□	Standard	1 NO & 1 NC	UN-AX11(CX)	
	Side Clip-On (*3)	S(D)-N80, N95, N125			1 NO & 1 NC	UN-AX80
					S(D)-N150, N180, N220, N300, N400	1 NO & 1 NC
S(D)-N600, N800					2 NO & 2 NC	UN-AX600


### Notes:

1. Front clip-on and side clip-on should not both be mounted on the same Contactor / Relay.
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.

## S-N, SD-N Mechanical Interlocks


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

## S-N, SD-N Mechanical Interlocks


	Description	Contactors	Model Number
 <b>UN-SD50</b>	<p>To connect 2 of the same contactors together to make up a reversing contactor.</p> <p>Kit consists of 3 connecting bars or wires for the load and line side (6 pieces total)</p>	S-N10(CX) or N11(CX)	UN-SD10(CX)
		S-N18(CX)	UN-SD18
		S-N20(CX) or N21(CX)	UN-SD21
		S-N25(CX) or N35(CX)	UN-SD25
		S-N50 or N65	UN-SD50
		S-N80 or N95	UN-SD80
		S-N125	UN-SD125
		S-N150	UN-SD150
		S-N180 or N220	UN-SD220
		S-N300 or N400	UN-SD300
		S-N600 or N800	UN-SD600




## S-N, SD-N Surge Absorbers

	Description	Contactor/Relay	Applicable Control Voltage	Model Number	
	Varistor Type		S-N10, -N11, -N12, -N18, -N20, -N21, -N25, -N35, -N28, -N38, -N48, SD-N11, -N12, -N21, -N35, SR(D) -N4	AC24-240V/DC24-250V	UN-SA21AC200V
				AC200-480V	UN-SA21AC400V
	Varistor Type with Operating Indicator (LED)		S-N10, -N11, -N12, -N18, -N20, -N21, -N25, -N35, -N28, -N38, -N48 SD-N11, -N12, -N21, -N35, SR(D) -N4	AC50-240V DC60-250V	UN-SA22AC200V
	Varistor and CR Type		S-N10, -N11, -N18, -N20, -N21, -N25, -N35, -N28, -N38, -N48, SD-N11, -N12, -N21, -N35 SR(D) -N4	AC24-127V DC24-125V	UN-SA25AC100V
				AC100-240V DC100-250V	UN-SA25AC200V
CR Type		S-N10, -N11, -N12, -N18, -N20, -N21, -N25, -N35, -N28, -N38, -N48, SR-N4 SD-N11, -N12, -N21, -N35, SRD-N4	AC24-240V	UN-SA23AC200V	
			DC24-250V	UN-SA13DC200V	

## S-N Pneumatic Time Delay Modules (see page 34 for details)

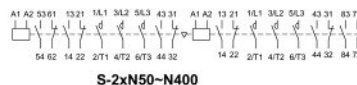
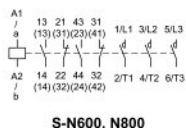
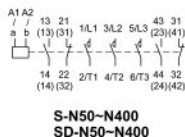
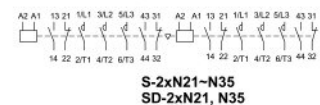
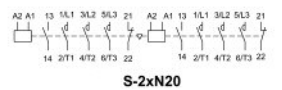
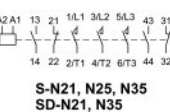
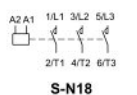
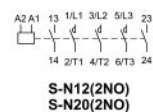
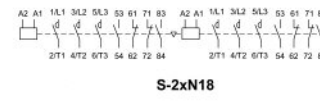
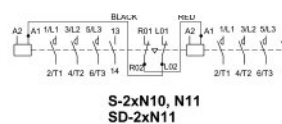
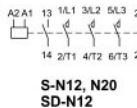
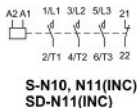
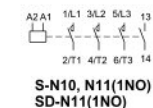
	Contactor/Relay	On Delay
	S-N10(CX) S-N11(CX) S-N12(CX) S-N18(CX) SR-N4(CX) SD-N11(CX) SD-N12(CX) SRD-N4(CX)	UN-TR4AN(CX)

## S-N DC Interface Modules (see page 32 for details)

	Contactor/Relay	Output Type	
		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

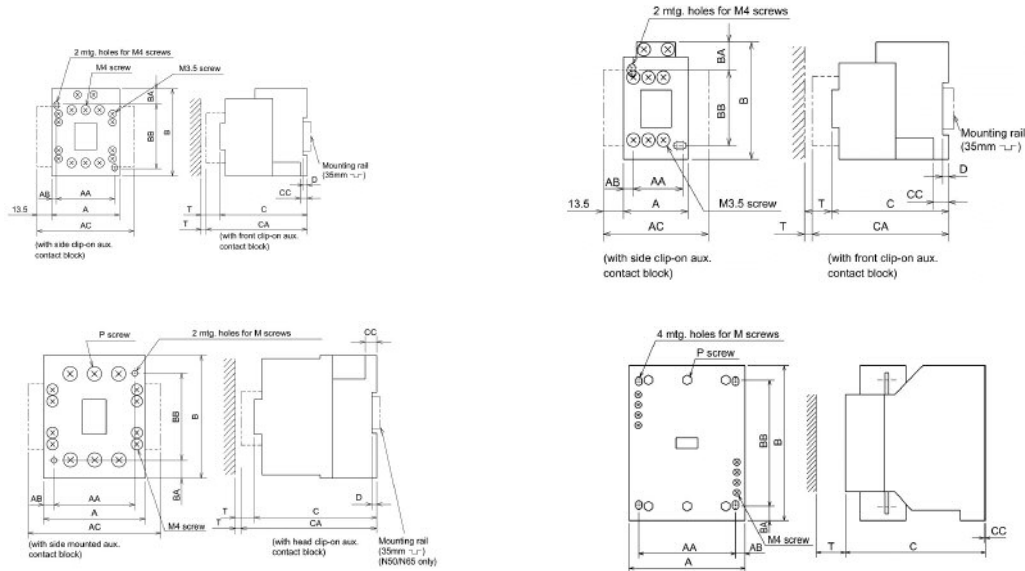
## Connections and Contact Arrangement

### S-N, SD-N



# S-N, SD-N Outline Dimensions

## Outline Dimensions of Non-Reversing Contactors



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 on the same contactor/relay.

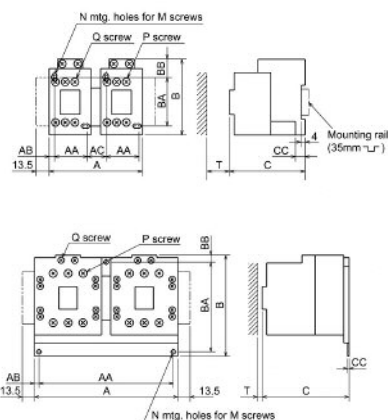
Type*	A	B	C	AA	AB	AC	BB	BA	CC	CA	D	Mass (kg)	T
S-N20(CX), -N21(CX)	63	81	81	54	4.5	90	60	14	6.5	109	4	0.4	5
S-N25(CX), -N35(CX)	75	89	91	65	5	102	70	13	6.5	119	4	0.52	5
SD-N21(CX)	63	81	113	54	4.5	90	60	14	6.5	141	4	0.72	5
SD-N35(CX)	75	89	123	65	5	102	70	13	6.5	151	4	0.85	5

Note: Front clip-on and side clip-on aux. contact blocks should not be mounted on the same contactor/relay.

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-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

Type	A	B	C	AA	AB	BB	BA	CC	M	P	Mass (kg)	T
S-N125	100	150	137	90	5	125	12.5	1.6	M4	M8	2.5	30
S-N150	120	160	145	100	10	125	17.5	1.6	M5	M8	3.2	30
S-N180, -N220	138	204	175	120	9	190	7	1.6	M6	M10	5.5	30
S-N300, -N400	163	243	195	145	9	225	9	2.3	M8	M12	9.5	50
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

## Outline Dimensions of Reversing Contactors



Type	Fig.	A	B	C	AA	AB	AC	BA	BB	CC	N	M	P	Q	Mass (kg)	T
S-2XN10/N11	a	99	78	78	35	4.5	21	50	19	10	4	M4	M3.5	M3.5	0.64	5
S-2XN18	a	96	79	109	30	3.5	23	60	13	10	4	M4	M4	M3.5	0.75	5
S-2XN20/N21	a	136	81	81	54	4.5	19	60	14	6.5	4	M4	M4	M3.5	0.8	5
S-2XN25/N35	b	160	110	97	150	15	—	100	8	1.6	3	M4	M5	M3.5	1.3	5
S-2XN50/N65	b	216	115	112	204	6	—	100	8	2	3	M5	M6	M4	2.6	10
S-2XN80/N95	b	270	140	137	247	11.5	—	100	32	10	3	M6	M6	M4	4.3	10
S-2XN125	c	276	150	148	255	10.5	—	125	12.5	1.6	4	M6	M8	M4	5.7	30
S-2XN150	c	296	160	156	275	10.5	—	125	17.5	1.6	4	M6	M8	M4	7.2	30
S-2XN180/220	c	370	215	189	340	15	—	190	12.5	1.6	4	M8	M10	M4	12	30
S-2XN300/N400	c	395	250	209	365	15	—	225	12.5	2.3	4	M8	M12	M4	20.5	50
S-2XN600/N800	d	660	—	—	—	—	—	—	—	—	—	—	—	—	54	—
SD-2XN11	a	99	78	110	35	4.5	21	50	19	10	4	M4	M3.5	M3.5	1.3	5
SD-2XN21	b	160	100	119	150	5	—	90	5	2	3	M4	M4	M3.5	1.7	5
SD-2XN35	b	160	113	129	150	5	—	100	8	1.6	3	M4	M5	M3.5	2.0	5
SD-2XN50/N65	b	216	116.5	133	204	6	—	100	8	2	3	M5	M6	M4	4.5	10
SD-2XN80/N95	b	270	140	167	247	11.5	—	100	32	10	3	M6	M6	M4	6.4	10

# Motor Protection Relays

## Thermal Overload Relays



### TH-N Thermal Overload Relays – A Convenient and Safer System

The TH-N Series overload relay will protect a motor from burnouts caused by overload, locked rotor, or single phasing. A relay is a three pole, bi-metal, non-interchangeable heater element type (phase failure protection). Although designed as a three phase device, TH-N overload relays can be used to protect single phase motors by connecting two heaters in series to one motor leg, and connecting the third heater to the other motor leg.

### Maintenance and Inspection

An operation indicator makes maintenance and inspection easy. Checks can be performed using manual operations.

### Rated Current Can Be Set Easily

The rated current value is displayed on a dial. Simply adjust the dial to the full-load current of the motor to assure motor protection.

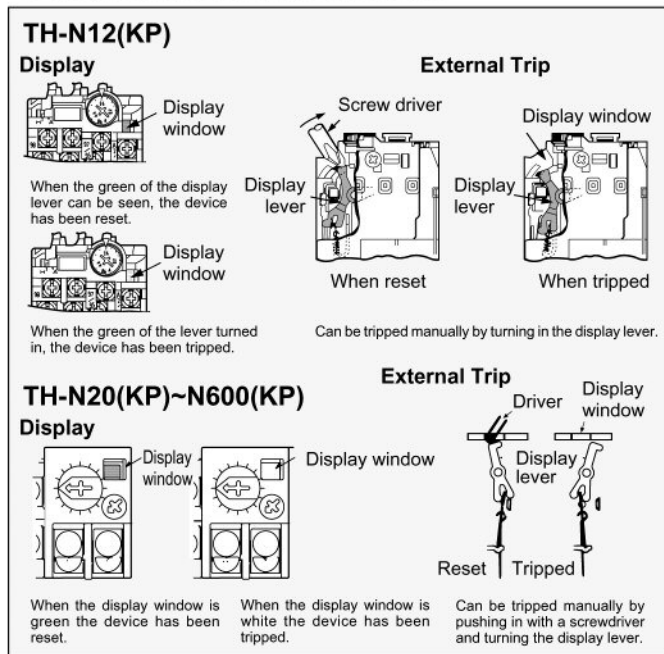
### Finger Protectors

TH-N12(CX), TH-N18(CX) and TH-N20(CX) have finger protection as standard.

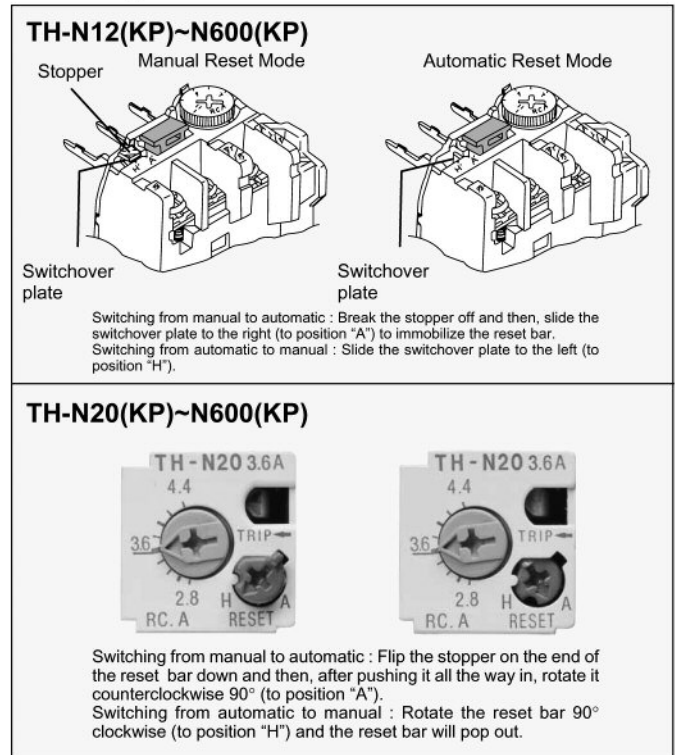
They conform to DIN-VDE\_0106 part 100.

TH-N60, TH-N120, TH-N220 and TH-N400 are not available with finger protection.

### • Display and External Trip Mechanism



### • Switching Between Automatic and Manual Reset



## TH-N Thermal Overload Relays Selection Guide

Max. Fuse Rating (660Vac) IEC 269-1 (A)			Overload Relay			Motor Capacity [kW, (hp)] (Three Phase 50/60Hz, Based on Four Poles)	
aM	gG	gM	Heater Designation	Setting Range (A)	Model (TH-)	AC220-240V	
0.5	0.5	—	0.12A	0.1-0.16	N12	—	
0.5	1	—	0.17A	0.14-0.22		—	
1	2	—	0.24A	0.2-0.32	N12 N20	0.03 (1/24)	
1	2	—	0.35A	0.28-0.42		0.05 (1/16)	
1	2	—	0.5A	0.4-0.6		0.06 (1/12)	
2	4	—	0.7A	0.55-0.85		0.09 (1/8)	
2	4	—	0.9A	0.7-1.1		0.12 (1/6)	
2	4	—	1.3A	1.0-1.6		0.18 (1/4)	
4	6	—	1.7A	1.4-2.0	N12 N18 N20	0.25 (1/3)	
4	6	—	2.1A	1.7-2.5		0.37 (1/2)	
6	10	—	2.5A	2.0-3.0		0.55 (3/4)	
6	10	—	3.6A	2.8-4.4		0.75 (1)	
8	16	—	5.0A	4.0-6.0		1.1 (1-1/2)	
12	20	—	6.6A	5.2-8.0		1.5 (2)	
12	20	—	9.0A	7.0-11		2.2 (3)	
16	25	32M35	11A	9.0-13		3 (4)	
20	32	32M50	15A	12-18		N18 N20 N60	3.7 (5)
40	63	32M63	22A	18-26		N20TA N60	5.5 (7-1/2)
50	80	63M80	29A	24-34	7.5 (10)		
63	80	63M80	35A (*1)	30-40	9 (12.5)		
63	100	100M100	42A	34-50	N60	11 (15)	
80	125	100M125	54A	43-65	N120	15 (20)	
100	160	100M160	67A	54-80	N60TA N120	18.5 (25)	
125	200	100M200	82A	65-100	N60TA N120 N220□□	22 (30)	
—	250	200M250	105A	85-125	N120TA N220□□ N400□□	30 (40)	
—	250	200M250	125A	100-150		37 (50)	
—	315	200M315	150A	120-180	N220□□ N400□□	45 (60)	
—	400	—	180A	140-220		55 (75)	
—	630	—	250A	200-300	N400□□ N600	75 (100)	
—	630	—	330A	260-400		90 (125)	
—	800	—	500A	400-600	N600	132 (180)	
—	1000	—	660A	520-800		200 (270)	

**Note:**

1. For starter size N35 only.

Contactor Mounting	W/O Finger Protection	TH-N12KP	TH-N18KP	TH-N20 KP*	TH-N20TA KP*	TH-N60 KP*	TH-N60TA KP*	TH-N120 KP*	TH-N120 TAKP*	TH-N220 RHKP	TH-N400 RHKP	—
	With Finger Protection	TH-N12 (CX)KP	TH-N18 (CX)KP	TH-N20 (CX)KP*	TH-N20CX TAKP*	—	—	—	—	—	—	—
Independent Mounting	W/O Finger Protection	TH- N12KP+UN -HZ12	—	TH-N20KP	—	TH-N60KP	—	TH- N120KP*	TH-N120 TAKP	TH-N220 HZKP	TH-N400 HZKP	TH-N600 KP+CTs
	With Finger Protection	TH- N12(CX)KP +UN- HZ12CX	—	TH- N20(CX)KP	—	—	—	—	—	—	—	—

Note: \*Use connecting parts when coupled with contactor.

## TH-N600KP Current Transformers

Heater Designation (A)	250	330	500	660
Setting Range (A)	200~300	260~400	400~600	520~800
Current Transformer Ratio	400/5A	500/5A	750/5A	1000/5A
Current Transformer Capacity	At least 15VA			

Note: Current transformer to be supplied by customer.

## TH-N Technical Data

Three Heater Type TH-		N12(CX) KP	N18(CX) KP	N20(CX) KP	N20CX TAKP	N60KP	N60TAKP	N120KP UL	N120TA KPUL	N220RH KPUL	N400RH KPUL	N600KP
Max. Setting Current (A)		13	18	22	40	65	105	100	150	220	400	800
Range of Setting Current (A)		0.1-13	2.8-18	0.2-22	18-44	12-65	54-105	34-100	85-150	65-250	85-400	200-800
Rated Insulation Voltage (V)		690	690	690	690	690	690	690	690	1000	1000	690
Permissible Ambient Temp. °C		-25 to +55										
Single Phase Protection		Types TH-N□□□KP provide the protection.										
Bimetal Heating		Direct								Via CTs		Via CTs (*1)
Max. Heater Dissipation Per Current Path	Min. Setting W	0.8	0.9	0.8	1.4	1.7	2.4	2.5	3.2	2.5	2.5	2.5
	Max. Setting W	1.8	2.2	2.2	3.5	4.9	5.2	7.1	8.6	6.0	6.0	6.0
Auxiliary Contact		1NO+1NC										
Rated Operating Current of Aux. Contacts	Category AC-15 NO Contact	120V (A)	2		2							
		240V (A)	1		1							
		500V (A)	0.5		0.5							
	Category AC-15 NC Contact	120V (A)	2		3							
		240V (A)	1		2							
		500V (A)	0.5		1							
	Category DC-13	48V (A)	0.4		0.5							
		110V (A)	0.2		0.2							
220V (A)		0.1		0.1								
Main Terminal Screw Size	Line Side (mm)	-		M4	M4	M6	M6	M8	M8	-	-	M4
	Load Side (mm)	M3.5	M4	M4	M5	M6	M6	M8	M8	M10	M12	M4
Standard Wire Sizes Recommended Heater Designation-Wire Size (mm <sup>2</sup> )		0.24A-2 — 11A-2	3.6A-2 — 11A-2 15A-3.5	0.24A-2 — 11A-2 15A-3.5	— 22A-5.5 29/35A-8	15A-3.5 22A-5.5 29/A-8 42A-14 54A-22	67A-22 82/A-38	42A-14 54/67A-22 82A-38	105A-60 125A-60	— —	— —	— —
Max. Conductor Side	Main Line Side (mm <sup>2</sup> )	(2.5) (*2)	—	6	—	25	—	38	60	—	—	6
	Main Load Side (mm <sup>2</sup> )	2.5	6	6	16	25	38	38	60	150	240	6
	Busbar Width Line Side (mm)	—	—	—	—	15	—	20	20	—	—	—
	Busbar Width Load Side (mm)	—	—	—	—	15	20	20	20	25	30	—
Auxiliary Contacts (mm <sup>2</sup> )		2.5	2.5	4	4	4	4	4	4	4	4	4

Notes:

- Used with current transformer (to be supplied by the customer).
- When used with UN-HZ 12 (CX) adaptor.

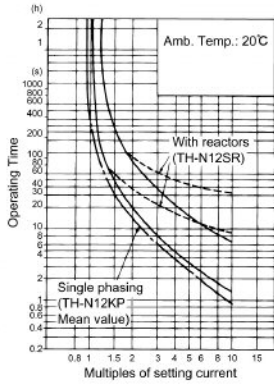
## Optional Parts and Accessories

	Thermal Overload Relay	Model Number	Length (mm)
Reset Release	TH-N12(CX)KP TH-N18(CX)KP	UN-RR205	200
		UN-RR405	400
		UN-RR555	550
		UN-RR705	700
	TH-N20, N20TACXKP TH-N60KP~ -N600KP	UN-RR200	200
		UN-RR400	400
		UN-RR550	550
	UN-RR700	700	
Separate Mounting Adaptor	TH-N12(CX)KP	UN-HZ12CX	

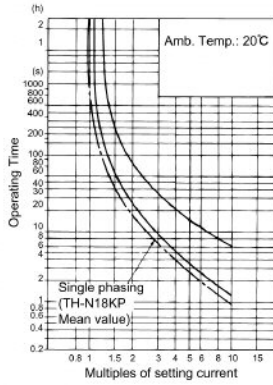
# Thermal Overload Relay Operating Characteristics

Connecting wire size: Refer to table on page 21

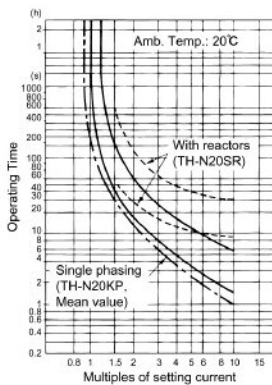
**TH-N12**  
**TH-N12KP-TH-N12SR**



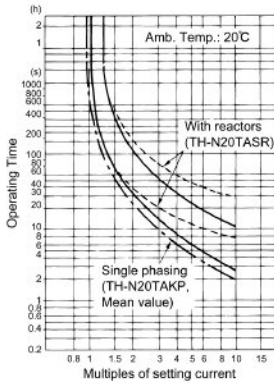
**TH-N18**  
**TH-N18KP**



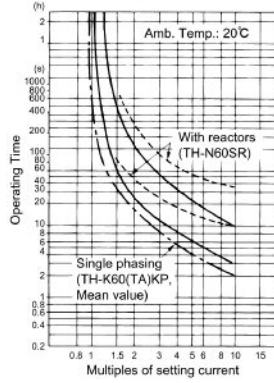
**TH-N20-TH-N20KP**  
**TH-N20SR-TH-N20KPSR**



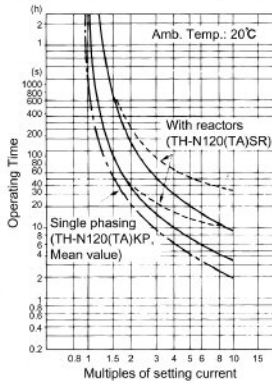
**TH-N20TA-TH-N20TAKP**  
**TH-N20TASR-TH-N20TAKPSR**



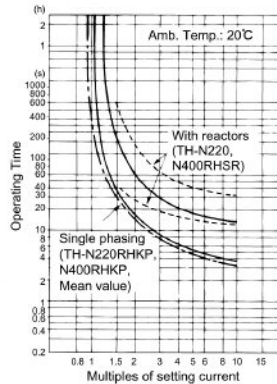
**TH-N60-TH-N60TA**  
**TH-N60KP-TH-N60TAKP**  
**TH-N60SR-TH-N60TASR**  
**TH-N60KPSR-TH-N60TAKPSR**



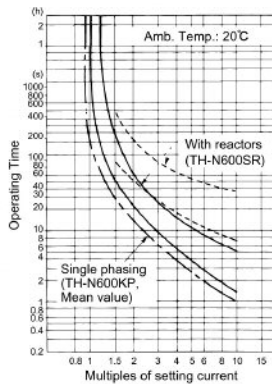
**TH-N120-TH-N120KP**  
**TH-N120SR-TH-N120KPSR**  
**TH-N120TA-TH-N120TAKP**  
**TH-N120TASR-TH-N120TAKPSR**




**TH-N220RH**  
**TH-N220RHKP**  
**TH-N220RHSR**  
**TH-N220RHKPSR**  
**TH-N400RH**  
**TH-N400RHKP**  
**TH-N400RHSR**  
**TH-N400RHKPSR**

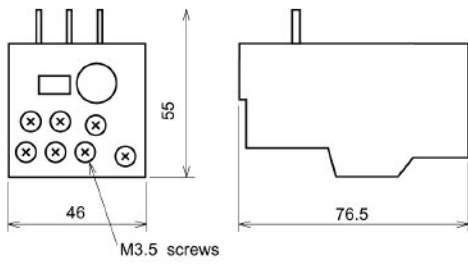


**TH-N600**  
**TH-N600KP**  
**TH-N600SR**  
**TH-N600KPSR**

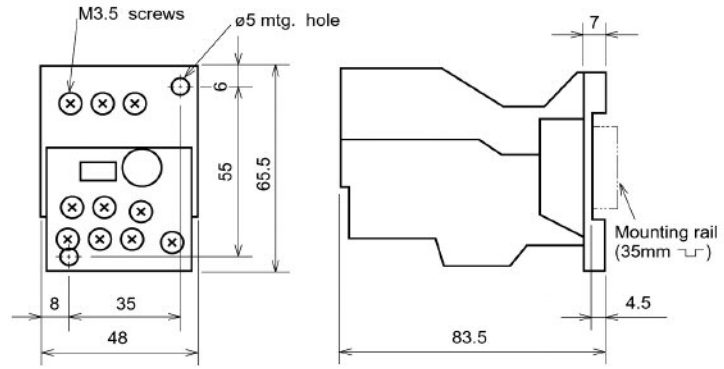


## TH-N Connecting Parts for Overload Contactors

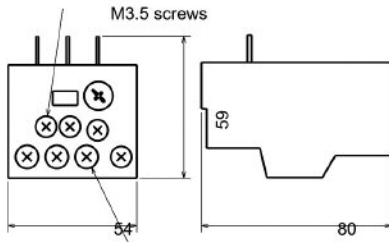
	Description	Overload Relay	Contactor	Model Number
	For Connecting O/L Relay to Contactor	TH-N20(CX)KPUL	S-N20(CX), S(D)-N21(CX)	UN-TH20
		TH-N20(CX)KPUL, TH-N20CX TAKPUL	S-N25(CX), S(D)-N35(CX)	UN-TH25
		TH-N60KP	S(D)-N50, -N65	CONNTBH559N350
Connecting Bars and Mounting Plate are included with TH-N220 and TH-N400 for use with S-N180, N220, N300 & N400		TH-N60KP, N60TAKP	S-N80, -N95	CONNTBH569N350
			SD-N80, -N95	CONNTBH569N352
		TH-N120KPUL, TH-N120TAKPUL	S(D)-N125	CONNTBH579N355
			S(D)-N150	CONNTBH589N355



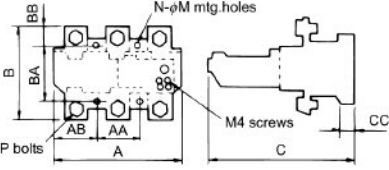
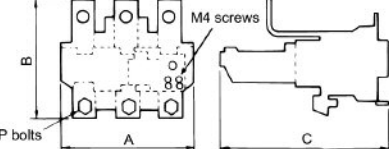
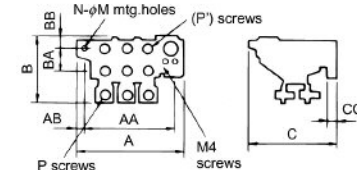
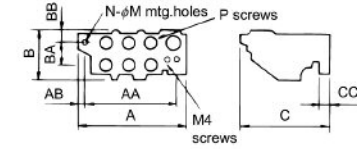
TH-N12(CX)(KP) (Mass: 0.11kg)



TH-N12(CX)(KP) with mounting adapter UN-HZ12(CX)



TH-N18(CX)(KP) (Mass: 0.14kg)



### TH-N Outline Dimensions

Type	A	B	C	AA	AB	BA	BB	CC	N	M	P	Q	Wt. (kg)
TH-N20KP(CX)	63	51	79	19	15	33	8.5	7	2	4.5	M4	M3.5	0.14
TH-N60KP	89	57	83.5	70	11	45	6	9	2	4.5	M6	M4	0.26
TH-N120KP	103	67	105	75	14	50	6	10	2	6	M8	M4	0.48
TH-N600KP	63	42	83.5	19	14	33	2	7	2	4.5	M4	M4	0.14

Type	A	B	C	AA	AB	BA	BB	CC	N	M	P(P)	Wt (kg)
TH-N20CX TAKP	74	72	83.5	-	-	-	-	-	-	-	M5 (M4)	0.2
TH-N60TAKP	89	73.5	83.5	-	-	-	-	-	-	-	M6 (M6)	0.32
TH-N120TAKP	112	87	105	-	-	-	-	-	-	-	M8 (M8)	0.75
TH-N120TAHZKP	112	103	105	75	25	50	25	10	2	6	M8 (M8)	1.0

Type	A	B	C	P(P)	Wt (kg)
TH-N220RHKP	144	114	180	M10	2.5
TH-N400RHKP	144	160	194	M12	2.7

Type	A	B	C	AA	AB	BA	BB	CC	N	M	P (P)	Wt (kg)
TH-N220HZKP	144	104	167	47	48.5	62	21	18	4	6	M10	2.5
TH-N400HZKP	144	173	167	47	48.5	62	55.5	18	4	6	M12	2.7

Note: Suffix "HZ" denotes separate mounting type.

Unit of Measure: mm

# Electronic Motor Protection Relays

The Mitsubishi Electric series ET-N relay is an excellent relay that can protect motors electrically. The Series ET-N relays have the following excellent features. These relays are not UL recognized or CSA certified.

## Features

- Selectable protection model
- Overload (including locked rotor condition)
- Phase failure (including current unbalance)
- Incorrect phase sequence
- Excellent wide current range
- Easy wiring
- Easy setting and maintenance
- Selectable tripping time at 600% of setting
- Standard trip (7s.)
- Quick trip (3s.)
- Fast trip (5s.)
- Medium trip (15s.)
- Slow trip (30s.)
- Withstands high overcurrent
- Fine indication of trip mode
- Conformity to International Standards

## ET-N60-8A100V

Frame Size	
N60	60A Frame
N150	150A Frame
N360	360A Frame

Frame Size	Current Range	
60A Frame	1A	0.25-1.0
	4A	1.0-4.0A
	8A	2.0-8.0A
	20A	5.0-20A
60A	15-60A	
150A Frame	150A	40-150A
360A Frame	360A	110-360A

## Control Voltage

100V 100-120V 50/60HZ  
200V 200-240V 50/60HZ

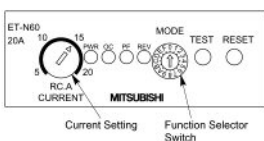
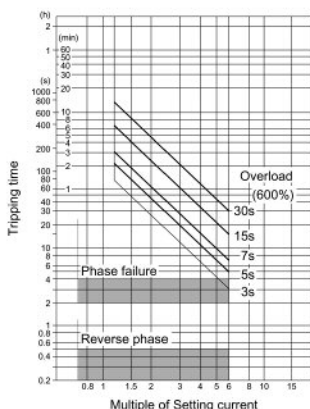
## Specifications

### Ratings and Characteristics

Frame Size [Current Range]			N60[1A]	N60[4A]	N60[8A]	N60[20A]	N60[60A]	N150[150A]	N360[360A]
Rated Insulation Voltage		VAC	690						
Adjustable Setting Range		A	0.25-1	1-4	2-8	5-20	15-60	40-150	110-360
Applicable Motor Capacity 3-ph	200-240VAC	kW	0.03-0.2	0.2-0.75	0.4-1.5	1.5-4	3.7-11	11-37	30-90
	380-440VAC	kW	0.05-0.4	0.4-1.5	0.75-2.2	2.2-7.5	7.5-22	22-75	55-150
	200-240VAC	HP	1/16-1/4	1/4-1	1/2-2	2-5	5-15	15-50	40-125
	380-440VAC	HP	1/8-1/2	1/2-2	1-3	3-10	10-30	30-100	75-200
Rated Operating Current of Aux. Contacts	Category AC-15	120VAC	A						
		240VAC	A						
	Category DC-13	24VDC	A						
		110VDC	A						
Permissible Ambient Temp./Humidity		°C/%RH	-10 to +55/45 to 85						
Control Circuit Consumption		VA	7.5 (AC100V)/15 (AC200V)						
Control Voltage Tolerance		times	0.85 to 1.1 (rated control voltage)						
Tripping Time			See Tripping Time diagram below						
Tripping Condition	Overload	%	[minimum tripping current] 110 to 120 (at setting current)						
	Phase Failure	%	more than 70 (at setting current) [Tripping time : 2-4 sec.]						
	Reversal Phase	%	more than 70 (at setting current) [Tripping time : less than 0.5 sec.]						
Withstand Voltage		VAC	2500 [1 minute]						
Shock Resistance	Vibration 10-55Hz	m/s <sup>2</sup>	19.6						
	Sine Wave Pulse	m/s <sup>2</sup>	49						
Conductor Size	Main Terminals	mm <sup>2</sup>	2-14				3.5-22	5.5-60	14-200
	Control Terminals	mm <sup>2</sup>	1.25-2						

Note: ET-N relay cannot be used on DC circuit.

## Characteristic Curves



### Selection of Protection Mode & Tripping Time

The selector switch is set at position "7" (overload and phase failure protection mode; standard trip type) when shipping. Reset the position of the changeover switch according to the table at right before installation.

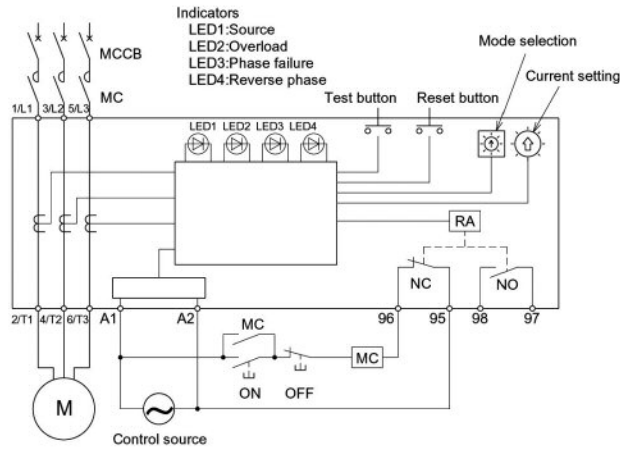
### Application to High Voltage or Big Motor Circuit

The high voltage current transformer (secondary current: smaller than 5A; capacity: more than 5VA) should be connected to ET-N60□8A in the star connection, when the load is high voltage or large AC motor.

Protection Mode	Overload Tripping Time at 600% of Setting	Symbol on Changeover Switch
Overload, Phase Failure and Reversal Phase [3E]	3	0
	5	1
	7	2
	15	3
Overload and Phase Failure [2E]	30	4
	3	5
	5	6
	7	7
Overload Only [1E]	15	8
	30	9
	3	A
	5	B
Overload Only [1E]	7	C
	15	D
	30	E



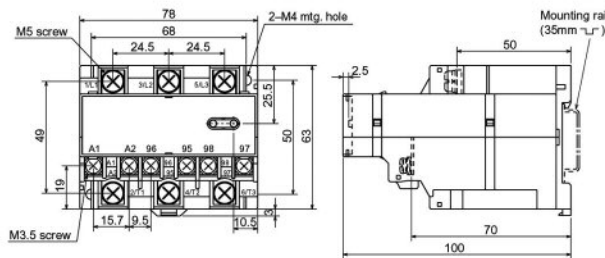
## Wiring Precautions



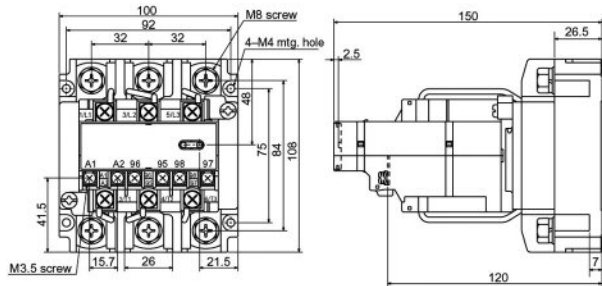
## Wiring Precautions

- The control source should be wired in the same phases as the contactor control source.
- When the load is a single phase motor, use 1/ L1-2/T1 and 5/L3-6/T3 phases. And reset the position of changeover switch from "A" to "E".
- If capacitors are used to correct the power factor, connect the capacitor in the power source side of the ET-N relay.

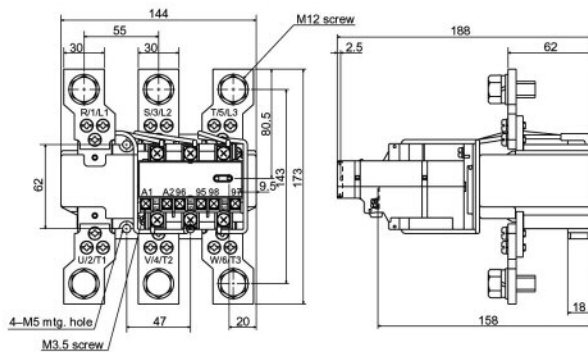
## Outline Dimensions



**ET-N60(1-60A) (Mass: 0.3kg)**



**ET-N150 (Mass: 1.6kg)**



**ET-N360 (Mass: 2.5kg)**


# Definite Purpose Contactors

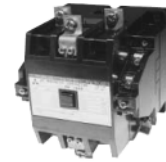
## DC Contactors

### Series DU

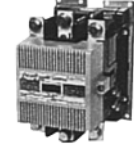
The Mitsubishi Electric series DU contactors are designed for DC circuits, that is the variable-speed drive-control circuits (SCR switching circuit) and DC motor control circuits.

### Features

- Compact design
- High break capacity
- CSA certified models are also available on AC operated type, add suffix "UR" immediately after the Frame size.
- Double break contacts
- UL recognized component (If  marking is required add suffix "UR" immediately after the frame size).
- Long life



DU-A60



DU-K180

## DU - A60 AC230V

### Control Type

DU AC Operated  
DUD DC Operated

Frame Size	
A30	50A frame
A60	90A frame
A120	160A frame
K180	260A frame
K260	360A frame

### Coil Designation

See Coil Designation Table on next page

## Series DU Specifications

Number of main contacts type DU : 2NO1NC, type DUD : 2NO

Number of auxiliary contacts type DU & DUD : 2NO2NC

## Series DU Ratings

Frame Size			A30	A60	A120	K180	K260	
Rated Continuous Current Ith			A	50	90	160	260	360
Rated Operating Current for SCR Switching Circuit 1-Pole	NO Contact	110VDC	A	40	80	160	260	360
		240VDC	A	40	80	160	260	360
		440VDC	A	15	30	60	90	130
		500VDC	A	15	30	60	90	130
	NC Contact	110VDC	A	120	240	480	720	1,040
		240VDC	A	120	240	480	720	1,040
		440VDC	A	120	240	480	720	1,040
		500VDC	A	120	240	480	720	1,040
Rated Operating Current for SCR Switching Current 2-Pole	NO Contact	110VDC	A	50	90	160	260	360
		240VDC	A	50	90	160	260	360
		440VDC	A	40	80	160	260	360
		500VDC	A	40	80	160	260	360
Rated Operating Current Category DC 2 & 4 1-Pole	NO Contact	110VDC	A	30	60	120	180	260
		240VDC	A	20	40	80	120	175
		440VDC	A	7.5	15	30	—	—
	NC Contact	110VDC	A	20	40	80	100	150
		240VDC	A	15	30	60	75	100
		440VDC	A	7.5	15	25	—	—
Rated Operating Current Category DC 2 & 4 2-Pole	NO Contact	110VDC	A	40	80	160	240	350
		240VDC	A	30	60	120	180	260
		440VDC	A	20	40	80	120	175
Rated Operating Current of Aux. Contacts	Category AC11	110VAC	A	6				
		240VAC	A	5				
	Category DC 11	110VDC	A	1.2				
		240VDC	A	0.2				

Note: For SCR switching, making current of NO contacts is 2 times the rated operating current and making current of NC contact is 1 times the rated operating current which means the peak value at making. In this application NO and NC contacts do not break any current.

## Series DU Characteristics

Frame Size			A30	A60	A120	K180	K260	
Mechanical Life			Operations					2.5 million
Electrical Life			Operations					0.5 million
Permissible Ambient Temperature			°C					-10 to 55
Coil Voltage Tolerance			Times					0.85 to 1.1 (rated coil voltage)
Coil Consumption		Inrush	VA	240	520	1260	480	480
		Sealed	VA	28	47	100	44	54
		Watts	W	7 (26)	13 (35)	25 (50)	5 (41)	7.3 (55)
Operating Time	Make	NO Contacts ON	msec	15 (60)	20 (100)	20 (140)	30 (150)	40 (180)
		NC Contact OFF	msec	12	13	13	26	37
	Break	NO Contacts OFF	msec	6 (18)	11 (27)	11 (37)	110 (25)	125 (30)
		NC Contact ON	msec	12	18	18	112	135
Make and Break Capacity Category DC2 & DC4		Make	times	4 (at the rated operating current)				
		Break	times	4 (at the rated operating current)				
Permissible Switching Frequency			Operations/hour		1200			
Vibration Resistance		10-55Hz	m/s <sup>2</sup>		19.6			
Shock Resistance		10 msec Half Sine Wave	m/s <sup>2</sup>		49			
Conductor Size		Main Terminals	mm <sup>2</sup>	2-25	2-35	6-70	10-150	16-185
		Control Terminals	mm <sup>2</sup>	1-4			1-2.5	

Note: Parenthesized data is for type DUD, DC operated contactors.

## Series DU Coil Designation

Coils for Type DU-A			Coils for Type DU-K		Coils for Type DUD	
Coil Designation	Applicable Voltage		Coil Designation	Applicable Voltage	Coil Designation	Applicable Voltage
	50Hz	60Hz				
AC100V	100VAC	100-110VAC	AC100V AC200V AC400V AC500V	100-127VAC 50/60Hz 200-240VAC 50/60Hz 380-440VAC 50/60Hz 460-550VAC 50/60Hz	DC24V	24VDC
AC120V	110-120VAC	115-120VAC			DC48V	48VDC
AC200V	200VAC	200-220VAC			DC100V	100VDC
AC230V	220-240VAC	230-240VAC			DC110V	110VDC
AC400V	380-415VAC	400-440VAC			DC120V (*1)	120VDC
AC440V	415-440VAC	460-480VAC			DC125V	120-125VDC (*2)
AC500V	500VAC	500-550VAC			DC200V	200VDC
					DC220V	220VDC

### Notes:

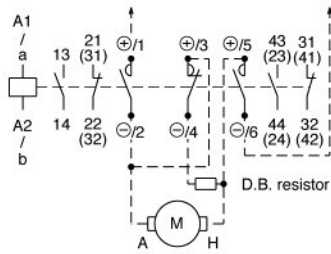
1. Only for type DUD-A60.
2. 125V DC for type DUD-A60.

Spare Parts	Ordering Designation
Main Contact Kit for DU-A30 (*1)	MAINKITZ939400G10
Main Contact Kit for DU-A60 (*1)	MAINKITZ939401G10
Main Contact Kit for DU-A120 (*1)	MAINKITZ939402G10
Normally Open (2 Contacts) Contact Kit for DU-K180	MAINKITBH599N308
Normally Closed (1 Contact) Contact Kit for DU-K180	MAINKITBH599N309
Normally Open (2 Contacts) Contact Kit for DU-K260	MAINKITBH609N308
Normally Closed (1 Contact) Contact Kit for DU-K260	MAINKITBH609N309
Auxiliary Contact Kit for DU(D)-A (*2)	AUXKITZ926783G30
Auxiliary Contact Kit for DU(D)-K	UN-AX150
Coil for DU-A30	DU-A30-COILAC□□□V
Coil for DU-A60	DU-A60-COILAC□□□V
Coil for DU-A120	DU-A120-COILAC□□□V
Coil for DU-K180	S-N220-COILAC□□□V
Coil for DU-K260	S-N300-COILAC□□□V
Coil for DUD-A30 (*3)	DUD-A30-COILAC□□□V
Coil for DUD-A60	DUD-A60-COILAC□□□V
Coil for DUD-A120	DUD-A120-COILAC□□□V
Coil for DUD-K180	SD-N220-COILAC□□□V
Coil for DUD-K260	SD-N300-COILAC□□□V

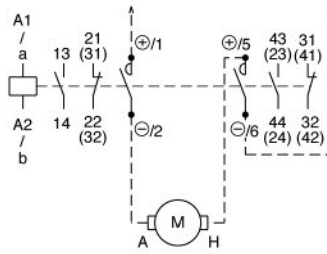
### Notes:

1. Contact kit of type DU-A consists of three moving and six stationary contacts.
2. Auxiliary contact kits of type DU(D)-A are all the same.
3. Coil for DUD-A30 includes only one coil. Other DC operated coils of type DUD include two coils.

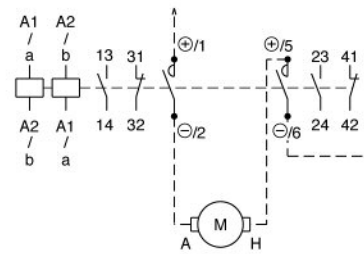
## Contact Arrangements



**DU-A30, DU-A60, DU-A120**  
**DU-K180, DU-K260**



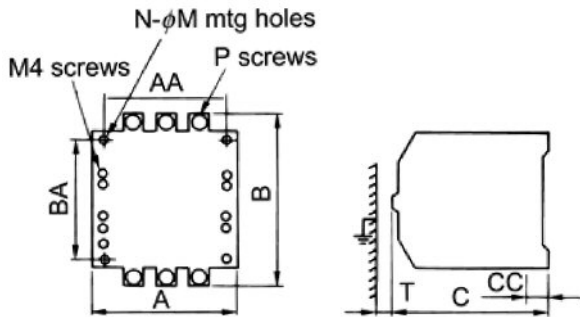
**DUD-A30, DUD-A60**  
**DUD-K180, DUD-K260**



**DUD-A120**

Note: Values in parenthesis are shown on auxiliary terminals of DU-A  or DUD-A .

## Series DU Outline Dimensions



Type	A	AA	B	BA	C	CC	N	M	P	Mass (kg)	T
DU-A30	100	86	118	90	105.5	12.5	3	5	6	1.2	10
DU-A60	120	100	144	100	128.5	16	3	5	6	2.0	10
DU-A120	162	130	160	140	162	2.3	4	6	10	4.1	10
DU-K180	138	120	204	190	174	1.6	4	6	10	5.5	30
DU-K260	163	145	243	225	195	2.3	4	8	12	10	50
DUD-A30	101	86	108	90	135.5	3.2	3	5	6	2.1	10
DUD-A60	120	100	144	100	161.5	2	3	5	6	3.5	10
DUD-A120	162	130	160	140	187	2.3	4	6	10	7.1	10
DUD-K180	138	120	204	190	200	1.6	4	6	10	7.5	30
DUD-K260	163	145	243	225	220	2.3	4	8	12	13.5	50

# AC Contactors - UL

## S-U Series

S-U contactors are compact horsepower rated devices used in lighter duty applications such as compressors, blowers, fan and pump motors and resistance heaters. A spiral kick-out spring is employed to improve pick-up performance under low voltage conditions. Contactors can be screw or DIN rail mounted, with or without 1NO-1NC A600 auxiliary contact blocks, and with or without quick-connect terminals. Reversing contactors are not available with quick connect terminals. Electrical life at full load is 500,000 operations. CSA certification is pending.

### Series S-U Rating and Ordering Information

Continuous Current Rating A	Maximum Horsepower Rating				Contactor Type	Auxiliary Contacts	Terminal Type	Complete Model Number (*1)
	Full Load Current Must Not Exceed "Continuous Current Rating"							
	Single Phase		Three Phase					
115V	230V	200-230V	460-575V					
15	1/2	1-1/2	3	5 (*2)	Non-Rev.	None	Saddle Clamps	S-U12UL AC□□□V
						1NO – 1NC	Saddle Clamps	S-U1211UL AC□□□V
						None	Quick Connect	S-U12FTUL AC□□□V
					Rev (*3)	None	Saddle Clamps	S-UR12UL AC□□□V
						1NO – 1NC (*4)	Saddle Clamps	S-UR1222UL AC□□□V

**Notes:**

- To complete Model Number, insert Coil Designation from table below, e/g/S-U12FTUL AC24V.
- Derated to 1 HP on S-U12FTUL ( Use insertion sleeve).
- Reversing contactors are unwired. Order CONNTBH509N362 (for S-UR12UL) or CONNTBH509N363 (for S-UR1222UL) wiring kit if required.
- Each direction.

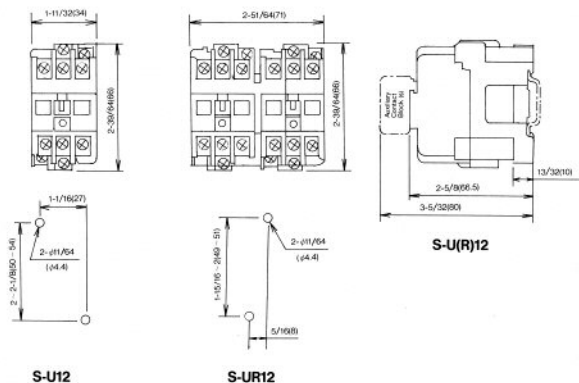
### Series S-U Coil and Wiring Data

Terminal Type		Saddle Clamp	Quick-Connect
Coil Consumption (at Rated Voltage)	Inrush (VA)		45
	Steady State (VA)		8
	Watts		3
Wire Size	Main Circuit	#12 ~ #14 one or two	.250" single tabs
	Control Circuit	#14 one or two	.187" single tabs

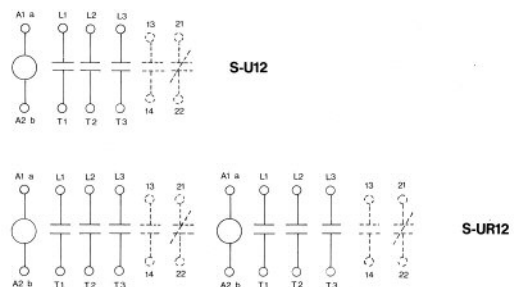
### Series S-U Coil Designation Table

Rated Voltage		Coil Designation
60Hz	50Hz	
24	24	AC24V
115~120	110~120	AC120V
208~230	—	AC208V
230~240	220~240	AC230V
400~440	380~415	AC400V
460~480	415~440	AC440V

### Dimensions in Inches (mm)



### Contact Arrangement



# DC Interface Contactors

## SD-Q Series

The Mitsubishi Electric Series SD-Q contactors are specially designed to be directly driven by the transistor output (DC24V) of a programmable sequence controller, etc.

### Series SD-Q Features

- Low coil power consumption: By combining an electromagnet with permanent magnet, coil operating current is reduced to DC24V 55mA (1.3W) for SD-Q11, Q12 and 75mA (1.8W) for SD-Q19.
- Compact construction: Width 45mm, Height 51mm, Depth 66.5mm in Type SD-Q11
- Can be mounted on 35mm rail
- Coil surge absorber
- Safety clear terminal cover
- Easy wiring: All terminals are in the same plane
- UL/CSA approved
- Auxiliary contact block available for SD-Q11 and SD-QR11



### Type Designation

Type		Non-Reversing		SD-Q11, SD-Q12	SD-Q19
		Reversing		SD-QR11, SD-QR12	SD-QR19
Rated Insulation Voltage		V		690	
Conventional Free Air Thermal Current		A		20	30
Rated Operational Current	Category AC-3	200 to 240V AC		A	12
		380 to 440V AC		A	9
	Category AC-1	200 to 240V AC		A	10 (15) (*1)
		380 to 440V AC		A	10
Rated 3ph Motor Capacity	Category (IEC) AC-3	200 to 240V AC		kW	3
		380 to 440V AC		kW	4
Pick-Up Voltage (to Rated Coil Voltage)		%		85	85
Coil Consumption (at Rated Coil Voltage) (at 20°C)		W		1.3	1.8
Coil Current (at 20°C)		mA		55	75
Operating Times (at Rated Coil Voltage)	Closing	mS		<50	<60
	Opening	mS		<20	<35
Mechanical Endurance		operations		10 million	10 million
Electrical Endurance	Category AC-3	operations		1 million	2 million
	Category AC-1	operations		0.5 million	0.5 million
Permissible Ambient Temperature		°C		-10 to 55	-10 to 55
Switching Frequency		operations / hour		1800	1800
Conductivity Size		mm <sup>2</sup>		1 to 2.5	main; 1 to 6 control; 1 to 2.5
Terminal Screw Tightening Torque Range (Standard Value)		N • m		0.94 to 1.17 (1.0)	main; 1.18 to 1.86 (1.47) control; 0.94 to 1.51 (1.17)

Note: The electrical endurance at the rating given in parentheses is 0.25 million

### Ratings of Auxiliary Contacts

Rated Insulation Voltage		V	690
Conventional Free Air Thermal Current		A	10
Rated Operational Current	Category AC-15	240V AC	A
		440V AC	A
	Category DC-12	24V DC	A
Mechanical Endurance		operations	10 million
Electrical Endurance		operations	0.5 million

### Coil Rating and Ordering Designation

Rated Voltage (V DC)	Ordering Designation
24 VDC	DC24V

Note: The operation coil terminal has a polarity, A1(+), A2(-)

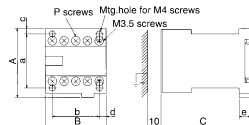


Fig.1 SD-Q type

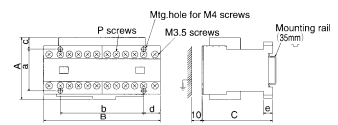


Fig.2 SD-QR type

Use	For Non-Reversing Type and for Reversing Type Left Side
Model Name	UQ-AX2
Applicable Contactor / Starter	SD-Q11, SD-QR11

Type		Dimensions								Mass (kg)	Reference Drawing	
		A	B	C	a	b	c	d	e			P
Non-Reversing	SD-Q11	51	45	66.5	40	35	4	5	8.5	M3.5	0.19	Fig. 1
	SD-Q12	52	56	67.5	40	35	5	5	8.5	M3.5	0.21	Fig. 1
	SD-Q19	58	66	78	50	55	4	5.5	9	M4	0.34	Fig. 1
Reversing	SD-QR11	59	90	66.5	40	80	11	5	8.5	M3.5	0.42	Fig. 2
	SD-QR12	59	112	67.5	40	80	11	16	8.5	M3.5	0.46	Fig. 2
	SD-QR19	79.5	133	77.5	50	110	22	11.5	9	M4	0.72	Fig. 2

# Compact 3-Pole Contactors

## Series S-N□8

The Mitsubishi Electric series S-N□8 compact 3-pole contactors are designed for limited panel space applications such as machine control panels.



## Series S-N□8 Features

- Compact design – Very limited mounting space required.
- Front clip-on type auxiliary contact block can be added.
- Coil surge absorbers are available.
- Mountable on 35mm rail.

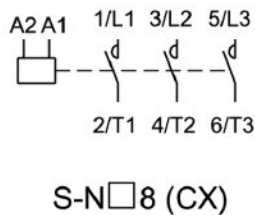
## Specifications

### Series S-N□8 Ratings and Characteristics

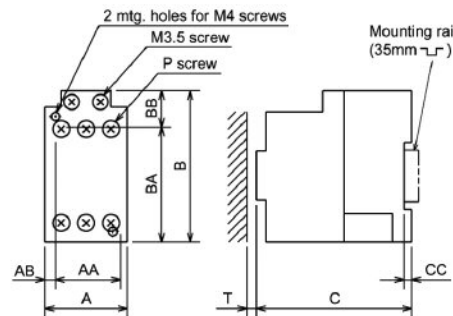
Type		S-N18(CX)	S-N38(CX)	S-N48(CX)
Rated Insulation Voltage	V	AC690		
Rated Operational Current 3-ph, Category AC-3	220~240V	A (kW)	18 (4.5)	39 (11)
	380~440V	A (kW)	16 (7.5)	32 (15)
	500V	A (kW)	13 (7.5)	24 (15)
	690V	A (kW)	9 (7.5)	12 (11)
Rated Continuous Current Ith	A	25	60	80
Electrical Life	Operations (million)	1		
Mechanical Life	Operations (million)	10	5	
Rated Making Current for 100,000 Cycle Operations Time 0.5ms Peak Let Through	A	200	500	670
Switching Frequency (AC3)	Operations/hour	1800	1800	1200
Coil Consumption (at Rated Coil Voltage)	Inrush	VA	60	110
	Sealed	VA	10	13
	Watts	W	3	4.5
Terminal Screw Size	Main Terminal	M4	M5	M5
	Control Terminal	M3.5	M3.5	M3.5
Conductor Size (Compression Terminal Size)	Main Terminal	1~6	2~16	
	Control Terminal	1~2.5	1~2.5	
Additional Auxiliary Contact Block		UN-AX2□□(CX) or UN-AX4□□(CX)		

Notes:  
See page 13 for coil designations.  
See pages 15 – 17 for parts, accessories and options.

## Contact Arrangement



## Outline Dimensions



Type	FIG	A	B	C	AA	AB	BB	BA	CC	CA	D	P	Q	Mass (kg)	T
S-N18	A	43	79	81	30	7	60	6	10	109	4	M4	M3.5	0.33	5
S-N38, N48	A	54	90	93	40	7	80	6	7	121	4	M5	M3.5	0.4	5

# DC Interface Modules

## Series UN-SY

The Mitsubishi Electric type UN-SY interface module is an optional unit for S-N series contactors or SR-N series relays, controlled by the transistor output of a programmable controller.

### UN-SY Features

- Easy mounting on the Type S-N10 to S-N65 contactors and SR-N series relays.
- Separate mounting type for the Type S-N80 to S-N400 contactors.
- Relay or solid state output versions are available.

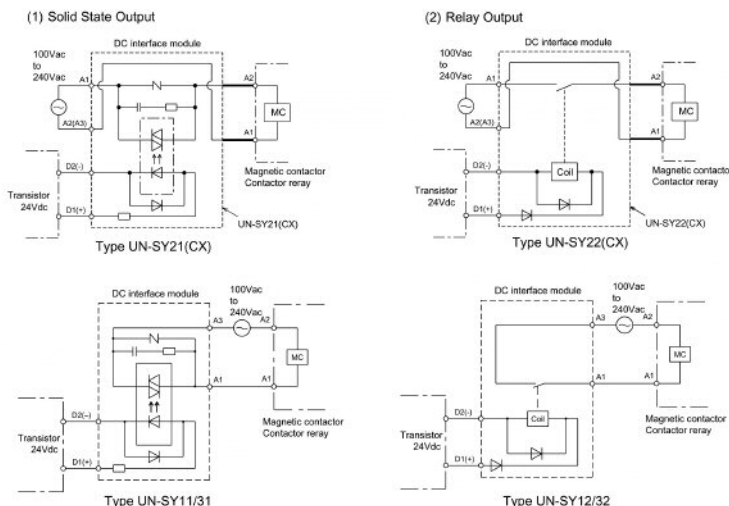
### Ordering Information

UN-SY 1		2	CX
<b>Applicable Contactor or Relay</b>			
UN-SY2	S-N10 to N35, SR-N4		
UN-SY3	S-N50 to N65		
UN-SY1	S-N80 to 400		
<b>Finger Protection</b>			
*	None		
CX	With Finger Protection		
<b>Output</b>			
1	Solid State Relay Output		
2	Relay Output		

### UN-SY Specifications

Type	UN-SY21(CX)	UN-SY31	UN-SY11	UN-SY22(CX)	UN-SY32	UN-SY12
<b>Output</b>	Solid State Relay			Relay		
<b>Applicable Type of Contactor or Relay</b>	<b>Direct Mounting to Contactor or Relay</b>	S-N10 to N35 S-N18, N38, N48	S-N50, N65	—	S-N10 to N35 S-N18, N38, N48	S-N50, N65
	<b>Separate Mounting</b>	—	—	S-N80 to N400	—	—
<b>Input</b>	<b>Rated Control Voltage</b>	24 Vdc			24 Vdc	
	<b>Permissible Voltage Tolerance</b>	80% to 110% of rated control voltage				
	<b>Min. Working Voltage</b>	18 Vdc			18 Vdc	
	<b>Max. Breaking Voltage</b>	4 Vdc			1 Vdc	
	<b>Power Consumption</b>	0.4W			0.24W	
<b>Output</b>	<b>Rated Voltage</b>	100Vac to 240Vac 50/60Hz				
	<b>Rated Operating Current</b>	0.5A (category AC11)				
	<b>Response Time</b>	11ms or less			10ms or less	
	<b>OFF-State Leakage Current</b>	3mA/240VAC			—	
	<b>Mechanical Life</b>	—			5 million operations	
	<b>Electrical Life</b>	—			1 million operations	
<b>Ambient Temperature</b>	-10 to 55°C					

### Connection



#### UN-SY Mounting

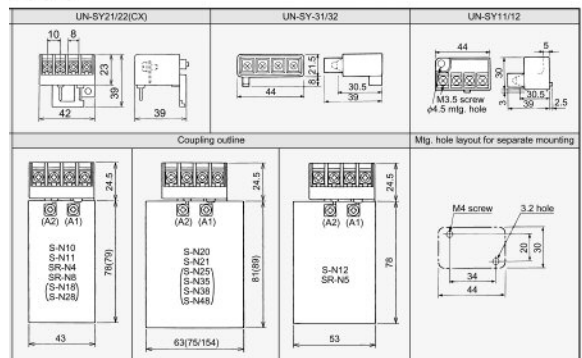
Direct mounting – Type S-N10 to S-N65 and SR-N4

Remove the coil terminal screw from the contactor or relay, then slide the tab on the interface module into the groove on the contactor or relay. Fasten the connecting conductor with the coil terminal screw.

Separate mounting – Type S-N80 to S-N400

Mount the interface module (UN-SY11/12) with screw on a panel.

### Outline and Mounting Dimensions

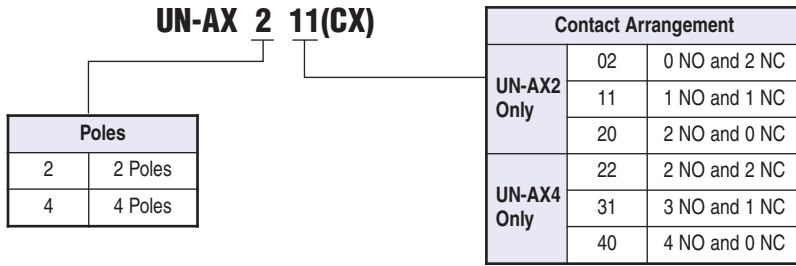






# Auxiliary Contact Blocks

Type Designation Series UN-AX



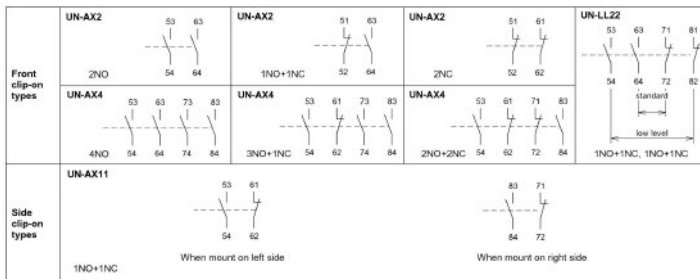
## Specifications

Type	UN-	AX2□□(CX)	AX4□□(CX)	AX11(CX)	LL22 (CX)	
Applicable Contact Arrangements		2NO 1NO+1NC 2NC	4NO 3NO+1NC 2NO+2NC	1NO+1NC	1NO+1NC [Standard]	1NO+1NC (*1) [Low level]
Rated Insulation Voltage		V	690			250
Rated Continuous Current Ith		A	16			1
Rated Operating Current	Category AC-15 (Coil Load)	110 VAC	A			240VAC 20mA (COS φ ≥ 0.95) 48VDC 100mA (L/R ≤ 1MSEC) Minimum operating current 5VDC 5mA
		220 VAC	A			
		440 VAC	A			
	Category DC-13 (Large Coil Load)	48 VDC	A			
		110 VDC	A			
		220 VDC	A			
Mechanical Life		Operations		10 million	2.5 million	
Electrical Life		Operations		0.5 million	0.5 million	
Permissible Ambient Temperature/Humidity		°C/%RH		-25 to +55/45 to 85		
Switching Frequency		Operations/Hour		1,800		
Conductor Size		mm <sup>2</sup>		1.0 to 2.5		

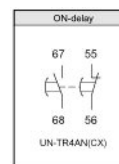
Note:

- Contact reliability may be decreased if it is operated more than 1 million operations.

## Series UN-AX Contact Arrangements

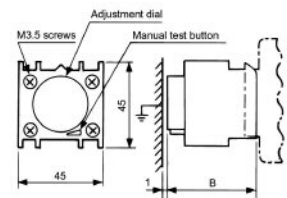


## UN-TR4AN Contact Arrangement



Note:  
55-56 Delayed NC contacts.  
67-68 Delayed NO contacts.

## UN-TR4AN Dimensions



Type	B	Mass (kg)
UN-TR4AN(CX)	48.5	0.06

## Pneumatic Time Delay Module



## UN-TR4AN Applicable Contactor and Relay Selection

Type	Type of Delay	Applicable Contactors and Relays	
UN-TR4AN(CX)	ON Delay	AC Operated	S-N10(CX), N11(CX), N18(CX), SR-N4(□□)(CX)
		DC Operated	SD-N11(CX), SRD-N4(□□)(CX)

Note: When this module is mounted, auxiliary contact block should not be mounted.

# Vacuum Contactors

## Series SH-V Medium Voltage

The Mitsubishi Electric series SH-V contactors are specially designed for the areas of mining, pumping, sawing and other applications where voltages above 1500VAC are frequently used. They are normally rated at 1500V with short circuit capability of 4KA (CO five times). Withstand rating for 1 minute is 6.5kV and impulse rating is 15kV. Withstand rating of the gap is 10kV. Contactors are UL Recognized and CSA Certified up to 600V. They are furnished with 2 NO and 2 NC A600 auxiliary contacts. Reversing units are also available. The SH-V160, 320 and 400 non-reversing contactors have an optional insulating barrier that raises the insulating rating to 3300V, the withstand rating to 16kV and the impulse rating to 45kV. Short circuit capability and contact gap withstand rating remain at 4kV and 10kV respectively.



## Type Designation

<b>SH-V</b>		<b>160QM</b>	<b>AC100V</b>	<b>Coil Designation</b> See Coil Designation Table on next page
<b>Control Type</b>	<b>Frame Size</b>			
SH-V Non-Reversing	160QM	160A frame		
SH-2XV Reversing	320QM	320A frame		
	400QM	400A frame		
	600 (*1)	600A frame		

**Note 1:** Only AC operated non-reversing type is available for Frame size 600. SH-V600 is not presently certified by CSA.

## Specifications

Frame Size			V160	V320	V400	V600	
Rated Insulation Voltage		V	1500	1500	1500	1500	
Rated Operating Capacity	Three Phase Motor Category AC3	240V	KW (A)	55 (180)	90 (320)	115 (400)	160 (630)
		440V		110 (180)	200 (320)	250 (400)	300 (630)
		660V		160 (180)	315 (320)	400 (400)	600 (600)
		1000V		225 (160)	450 (320)	550 (400)	750 (600)
		1500V		315 (160)	700 (320)	800 (400)	1000 (600)
	Three Phase Capacitor	240V	KVar (A)	50 (150)	75 (250)	100 (300)	200 (580)
		440V		100 (150)	150 (250)	200 (300)	400 (580)
		1000V		250 (150)	300 (200)	300 (200)	—
1500V		350 (150)		500 (200)	500 (200)	—	
Resistance Load Rating Category AC-1		A	200	350	450	750	
Continuous Current Ith		A	200	350	450	750	
Short Circuit Interrupting Current		A	4,000			5040	
Withstand Current For Short Time	for 2 Seconds		kA	4			
	for 10 Milliseconds		kA	33			
Rated Operating Current of Aux. Contacts	Category AC-15	240 VAC	A	5			
		480 VAC		3			
		660 VAC		3			
	Category DC-13	110 VAC	A	1.2			
		220 VAC		0.2			

**Note:** A surge absorber is required for motors less than 5.5kW only.

## Characteristics

Frame Size			V160	V320	V400	V600
Mechanical Life (*1)	Operations		2.5 million			
Electrical Life (*2) (Category AC3)	Operations		0.5 million			
Permissible Ambient Temperature	Degree C		-10 to +55			
Coil Voltage Tolerance	Times		0.85 to 1.1 (rated coil voltage)			
Coil Consumption	AC Operated	Inrush VA	550			1150
		Sealed VA	45			55
		Watts W	5.2			7.3
	DC Operated	Inrush VA	500			—
		Sealed VA	40			—
Operating Time (Approx.)	Make	Msec	40			65
	Break	Msec	130			80
Make & Break Current Capacity	Make	Times	10 (at AC3 rated operating current)			
	Break	Times	8 (at AC3 rated operating current)			
Permissible Switching Frequency	Operations / Hour		1,200			
Vibration Resistance	10-55Hz	m/s <sup>2</sup>	19.6			
Shock Resistance	Sine Wave Pulse	m/s <sup>2</sup>	49			

**Notes:**

- Mechanical life of vacuum tube is 1 million.
- When the load is three phase capacitors, electrical life is 0.1 million operations.

## Coil Designation

Coil Designation	Rated Voltage
AC100V	100~127V 50/60Hz
AC200V	200~240V 50/60Hz
AC400V	380~440V 50/60Hz
AC500V	460~550V 50/60Hz

## Spare Parts and Accessories

Contactor Model Number	Coil Model Number (*1, *2)	Main Contact Model Number	Auxiliary Contacts Model Number		3300V Barrier
			Replacement (1NO-1NC)	Add-on (2NO-2NC)	
SH-V160	S-K220QM-COILAC□□□V	SHVBJ333C100G01 (*3)	UA-AXV1	UA-AXV2 (*4)	SHVBJ333D180G21
SH-V320		SHVBJ333C100G02 (*3)			SHVBJ333D180G22
SH-V400		SHVBJ333C100G03 (*3)			SHVBJ333D180G23
SH-V600	S-N300-COILAC□□□V	SHVBJ336C100G10 (*3)		UA-AXV4	—

### Notes:

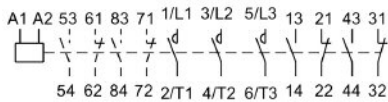
1. Insert appropriate voltage from coil designation table above.
2. Please note that only AC100V and AC200V are available with QM (quick make). Remove "QM" from pin for AC400V and AC500V coils.
3. Main contact kits consist of 3 vacuum bottles and any hardware needed attached to them.
4. Consists of two UA-AXV1 contact blocks on a mounting plate with an interlock to be installed on the left side of the contactor.

## Surge Absorber

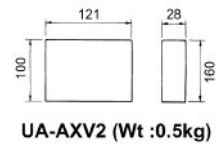
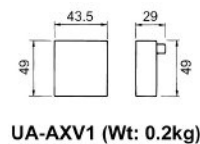
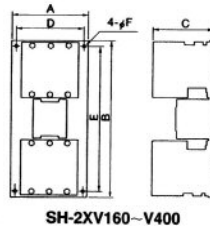
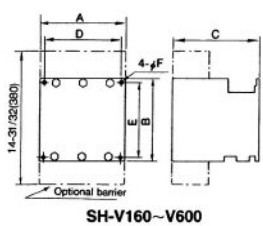
As the vacuum tubes of the SH-V use a special contact material, the surge voltage by current chopping is very small. Surge absorbers are required only for motors smaller than 5.5kW.

Applicable Voltage	Ordering Designation
up to 440VAC	UA-SU4
up to 550VAC	UA-SU5
up to 660VAC	UA-SU6
up to 1,000VAC	UA-SU10
up to 1,500VAC	UA-SU15

## SH-V Contact Arrangement



## SH-V Dimensions



Catalog Number	Dimensions in inches (millimeters)					
	Width A	Height B	Depth C	Mounting Holes		
				D	E	Hole Dia. F
SH-V160 ~ V400	8-17/64 (210)	8-17/64 (210)	8-17/64 (210)	7-31/64 (190)	7-31/64 (190)	11/32 (9)
SH-V600	11-27/64 (290)	11-15/64 (285)	8-15/16 (225)	10-5/8 (270)	10-15/64 (260)	11/32 (9)
SH-2XV160 ~ V400	11-1/32 (280)	23-15/64 (590)	9-1/16 (230)	9-27/32 (250)	21-21/32 (550)	11/32 (9)








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