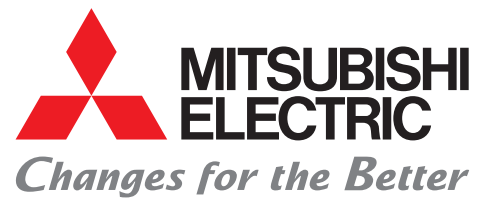




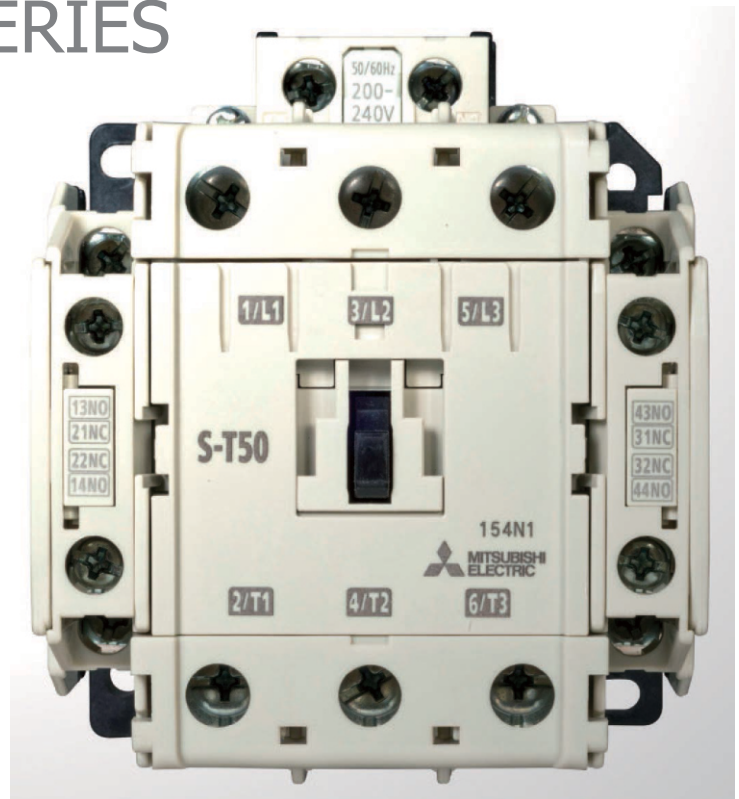
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FACTORY AUTOMATION

Mitsubishi Electric Magnetic Starters

MS-T/N SERIES



Low Voltage Circuit Breakers

《General Catalog》



**Empowering
Industries**

MS-T/N Series Specification List

AC Operated	Category AC-3 (Note 1) (Three- Phase Cage Motor Standard Duty) [kW/A] (Note 2)	AC220 to 240V AC380 to 440V	2.5/11 [2.2/11]	3.5/13 [2.7/13]	4.5/18 [3.7/18]	5.5/25 [4/20]	7.5/30(26) [5.5/26]	7.5/32 [7.5/32]	11/40 [7.5/35]	15/55 (50) [11/50]	18.5/65 [15/65]	
	AC500V	4/9 [2.7/7]	5.5/12 [4/9]	7.5/18 [7.5/18]	11/23 [7.5/20]	15/30(26) [11/25]	15/32 [15/32]	18.5/40 [15/32]	22/50 [22/48]	30/65 [30/65]		
	AC690V	4/7 [2.7/6]	5.5/9 [5.5/9]	7.5/17 [7.5/17]	11/17 [7.5/17]	15/24 [11/20]	15/24 [11/20]	18.5/32 [15/26]	25/38 [22/38]	37/60 [30/45]		
Conventional Free Air Thermal Current [A]		4/5	5.5/7	7.5/9	7.5/9	11/12	11/12	15/17	22/26	30/38		
		20	20	20	32	32	32	60	80	100		
MS-T/N Type Enclosed Magnetic Starters		1a	1a1b	1a1b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	
				—		—	—					
		MS-T10	MS-T12		MS-T21			MS-T35	MS-T50	MS-T65		
MSO-T/N Type Open Magnetic Starters							—					
		MSO-T10 MSO-T10BC	MSO-T12 MSO-T12BC	MSO-T20 MSO-T20BC	MSO-T21 MSO-T21BC	MSO-T25 MSO-T25BC		MSO-T35 MSO-T35BC	MSO-T50 MSO-T50BC	MSO-T65		
S-T/N Type Magnetic Contactors												
		S-T10 S-T10BC	S-T12 S-T12BC	S-T20 S-T20BC	S-T21 S-T21BC	S-T25 S-T25BC	S-T32 S-T32BC	S-T35 S-T35BC	S-T50 S-T50BC	S-T65		
TH-T/N Type Thermal Overload Relays												
		TH-T18(BC) TH-T18(BC)KP			TH-T25(BC) TH-T25(BC)KP		TH-T50(BC) TH-T50(BC)KP		TH-T65 TH-T65KP			
Current Range of Thermal Overload Relays [A]		0.1 to 11	0.1 to 13	0.1 to 18	0.2 to 18	0.2 to 26	—	0.2 to 34	0.2 to 50	12 to 65		
Electromagnetic Method		AC Operation/AC Excitation										
IEC 35 mm Rail Mounting		Applicable to AC690 V										
Surge Absorber		Externally Mounted Units (Model names with "SA" are externally mounted.)										
Auxiliary Twin Contacts												
Applied Products	DC Operated											
	Mechanically Latched Type											
	Delayed Release											

Note 1. The value in parentheses for the rated operating current is applicable in the case of magnetic contactors.

Note 2. , ,  stand for "manufactured range", while  stands for "outside manufactured range".

Note 3. "BC" in the model name refers to "wiring streamlining terminal".

Note 4. The value in parentheses for the motor capacity is applicable in the case of enclosed magnetic starters.

Note 5. Mechanically latched types and delay open types have differing auxiliary contact arrangements.

Refer to page 100 for details about mechanically latched types, or page 109 for delay open types.

Note 6. Because there are products that cannot be mounted, please refer to combination details on page 180 when applying optional products.

Magnetic Starters, Magnetic Contactors, Thermal Overload Relays

1

	22/85 [19/80]	30/105 [22/100]	37/125 [30/125]	45/150 [37/150]	55/180 [45/180]	75/250 [55/220]	90/300 [75/300]	125/400 [110/400]	190/630 [160/630]	220/800 [200/800]
	45/85 [37/80]	55/105 [45/93]	60/120 [60/120]	75/150 [75/150]	90/180 [90/180]	132/250 [110/220]	160/300 [150/300]	220/400 [200/400]	330/630 [300/630]	440/800 [400/800]
	45/75 [45/75]	55/85 [45/75]	60/90 [60/90]	90/140 [90/140]	110/180 [110/180]	132/200 [132/200]	160/250 [160/250]	225/350 [200/350]	330/500 [300/500]	500/720 [400/720]
	45/52	55/65	60/70	90/100	110/120	132/150	200/220	250/300	330/420	500/630
	120	150	150	200	260	260	350	450	660	800
	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b
									—	—
	MS-T80	MS-T100	MS-N125	MS-N150	MS-N180	MS-N220	MS-N300	MS-N400		
									—	—
	MSO-T80	MSO-T100	MSO-N125	MSO-N150	MSO-N180	MSO-N220	MSO-N300	MSO-N400		
										
	S-T80	S-T100	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
										
	TH-T100 TH-T100KP		TH-N120 TH-N120KP	TH-N120TA TH-N120TAKP	TH-N220RH TH-N220RHKP		TH-N400RH TH-N400RHKP		TH-N600 TH-N600KP (Excluding +CT supply)	
	12 to 80	12 to 100	34 to 125	34 to 150	65 to 180	65 to 220	85 to 300	85 to 400	200 to 800	
AC Operation/DC Excitation										
Built-in										

2 Selection and Application

2.1 Model List

Frame			T10	T12	T20	T21	T25	T32	T35	T50		
Applicable standard			JIS C8201-4-1, IEC60947-4-1, EN60947-4-1, GB14048.4									
Model Name	Magnetic Contactors (Without Thermal Overload Relay, Open Type)		Non-Reversing	S-T10	S-T12	S-T20	S-T21	S-T25	S-T32	S-T35	S-T50	
			Reversing	S-2 x T10	S-2 x T12	S-2 x T20	S-2 x T21	S-2 x T25	S-2 x T32	S-2 x T35	S-2 x T50	
	Magnetic Starters (With standard 2-element, With Thermal Overload Relay)	Enclosed Type	Non-Reversing	MS-T10	MS-T12	—	MS-T21	—	—	MS-T35	MS-T50	
			Reversing	—	—	MS-2 x T21	—	—	MS-2 x T35	MS-2 x T50		
		Open Type	Non-Reversing	MSO-T10	MSO-T12	MSO-T20	MSO-T21	MSO-T25	—	MSO-T35	MSO-T50	
			Reversing	MSO-2 x T10	MSO-2 x T12	MSO-2 x T20	MSO-2 x T21	MSO-2 x T25	—	MSO-2 x T35	MSO-2 x T50	
			Combined Thermal Overload Relays	TH-T18				TH-T25		TH-T25 / T50	TH-T25 / T50	
Magnetic Starters With 3-element type Thermal Overload Relays		Non-Reversing	MSO-T10KP	MSO-T12KP	MSO-T20KP	MSO-T21KP	MSO-T25KP	—	MSO-T35KP	MSO-T50KP		
		Reversing	MSO-2 x T10KP	MSO-2 x T12KP	MSO-2 x T20KP	MSO-2 x T21KP	MSO-2 x T25KP	—	MSO-2 x T35KP	MSO-2 x T50KP		
		Combined Thermal Overload Relays	TH-T18KP				TH-T25KP		TH-T25 / T50KP	TH-T25 / T50KP		
Main contact rating	Rated Insulation Voltage		[V]	690								
	Rated Impulse Withstand Voltage		[kV]	6								
	Rated Frequency		[Hz]	50/60								
	Pollution Degree			3								
	Rated operational current / power Category AC-3 (Note 1)		AC220 to 240V	2.5/11 [2.2/11]	3.5/13 [2.7/13]	4.5/18 [3.7/18]	5.5/25 [4/20]	7.5/30[26] [5.5/26]	7.5/32 [7.5/32]	11/40 [7.5/35]	15/55 [50] [11/50]	
			AC380 to 440V	4/9 [2.7/7]	5.5/12 [4/9]	7.5/18 [7.5/18]	11/23 [7.5/20]	15/30[26] [11/25]	15/32 [15/32]	18.5/40 [15/32]	22/50 [22/48]	
	(Three-phase squirrel-cage motor load standard responsibility) (Note 2) [kW/A]		AC500V	4/7 [2.7/6]	5.5/9 [5.5/9]	7.5/17 [7.5/17]	11/17 [7.5/17]	15/24 [11/20]	15/24 [11/20]	18.5/32 [15/26]	25/38 [22/38]	
			AC690V	4/5	5.5/7	7.5/9	7.5/9	11/12	11/12	15/17	22/26	
	Rated operational current / power Category AC-4 (Three-phase squirrel-cage motor load inching responsibility) [kW/A]		AC220 to 240V	1.5/8	2.2/11	3.7/18		4.5/20	5.5/26	5.5/26	7.5/35	
			AC380 to 440V	2.2/6	4/9	5.5/13		7.5/17	11/24	11/24	15/32	
			AC500V	2.7/6	5.5/9	5.5/10		7.5/12	7.5/13	11/17	15/24	
	Rated operational current / power Category AC-1 (Resistance, heater load)		AC100 to 240V	20				32		60	80	
			AC380 to 440V	11	13		32		60	80	80	
Conventional Free Air Thermal Current Ith		[A]	20				32		60	80		
Auxiliary contact rating	Contact Arrangement	Standard Accessory (Note 7)	Non-Reversing	1a	1a1b		2a2b		—	2a2b	2a2b	
			Reversing (Note 8, Note 10)	1a x 2 + 2b	1a1b x 2 + 2b		2a2b x 2		2a2b x 2	2a2b x 2	2a2b x 2	
		Special accessory	Non-Reversing	1b	2a		—	—		—	—	
			Reversing (Note 4, Note 6)	1a x 2 + 2b	2a x 2 + 2b		—	—		—	—	
	Max. number of additional options (Note 10)	Non-Reversing	1 for UT-AX2/4, 2 for UT-AX11									
		Reversing (Note 8, Note 10)	2 for any UT-AX2/4/11						—	2 for any UT-AX2/4/11		
	Rated Operating Current (Category AC-15: Alternating current coil load) [A]		AC120V	6	6	6	6	6	6	6	6	
			AC240V	3	3	3	3	3	3	3	3	
	Rated Operational Current (Category DC-13 : Direct current coil load)		DC24V	3								
			DC110V	0.6								
Performance	Conventional Free Air Thermal Current Ith		[A]	10	10	10	10	10	10	10		
	Mechanical Durability		[x 10000]	1000								
	Electrical Durability (Note 5) [Ten thousand times]	Category AC-3	200 (Note 5, 6)									
		Category AC-4	3 (Note 5)									
		Category AC-1	50									
	Switching Frequency [Times/Hour]	Category AC-3	1800								1200	
Category AC-4		300										
Category AC-1		1200										
Characteristic	Coil consumption (Note7) [VA]		Sealed	7			7		4.5	10		
			Inrush	45			75		55	110		
Outside Dimensions	Power Consumption (Note 7) [W]			2.2			2.4	2.4	1.8	3.8	3.8	
	Magnetic Contactors (without Thermal Overload Relays) (Width x Height x Depth) [mm]	Non-Reversing	36 x 75 x 78	44 x 75 x 78			63 x 81 x 81		43 x 81 x 81	75 x 89 x 91		
		Reversing	82 x 85 x 78	98 x 85 x 78			136 x 81 x 81		96 x 81 x 111	160 x 114 x 97		
	Open Type Magnetic Starters (Width x Height x Depth) [mm]	Non-Reversing	46 x 115 x 79			63 x 128 x 82		—		75 x 157.5 x 91		
		Reversing	90.5 x 125 x 79	98.5 x 125 x 79			136 x 138 x 82		—		160 x 179 x 97	
	Enclosed Magnetic Starters (Width x Height x Depth) [mm]		Non-Reversing	76x165x97.5			104x176x110		—		135x231x126	
		Reversing	—			220x192x115		—		300x247x130		
IEC 35mm rail mounting			Possible (excluding Enclosed Magnetic Starters)									
Installable Optional Unit Model Names (Note 12)	Additional Auxiliary Contact Units	(Contact Arrangement 1a1b)	UT-AX2/AX11									
		(Contact Arrangement 2a2b)	UT-AX4									
		With Low-Level Signal Contact	—									
	Coil Surge Absorber Units (Note 4)	(Varistor) (Note 4)	UT-SA21									
		(Varistor + Display LED)	UT-SA22									
		(CR)	UT-SA23									
		(Varistor + CR)	UT-SA25									
	DC-AC Interface	Triac Output	UT-SY21									
		Contact Output	UT-SY22									
	Live Part Protection Cover	For Magnetic Starters	Non-Reversing	—								
			Reversing	—								
		For Magnetic Contactors	Non-Reversing	—								
			Reversing	—								
	Terminal Cover	For Magnetic Starters (Non-Reversing)	(Standard Equipment)									
For Magnetic Contactors (Non-Reversing)		(Standard Equipment)										
Mechanical Interlock Units			UT-ML11 (Note 13)				UN-ML21					

- Note 1. The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times for T10 to T65 (1,000,000 times for the T20 380V, T80 and T100). Refer to the electric durability curve for the life performance.
- Note 2. The value between parentheses for the rated operating current is for the magnetic contactor (without thermal overload relay), while the value between parentheses for the motor capacity applies to an enclosed type magnetic starter.
- Note 3. AC operated types T10 to T50, DC operated types T12 to T50 can be manufactured with coil surge absorber (□-□SA type). The UT-SA21 type can be mounted.
- Note 4. T65 to N800 types have an integrated coil surge absorber rendering a coil surge absorber unit for prevention of coil switching surges unnecessary.
- Note 5. 1 million times for T20 class AC-3 380 V or more types for the rating in parentheses and 15,000 times for class AC-4 types. 15 thousand times for T35 to N800 class AC-4 380 V or more types.
- Note 6. Values are for the ratings in parentheses. The electrical durability for the current values not in parentheses varies inversely with the rough square of the current.
- Note 7. Mechanically latched types and delay open types have differing auxiliary contact arrangements. Refer to page 100 for details about mechanically latched types, or page 109 for delay open types.

	T65	T80	T100	N125	N150	N180	N220	N300	N400	N600	N800
	JIS C8201-4-1, IEC60947-4-1, EN60947-4-1, GB14048.4										
	S-T65	S-T80	S-T100	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
	S-2 x T65	S-2 x T80	S-2 x T100	S-2 x N125	S-2 x N150	S-2 x N180	S-2 x N220	S-2 x N300	S-2 x N400	S-2 x N600	S-2 x N800
	MS-T65	MS-T80	MS-T100	MS-N125	MS-N150	MS-N180	MS-N220	MS-N300	MS-N400	—	—
	MS-2 x T65	MS-2 x T80	MS-2 x T100	MS-2 x N125	MS-2 x N150	MS-2 x N180	MS-2 x N220	MS-2 x N300	MS-2 x N400	—	—
	MSO-T65	MSO-T80	MSO-T100	MSO-N125	MSO-N150	MSO-N180	MSO-N220	MSO-N300	MSO-N400	—	—
	MSO-2 x T65	MSO-2 x T80	MSO-2 x T100	MSO-2 x N125	MSO-2 x N150	MSO-2 x N180	MSO-2 x N220	MSO-2 x N300	MSO-2 x N400	—	—
	TH-T65	TH-T65 / T100	TH-T65 / T100	TH-N120(TA)	TH-N120(TA)	TH-N220RH	TH-N220RH	TH-N400RH	TH-N400RH	TH-N600(+CT)	TH-N600(+CT)
	MSO-T65KP	MSO-T80KP	MSO-T100KP	MSO-N125KP	MSO-N150KP	MSO-N180KP	MSO-N220KP	MSO-N300KP	MSO-N400KP	—	—
	MSO-2 x T65KP	MSO-2 x T80KP	MSO-2 x T100KP	MSO-2 x N125KP	MSO-2 x N150KP	MSO-2 x N180KP	MSO-2 x N220KP	MSO-2 x N300KP	MSO-2 x N400KP	—	—
	TH-T65KP	TH-T65 / T100KP	TH-T65 / T100KP	TH-N120(TA)KP	TH-N120(TA)KP	TH-N220RHKP	TH-N220RHKP	TH-N400RHKP	TH-K400RHKP	TH-N600KP(+CT)	TH-N600KP(+CT)
	690										
	6										
	50/60										
	3										
	18.5/65 [15/65]	22/85 [19/80]	30/105 [22/100]	37/125 [30/125]	45/150 [37/150]	55/180 [45/180]	75/250 [55/220]	90/300 [75/300]	125/400 [110/400]	190/630 [160/630]	220/800 [200/800]
	30/65 [30/65]	45/85 [37/80]	55/105 [45/93]	60/120 [60/120]	75/150 [75/150]	90/180 [90/180]	132/250 [110/220]	160/300 [150/300]	220/400 [200/400]	330/630 [300/630]	440/800 [400/800]
	37/60 [30/45]	45/75 [45/75]	55/85 [45/75]	60/90 [60/90]	90/140 [90/140]	110/180 [110/180]	132/200 [132/200]	160/250 [160/250]	225/350 [200/350]	330/500 [300/500]	500/720 [400/720]
	30/38	45/52	55/65	60/70	90/100	110/120	132/150	200/220	250/300	330/420	500/630
	11/50	15/65	19/80	22/93	30/125	37/150	45/180	55/220	75/300	110/400	160/630
	22/47	30/62	37/75	45/90	55/110	75/150	90/180	110/220	150/300	200/400	300/630
	22/38	30/45	37/55	45/65	55/80	75/140	90/140	110/200	150/250	200/350	300/500
	100	120	150	150	200	260	260	350	450	660	800
	100	120	150	150	200	260	260	350	450	660	800
	100	120	150	150	200	260	260	350	450	660	800
	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b	2a2b
	2a2b x 2	2a2b x 2	2a2b x 2	2a2b x 2	3a3b x 2	3a3b x 2	3a3b x 2	3a3b x 2	3a3b x 2	4a4b x 2	4a4b x 2
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	1 for UT-AX2/4, 2 for UT-AX11		4a4b	4a4b	4a4b	4a4b	4a4b	4a4b	4a4b	4a4b	4a4b
	2 for any UT-AX2/4/11		3a3b x 2	3a3b x 2	—	—	—	—	—	—	—
	6	6	6	6	6	6	6	6	6	6	6
	3	3	3	3	3	3	3	3	3	3	3
	3			3	3	3	3	3	3	3	3
	0.6										
	10	10	10	10	10	10	10	10	10	10	10
	500										
	200	100							50		
	3 (Note 5)										
	50										
	1200										
	300										
	1200		600								
	20		23	24	24	40	40	50	50	90	90
	115		210	270	270	440	440	440	440	790	790
	2.2	2.2	2.8	2.9	2.9	4.2	4.2	6.1	6.1	17	17
	88 x 106 x 106	88 x 106 x 106	100 x 124 x 127	100 x 150 x 137	120 x 160 x 145	138 x 204 x 175	138 x 204 x 175	163 x 243 x 195	163 x 243 x 195	290 x 310 x 235	290 x 310 x 235
	216 x 115 x 112	216 x 115 x 112	270 x 140 x 137	276 x 150 x 148	296 x 160 x 156	370 x 215 x 189	370 x 215 x 189	395 x 250 x 209	895 x 250 x 209	660 x 435 x 254	660 x 435 x 254
	90 x 158 x 106	90 x 174.5 x 106	100 x 196 x 127	112 x 239 x 137	120 x 250 x 145	144 x 282 x 180.5	144 x 282 x 180.5	163 x 360 x 195	163 x 360 x 195	—	—
	216 x 169 x 112	216 x 185.5 x 112	270 x 213 x 137	276 x 251 x 148	296 x 276 x 156	370 x 304 x 194.5	370 x 304 x 194.5	395 x 392 x 209	395 x 392 x 209	—	—
	160 x 282 x 145		190 x 317 x 163	230 x 396 x 190	270 x 496 x 209			—		—	—
	320 x 282 x 140		410 x 347 x 154	440 x 436 x 170	520 x 536 x 209			600 x 616 x 230		—	—
	Possible (excluding Enclosed Magnetic Starters)		—	—	—	—	—	—	—	—	—
	UN-AX2/AX11		UN-AX80			UN-AX150				—	—
	UN-AX4		—	—	—	—	—	—	—	UN-AX600	
	UN-LL22		—	—	—	—	—	—	—	—	—
	—		—	—	—	—	—	—	—	—	—
	—		—	—	—	—	—	—	—	—	—
	—		—	—	—	—	—	—	—	—	—
	—		—	—	—	—	—	—	—	—	—
	UN-SY31		—	—	—	—	—	—	—	—	—
	UN-SY32		—	—	—	—	—	—	—	—	—
	UN-CZ500 + UN-CZ501		UN-CZ800+ UN-CZ801	UN-CZ1250+ UN-CZ1251	UN-CZ1500+ UN-CZ1501	UN-CZ2200 + UN-CZ2201		UN-CZ3000 + UN-CZ3001		—	—
	UN-CZ504		UN-CZ804	UN-CZ1254	UN-CZ1504	UN-CZ2204		UN-CZ3004		—	—
	UN-CZ500 x 2		UN-CZ800 x 2	UN-CZ1250 x 2	UN-CZ1500 x 2	UN-CZ2200 x 2		UN-CZ3000 x 2		—	—
	UN-CZ502		UN-CZ802	UN-CZ1252	UN-CZ1502	UN-CZ2202		UN-CZ3002		—	—
	UT-CW800 + UT-CW655		—	—	—	—	—	—	—	—	—
	UT-CW800		—	—	—	—	—	—	—	—	—
	UN-ML21		UN-ML80		UN-ML150	UN-ML220				—	—

Note 8. Operational coil input and coil consumption are average values in case of applying 220V60Hz to AC200V coil.

Note 9. The +2b on the auxiliary contact arrangement of reversible T10 to T20 types indicates the break contact of the integrated UT-ML11 interlock unit.

There is no need to specify when ordering.

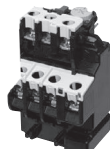
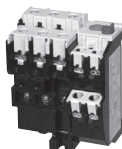
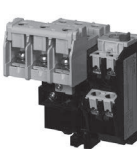
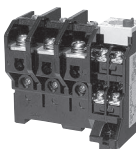
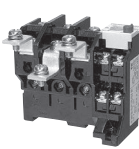
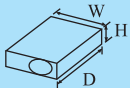
Note 10. The body and auxiliary contact unit can be additionally installed by the customer as a separate arrangement. Enclosed type auxiliary contact units and mechanically latched front clip-on auxiliary contacts cannot be additionally installed. Refer to page 182 for details about auxiliary contact units.

Note 11. Auxiliary contact arrangements for reversible types are displayed by twos, in a contact arrangement combined with two magnetic contactors. For standard contact arrangements there is no need to specify when ordering; however, please specify a matching contact arrangement for 2 units if for a special configuration. <Example> For 1b x 2 + 2b: 2B

Note 12. Because there are products that cannot be mounted, please refer to combination details on page 180 when applying optional products.

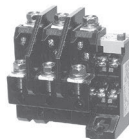
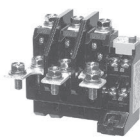
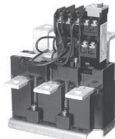
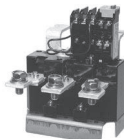
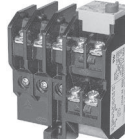
Note 13. The DC operated type is combined with UT-ML20.

5.1 Model List

Frame			T18	T25	T50	T65	T100		
Appearance									
Model Name	Standard with 2-Element	For Magnetic starters	TH-T18	TH-T25	TH-T50	TH-T65	TH-T100		
		For Independent thermal unit	UT-HZ18 + TH-T18		—		—		
	With 3-Element (2E)	For Magnetic starters	TH-T18KP	TH-T25KP	TH-T50KP	TH-T65KP	TH-T100KP		
	Outline Drawing [mm] W x H x D	For Magnetic starters	46 x 55 x 76.5	63 x 53 x 80	74.3 x 74 x 88	89 x 57 x 83.5	89 x 68.5 x 83.5		
		For Independent thermal unit	46 x 63 x 82.4		—		—	—	
	Product Weight [kg]	For Magnetic starters	0.11	0.16	0.2	0.26	0.32		
	For Independent thermal unit	0.16	—		—		—		
Applicable Standard			JIS C8201-4-1, IEC60947-4-1, EN60947-4-1, GB14048.4						
Use Conditions		Ambient Temperature [°C]	-10 to +40 (Standard is 20°C, Inner Panel Maximum Temperature is 55°C)						
		Frequency [Hz]	0 (DC) to 400						
Specifications of the Main Circuit	Rated Insulation Voltage [V]		690						
	Rated Impulse Withstand Voltage [kV]		6						
	Pollution Degree		3						
	Heater Designation (Adjustment Range of Settling Current) [A] (The --- line in the table on the right represents the correspondence between the magnetic contactor and frame to be combined) (Refer to the relevant text regarding the heater designation of the applied products)		0.12 (0.1 to 0.16)	0.24 (0.2 to 0.32)	29 (24 to 34)	15 (12 to 18)	67 (54 to 80)		
			0.17 (0.14 to 0.22)	0.35 (0.28 to 0.42)	35 (30 to 40)	22 (18 to 26)	82 (65 to 100)		
			0.24 (0.2 to 0.32)	0.5 (0.4 to 0.6)	42 (34 to 50)	29 (24 to 34)	95 (85 to 105)		
			0.35 (0.28 to 0.42)	0.7 (0.55 to 0.85)	—	35 (30 to 40)	—		
			0.5 (0.4 to 0.6)	0.9 (0.7 to 1.1)	—	42 (34 to 50)	—		
			0.7 (0.55 to 0.85)	1.3 (1 to 1.6)	—	54 (43 to 65)	—		
			0.9 (0.7 to 1.1)	1.7 (1.4 to 2)	—	—	—		
			1.3 (1 to 1.6)	2.1 (1.7 to 2.5)	—	—	—		
			1.7 (1.4 to 2)	2.5 (2 to 3)	—	—	—		
			2.1 (1.7 to 2.5)	3.6 (2.8 to 4.4)	—	—	—		
2.5 (2 to 3)	5 (4 to 6)	—	—	—					
3.6 (2.8 to 4.4)	6.6 (5.2 to 8)	—	—	—					
5 (4 to 6)	9 (7 to 11)	—	—	—					
6.6 (5.2 to 8)	11 (9 to 13)	—	—	—					
9 (7 to 11)	15 (12 to 18)	—	—	—					
11 (9 to 13)	22 (18 to 26)	—	—	—					
15 (12 to 18)									
Power Consumption [VA/Element] Minimum/Maximum Settling			0.8/1.8	1.0/2.1	1.6/3.2	2.4/5.5	2.5/6.0		
Terminal Screw Size			M3.5	M4	M5	M6	M6		
Terminal-Compatible		Wire Size [mm ²]	φ 1.6, 0.75 to 2.5	φ 1.6 to 2.6, 1.25 to 6	φ 2 to 3.6, 4 to 14	—	—		
		Crimp Lug Size	1.25-3.5 to 2-3.5, 5.5-S3	1.25-4 to 5.5-4	5.5-5 to 14-5	5.5-6 to 22-6	14-6 to 22-6, 38-S6		
Specifications of the Control Circuit (Contact)	Contact Arrangement		1a1b	1a1b	1a1b	1a1b	1a1b		
	Conventional Free Air Thermal Current Ith [A]		2	5	5	5	5		
	Rating Use Current [A]	Category AC-15 (AC Contactors Coil Switching) Make Contact/Break Contact The value in parentheses is the rating during auto reset	AC24 V	2 (0.5)/2 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	
			AC120 V	2 (0.5)/2 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	
			AC240 V	1 (0.5)/1 (0.5)	1 (0.5)/2 (0.5)	1 (0.5)/2 (0.5)	1 (0.5)/2 (0.5)	1 (0.5)/2 (0.5)	
			AC550 V	0.3 (0.3)/0.3 (0.3)	0.3 (0.3)/0.3 (0.3)	0.3 (0.3)/0.3 (0.3)	0.5 (0.5)/1 (0.5)	0.5 (0.5)/1 (0.5)	
		Category DC-13 (DC Contactors Coil Switching) The value in parentheses is the rating during auto reset	DC24 V	0.5(0.3)	1(0.3)	1(0.3)	1(0.3)	1(0.3)	
			DC110 V	0.2(0.2)	0.2(0.2)	0.2(0.2)	0.2(0.2)	0.2(0.2)	
			DC220 V	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.1(0.1)	
			Minimum Applicable Load Level		20 V 5 mA	20 V 5 mA	20 V 5 mA	20 V 5 mA	20 V 5 mA
	Terminal Screw Size			M3.5	M3.5	M3.5	M4	M4	
	Terminal-Compatible		Wire Size [mm ²]	φ 1.6, 0.75 to 2.5	φ 1.6, 0.75 to 2.5	φ 1.6, 1.25 to 2	φ 1.6, 1.25 to 2	φ 1.6, 1.25 to 2	
			Crimp Lug Size	1.25-3.5 to 2-3.5	1.25-3.5 to 2-3.5	1.25-3.5 to 2-3.5	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4	
	Properties/Functions	Operating Characteristic Curve Page		145					
		Vibration Resistance (Vibration and Malfunction Resistance Performance)		10 to 55 Hz 19.6 m/s ²					
		Trip Free		☐	☐	☐	☐	☐	
Reset Method		Manual/Automatic Switchable	Manual/Automatic Switchable	Manual/Automatic Switchable	Manual/Automatic Switchable	Manual/Automatic Switchable			
Operation Indicator (Lever Display)		☐	☐	☐	☐	☐			
Manual Tripping Check		☐	☐	☐	☐	☐			
Frame of the Combined Magnetic Contactor			T10, T12, T20 T12, T20 T20	T21, T25, T35, T50	T35, T50 T50	T65, T80, T100	T80, T100 T100		
Applied Products	With Saturable Reactor [See Page 138]	With 2-Element (TH-□ SR)	○ (TH-T18SR)	○ (TH-T25SR)	○ (TH-T50SR)	○ (TH-T65SR)	○ (TH-T100SR)		
		With 3-Element (2E) (TH-□ KPSR)	—	○ (TH-T25KPSR)	○ (TH-T50KPSR)	○ (TH-T65KPSR)	○ (TH-T100KPSR)		
	Quick Trip Type [See Page 139]	With 2-Element (TH-□ FS)	—	□ (TH-T25FS)	□ (TH-T50FS)	□ (TH-T65FS)	□ (TH-T100FS)		
		With 3-Element (2E) (TH-□ FSKP, KF)	□ (TH-T18FSKP)	□ (TH-T25FSKP)	□ (TH-T50FSKP)	□ (TH-T65FSKP)	□ (TH-T100FSKP)		
Optional	Live Part Protection Cover		(Standard Equipment)	(Standard Equipment)	(Standard Equipment)	□ (UN-CZ605)	—		
	Reset Release		□ (UT-RR□ 5)	□ (UN-RR□ 0)	□ (UN-RR□ 0)	□ (UN-RR□ 6)	□ (UN-RR□ 6)		
	Operation Indicator Lamp		□ (UN-TL12)	□ (UN-TL20)	□ (UN-TL20)	□ (UN-TL60)	□ (UN-TL60)		
	Independent/IEC 35 mm Rail Mounting Unit		□ (UT-HZ18)	□ (UN-RM20)	—	—	—		
Misoperation Prevention Cover			—	□ (UN-CV203)	□ (UN-CV203)	□ (UN-CV603)	□ (UN-CV603)		

Note 1. All model names come with ambient temperature compensation device.

Note 2. □ indicates standard type (standard equipment), ○ indicates semi-standard type, □ indicates special products and - indicates products outside production range.

	N120	N120TA	N220	N400	N600
					
	TH-N120	TH-N120TA	TH-N220RH	TH-N400RH	TH-N600 (Note 3)
		TH-N120TAHZ	TH-N220HZ	TH-N400HZ	
	TH-N120KP	TH-N120TAKP	TH-N220RHKP	TH-N400RHKP	TH-N600KP (Note 3)
		TH-N120TAHZKP	TH-N220HZKP	TH-N400HZKP	
	103 x 67 x 105	112 x 87 x 105	144 x 114 x 179.5	144 x 160 x 193.5	63 x 42 x 83.5
		112 x 103 x 105	144 x 104 x 166.5	144 x 173 x 166.5	
	0.48	0.75	2.5	2.7	0.14
		1.0	2.5	2.7	
	JIS, JEM, IEC, VDE, BS, UL, GB				
	-10 to +40 (Standard is 20°C, Inner Panel Maximum Temperature is 55°C)				
	0 (DC) to 400		50 to 60		
	690				
	6				
	3				
	42 (34 to 50) 54 (43 to 65) 67 (54 to 80) 82 (65 to 100)	105 (85 to 125) 125 (100 to 150)	82 (65 to 100) 105 (85 to 125) 125 (100 to 150) 150 (120 to 180) 180 (140 to 220) 210 (170 to 250)	105 (85 to 125) 125 (100 to 150) 150 (120 to 180) 180 (140 to 220) 250 (200 to 300) 330 (260 to 400) * The thermal overload relay with the heater designation of 180A or less is the same as the N220 frame.	250 (200 to 300) (Current Transformer Ratio 400/5 A) 330 (260 to 400) (Current Transformer Ratio 500/5 A) 500 (400 to 600) (Current Transformer Ratio 750/5 A) 660 (520 to 800) (Current Transformer Ratio 1000/5 A)
	3.0/7.1	3.8/8.6	1.0/2.3 (Note 4)	1.0/2.3 (Note 4)	1.0/2.3 (Note 4)
	M8	M8	M10	M12	—
	—	—	—	—	—
	8-8 to 38-8	38-8 to 100-8	22-10 to 150-10	22-12 to 200-12	—
	1a1b	1a1b	1a1b	1a1b	1a1b
	5	5	5	5	5
	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)
	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)	2 (0.5)/3 (0.5)
	1 (0.5)/2 (0.5)	1 (0.5)/2 (0.5)	1 (0.5)/2 (0.5)	1 (0.5)/2 (0.5)	1 (0.5)/2 (0.5)
	0.5 (0.5)/1 (0.5)	0.5 (0.5)/1 (0.5)	0.5 (0.5)/1 (0.5)	0.5 (0.5)/1 (0.5)	0.5 (0.5)/1 (0.5)
	1(0.3)	1(0.3)	1(0.3)	1(0.3)	1(0.3)
	0.2(0.2)	0.2(0.2)	0.2(0.2)	0.2(0.2)	0.2(0.2)
	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.1(0.1)
	20 V 5 mA	20 V 5 mA	20 V 5 mA	20 V 5 mA	20 V 5 mA
	M4	M4	M4	M4	M4
	φ 1.6, 1.25 to 2	φ 1.6, 1.25 to 2	φ 1.6, 1.25 to 2	φ 1.6, 1.25 to 2	φ 1.6, 1.25 to 2
	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4	1.25-4 to 2-4, 5.5-S4
	148		148		148
	10 to 55 Hz 19.6 m/s ²				
	☐	☐	☐	☐	☐
	Manual/Automatic Switchable	Manual/Automatic Switchable	Manual/Automatic Switchable	Manual/Automatic Switchable	Manual/Automatic Switchable
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	N125, N150	N125, N150 N150	N180, N220 N220	N300, N400 N400	N600, N800
	○ (TH-N120SR)	○ (TH-N120TASR)	○ (TH-N220□ SR)	○ (TH-N400□ SR)	○ (TH-N600SR)
	○ (TH-N120KPSR)	○ (TH-N120TAKPSR)	○ (TH-N220□ KPSR)	○ (TH-N400□ KPSR)	○ (TH-N600KPSR)
	—	—	—	—	—
	—	—	—	—	—
	—	—	—	—	—
	☐ (UN-RR□ 6)	☐ (UN-RR□ 6)	☐ (UN-RR□ 6)	☐ (UN-RR□ 6)	☐ (UN-RR□ 6)
	☐ (UN-TL60)	☐ (UN-TL60)	☐ (UN-TL60)	☐ (UN-TL60)	☐ (UN-TL60)
	—	—	—	—	—
	☐ (UN-CV603)	☐ (UN-CV603)	☐ (UN-CV603)	☐ (UN-CV603)	☐ (UN-CV603)

Note 3. Use TH-N600(KP) in combination with current transformer for measuring instruments (rated secondary load of 15 V or CW-15L for 250, 330 and 500 A, and CW-40LM for 660 A. The ratio of current transformation is as shown in the heater designation field in the table.

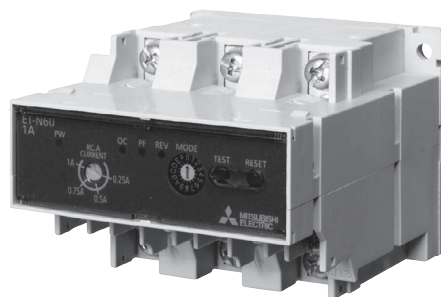
Note 4. The power consumption indicates the amount consumed by the heater element only. (The current transformer consumption amounts of the N220 to N600 frames are not included.)

11.7 ET-N□ Electric Motor Protection Relays

Electric motor protection relays that can protect against overloads (including restriction) and open-phases (including unbalanced currents) during AC motor start-up or running, as well as detect reverse-phase states.

Features

- **Optimal Protection to Suit Load Properties**
Protection function and overload operating time can be selected to suit the load via the mode setting switch.
Protection Function: Overload, Open-Phase and Reverse-Phase Combination
Operating Time: Select Among 3/5/7/15/30 Seconds
(At Current 600% of Setpoint)
- **Wide Current Settling Range**
Applicable with a current settling range 3 to 4 times the minimum scale.
- **Easy Fault-Finding Via Operation Indicator Lamp**
Indicators: Power/Overload/Open-Phase/Reverse-Phase
- **Indicates Load Equipment Running State**
Indicates the normal running or stopped states of load equipment.
- **Output Contacts 1a1b**
Make contacts and break contacts are completely independent and can be used with circuits at different voltages.
- **Simple Operation**
Has settings/operation displays located on the front surface to make initial settings and maintenance easy.
Settings/operation displays have protective covers to prevent misoperation.
- **Operation Checking**
Checking of overload operation properties is possible.
Can also be operated momentarily with external testing circuits.
- **Self-Diagnosing Functionality**
Equipped with self-diagnosing functionality that triggers a trip when abnormalities are detected.



ET-N60

- **Compact**
ET-N60 have a reduced width of 78 mm which is effective for reducing the size of control panels.
- **Simple Wiring**
The main circuit wiring is connected via terminals so there is no need to wind up main circuit power lines.
- **Rail Mounting Standardized**
ET-N60 can be mounted on IEC, DIN and JIS standards compliant 35 mm width rail.

Type Designations

· Electric Motor Protection Relays

ET		-	N60		△	20A		△	AC100V		
Symbol		Frame Size		Symbol		Current Setting Range		Symbol		Operating Voltage	
N60		60 A Frame		1A		0.25 to 1 A		AC100V		AC100 to 120 V 50/60 Hz	
				4A		1 to 4 A		AC200V		AC200 to 240 V 50/60 Hz	
N150		150 A Frame		8A		2 to 8 A					
N360		360 A Frame		20A		5 to 20 A					
				60A		15 to 60 A					
				150A		40 to 150 A					
				360A		110 to 360 A					

· Terminal Cover Units

UN	CV602
Symbol Indicates Unit	Symbol Indicating Unit Product Name
	ET-N60 Terminal Cover

Rating

Model Name	Range of Settling Current [A]	Applicable Motor Capacity [kW]		Model Name	Range of Settling Current [A]	Applicable Motor Capacity [kW]	
		200 to 220 V	400 to 440 V			200 to 220 V	400 to 440 V
ET-N60	1A	0.25 to 1	0.03 to 0.2	ET-N60	60A	3.7 to 11	7.5 to 22
ET-N60	4A	1 to 4	0.2 to 0.75	ET-N150	150A	11 to 37	22 to 75
ET-N60	8A	2 to 8	0.4 to 1.5	ET-N360	360A	30 to 90	55 to 150
ET-N60	20A	5 to 20	1.5 to 4				

● Properties

Main Circuit Rated Insulation Voltage		660 V 50/60 Hz						
Rated Current		1 A	4 A	8 A	20 A	60 A	150 A	360 A
Current Settling Range		0.25 to 1 A	1 to 4 A	2 to 8 A	5 to 20 A	15 to 60 A	40 to 150 A	110 to 360 A
Control Circuit Rated Operating Voltage		100 to 120 V or 200 to 240 V 50/60 Hz						
Allowable Operating Voltage Fluctuation Range		85 to 110% of Rated Operating Voltage						
Control Circuit Input		For AC100 V: 7 VA (With AC100 V Applied)/For AC200 V: 14 VA (With AC200 V Applied)						
Output Contact	Contact Arrangement	1a1b						
	Rating	AC240 V 1 A, AC120 V 2 A (Class AC-15)						
	Reset	Manual Reset						
Protection Mode		Overload/Overload + Open-Phase/Overload + Open-Phase + Reverse-Phase						
Overload	Operating Current	115±5%						
	Operating Time	3/5/7/15/30 Seconds (at 600% Current)						
	Operating Method	Heat-Accumulating Operation (Inching/Hot Start Protection)						
Open Phase	Imbalance Sensitivity	30 to 50%						
	Operating Time	3±1 s						
Reverse-Phase	Detection Method	Current Detection						
	Operating Time	0.5 s or Less						
Property Fluctuations As Voltage Fluctuates		Operating Current ±5%, Operating Time ±10%						
Property Fluctuations As Temperature Fluctuates		Operating Current ±5%, Operating Time ±10%						
Operation Indicator Lamp		Power/Overload/Open-Phase/Reverse-Phase Individual Tripping Indicators						
Withstand Voltage		Main Circuit: AC2500 V for 1 Minute, Operation Control Circuit: AC2000 V for 1 Minute						

● Working Environment Criteria

- (1) Ambient Temperature: -10 to 55°C (no condensation, no freezing)
- (2) Relative Humidity: 45 to 85% RH
- (3) Vibration: 10 to 55 Hz 19.6 m/s² or Less
- (4) Shock: 49 m/s² or Less
- (5) Altitude: 2000 m or Below

● Handling

● Control Panel

The protection mode setting switch and current adjusting dial have a control groove to support control operations via compact minus (flathead) screwdrivers.

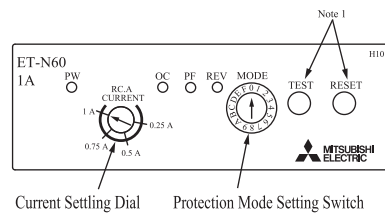


Fig. 1. Control Panel

Note 1. When operating the buttons with the protective cover on, do so with the button front surface part open. If the buttons are pressed from above the cover without opening it, unnecessary operations may occur.

● Protection Mode Settings

Configure the protection function and operating time via the protection mode settings switch to suit the load characteristics and application before use. The switch is set to position 0 at shipping.

However, if the settings switch is stopped between two values unstable operation may result, so take care ensure a clear selection is made.

Do not set the switch to the “F” position.

● Protection Mode Setting Switch Settings and Protection Functionality

Set Position	Protection Function	Operating Time (At 600% I)	Set Position	Protection Function	Operating Time (At 600% I)	Set Position	Protection Function	Operating Time (At 600% I)
0	Overload, Open-Phase and Reverse-Phase Protection (3E)	3 s	5	Overload and Open-Phase Protection (2E)	3 s	A	Overload Protection (1E)	3 s
1	Overload, Open-Phase and Reverse-Phase Protection (3E)	5 s	6	Overload and Open-Phase Protection (2E)	5 s	B	Overload Protection (1E)	5 s
2	Overload, Open-Phase and Reverse-Phase Protection (3E)	7 s	7	Overload and Open-Phase Protection (2E)	7 s	C	Overload Protection (1E)	7 s
3	Overload, Open-Phase and Reverse-Phase Protection (3E)	15 s	8	Overload and Open-Phase Protection (2E)	15 s	D	Overload Protection (1E)	15 s
4	Overload, Open-Phase and Reverse-Phase Protection (3E)	30 s	9	Overload and Open-Phase Protection (2E)	30 s	E	Overload Protection (1E)	30 s

● Configuring Settling Current

Configure the current adjusting dial to suit the rated current of the load before use.

For greater precision configuration, illuminate the “OC” lamp of the ET-N when setting the current.

● Detailed Setting Procedure (Set the current using the following procedure.)

- (1) Turn the current adjusting dial to the maximum position.
- (2) Apply the operating power supply.
- (3) Allow 115% of the rated motor current to flow through the ET-N main circuit terminal using an actual load or a resistor.
- (4) Set the protection mode setting switch to “A” to “E” if testing single-phase current, connect the main circuit in series with 1/L1 phase, 3/L2 phase and 5/L3 phase, then allow the main circuit current to flow.
- (5) The “OC” indicator lamp should now blink with a 1 second period.
- (6) In this state, slowly reduce the current value using the current adjusting dial. (Rotate to the left)
- (7) Stop turning the dial when the “OC” indicator lamp blinking changes from a 1 second period to a 0.2 second period to complete configuration.

The overload protection properties are those shown in Figure 2. Configure special load devices by first verifying the overload withstanding capacity of the device.

Do not turn the current adjusting dial past the maximum or minimum values of the rated current range.

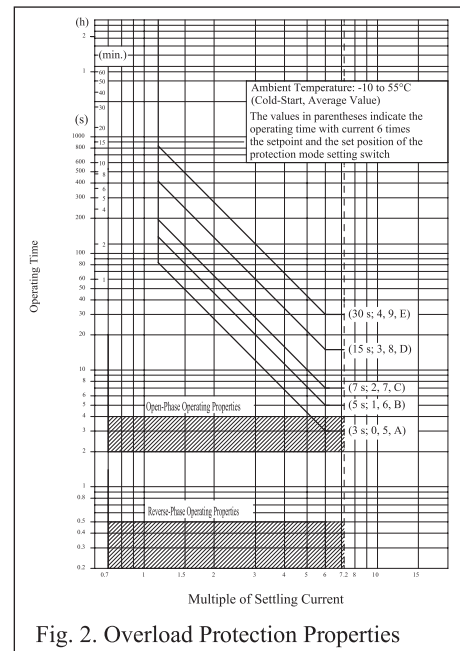


Fig. 2. Overload Protection Properties

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Belgium	Koning & Hartman B.V.	Woluvelaan 31, BE-1800 Vilvoorde, Belgium	+32(0)2570240
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For Safety : Please read the instruction manual carefully before using the products in this catalog.
Wiring and connection must be done by the person have a specialized knowledge of electric construction and wiring.



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



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