

## ● Thermal Overload Relays

Frame		T18	T25	<b>T50</b>	<b>T65</b>	T100	N120	N120TA	N220	N400	N600
Heater designation (Standard specifications)		0.12 to 15	0.24 to 22	24 to 50	12 to 65	54 to 100	42 to 82	105 to 125	82 to 180	105 to 330	250 to 660
Thermal Overload Relays	Standard specifications TH-□	○	○	○	○	○	○	○	○	○	○
	With saturable reactor TH-□SR	○	○	○	○	○	○	○	○	○	○
	2-element Quick-acting characteristics thermal TH-□FS	—	○	○	○	○	—	—	—	—	—
	3-element (2E) thermal TH-□KP	○	○	○	○	○	○	○	○	○	○
	3-element (2E) thermal With saturable reactor TH-□KPSR	—	○	○	○	○	○	○	○	○	○
	3-element (2E) Quick-acting characteristics thermal TH-□FSKP	○	○	○	○	○	—	—	—	—	—
	3-element (2E) Quick-acting characteristics thermal TH-□KF	—	—	—	—	—	—	—	—	—	—
	With terminal cover TH-□CW	—	—	—	○	—	—	—	—	—	—
	Wiring streamlining terminal TH-□BC	○	○	○	—	—	—	—	—	—	—
	Anticorrosion treatment TH-□YS	○	○	○	○	○	○	○	○	○	○

Note 1: — indicates out of manufacturing range.

## ● Contactor Relays

Frame		T5	T9
Number of contact		5	9
Contact arrangement		5a	9a
		4a1b	7a2b
		3a2b	5a4b
Standard	SR-□	○	○
DC operated type	SRD-□	○	○
Mechanically latched type	SRL-□	○	—
	SRLD-□	○	—
With large rated auxiliary contacts	SR-□JH	○	○
	SRD-□JH	○	○
With overlap contact	SR-□LC	○	○
	SRD-□LC	○	○
Delay open type	SR-□DL	○	○
With fast wiring terminal	SR-□BC	○	○
	SRD-□BC	○	○
With terminal cover	SR-□CX	—	—
	SRD-□CX	—	—
With surge absorber	SR-□SA	○	○
	SRD-□SA	○	○

Note 1: — indicates out of manufacturing range.

Note 2: Refer to the individual rating table for the contact rating when using a type with large capacity contact or type with overlap contact. The value given in brackets is the value for switching the load with two poles installed in a series.

Note 3: When using the mechanically latched type (SRL-□, SRLD-□), one each can be mounted on the opening coil and closing coil.

Note 4: Only the side-on auxiliary contact unit UT-AX11 can be mounted on the mechanically latched type SRL-T5 or SRLD-T5. Only UN-AX11 can be mounted on SRL-N4 or SRLD-N4.




Note 5: Both the surge absorber unit and DC/AC interface unit cannot be additionally mounted onto the Contactor Relay's coil terminal.

Note 6: A live section protection cover is provided as a standard.

Note 7: The minimum applicable load level for the contacts at the SR(D)-T9 head-on section (four terminals on upper level) is the same as UT-AX2/4.

## Specification List





### Model list

Frame			T18	T25		
Appearance						
Model name	with 2-elements	For Magnetic Starters For independent mounting	TH-T18 -	TH-T25		
	with 3-elements	For Magnetic Starters For independent mounting	TH-T18KP -	TH-T25KP		
	Outside dimensions [mm]	For Magnetic Starters	45×55×76.5	63×51×79		
	W×H×D	For independent mounting	-	-		
	Product weight [kg]	For Magnetic Starters	0.11	0.16		
		For independent mounting	-	-		
Applicable standard			IEC60947-4-1, EN60947-4-1, JIS C8201-4-1, GB14048.4			
Use condition		Ambient temperature [°C]	-10 to +40 (Standard: 20°C; maximum temperature on the board: 55°C)			
		Frequency [Hz]	0(DC) to 400			
Main circuit specifications	Rated insulation voltage [V]		690			
	Rated impulse withstand voltage [kV]		6			
	Pollution degree		3			
	Heater designation (adjustable range of stabilized current) [A] (Rated operational voltage : 550V maximum)		0.12 (0.1 to 0.16)	2.1 (1.7 to 2.5)	0.24 (0.2 to 0.32)	2.5 (2 to 3)
			0.17 (0.14 to 0.22)	2.5 (2 to 3)	0.35 (0.28 to 0.42)	3.6 (2.8 to 4.4)
			0.24 (0.2 to 0.32)	3.6 (2.8 to 4.4)	0.5 (0.4 to 0.6)	5 (4 to 6)
			0.35 (0.28 to 0.42)	5 (4 to 6)	0.7 (0.55 to 0.85)	6.6 (5.2 to 8)
			0.5 (0.4 to 0.6)	6.6 (5.2 to 8)	0.9 (0.7 to 1.1)	9 (7 to 11)
			0.7 (0.55 to 0.85)	9 (7 to 11)	1.3 (1 to 1.6)	11 (9 to 13)
			0.9 (0.7 to 1.1)	11 (9 to 13)	1.7 (1.4 to 2)	15 (12 to 18)
1.3 (1 to 1.6)			15 (12 to 18)	2.1 (1.7 to 2.5)	22 (18 to 26)	
1.7 (1.4 to 2)						
Power consumption [VA/element] at minimum/maximum stabilization			0.8 / 1.8		1.5 / 3.0	
Terminal screw size		M3.5		M4		
Compatible with terminal	Electric wire size [mm <sup>2</sup> ]	φ 1.6, 0.75 to 2.5		φ 1.6 to 2.6, 1.25 to 6		
	Crimp lug size	1.25-3.5 to 2-3.5, 5.5-S3		1.25-4 to 5.5-4		
Contact arrangement			1a1b			
Conventional free air thermal current Ith [A]			2			
Rating Operational	Category AC-15 (AC operated Magnetic Contactors) Coil opening and closing a contact/b contact The value in brackets indicates the rating for automatic reset.	24VAC	2(0.5) / 2(0.5)		2(0.5) / 3(0.5)	
		120VAC	2(0.5) / 2(0.5)		2(0.5) / 3(0.5)	
		240VAC	1(0.5) / 1(0.5)		1(0.5) / 2(0.5)	
		550VAC	0.3(0.3) / 0.3(0.3)		0.3(0.3) / 0.3(0.3)	
Current [A]	Category DC-13 (DC operated Magnetic Contactors) Coil opening and closing The value in brackets indicates the rating for automatic reset.	24VDC	0.5(0.3)		1(0.3)	
		110VDC	0.2(0.2)		0.2(0.2)	
		220VDC	0.1(0.1)		0.1(0.1)	
Minimum applicable load level			20V 5mA			
Terminal screw size			M3.5			
Compatible with terminal	Electric wire size [mm <sup>2</sup> ]	φ 1.6, 0.75 to 2.5		φ 1.6, 0.75 to 2.5		
	Crimp lug size	1.25-3.5 to 2-3.5		1.25-3.5 to 2-3.5		
Trip class			10A			
Operating characteristic curve description page			Page 27			
Vibration resistance (vibration resistance malfunction performance)			10 to 55 Hz, 19.6 m/s <sup>2</sup>			
Trip-free			⊙			
Reset method			Manual/Automatic switchable			
Operation indication (lever indication)			⊙			
Manual trip check			⊙			
Applied products	With saturable reactor	TH-□SR	⊙			
	With 3-element (2E) thermal saturable reactor	TH-□KPSR	⊙			
	2-element quick-acting characteristics thermal	TH-□FS	⊙			
	With 3-element (2E) thermal quick-acting characteristics	TH-□FSKP	⊙			

Note 1: The ambient temperature compensator is mounted on all types.  
Note 2: ⊙ indicates standard equipment.

## Thermal Overload Relays

## Model list

Frame			T50	T65	T100	
Appearance						
Model name	with 2-elements	For Magnetic Starters For independent mounting	TH-T50 —	TH-T65 —	TH-T100 —	
	with 3-elements	For Magnetic Starters For independent mounting	TH-T50KP —	TH-T65KP —	TH-T100KP —	
	Outside dimensions [mm] W×H×D	For Magnetic Starters For independent mounting	74.3×72×83.5 —	89×57×83.5 —	89×73.5×83.5 —	
	Product weight [kg]	For Magnetic Starters For independent mounting	0.2 —	0.26 —	0.32 —	
Applicable standard			IEC60947-4-1, EN60947-4-1, JIS C8201-4-1, GB14048.4			
Use condition		Ambient temperature [°C]	-10 to +40 (Standard: 20°C; maximum temperature on the board: 55°C)			
		Frequency [Hz]	0(DC) to 400			
Rated insulation voltage [V]			690			
Rated impulse withstand voltage [kV]			6			
Pollution degree			3			
Main circuit specifications	Heater designation (adjustable range of stabilized current) [A] (Rated operational voltage : 550V maximum)		29 (24 to 34) 35 (30 to 40) 42 (34 to 50)	15 (12 to 18) 22 (18 to 26) 29 (24 to 34) 35 (30 to 40) 42 (34 to 50) 54 (43 to 65)	67 (54 to 80) 82 (65 to 100)	
	Power consumption [VA/element] at minimum/maximum stabilization		1.6/3.2      2.4/5.5      2.5/6.0			
	Terminal screw size		M5      M6      M6			
	Compatible with terminal	Electric wire size [mm <sup>2</sup> ]	φ5.5 to 14      —      —			
Crimp lug size		5.5-5 to 14-5      5.5-6 to 22-6      14-6 to 22-6, 38-S6				
Contact arrangement			1a1b      1a1b      1a1b			
Conventional free air thermal current Ith [A]			5      5      5			
Operation circuit specifications	Rating Operational Current [A]	Category AC-15 (AC operated Magnetic Contactors) (Coil opening and closing) a contact/b contact The value in brackets indicates the rating for automatic reset.	24VAC	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)
			120VAC	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)	2(0.5) / 3(0.5)
			240VAC	1(0.5) / 2(0.5)	1(0.5) / 2(0.5)	1(0.5) / 2(0.5)
	Category DC-13 (DC operated Magnetic Contactors) (Coil opening and closing) The value in brackets indicates the rating for automatic reset.	550VAC	0.3(0.3) / 0.3(0.3)	0.5(0.5) / 1(0.5)	0.5(0.5) / 1(0.5)	
		24VDC	1(0.3)	1(0.3)	1(0.3)	
		110VDC	0.2(0.2)	0.2(0.2)	0.2(0.2)	
Minimum applicable load level		220VDC      0.1(0.1)      0.1(0.1)      0.1(0.1)				
Terminal screw size		20V 5mA      20V 5mA      20V 5mA				
Compatible with terminal	Electric wire size [mm <sup>2</sup> ]	M3.5      M4      M4				
	Crimp lug size	φ 1.6, 1.25 to 2      φ 1.6, 1.25 to 2      φ 1.6, 1.25 to 2				
		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				
Trip class			10A      15 to 42A:10      54A:10A      67A:10      82A:10A			
Operating characteristic curve description page			Page 27			
Vibration resistance (vibration resistance malfunction performance)			10 to 55Hz      19.6m/s <sup>2</sup>			
Trip-free			○      ○      ○			
Reset method			Manual/Automatic switchable      Manual/Automatic switchable      Manual/Automatic switchable			
Operation indication (lever indication)			○      ○      ○			
Manual trip check			○      ○      ○			
With saturable reactor		TH-□SR	○(TH-T50SR)	○(TH-T65SR)	○(TH-T100SR)	
With 3-element (2E) thermal saturable reactor		TH-□KPSR	○(TH-T50KPSR)	○(TH-T65KPSR)	○(TH-T100KPSR)	
2-element quick-acting characteristics thermal		TH-□FS	△(TH-T50FS)	△(TH-T65FS)	△(TH-T100FS)	
With 3-element (2E) thermal quick-acting characteristics		TH-□FSKP	△(TH-T50FSKP)	△(TH-T65FSKP)	△(TH-T100FSKP)	

Note 1: The ambient temperature compensator is mounted on all types.

Note 2: ○ indicates standard equipment.

## Selection Table

Thermal Overload Relays

### Application to standard three-phase motor of Thermal Overload Relays

Thermal Overload Relays				Standard three-phase motor capacity [kW]		Magnetic Contactors that can be combined																							
Heater designation (A)	Setting range (A)	Short-circuit protector rating [A] * Fuse gG (IEC60289-1/2)		Frame	200-220V	380-440V	TH-T18	TH-T25	TH-T50	TH-T65	TH-T100																		
		Main circuit	Auxiliary circuit																										
0.12	0.1-0.16	2	6	T18			S-T10	S(D)-T12	S(D)-T20	S(D)-T21	S-T25	S(D)-T35	S(D)-T50																
0.17	0.14-0.22	2	6																										
0.24	0.2-0.32	2	6			0.03								0.05															
0.35	0.28-0.42	2	6			0.05								0.1															
0.5	0.4-0.6	2	6			0.07																							
0.7	0.55-0.85	4	6			0.1								0.18															
0.9	0.7-1.1	4	6											0.25															
1.3	1.0-1.6	4	6			0.2								0.37, 0.55															
1.7	1.4-2.0	6	6											0.75															
2.1	1.7-2.5	6	6			0.4																							
2.5	2.0-3.0	10	6	T25			S-T10	S(D)-T12	S(D)-T20	S(D)-T21	S-T25	S(D)-T35	S(D)-T50																
3.6	2.8-4.4	10	6											1.1															
5	4.0-6.0	16	6			0.75								1.5															
6.6	5.2-8.0	20	6			1								2.2															
9	7.0-11	20	6			1.5								3, 3.7															
11	9.0-13	25	6			2.2								3, 3.7															
15	12-18	32	6			3.7								5.5															
22	18-26	50	6			5.5								11															
29	24-34	63	6			7.5								15															
35	30-40	100	6											18.5															
42	34-50	100	6	T50			S-T10	S(D)-T12	S(D)-T20	S(D)-T21	S-T25	S(D)-T35	S(D)-T50																
54	43-65	100	6			11								22															
67	54-80	125	6			15								30															
82	65-100	160	6			18.5								37															
					T65										S-T10	S(D)-T12	S(D)-T20	S(D)-T21	S-T25	S(D)-T35	S(D)-T50								
														22								45							
				T100			S-T10	S(D)-T12	S(D)-T20	S(D)-T21	S-T25	S(D)-T35	S(D)-T50																

## Precautions for Use

Thermal Overload Relays

### Disassembly

The Thermal Overload Relays are adjusted at the time of assembly. Do not disassemble it.

### Ambient temperature compensation

The TH-T type Thermal Overload Relays are adjusted with the Magnetic Starters in the standard box (the MS type) relative to the ambient temperature of 20°C (The temperature on the control board of the MSO type Magnetic Starters is 35°C). The ambient temperature compensator is mounted on the TH-T type Thermal Overload Relays. Therefore, the ambient temperature less affects the operational characteristic change. The minimum operating current change according to the ambient temperature change relative to the ambient temperature of 20°C (the temperature on the control board of 35°C) generally depends on the characteristics in the diagrams 1 and 2.

The Thermal Overload Relays have a characteristic that the operating current becomes high when the ambient temperature is low and becomes low when the ambient temperature is high. If the ambient temperature of the installation site is significantly different from 20°C (the temperature on the control board of 35°C), the setting current of the Thermal Overload Relays needs to be corrected as shown in diagrams 1 and 2. In addition, note that the compensation factor has a characteristic to be the minimum scale>middle scale>maximum scale at the adjustment knob location. (Note that the Thermal Overload Relays may operate at a current of less than 100% stabilized current if in use at temperatures exceeding the allowable working temperature of 40°C (55°C).)

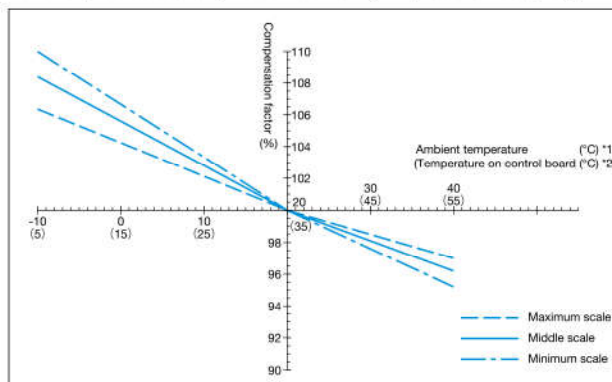


Diagram 1. Ambient temperature compensation curve (T18 frame)

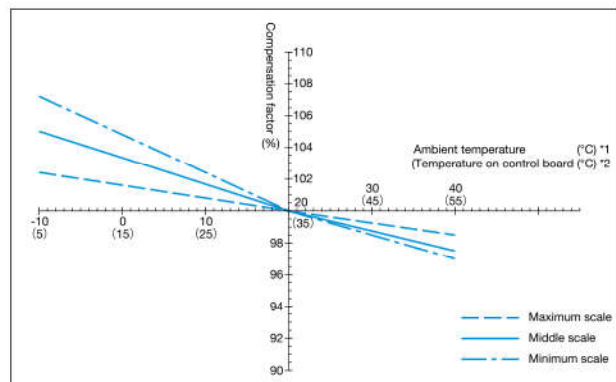


Diagram 2. Ambient temperature compensation curve (T25, T50, T65, T100 frame)

Compensation factor: Percentage of the minimum operating current at the ambient temperature of 20°C (the temperature on the control board of 35°C)

<Compensation procedure of setting current>

Determine the compensation factor of the working ambient temperature according to the curves in diagrams 1 and 2 and use the value of all load currents of the motor divided by the determined compensation factor as the stabilization value.

Example: The ambient temperature compensation factor for TH-T25 at the ambient temperature of 40°C (the temperature on the control board of 55°C) is 97% at the minimum scale according to diagram 2. If the motor rated current is 15A, the stabilization value is 15.5A (=15/0.97).

Note 1: [\*1] The ambient temperature applied to the MS type indicates the outside temperature of the box.

[\*2] The temperature including temperature increase on the control board applied to the MSO type is indicated.

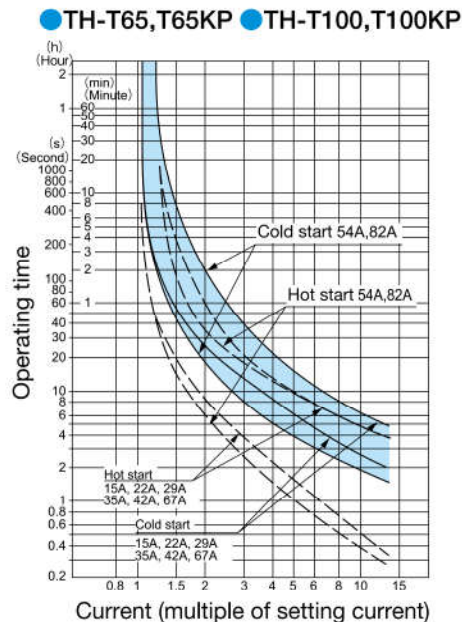
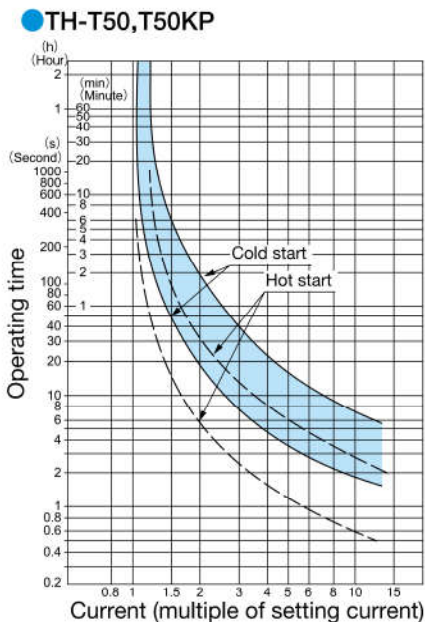
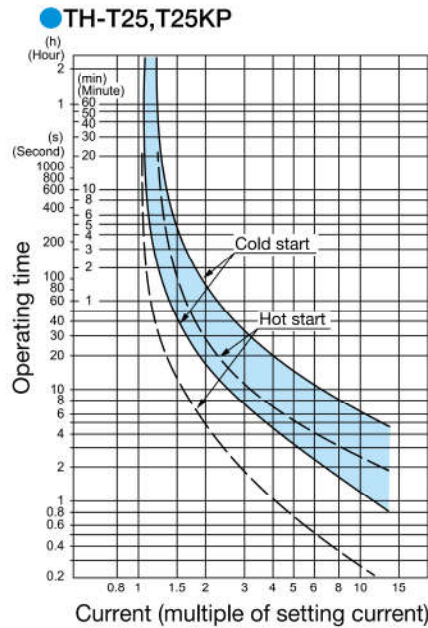
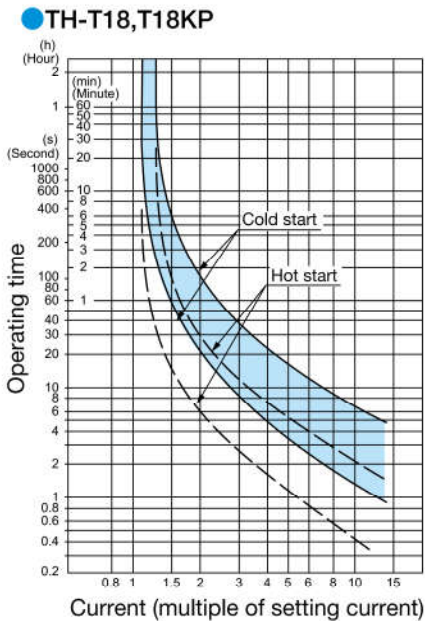
## Connecting electric wire size and operating current

The TH-T type adjusts the minimum operating current with the standard electric wire size shown in the following table. If the electric wire is thicker or thinner than this standard electric wire size, the operating current becomes high or low, respectively. Therefore, correct the stabilized current (divide it by the change rate of the minimum operating current) to use a size different from the standard connecting electric wire size.

Model name	Heater designation [A]	Standard electric wire size [mm <sup>2</sup> ]	Connecting electric wire size [mm <sup>2</sup> ]		Change rate of minimum operating current [%]	
TH-T18(KP)	0.12 to 15	2	1.25	2.5	98	103
TH-T25(KP)	0.24 to 11		2	6	97	104
TH-T50(KP)	15, 22	3.5	2	6	96	104
	29	8				
	35	8	5.5	14	96	104
	42					
TH-T65(KP)	15	3.5	2	5.5	95	105
	22, 29	5.5	3.5	8	96	105
	35	8	5.5	14	95	105
	42	14	8	22	95	104
TH-T100(KP)	54	22	14	30	96	104
	67	22	14	30	97	103
	82	38	30		97	

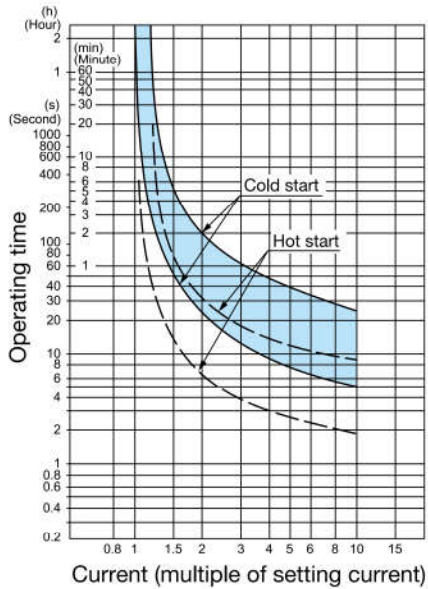
## Operating Characteristic of Thermal Overload Relays (Ambient Temperature of 20°C) Thermal Overload Relays

For the information on the connecting electric wire size, refer to page 16.

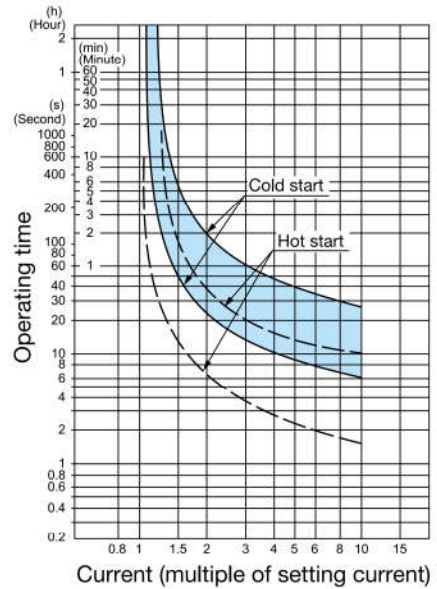


## Operating Characteristic of Thermal Overload Relays (Ambient Temperature of 20°C)

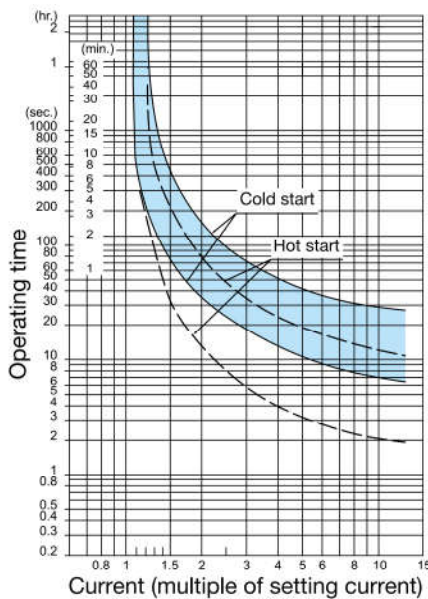
● TH-T18SR



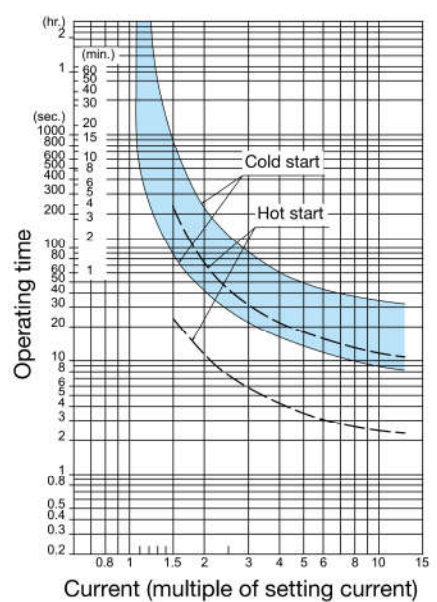
● TH-T25SR, T25KPSR



● TH-T50SR, T50KPSR

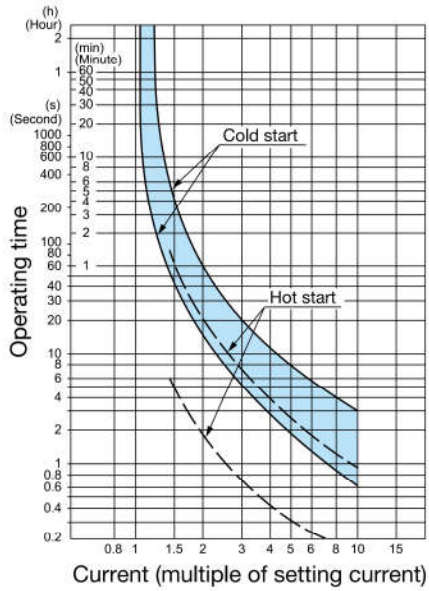


● TH-T65SR, T65KPSR  
● TH-T100SR, T100KPSR

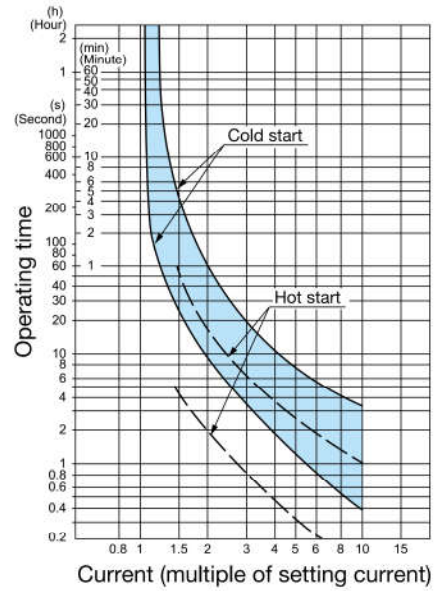


Thermal Overload Relays

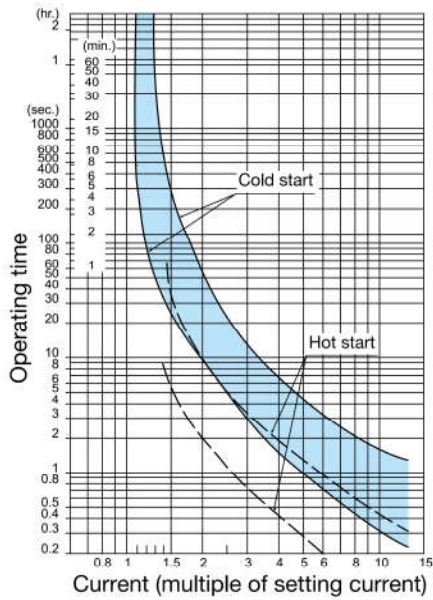
● TH-T18FSKP



● TH-T25FS, TH-T25FSKP  
● TH-T50FS, TH-T50FSKP



● TH-T65FS, T65FSKP  
● TH-T100FS, T100FSKP



## Magnetic Starters

- MS-T series (non-Reversing) : Enclosed
- MS-2xT series (Reversing) : Enclosed

Model name	Non-reversing Reversing	MS-T10 —	MS-T12 —	MS-T21 MS-2XT21	MS-T25 MS-2XT25	MS-T35 MS-2XT35	MS-T50 MS-2XT50	MS-T65 MS-2XT65	MS-T80 MS-2XT80	MS-T100 MS-2XT100
Rated capacity (kW) Category AC-3 (Note 1)	220 to 240VAC 380 to 440VAC 500VAC	2.5[2.2] 4[2.7] 4[2.7]	3.5[2.7] 5.5[4] 5.5[5.5]	5.5[4] 11[7.5] 11[7.5]	7.5[5.5] 15[11] 15[11]	11[7.5] 18.5[15] 18.5[15]	15[11] 22[22] 22[22]	18.5[15] 30[30] 37[30]	22[19] 45[37] 45[45]	30[22] 55[45] 55[45]
Heater rating (designation) of standard Thermal Overload Relays (A)		0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9	0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22 29 35	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22 29 35 42	15 22 29 35 42 54	15 22 29 35 42 54 67 82	15 22 29 35 42 54 67 82 95
Operation coil rating	Refer to page 22									
Auxiliary contact arrangement	Non- Reversing	Standard	1a	1a1b	2a2b					
		Special	1b	2a	—					
	Reversing	Standard	—		2a2bx2					
		Special	—		—					
 (unit: mm)		Non-reversing	A	165	176	231	282	317		
			B	76	104	135	160	190		
			C	97.5	110	126	145	163		
		Reversing	A	—	192	247	282	347		
			B	—	220	300	320	410		
			C	—	115	130	140	154		

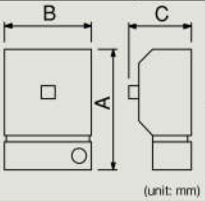
Note 1: The figure in the square brackets indicates the rated current shown on the rating plate of the product at which the category AC-3 opening/closing durability is 2,000,000 times (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

- MSO-T series (non-Reversing) : Open type
- MSO-2xT series (Reversing) : Open type

Model name	Non-Reversing Reversing	MSO-T10 MSO-2xT10	MSO(D)-T12 MSO(D)-2xT12	MSO(D)-T20 MSO(D)-2xT20	MSO(D)-T21 MSO(D)-2xT21	MSO-T25 MSO-2xT25		
Rated capacity (kW) Category AC-3 (Note 1)	220 to 240VAC 380 to 440VAC 500VAC	2.5[2.2] 4[2.7] 4[2.7]	3.5[2.7] 5.5[4] 5.5[5.5]	4.5[3.7] 7.5[7.5] 7.5[7.5]	5.5[4] 11[7.5] 11[7.5]	7.5[5.5] 15[11] 15[11]		
Heater rating (designation) of standard Thermal Overload Relays (A)		0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9	0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11	0.12 0.17 0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22	0.24 0.35 0.5 0.7 0.9 1.3 1.7 2.1 2.5 3.6 5 6.6 9 11 15 22		
Operation coil rating	Refer to pages 22							
Auxiliary contact arrangement	Non- Reversing	Standard	1a	1a1b	1a1b	2a2b	2a2b	
		Special	1b	2a	2a	—	—	
	Reversing	Standard	1a×2+2b	1a1b×2+2b	1a1b×2+2b	2a2b×2	2a2b×2	
		Special	1b×2+2b	2a×2+2b	2a×2+2b	—	—	
 (unit: mm)		Non-Reversing	A	115	115	115	128	128
			B	45	45	45	63	63
			C	79	79(101)	79(101)	82(109)	82
		Reversing	A	125	125	125	138	138
			B	90	97	97	136	136
			C	79	79(101)	79(101)	82(115)	82
		IEC 35mm rail mounting type		←—————→				
		Option	Front clip-on auxiliary contact block mounting type	←—————→				
			Side clip-on auxiliary contact block mounting type	←—————→				
Surge absorber mounting type	←—————→							

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 (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.



Model name		Non-Reversing	MSO (D)-T35			MSO (D)-T50			MSO (D)-T65			MSO (D)-T80			MSO (D)-T100					
		Reversing	MSO (D)-2xT35			MSO (D)-2xT50			MSO (D)-2xT65			MSO (D)-2xT80			MSO (D)-2xT100					
Rated capacity (kW) Category AC-3 (Note 1)	220 to 240VAC		11[7.5]			15[11]			18.5[15]			22[19]			30[22]					
	380 to 440VAC		18.5[15]			22[22]			30[30]			45[37]			55[45]					
	500VAC		18.5[15]			22[22]			37[30]			45[45]			55[45]					
Heater rating (designation) of standard Thermal Overload Relays (A)			0.24	0.35	0.5	0.24	0.35	0.5				15	22	29	15	22	29	15	22	29
			0.7	0.9	1.3	0.7	0.9	1.3				35	42	54	35	42	54	35	42	54
			1.7	2.1	2.5	1.7	2.1	2.5							67	82		67	82	95
			3.6	5	6.6	3.6	5	6.6												
			9	11	15	9	11	15												
			22	29	35	22	29	35												
						42														
Operation coil rating		Refer to pages 22																		
Auxiliary contact arrangement	Non-Reversing	Standard	2a2b			2a2b			2a2b			2a2b			2a2b					
		Special	—			—			—			—			—					
	Reversing	Standard	2a2b×2			2a2b×2			2a2b×2			2a2b×2			2a2b×2					
		Special	—			—			—			—			—					
 (unit: mm)		Non-Reversing	A	157.5						158(160)			174.5(176.5)			196(206)				
			B	75						90			90			100				
			C	91(123)						106(133)			106(133)			127(157)				
		Reversing	A	179						169			185.5			213				
			B	160						216			216			270				
			C	97(129)						112(139)			112(139)			137(167)				
IEC 35mm rail mounting type		←—————→																		
Option	Front clip-on auxiliary contact block mounting type	←—————→																		
	Side clip-on auxiliary contact block mounting type	←—————→																		
	Surge absorber mounting type	←—————→																		

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 (1,000,000 times for the T20 380V). Refer to the electric durability curve for the life performance.

## ● Thermal Overload Relays configuring the Magnetic Starters

Thermal Overload Relays models and heater types that configure Magnetic Starters

Magnetic Contactors frame	Thermal Overload Relays model	Heater designation (adjustable range of stabilized current) (A)
T10, T12, T20	TH-T18	0.12(0.1 to 0.16), 0.17(0.14 to 0.22), 0.24(0.2 to 0.32), 0.35(0.28 to 0.42), 0.5(0.4 to 0.6), 0.7(0.55 to 0.85), 0.9(0.7 to 1), 1.3(1 to 1.6), 1.7(1.4 to 2), 2.1(1.7 to 2.5), 2.5(2 to 3), 3.6(2.8 to 4.4), 5(4 to 6), 6.6(5.2 to 8), 9(7 to 11), 11(9 to 13)*, 15(12 to 18)*
T21, T25	TH-T25 Note 3	0.24(0.2 to 0.32), 0.35(0.28 to 0.42), 0.5(0.4 to 0.6), 0.7(0.55 to 0.85), 0.9(0.7 to 1.1), 1.3(1 to 1.6), 1.7(1.4 to 2), 2.1(1.7 to 2.5), 2.5(2 to 3), 3.6(2.8 to 4.4), 5(4 to 6), 6.6(5.2 to 8), 9(7 to 11), 11(9 to 13), 15(12 to 18), 22(18 to 26)*
T35	TH-T25	0.24 (0.2 to 0.32), 0.35 (0.28 to 0.42), 0.5 (0.4 to 0.6), 0.7 (0.55 to 0.85), 0.9 (0.7 to 1.1), 1.3 (1 to 1.6), 1.7 (1.4 to 2), 2.1 (1.7 to 2.5), 2.5 (2 to 3), 3.6 (2.8 to 4.4), 5 (4 to 6), 6.6 (5.2 to 8), 9 (7 to 11), 11 (9 to 13), 15 (12 to 18), 22 (18 to 26)
	TH-T50	29 (24 to 34)
T50	TH-T25	0.24 (0.2 to 0.32), 0.35 (0.28 to 0.42), 0.5 (0.4 to 0.6), 0.7 (0.55 to 0.85), 0.9 (0.7 to 1.1), 1.3 (1 to 1.6), 1.7 (1.4 to 2), 2.1 (1.7 to 2.5), 2.5 (2 to 3), 3.6 (2.8 to 4.4), 5 (4 to 6), 6.6 (5.2 to 8), 9 (7 to 11), 11 (9 to 13), 15 (12 to 18), 22 (18 to 26)
	TH-T50	29 (24 to 34), 35 (30 to 40), 42 (34 to 50)
T65	TH-T65	15 (12 to 18), 22 (18 to 26), 29 (24 to 34), 35 (30 to 40), 42 (34 to 50), 54 (43 to 65)
T80	TH-T65	15 (12 to 18), 22 (18 to 26), 29 (24 to 34), 35 (30 to 40), 42 (34 to 50), 54 (43 to 65)
	TH-T100	67 (54 to 80)
T100	TH-T65	15 (12 to 18), 22 (18 to 26), 29 (24 to 34), 35 (30 to 40), 42 (34 to 50), 54 (43 to 65)
	TH-T100	67 (54 to 80), 82 (65 to 100)

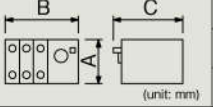
Note 1: Select the value closer to the heater designation if the stabilized current has two values.

Note 2: Heater designation marked with \* has Magnetic Starters frames that cannot be applied. For information on the applicable Magnetic Starters frames, refer to the "Heater rating (designation) of standard Thermal Overload Relays" field in the above table.

Note 3: The connection conductor kit UN-TH21 is required to use in combination with the Magnetic Contactor to make a Magnetic Starters.

## Thermal Overload Relays

### TH-T series

Model name	TH-T18		TH-T25		TH-T50		TH-T65		TH-T100	
Application	MSO-T10 -T12 -T20	MSOD-T12 -T20	MSO-T21 -T25 -T35 -T50	MSOD-T21 -T35 -T50	MSO-T35 -T50	MSOD-T35 -T50	MSO-T65 -T80 -T100	MSOD-T65 -T80 -T100	MSO-T80 -T100	MSOD-T80 -T100
Standard heater rating (designation) (A)	0.12, 0.17, 0.24, 0.35, 0.5, 0.7, 0.9, 1.3, 1.7, 2.1, 2.5, 3.6, 5, 6.6, 9, 11, 15		0.24, 0.35, 0.5, 0.7, 0.9, 1.3, 1.7, 2.1, 2.5, 3.6, 5, 6.6, 9, 11, 15, 22		29, 35, 42		15, 22, 29 35, 42, 54		67, 82	
Contact arrangement	1a1b		1a1b		1a1b		1a1b		1a1b	
 (unit: mm)	A	55	53	74	57	73.5				
	B	45	63	74.3	89	89				
	C	76.5	80	88	83.5	83.5				

### Heater types

Heater types of TH type Thermal Overload Relays

Model	For Magnetic Starters		For single mounting		Heater designation (adjustable range of stabilized current) (A)																
	2-element	3-element	2-element	3-element																	
Standard	T18	T18KP	— Note 1	— Note 1	0.12(0.1 to 0.16)	0.17(0.14 to 0.22)	0.24(0.2 to 0.32)	0.35(0.28 to 0.42)	0.5(0.4 to 0.6)	0.7(0.55 to 0.85)	0.9(0.7 to 1.1)	1.3(1 to 1.6)	1.7(1.4 to 2)	2.1(1.7 to 2.5)	2.5(2 to 3)	3.6(2.8 to 4.4)	5(4 to 6)	6.6(5.2 to 8)	9(7 to 11)	11(9 to 13)	15(12 to 18)
	T25	T25KP	T25 Note 1	T25KP Note 1	0.24(0.2 to 0.32)	0.35(0.28 to 0.42)	0.5(0.4 to 0.6)	0.7(0.55 to 0.85)	0.9(0.7 to 1.1)	1.3(1 to 1.6)	1.7(1.4 to 2)	2.1(1.7 to 2.5)	2.5(2 to 3)	3.6(2.8 to 4.4)	5(4 to 6)	6.6(5.2 to 8)	9(7 to 11)	11(9 to 13)	15(12 to 18)	22(18 to 26)	
	T50	T50KP	—	—	29(24 to 34)	35(30 to 40)	42(34 to 50)														
	T65	T65KP	T65	T65KP	15(12 to 18)	22(18 to 26)	29(24 to 34)	35(30 to 40)	42(34 to 50)	54(43 to 65)											
	T100	T100KP	—	—	67(54 to 80)	82(65 to 100)															
Quick trip type	—	T18FSKP	— Note 1	— Note 1	2.1(1.7 to 2.5)	3.6(2.8 to 4.4)	5(4 to 6)	6.6(5.2 to 8)	9(7 to 11)	11(9 to 13)	15(12 to 18)										
	T25FS	T25FSKP	T25FS	T25FSKP	2.1(1.7 to 2.5)	3.6(2.8 to 4.4)	5(4 to 6)	6.6(5.2 to 8)	9(7 to 11)	11(9 to 13)	15(12 to 18)	22(18 to 26)									
	T50FS	T50FSKP	—	—	29(24 to 34)	35(30 to 40)	42(34 to 50)														
	T65FS	T65FSKP	T65FS	T65FSKP	42(34 to 50)	54(43 to 65)															
	T100FS	T100FSKP	—	—	67(54 to 80)	82(65 to 93)															
Delay trip type	T18SR	—	— Note 1	— Note 1	0.24(0.2 to 0.32)	0.35(0.28 to 0.42)	0.5(0.4 to 0.6)	0.7(0.55 to 0.85)	0.9(0.7 to 1.1)	1.3(1 to 1.6)	1.7(1.4 to 2)	2.1(1.7 to 2.5)	2.5(2 to 3)	3.6(2.8 to 4.4)	5(4 to 6)	6.6(5.2 to 8)	9(7 to 11)	11(9 to 13)	15(12 to 18)		
	T25SR	T25KPSR	T25SR Note 1	T25KPSR Note 1	0.24(0.2 to 0.32)	0.35(0.28 to 0.42)	0.5(0.4 to 0.6)	0.7(0.55 to 0.85)	0.9(0.7 to 1.1)	1.3(1 to 1.6)	1.7(1.4 to 2)	2.1(1.7 to 2.5)	2.5(2 to 3)	3.6(2.8 to 4.4)	5(4 to 6)	6.6(5.2 to 8)	9(7 to 11)	11(9 to 13)	15(12 to 18)	22(18 to 26)	
	T50SR	T50KPSR	—	—	29(24 to 34)	35(30 to 40)	42(34 to 50)														
	T65SR	T65KPSR	T65SR	T65KPSR	15(12 to 18)	22(18 to 26)	29(24 to 34)	35(30 to 40)	42(34 to 50)	54(43 to 65)											
	T100SR	T100KPSR	—	—	67(54 to 80)	82(65 to 100)															

Note 1: Combining UT-HZ18 allows the T18 frame to be used singly (screw mounting or IEC 35 mm rail mounting).  
Combining UN-RM20 allows the T25 frame for single mounting to have the IEC 35mm rail mounted.

## ● UT-ML Mechanical Interlock Unit

### Application

Model	Applicable Magnetic Contactor model
UT-ML11	S-T10, T12, T20
UT-ML20	SD-T12, T20
UN-ML21 (Note1)	S-T21, T25, T32, T35, T50, T80 SD-T21, T32, T35, T50, T80
UN-ML80	S-T100, SD-T100

Note 1: Use UN-ML21 of the MS-N Series as the mechanical interlock unit for S-T21 to T32.

### Specifications

Model	UT-ML11
Rated insulation voltage	690V
Rated impulse withstand voltage	6kV
Rated frequency	50/60Hz
Pollution degree	3
Terminal screw size/type	M3.5 cross slot screw with pressure plate
Applicable electric wire size[φmm,mm <sup>2</sup> ]	φ1.6 0.75 to 2.5
Applicable crimp lug size	1.25-3.5 to 2-3.5
Terminal screw tightening torque[N·m]	0.9 to 1.5

### Mounting

#### Hole drilling dimension

(Drilling of holes is not required when mounting the IEC 35mm rail mountable model is mounted to the IEC 35mm rail for reversing.)

	<table border="1"> <thead> <tr> <th rowspan="2">Model</th> <th rowspan="2">Applicable frame</th> <th colspan="3">Dimension[mm]</th> </tr> <tr> <th>A±0.2</th> <th>B±0.2</th> <th>C±0.3</th> </tr> </thead> <tbody> <tr> <td rowspan="2">UT-ML11</td> <td>T10</td> <td>74</td> <td>—</td> <td>60</td> </tr> <tr> <td>S-T12, T20</td> <td>89</td> <td>—</td> <td>60</td> </tr> <tr> <td>UT-ML20</td> <td>SD-T12, T20</td> <td>89</td> <td>—</td> <td>60</td> </tr> </tbody> </table>	Model	Applicable frame	Dimension[mm]			A±0.2	B±0.2	C±0.3	UT-ML11	T10	74	—	60	S-T12, T20	89	—	60	UT-ML20	SD-T12, T20	89	—	60												
	Model			Applicable frame	Dimension[mm]																														
A±0.2		B±0.2	C±0.3																																
UT-ML11	T10	74	—	60																															
	S-T12, T20	89	—	60																															
UT-ML20	SD-T12, T20	89	—	60																															
	<table border="1"> <thead> <tr> <th rowspan="2">Model</th> <th rowspan="2">Applicable frame</th> <th colspan="3">Dimension[mm]</th> </tr> <tr> <th>A±0.2</th> <th>B±0.2</th> <th>C±0.3</th> </tr> </thead> <tbody> <tr> <td rowspan="4">UN-ML21</td> <td>T21, T25</td> <td>54(54)</td> <td>19(19)</td> <td>60(56)</td> </tr> <tr> <td>T35, T50</td> <td>65</td> <td>20</td> <td>70</td> </tr> <tr> <td>S-T32</td> <td>30</td> <td>23</td> <td>60</td> </tr> <tr> <td>SD-T32</td> <td>32</td> <td>21</td> <td>67</td> </tr> <tr> <td rowspan="2">UN-ML80</td> <td>S-T100</td> <td>80</td> <td>57</td> <td>80</td> </tr> <tr> <td>SD-T100</td> <td>80</td> <td>57</td> <td>80</td> </tr> </tbody> </table>	Model	Applicable frame	Dimension[mm]			A±0.2	B±0.2	C±0.3	UN-ML21	T21, T25	54(54)	19(19)	60(56)	T35, T50	65	20	70	S-T32	30	23	60	SD-T32	32	21	67	UN-ML80	S-T100	80	57	80	SD-T100	80	57	80
Model	Applicable frame			Dimension[mm]																															
		A±0.2	B±0.2	C±0.3																															
UN-ML21	T21, T25	54(54)	19(19)	60(56)																															
	T35, T50	65	20	70																															
	S-T32	30	23	60																															
	SD-T32	32	21	67																															
UN-ML80	S-T100	80	57	80																															
	SD-T100	80	57	80																															

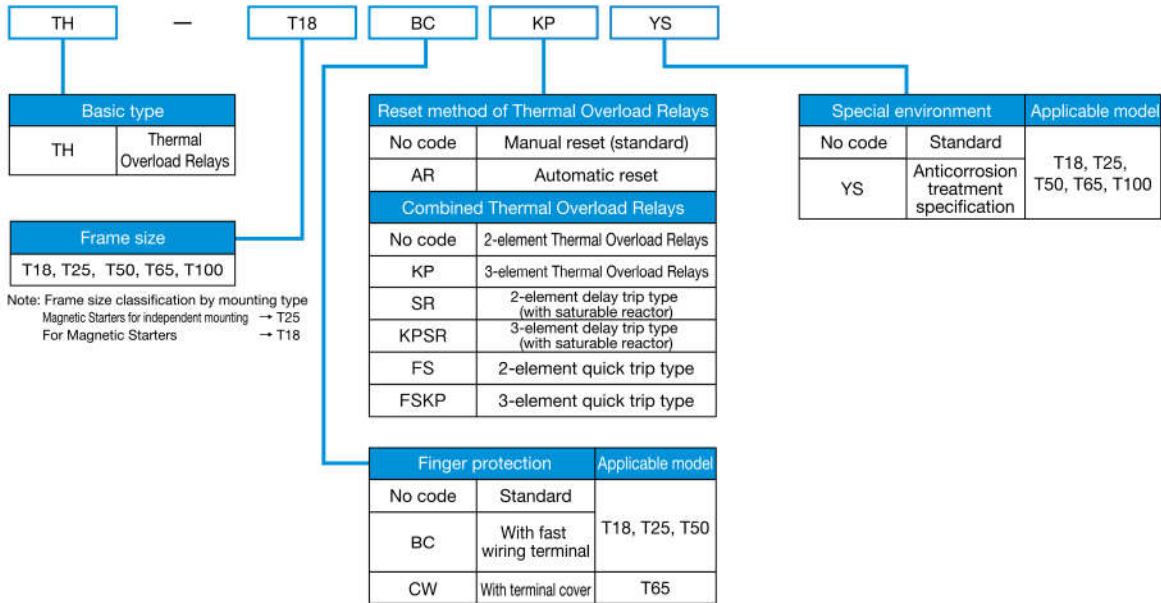
## ● UT-HZ18 (BC) Independent mounting unit for thermal relay

### Type and applicable model

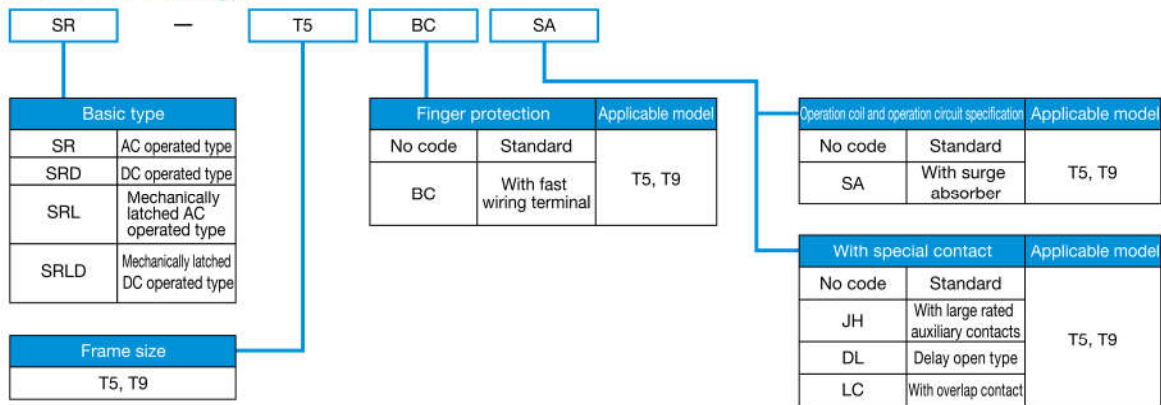
Model	Mounting	Applicable model
UT-HZ18	Screw mounting	TH-T18(KP)
UT-HZ18BC	IEC 35mm rail mounting	TH-T18BC(KP)
UN-RM20	IEC 35mm rail mounting	TH-T25(BC)(KP), TH-T25(BC)(KP)SR

Note 1: BC is the model with wiring streamlining terminal.

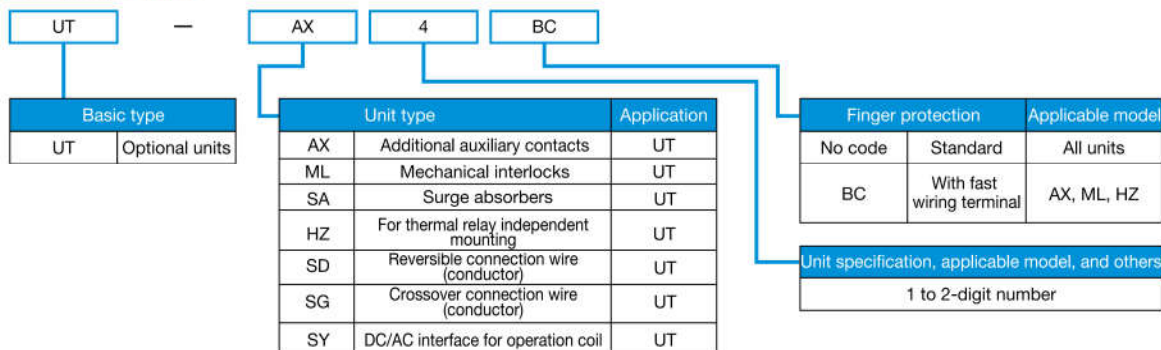
## Thermal Overload Relays



## Contactor Relays



## Optional Units



MS-T Series Introduction

Selection and Application

Application Thermal Overload Relay

Product Introduction

Overseas Standard

Type Codes

Order Procedure

Outline Drawing

Warranty and Safety

## Thermal Overload Relays

### ● TH-T type

Model name	Heater designation
TH-T18KP	▲ 15A
Refer to page 51.	Refer to page 26 and designate the heater nominal.

## Optional Units

### ● UT-AX□ auxiliary contact block

Model name	Contact arrangement
UT-AX4	▲ 2A2B
Refer to page 37.	Designate the contact arrangement listed on page 37 for the UT-AX2/AX4. UT-AX11 does not need to be designated as 1A1B is fixed.

### ● UT-SA□ Operation Coil Surge Absorber Unit

Model name	Voltage nominal
UT-SA21	▲ AC400V
UT-SA22	▲ AC200V
UT-SA25	▲ AC48V
Refer to page 38.	Select according to the operation circuit voltage.

### ● UT-ML□ Mechanical Interlock Unit

Model name
UT-ML11
Refer to page 39.

### ● UT-SY□ (BC) type DC/AC interface unit for operation coil

Model name
UT-SY21 UT-SY21BC
Refer to page 41.

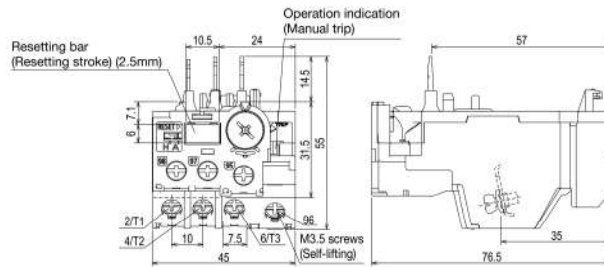
### ● UT-HZ18 (BC), UN-RM20 type Independent mounting unit for thermal relay

Model name
UT-HZ18 UT-RM20
Refer to page 39.

## Outline Drawing, Contact Arrangement

### Thermal Overload Relays

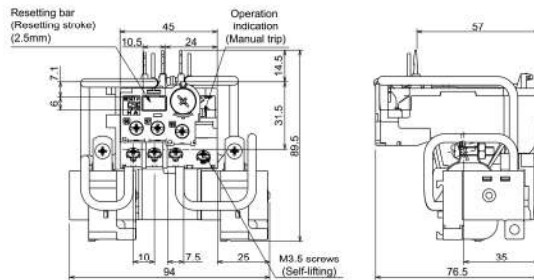
#### ● TH-T18(BC)KP



Model name	Contact arrangement
TH-T18	
TH-T18KP	

For combination with the following magnetic contactors  
 TH-T18: S-T10, T12, T20 SD-T12, T20  
 Independent use is possible by combining with the independent mounting unit UT-HZ18

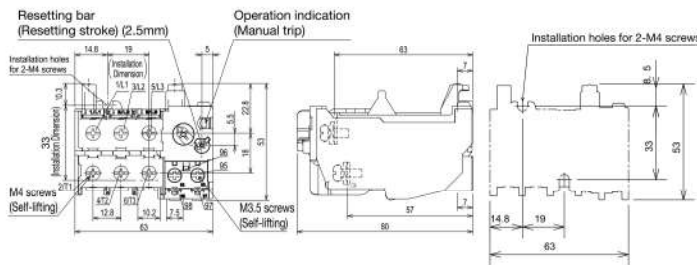
#### ● TH-T18SR



Model name	Contact arrangement
TH-T18SR	

For combination with the following magnetic contactors  
 TH-T18SR: S-T10, T12, T20 SD-T12, T20  
 Independent use is possible by combining with the independent mounting unit UT-HZ18

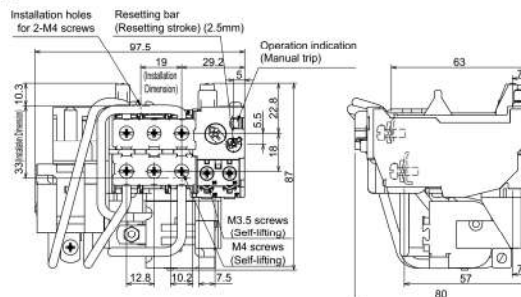
#### ● TH-T25(BC)KP



Model name	Contact arrangement
TH-T25	
TH-T25KP	

Use the following connection conductor (option) when using in combination with the magnetic contactor  
 Combination with S-T35/T50(BC), SD-T35/T50(BC), SL(D)-T35/T50(BC); UT-T1450  
 DIN rail independent mounting possible when used in combination with independent mounting unit UN-RM20

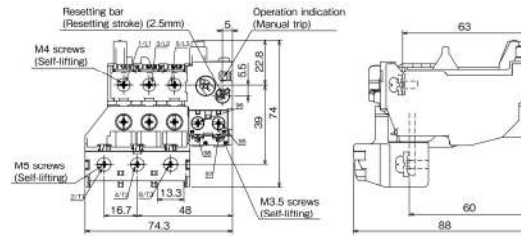
#### ● TH-T25(BC)(KP)SR



Model name	Contact arrangement
TH-T25 (BC)SR	
TH-T25 (BC)KP SR	

Use the following connection conductor (option) when using in combination with the magnetic contactor  
 Combination with S-T35/T50(BC), SD-T35/T50(BC), SL(D)-T35/T50(BC); UT-T1450  
 \* The reversing Magnetic Contactor with wiring streamlining terminal cannot be combined with TH-T25BC(KP)SR.

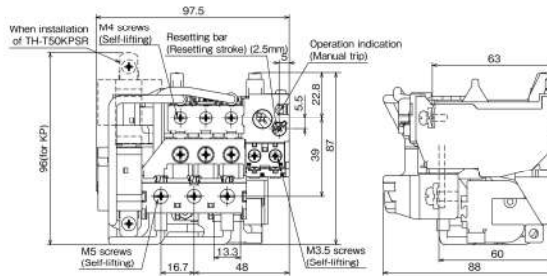
● TH-T50(BC)(KP)



Model name	Contact arrangement					
TH-T50(FS) TH-T50BC(FS)	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	
TH-T50(FS)KP TH-T50BC(FS)KP	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	

Use as an independent unit is not possible.  
 When combining with the Magnetic Contactor, use the following connection conductor kit (optional).  
 Combination with S-T35/T50(BC), SD-T35/T50(BC); UT-TH50

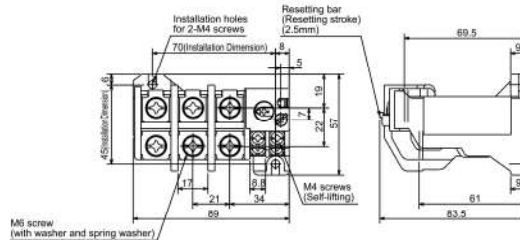
● TH-T50(BC)(KP)SR



Model name	Contact arrangement					
TH-T50SR	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	
TH-T50KPSR	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	

Use as an independent unit is not possible.  
 When combining with the Magnetic Contactor, use the following connection conductor kit (optional).  
 Combination with S-T35/T50(BC), SD-T35/T50(BC); UT-TH50

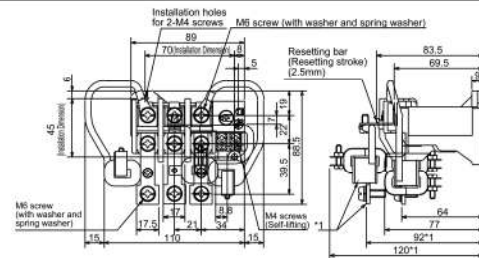
● TH-T65(KP)



When combining with the Magnetic Contactor, use the following connection conductor kit (optional).  
 Combination with S(D)-N50/N65, SL(D)-N50/N65; BH559N350  
 Combination with S-N80/N95, SL(D)-N80/N95; BH569N350  
 Combination with SD-N80/N95; BH569N352  
 TH-N60 and TH-N60KP can be used either for the Magnetic Starter (MSO) or independent mounting.  
 Note: With TH-N60CX, the width is 92 and the depth is 87.

Model name	Contact arrangement					
TH-T65(FS)	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	
TH-T65(FS)KP	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	

● TH-T65(KP)SR



\*1 applies for TH-N60(TA)KPSR.  
 When combining with the Magnetic Contactor, use the following connection conductor kit (optional).  
 Combination with S(D)-N50/N65, SL(D)-N50/N65; BH559N350  
 Combination with S-N80/N95, SL(D)-N80/N95; BH569N350  
 Combination with SD-N80/N95; BH569N352  
 TH-N60TA(KP)SR cannot be used with independent mounting.

Model name	Contact arrangement					
TH-T65SR	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	
TH-T65KPSR	1/L1	3/L2	5/L3	97	95	
	2/T1	4/T2	6/T3	98	96	

MS-T Series Introduction

Selection and Application

Application Items Details

Product Introduction

Overseas Standard

Type Codes

Order Procedure

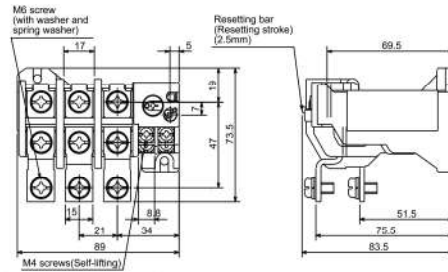
Outline Drawing

Warranty and Safety

## Outline Drawing, Contact Arrangement

### Thermal Overload Relays

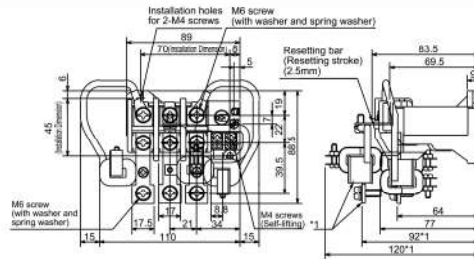
#### ● TH-T100(KP)



Use with independent mounting is not possible.  
 When combining with the Magnetic Contactor, use the following connection conductor kit (optional).  
 Use the connection conductor kit (optional, type: BH569N350)  
 Combination with S-N80/N95, SL(D)-N80/N95: BH569N350  
 Combination with SD-N80/N95: BH569N352

Model name	Contact arrangement
TH-T100(FS)	
TH-T100(FS)KP	

#### ● TH-T100(KP)SR



\*1 applies for TH-N60(TA)KPSR.  
 When combining with the Magnetic Contactor, use the following connection conductor kit (optional).  
 Combination with S(D)-N50/N65, SL(D)-N50/N65: BH559N350  
 Combination with S-N80/N95, SL(D)-N80/N95: BH569N350  
 Combination with SD-N80/N95: BH569N352  
 TH-N60TA(KP)SR cannot be used with independent mounting.

Model name	Contact arrangement
TH-T100SR	
TH-T100KPSR	