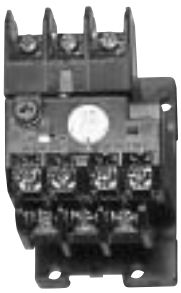
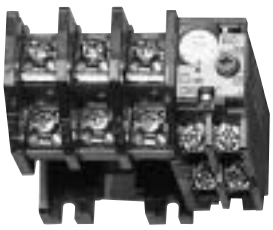
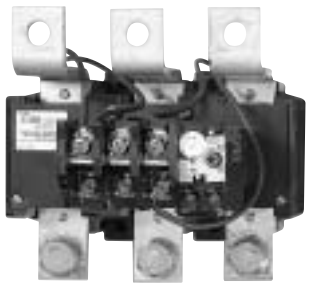
STANDARD AND OPEN-PHASE THERMAL OVERLOAD RELAYS







Model identification

TJ — 35 T26J — 3

Type
TJ ···Standard type GTJ ···Open phase type In the case of 400,600 frames, and SL2,it becomes the following type. T··· Standard type GT··· Open phase type

Frame	
Standard type	Open-phase type
18JA	18JA
18	18
18N	18N
35	35
50	50
125	125
220	220
400	400
400N	400N
600	600

Accessories
If required connecting parts for mounting to the contactor, specify its frame designation. However,it is not required for the combination with PAK-6JC. 【Ex】 Specify T26J for a combination with the PAK-26J. For a PAK-H model, the suffix will be H instead of J.

Accessory devices		
Code	Standard type	Open-phase type
Blank	2-element	—
3	3-element	—
F	Fast-trip	Fast-trip

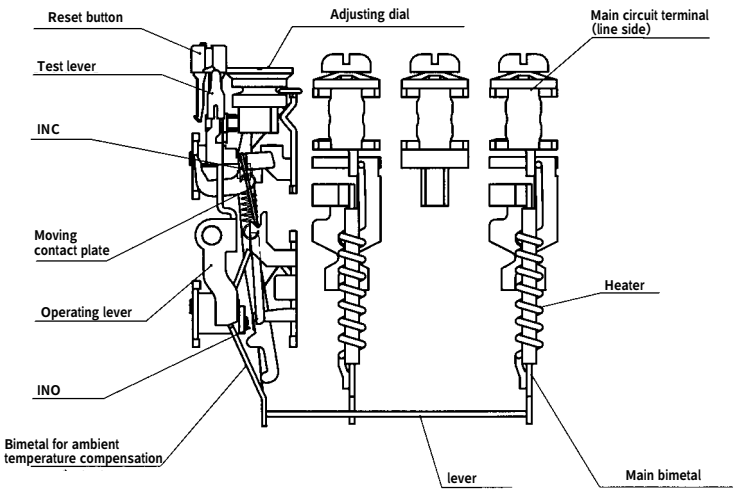
Features

- With operating indication
  An output contact is electrically in sulated contact of 1NO1NC.
- Automatic compensation for ambient temperature
  Operating current will automatically adjusted throughout the ambient temperature range of -20 to +60°C.
- One-touch selection of manual or automatic reset.
  Just press the reset button for change over the resetting method.
- TJ-18N,TJ-35～TJ-125 and TJ-400N can be used independently.

Structure

1. Standard type

Internal structure of standard thermal overload relay(TJ-35)



※All models have one-touch changeover mechanisim of auto/manual reset. See page 17 for how to use the reset button.

2. Open-phase type

Open-phase detection is made by using the difference of bend on main bimetals. The amplifier mechanism, composed of the first,second, and differential motion lever which are very accurate, detects the difference in bend.

A. Rated load mechanism

Bimetals on three phases make " a " bend by load current. First, second and differential motion levers make " a " parallel movement to the left, but the contact does not open.

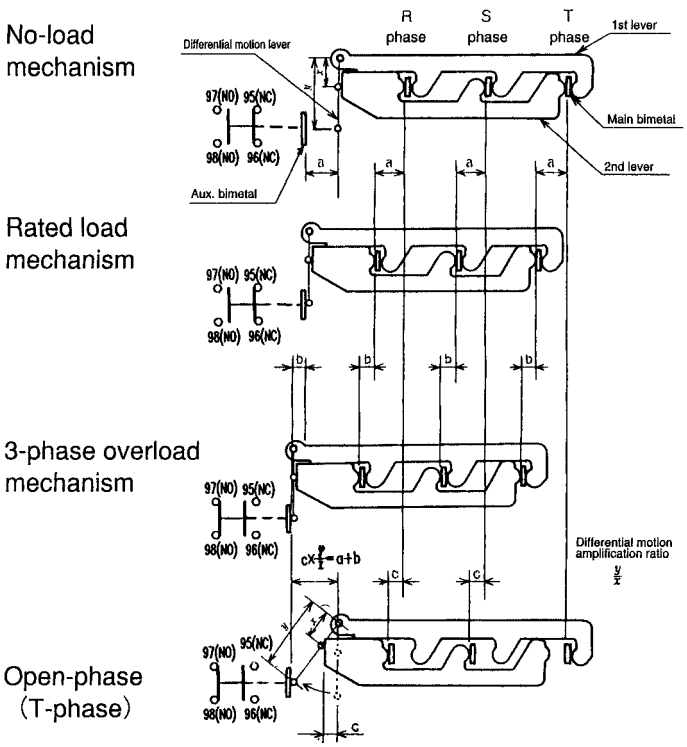
B. 3-phase overload mechanism

Due to over current, bimetals make more " b " bend than rated load mechanism, and the contact opens.

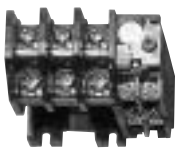
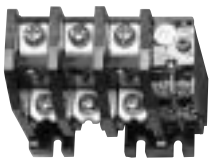
C. Open-phase (T phase) mechanism

The bimental of T phase does not bend, but bimentals on R and S phases make " c " bend. " c " bend is amplified to y/x and the contact opens.

Thus at the open-phase condition, it operates at lower current than at 3-phase overload current.

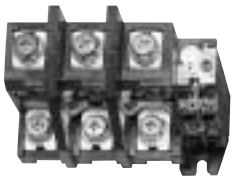
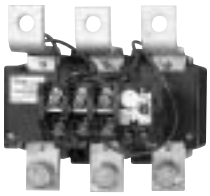
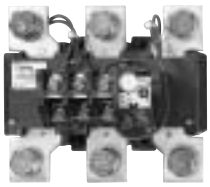
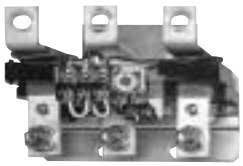
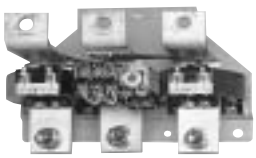


Product specifications

Types	standard model	TJ-18JA	TJ-18	TJ-18N	TJ-35	TJ-50
	open-phase protection model	GTJ-18JA	GTJ-18	GTJ-18N	GTJ-35	GTJ-50
	3-element protection model	TJ-18JA-3	TJ-18-3	TJ-18N-3	TJ-35-3	TJ-50-3
Appearance						
Magnetic contactors		PAK-6JC ①	PAK-11J PAK-12J PAK-20J PAK-21J	(Indivisual use)	PAK-26J PAK-35J	PAK-50H PAK-65H PAK-80H
Poies		3		3	3	3
Heater elements	standard model	2		2	2	2
	open-phase protection model	3		3	3	3
	3-element protection model	3		3	3	3
Indivisual use		—		Possible	Possible	Possible
Rated current — Standard model Open-phase protection (3-point current scale set-up)		0.28 — 0.35 — 0.42 0.4 — 0.5 — 0.6 0.56 — 0.7 — 0.84 0.8 — 1 — 1.2 1 — 1.2 — 1.4 1.4 — 1.8 — 2.2 1.8 — 2.3 — 2.8 2.4 — 3 — 3.6 2.9 — 3.6 — 4.3		3.7 — 4.6 — 5.5 4 — 5 — 6 5.4 — 6.7 — 8 6 — 7.5 — 9 7.4 — 9.2 — 11 8.8 — 11 — 13 11 — 13 — 15 12 — 15 — 18 15 — 18 — 20 18 — 22 — 25	7.4 — 9.2 — 11 8.8 — 11 — 13 12 — 15 — 18 15 — 18 — 20 18 — 22 — 25 24 — 30 — 36 28 — 34 — 42 34 — 42 — 45 40 — 48 — 52	12 — 15 — 18 18 — 22 — 26 24 — 30 — 36 28 — 34 — 42 34 — 42 — 48 40 — 48 — 58 46 — 56 — 64 56 — 68 — 80 68 — 80 — 94 76 — 90 — 100
Rated current — Fast-trip model (1-point current scale set-up) ③		5. 6. 7. 8. 10. 12. 14. 15. 16. 18. 20. 24. 26.			17. 21. 24. 26. 28. 32. 36. 40. 42. 46. 50.	28. 32. 36. 42. 50. 58. 64. 72. 80. 90. 100.
Adjusting dial		Ampere scale			Ampere scale	Ampere scale
Resetting method		Manual/automatic			Manual/automatic	Manual/automatic
Ambient temperature compensation		Provided			Provided	Provided
Manual check button		Provided			Provided	Provided
Indication of operation		Provided			Provided	Provided
Output Contact		1NO1NC			1NO1NC	1NO1NC

Rated ope-current of output contacts(A) AC15	Contacts	1NO	1NC	1NO	1NC	1NO	1NC
	100-110V	2	3	4	4	4	4
	200-220V	1	2	2	3	2	3
	380-440V	0.5	1.5	1	2	1	2
	500-550V	0.4	0.7	0.8	1	0.8	1

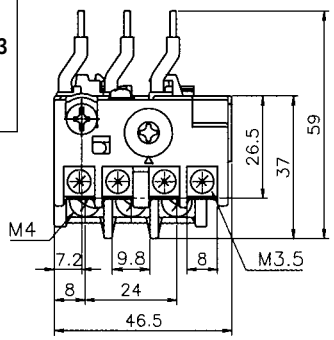
Notes. ①For PAK-6JC,the accessories for connection are not necessary.
②However 3-element models for T-400 and T-600 are not manutactured.

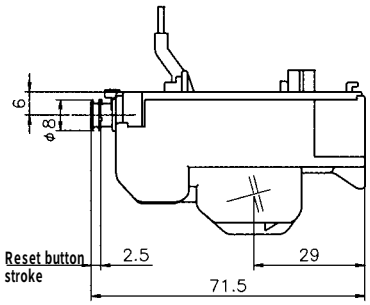
TJ-125	TJ-220	TJ-400N	T-400	T-600
GTJ-125	GTJ-220	GTJ-400N	GT-400	GT-600
TJ-125-3	TJ-220-3	TJ-400-3	—	—
				
PAK-100H PAK-125H PAK-150H	PAK-220H	(Indivisual use)	PAK-300H PAK-400H	PAK-600H
3	3	3	3	3
2	2	2	2	2
3	3	3	3	3
3	3	3	3	3
Possible	—	Possible	—	—
34 — 42 — 48 40 — 48 — 58 46 — 56 — 64 56 — 68 — 80 68 — 80 — 94 76 — 90 — 100 85 — 105 — 125 110 — 130 — 150 130 — 160 — 190	65 — 80 — 95 85 — 105 — 125 105 — 130 — 150 130 — 160 — 190 150 — 190 — 230	130 — 160 — 190 150 — 190 — 230 185 — 230 — 275 215 — 270 — 325 265 — 330 — 400 310 — 390 — 470 400 — 500 — 600	110 — 140 — 180④ 170 — 240 — 290 280 — 380 — 410 110 — 140 — 170④ 140 — 180 — 220 200 — 240 — 280 240 — 300 — 360 300 — 380 — 450	110 — 140 — 180④ 170 — 240 — 290 280 — 380 — 410 400 — 500 — 600 110 — 140 — 170④ 140 — 180 — 220 200 — 240 — 280 240 — 300 — 360 300 — 380 — 450 400 — 500 — 600
60. 66. 70. 76. 80. 85. 94. 100. 114. 125. 130. 140. 150	—	—	—	—
Ampere scale	Ampere scale	Ampere scale	Ampere scale	Ampere scale
Manual/automatic	Manual/automatic	Manual/automatic	Manual/automatic	Manual/automatic
Provided	Provided	Provided	Provided	Provided
Provided	Provided	Provided	Provided	Provided
Provided	Provided	Provided	Provided	Provided
1NO1NC	1NO1NC	1NO1NC	1NO1NC	1NO1NC
1NO / 1NC	1NO / 1NC	1NO / 1NC	1NO / 1NC	1NO / 1NC
4 / 4	4 / 4	4 / 4	2(0.5)⑤ / 3(1)⑤	2(0.5)⑤ / 3(1)⑤
2 / 3	2 / 3	2 / 3	1(0.5)⑤ / 2(1)⑤	1(0.5)⑤ / 2(1)⑤
1 / 2	1 / 2	1 / 2	0.5(0.2)⑤ / 1(0.3)⑤	0.5(0.2)⑤ / 1(0.3)⑤
0.8 / 1	0.8 / 1	0.8 / 1	— / —	— / —

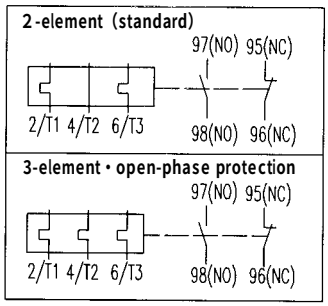
③The rated current of thermal overload relays must be selected within the rated operational current of magnetic contactor for 3-phase motor.
④For T-400 to T-600, upper column indicates for 2-element type and lower for open-phase protection type.
⑤Value in parenthesize indicates at auto-reset condition.
⑥Standard and open-phase protection models are also available in fast-trip models. See page 70 for details.

Dimensions and connection diagram

TJ−18JA
TJ−18
TJ−18JA−3
TJ−18−3
GTJ−18JA
GTJ−18

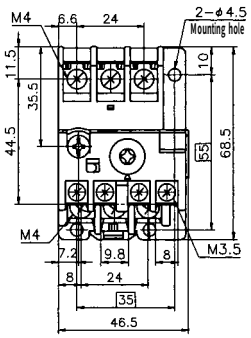


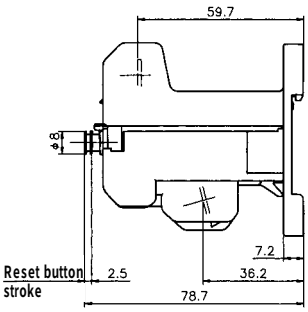


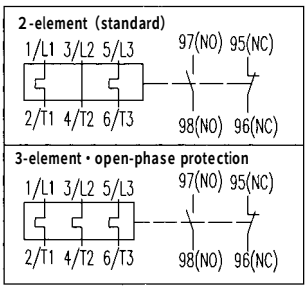


Weight 0.09kg

TJ−18N
TJ−18N−3
GTJ−18N

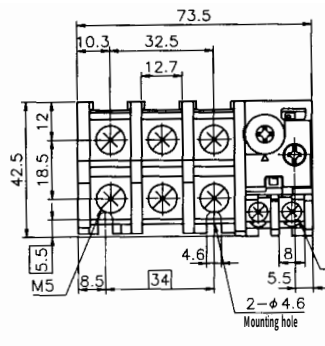


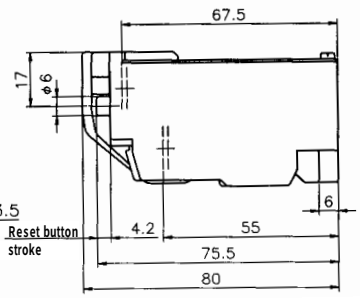


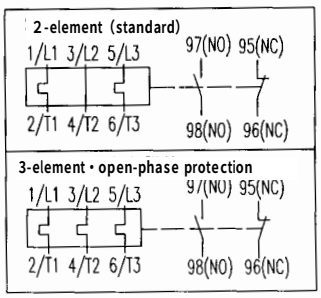


Weight 0.13kg

TJ−35
TJ−35−3
GTJ−35

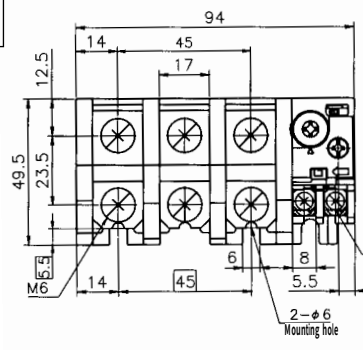


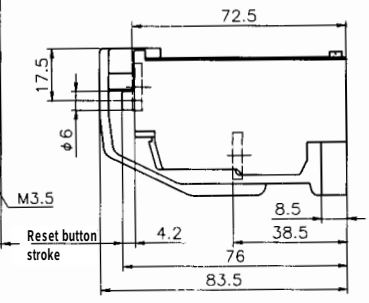


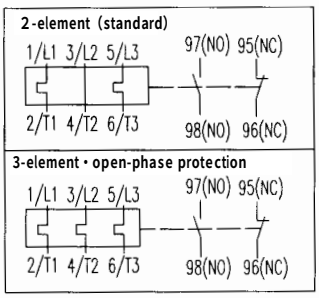


Weight 0.2kg

TJ−50
TJ−50−3
GTJ−50



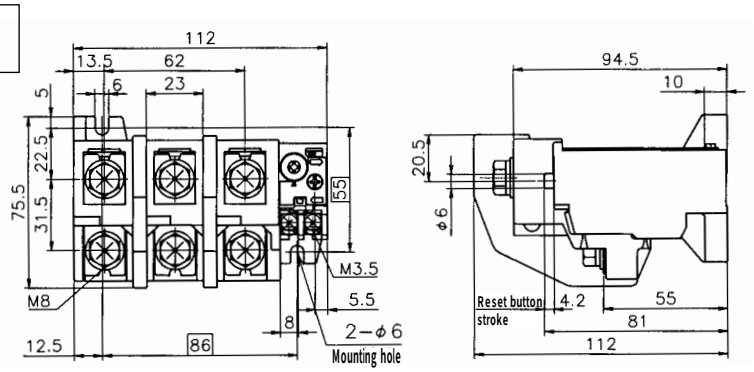


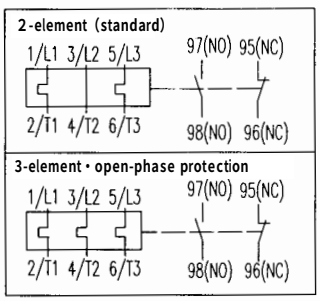


Weight 0.38kg

Dimensions and connection diagram

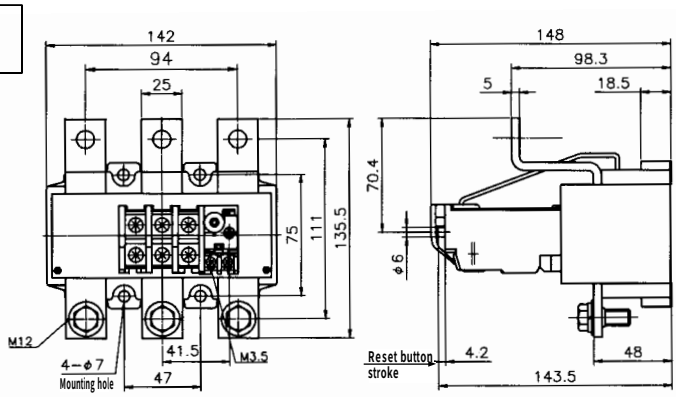
TJ−125
TJ−125−3
GTJ−125

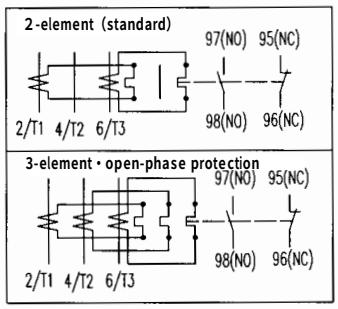




Weight 0.6kg

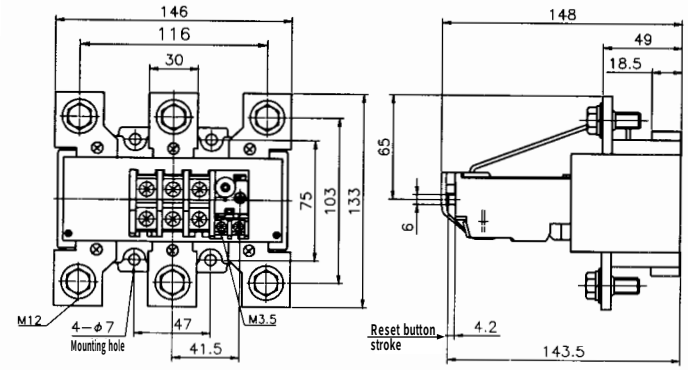
TJ−220
TJ−220−3
GTJ−220

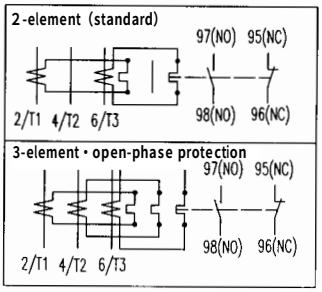




Weight 2.3kg

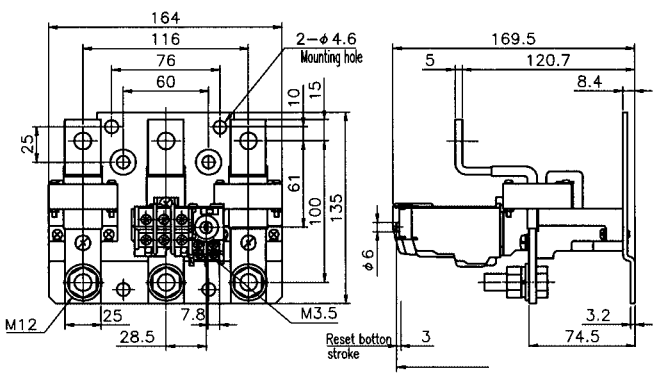
TJ−400N
TJ−400N−3
GTJ−400N

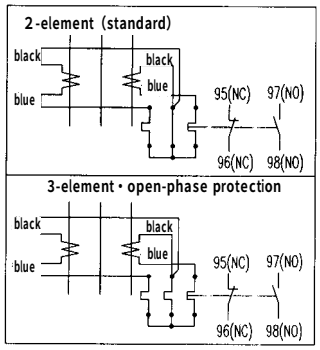




Weight 2.5kg

T−400
GT−400

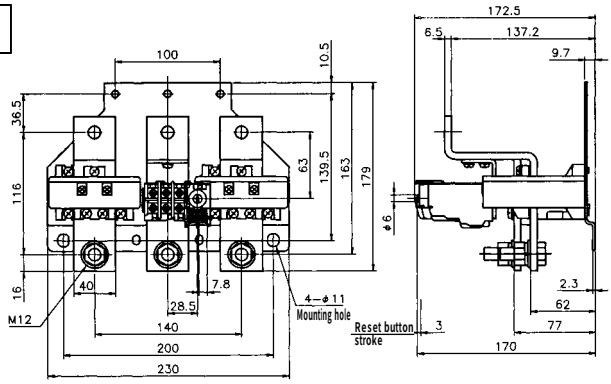


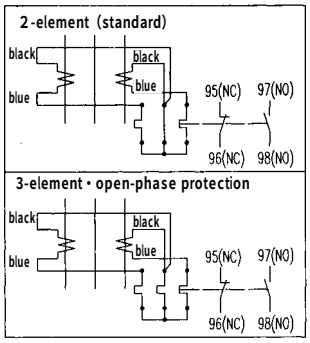


Weight 2.0kg

Dimensions and connection diagram

T—600
GT—600



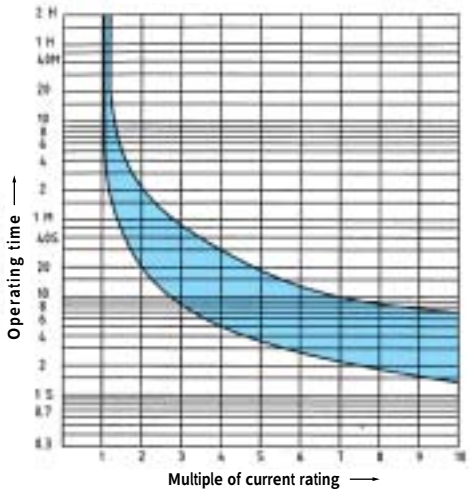


Weight 5.0kg

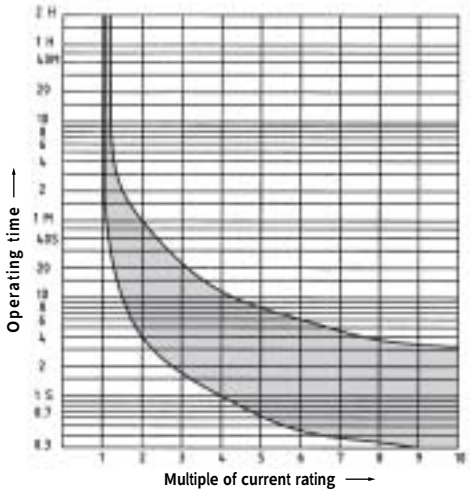
Dimensions and connection diagram

TJ–18JA
TJ–18
TJ–18N
TJ–18JA–3
TJ–18–3
TJ–18N–3

Cold start characteristics

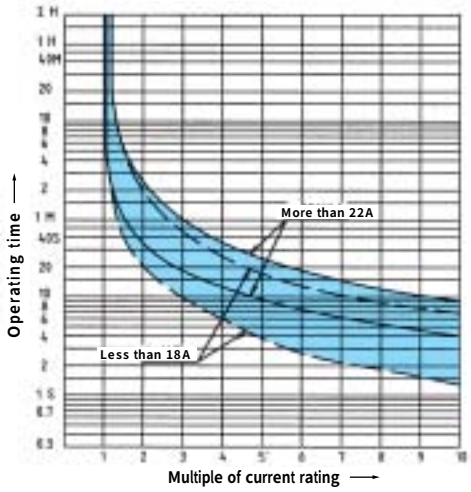


Hot start characteristics

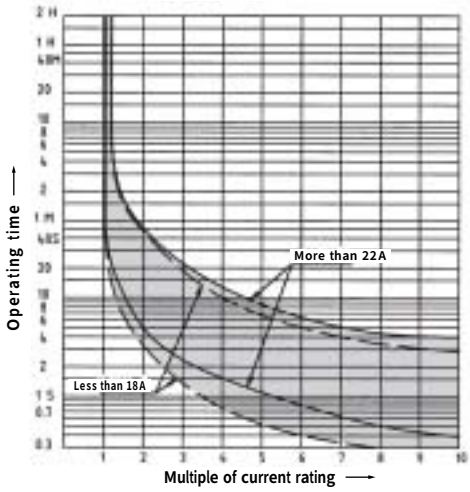


TJ–35
TJ–35–3

Cold start characteristics

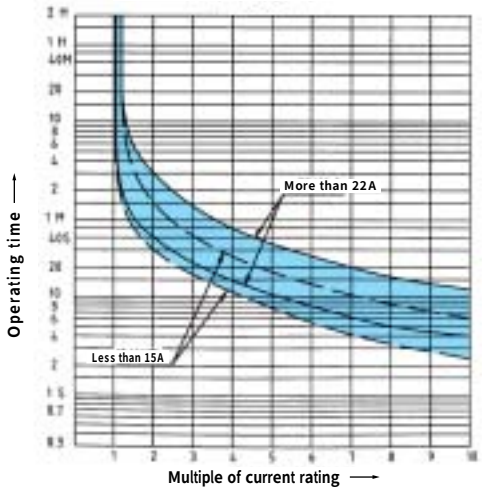


Hot start characteristics

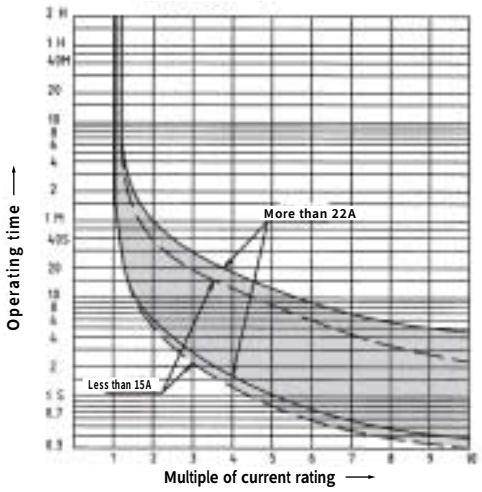


TJ–50
TJ–50–3

Cold start characteristics



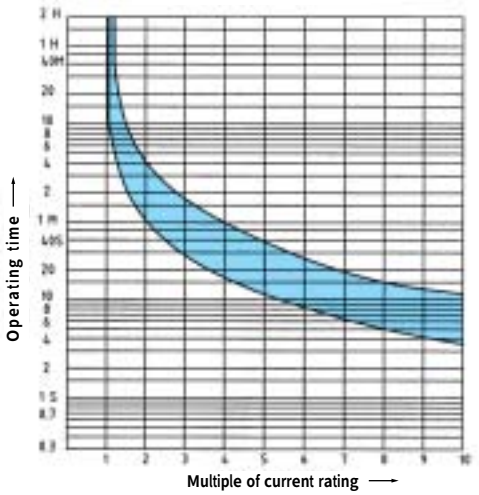
Hot start characteristics



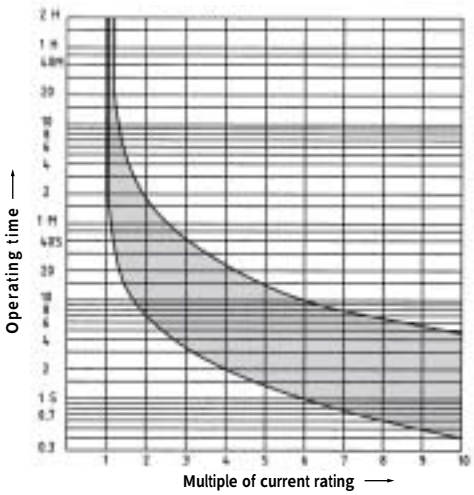
Operation characteristic curves

TJ−125
TJ−125−3

Cold start characteristics

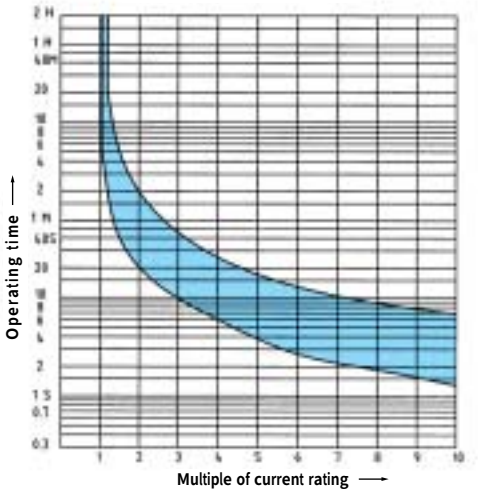


Hot start characteristics

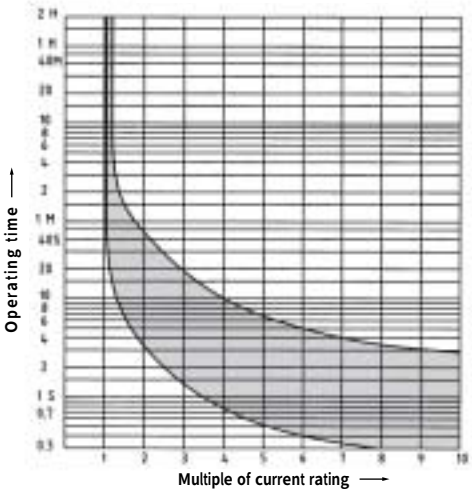


TJ−220
TJ−220−3

Cold start characteristics

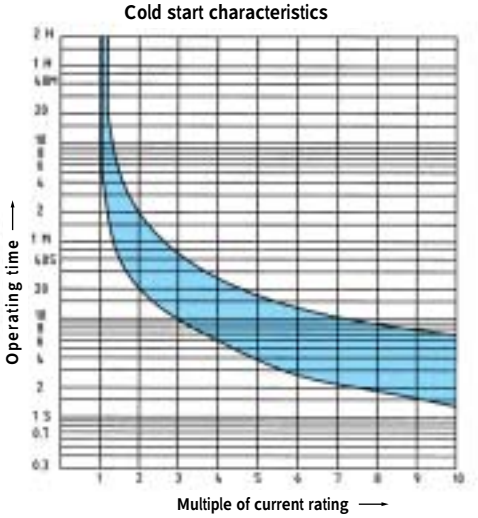


Hot start characteristics

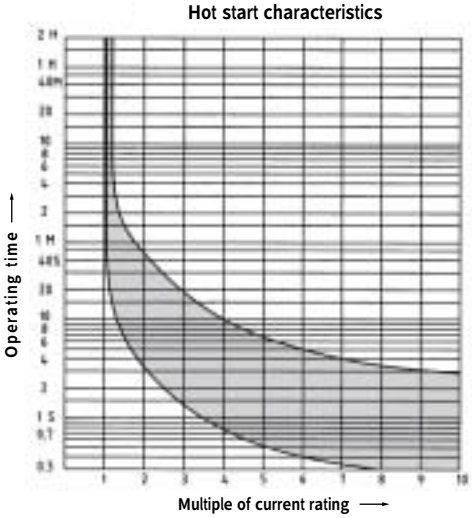


TJ−400N
TJ−400N−3

Cold start characteristics



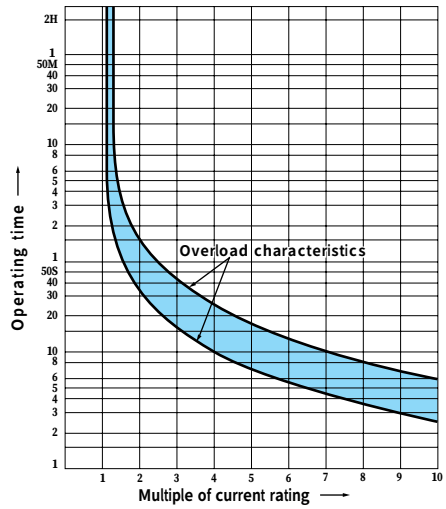
Hot start characteristics



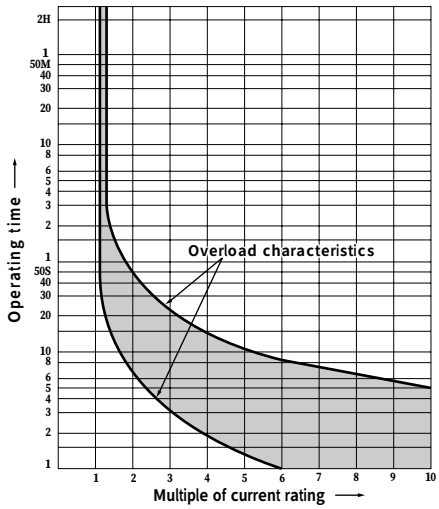
Operation characteristic curves

T−400

Cold start characteristics

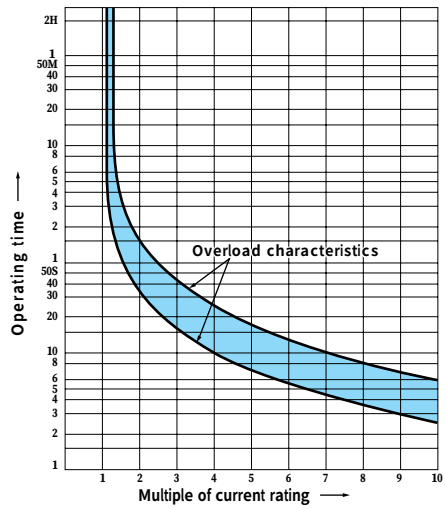


Hot start characteristics

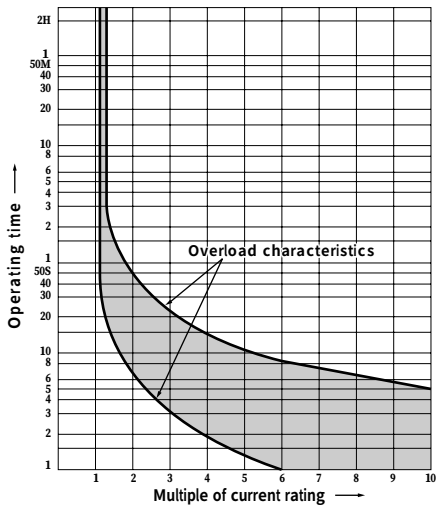


T−600

Cold start characteristics



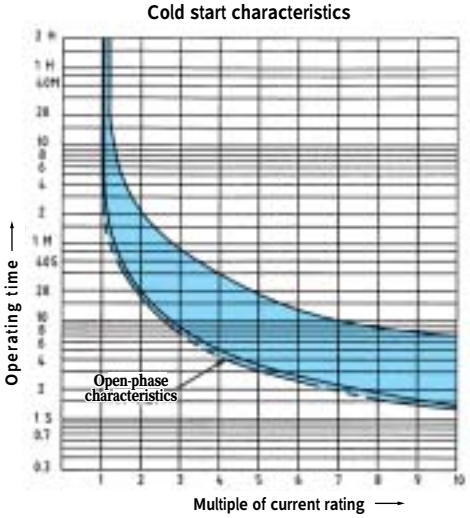
Hot start characteristics



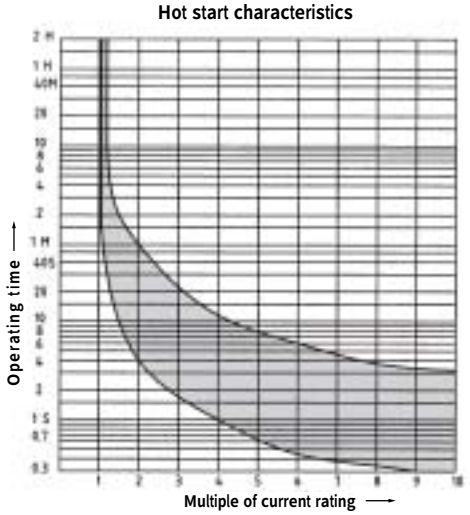
Operation characteristic curves

GTJ−18JA
GTJ−18
GTJ−18N

Cold start characteristics

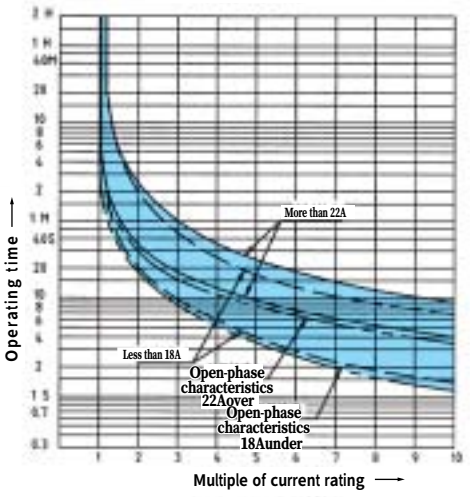


Hot start characteristics

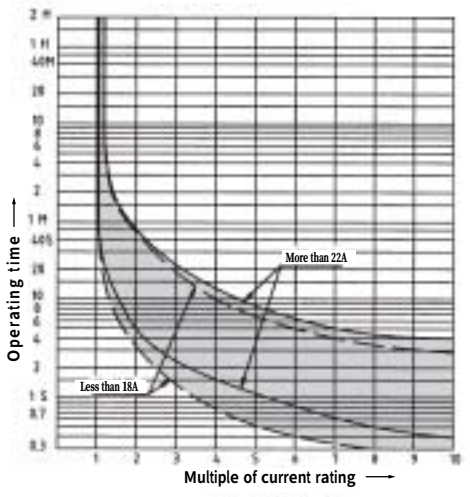


GJT−35

Cold start characteristics

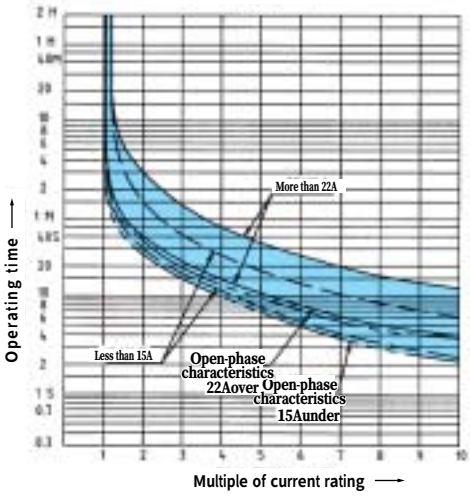


Hot start characteristics

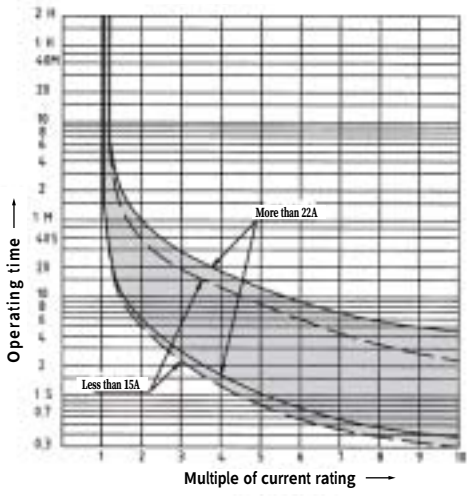


GTJ−50

Cold start characteristics



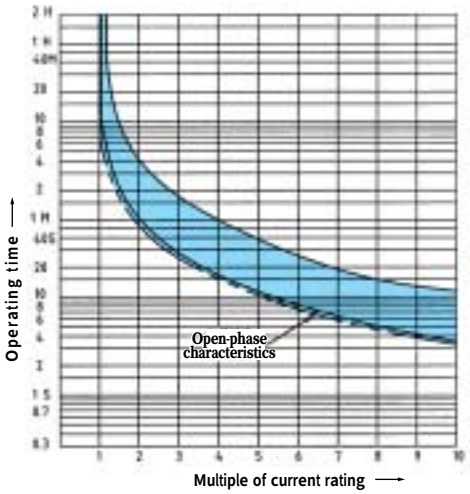
Hot start characteristics



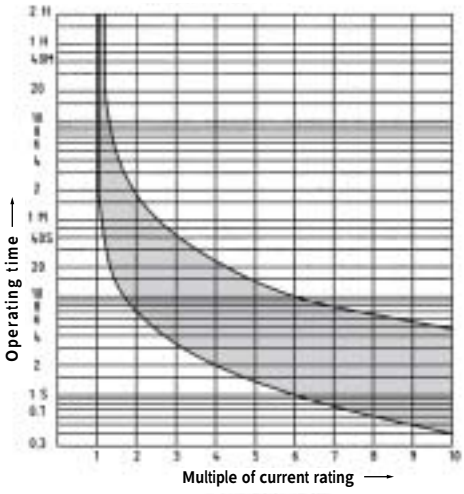
Operation characteristic curves

GTJ−125

Cold start characteristics

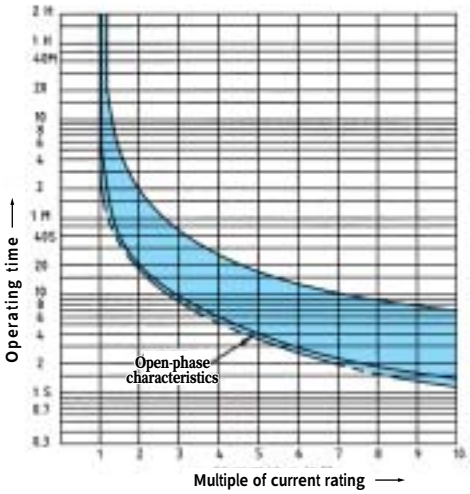


Hot start characteristics

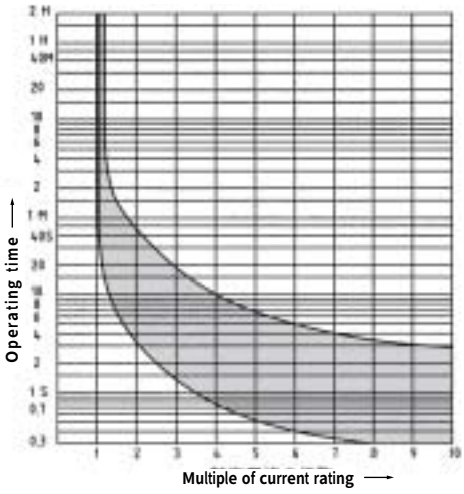


GTJ−220

Cold start characteristics

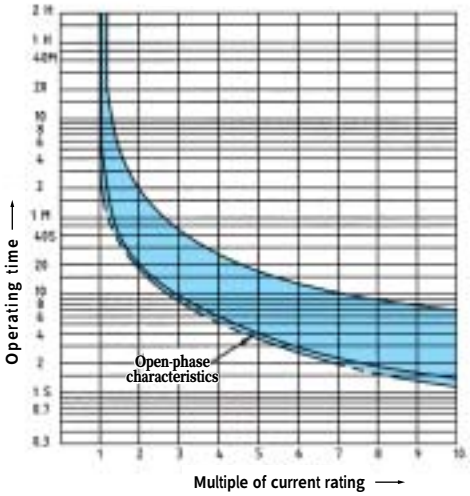


Hot start characteristics

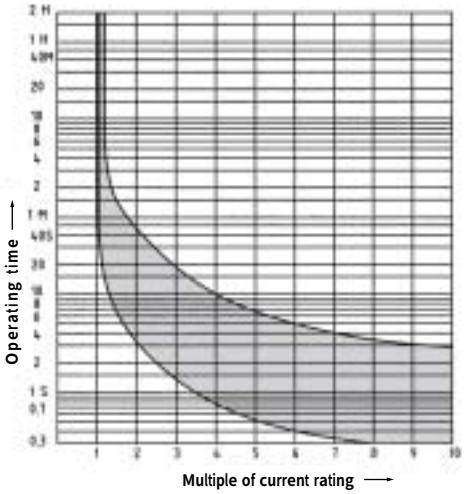


GTJ−400N

Cold start characteristics



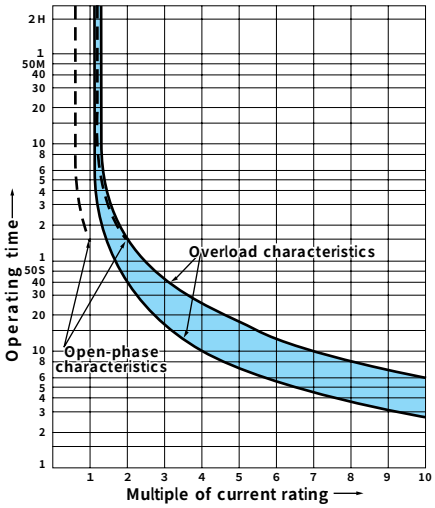
Hot start characteristics



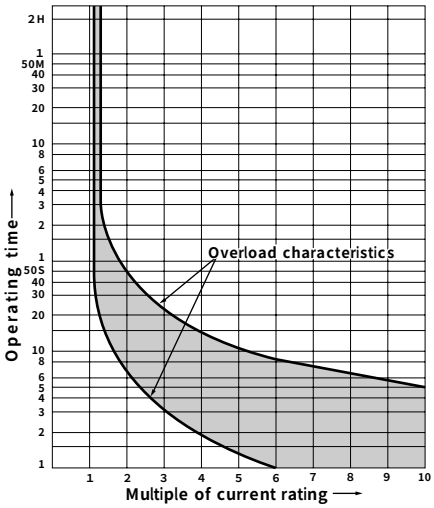
Operation characteristic curves

GT−400

Cold start characteristics

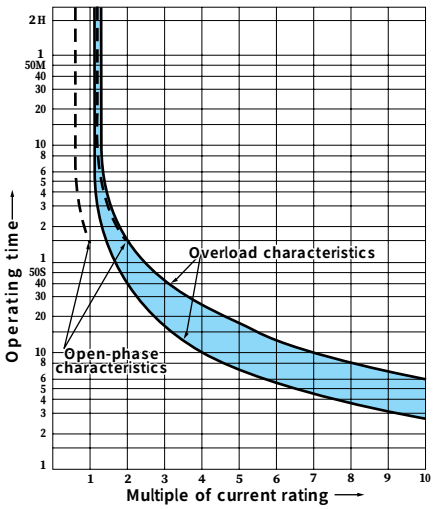


Hot start characteristics

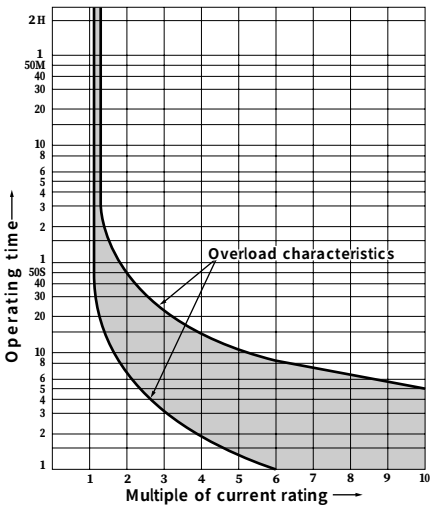


GT−600

Cold start characteristics

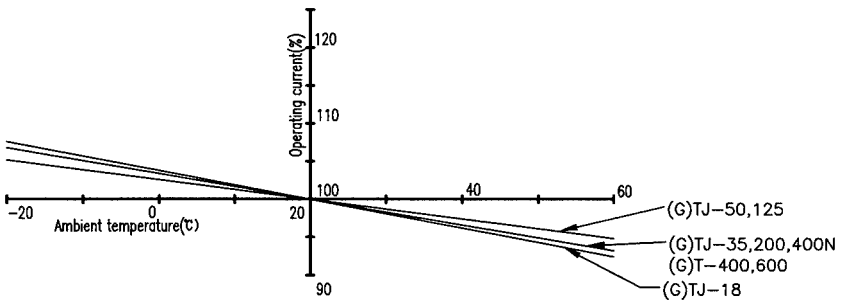


Hot start characteristics



Ambient temperature compensation

Thermal overload relay are provided with an ambient temperature compensating mechanism. At temperature between -20°C and +60°C,the operation is automatically compensated. The automatic compensating characteristics are shown in the curves based on temperature of 20°C.

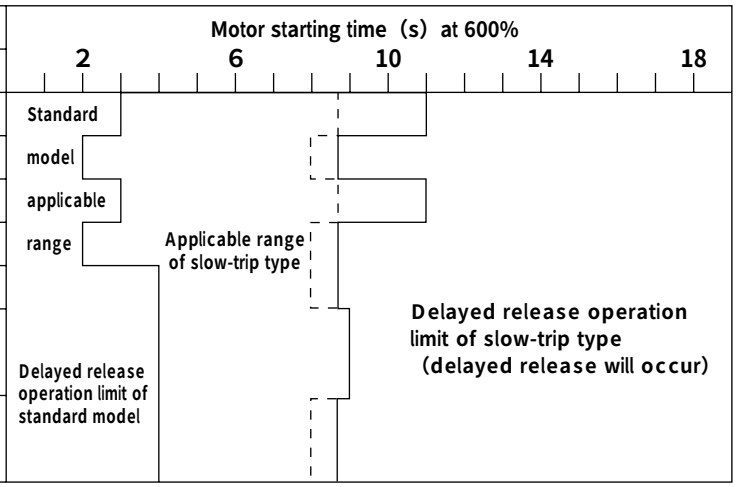


Motors used in high-inertia blowers, fans, centrifuges and similar machinery have long starting times, and standard thermal overload relays will often trip unnecessarily. The slow-trip thermal overload relay is highly suitable for overload protection of these high-inertia motors.

Selection

The table below indicates applicable range of motor starting time for slow-trip thermal overload relays. Please make the selection based on this table.
Note that even if the motor starting current decreases within the overcurrent characteristic curve, the thermal overload relay mag operate after a few seconds to about ten seconds by its delayed release characteristic. Therefore, please select models so that the motor starting time, is lower than the delayed release characteristic curve.

Model	Rated current range of thermal overload relay	
	T type	GT type
T-20-SL2	1.4～12.5	1.25～13.5
GT-18-SL2	15～18.5	17
T-35-SL2	5.3～12.5	5.3～13.5
GT-35-SL2	15～18.5	17
	25～35	23～36
T-50-SL2 GT-50-SL2	27～80	24～75
T-125-SL2 GT-125-SL2	68～190	62～180



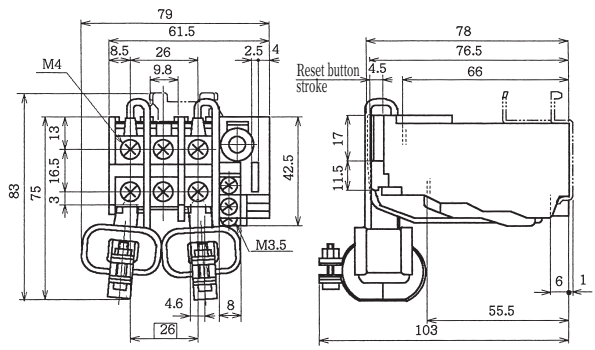
Notes. ①Rated current shows the center value of adjusting dial.
②Threshold line for delayed release operation shows for T type (2-element).

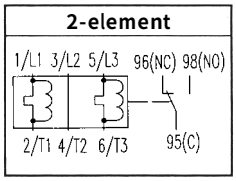
Rated operating current

Model	T-20-SL2	GT-20-SL2	T-35-SL2	GT-35-SL2	T-50-SL2	GT-50-SL2	T-125-SL2	GT-125-SL2
Magnetic contactor	PAK-21J		PAK-26J PAK-35J		PAK-50H PAK-65H PAK-80H		PAK-100H PAK-125H PAK-150H	
Dial adjustment range (A)	1.2－1.4－1.6	1－1.25－1.5	4.2－5.3－6.3	4.2－5.3－6.3	22－27－32	20－24－29	55－68－80	50－62－74
	1.4－1.65－1.9	1.2－1.5－1.8	4.7－5.8－6.9	5.7－7－8.4	29－36－43	27－33－39	66－80－96	60－75－90
	1.7－2.1－2.5	1.5－1.9－2.3	6.3－7.7－9.2	6.4－8－9.4	33－41－49	30－37－44	78－95－115	75－90－105
	2.2－2.6－3.2	2－2.4－2.9	7－8.7－10	7.8－9.7－11.5	41－51－61	37－46－55	102－125－150	95－115－135
	2.8－3.5－4	2.5－3.1－3.7	8.6－10.5－12.5	9.2－11.5－13.5	47－58－70	43－53－63	130－155－185	115－145－170
	3.4－4.2－4.9	3.1－3.8－4.5	10.5－12.5－15	12－13.5－15.5	55－68－80	50－62－74	155－190－230	145－180－210
	4.2－5.3－6.3	3.9－4.8－5.8	13－15－17	13.5－17－20.5	66－80－96	60－75－90		
	4.7－5.8－6.9	4.2－5.3－6.3	15－18.5－22	19－23－27				
	6.3－7.7－9.2	5.7－7－8.4	20.5－25－30	26－31－37				
	7－8.7－10	6.4－8－9.4	28－35－41	29－36－42				
	8.6－10.5－12.5	7.8－9.7－11.5						
	10.5－12.5－15	9.2－11.5－13.5						
	13－15－17	12－13.5－15.5						
	15－18.5－22	13.5－17－20.5						

Dimensions and specifications

T−20−SL2,T-20JA-SL2

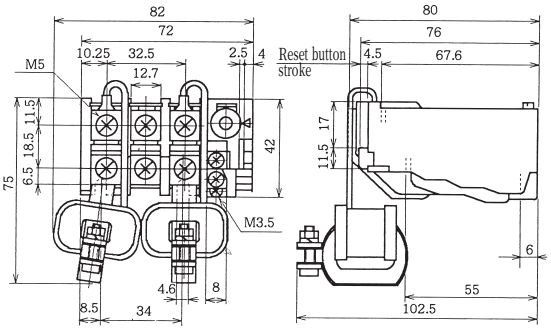


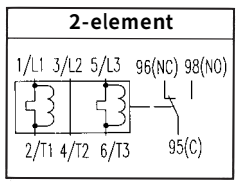


Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M4	M3.5
Applicable wire	φ1～2 0.5～3.5mm	φ1～1.6 0.5～2mm
Applicable round crimp-type terminals	1.25－4 5.5－4	1.25－3.5 2－3.5
Tightening torque N·m(kgf·cm)	1.2～1.8 (12～18)	0.8～1.2 (8～12)

Note. Steel base of dotted line is only provided on the T-20JA-SL2.

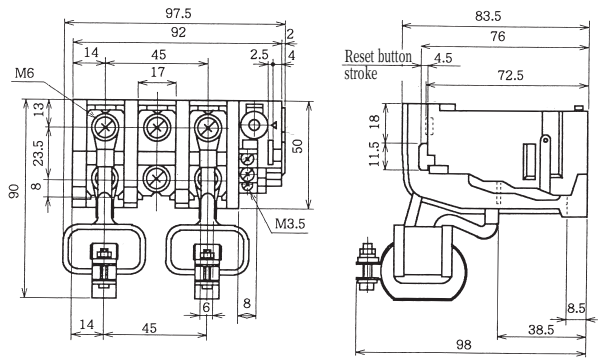
T−35−SL2

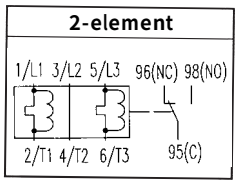




Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M5	M3.5
Applicable wire	φ1.6～3.2 1.25～14mm²	φ1～1.6 0.5～2mm²
Applicable round crimp-type terminals	1.25－5 14－5	1.25－3.5 2－3.5
Tightening torque N·m(kgf·cm)	2.4～3.5 (24～26)	0.8～1.2 (8～12)

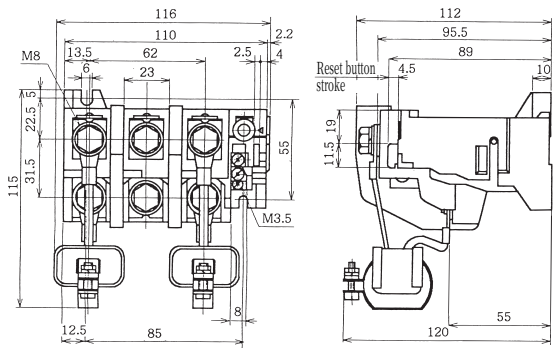
T−50−SL2

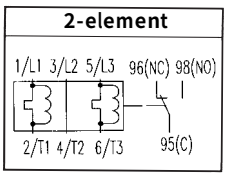




Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M6	M3.5
Applicable wire	2～38mm² (Using crimped terminals)	φ1～1.6 0.5～2mm²
Applicable round crimp-type terminals	2－6 38－6S	1.25－3.5 2－3.5
Tightening torque N·m(kgf·cm)	3.9～5.9 (40～60)	0.8～1.2 (8～12)

T−125−SL2

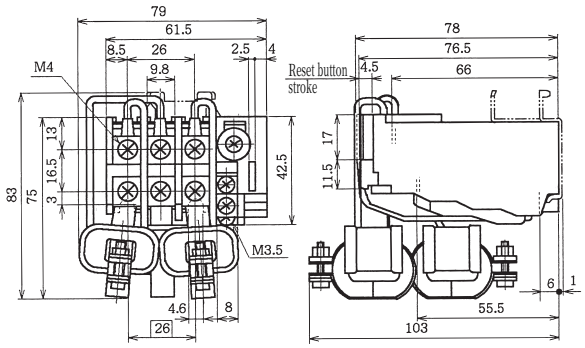




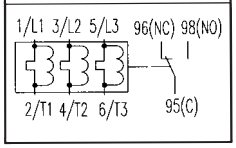
Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M8	M3.5
Applicable wire	2～100mm² (Using crimped terminals)	φ1～1.6 0.5～2mm²
Applicable round crimp-type terminals	2－8 CB100－8	1.25-3.5 2-3.5
Tightening torque N·m(kgf·cm)	9.0～13.5 (92～138)	0.8～1.2 (8～12)

Dimensions and specifications

GT−20−SL2,GT-20JA-SL2



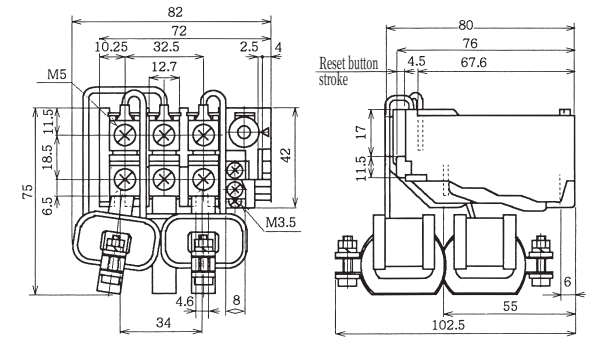
Open-phase protection



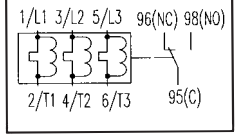
Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M4	M3.5
Applicable wire	φ1～2 0.5～3.5㎟	φ1～1.6 0.5～2㎟
Applicable round crimp-type terminals	1.25－4 5.5－4	1.25－3.5 2－3.5
Tightening torque N·m(kgf·cm)	1.2～1.8 (12～18)	0.8～1.2 (8～12)

Note. Steel base of dotted line is only provided on the T-20JA-SL2.

GT−35−SL2

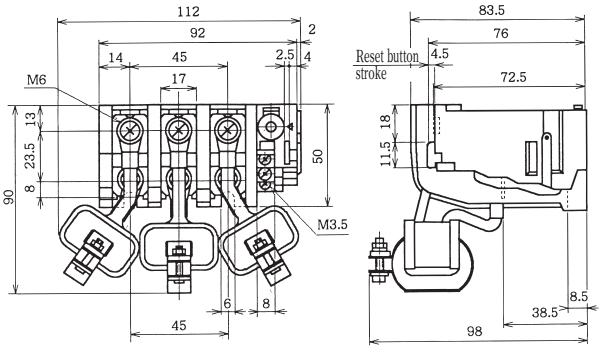


Open-phase protection

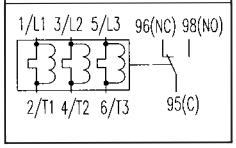


Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M5	M3.5
Applicable wire	φ1.6～3.2 1.25～14㎟	φ1～1.6 0.5～2㎟
Applicable round crimp-type terminals	1.25－5 14－5	1.25－3.5 2－3.5
Tightening torque N·m(kgf·cm)	2.4～3.5 (24～26)	0.8～1.2 (8～12)

GT−50−SL2

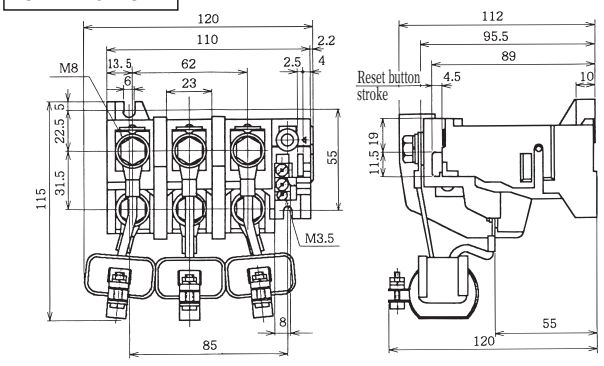


Open-phase protection

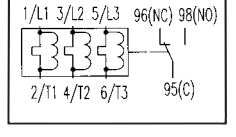


Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M6	M3.5
Applicable wire	2～38㎟ (Using crimped terminals)	φ1～1.6 0.5～2㎟
Applicable round crimp-type terminals	2－6 38－6S	1.25－3.5 2－3.5
Tightening torque N·m(kgf·cm)	3.9～5.9 (40～60)	0.8～1.2 (8～12)

GT−125−SL2



Open-phase protection

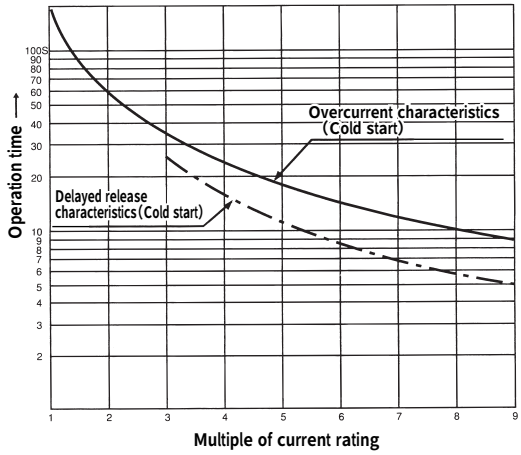


Applicable wires and tightening torque		
Item	Main circuit	Aux. circuit
Screw size	M8	M3.5
Applicable wire	2～100㎟ (Using crimped terminals)	φ1～1.6 0.5～2㎟
Applicable round crimp-type terminals	2－8 CB100－8	1.25－3.5 2－3.5
Tightening torque N·m(kgf·cm)	9.0～13.5 (92～138)	0.8～1.2 (8～12)

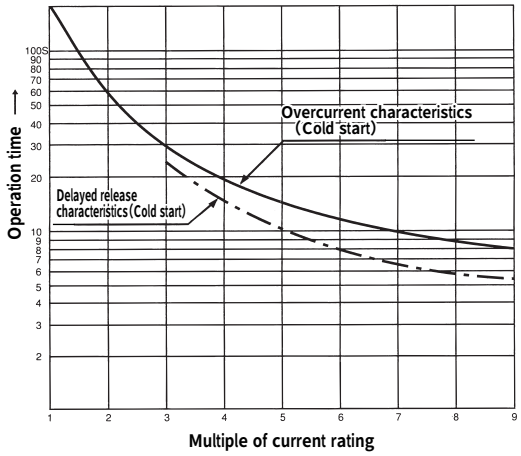
Operational characteristic curves

T−20−SL2
T−20JA−SL2
T−35−SL2

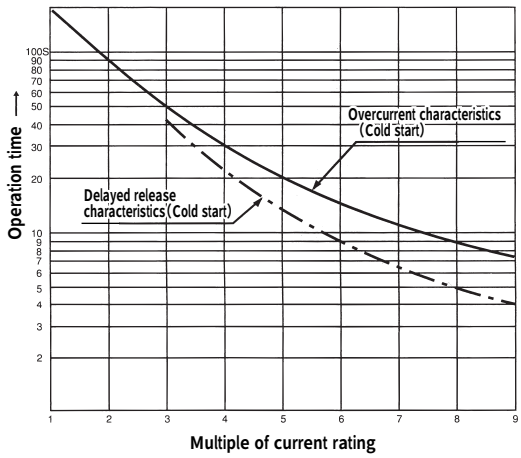
12.5A **under**



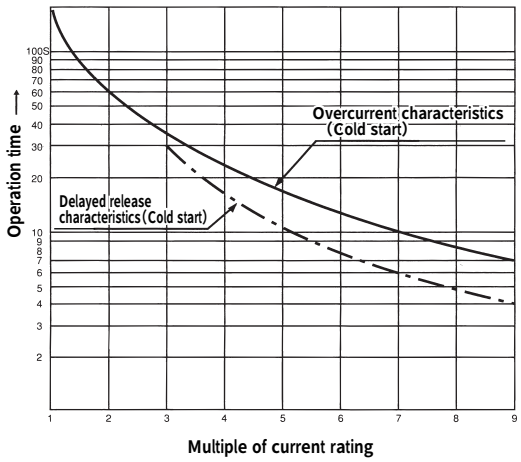
15A **over**



T−50−SL2



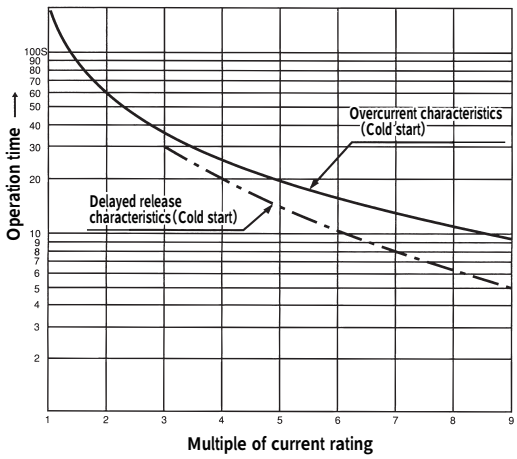
T−125−SL2



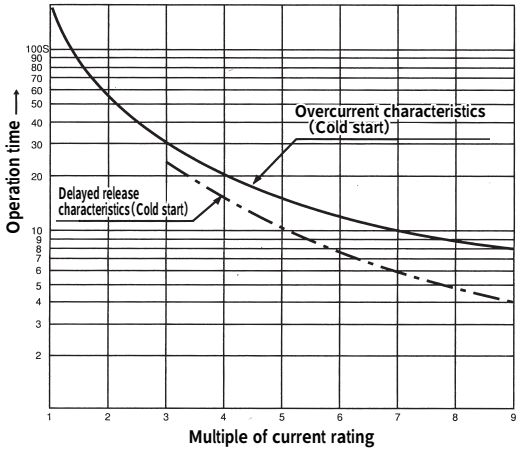
Operational characteristic curves

GT−20−SL2
GT−20JA−SL2
GT−35−SL2

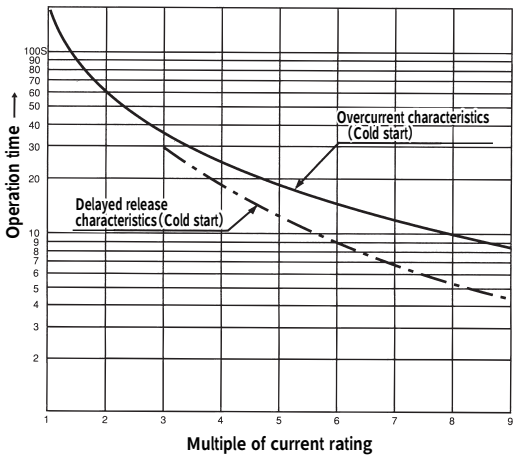
13.5A **under**



14.5A **over**



GT−50−SL2



GT−125−SL2