

Technical data for release times up to 10 s according to PN-EN 60947-1

Type of thermal overload relay	RSTM	RSTN1 / RSTN2	RSTN3	RSTN4	RSTL1	RSTL2 / RSTL3	RSTL4				
Release time classification	Class 10 A (2 s < t _A ≤ 10 s at 7,2 x I _e from cold state and t _A ≤ 2 min. at 1,5 x I _e from hot state)										
Phase failure protection by differential phase shift	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Changeover to automatic reset	No	Yes	Yes	Yes	Yes	Yes	Yes				
RESET button with trip-free feature	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Temperature compensation	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Switch position indicator	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Test button actuates the NO and NC contacts	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Terminal for contactor coil	No ②	Yes	Yes	No ②	No ②	No ②	No ②				
Ambient temperature [°C]	-25...+55 ①	-25...+55									
Degree of protection	IP 00 (open) or IP 20 to PN-EN 60947-1 and DIN 40050										
Shock resistance [g/ms]	8/10										
Operating / main circuit											
Rated current [A]	10	14,5 / 25	45	88	135	150 / 180	400				
Rated voltage [V AC]	600	600	600	600	600	600	600				
Rated impulse strength U _{imp} [kV]	6	6	6	8	8	8	8				
Rated voltage of insulation U _i [V] ③	690	690	690	1000	1000	1000	1000				
Type and frequency of current	DC, AC up to 400 Hz						AC up to 400 Hz				
Conductor cross-sections											
Terminal screw	M3	M4	M5	M5	M6	M8	M8 / M10 ④				
• solid or stranded [mm ²]	0,5 to 2,5	2,5 to 6	1,5 to 25	2,5 to 35	25 to 70	50 to 120	185 / 240 ④				
• finely stranded with end sleeve [mm ²]	0,5 to 1,5	1,5 to 4	1 to 16	1,5 to 25	25 to 50	25 to 95	-				
• flat bars [mm]	-	-	-	-	-	20×3	20×3 / 20×3×5 ④				
• tightening torque [Nm]	0,4 to 0,7	1 to 1,5	2,5 to 3	2,5 to 3	6 to 8	10 to 14	10 to 14 / 14 to 24 ④				
• tightening torque [lb.in]	4 to 6,5	9 to 13	22 to 26,5	22 to 26,5	52 to 50	89 to 124	89 to 124 / 124 to 210 ④				
Max. power loss per current path											
• at lowest value [W (VA)]	0,6	0,9	1,2	2,6	5	5	4 (5)				
• at highest value of the setting range [W (VA)]	2,3	2,25	3	4	7	7 / -	10 (12)				
Auxiliary circuit											
Auxiliary contacts	1NO + 1NC / 1NC	1NO + 1NC / 1 changeover			1NO + 1NC						
Conductor cross-sections											
Terminal screw	M3	M3,5									
• solid or stranded [mm ²]	2×(0,5 to 2,5)	2×(0,5 to 1) / 2×(1 to 2,5)									
• finely stranded with end sleeve [mm ²]	2×(0,5 to 1,5)	2×(0,5 to 1) / 2×(0,75 to 2,5)									
• tightening torque [Nm]	0,4 to 0,7	0,8 to 1,4									
• tightening torque [lb.in]	4 to 6,5	7 to 12									
Rated voltage [V AC]	600; > 150 same polarity										
Rated impulse strength U _{imp} [kV]	6										
Rated voltage of insulation U _i [V] ③	690 NC	400 Unequal potential (NO + NC)	690 Equal potential (NO + NC connected as changeover contact)								
Switching capacity											
	AC15						B 600, R 300	DC13			
• rated operating voltage U _e [V]	24	60	125	230	400	500	690	24	60	110	220
• rated operating current I _e [A]	2	1,5	1,25	1,15	1,1	1	0,8	2	0,5	0,3	0,2
• conventional thermal current I _{th} [A]	6										
Short-circuit protection	Fuses Class gL/gG - 6 A										

② Terminal for contactor coil is not required.

③ Pollution degree 3

④ Setting range (≤ 200 A / > 200 A)

① The upper set value of thermal current is to be reduced by 0,5% per 1 °C of excess temperature or a min. space of 5 mm is to be maintained the units when several overload relays are series mounted and simultaneously operated at ambient temperatures exceeding 25 °C.

Release time

Adjustment rated range [A]	Conductor cross-sections [mm ²]	Release time ($\pm 20\%$) with three-pole symmetrical load form the cold state. Adjusted current multiplication factor ($\times I_e$) [s]					
		3	4	5	6	7,2	8
		RSTM					
0,1 - 0,16	1	23,8	14,5	10,5	8,3	6,8	5,8
0,16 - 0,25	1	22,5	14	10,1	8	6,5	5,5
0,25 - 0,4	1	22,8	14	10	7,8	6,3	5,4
0,4 - 0,63	1	23,5	14,1	10,2	8	6,5	5,6
0,63 - 1	1	25	15	10,8	8,3	6,8	5,7
0,8 - 1,25	1	27,5	16,7	11,8	9	7,2	6
1 - 1,6	1	25	15,5	11	8,6	7	5,9
1,25 - 2	1	26,5	17	12,7	10	8,4	7,2
1,6 - 2,5	1	27,4	17,3	12,7	10	8,3	7,2
2 - 3,2	1	29,5	18	12,9	10	8,1	6,7
2,5 - 4	1	28,5	17,5	12,4	9,6	7,8	6,5
3,2 - 5	1	29	17,6	12,3	9,5	7,5	6,3
4 - 6,3	1	28,5	17	11,9	9	7,2	5,8
5 - 8	1	29	17,5	12	9	7,1	5,8
6,3 - 10	1,5	25	14,1	9,4	6,8	5,2	4,2
RSTN1							
0,1 - 0,16	1	16,7	10,3	7,5	5,9	4,8	4,1
0,16 - 0,25	1	20,5	12,8	9,5	7,5	6,3	5,4
0,25 - 0,4	1	18	11,2	8,2	6,5	5,4	4,6
0,4 - 0,63	1	20,8	12,8	9,5	7,6	6,3	5,4
0,63 - 1	1	23,3	14,4	10,5	8,3	6,8	5,8
0,8 - 1,25	1	28	17,5	12,7	9,8	8,1	6,8
1 - 1,6	1	22,6	14,3	10,4	8,3	6,8	5,9
1,25 - 2	1	22,3	14	10,3	8,4	6,9	6,0
1,6 - 2,5	1	24,5	15,5	11,5	9	7,5	6,4
2 - 3,2	1	23,8	15	11	8,8	7,3	6,3
2,5 - 4	1	24,4	15,6	11,4	9,1	7,6	6,5
3,2 - 5	1	27,5	17	12,2	9,5	7,8	6,5
4 - 6,3	1	23,4	14,4	10,4	8	6,5	5,5
5 - 8	1	22,5	13,5	9,5	7,2	5,7	4,7
6,3 - 10	1,5	24	13,9	9,3	6,8	5,3	4,3
8 - 12,5	2,5	24,5	14,8	10,2	7,8	6,2	5,2
10 - 14,5	2,5	23,2	13,9	9,5	7,2	5,6	4,6
RSTN2							
4 - 6,3	1	23,4	14,4	10,4	8	6,5	5,5
5 - 8	1	22,5	13,5	9,5	7,2	5,7	4,7
6,3 - 10	1,5	24	13,9	9,3	6,8	5,3	4,3
8 - 12,5	2,5	24,5	14,8	10,2	7,8	6,2	5,2
10 - 16	2,5	23,2	13,9	9,5	7,2	5,6	4,6
12,5 - 20	2,5	23	13	8,6	6,3	4,8	3,9
16 - 25	4	31	17	11	7,7	5,8	4,6
RSTN3							
8 - 12,5	2,5	24,5	14,8	10,2	7,8	6,2	5,2
10 - 16	2,5	26,2	15,8	10,8	8,1	6,4	5,2
12,5 - 20	2,5	26,6	14,8	9,7	7	5,3	4,3
16 - 25	4	29	15,4	9,8	7	15,3	4,2
20 - 32	6	28	16,1	10,8	8,2	6,3	5,2
25 - 36	10	33,4	19	12,8	9,3	7,2	5,8
32 - 40	10	24,3	13,6	8,8	6,6	5	4,2
36 - 45	10	23	13	8,5	6,2	4,5	3,3

Release time

Adjustment rated range [A]	Conductor cross-sections [mm ²]	Release time (±20%) with three-pole symmetrical load form the cold state. Adjusted current multiplication factor (x I _e) [s]					
		3	4	5	6	7,2	8
RSTN4							
12,5-20							
16 - 25	4	34	19,5	13,2	9,7	7,6	6,2
20 - 32	6	33	18,5	12,8	9,4	7,4	6
25 - 40	10	30	17	11,5	8,4	6,5	5,3
32 - 50	10	29	16,6	11	8	6,2	5
40 - 57	16	35	19,4	12,3	8,7	6,6	5,3
50 - 63	16	37	20,5	13,3	9,6	7,3	5,8
57 - 70	25	40	21,5	14	9,8	7,4	5,8
63 - 80	25	40	21,5	13,8	9,7	7,3	5,8
70 - 88	35	33,9	17,6	11,8	8	6,5	4,9
RSTL1, RSTL2, RSTL3							
55 - 80	25	36	21	13,5	9,8	7,5	6,1
63 - 90	35	44	24	15,5	11	8,5	6,7
80 - 110	35	43	22	14	10	7,7	6,1
90 - 120	50	40	21,8	14	10	7,5	5,9
110 - 135	50	32	18	11,7	8,4	6,4	5,1
120 - 150	50	35	19,5	12,8	9,4	7,2	5,8
135 - 160	70	38	20,6	13,8	10	7,6	6,2
150 - 180	95	37	20,5	13,5	9,7	7,4	6,0
RSTL4							
80 - 125	50	25	16,8	13,1	11,1	9,9	9,1
125 - 200	95	24,4	16,1	11,9	9,8	8,4	7,4
160 - 250	120	23,8	13,9	10,3	8,5	7,3	6,5
200 - 320	185	25,6	15,5	10,9	8,5	7	6,4
250 - 400	240	25	15	10,5	8,5	7	6,2

Protection characteristics

Item No.	Adjusted current multiplication factor		Release time	Test condition
1	1,05		> 2 h ❶	Cold state
2	1,20		< 2 h ❶	Hot state
3	1,50		< 2 min. ❶	Pre-heated for 2 hours with 1 adjusted current multiplication factor
4	7,2		2 s < T _p < 10 s, Class 10 A	Cold state
Hot state means heat the thermal overload relay into steady state with the current as shown in "Item No. 1".				
	Adjusted current multiplication factor		Release time	Test condition
	Any two phases	Another phase		
5	1,0	0,9	> 2 h ❷	Cold state
6	1,15	0	> 2 h ❷	Hot state
Hot state means heat the thermal overload relay into steady state with the current as shown in "Item No. 1".				

❶ Release time with three-pole symmetrical load at ambient temperature +20 °C

❷ Release time with three-pole unsymmetrical load (phase-failure) at ambient temperature +20 °C

Tripping characteristics

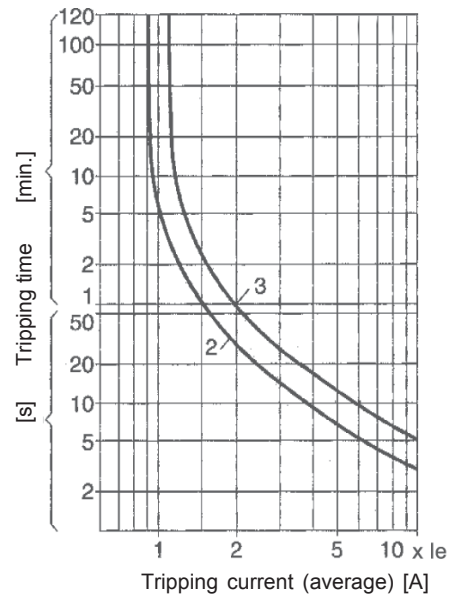
The current-time curves show the relationship between the tripping time from cold state and multiples of the set current I_e . When the relay is at operating temperature and carrying $1,0 \times I_e$, the tripping times are reduced to approximately 25%.

Tripping curve 3 is applicable to three-pole loads and curve 2 to two-pole loads. For single-pole loads the tripping curves lie between curves 2 and 3. For normal operation, all three bimetallic strips of the overload relay must be heated.

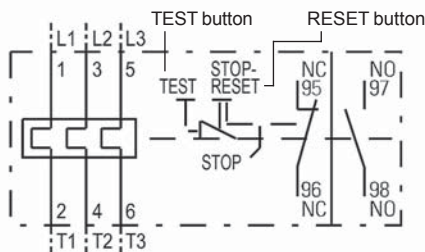
The thermal overload relays **RSTM**, **RSTN**, **RSTL** are suitable for protecting motors with phase control. For protecting single-phase or DC-loads, therefore, all three main conducting paths must be connected in series. Tripping curve 3 is then applicable.

The release current with a three-pole symmetrical load is between 105% and 120% of the set current.

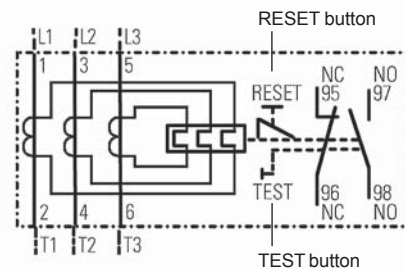
Fig. Typical tripping characteristics



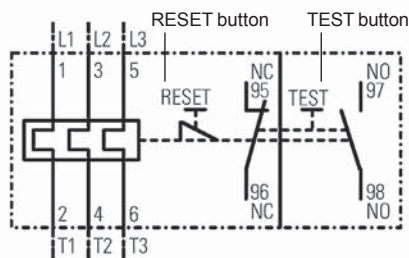
Internal connections diagrams



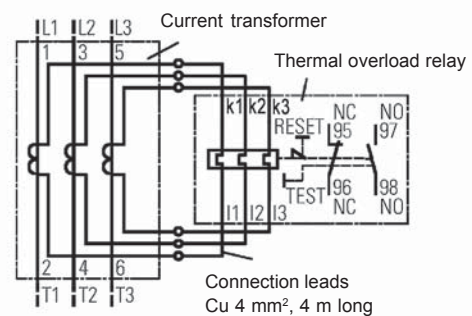
RSTM



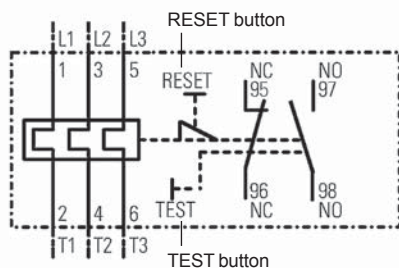
RSTL4



RSTN1, RSTN2



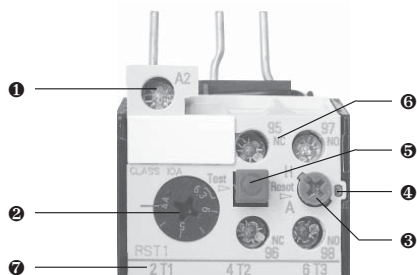
RSTL4 separate mounting of current transformer and thermal overload relay



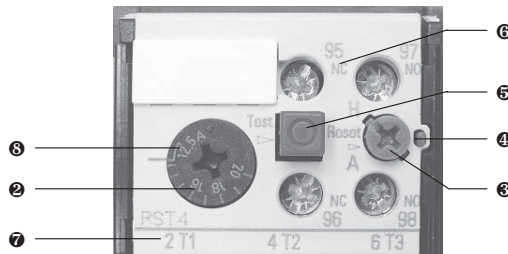
**RSTN3, RSTN4,
RSTL1, RSTL2, RSTL3**

Installation

1. Marks on panel (marks on thermal overload relays).



Panel RSTN1, RSTN2, RSTN3



Panel RSTN4, RSTL1, RSTL2, RSTL3, RSTL4

- ❶ Terminal A2 must be connected for contactor coil terminal A2 before connection of overload relay to contactor (mounted device make connect of wire to contactor terminal A2 impossible). Overload relay terminal A2 and contactor terminal A1 are used to coil supply.
- ❷ Setting current adjusting scale.
- ❸ RESET button (blue): H - manual, A - automatic.
- ❹ Switch position indicator (green). Indicator operates in the mode of manual relay resetting.
- ❺ TEST button (red).
- ❻ Auxiliary contacts terminals.
- ❼ Main circuit connection terminal No. It must correspond with terminal No. of contactor.
- ❽ In case of separate mounting of RSTL and ambient temperature higher than +55 °C there must to set a correction relay setting current. The table show indicators of maximum current value which are refer to higher value relay setting dependent on ambient temperature and additionally there show factors of current corrections. Below there show examples of setting current calculation for ambient temperature +70 °C.

Ambient temperature	Maximum permissible current loading referred to end-of-scale value of thermal overload relay	Setting current correction
+55 °C	1,00	1,00
+60 °C	0,94	1,08
+65 °C	0,88	1,09
+75 °C	0,82	1,10

Example:

Motor rated current: 60 A. Ambient temperature: +70 °C.
Overload relay fitted: 55 to 80 A.

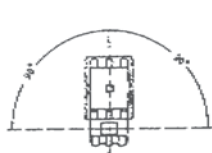
1. Determine the permissible current loading:

Max. current loading: $80 \text{ A} \times 0,82 = 65,6 \text{ A}$.
Loading with motor rated current 60 A at +70 °C ambient temperature is permissible.

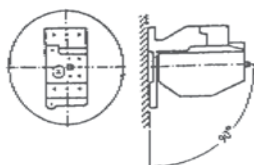
2. Calculate the setting current:

Motor rated current: 60 A.
Setting current correction: $60 \text{ A} \times 1,1 = 66 \text{ A}$.
You must set the overload relay to 66 A.

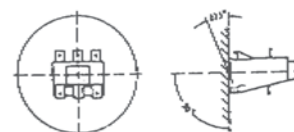
- 2. Set the scale to the rated current of the load ❹.
- 3. If the reset button points to H (manual) and the relay has been tripped, pressing the button puts the relay in operation again. Changing to automatic reset by pressing and turning the button anti-clock wise from H to A.
- 4. When the test button is actuated, the NC contact opens and the NO contact closes, therefore the auxiliary circuit (simulation of overload tripping) can be tested. In the "manual" position, the relay is resetted when the blue reset button is pressed. In the "automatic" position, the relay is reset automatically. **In the automatic mode, there is a risk of self-switching.**
- 5. Mounting and operating position, the relays are shown in drawings.



Thermal overload relay with CRNI contactor



Thermal overload relay with CRI-320 to CRI-350 relay base - for installing as a single unit



Tripping relay to be installed as a single unit