

Thermal Overload Relays

TR series

General information

Standard type thermal overload relays

■ Description

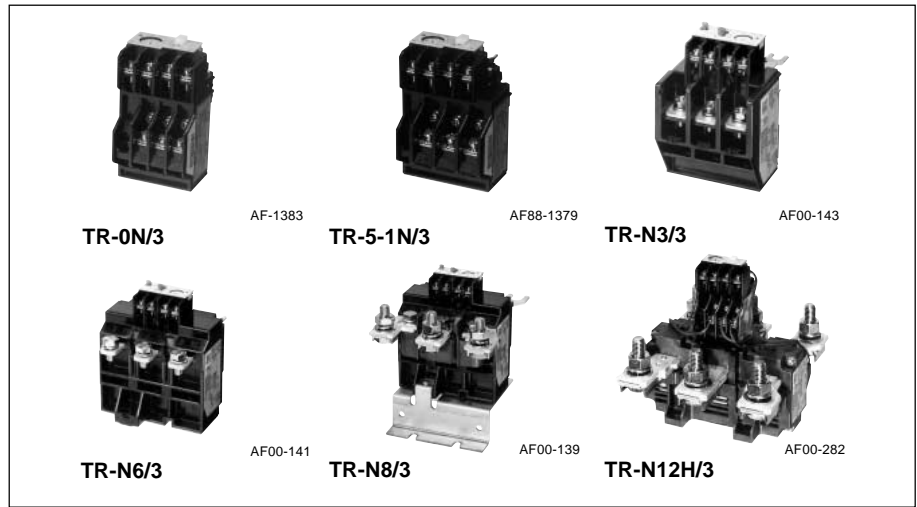
- Highly reliable thermal overload relays
- FUJI thermal overload relays are designed to provide overload protection to meet the thermal characteristics of low voltage induction motors. Adjustable thermal overload relays give motors positive overcurrent protection. The starter contacts cannot be held closing under overload conditions. However, once the bimetal element has cooled, the reset button can be depressed and the motor can be restarted in the normal manner. Ordinarily this reset is carried out manually but the starter can be changed over to 'automatic reset' by means of a screw-driver.
- FUJI thermal overload relay is subjected to stringent testing in the factory to check performance and actual values are calibrated with the markings on the adjustable dial. Consequently, they provide a positive protection.
 - Relays are also provided with ambient temperature compensators, so that their performance will be maintained in spite of temperature changes. The ambient temperature is regulated for 20°C.
 - The heater elements are available for either 2- or 3-pole use.

Long time operating type

In the case of loads having large inertia moments such as blowers, winders or centrifuges the starting time is extended. This will cause the standard-type thermal overload relay to operate during starting so isolating the motor. If necessary FUJI will supply thermal relays with saturable reactors. (Time-delay type).

Quick operating type overload relays

The windings of submersible pump and compressor motors normally have a smaller overload capacity than those of standard motors, since they are generally cooled by the water and other medium being pumped. Q type overload relays will operate more quickly than the standard type in the face of a locked rotor current.



■ Features

- Isolated NO and NC contacts can be used with different potentials.
- Gold-flashed silver contact assures high contact reliability (TR-0N/3 to N14/3).
- Stable operating characteristics protect motors from burnout due to overload or locked rotor currents.
- Easy setting of current value with a calibrated dial.
- Both manual and auto reset available. A manual trip button is provided to facilitate sequence testing.
- Mechanical trip indication
- Trip-free mechanism is provided.
- Reset release button and trip indicator are optional accessories.

■ Warning

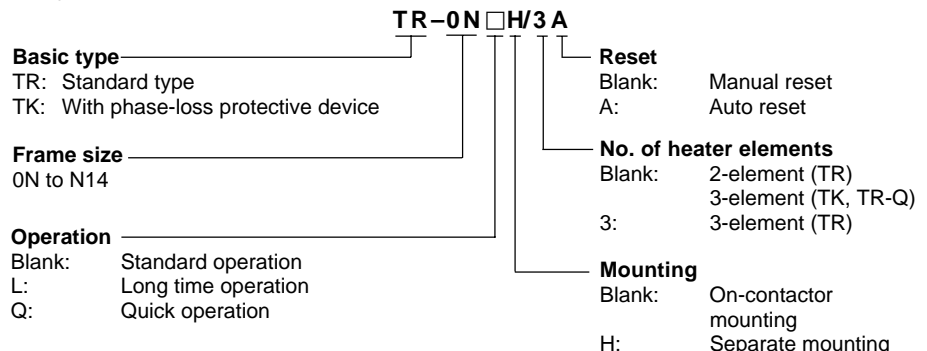
All FUJI thermal overload relays have been tested and calibrated at the factory. They should not be tampered with or stripped down at the job site since this would affect their accuracy. A special feature of the FUJI starter series is the ease by which the relay current ratings can be varied to match the requirements of the load. The changeover is effected by simply turning a dial to the new value required. The range of adjustment is approximately 100%–125%–150% and details are given overleaf.

■ Ordering information

Specify the following:

1. Ordering code
 2. Setting range code
- See page 01/89.

■ Type number nomenclature



■ Ordering code system

T R 2 0 B N W — T A
① ② ③④ ⑤ ⑥ ⑦ ⑧ ⑨

① Product category

Description	Code
Thermal overload relay	T

② Series category

Description	Code
TR-N□ series	R

③④ Frame size

Frame size	Code	
	③	④
0N	1	3
5-1N	2	0
N2	3	5
N3	6	5
N5	9	3
N6	1	C
N7	1	F
N8	1	J
N10	2	C
N12	4	A
N14	6	A

⑤ Index

Type	Code
TR-0N, 5-1N	Blank
TR-N2 to N14	B

⑥ Version

Description	No. of element	Code
Standard	2	N
	3	D
Long time operation	2	L
	3	F
Quick operation	3	S
With phase-loss	3	E

⑦ Mounting

Description	Code
On-contactor mounting	W
Separate mounting	H

⑨ Reset

Description	Code
Manual reset	Blank
Auto reaset	A

⑧ Thermal overload relay ampere setting range

Ampere setting range (A)	Code
0.1 — 0.15	A
0.13 — 0.2	B
0.15 — 0.24	C
0.2 — 0.3	D
0.24 — 0.36	E
0.3 — 0.45	F
0.36 — 0.54	G
0.48 — 0.72	H
0.64 — 0.96	J
0.8 — 1.2	K
0.95 — 1.45	L
1.4 — 2.2	M
1.7 — 2.6	N
2.2 — 3.4	P
2.8 — 4.2	R
4 — 6	S
5 — 8	T
6 — 9	U
7 — 11	V
9 — 13	W
12 — 18	X
16 — 22	Q
18 — 26	B
24 — 36	E
28 — 40	F
32 — 42	I
34 — 50	G
45 — 65	J
48 — 68	O
53 — 80	L
65 — 95	M
85 — 105	I
85 — 125	N
110 — 160	P
125 — 185	R
160 — 240	S
200 — 300	T
240 — 360	U
300 — 450	V
400 — 600	W

Ordering example

- ① Thermal overload relay T
- ② TR-N□ series R
- ③④ Frame size: 5-1N 20
- ⑤ Index Blank
- ⑥ Standard type, 3-element D
- ⑦ On-contactor mounting W
- ⑧ Ampere setting range 4-6A S
- ⑨ Auto reset A

- ① Thermal overload relay T
- ② TR-N□ series R
- ③④ Frame size: N3 65
- ⑤ Index B
- ⑥ With phase-loss protection E
- ⑦ On-contactor mounting W
- ⑧ Ampere setting range 24-36A E
- ⑨ Manual reset Blank

TR20DW-SA

TR65BEW-E

Thermal Overload Relays

TR series

■ Features

● Manual trip

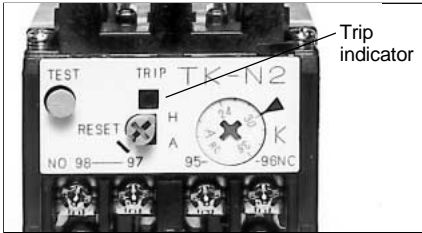
These relays can be manually tripped for sequence inspection by pressing manual trip bar (TR-0N/3, TR-5-1N/3). A sequence inspection will be performed when the test button is pulled out. When the test button is pressed in, only the NC contact will turn OFF. The original status will be restored when the test button is then released. (TR-N2/3 to N8/3)

● Trip-free mechanism

Even if the reset button is carelessly pressed, this relay trips without trouble (Trip-free mechanism).

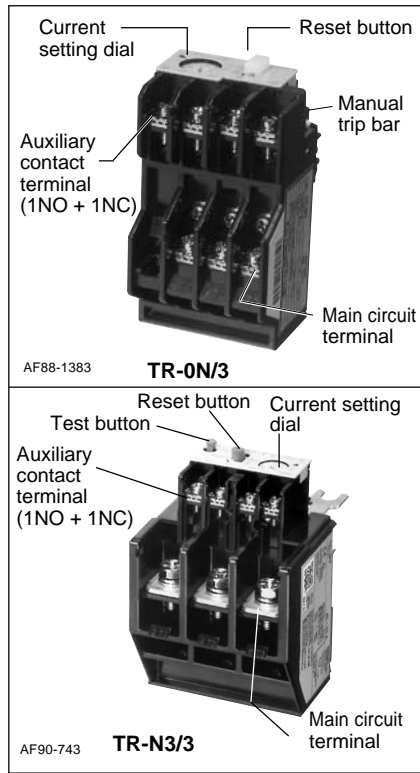
● Easy visual checking of operating status

Trip indicator and manual trip bar permit visual check of tripping status.



● Dial ampere setting

The setting dial uses a RC (Rated Current) marking which is set to the motor full load current.



■ Versatile optional accessories

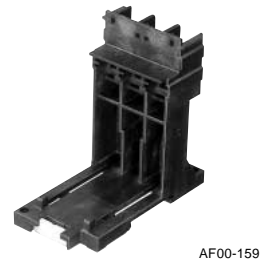
Trip indicator



Reset release



Base unit for separate mounting



■ Optional accessories

Description		Type	Ordering code	Used with thermal overload relay
Reset release	Lead length 300 mm	SZ-R1	TZ1R1	TR-0N/3, TR-5-1N/3, TK-0N, TK-5-1N
	500 mm	SZ-R2	TZ1R2	
	700 mm	SZ-R3	TZ1R3	TR-N10 to N14, TK-N10 to N14
You can reset these relays remotely on the front panels of switchboards.	Lead length 300 mm	SZ-R4	TZ2R4	TR-N2/3 to N8/3, TK-N2 to N8
	500 mm	SZ-R5	TZ2R5	
	700 mm	SZ-R6	TZ2R6	
Trip indicator	100–110V AC 50/60Hz	SZ-L100	TZ1L100	TR-0N/3, TR-5-1N/3, TK-0N, TK-5-1N
	200–220V AC 50/60Hz	SZ-L200	TZ1L200	TR-N10 to N14, TK-N10 to N14
Easier checking of trip status	100–110V AC 50/60Hz	SZ-L100N2	TZ2L100N2	TR-N2/3 to N8/3, TK-N2 to N8
	200–220V AC 50/60Hz	SZ-L200N2	TZ2L200N2	
Dial cover For protection against the current setting being changed in error		SZ-DA	SZ1DA	TR-0N/3, TR-5-1N/3, TK-0N, TK-5-1N TR-N2/3 to N14/3, TK-N2 to N14
Base unit for separate mounting The unit can be screw-mounted and rail-mounted.		SZ-HB	TZ1HB	TR-0N/3, TK-0N
		SZ-HC	TZ1HC	TR-5-1N/3, TK-5-1N
		SZ-HD	TZ2HD	TR-N2/3, TK-N2
		SZ-HE	TZ2HE	TR-N3/3, TK-N3
Terminal cover		SZ-T10	SZ1T10	Base unit for separate mounting SZ-HB
		SZ-T11	SZ1T11	Base unit for separate mounting SZ-HC
		SZ-T14	SZ2T14	For separate mounting TR-N2H/3, TK-N2H
		SZ-T15	SZ2T15	For separate mounting TR-N3H/3, TK-N3H
		SZ-RN6T	SZ2RN6T	For separate mounting TR-N6H/3, TK-N6H
		SZ-T12	TZ1T12	TR-0N/3, TK-0N
		SZ-T13	TZ1T13	TR-5-1N/3, TK-5-1N
		SZ-T16	SZ2T16	TR-N2/3, TK-N2
		SZ-T17	SZ2T17	TR-N3/3, TK-N2

■ Selection guide/Standard type

On-contactor mounting	3-element	TR-0N/3 (TR13DW) TR-0N (TR13NW)		TR-5-1N/3 (TR20DW) TR-5-1N (TR20NW)		TR-N2/3 (TR35BDW) TR-N2 (TR35BNW)		TR-N3/3 (TR65BDW) TR-N3 (TR65BNW)	
	2-element	TR-0NH/3 (TR13DH) TR-0NH (TR13NH)		TR-5-1NH/3 (TR20DH) TR-5-1NH (TR20NH)		TR-N2H/3 (TR35BDH) TR-N2H (TR35BNH)		TR-N3H/3 (TR65BDH) TR-N3H (TR65BNH)	
Separate mounting	3-element	TR-0N/3 (TR13DW) TR-0N (TR13NW)		TR-5-1N/3 (TR20DW) TR-5-1N (TR20NW)		TR-N2/3 (TR35BDW) TR-N2 (TR35BNW)		TR-N3/3 (TR65BDW) TR-N3 (TR65BNW)	
Separate mounting	2-element	TR-0NH/3 (TR13DH) TR-0NH (TR13NH)		TR-5-1NH/3 (TR20DH) TR-5-1NH (TR20NH)		TR-N2H/3 (TR35BDH) TR-N2H (TR35BNH)		TR-N3H/3 (TR65BDH) TR-N3H (TR65BNH)	
Contactor to be combined		SC-03	SC-0 SC-05	SC-4-0	SC-4-1 SC-5-1	SC-N1	SC-N2	SC-N2S	SC-N3
Ampere setting range (A)	Code	A	0.1 – 0.15	0.1 – 0.15	0.1 – 0.15	0.1 – 0.15			
	B	0.13 – 0.2	0.13 – 0.2	0.13 – 0.2	0.13 – 0.2				
	C	0.15 – 0.24	0.15 – 0.24	0.15 – 0.24	0.15 – 0.24				
	D	0.2 – 0.3	0.2 – 0.3	0.2 – 0.3	0.2 – 0.3				
	E	0.24 – 0.36	0.24 – 0.36	0.24 – 0.36	0.24 – 0.36				
	F	0.3 – 0.45	0.3 – 0.45	0.3 – 0.45	0.3 – 0.45				
	G	0.36 – 0.54	0.36 – 0.54	0.36 – 0.54	0.36 – 0.54				
	H	0.48 – 0.72	0.48 – 0.72	0.48 – 0.72	0.48 – 0.72				
	J	0.64 – 0.96	0.64 – 0.96	0.64 – 0.96	0.64 – 0.96				
	K	0.8 – 1.2	0.8 – 1.2	0.8 – 1.2	0.8 – 1.2				
	L	0.95 – 1.45	0.95 – 1.45	0.95 – 1.45	0.95 – 1.45				
	M	1.4 – 2.2	1.4 – 2.2	1.4 – 2.2	1.4 – 2.2				
	N	1.7 – 2.6	1.7 – 2.6	1.7 – 2.6	1.7 – 2.6				
	P	2.2 – 3.4	2.2 – 3.4	2.2 – 3.4	2.2 – 3.4				
	R	2.8 – 4.2	2.8 – 4.2	2.8 – 4.2	2.8 – 4.2				
	S	4 – 6	4 – 6	4 – 6	4 – 6	4 – 6	4 – 6		
	T	5 – 8	5 – 8	5 – 8	5 – 8	5 – 8	5 – 8		
	U	6 – 9	6 – 9	6 – 9	6 – 9	6 – 9	6 – 9		
	V	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11
	W		9 – 13	9 – 13	9 – 13	9 – 13	9 – 13	9 – 13	9 – 13
X			12 – 18	12 – 18	12 – 18	12 – 18	12 – 18	12 – 18	
Q				16 – 22					
B						18 – 26	18 – 26	18 – 26	
E						24 – 36	24 – 36	24 – 36	
F								28 – 40	
I							32 – 42		
G								34 – 50	
J								45 – 65	
O								48 – 68	
L								53 – 80*	
M								65 – 95*	
I								85 – 105*	

On-contactor mounting	3-element	TR-N5/3 (TR80BDW) TR-N5 (TR80BNW)		TR-N6/3 (TR1CBDW) TR-N6 (TR1CBNW)	TR-N7/3 (TR1FBDW) TR-N7 (TR1FBNW)	TR-N8/3 (TR1JBDW) TR-N8 (TR1JBNW)	TR-N10/3 (TR2CBDW) TR-N10 (TR2CBNW)	TR-N12/3 (TR4ABDW) TR-N12 (TR4ABNW)	TR-N14/3 (TR8ABDW) TR-N14 (TR8ABNW)
	2-element	TR-N6H/3 (TR1CBDH) TR-N6H (TR1CBNH)		–	–	–	TR-N10H/3 (TR2CBDH) TR-N10H (TR2CBNH)	TR-N12H/3 (TR4ABDH) TR-N12H (TR4ABNH)	TR-N14H/3 (TR8ABDH) TR-N14H (TR8ABNH)
Separate mounting	3-element	–	TR-N6H/3 (TR1CBDH) TR-N6H (TR1CBNH)	–	–	–	TR-N10H/3 (TR2CBDH) TR-N10H (TR2CBNH)	TR-N12H/3 (TR4ABDH) TR-N12H (TR4ABNH)	TR-N14H/3 (TR8ABDH) TR-N14H (TR8ABNH)
Separate mounting	2-element	–	–	–	–	–	–	–	–
Contactor to be combined		SC-N4	SC-N5A	SC-N6	SC-N7	SC-N8	SC-N10	SC-N11	SC-N12
Ampere setting range (A)	Code	B	18 – 26	18 – 26					
	E	24 – 36	24 – 36						
	F	28 – 40	28 – 40						
	G	34 – 50	34 – 50						
	J	45 – 65	45 – 65	45 – 65	45 – 65				
	L	53 – 80	53 – 80	53 – 80	53 – 80				
	M		65 – 95	65 – 95	65 – 95	65 – 95			
	I		85 – 105						
	N			85 – 125	85 – 125	85 – 125	85 – 125		
	P			110 – 160*	110 – 160	110 – 160	110 – 160	110 – 160	110 – 160
	R					125 – 185	125 – 185	125 – 185	125 – 185
	S						160 – 240	160 – 240	160 – 240
	T							200 – 300	200 – 300
	U								240 – 360
V								300 – 450	
W								400 – 600	

- Notes: • TR-N10/3 to N14/3 types are provided with CTs.
 • Max. setting ranges of these starters are as shown in the table on the right.
 • When ordering the thermal overload relays for starter use, select the applicable setting range.
 (): Basic ordering code (When ordering phase-loss protective type, enter the version code E instead of D)
 *: Separate mounting only

Motor starter	Maximum applicable heater range (A)	
	200–240V	380–440V
SW-03/3H	7–11	6–9
SW-4-0/3H	12–18	12–18
SW-N1/3H	24–36	24–36
SW-N2S/3H	34–50	34–50
SW-N4/3H	53–80	53–80
SW-N6/3H	85–125	85–125

Thermal Overload Relays

TR series

Long time operating type

■ Selection guide/Long time operating type

On-contactor mounting	3-element	-		-		TR-N2L/3 (TR35BFW)		TR-N3L/3 (TR65BFW)	
	2-element	-		-		TR-N2L (TR35BLW)		TR-N3L (TR65BLW)	
Separate mounting	3-element	TR-0NLH/3 (TR13FH)		TR-5-1NLH/3 (TR20FH)		TR-N2LH/3 (TR35BFH)		TR-N3LH/3 (TR65BFH)	
	2-element	TR-0NLH (TR13LH)		TR-5-1NLH (TR20LH)		TR-N2LH (TR35BLH)		TR-N3LH (TR65BLH)	
Contactor to be combined		SC-03	SC-0 SC-05	SC-4-0	SC-4-1 SC-5-1	SC-N1	SC-N2	SC-N2S	SC-N3
Ampere setting range (A)	Code	L	0.95 – 1.45	0.95 – 1.45	0.95 – 1.45	0.95 – 1.45			
	M	1.4 – 2.2	1.4 – 2.2	1.4 – 2.2	1.4 – 2.2	1.4 – 2.2			
	N	1.7 – 2.6	1.7 – 2.6	1.7 – 2.6	1.7 – 2.6	1.7 – 2.6			
	P	2.2 – 3.4	2.2 – 3.4	2.2 – 3.4	2.2 – 3.4	2.2 – 3.4			
	R	2.8 – 4.2	2.8 – 4.2	2.8 – 4.2	2.8 – 4.2	2.8 – 4.2			
	S	4 – 6	4 – 6	4 – 6	4 – 6	4 – 6	4 – 6		
	T	5 – 8	5 – 8	5 – 8	5 – 8	5 – 8	5 – 8		
	U	6 – 9	6 – 9	6 – 9	6 – 9	6 – 9	6 – 9		
	V	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11	7 – 11
	W		9 – 13	9 – 13	9 – 13	9 – 13	9 – 13	9 – 13	9 – 13
	X			12 – 18	12 – 18	12 – 18	12 – 18	12 – 18	12 – 18
	B					18 – 26	18 – 26	18 – 26	18 – 26
	E						24 – 36	24 – 36	24 – 36
F							28 – 40	28 – 40	
G							34 – 50	34 – 50	
J								45 – 65	
L								53 – 80*	
M								65 – 95*	

On-contactor mounting	3-element	TR-N5L/3 (TR80BFW)		TR-N6L/3 (TR1CBFW)	TR-N7L/3 (TR1FBFW)	TR-N10L/3 (TR2CBFW)		TR-N12L/3 (TR4ABFW)		TR-N14L/3 (TR8ABFW)	
	2-element	TR-N5L (TR80BLW)		TR-N6L (TR1CBLW)	TR-N7L (TR1FBLW)	TR-N10L (TR2CBLW)		TR-N12L (TR4ABLW)		TR-N14L (TR8ABLW)	
Separate mounting	3-element	-		TR-N6LH/3 (TR1CBFH)	-	TR-N10LH/3 (TR2CBFH)		TR-N12LH/3 (TR4ABFH)		TR-N14LH/3 (TR8ABFH)	
	2-element	-		TR-N6LH (TR1CBLH)	-	TR-N10LH (TR2CBLH)		TR-N12LH (TR4ABLH)		TR-N14LH (TR8ABLH)	
Contactor to be combined		SC-N4	SC-N5A	SC-N6	SC-N7	SC-N8	SC-N10	SC-N11	SC-N12	SC-N14	
Ampere setting range (A)	Code	B	18 – 26	18 – 26							
	E	24 – 36	24 – 36								
	F	28 – 40	28 – 40								
	G	34 – 50	34 – 50								
	J	45 – 65	45 – 65	45 – 65	45 – 65						
	L	53 – 80	53 – 80	53 – 80	53 – 80						
	M		65 – 95	65 – 95	65 – 95						
	N			85 – 125	85 – 125	85 – 125	85 – 125				
	P			110 – 160*	110 – 160	110 – 160	110 – 160	110 – 160	110 – 160	110 – 160	
	R					125 – 185	125 – 185	125 – 185	125 – 185	125 – 185	
	S						160 – 240	160 – 240	160 – 240	160 – 240	
	T							200 – 300	200 – 300	200 – 300	
	U								240 – 360	240 – 360	240 – 360
V								300 – 450	300 – 450	300 – 450	
W									400 – 600	400 – 600	

Notes: Maximum setting ranges of the these starters are as shown in the table below.

Select the applicable setting range when ordering the thermal overload relays for starter use.

(): Basic ordering code

*: Separate mounting only

Motor starter	Maximum applicable heater range (A)	
	200–240V	380–440V
SW-03/2L, 3L	7–11	6–9
SW-N2S/2L, 3L	34–50	34–50
SW-N4/2L, 3L	53–80	53–80
SW-N6/2L, 3L	85–125	85–125

■ Selection guide/Quick operating type

On-contactor mounting	3-element	TR-0NQ (TR13SW)		TR-5-1NQ (TR20SW)		TR-N2Q (TR35BSW)	
Separate mounting	3-element	-		-		-	
Contactor to be combined		SC-03	SC-0 SC-05	SC-4-0	SC-4-1 SC-5-1	SC-N1	SC-N2
Rated operational current (A)	200-240V 380-440V	11 9	13 12	18 16	22 22	27 30	39 37
Ampere setting range (A)	Code	M	M	M	M		
		N	N	N	N		
		P	P	P	P		
		R	R	R	R		
		S	S	S	S		
		T	T	T	T		
		U	U	U	U		
		V	V	V	V		
		W	W	W	W		
		X		X	X	X	X
		B				B	B
		E					E

Specify the setting range code when ordering.

On-contactor mounting	3-element	TR-N3Q (TR65BSW)		TR-N5Q (TR80SW)	
Separate mounting	3-element	TR-N3Q (TR65BSW)		-	
Contactor to be combined		SC-N2S	SC-N3	SC-N4	SC-N5A
Rated operational current (A)	200-240V 380-440V	52 48	65 65	80 80	105 105
Ampere setting range (A)	Code	B	B	B	B
		E	E	E	E
		F	F	F	F
		G	G	G	G
		J	J	J	J
		L	L	L	L
		M	M	M	M

Specify the setting range code when ordering.

Notes: *1 Thermal overload relay with phase-loss protection is available with *1 marked setting ranges of TR-0NQ, TR-5-1NQ and all setting ranges of TR-N2Q to N5Q.
Type numbers are TK-0NQ, TK-5-1NQ, TK-N2Q to N5Q. The setting ranges of these TK-□Q type relays are as same as those of the above setting ranges.
*2 Separate mounting only.
() Basic ordering code

■ Ratings of auxiliary contact

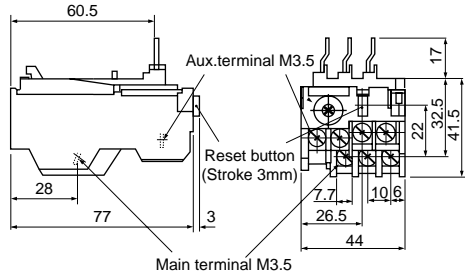
Type	Rated thermal current (A)	Rated voltage (V)	Rated AC operational current (A)	Rated DC operational current (A)
TR-0N, 5-1N TR-0N/3, 5-1N/3 TK-0N, 5-1N TR-0NQ, 5-1NQ	3	24 100-120 200-240 380-440 500-600	3 (0.3)* 2.5 (0.3)* 2 (0.3)* 1 (0.3)* 0.6 (0.3)*	1.1 (0.3)* 0.28 0.14 - -
TR-N2 to N8 TR-N2/3 to N8/3 TK-N2 to N8 TR-N2Q to N5Q	5	24 100-120 200-240 380-440 500-600	3 (0.5)* 2.5 (0.5)* 2 (0.5)* 1 (0.5)* 0.6 (0.5)*	1.1(0.3)* 0.28 0.14 - -
TR-N10 to N14 TR-N10/3 to N14/3 TK-N10 to N14	5	24 100-120 200-240 380-440 500-600	3 (0.3)* 2.5 (0.3)* 2 (0.3)* 1 (0.3)* 0.6 (0.3)*	1.1(0.3)* 0.28 0.14 - -

Notes: Conforming to Class AC-15, DC-13, IEC, JIS, and JEM.
() * NO contact of auto reset type.

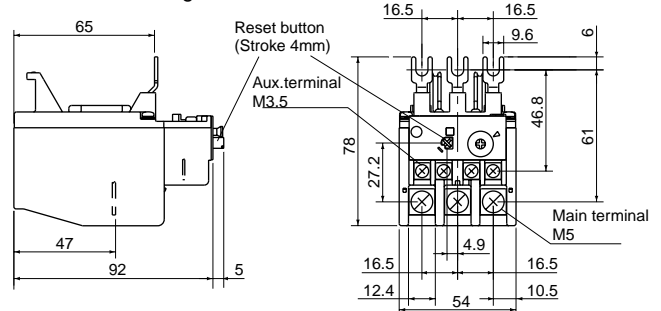
Thermal Overload Relays

TR series

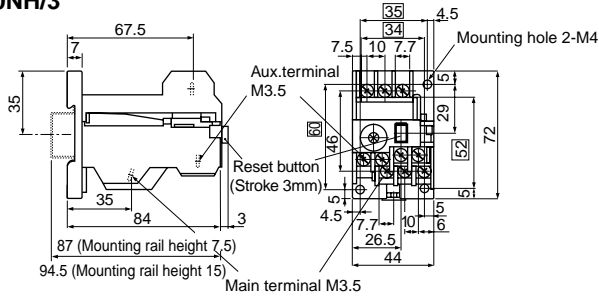
■ **Dimensions, mm**
Standard and quick operating types
TR-0N/3, TR-0NQ
 On-contactor mounting



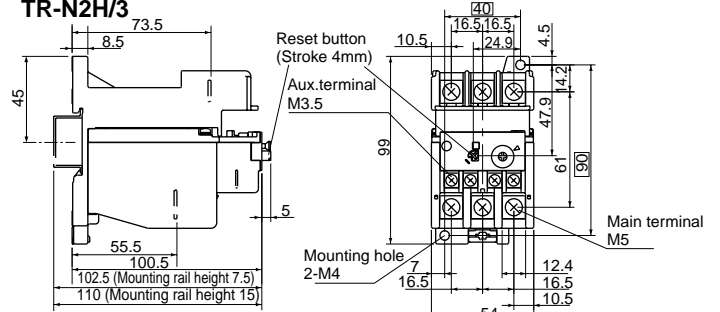
TR-N2/3, TR-N2Q
 On-contactor mounting



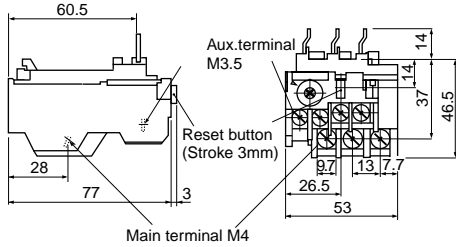
TR-0NH/3



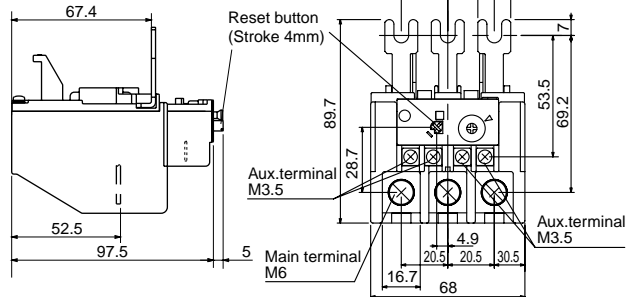
TR-N2H/3



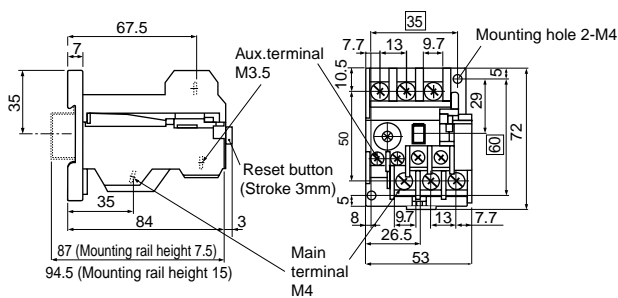
TR-5-1N/3, TR-5-1NQ
 On-contactor mounting



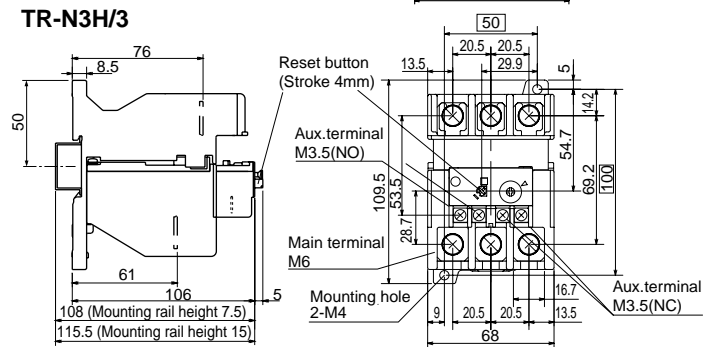
TR-N3/3, TR-N3Q
 On-contactor mounting



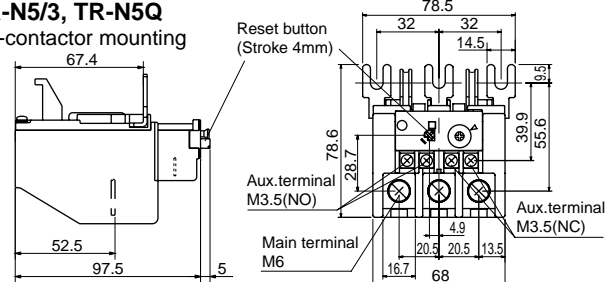
TR-5-1NH/3



TR-N3H/3



TR-N5/3, TR-N5Q
 On-contactor mounting

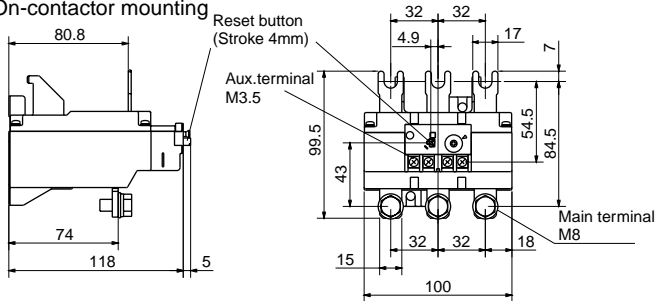


□ : Mounting pitch
 Mass: See page 01/96.

■ Dimensions, mm
Standard and quick operating types

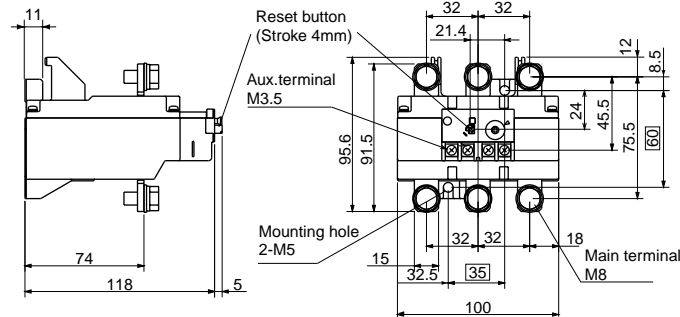
TR-6N/3

On-contactor mounting



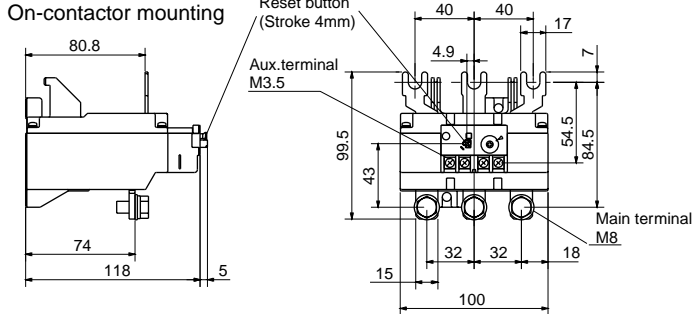
TR-N6H/3

On-contactor mounting



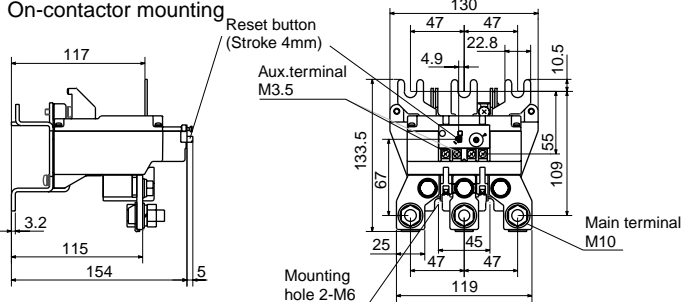
TR-N7/3

On-contactor mounting



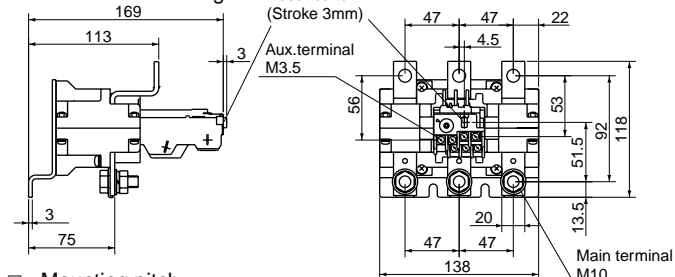
TR-N8/3

On-contactor mounting

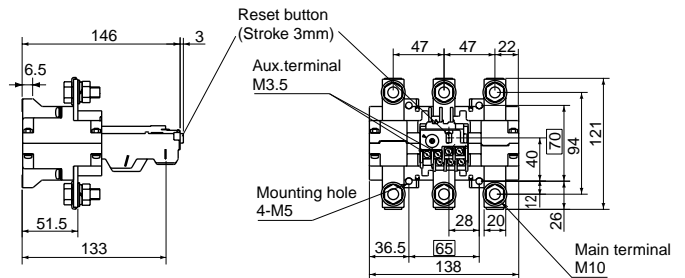


TR-N10/3

On-contactor mounting

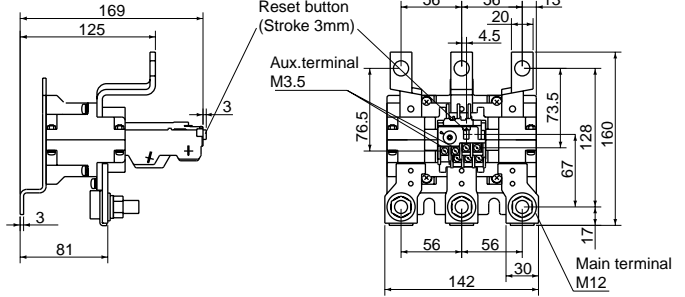


TR-N10H/3



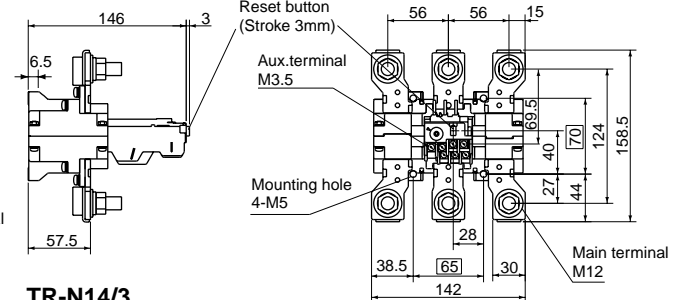
TR-N12/3

On-contactor mounting



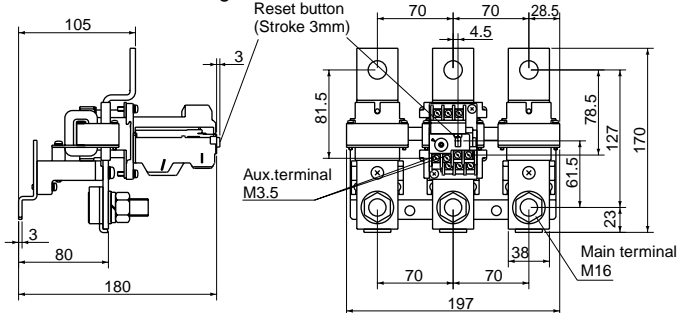
TR-N12H/3

On-contactor mounting



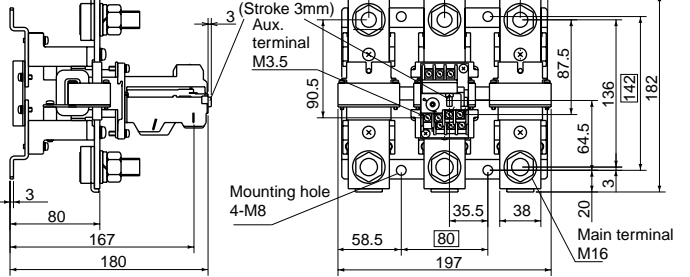
TR-N14/3

On-contactor mounting



TR-N14H/3

On-contactor mounting



□ : Mounting pitch
Mass: See page 01/96.

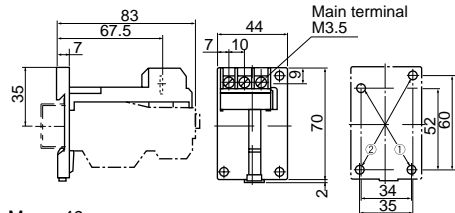
Thermal Overload Relays

TR series

■ Dimensions, mm

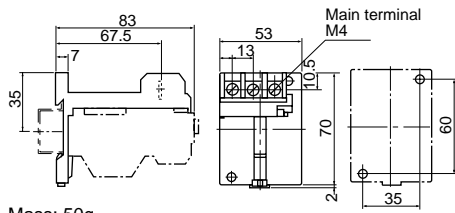
Base unit for separate mounting

SZ-HB



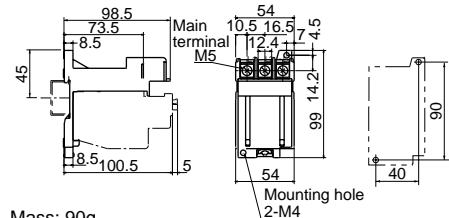
Mass: 40g

SZ-HC



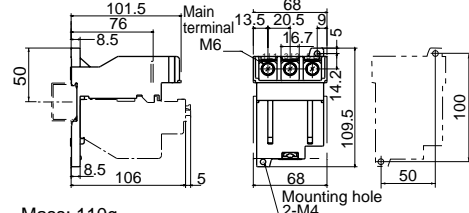
Mass: 50g

SZ-HD



Mass: 90g

SZ-HE



Mass: 110g

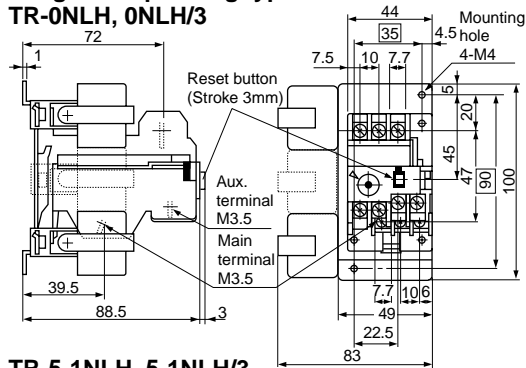
■ Mass/Standard and quick operating types

On-contactor mounting		Separate mounting		On-contactor mounting		Separate mounting	
Type	Mass	Type	Mass	Type	Mass	Type	Mass
TR-0N	0.09kg	TR-0NH	0.13kg	TR-N7	0.61kg		
TR-0N/3	0.10kg	TR-0NH/3	0.14kg	TR-N7/3	0.61kg		
TR-0NQ	0.10kg						
TR-5-1N	0.11kg	TR-5-1NH	0.16kg	TR-N8	1.2kg		
TR-5-1N/3	0.12kg	TR-5-1NH/3	0.17kg	TR-N8/3	1.2kg		
TR-5-1NQ	0.12kg						
TR-N2, N2/3	0.2kg	TR-N2H	0.29kg	TR-N10	1.85kg	TR-10NH	1.5kg
TR-N2Q	0.2kg	TR-N2H/3	0.29kg	TR-N10/3	1.85kg	TR-10NH/3	1.5kg
TR-N3, N3/3	0.27kg	TR-N3H, N3H/3	0.38kg	TR-N12, N12/3	2.3kg	TR-12NH, 12NH/3	2.25kg
TR-N3Q	0.27kg						
TR-N5, N5/3	0.27kg			TR-N14, N14/3	3.5kg	TR-14NH, 14NH/3	4kg
TR-N5Q	0.27kg						
TR-N6, N6/3	0.61kg	TR-N6H, N6H/3	0.67kg				

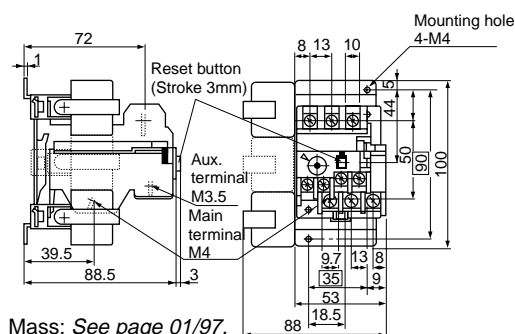
■ Dimensions, mm

Long time operating type

TR-0NLH, 0NLH/3



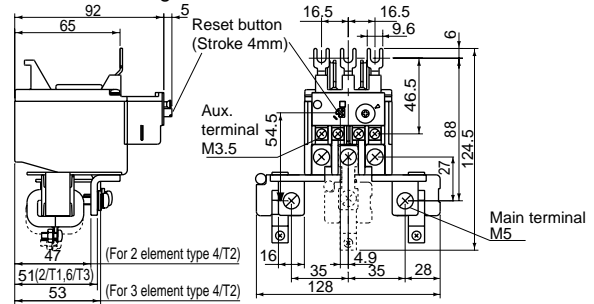
TR-5-1NLH, 5-1NLH/3



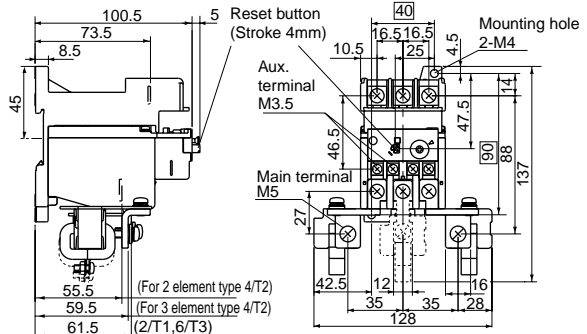
Mass: See page 01/97.

TR-N2L, N2L/3

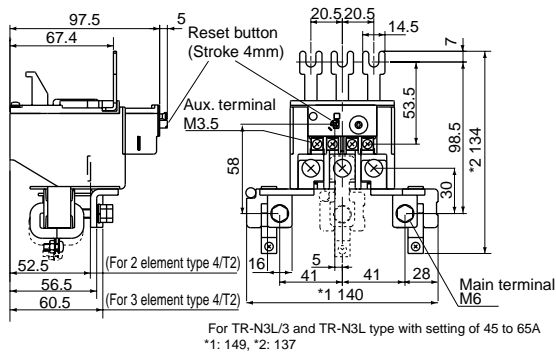
On-contactor mounting



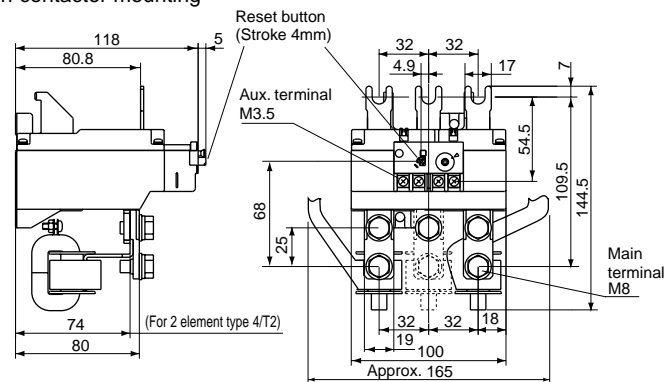
TR-N2LH, N2LH/3



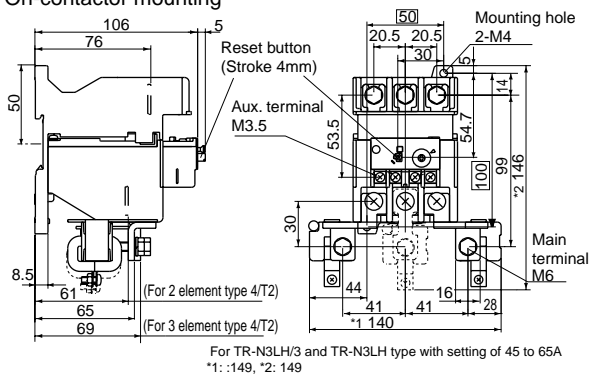
■ Dimensions, mm
Long time operating type
TR-N3L, N3L/3



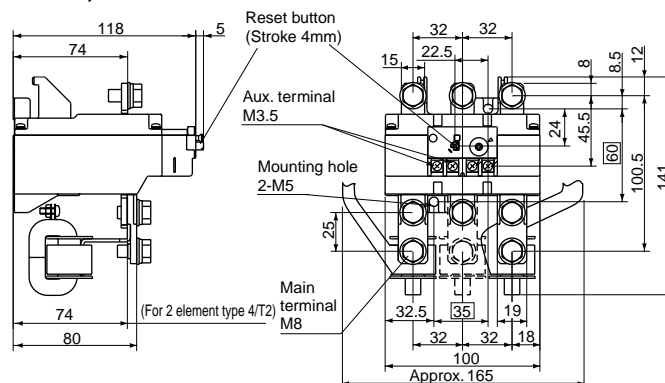
TR-N6L, N6L/3
On-contactor mounting



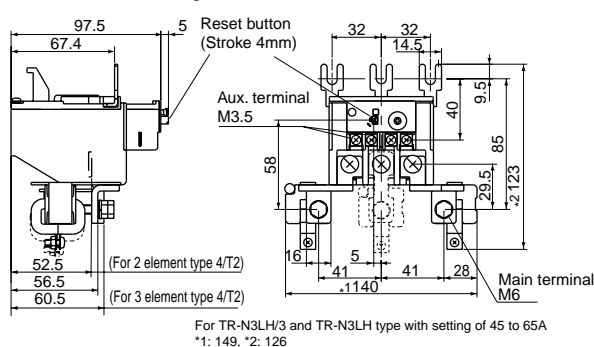
TR-N3LH, N3LH/3
On-contactor mounting



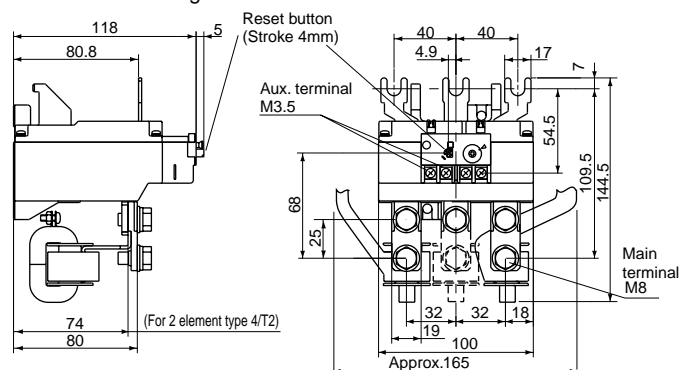
TR-N6LH, N6LH/3



TR-N5L, N5LH/3
On-contactor mounting



TR-N7L, N7L/3
On-contactor mounting



Note: TR-N10L, N10LH, N12NL, N12LH, N14L and N14LH types have the same dimensions as standard types. See pages 01/105.

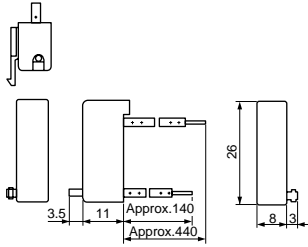
■ Mass/Long time operating type

On-contactor mounting Type	Mass	Separate mounting Type	Mass	On-contactor mounting Type	Mass	Separate mounting Type	Mass
-		TR-0NLH	0.4kg	TR-N6L	1.54kg	TR-N6LH	1.6kg
-		TR-0NLH/3	0.5kg	TR-N6L/3	1.85kg	TR-N6LH/3	1.91kg
-		TR-5-1NLH	0.42kg	TR-N7L	1.54kg	-	
-		TR-5-1NLH/3	0.52kg	TR-N7L/3	1.85kg	-	
TR-N2L	0.56kg	TR-N2LH	0.65kg	TR-N10L	1.85kg	TR-N10LH	1.5kg
TR-N2L/3	0.68kg	TR-N2LH/3	0.77kg	TR-N10L/3	1.85kg	TR-N10LH/3	1.5kg
TR-N3L	0.63kg	TR-N3LH	0.74kg	TR-N12L	2.3kg	TR-N12LH	2.25kg
TR-N3L/3	0.77kg	TR-N3LH/3	0.88kg	TR-N12L/3	2.3kg	TR-N12LH/3	2.25kg
TR-N5L	0.63kg	-		TR-N14L	3.5kg	TR-N14LH	4kg
TR-N5L/3	0.77kg	-		TR-N14L/3	3.5kg	TR-N14LH/3	4kg

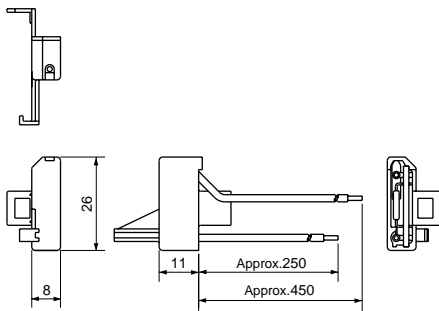
Thermal Overload Relays TR series

■ Dimensions, mm Optional accessories Trip indicator

SZ-L100
SZ-L200

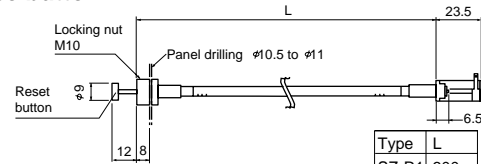


SZ-L100N2
SZ-L200N2



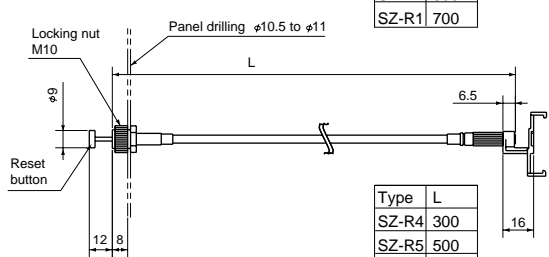
Reset release button

SZ-R1
SZ-R2
SZ-R3



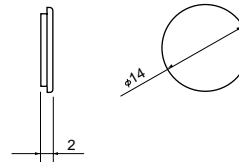
Type	L
SZ-R1	300
SZ-R1	500
SZ-R1	700

SZ-R4
SZ-R5
SZ-R6



Type	L
SZ-R4	300
SZ-R5	500
SZ-R6	700

Dial cover SZ-DA

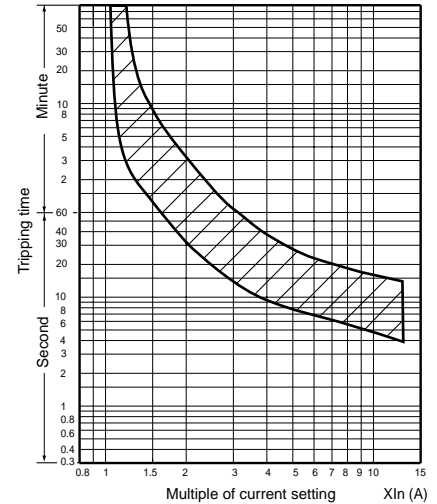
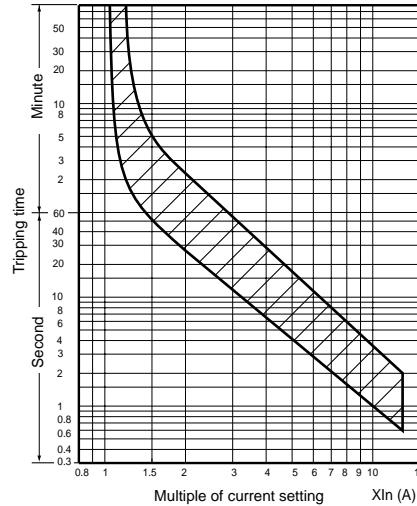
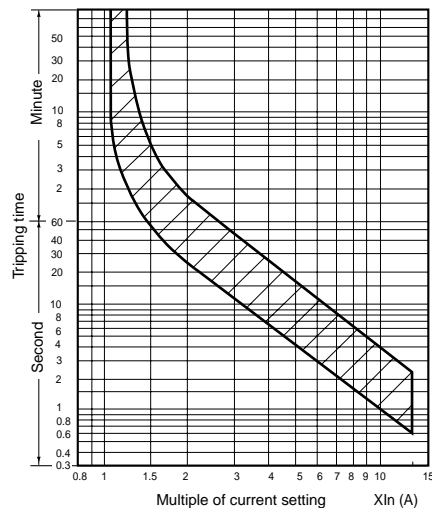


■ Characteristic curves These curves show cold starting characteristics.

● Standard type
TR-0N, 5-1N,
TR-0N/3, 5-1N/3,
TR-0NH, 5-1NH,
TR-0NH/3, 5-1NH/3

TR-N2 to N8
TR-N2/3 to N8/3
TR-N2H, N3H, N6H
TR-N2H/3, N3H/3, N6H/3

TR-N10 to N14,
TR-N10/3 to N14/3,
TR-N10H to N14H
TR-N10H/3 to N14H/3

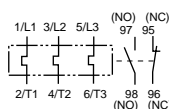
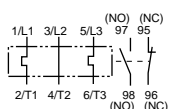


■ Wiring diagrams

● Standard type
TR-0N to N8
TR-0N/3 to N8/3
TR-0NH, 5-1NH, N2H, N3H, N6H
TR-0NH/3, 5-1NH/3, N2H/3, N3H/3, N6H/3

2-element

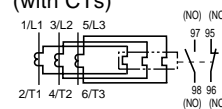
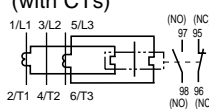
3-element



TR-N10 to N14
TR-N10/3 to N14/3
TR-N10H to N14H
TR-N10H/3 to N14H/3

2-element
(with CTs)

3-element
(with CTs)

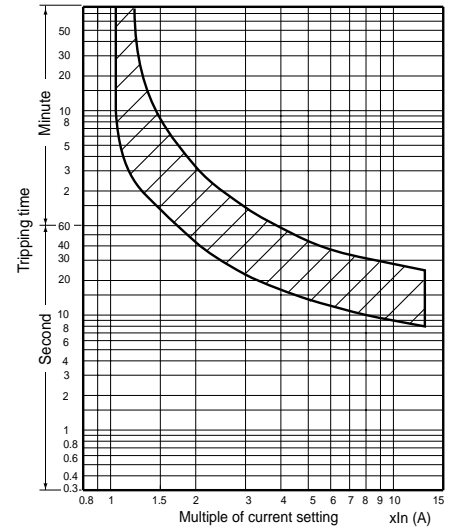
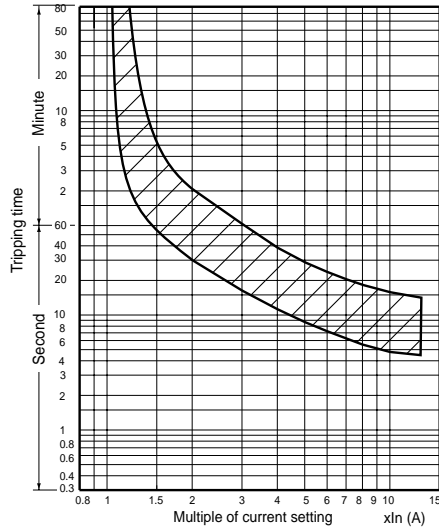
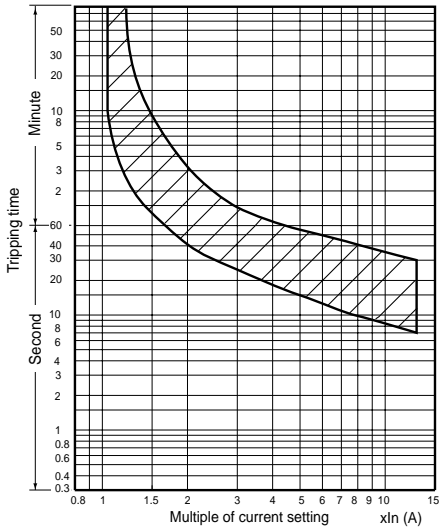


■ **Characteristic curves** These curves show cold starting characteristics
● **Long time operating type** (When setting at the center dial current)

TR-0NL, 5-1NL
TR-0NL/3, 5-1NL/3
TR-0NLH, 5-1NLH
TR-0NLH/3, 5-1NLH/3

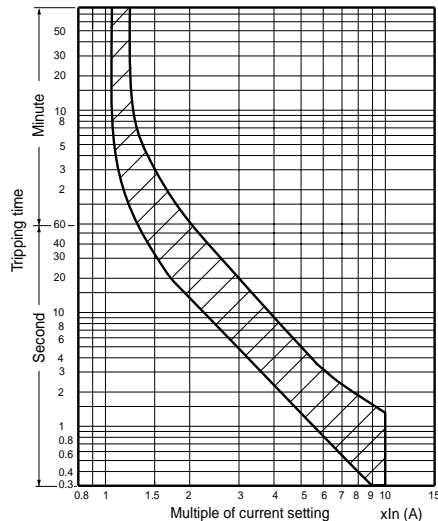
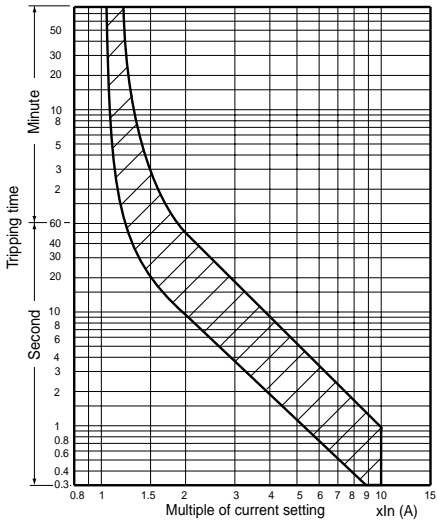
TR-N2L to N7L
TR-N2L/3 to N7L/3
TR-N2LH, N3LH, N6LH
TR-N2LH/3, N3LH/3, N6LH/3

TR-N10L to N14L
TR-N10L/3 to N14L/3
TR-N10LH to N14LH
TR-N10LH/3 to N14LH/3



● **Quick operating type**
TR-0NQ, 5-1NQ

TR-N2Q, N3Q, N5Q



■ **Wiring diagrams**

● **Long time operating type**

TR-0NL to N7L
TR-0NL/3 to N7L/3
TR-0NLH, 5-1NLH, N2LH, N3LH, N6LH
TR-0NLH/3, 5-1NLH/3, N2LH/3, N3LH/3, N6LH/3

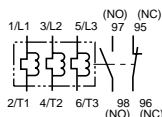
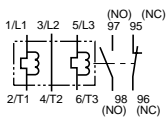
TR-N10L to N14L
TR-N10L/3 to N14L/3
TR-N10LH to N14LH
TR-N10LH/3 to N14LH/3

● **Quick operating type**

TR-0NQ, 5-1NQ
TR-N2Q, N3Q, N5Q

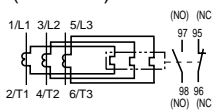
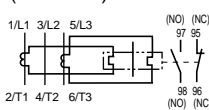
2-element

3-element

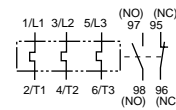


2-element
(with CTs)

3-element
(with CTs)



3-element



Thermal Overload Relays TK series With phase-loss protective device

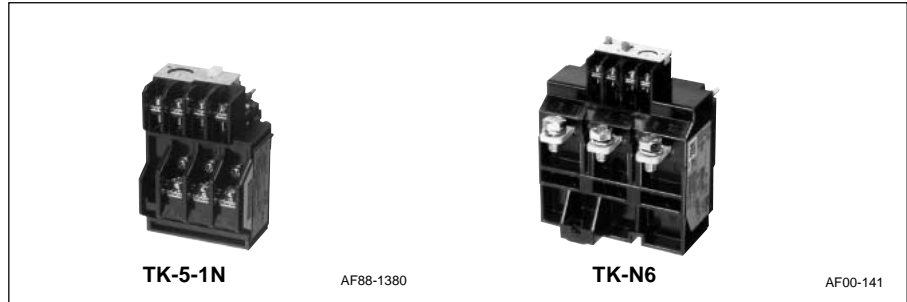
Thermal overload relays with phase-loss protective device

■ Description

FUJI TK series consists of a 3-heater element thermal overload relay and an phase-loss protective device. These two elements are assembled to make the relay unit. The overload relay characteristics are designed to meet the thermal characteristics of a squirrel-cage motors at the time of overload. A FUJI ADL mechanism is also provided to protect from phase-loss. This ADL mechanism is incorporated with the overload relay. The characteristics are coordinated with the temperature rise curve in stator winding at the time of motor phase-loss. They respond quickly to overloads. Other features include the following.

■ Characteristics

The operating characteristics of a thermal overload relays represents its tripping time and response current starting from cold or hot state.



A trip-free mechanism, wide-range dial ampere adjustment, manual/auto reset chageover lever, operating indicator, and ambient temperature compensators. Types are available ranging from TK-0N to TK-N14.

■ Ordering information

Specify the following:
1. Ordering code
See pages 01/89.

Cold starting characteristics

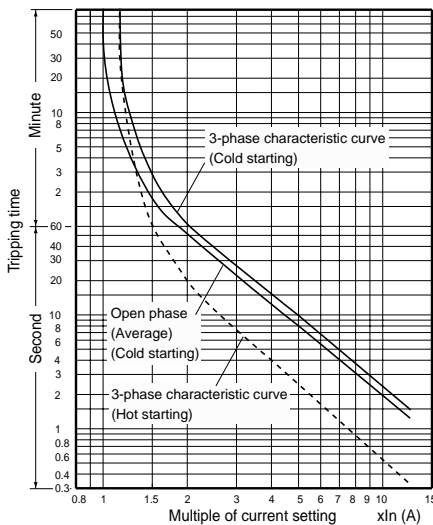
In cold starting, tripping time is measured from the time when the temperature of the thermal overload relay is equal to the ambient temperature.

Hot starting characteristics

In hot starting, tripping time is measured from the time when the thermal overload relay reaches the steady state after non-tripping current flows two hours.

Standard	When all poles are equally energized			When all poles are not equally energized			Ambient temp.	
	Operating limit Non-tripping	Tripping	Overload (hot start)	Locked rotor (cold start)	Phase-loss protection	Operating limit Non-tripping		Tripping Hot start
IEC 60947-4-1	105% I _e	120% I _e (2h max.)	class 10A 150% I _e 2min max.	class 10A 720% I _e 2 to 10s max.	Not provided	3-phase: 105% I _e	2-phase: 132% I _e	20°C
			class 10 150% I _e 4min max.	class 10 720% I _e 4 to 10s max.			1-phase: 0 2h max.	
			class 20 150% I _e 8min max.	class 20 720% I _e 6 to 20s max.	Provided	2-phase: 100% I _e	2-phase: 115% I _e	
			class 30 150% I _e 12min max.	class 30 720% I _e 9 to 30s max. *		1-phase: 90% I _e	1-phase: 0 2h max.	

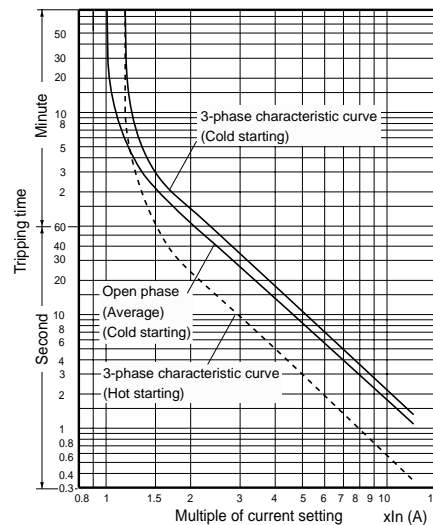
TK-0N, 5-1N TK-0NH, 5-1NH



■ Dimensions, mm

TK-0N to N14 types:
Same as standard types
See pages 01/94, 01/95.

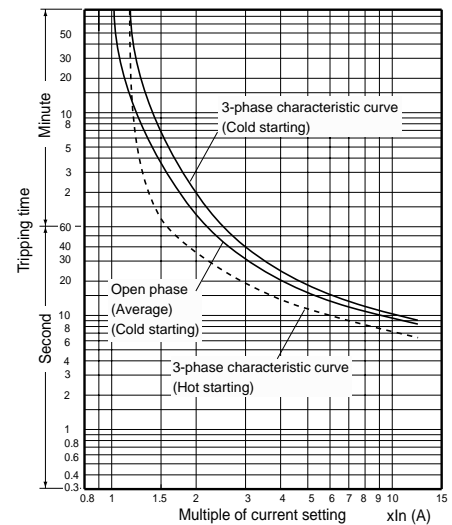
TK-N2, N3, N5, N6, N7, N8 TK-N2H, N3H, N6H



■ Wiring diagrams

TK-0N to N14 types:
Same as standard 3-heater element types
See pages 01/98.

TK-N10, N12, N14 TK-N10H, N12H, N14H



■ Ratings of auxiliary contact

Same as standard types.
See Page 01/93.

Solid-state contactors
General use

■ **Description**

Solid-state contactors (SSC) are required in cases where contacts must have long life because contacts are frequently made and broken, and where contactor noise must be eliminated. Single- and 3-pole solid-state contactors incorporate thyristors as making and breaking elements in the main circuit.

■ **Features**

● **Operation indicator provided**

An operation indicator LED (red) is provided as a standard feature for all models, so you can easily check whether a control voltage is applied to the SSC.

● **Long service life, optimum for highly frequent switching**

The solid-state contactor utilizes high-performance semiconductor switch elements to include the functions and features of conventional magnetic contactors. The SSC, featuring long life, low-noise, and high-speed response, is suitable for highly frequent switching of various types of loads, such as motors and heaters.

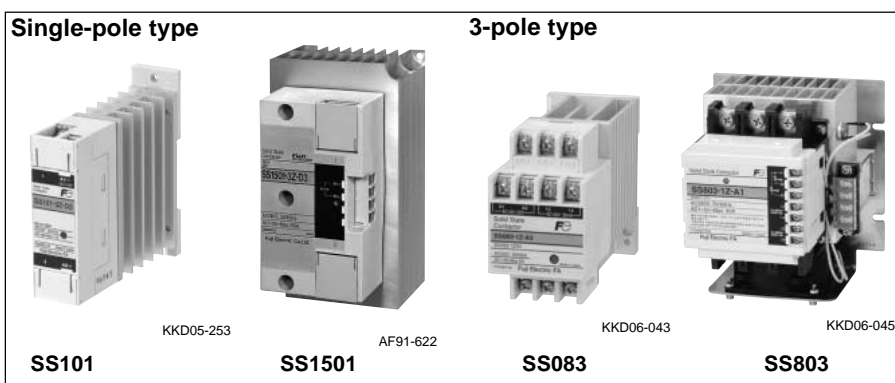
■ **Specifications**

Single-pole types

● **Main circuit 240V AC, SS101 to SS501**
AC control voltage

Type	SS101-5Z-A3 SS101-5Z-A4	SS201-5Z-A3 SS201-5Z-A4	SS301-5Z-A3 SS301-5Z-A4	SS401-5Z-A3 SS401-5Z-A4	SS501-5Z-A3 SS501-5Z-A4	
Ordering code	SS101-5ZA3 SS101-5ZA4	SS201-5ZA3 SS201-5ZA4	SS301-5ZA3 SS301-5ZA4	SS401-5ZA3 SS401-5ZA4	SS501-5ZA3 SS501-5ZA4	
Main circuit	Rated voltage					
	100 — 240V AC 50/60Hz					
	Rated thermal current (A)*	10	20	30	40	50
	Max. heater capacity (kW) Single phase 200V AC	2	4	6	8	10
Control circuit	Number of elements					
	Single-pole, 1-element					
	Isolation method					
	Photocoupler					
	Control voltage Vn					
A3: 100 — 120V AC, A4: 200 — 240V AC						
Pick-up voltage						
85% Vn or less						
Drop-out voltage						
35% Vn and over						
Operating time (at 100% Vn)						
30ms or less						
Release time (at 100% Vn)						
30ms or less						
Auxiliary circuit	—					

Note: * The values are the maximum ratings of type with cooling fin that apply at an ambient temperature not exceeding 40°C.



● **Built-in surge suppressor**

Varistors and C-R circuits are included so that surge voltage due to SSC switching and lightning can be suppressed to protect the control and main circuits.

● **AC and DC operation**

The AC and DC operated type SSCs are available, either of which can be selected as required.

● **SSC with zero-cross switching function**

The SSC is also available with a zero-cross switching function to enable load current switching at the point where the line voltage is near zero to suppress excessive inrush current in the load circuit.

● **Built-in auxiliary contact**

An auxiliary contact module using semiconductor switches or relay contacts is included. Therefore an auxiliary output signal can easily be obtained without using a separate auxiliary devices.

■ **Standards**



Solid-state Contactors

SS series

General use

■ Specifications

Single-pole types

● Main circuit 240V AC, SS701 to SS2001

AC control voltage

Type	SS701-1Z-A3 SS701-1Z-A4	SS1001-1Z-A3 SS1001-1Z-A4	SS1501-1Z-A3 SS1501-1Z-A4	SS2001-1Z-A3 SS2001-1Z-A4	
Ordering code	SS701-1ZA3 SS701-1ZA4	SS1A1-1ZA3 SS1A1-1ZA4	SS1F1-1ZA3 SS1F1-1ZA4	SS2A1-1ZA3 SS2A1-1ZA4	
Main circuit	Rated voltage	100 — 240V AC 50/60Hz			
	Rated thermal current (A)*	70	100	150	200
	Max. heater capacity (kW) Single phase 200V AC	14	20	30	40
	Number of elements	Single-pole, 1-element			
Control circuit	Isolation method	Photocoupler			
	Control voltage Vn	A3: 100 — 120V AC, A4: 200 — 240V AC			
	Pick-up voltage	85% Vn or less			
	Drop-out voltage	35% Vn and over			
	Operating time (at 100% Vn) Release time (at 100% Vn)	30ms or less 30ms or less			
Auxiliary circuit	Output	Thyristor 1NO			
	Rated current and voltage	A3: 50mA, 120V AC A4: 50mA, 240V AC			

Note: * The values are the maximum ratings of type with cooling fin that apply at an ambient temperature not exceeding 40°C.

● Main circuit 240V AC, SS101 to SS2001

DC control voltage

Type	SS101-3Z-D3	SS201-3Z-D3	SS301-3Z-D3	SS401-3Z-D3	SS501-3Z-D3	
Ordering code	SS101-3ZD3	SS201-3ZD3	SS301-3ZD3	SS401-3ZD3	SS501-3ZD3	
Main circuit	Rated voltage	100 — 240V AC 50/60Hz				
	Rated thermal current (A)*	10	20	30	40	50
	Max. heater capacity (kW) Single phase 200V AC	2	4	6	8	10
	Number of elements	Single-pole, 1-element				
Control circuit	Isolation method	Photocoupler				
	Control voltage Vn	5 — 24V DC				
	Pick-up voltage	3.5V or less				
	Drop-out voltage	1V and over				
	Operating time (at 100% Vn) Release time (at 100% Vn)	15ms or less 15ms or less				
Auxiliary circuit	—					

Type	SS701-3Z-D3	SS1001-3Z-D3	SS1501-3Z-D3	SS2001-3Z-D3	
Ordering code	SS701-3ZD3	SS1A1-3ZD3	SS1F1-3ZD3	SS2A1-3ZD3	
Main circuit	Rated voltage	100 — 240V AC 50/60Hz			
	Rated thermal current (A)*	70	100	150	200
	Max. heater capacity (kW) Single phase 200V AC	14	20	30	40
	Number of elements	Single-pole, 1-element			
Control circuit	Isolation method	Photocoupler			
	Control voltage Vn	5 — 24V DC			
	Pick-up voltage	3.5V or less			
	Drop-out voltage	1V and over			
	Operating time (at 100% Vn) Release time (at 100% Vn)	15ms or less 15ms or less			
Auxiliary circuit	—				

Note: * The values are the maximum ratings of type with cooling fin that apply at an ambient temperature not exceeding 40°C.