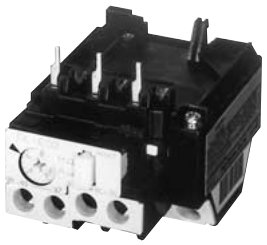
SC-E series
Thermal overload relays

TK-E series with phase-loss protective device

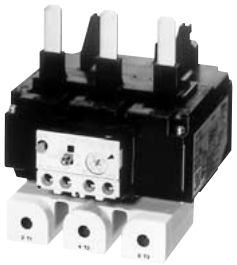
■ Features

- This relay protects motor windings from burning due to overloads, locked rotor current, or phase-loss.
- Maintenance and inspection safety has been improved by employing a finger protection mechanism to cover exposed terminals (conforms to DIN 57106, VDE 0106 Teil 100).
- Isolated NO and NC contacts can be used with different potentials.
- A high-precision scale for the current adjustment dial enables easy and exact current setting.
- The operating status can be visually checked with ease.
- The relays can be manually tripped. A trip-free mechanism is also provided.
- Base unit can be added to enable separate-mounting types of the TK-E02, E2, and E3 models.



TK-E02

AF01-86



TK-E6

AF01-84

■ Types and specifications

Applicable contactor Non-reversing	Type	Aux. contact	Trip category (JIS)	No. of heater elements	Power consumption per pole	Provided functions
SC-E02, E03, E04, E05	**TK-E02**	1NO+1NC	10A	3	2.2VA	Overload, phase-loss protection
SC-E1, E2, E2S	**TK-E2**				3.8VA	Ambient temperature compensation
SC-E3, E4	**TK-E3**				6.6VA	Manual/auto reset setectable
SC-E5	**TK-E5**				6.6VA	Manual trip mechanism
SC-E6, E7	**TK-E6**				8.0VA	Trip indicator
Separate mounting type	**TK-E6H**					

■ Ampere setting range

Order current (A)	Thermal overload relay type				
	TK-E02	**TK-E2**	**TK-E3**	**TK-E5**	**TK-E6, E6H ***
0.1	0.1–0.15				
0.13	0.13–0.2				
0.15	0.15–0.24				
0.2	0.2–0.3				
0.24	0.24–0.36				
0.3	0.3–0.45				
0.36	0.36–0.54				
0.48	0.48–0.72				
0.64	0.64–0.96				
0.8	0.8–1.2				
0.95	0.95–1.45				
1.4	1.4–2.2				
1.7	1.7–2.6				
2.2	2.2–3.4				
2.8	2.8–4.2				
4	4–6	4–6			
5	5–8	5–8			
6	6–9	6–9			
7	7–11	7–11	7–11		
9	9–13	9–13	9–13		
12	12–18	12–18	12–18		
16	16–22				
18		18–26	18–26	18–26	
20	20–25				
24		24–36	24–36	24–36	
28			28–40	28–40	
32		32–42			
34			34–50	34–50	
40		40–50			
44		44–54			
45			45–65	45–65	45–65
48			48–68		
53					53–80
64			64–80		
65			65–95 *	65–95	65–95
85			85–105 *	85–105	
85					85–125
110					110–160

Note: * Applicable only for separate-mounting type. Not applicable for use in combination with a magnetic contactor.

■ Standards

IEC 60947-4-1, EN60947-4-1
VDE 0660, JIS C 8201-4-1
UL 508, CSA C22.2
TÜV (EN60947-4-1)

■ Ordering information

Specify the following:
1. Type number
2. Ampere setting range order current

■ Auxiliary contact ratings

• Based on JIS and IEC

Type	Rated insulation voltage (V)	Rated thermal current (A)	Rated operational current (A) AC Voltage (V)	AC-15 Ind. load	DC Voltage (V)	DC-13 Ind. load	Minimum voltage and current
TK-E02	690	5	24	3 (0.3) *	24	1.1 (0.3)	3V DC, 5mA
			100–120	2.5 (0.3) *	100–120	0.28	
			200–240	2 (0.3) *	200–240	0.14	
			380–440	1 (0.3) *			
			500–600	0.6 (0.3) *			
TK-E2 **TK-E3** **TK-E5** **TK-E6**	690	5	24	3 (0.5) *	24	1.1 (0.3)	3V DC, 5mA
			100–120	2.5 (0.5) *	100–120	0.28	
			200–240	2 (0.5) *	200–240	0.14	
			380–440	1 (0.5) *			
			500–600	0.6 (0.5) *			

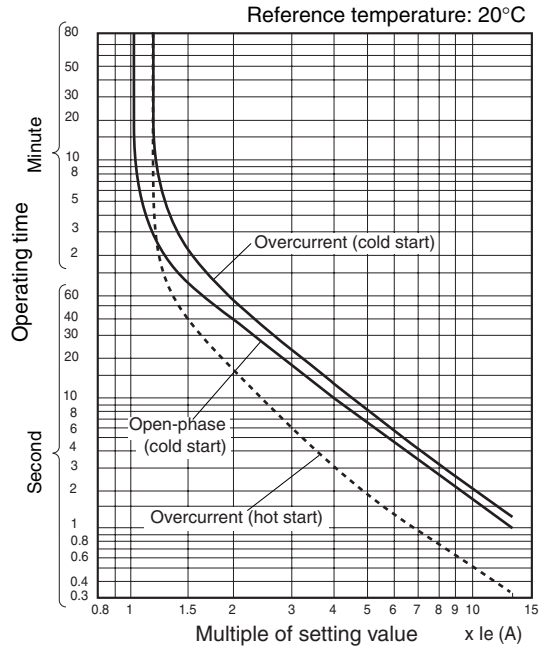
Note: * In case of auto reset type NO contact.

• Based on UL and CSA

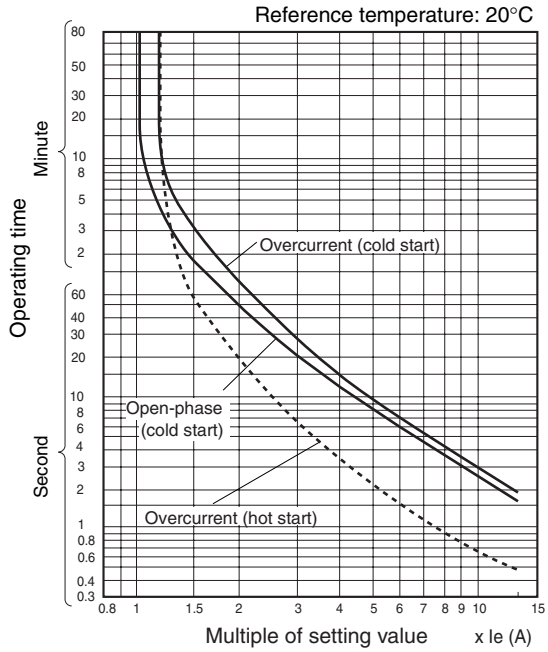
Type	Rated insulation voltage (V)	Rated thermal current (A)	Making and breaking current (A) AC (rating code B600) Voltage (V)	Making (A)	Breaking (A)	DC (rating code R300) Voltage (V)	Making (A)	Breaking (A)
TK-E02	600	5	120	30	3	120	0.22	0.22
TK-E2, E3			240	15	1.5	250	0.11	0.11
TK-E5			480	7.5	0.75			
TK-E6			600	6	0.6			

■ Operating characteristics (mean value)

• TK-E02



• TK-E2 to E6, E6H



■ Optional accessories

• Base units for separate mounting

The base unit modifies thermal overload relays to separate mounting types that can be mounted to 35mm-wide IEC top hat rail or secured with screws.

Applicable thermal overload relay	Type
TK-E02	**SZ-HCE**
TK-E2	**SZ-HDE**
TK-E3	**SZ-HEE**

• Trip indicator

Reports any tripping action at a thermal overload relay through its LED display.

Applicable thermal overload relay	Rated voltage	Type
TK-E02	100–110V AC, 50/60Hz	**SZ-L100**
	200–220V AC, 50/60Hz	**SZ-L200**
TK-E2 to TK-E6	100–110V AC, 50/60Hz	**SZ-L100N2**
	200–220V AC, 50/60Hz	**SZ-L200N2**

• Reset release button

Reset a thermal overload relay from the rear side of the board or a distant location.

Applicable thermal overload relay	Load length (mm)	Type
TK-E02	300	**SZ-R1**
	500	**SZ-R2**
	700	**SZ-R3**
TK-E2 to TK-E6	300	**SZ-R4**
	500	**SZ-R5**
	700	**SZ-R6**


KK01-108

Base unit
SZ-HDE


AF00-291

Trip indicator
SZ-L200N2


AF88-585

Reset release button
SZ-R1


AF88-1056

Dial cover
SZ-DA

• Dial cover

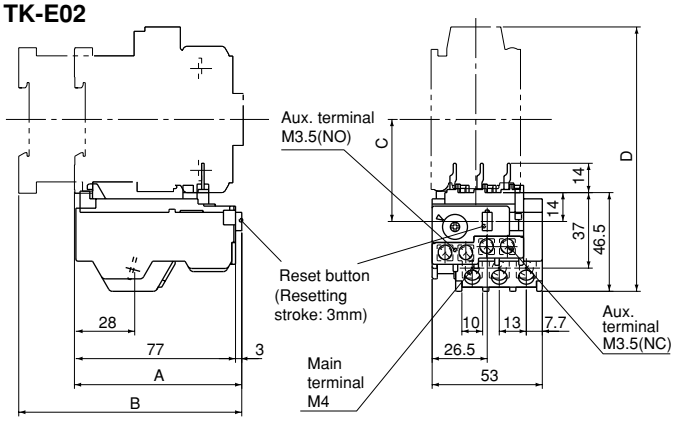
Protects the setting current value of a thermal overload relay from being changed unintentionally.

Applicable thermal overload relay	Type
TK-E02 to TK-E6	**SZ-DA**

02

■ Dimensions, mm

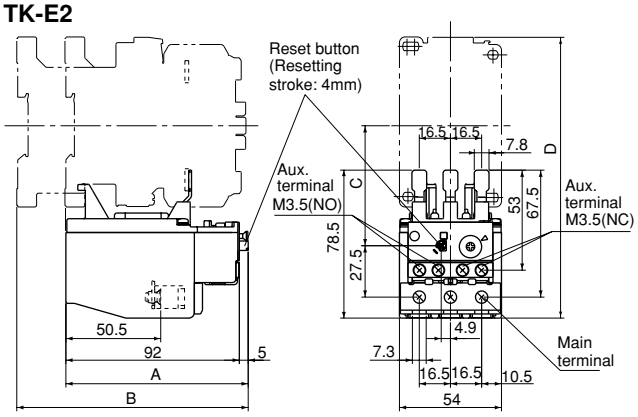
TK-E02



Contactor	A	B	C	D
SC-E02 to 05	80.5	–	49	127.5
SC-E02/G to 05/G	–	107.5	49	127.5

Mass: 0.13kg

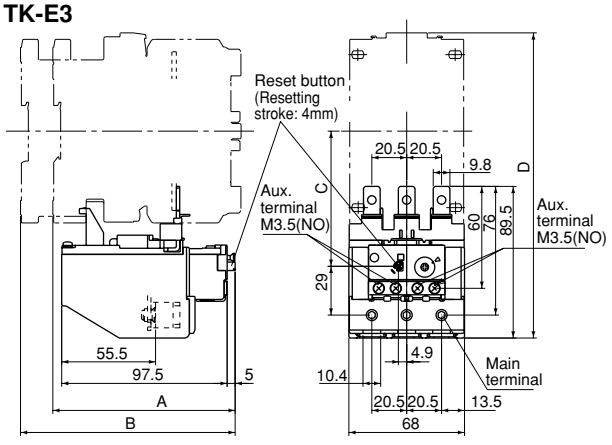
TK-E2



Contactor	A	B	C	D
SC-E1 to E2S	97	–	63.5	149
SC-E1/G to E2S/G	–	123	63.5	149

Mass: 0.25kg

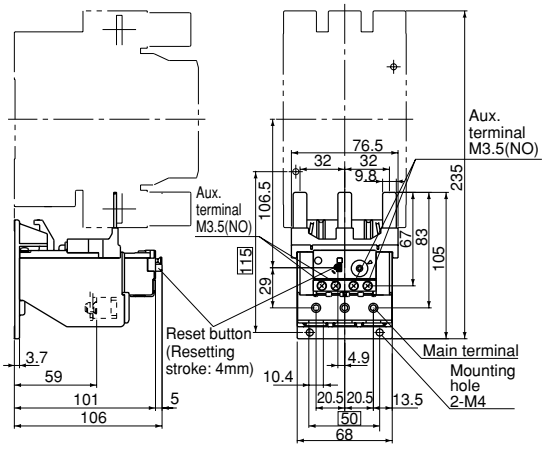
TK-E3



Contactor	A	B	C	D
SC-E3, E4	107.5	–	79.5	180
SC-E3/G, E4/G	–	126.5	79.5	180

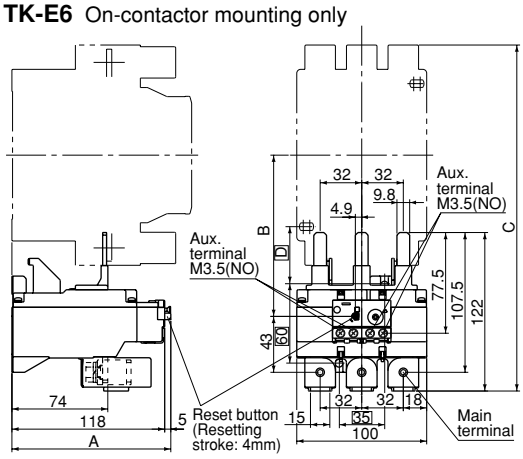
Mass: 0.34kg

TK-E5 On-contactor mounting only



Mass: 0.37kg

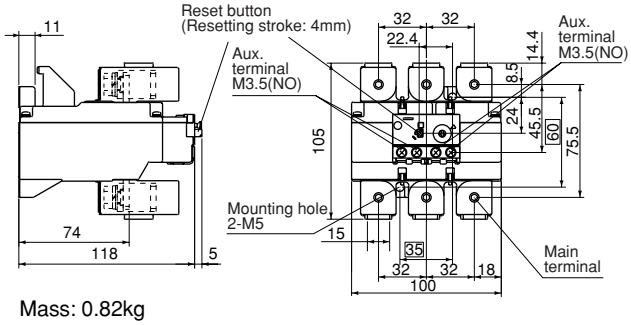
TK-E6 On-contactor mounting only



Contactor	A	B	C	D
SC-E6	123	124	266.5	45
SC-E7	123	129	274	50

Mass: 0.71kg

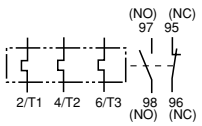
TK-E6H For separate mounting only



Mass: 0.82kg

■ Wiring diagrams

3-heater element

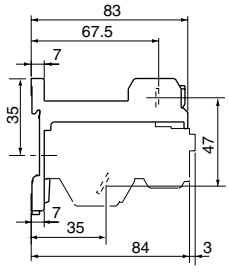


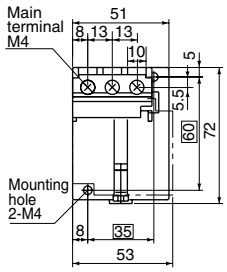
SC-E series
Thermal overload relays

■ Dimensions, mm

• Base units for separate mounting

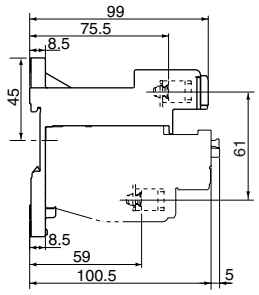
SZ-HCE

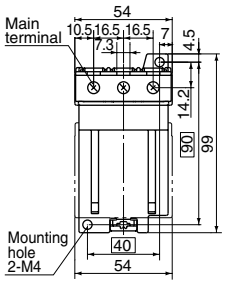




Mass: 55g

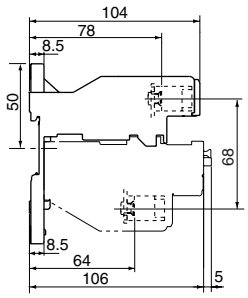
SZ-HDE

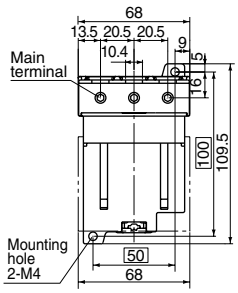




Mass: 0.1kg

SZ-HEE

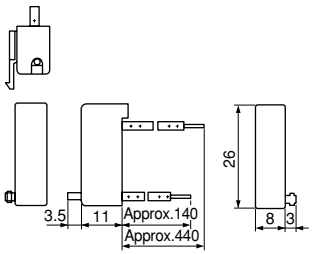




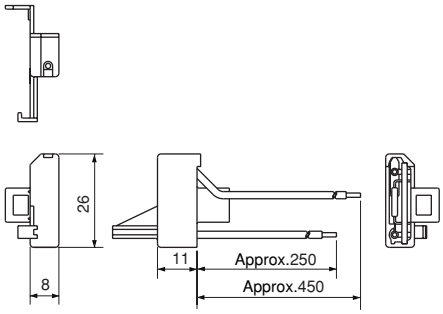
Mass: 0.15kg

• Trip indicators

SZ-L100, L200

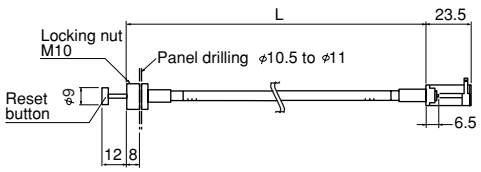


SZ-L100N2, L200N2



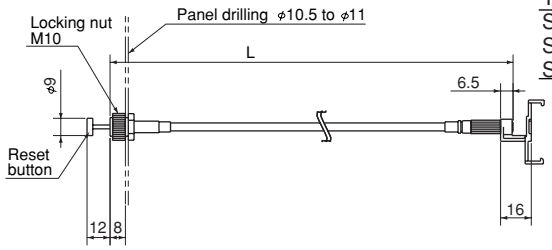
• Reset release button

SZ-R1, R2, R3



Type	L
SZ-R1	300
SZ-R2	500
SZ-R3	700

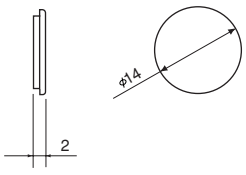
SZ-R4, R5, R6



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

• Dial cover

SZ-DA



■ Standard operating conditions

The thermal overload relays are manufactured for use in the standard operating conditions given in the table at the right. Consult FUJI before using the thermal overload relays in different conditions.

Ambient temperature	Operating: –5 to 55˚C No sudden temperature changes resulting in condensation or icing (The average temperature over a 24-hour period must not exceed 35˚C) Storage: –40 to 65˚C
Humidity	45 to 85%RH
Atmosphere	No excessive dust, smoke, corrosive gases, flammable gases, steam, or salt
Vibration	10 to 55Hz 15m/s^2
Shock	50m/s^2

■ Wirings

• Connection-wires and terminal processing

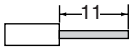
Be sure to perform wiring correctly with reference to the connections diagram. Main terminals for models TK-E02 to TK-E6 are wired using solid wires or stranded wires. Stranded wires or flexible stranded wires can be connected by twisting them together, crimping a sleeve (ferrule) onto them before connecting.

• Tightening torque

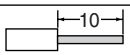
If wires are not tightened sufficiently, they may become hot or come loose and result in a fire, short-circuit, electric shock, or some other potentially dangerous situation. Be sure to tighten the wires to the torques specified in the tables below.

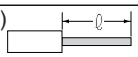
• Connectable wire sizes, tightening tools, tightening torques

Main circuit

Thermal overload relay type		**TK-E02**
Base unit type		SZ-HCE
Solid wire (mm^2)	One	0.75 to 4
	Two	1 to 4
Stranded wire (mm^2) *1	One	0.75 to 4
	Two	1 to 4
AWG	One	18-12
	Two	18-12
Sheath stripping length (mm)		 11
Terminal screw size		M4
Tool		⊕ Phillips screwdriver, H-type, No. 2 (ISO 8764) ⊖ Flat-blade screwdriver, 1×5.5×L-type, B (ISO 2830)
Tightening torque [N·m]		1.2 to 1.5

Control circuit

Solid or stranded wire (mm^2)	One	0.75 to 2.5 (ø1 to ø1.6)
	Two	0.75 to 1.5 or 1.5 to 2.5
AWG	One	18 to 14
	Two	18 to 14
Sheath stripping length (mm)		 10
Fork terminal		Max. 7.7mm wide (R2-3.5)
Terminal screw size		M3.5
Tool		⊕ Phillips screwdriver, H-type, No. 2 (ISO 8764) ⊖ Flat-blade screwdriver, 1×5.5×L-type, B (ISO 2830)
Tightening torque [N·m(lb·in)]		0.8 to 1

Thermal overload relay type		**TK-E2**	**TK-E3**	**TK-E5**	**TK-E6, E6H**
Base unit type		SZ-HDE	SZ-HEE	–	–
	Solid or stranded wire (mm^2) *1	0.75 to 22	1 to 38		16 to 70
	Flexible stranded wire with sleeve (mm^2)	0.75 to 22	1 to 38		16 to 70
	Flexible stranded wire without sleeve (mm^2)	0.75 to 22	1.5 to 38		16 to 70
	AWG	18-4	18-0		6-3/0
	Sheath stripping length (mm)  0	18	21		23
	Tool	⊕ Phillips screwdriver, H-type, No. 2 (ISO 8764) ⊖ Flat-blade screwdriver, 1×5.5×L-type, B (ISO 2830)	◎ Hex. wrench 4 (ISO 2936)		
	Tightening torque (N·m)	2.5	6		10

Notes: *1 Stranded wire (0 to 35mm^2) consists of 7 wires or less.
Stranded wire (38 to 120mm^2) consists of 19 wires or less.
Flexible stranded wire consists of more number wires than the above.