



Thermal Overload Relay

Type

- TK-E2      TK-E6
- TK-E3      TK-E6H
- TK-E5

This manual should be given to the person who actually uses the products and is responsible for their maintenance.

**Safety Precautions**

To ensure proper use of the product, be sure to read this manual and the other attached documents carefully before starting installation, operation, maintenance and inspection. Within this instruction manual, safety precautions are ranked, in order of importance, as either "Warning" or "Caution".



An operator may be killed or seriously injured by a hazardous condition resulting from improper operation.



An operator may suffer minor injuries and/or objects may be damaged by a hazardous condition resulting from improper operation.

Under certain conditions, improper operation may result in serious injury and/or damage even if it is labeled only as "Caution". Every item indicated by either "Warning" or "Caution" should be considered significant. Be sure to give particular care to those items.

**WARNING**

- Do not touch the product or approach it when power connected. Electric shock or burns may result.
- Turn off the power before starting maintenance or inspection.. Failure to turn off power may result in Electric shock or burns.

**CAUTION**

- For wiring, select wire sizes suitable for the applied voltage and current.
- Tighten wires with the tightening torque specified in the instruction manual. Failure to do so may result in fire.
- Do not touch the product immediately after the power is turned off. As it may still be hot, burns may result.
- Treat the product as industrial waste when discarding.

1. Unpacking

- (1) Check that the type and rating match the requested specifications.
- (2) Make sure that no parts have been lost or damaged.

2. Storage

Store the unit in the packing box. Do not store the packing box in a location subject to high temperature, high humidity, corrosive gas, or direct sunlight.

3. Mounting

- (1) Mount in a dry, clean and stable location.
- (2) Mounting on a vertical surface. The product must not incline more than 30° (Fig. 1)
- (3) Combination of magnetic contactors and separate mounting unit.

Thermal overload relay	Combination type of magnetic contactor	Separate mounting unit for thermal overload relay
TK-E2	SC-E1, SC-E2, SC-E2S SC-E1/G, SC-E2/G, SC-E2S/G	SZ-HDE
TK-E3	SC-E3, SC-E4, SC-E3/G, SC-E4/G	SZ-HEE
TK-E5	SC-E5	-
TK-E6	SC-E6, SC-E7	-
TK-E6H	-	Unnecessary

4. Mounting space

Mount the products at a distance of at least that shown in the table below. (Fig. 2 ex. TK-E3+SZ-HEE)

Dimension A	20mm
Dimension B	10mm

5. Connection

Connectable wire size and proper tightening torque.

(1) Main terminals

Types			TK-E2	TK-E3 TK-E5	TK-E6 TK-E6H
Direct Connection	Solid Stranded 【Note 2】	AWG	18 to 4	18 to 0	6 to 3/0
		[mm <sup>2</sup> ]	0.75 to 22	1 to 38	14 to 70
	Flexible stranded with end sleeve 【Note 2】	AWG	18 to 4	18 to 0	6 to 3/0
		[mm <sup>2</sup> ]	0.75 to 22	1 to 38	8 to 70
	Flexible stranded without end sleeve 【Note 2】	AWG	14 to 4	14 to 2	6 to 3/0
[mm <sup>2</sup> ]		1.5 to 22	1.5 to 38	70	
Stripped length 		[mm]	18	21	23
Kinds of screw 【Note 1】			⊕ ⊖	⊙	
Tightening torque		[lb·in]	22	53	89
		[N·m]	2.5	6	10

(2) Auxiliary terminals

Types			TK-E2, TK-E3, TK-E5, TK-E6, TK-E6H
Direct Connection	Solid Stranded Flexible stranded wire with end sleeve 【Note 2】	AWG	1×(18 to 14) 2×(18 to 14)
		[mm <sup>2</sup> ]	1×(0.75 to 2.5) 1×(φ 1 to φ 1.6) 2×(0.75 to 1.5) 2×(1.5 to 2.5)
	Stripped length 		[mm]
Terminal screw size			M3.5
Kinds of screw【Note 1】			⊕ ⊖
Tightening torque		[lb·in]	7 to 9
		[N·m]	0.8 to 1

【Note 1】 ⊙: Hexagon socket screw keys

⊕: Philips PH2 φ 6

⊖: Slotted-head screw I 1×5.5 type B

【Note 2】 Stranded wire (0.75 to 35 [mm<sup>2</sup>]): Number of solids ≤ 7

Stranded wire (38 to 70 [mm<sup>2</sup>]): Number of solids ≤ 19

Flexible stranded wire: Number of solids is more than the above-mentioned value.

【Note 3】 Tighten all terminal screws even if not used.

【Note 4】 After alignment or bending back of connected wires, check the tightening torque of the clamping screws.

【Note 5】 Cut the grid bar in main terminal hole if necessary. (Fig. 3)

6. Usage

- (1) Turn the adjustment dial within the dial gradations so that the current loaded to the motor is at the ▼ mark. (Fig. 4)
- (2) If the test button is pulled out, the sequence check starts. If it is depressed, only the NC contact (95-96) is opened. If it is released, the NC contact is closed again. (Fig. 4)
- (3) If the thermal overload relay operates, first remove the cause of failure such as overload, and then lightly press the reset button to reset it. (In this case, the thermal overload relay cannot be reset, if it is not cooled sufficiently.) (Fig. 4)
- (4) When the thermal overload relay operates, the trip square hole displays a yellow sign. If the thermal overload relay is reset, indication disappears from the square hole. (Fig. 4)
- (5) To change from the manual reset mode to the automatic reset mode, ①Break off the stopper of the indication cover. ②and③ Push and turn the reset button to the right. To return to the manual reset mode, turn the reset button to the left. (Fig. 5)
- (6) Note that if the thermal overload relay in a two-wire circuit is reset in the automatic reset mode, the motor restarts automatically.

7. Maintenance and Inspection

- (1) Check that all screws are tightened.
- (2) Check that all terminals are tightened with the proper torque periodically.

8. Short-circuit protective device (SCPD)

Thermal overload relay		Contactor type	IEC60947-4-1				UL508	
Type	Heater range [A]		Prospective Current Iq [kA]	Type "1"		Type "2"		
				Part No.	Rating [A]	Prospective Current Iq [kA]		IEC60269-1 gG and gM Fuse Rating [A]
TK-E2	4-6	SC-E1	18	SA103RA	50	50	20	
	5-8			SA103RA	50		20	
	6-9			SA103RA	50		20	
	7-11			SA103RA	50		25	
	9-13			SA103RA	50		25	
	12-18	SC-E1/G		SA103RA	50		25	
	18-26			SC-E2/G	SA103RA		60	50
	24-36	SA103RA			60		50	
	32-42	SA103RA		60	50			
	4-6	SC-E2S		SA103RA	100		25	
	5-8			SA103RA	100		25	
	6-9			SA103RA	100		25	
	7-11			SA103RA	100		25	
	9-13			SA103RA	100		25	
	12-18			SC-E2S/G	SA103RA		100	25
	18-26				SA103RA		100	50
	24-36			SA103RA	100		50	
	32-42			SA103RA	100		50	
	40-50			SA103RA	100		80	
	44-54			SA103RA	100		80	
7-11	SC-E3		SA103RA	100	25			
9-13			SA103RA	100	25			
12-18		SA103RA	100	25				
18-26		SC-E4	SA103RA	100	50			
24-36			SA103RA	100	50			
28-40		SC-E3/G	SA103RA	100	50			
34-50			SA103RA	100	50			
45-65		SC-E4/G	SA103RA	100	80			
48-68	SA103RA		100	80				
64-80	SC-E5	H203B	150	50				
18-26		H203B	150	50				
24-36		H203B	150	50				
28-40		H203B	150	50				
34-50		H203B	150	80				
45-65		H203B	150	100				
65-95	SC-E6	H203B	150	125				
85-105		H203B	150	100				
45-65		SC-E7	H203B	225	100			
53-80			H203B	225	100			
65-95	SC-E7	H203B	225	100				
85-125		H203B	225	125				
110-160		H203B	225	160				

Suitable for use on capable of delivering not more than 5000 rms symmetrical amperes, 600V max.

Suitable for use on capable of delivering not more than 10000 rms symmetrical amperes, 600V max.

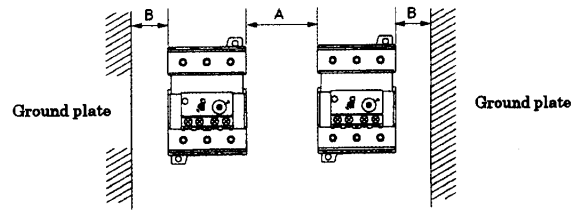


Fig. 2

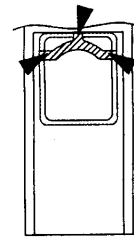


Fig. 3

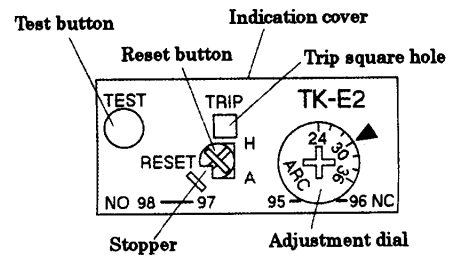


Fig. 4

Type "1" co-ordination requires that, under short-circuit conditions, the contactor or starter shall cause no danger to persons or installation and may not be suitable for further service without repair and replacement of parts.

Type "2" co-ordination requires that, under short-circuit conditions, the contactor or starter shall cause no danger to persons or installation and shall be suitable for further use. The risk of contact welding is recognized, in which case the manufacturer shall indicate the measures to be taken as regards the maintenance of the equipment.

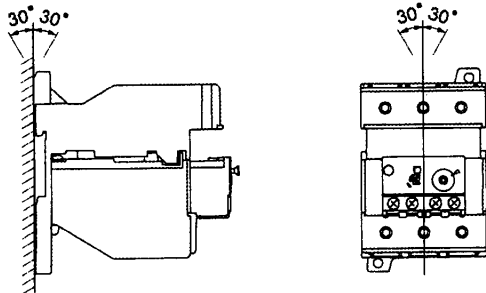
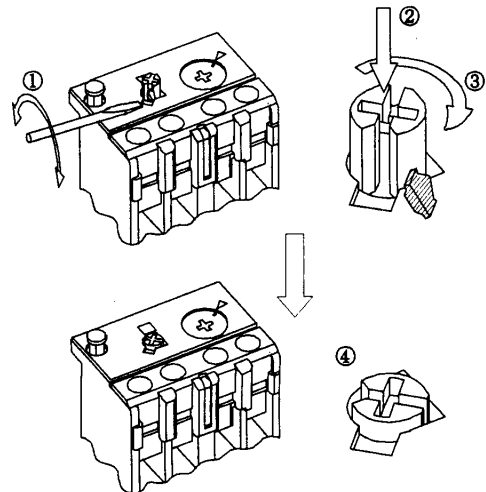


Fig. 1



Note: Use caution when selecting automatic reset mode. Equipment damage can result when used improperly.

Fig. 5

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