

# INSTRUCTION MANUAL

## Safety precautions

Use the product in the right way after reading this instruction manual and "Instruction manual" (BON-152A445) in detail. Thoroughly understand the equipment and device, safety information and precautions before starting operation. The safety precautions are ranked as "WARNING" and "CAUTION" in this instruction manual.

**WARNING** When a dangerous situation may occur if handling is mistaken leading to fatal or major injuries.

**CAUTION** When a dangerous situation may occur if handling is mistaken leading to medium or minor injuries, or physical damage.

Note that some items described as **CAUTION** may lead to serious results depending on the situation. In any case, important information that must be observed is described.

## WARNING

- Turn off the power before mounting, connecting, maintenance and inspections. Otherwise, there is danger of getting an electric shock.
- The malfunction of the machine and the short-circuit of the power supply happen by the malfunction of magnetic contactor caused by vibration, impact and faulty wiring.
- Do not touch or go near the product while power is ON. Otherwise, there is danger of getting an electric shock or a burn.

## 1. Environment

### CAUTION

Using it excluding the following environments becomes a factor that the product breaks down. Use it under the following environments.

- Ambient temperature(outside of an enclosure) : -10°C to 40°C
  - The height of average temperature in daytime : 35°C
  - The height of average temperature all the year round : 25°C
  - Ambient temperature(inside of an enclosure) : 55°C
  - The ambient temperature influences the performance character of the contactor.
  - Relative humidity: 45RH to 85%RH
  - There must be neither dew nor freezing.
  - Altitude : 2,000m or less
  - Vibration : 10Hz to 55Hz, 19.6m/s<sup>2</sup> or less
  - Impact : 49m/s<sup>2</sup> or less
  - Atmosphere : Low level of dust, smoke, corrosion gas, steam and salinity
- Note that there is a possibility that defective contact is generated if the product is used by the shut space for a long time. Do not use the product in the atmosphere including flammable gas.

## 2. Storage and transportation

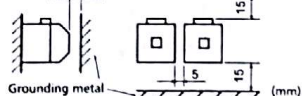
### CAUTION

- Do not injure by the corner of the package or the product.
- Confirm parts have not been damaged by the accidents during the transportation.
- Do not keep the product in the place filled with humidity or dust.
- Do not get on and do not put the objects on the product.
- Ambient temperature of storage : -30°C to 65°C
- Do not drop the product during transportation.
- Pack it carefully when you transport the product which installed and wired.

## 3. Mounting

### CAUTION

- Make sure that foreign matter does not enter the product during mounting or wiring.
- Do not use the damaged product during transportation or mounting or wiring. It becomes the factor of a fire and the malfunction.
- When the size of the screw is changed or the number is insufficient and the mounting on the IEC 35mm width rail is incomplete, the product may fall.
- Do not mount the product on the floor or ceiling.
- When the product mounting is horizontal, the mechanical durability decrease.
- Secure space more than figure below.
- An ionizing hot gas by the electric current opening and shutting is spouted.
- Mount the product in a dry place that there are hardly dust, corrosive gas, vibration.



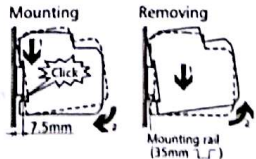
## Mounting direction

Correct mounting	Tilted mounting	Horizontal mounting
Recommend	Acceptable	Acceptable

## Installation of rail



- When the product is used in acid gas or sulfide gas or ammonia gas or chloride gas etc. contact us.



## 4. Connecting

### CAUTION

- If the terminal screws loosen, overheating or a fire might happen.
- Periodically tighten with the specified tightening torque.
- If tightening torque is excessive, the terminal screw might be damaged.
- Secure an enough insulation distance between crimp terminals and connecting conductors. Otherwise the circuit might be short-circuited.
- If the wire size is insufficient, overheating or a fire might happen.
- If the lock-paints, thermo-label, etc. adhere to the joint of the wire or contacts, overheating or a fire might happen.
- If the terminal screws have been loosened, securely tighten with the specified tightening torque. Otherwise overheating or a fire might happen.

## Wire size and Tightening torque

Model	Terminal	Screw size	Applicable wire size		Crimp Lug (JST Cat No.)	Tightening torque (N·m)
			Solid (mm)	Stranded (mm <sup>2</sup> )		
S-T21/T25	Main	M4	φ 1.6 - 2.6	1.25-6	1.25-4 to 5.5-4	1.2-1.9
TH-T25KP	Coil and Aux. circuit	M3.5	φ 1.6	0.75-2.5	1.25-3.5 to 2-3.5	0.9-1.5

## Contact arrangement

Model	Contact arrangement	Model	Contact arrangement
S-T21	2NO + 2NC	TH-T25KP	1/L1 3/L2 5/L3 97 95
S-T25	A2 A1 13 21 1/L1 3/L2 5/L3 43 31		2/T1 4/T2 6/T3 98 96
	14 22 2/T1 4/T2 6/T3 44 32		



## 5. Coil

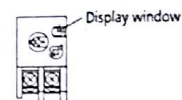
### CAUTION

- If a low voltage that contactor doesn't work is used, the excessive current might flow, and the coil might be damaged by a fire in a short time.
- If the length of the control wire is long, the coil voltage might decrease because of the wiring impedance. And the contactor might not make.
- Even if the coil voltage is turned off, the contactor might not be turned off because of stray capacity during wiring.
- The coil's voltage permissible fluctuation range is 85-110%, but use it at 95 to 100% of the rated coil voltage, because if using over 100% voltage for a long time, the insulation deterioration of coil progress and the mechanical durability decrease.
- If using it in a circuit having a higher harmonics or surge, coil burning or fires might happen.
- If the coil is smoking due to the short-circuit accident etc. corrosive gas might have been generated. Do not inhale corrosive gas.

Note. Confirm the coil rated voltage and frequency are corresponding to the circuit voltage and frequency.

## 6. Thermal overload relay

- Check that type, heater designation and setting range on the nameplate correspond to your original order.
- The position of adjustment knob should be value of full load current of the motor used.
- Do not remove the cover of OLR.
- It should be noted that foreign matter, such as wire chip, should not enter the relay interior through the display window.



7. Refer to Instruction manual for addition of optional parts and accessories.

8. If you need "Instruction manual" (BON-152A445) please contact us.

## Instruction for UL/CSA

### Available Short Circuit Current and Short Circuit Protection Device (S.C.P.D.)

Model	S.C.P.D.	Available Short Circuit Current	Circuit Breaker		Available Short Circuit Current
			Max. Current Ratings	Min. Interrupting Ratings	
	Max. Circuit Voltage	600V	240V/480V/600V	240V/480V/600V	240V/480V/600V
S-T21	70A	5kA	50A 50A	10kA 50kA	10kA 35kA
S-T25	100A		75A 75A	50kA 50kA	10kA 35kA

\*1. Main circuit wires must be connected to contactor using applicable lugs shown in below table.

Model	Heater Desig.	Adjustable Range Amps.	S.C.P.D.	Available Short Circuit Current	Circuit Breaker		Available Short Circuit Current
					Max. Current Ratings	Min. Interrupting Ratings	
			600V	600V	240V/480V/600V	240V/480V/600V	240V/480V/600V
TH-T25KP	0.24A	0.20 - 0.32	15A	5kA	N/A		N/A
	0.35A	0.28 - 0.42					
	0.5A	0.4 - 0.6					
	0.7A	0.55 - 0.85					
	0.9A	0.7 - 1.1					
	1.3A	1.0 - 1.6					
	1.7A	1.4 - 2.0					
	2.1A	1.7 - 2.5					
	2.5A	2.0 - 3.0					
	3.6A	2.8 - 4.4					
	5A	4.0 - 6.0					
	6.6A	5.2 - 8.0					
	9A	7 - 11					
	11A	9 - 13					
	15A	12 - 18					
	22A*2	18 - 26					

\*1. Main circuit wires must be connected to contactor using applicable lugs shown in below table.

\*2. 22A heater is applied to type S-T25.

Notes 1) This overload relay is adjustable and ambient compensated. Set the dial in the position corresponding to the motor full load current.

2) Trip rating is 125% of setting.

**WARNING** To provide continued protection against a risk of fire and electric shock, the complete overload relay must be replaced if burnout of current element occurs.

## Applicable wire size, lug size and tightening torque

Model	S-T21	S-T25	S-T21/T25	S-T21/T25	TH-T25KP
Terminal	Main	Auxiliary	Control	Main	Auxiliary
Screw size	M4	M3.5	M3.5	M4	M3.5
Wire strip length	11.5mm	11.5mm	9mm	10mm	10.5mm
Wire size (60/75°C) (copper only) (Sol/Str)	14 - 10 AWG	14 - 8 AWG	14 AWG	14 AWG	14 - 8 AWG
Recommended Crimp Lug Size (JST Cat No.) *2	1.25-4 to 5.5-4	1.25-4 to 5.5-4	1.25-3.5 to 2-3.5	1.25-3.5 to 2-3.5	1.25-4 to 5.5-4
Connection to terminal Max. qty.	2 Wires or 2 Lugs per terminal *1				
Tightening torque	15 lb-in (1.69N·m)	10.3 lb-in (1.17N·m)	10.3 lb-in (1.17N·m)	15 lb-in (1.69N·m)	10.3 lb-in (1.17N·m)

\*1. Two conductors of the same size can be connected.

\*2. Please use swaging tool which is recommended by JST.

**WARNING** When a 2-wire control is used to reset the automatic reset overload relay of a motor controller, the motor connected to the circuit may start automatically when the relay is in the automatic reset position.