

Autonics

THUMBWHEEL SWITCH SETTING TYPE TEMPERATURE CONTROLLER

T3/T4 SERIES

INSTRUCTION MANUAL



Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

Safety Considerations

- ※Please observe all safety considerations for safe and proper product operation to avoid hazards.
- ※Safety considerations are categorized as follows.
- Warning** Failure to follow these instructions may result in serious injury or death.
- Caution** Failure to follow these instructions may result in personal injury or product damage.
- ※The symbols used on the product and instruction manual represent the following
- ⚠ symbol represents caution due to special circumstances in which hazards may occur.

Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in fire, personal injury, or economic loss.
- Install on a device panel to use.**
Failure to follow this instruction may result in electric shock or fire.
- Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in electric shock or fire.
- Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.**
Failure to follow this instruction may result in electric shock or fire.

Caution

- When connecting the power input and relay output, use AWG 20(0.50mm²) cable or over and tighten the terminal screw with a tightening torque of 1.0N·m.**
When connecting the sensor input and communication cable without dedicated cable, use AWG 28-16 cable and tighten the terminal screw with a tightening torque of 1.0N·m.
Failure to follow this instruction may result in fire or malfunction due to contact failure.
- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in electric shock or fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
Failure to follow this instruction may result in fire or explosion.
- Keep metal chip, dust, and wire residue from flowing into the unit.**
Failure to follow this instruction may result in fire or product damage.

Ordering Information

T	3	S	-	B	4	R	P	4	C	-	N
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Upgrade: N (New type)

Unit: C (°C), F (°F)

Temperature range:²
 0: -99 to 199°C, -99.9 to 199.9°C
 1: 0 to 99.9°C
 2: 0 to 200°C, 0 to 200.0°C
 3: 0 to 400°C
 4: 0 to 800°C/F
 A: 0 to 999°C
 B: 0 to 1200°C
 C: 600 to 1600°C

Input type³: P (DPT100Q), J (IC), K (CA), R (PR)

Control output⁴: R (Relay output), S (SSR drive output), C (Current output)

Power supply: B (100-240VAC 50/60Hz)

Control method: 4 (ON/OFF control, Proportional control)

Alarm/Sub output⁵: No mark (None), A (Alarm output), S (Sub output), P (Dual setting output)

Size: M (DIN W48×H48mm (8-pin plug type)⁶), S (DIN W72×H72mm), H (DIN W48×H96mm), L (DIN W96×H96mm)

Digit: 3 (999 (3 digit)), 4 (9999 (4 digit))

Item: T (Temperature Controller)

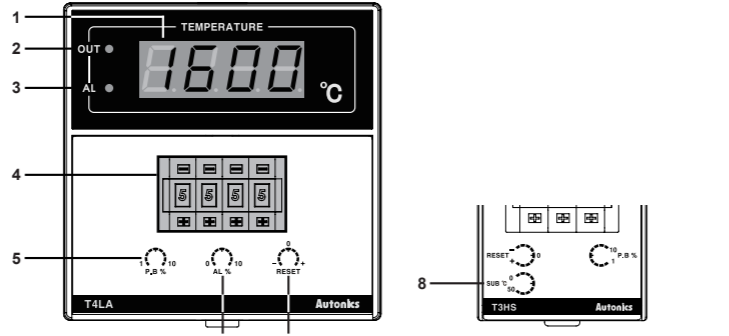
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

Specifications

Series	T3S	T3H	T3HA	T3HS	T4M	T4MA	T4L	T4LA	T4LP
Power supply	100-240VAC~ 50/60Hz								
Allowable voltage range	90 to 110% of rated voltage								
Power consumption	Max. 5VA								
Display method	7 segment (red) LED method								
Character size (W×H)	3.8×7.8mm (6.0×10.0mm)			8.0×14.2mm					
Input type	RTD	DP100Q (Allowable line resistance max. 5Ω per a wire)							
	TC	K (CA), J (IC)							K (CA), J (IC), R (PR)
Display accuracy ¹	RTD	±At room temperature (23°C ± 5°C); (PV ± 0.5% or ±1°C, select the higher one) ± 1 digit							
	TC	±Out of room temperature range: (PV ± 0.5% or ±2°C, select the higher one) ± 1 digit							
Relay	OUT1: 250VAC~ 5A 1c, OUT2: 250VAC~ 2A 1c ²								
SSR	Max. 12VDC=±2V 20mA								
Current	DC4-20mA (resistive load max. 500Ω)								
Alarm/Sub Dual setting output	—		250VAC~ 2A 1c		—		250VAC~ 2A 1c		
Control method	ON/OFF, Proportional control								
Hysteresis	F.S. 0.5%		F.S. 0.2 to 3% variable						
Proportional band	F.S. 3%		F.S. 1 to 10% variable						
Proportional cycle	20 sec.								
RESET range	F.S. -3 to 3% variable								
Relay Mechanical life cycle	Over 5,000,000 times								
Electrical life cycle	OUT1: Over 100,000 times, OUT2: Over 200,000 times								
Dielectric strength	2,000VAC 50/60Hz 1min. (between input terminal and power terminal)								
Vibration	0.75mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction for 2 hours								
Insulation resistance	Min. 100MΩ (at 500VDC megger)								
Noise	Square-wave noise by noise simulator (pulse width 1μs) ±2kV R-phase and S-phase								
Memory retention	Approx. 10 years (when using non-volatile semiconductor memory type)								
Environment	Ambient temperature: -10 to 50°C, Storage: -20 to 60°C								
	Ambient humidity: 35 to 85% RH, Storage: 35 to 85% RH								
Weight ³	Approx. 135g (approx. 95g)	Approx. 239g (approx. 176g)	Approx. 246g (approx. 180g)	Approx. 310g (approx. 222g)					

- ※1: In case of the T3S Series and the decimal point display models
At room temperature (23°C±5°C): (PV ±0.5% or ±2°C, select the higher one)±1 digit
Out of room temperature range: (PV ±0.5% or ±3°C, select the higher one)±1 digit
- ※2: Dual setting output of the T4LP is fixed as relay output and it is available as alarm output.
- ※3: The weight is with packaging and the weight in parentheses is only unit weight.
- ※Environment resistance is rated at no freezing or condensation.

Unit Description



- Present temperature (PV) display**
It displays present temperature.
- Control output (OUT) indicator**
It turns ON when control output is ON.
※In case of the T3S, the upper DOT of last digit flashes.
- Alarm output (AL) indicator**
It turns ON when alarm output is ON. (only for alarm output model)
In case of the sub output model (T3HS), the sub (SUB) indicator turns ON when sub output is ON.
- Set value (SV) thumbwheel switch**
Switch for setting temperature.
(-) button: Decreases number, (+) button: Increases number
If the setting is out of the temperature range of temperature sensor, the present temperature (PV) display part flashes 5uE- and the present value in turn.
※The models which temperature range is 0 (-99.9 to 199.9°C, -99 to 199°C) of temperature sensor DP100Q are only set 1~4 (-) (-).
※The dual setting output model (T4LP) has two thumbwheel switches.
LO SET (low set output) HI SET (high set output)
- Hysteresis/Proportional width volume switch (except T3S)**
ON/OFF control: Setting for hysteresis. [Setting range] F.S. 0.2 to 3% (For T3S, F.S. 0.5% fixed)
Proportional control: Setting for proportional width. [Setting range] F.S. 1 to 10% (For T3S, F.S. 3% fixed)
Proportional cycle: 20 sec. fixed
- Alarm output value volume switch (only for alarm output model)**
It sets alarm output value. [Setting range] F.S. 0 to 10%
- RESET volume switch**
In case of proportional control, it sets offset. [Setting range] F.S. -3 to 3%
- Temperature setting of sub output volume switch (only for T3HS)**
It sets temperature of the sub output. This output operates as deviation low-limit alarm based on the set sub-output temperature (SV). [Setting range] 0 to 50°C

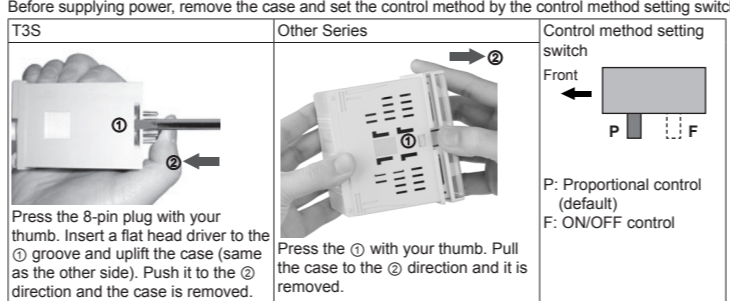
※1: Socket (PG-08, PS-08(N)) is sold separately.
※2: Output by Series

Series	T3S	T3H	T3HA	T3HS	T4M	T4MA	T4L	T4LA	T4LP
Control output	●	●	●	●	●	●	●	●	●
Control+ Alarm/Sub output	●	●	●	●	●	●	●	●	●
Dual setting output	●	●	●	●	●	●	●	●	●

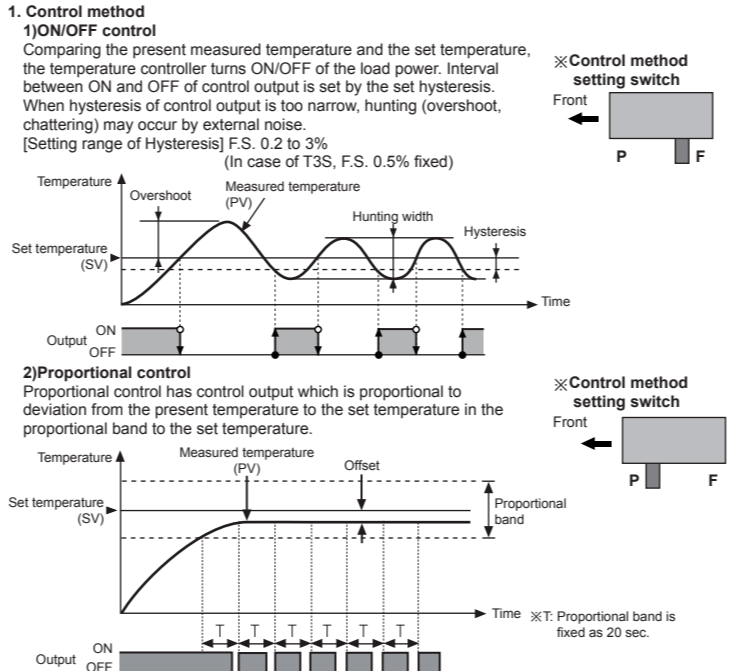
※3: Input type and temperature range by Series

Input type	Model	T3S	T3H	T3HA	T3HS	T4M	T4MA	T4L	T4LA	T4LP
T	K (CA)	0 to 400°C	●	●	●	●	●	●	●	●
		0 to 800°C	●	●	●	●	●	●	●	●
		0 to 999°C	●	●	●	●	●	●	●	●
		0 to 1200°C	●	●	●	●	●	●	●	●
J (IC)		0 to 200°C	●	●	●	●	●	●	●	●
		0 to 400°C	●	●	●	●	●	●	●	●
		0 to 800°C	●	●	●	●	●	●	●	●
		0 to 800°F	●	●	●	●	●	●	●	●
R (PR)		600 to 1600°C	●	●	●	●	●	●	●	●
		-99.9 to 199.9°C	●	●	●	●	●	●	●	●
		0 to 99.9°C	●	●	●	●	●	●	●	●
		0 to 200.0°C	●	●	●	●	●	●	●	●
DPT 100Q		0 to 200°C	●	●	●	●	●	●	●	●
		0 to 400°C	●	●	●	●	●	●	●	●
		0 to 800°C	●	●	●	●	●	●	●	●
		0 to 400°C	●	●	●	●	●	●	●	●

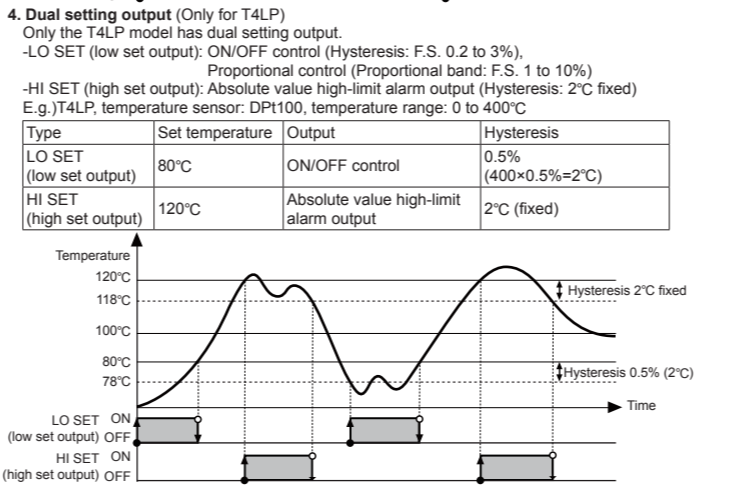
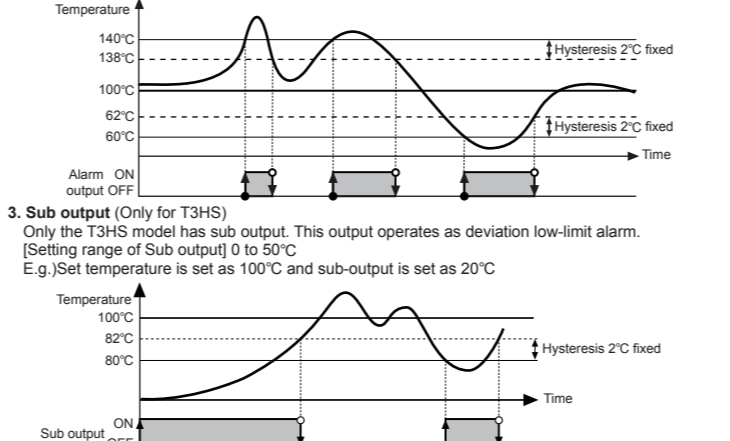
Control Method (ON/OFF, proportional control) Setting



Function



- It is available to control without overshoot or hunting comparing ON/OFF control but it may cause offset. Correct the offset with the RESET volume switch.
[Setting range of Proportional band] F.S. 1 to 10% (In case of T3S, F.S. 3% fixed)
[Setting range of RESET] F.S. -3 to 3%
- 2) Alarm output**
Alarm temperature is applied to the high/low-limit based on the set temperature. Alarm output operates deviation high/low-limit.
[Setting range of Alarm temperature] F.S. 0 to 10%
E.g.) When F.S. is 400°C and max. alarm temperature (F.S. 10%) is 40°C.
When the set temperature is set as 100°C, alarm output operation range is 140°C to 60°C.

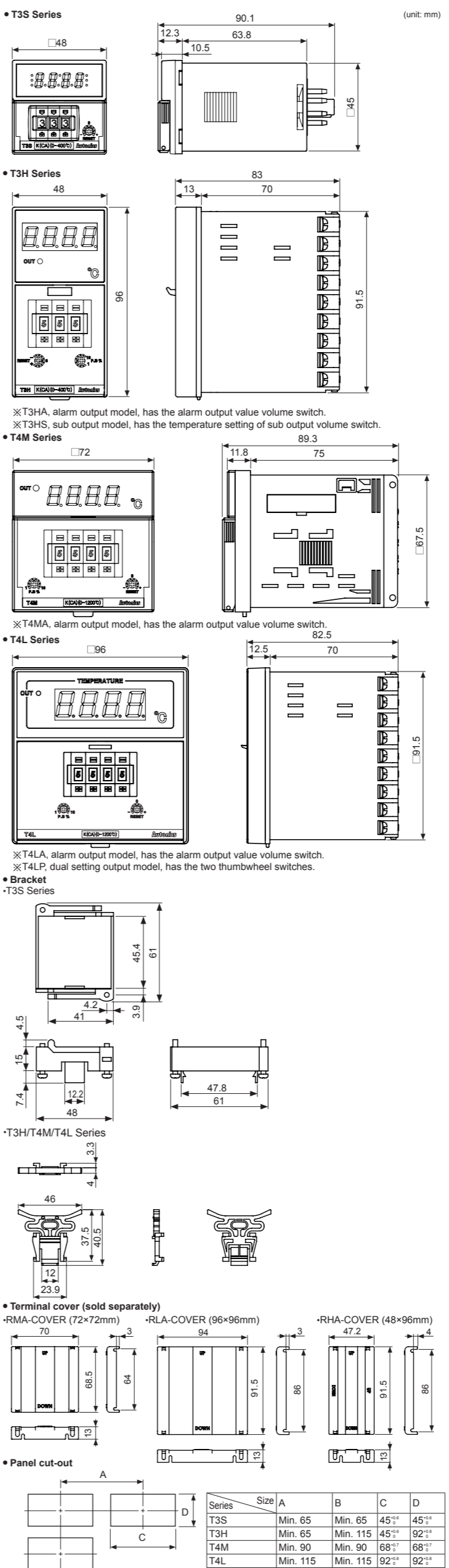


Error Display And Output Operation

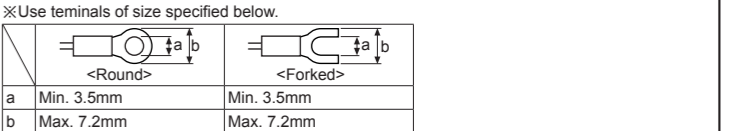
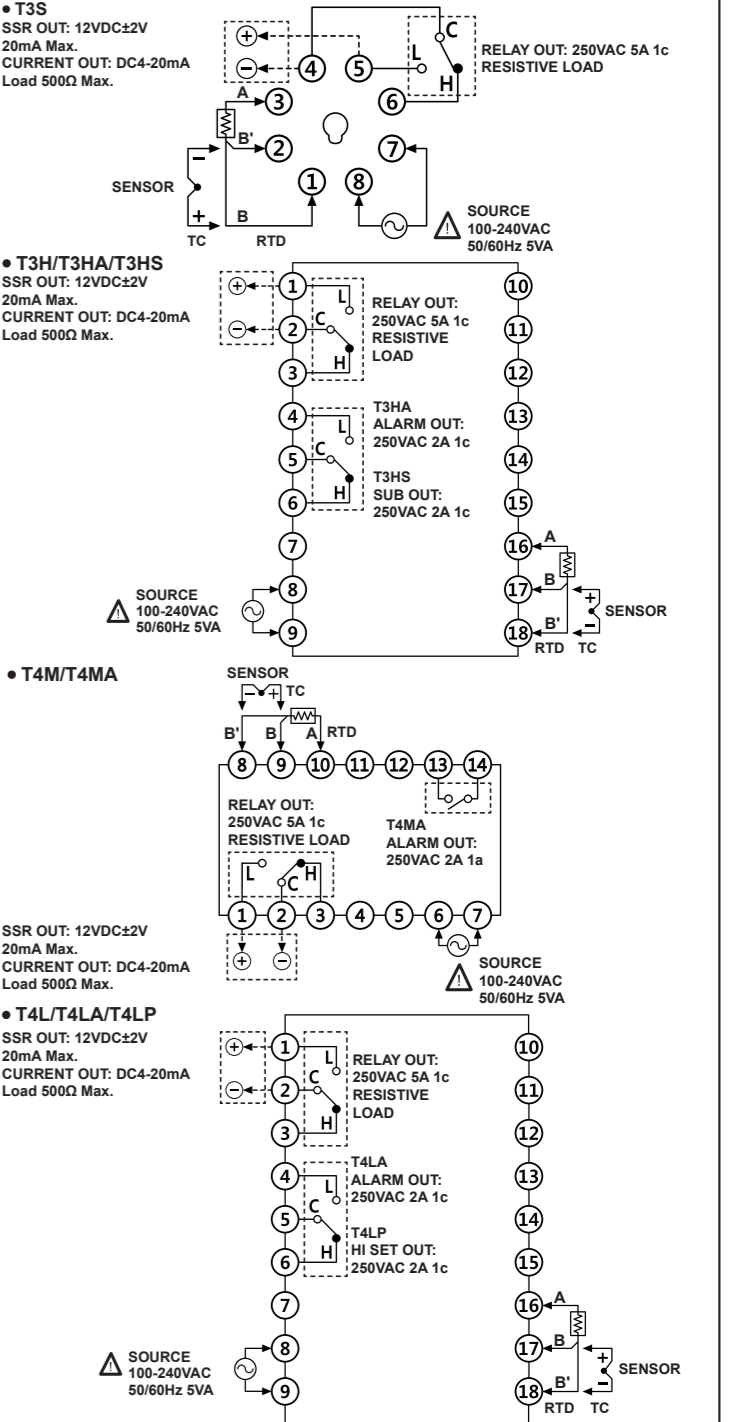
Display	Description	Control output ¹	Alarm output ²	Sub output	Dual output	Troubleshooting
αPE	Flashes when a temperature sensor is broken or not connected.	○	●	○	●	Check the status of the temperature sensor. When the sensor is connected correctly, it is clear.
HHHH	Flashes when the measured input value is higher than the temperature range of the sensor.	○	○	○	●	When the measured temperature is within the temperature range of the sensor, it is clear.
LLLL	Flashes when the measured input value is lower than the temperature range of the sensor.	○	○	○	●	When the measured temperature is within the temperature range of the sensor, it is clear.
SuEr	Flashes with the present value when the set value is out of the temperature range of the sensor.	○	○	○	○	The set value should be within the temperature range of the sensor.

※1: T4LP (Dual setting output) is the single output.
※2: When SuEr and αPE/HHHH/LLLL occur at the same time, SuEr and αPE/HHHH/LLLL flash in turn and all output turns OFF.

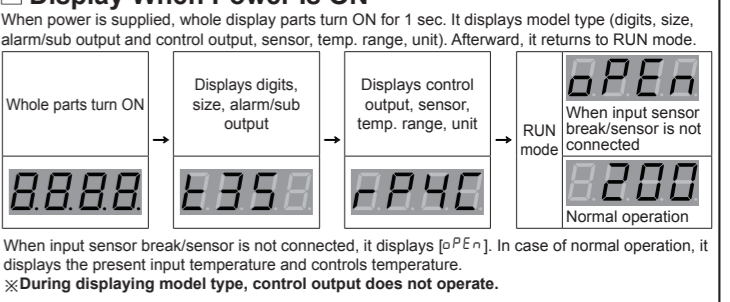
Dimensions



Connection



Display When Power Is ON



Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Check the polarity of the terminals before wiring the temperature sensor.
- For thermocouple (CT) temperature sensor, use the designated compensation wire for extending wire.
- Keep away from high voltage lines or power lines to prevent inductive noise.
- In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
- Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- Do not use the unit for other purpose (e.g. voltmeter, ammeter), but temperature controller.
- Make a required space around the unit for radiation of heat.
- For accurate temperature measurement, warm up the unit over 20 min after turning on the power.
- Make sure that power supply voltage reaches to the rated voltage within 2 sec after supplying power.
- Do not wire to terminals which are not used.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications') ①Altitude max. 2,000m
 - ②Pollution degree 2 ②Installation category II

Major Products

- Photoelectric Sensors
 - Fiber Optic Sensors
 - Door Sensors
 - Door Side Sensors
 - Area Sensors
 - Proximity Sensors
 - Pressure Sensors
 - Control Switches, Lamp/Buzzers
 - Connector/Sockets
 - Switching Mode Power Supplies
 - Control Switches, Lamp/Buzzers
 - IO Terminal Blocks & Cables
 - Stepper Motors/Drivers/Motion Controllers
 - Field Network Devices
 - Laser Marking System (Fiber, Co., Nd: YAG)
 - Laser Welding/Cutting System
 - Temperature Controllers
 - Temperature/Humidity Transducers
 - SSR/Power Controllers
 - Counters
 - Timers
 - Process Meters
 - Tachometer/Pulse (Rate) Meters
 - Supply Units
 - Sensor Controllers
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