

# Autonics TEMPERATURE CONTROLLER TA 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 personal injury, fire, or economic loss.
- The unit must be installed on a device panel before use.** Failure to follow this instruction may result in electric shock.
- Do not connect, repair, or inspect the unit while connected to a power source.** Failure to follow this instruction may result in electric shock.
- Check the terminal numbers before connecting the power source.** Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit. Please contact us if necessary.** Failure to follow this instruction may result in electric shock or fire.

### Caution

- Do not use the unit outdoors.** Failure to follow this instruction may result in shorten the life cycle of the unit, or electric shock.
- When connecting the power input and relay output cables, use AWG20 (0.05mm<sup>2</sup>) cables and make sure to tighten the terminal screw bolt above 0.74N·m to 0.90N·m.** Failure to follow this instruction may result in fire due to contact failure.
- For crimped terminal, select following shaped terminal.**
- Use the unit within the rated specifications.** Failure to follow this instruction may result in shorten the life cycle of the unit, or fire.
- Do not use loads beyond the rated switching capacity of the relay contact.** Failure to follow this instruction may result in insulation failure, contact melt, contact failure, relay broken, or fire.
- Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.** Failure to follow this instruction may result in electric shock or fire.
- Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, or impact may be present.** Failure to follow this instruction may result in fire or explosion.
- Keep dust and wire residue from flowing into the unit.** Failure to follow this instruction may result in fire or product damage.
- Check the polarity of the measurement input contact before wiring the temperature sensor.** Failure to follow this instruction may result in fire or explosion.
- For installing the unit with reinforced insulation, use the power supply unit which basic level is ensured.**

### Ordering Information

TA	S	B	4	R	P	4	C					
Unit								C	Celsius (°C)			
								F	Fahrenheit (°F)			
Temperature range for each sensor												
								Celsius (°C)	Fahrenheit (°F)	Temperature sensor		
0								-50 to 100	-58 to 212	DPT	-	-
1								0 to 100	32 to 212	DPT	-	K(CA)
2								0 to 200	32 to 392	DPT	J (IC)	K(CA)
3								0 to 300	32 to 572	-	J (IC)	-
4								0 to 400	32 to 752	DPT	J (IC)	K(CA)
6								0 to 600	32 to 1,112	-	-	K(CA)
8								0 to 800	32 to 1,472	-	-	K(CA)
C								0 to 1,200	32 to 2,192	-	-	K(CA)
Sensor input type								P		DPT100Ω		
								J		J (IC)		
								K		K (CA)		
Control output								R		Relay output		
								S		SSR drive output		
Power supply								4		100-240VAC 50/60Hz		
Control method								B		ON/OFF control & PID control combined		
Size								S		DIN W48 × H48mm (8 pin plug type) <sup>*1</sup>		
								M		DIN W72 × H72mm		
								L		DIN W72 × H72mm		
Item								TA		Analog setting type temperature controller		

\*1: Socket (PG-08, PS-08 (N)) is sold separately.

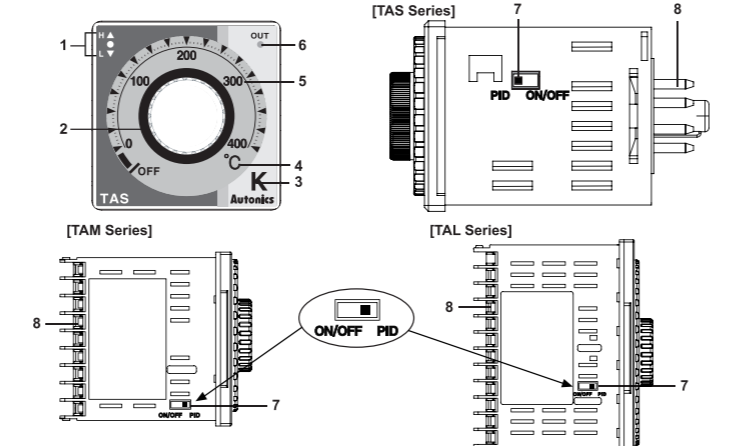
\*2: The above specifications are subject to change and some models may be discontinued without notice.

### Specification

Series	TAS	TAM	TAL
Power supply	100-240VAC 50/60Hz		
Allowable voltage range	90 to 110% of rated voltage		
Power consumption	Max. 4VA		
Size	DIN W48 × H48mm	DIN W72 × H72mm	DIN W96 × H96mm
Display method	Deviation LED (red, green), Output LED (red)		
Setting type	Dial setting		
Setting accuracy	F.S. ±2% (room temperature 23°C ±5°C) <sup>*1</sup>		
Input type	RTD Thermocouples K (CA), J (IC)		
Control	ON/OFF Control Hysteresis: 2°C Fixed		
PID Control	Control period: Relay output 20 sec/SSR drive output 2 sec		
Relay output	250VAC 3A 1c		
SSR	Max. 12VDC±2V 20mA		
Functions	PV deviation indication, Error indication		
Sampling period	100ms		
Dielectric strength	2,000VAC 50/60Hz for 1 minute (between input terminal and power terminal)		
Vibration	0.75mm amplitude at frequency of 5 to 55Hz in each X, Y, Z direction for 2 hours		
Relay life cycle	Mechanical	Min. 10,000,000 operation (18,000 times/hr)	
	Electrical	Min. 100,000 operation (900 times/hr)	
Insulation resistance	Min. 100MΩ (at 500VDC megger)		
Noise strength	Square shaped 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)		
Environ-ment	Ambient temperature	-10 to 50°C . Storage: -20 to 60°C	
	Ambient humidity	35 to 85%RH. Storage: 35 to 85%RH	
Insulation type	Double insulation or reinforced insulation (mark:  , dielectric strength between the measuring input part and the power part: 2kV)		
Approval			
Weight <sup>*2</sup>	Approx. 107g (approx. 69g)	Approx. 171g (approx. 109g)	Approx. 232g (approx. 147g)

- \*1: <at room temperature range> Below 100 °C model is F.S. ±3% <out of room temperature range> Below 100°C model is F.S. ±4%, Over 100°C model is F.S. ±3%
- \*2: The weight includes packaging. The weight in parentheses is for unit only.
- \*Environment resistance is rated at no freezing or condensation.

### Front Panel Identification



PV deviation indicator	
It shows deviation of present temperature (PV) based on set temperature (SV) by LED.	
PV deviation temperature	Input deviation indicator [Deviation indicator: ● (green), ▲/▼ (red)]
Input sensor OPEN	▲ + ● + ▼ indicators flash (every 0.5 sec)
Exceed max. input value	▲ indicator flashes (every 0.5 sec)
More than 10°C	▲ indicator turns ON
More than 2°C to less than or equal to 10°C	▲ + ● indicators turn ON
Less than or equal to ±2°C	● indicator turns ON
More than -2°C to less than or equal to -10°C	● + ▼ indicators turn ON
More than -10°C	▼ indicator turns ON
Less than min. input value	▼ indicator flashes (every 0.5 sec)

**When power is on, all indicators light for 2 sec, then they turn off and control operation starts.**

**2. Set temperature (SV) dial**  
Dial to change set temperature (SV). When changing set temperature, it is applied after 2 sec for the stable input.

**3. Input sensor**  
Indicates sensor type of present value. Input sensor type or input range each product is shown in the below table.

Input Sensor	Range No.	Input range (°C)	Input range (°F)		
Thermo-couple	K (CA)	1	0 to 100	32 to 212	
		2	0 to 200	32 to 392	
		4	0 to 400	32 to 752	
		6	0 to 600	32 to 1,112	
	J (IC)	8	0 to 800	32 to 1,472	
		C	0 to 1,200	32 to 2,192	
		RTD	DPT100Ω		
			1	0 to 100	32 to 212
2	0 to 200		32 to 392		
4	0 to 400		32 to 752		

**4. Temperature unit**  
Indicates temperature unit (°C, °F) of set temperature (SV) and present value (PV).

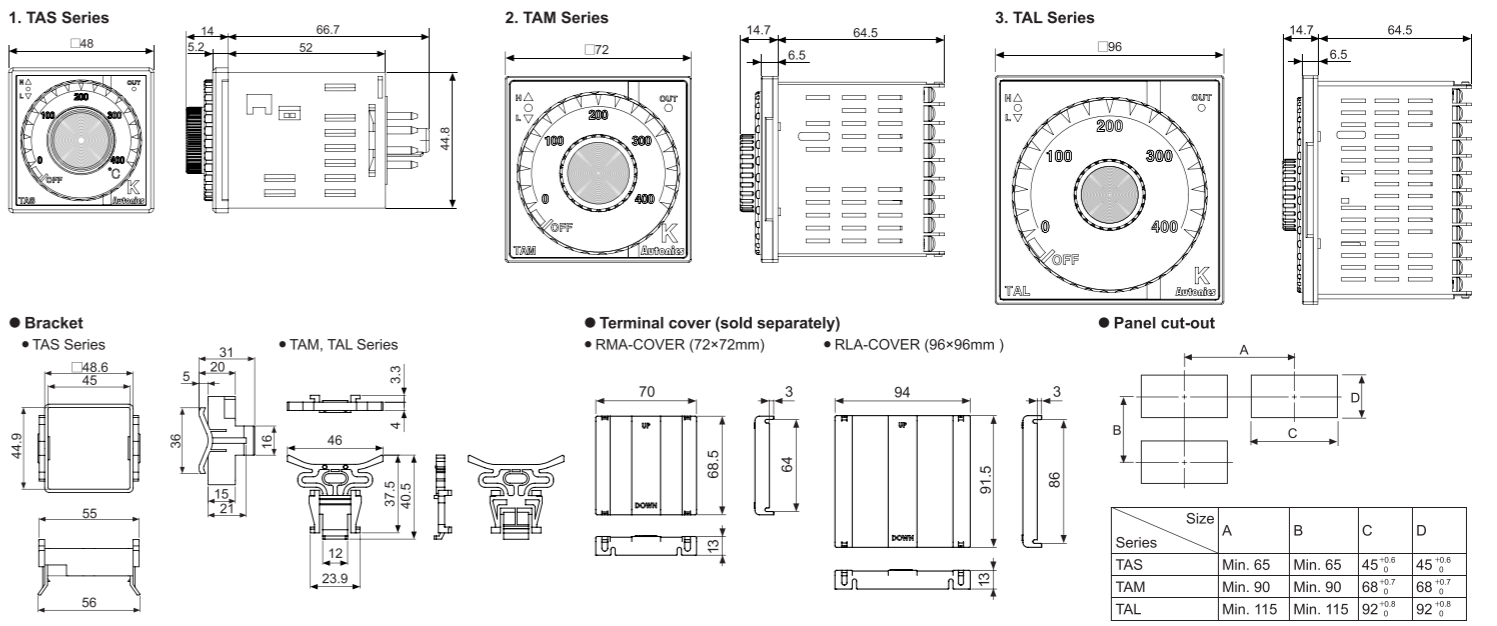
**5. Temperature range**  
Indicates temperature range of set temperature (SV)

**6. Control output indicator**  
Turns ON when control output (Relay Output/SSR Output)

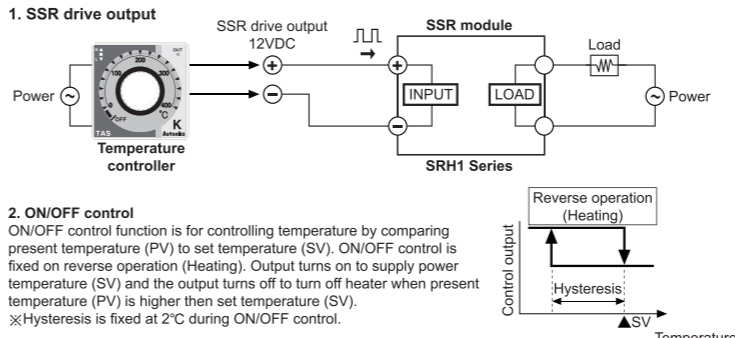
**7. Control mode selection switch**  
Select PID control (front part) or ON/OFF control (rear part) using switch.

**8. Terminal block**  
Terminals for external connections. For more information, refer to 'Connections'.

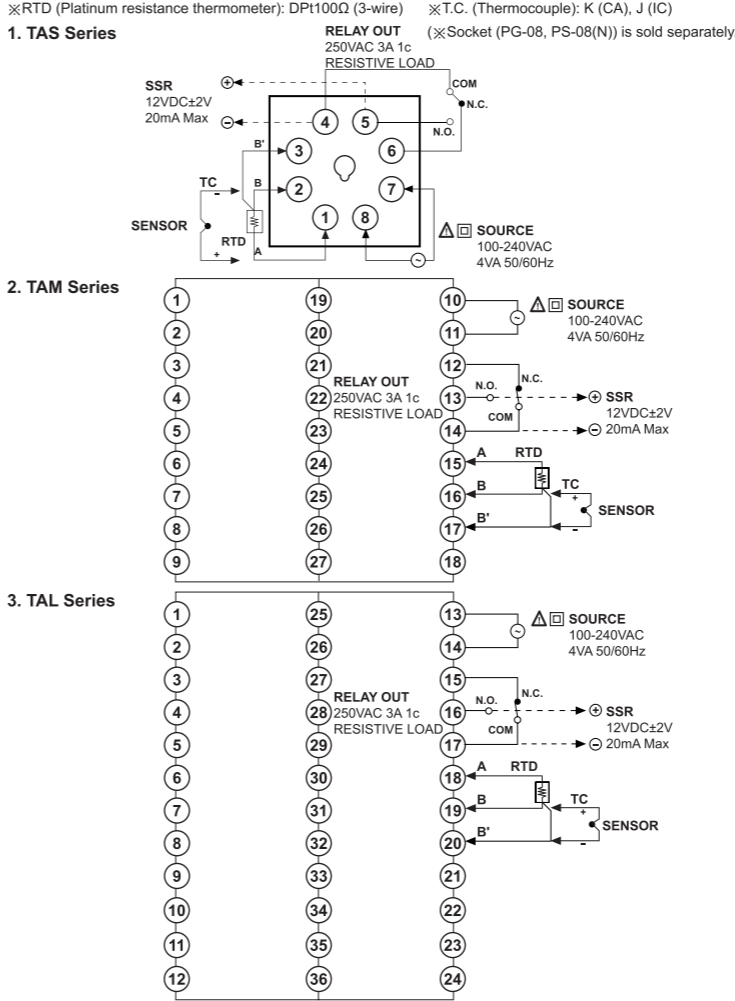
### Dimensions



### Functions



### Connections



### 3. PID Control

PID constants are suggested and implemented based on self tuning from supply power until reaching set temperature (SV), then self tuning is over after reaching set temperature (SV). When power supply, in case that set temperature (SV) dial points at OFF or self tuning can not be started because present temperature (PV) is higher than set temperature (SV) or hunting occurs during self tuning, output control is switched to proportion band (P) because that is considered to error. At that time, proportion band is fixed at 10°C.

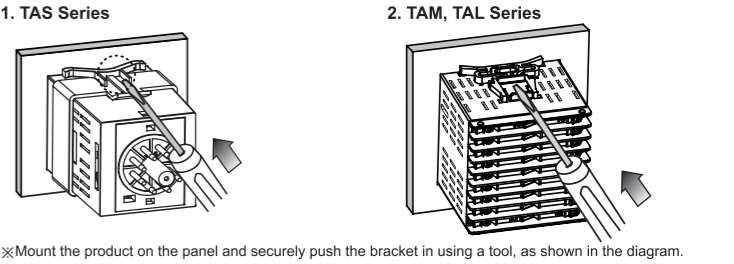
\*Control cycle of PID control and proportion control is 20 sec in relay output model and 2 sec in SSR drive output model.

**4. STOP**  
Control output could stop without power off by setting the front setting volume to below min. setting range. If control output stops by STOP function, green indicator in deviation indicator (●) will flash every 1 sec.

**5. Error**  
Error mark will flash (every 1 sec) in PV indicator when error occurs during the control operation. It will operate normally, if input sensor is connected or temperature is returned to normal range.

No	Display	Description
1	▲ + ● + ▼ indicators flash	If input sensor is broken or sensor is not connected.
2	▲ indicator flashes	If measured sensor input is higher than temperature range.
3	▼ indicator flashes	If measured sensor input is lower than temperature range.

### Installation



- Please use separated line from high voltage line or power line in order to avoid inductive noise.
  - Install power switch or circuit-breaker in order to on/off the power.
  - The switch or circuit-breaker should be installed nearby users for safety.
  - Do not use this product as Volt-meter or Ampere-meter, this is a temperature controller.
  - In case of using RTD sensor, 3-wire type must be used. If you need to extend the line, 3 wires must be used with the same thickness as the line. It might cause the deviation of temperature if the resistance of line is different.
  - In case of making power line and input signal line closely, line filter for noise protection should be installed at power line and input signal line should be shielded.
  - Keep away from the high frequency instruments. (High frequency welding machine & sewing machine, large capacity SCR controller)
  - Installation environment
    - It shall be used indoor.
    - Altitude up to 2,000m
    - Pollution degree 2
    - Installation category II
- \*Failure to follow these instructions may result in product damage.

### Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connector/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System (Fiber, Co., Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometers/Pulse (Rate) Meters
- Display Units
- Sensor Controllers

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