**TA Series**

**Analog And Non-Indicating Type, PID Control, Set Temperature By Dial**

- Improved control performance with built-in microcomputer
- Adopting new Auto-tuning PID control algorithm
  - Selectable ON/OFF, PID control (the external switch)
- Easy to check controlling status with deviation indicators
  - Deviation LED (red, green), output LED (red) indicators
- Dial setting output OFF function
- Sensor broken display function

⚠️ Please read “Safety Considerations” in the instruction manual before using.

## Ordering Information

<table>
<thead>
<tr>
<th>TA</th>
<th>S</th>
<th>B</th>
<th>4</th>
<th>R</th>
<th>P</th>
<th>4</th>
<th>C</th>
</tr>
</thead>
</table>

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### Specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>TAS</th>
<th>TAM</th>
<th>TAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>100-240VAC~ 50/60Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable voltage range</td>
<td>90 to 110% of rated voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>Max. 4VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>DIN W48×H48mm</td>
<td>DIN W72×H72mm</td>
<td>DIN W96×H96mm</td>
</tr>
<tr>
<td>Display method</td>
<td>Deviation LED (red, green), Output LED (red)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting type</td>
<td>Dial setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting accuracy</td>
<td>±2% (room temperature 23°C±5°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input type</td>
<td>RTD DPt100Ω (allowable line resistance max. 5Ω per a wire)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>ON/OFF Control</td>
<td>Control period: Relay output - 20 sec / SSR drive output - 2 sec</td>
<td></td>
</tr>
<tr>
<td>Control Relay</td>
<td>250VAC~ 3A, 30VDC= 1A, 1c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control SSR output</td>
<td>12VDC=±2V 20mA Max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functions</td>
<td>PV deviation indicatable, Error indicatable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling period</td>
<td>100ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>2,000VAC 50/60Hz for 1 min (between input terminal and power terminal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>0.75mm amplitude at frequency of 5 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relay life cycle</td>
<td>Mechanical Min. 10,000,000 operations (18,000 operations/hr)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical Min. 100,000 operations (900 operations/hr)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>Min. 100MO (at 500VDC megger)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise immunity</td>
<td>±2KV R-phase, S-phase the square wave noise (pulse width: 1us) by the noise simulator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory retention</td>
<td>Approx. 10 years (when using non-volatile semiconductor memory type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Ambient temperature</td>
<td>-10 to 50°C, storage: -20 to 60°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient humidity</td>
<td>35 to 85%RH, storage: 35 to 85%RH</td>
<td></td>
</tr>
<tr>
<td>Insulation type</td>
<td>Double insulation or reinforced insulation (mark: , dielectric strength between the measuring input part and the power part: 2kV)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approval</td>
<td>Weight</td>
<td>Approx. 107g (approx. 69g)</td>
<td>Approx. 171g (approx. 109g)</td>
</tr>
</tbody>
</table>

※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 parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

### Connections

※RTD: DPt100Ω (3-wire type)
※Thermocouples: K (CA), J (IC)
※Use terminals of size specified below.

#### TAS

(※Socket (PG-08, PS-08 (N)) is sold separately)

#### TAM

(※Socket (PG-08, PS-08 (N)) is sold separately)
### Connections

※RTD: DPt100Ω (3-wire type)  ※Thermocouple: K (CA), J (IC)

- **TAL**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12
  - 13
  - 14
  - 15
  - 16
  - 17
  - 18
  - 19
  - 20
  - 21
  - 22
  - 23
  - 24
  - 25
  - 26
  - 27
  - 28
  - 29
  - 30
  - 31
  - 32
  - 33
  - 34
  - 35
  - 36

- **TAM**
  - A
  - B
  - C
  - D

### Dimensions

([unit: mm])

- **TAS**
  - 14
  - 66.7
  - 5.2
  - 52

- **TAM**
  - 14.7
  - 64.5
  - 6.5

- **TAL**
  - 96
  - 14.7
  - 64.5
  - 6.5

- **Panel cut-out**

<table>
<thead>
<tr>
<th>Series</th>
<th>Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAS</td>
<td>Min. 65</td>
<td>45°6</td>
<td>45°6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAM</td>
<td>Min. 90</td>
<td>68°7</td>
<td>68°7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAL</td>
<td>Min. 115</td>
<td>92°8</td>
<td>92°8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analog Setting Non-Indicating Type, PID Control

- Bracket
  - TAS

- Terminal cover (sold separately)
  - RMA-COVER
    (72×72mm)
  - RLA-COVER
    (96×96mm)

- Mounting
  - TAS (48×48mm) Series
  - Other Series

※Mount the product on the panel, fasten bracket by pushing with tools as shown above.
1. Deviation indicator: It shows deviation of present temperature (PV) based on set temperature (SV) by LED.

<table>
<thead>
<tr>
<th>Input deviation indicator</th>
<th>Deviation indicator: ● (green), ▲/▼ (red)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input sensor OPEN</td>
<td>▲ + ● + ▼ indicators flash (every 0.5 sec)</td>
</tr>
<tr>
<td>Exceed max. input value</td>
<td>▲ indicator flashes (every 0.5 sec)</td>
</tr>
<tr>
<td>More than 10°C</td>
<td>▲ indicator turns ON</td>
</tr>
<tr>
<td>More than 2°C to less than or equal to 10°C</td>
<td>▲ + ● indicators turn ON</td>
</tr>
<tr>
<td>Less than or equal to ±2°C</td>
<td>● indicator turns ON</td>
</tr>
<tr>
<td>More than -2°C to less than or equal to -10°C</td>
<td>● + ▼ indicators turn ON</td>
</tr>
<tr>
<td>More than -10°C</td>
<td>▼ indicator turns ON</td>
</tr>
<tr>
<td>Less than min. input value</td>
<td>▼ indicator flashes (every 0.5 sec)</td>
</tr>
</tbody>
</table>

※ This is the same as Fahrenheit (°F).
※ 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 type:
Indicates sensor type of present value. Input sensor type or input range each product is shown in the below table.

<table>
<thead>
<tr>
<th>Input sensor</th>
<th>Range No.</th>
<th>Temperature range (°C)</th>
<th>Temperature range (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouple</td>
<td>1</td>
<td>0 to 100</td>
<td>32 to 212</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0 to 200</td>
<td>32 to 392</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0 to 400</td>
<td>32 to 752</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>0 to 600</td>
<td>32 to 1,112</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0 to 800</td>
<td>32 to 1,472</td>
</tr>
<tr>
<td>J (IC)</td>
<td>2</td>
<td>0 to 200</td>
<td>32 to 392</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0 to 300</td>
<td>32 to 572</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0 to 400</td>
<td>32 to 752</td>
</tr>
<tr>
<td>RTD</td>
<td>0</td>
<td>-50 to 100</td>
<td>-58 to 212</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0 to 100</td>
<td>32 to 212</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0 to 200</td>
<td>32 to 392</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0 to 400</td>
<td>32 to 752</td>
</tr>
</tbody>
</table>

※ Set temperature within input range each sensor.

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 drive output).

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

8. Terminal: Terminals for external connections. For detail, refer to Connections.
Functions

- SSR drive output

![SSR drive output diagram]

ON/OFF control

ON/OFF control function is for controlling temperature by comparing present temperature (PV) to setting temperature (SV). ON/OFF control is fixed on reverse operation (Heating).

Output turns on to supply power to heater when present temperature (PV) falls lower than setting temperature (SV) and the output turns off to turn off heater when present temperature (PV) is higher than setting temperature (SV).

※ Hysteresis is fixed 2°C during ON/OFF control.

- 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.

- 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.

- 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 returned to normal range.

<table>
<thead>
<tr>
<th>No</th>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>▲ + ● + ▼ indicators flash</td>
<td>If input sensor line is broken or sensor is not connected.</td>
</tr>
<tr>
<td>2</td>
<td>▲ indicator flashes</td>
<td>If measured sensor input is higher than temperature range.</td>
</tr>
<tr>
<td>3</td>
<td>▼ indicator flashes</td>
<td>If measured sensor input is lower than temperature range.</td>
</tr>
</tbody>
</table>