TK Series

High function/High performance PID control

Features

- Upgrade functions (★)
  - Convenient parameter setting (by DAQMaster)
    - Parameter mask
      Hides unnecessary and seldom used parameters
    - User parameter group
      Groups usually used parameters to set parameters fast and conveniently
  - Line-up Alarm output (heating & cooling OUT2, Relay output model), transmission output 2 (transmission output model)
  - Super high-speed sampling cycle (10 times faster compared to previous models)
    : 50ms sampling cycle and ±0.3% display-accuracy.
  - Improved visibility with wide display part and high luminance LED
  - High performance controlling with heating/cooling control and automatic/manual control modes.
  - Communication function supported: RS485 (Modbus RTU)
  - Allows parameter setting by USB port of PC.
    : Free download the integrated device management program (DAQMaster)
    ※ Communication converter, sold separately.
    : SCM-US (USB to Serial converter), SCM-38I (RS-232C to RS485 converter), SCM-US48I (USB to RS485 converter)
  - SSR drive output / Current output selectable.
  - SSRP output (standard/phase/cycle control selectable)
  - Heater burn-out alarm (CT input) (except TK4SP) ※ CT, sold separately: CSTC-E80LN, CSTC-E200LN
  - Multi SV setting function (Max. 4) - selectable via digital input terminals.
  - Mounting space saving with compact design.
    : downsized by approx. 38% (60mm) in depth compared to previous models.
    ※ Terminal cover, sold separately: R-A-COVER (except TK4N, TK4SP)
  - Multi input / Multi range

Manual

- Visit our website (www.autonics.com) to download user manual and communication manual.
- User manual describes for specifications and function, and communication manual describes for RS485 communication (Modbus RTU protocol) and parameter address map data.

Integrated device management program (DAQMaster)

- DAQMaster is a integrated device management program. It is available for parameter setting, monitoring, and user parameter group setting, parameter mask setting for only TK4 Series.
- Visit our website (www.autonics.com) to download user manual and integrated device management program.

< Computer specification for using software >

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>IBM PC compatible computer with Intel Pentium III or above</td>
</tr>
<tr>
<td>Operating system</td>
<td>Microsoft Windows 98/NT/XP/Vista/7</td>
</tr>
<tr>
<td>Memory</td>
<td>256MB or more</td>
</tr>
<tr>
<td>Hard disk</td>
<td>More than 1GB of free hard disk space</td>
</tr>
<tr>
<td>VGA</td>
<td>1024×768 or higher resolution display</td>
</tr>
<tr>
<td>Others</td>
<td>RS-232 serial port(9-pin), USB port</td>
</tr>
<tr>
<td>Size</td>
<td>Digit</td>
</tr>
<tr>
<td>------------</td>
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<tr>
<td>W</td>
<td>96</td>
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<td>H</td>
<td>48</td>
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<td>L</td>
<td>96</td>
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<td>S</td>
<td>48</td>
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<tr>
<td>SP</td>
<td>48</td>
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<tr>
<td>M</td>
<td>72</td>
</tr>
<tr>
<td>N</td>
<td>48</td>
</tr>
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<table>
<thead>
<tr>
<th>lier</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>TK</td>
<td>Temperature / Process Controller</td>
</tr>
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</table>

**Ordering information**

<table>
<thead>
<tr>
<th>TK</th>
<th>4</th>
<th>S</th>
<th>1</th>
<th>4</th>
<th>R</th>
<th>R</th>
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</tbody>
</table>

OUT2 control output

OUT1 control output

Power supply

Option input/output

※1: In case of TK4N, TK4SP, option output may be limited due to number of terminals.

※2: “S” represents SSR drive output support models which SSRP function (standard ON/OFF control, cycle control, phase control) are available. “C” represents selectable current and SSR drive output support models.

※3: Select “R” or “C” type in case of using heating & cooling control and “N” type in case of using standard control.

※4: (★) CT input of TK4N is available only for the standard model which has alarm output 1.

※5: (★) The heating & cooling model of TK4N-1 has only alarm output 2.

※6: Only for TK4S-D, OUT2 output terminal is used as DI-2 input terminal.

※7: Sockets for TK4SP (PG-11, PS-11) are sold separately.

※8: In case of TK4N, TK4SP, option output may be limited due to number of terminals.
## Specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>TK4N(*)</th>
<th>TK4SP</th>
<th>TK4S</th>
<th>TK4M</th>
<th>TK4W</th>
<th>TK4H</th>
<th>TK4L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>100-240VAC 50/60Hz</td>
<td></td>
<td></td>
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<tr>
<td>Allowable voltage range</td>
<td>90 to 110% of rated voltage</td>
<td></td>
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<tr>
<td>Power consumption</td>
<td>Max. 6VA</td>
<td>Max. 8VA</td>
<td></td>
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<tr>
<td>Display method</td>
<td>7 Segment (PV: red, SV: green), Other display part (green, yellow, red) LED method</td>
<td></td>
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<tr>
<td>Character size</td>
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<tr>
<td>Input type</td>
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<tr>
<td>RTD</td>
<td></td>
<td></td>
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<tr>
<td>Thermocouple</td>
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<tr>
<td>Analog</td>
<td>Voltage: 0-100mV, 0-5V, 0-10V (4 types)</td>
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<tr>
<td>Display accuracy</td>
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<tr>
<td>RTD</td>
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<tr>
<td>Thermocouple</td>
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<tr>
<td>Analog</td>
<td>Voltage: 0-100mV, 0-5V, 0-10V (4 types)</td>
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<tr>
<td>Control output</td>
<td>Relay OUT1, OUT2: 250VAC 1A</td>
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<td></td>
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<tr>
<td>Current</td>
<td>DC4-20mA or DC0-20mA selectable (DC4-20mA 20mA Max.)</td>
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<tr>
<td>Alarm output</td>
<td>Relay AL1, AL2: 250VAC 1A</td>
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<tr>
<td>Option output</td>
<td>Transmission DC4-20mA (load 5000 Max., Accuracy: ±0.3% F.S.)</td>
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<tr>
<td>Communication</td>
<td>RS485 communication output (Modbus RTU)</td>
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<tr>
<td>Option input</td>
<td>CT input 0.0-50.0A (primary heater current value measuring range)</td>
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<tr>
<td>Digital input</td>
<td></td>
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<tr>
<td>Control type</td>
<td>Heating, cooling ON/OFF, P, PI, PD, PID control</td>
<td></td>
<td></td>
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<tr>
<td>Hysteresis</td>
<td>±0.3% or ±1°C, select the higher one ±1digit</td>
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<tr>
<td>Proportional band (P)</td>
<td>0.1 to 999.9°C</td>
<td></td>
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<tr>
<td>Integral time (I)</td>
<td>0 to 9999 sec.</td>
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<tr>
<td>Derivative time (D)</td>
<td>0 to 9999 sec.</td>
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<tr>
<td>Control period (T)</td>
<td>Relay output, SSR drive output: 0.1 to 120.0 sec.</td>
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<tr>
<td>Manual reset value</td>
<td>0.0 to 100.0%</td>
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<td></td>
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<tr>
<td>Sampling period</td>
<td>50ms</td>
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<tr>
<td>Vibration</td>
<td>0.75mm amplitude at frequency of 5 to 55Hz (for 1min.) in each of X, Y, Z direction for 2 hours</td>
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<tr>
<td>Relay life cycle</td>
<td>Mechanical OUT1/2: Over 5,000,000 times, AL1/2: Over 20,000,000 times (TK4H/W/L: Over 5,000,000 times)</td>
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<tr>
<td>Electrical OUT1/2: Over 200,000 times, AL1/2: Over 100,000 times (TK4H/W/L: Over 200,000 times)</td>
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<tr>
<td>Insulation resistance</td>
<td>Min. 100MΩ (at 500VDC megger)</td>
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<tr>
<td>Noise resistance</td>
<td>±2KV R-phase, S-phase the square wave noise (pulse width: 1us) by the noise simulator</td>
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<tr>
<td>Memory retention</td>
<td>Approx. 10 years (when using non-volatile semiconductor memory type)</td>
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<tr>
<td>Environment</td>
<td>Ambient temperature -10 to 50°C, storage: -20 to 60°C</td>
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<tr>
<td>Ambient humidity</td>
<td>35 to 85%RH, storage: 35 to 85%RH</td>
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<tr>
<td>Protection</td>
<td>IP65 (Front panel)</td>
<td>TK4SP: IP50 (Front panel)</td>
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<tr>
<td>Insulation type</td>
<td>Double insulation or reinforced insulation</td>
<td></td>
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<tr>
<td>Approval</td>
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</tbody>
</table>

※1: At room temperature (23°C±5°C)
- Thermocouple K, J, T, N, E type, below -100°C / Thermocouple L, U, PLII type, RTD(★) Cu50Ω, DPt50Ω
  - (PV ±0.3% or ±2°C, select the higher one) ±1digit
- Thermocouple G, R, S type, below 200°C; (PV ±0.3% or ±3°C, select the higher one) ±1digit
- Thermocouple B type, below 400°C; There is no accuracy standards.
- Out of room temperature range
- RTD Cu50Ω, DPt50Ω: (PV ±0.5% or ±3°C, select the higher one) ±1digit
- Thermocouple R, S, B, C type: (PV ±0.5% or ±5°C, select the higher one) ±1digit
- Others, Below -100°C: Within ±5°C
- In case of TK4SP Series, ±1°C will be added to the degree standard.

※2: The weight is with packaging and the weight in parentheses is only unit weight.
High Accuracy Standard PID Control

Connections
※Please check the polarity when connecting temperature sensor or analog input.
※Standard model has shaded terminals only.
(☆) Operation mode of heating&cooling OUT2 relay output model is heating or cooling, OUT2 is available as alarm output 3. (except TK4N Series).
(☆) Operation mode of heating&cooling OUT2 current output model is heating or cooling, OUT2 is available as transmission output 2.

● TK4N

Line-up

● TK4S

● TK4SP

● TK4M
TK Series

Connections

※ Please check the polarity when connecting temperature sensor or analog input.
※ Standard model has shaded terminals only.
(★) Operation mode of heating&cooling OUT2 relay output model is heating or cooling, OUT2 is available as alarm output 3.
(except TK4N Series).
(★) Operation mode of heating&cooling OUT2 current output model is heating or cooling, OUT2 is available as transmission output 2.

- TK4H / TK4W / TK4L

![Connection Diagram](image)

Digital input is not electrically insulated from internal circuits, so it should be insulated when connecting other circuits. (Photocoupler, Relay, Independent switch)

- Dimensions

**TK4N** Line-up

![Dimension Diagram](image)

**TK4S**

![Dimension Diagram](image)

**TK4SP**

![Dimension Diagram](image)

**TK4W**

![Dimension Diagram](image)

(unit: mm)
High Accuracy Standard PID Control

- **Photo electric sensor**
- **Fiber optic sensor**
- **Door/Area sensor**
- **Proximity sensor**
- **Pressure sensor**
- **Rotary encoder**
- **Connector/ Socket**
- **Temp. controller**
- **SSR/ Power controller**
- **Counter**
- **Timer**
- **Panel meter**
- **Tacho/ Speed Pulse meter**
- **Display unit**
- **Sensor controller**
- **Switching mode power supply**
- **Stepper motor& Driver&Controller**
- **Graphic/ Logic panel**
- **Field network device**
- **Software**
- **Other**

## Dimensions

### TK4L

![Dimensions Diagram](image)

### Panel cut-out

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TK4N</td>
<td>Min. 55</td>
<td>Min. 37</td>
<td>45(\pm)2</td>
<td>22.2(\pm)1</td>
</tr>
<tr>
<td>TK4S</td>
<td>Min. 65</td>
<td>Min. 65</td>
<td>45(\pm)2</td>
<td>45(\pm)2</td>
</tr>
<tr>
<td>TK4P</td>
<td>Min. 65</td>
<td>Min. 65</td>
<td>45(\pm)2</td>
<td>45(\pm)2</td>
</tr>
<tr>
<td>TK4M</td>
<td>Min. 90</td>
<td>Min. 90</td>
<td>68(\pm)2</td>
<td>68(\pm)2</td>
</tr>
<tr>
<td>TK4H</td>
<td>Min. 90</td>
<td>Min. 115</td>
<td>92(\pm)2</td>
<td>92(\pm)2</td>
</tr>
<tr>
<td>TK4W</td>
<td>Min. 115</td>
<td>Min. 65</td>
<td>92(\pm)2</td>
<td>45(\pm)2</td>
</tr>
<tr>
<td>TK4L</td>
<td>Min. 115</td>
<td>Min. 115</td>
<td>92(\pm)2</td>
<td>92(\pm)2</td>
</tr>
</tbody>
</table>

((unit: mm)

### Bracket

#### TK4N Series

![Bracket Diagram](image)

#### TK4S, TK4SP Series

![Bracket Diagram](image)

#### TK4M/W/H/L Series

![Bracket Diagram](image)

### Terminal cover (sold separately)

#### TK4N Cover(48×24mm)

![Terminal Cover Diagram](image)

※TK4N COVER is accessory.

#### RSA Cover(48×48mm)

![Terminal Cover Diagram](image)

#### RMA Cover(72×72mm)

![Terminal Cover Diagram](image)

#### RHA Cover(48×96mm, 96×48mm)

![Terminal Cover Diagram](image)

#### RLA Cover(96×96mm)

![Terminal Cover Diagram](image)
TK Series

Product mounting

TK4N(48×24mm) Series

TK4S/SP(48×48mm) Series

Other Series

※ Insert the unit into a panel, fasten the bolt with a (+) driver.

※ Insert the unit into a panel, fasten the bracket by pushing with tools with a (-) driver.

Sold separately

Communication converter

SCM-38I
(RS232C to RS485 converter)

SCM-US48
(USB to RS485 converter)

SCM-US
(USB to Serial converter)

Current transformer (CT)

CSTC-E80LN

Max. load current: 80A (50/60Hz)
※ Max. load current for TK4 Series is 50A.
※ Current ratio: 1/1000
※ Wire wounded resistance: 31Ω±10%

CSTC-E200LN

Max. load current: 200A (50/60Hz)
※ Max. load current for TK4 Series is 50A.
※ Current ratio: 1/1000
※ Wire wounded resistance: 20Ω±10%

※ Do not supply primary current in case that CT output is open. High voltage will be generated in CT output.
※ The current for above two CTs is 50A same but inner hole sizes are different. Please use this for your environment.
High Accuracy Standard PID Control

Parts description

1. Measured value (PV) display part:
   - RUN mode: It displays currently measured value (PV).
   - Setting mode: It displays the parameter.

2. Set value (SV) display part:
   - RUN mode: It displays the set value (SV).
   - Setting mode: It displays the value of the parameter.

3. Unit (°C / °F / %) indicator: It displays the unit set at display unit [°C/°F/%] in parameter group 3.


5. Multi SV indicator: One of SV1 to 3 indicators will be ON in case of selecting multi SV function.

6. Auto tuning indicator: It flashes by 1 sec. when executing auto tuning.

7. Alarm output (AL1, AL2) indicator: It turns ON when the alarm output is ON.

8. Control output (OUT1, OUT2) indicator: It turns ON when the control output is ON.
   ※ During cycle/phase controlling in SSRP function model (TK4-4S-4S) when MV is over 5.0%, it turns ON.
   ※ To use current output, when MV is 0.0% in manual control, it turns OFF. Otherwise, it always turns ON. When MV is over 3.0% in auto control, it turns ON when MV is below 2.0%, it turns OFF.

9. AM key: It is used when switching auto control to manual control.
   ※ TK4N/SP do not have AM key. MODE key operates switching simultaneously.

10. MODE key: It is used when entering parameter setting group, returning to RUN mode, moving parameter, saving the set value.

11. or key: It is used when entering the set value changing mode and moving or changing up/down digit.

12. Digital input key: When pressing + keys for 3 sec. at the same time, it operates the function (RUN/STOP, alarm clear, auto tuning) set at digital input key [DI] in parameter group 5.

13. PC loader port: It is the PC loader port for serial communication to set parameter and monitoring by DAQMaster installed in PC. Use this for connecting SCM-US (USB to Serial converter, sold separately).

14. Input selection switch: Used when switching sensor (TC, RTD) input ↔ analog input (mV, V, mA), (only the previous model)

SV setting

You can set the temperature to control with ⊿, ⊿, ⊿ keys. Set range is within SV low-limit value [L - 5U] to SV high-limit value [H - 5U].

Ex) In case of changing set temperature from 210ºC to 250ºC

1 Press any key among ⊿, ⊿, ⊿ key in RUN mode, the right digit at SV display flashes and it enters to SV setting.

2 Press key to move the desired digit. (10⁰ → 10¹ → 10² → 10³ → 10⁵)

3 Press or key to move the desired number (1 → 5).

4 Press MODE key to save the value and it controls with this set value. (even though there is no key input for over 3 sec., it saves automatically.)
Parameter group

When PW is valid

Set the setting value

SV will be automatically saved after 5 sec.

※1: PASS parameter will be displayed only when password is set. It is not displayed when purchasing the unit since default password is set to 0000.

If password is not valid, the screen will be shifted to password code required window.

Press any key among [ ], [ ], [ ] to return to password entering window.

In case you forget password, contact Autonics A/S center after checking password code.

※2: TK4N/4S/4SP do not have [ ] key. [ ] key replaces [ ] key.

※3: It is displayed when setting user parameter group in the integrated device management program (DAQMaster).

※Press [ ] key over 2 sec in RUN mode to enter into setting mode.

※Press [ ] key for 1.5 sec while in setting mode to move to other parameter group.

※Press [ ] key over 3 sec while in setting mode to return to RUN mode.

※Press [ ] key at the last parameter of each parameter, it moves to that parameter name. You can move to other groups.

※If there is no additional key operation within 30 sec after entering into setting mode, it will be automatically returned to RUN mode and previous setting value will be remained.

(★) The shaded parameters( ) are displayed in common.

The others may not be displayed by the specifications of the product, other parameter’s setting, or parameter mask setting.

Heating proportional band[ H-P ]

Cooling proportional band[ C-P ]

Heating integral time[ H-I ]

Cooling integral time[ C-I ]

Heating derivative time[ H-D ]

Cooling derivative time[ C-D ]

Dead_overlap band[ dB ]

Manual reset[ r-ES ]

Heating hysteresis[ H-HYS ]

Heating OFF offset[ H-OFF ]

Cooling hysteresis[ C-HYS ]

Cooling OFF offset[ C-OFF ]

MV low-limit[ L-MV ]

MV high-limit[ H-MV ]

RAMP-up change rate[ R-AU ]

RAMP-down change rate[ R-AD ]

RAMP time unit[ r-unit ]
Parameter 1 group

- **Run mode**: 3 sec.
- **Password entry**: 2 sec.

**Output code when PW value is unequal in SV display**

- **Control Output RUN/STOP**
- **Multi SV number**
- **Heater current monitoring**
- **Alarm output1 low-limit set value**
- **Alarm output1 high-limit set value**
- **Alarm output2 low-limit set value**
- **Alarm output2 high-limit set value**
- **Alarm output3 low-limit set value**
- **Alarm output3 high-limit set value**
- **Setting value(SV)-0**
- **Setting value(SV)-1**
- **Setting value(SV)-2**
- **Setting value(SV)-3**

**Set range**: Deviation alarm (-F.S. to F.S.), Absolute alarm (within display range), Unit (°C/°F)

- **Absolute alarm**: Displayed only when alarm output 1’s operation mode [AL-1] is set to low-limit alarm for offset/absolute value or high/low-limit alarm/reverse alarm for offset value.
- **Set range**: Deviation alarm (-F.S. to F.S.), Absolute alarm (within display range), Unit (°C/°F)

**Password entry**

- **Parameter 1 group**
- **Parameter 2 group**
- **Parameter 3 group**

**Password entry**: 3 sec., 2 sec.

- **After entering setting mode, press key anytime for 3 sec. to return to Run mode.**
- **After entering setting mode, press key anytime for 1.5 sec. to go to the concerned group name.**
- **If you press the key after changing the setting value of the parameter the setting value will be stored.**
- **Shaded parameters are for standard-level users, the others are for high-level users.** (You can set the user level in parameter 5 group)
- **This parameter might not be displayed depending on other parameter settings.**

**Set range**: Deviation alarm (-F.S. to F.S.), Absolute alarm (within display range), Unit (°C/°F)

- **Set range**: Deviation alarm (-F.S. to F.S.), Absolute alarm (within display range), Unit (°C/°F)

- **Password entry**: 3 sec., 2 sec.

- **After entering setting mode, press key anytime for 3 sec. to return to Run mode.**
- **After entering setting mode, press key anytime for 1.5 sec. to go to the concerned group name.**
- **If you press the key after changing the setting value of the parameter the setting value will be stored.**
- **Shaded parameters are for standard-level users, the others are for high-level users.** (You can set the user level in parameter 5 group)
- **This parameter might not be displayed depending on other parameter settings.**

**Set range**: Deviation alarm (-F.S. to F.S.), Absolute alarm (within display range), Unit (°C/°F)

- **Set range**: Deviation alarm (-F.S. to F.S.), Absolute alarm (within display range), Unit (°C/°F)
High Accuracy Standard PID Control

Parameter 2 group

- **Parameter 2 group**: This parameter might not be displayed depending on other parameter settings.
- **Parameter 3 group**: This parameter might not be displayed depending on other parameter settings.
- **Parameter 4 group**: This parameter might not be displayed depending on other parameter settings.

**Press any key among **

- **Parameter 2 group**
- **Parameter 3 group**
- **Parameter 4 group**

**After entering setting mode, press ** key anytime for 3 sec. to return to Run mode.

**After entering setting mode, press ** key anytime for 1.5 sec. to go to the concerned group name.

**If you press the ** key after changing the setting value of the parameter the setting value will be stored.

**Shaded parameters are for standard-level users, the others are for high-level users.

(You can set the user level in parameter 5 group)

**This parameter might not be displayed depending on other parameter settings.

1. **Press any key among **

- **Parameter 2 group**
- **Parameter 3 group**
- **Parameter 4 group**

**After entering setting mode, press ** key anytime for 3 sec. to return to Run mode.

**After entering setting mode, press ** key anytime for 1.5 sec. to go to the concerned group name.

**If you press the ** key after changing the setting value of the parameter the setting value will be stored.

**Shaded parameters are for standard-level users, the others are for high-level users.

(You can set the user level in parameter 5 group)

**This parameter might not be displayed depending on other parameter settings.

- **Parameter 2 group**
- **Parameter 3 group**
- **Parameter 4 group**

**Displayed only when temperature control type[ C - H ] is set to PID control.
**Parameter 3 group**

- **MV low limit**
  - Set range: 000.0 to \((H\cdot\tilde{n}_L)-0.1\%\) (Standard control), -100.0 to 000.0\% (Heating & cooling control)
  - Displayed only when control type \((C\cdot\tilde{n}_C)\) is PID control, or control output operation \((O\cdot\tilde{n}_O)\) is heating & cooling \((H\cdot\tilde{n}_H)\).

- **MV high limit**
  - Set range: \((L\cdot\tilde{n}_L)+0.1\%) to 100.0\% (Standard control), 0.00 to 100.0\% (Heating & cooling control)

- **RAMP-up change rate**
  - Set range: 0000 to 9999\% (0.00 to 99.99)

- **RAMP-down change rate**
  - Set range: 0000 to 9999\% (0.00 to 99.99)

- **RAMP unit**
  - Set range: SEC / MIN / HOUR

- **Input type**
  - **Sensor temperature unit**
    - **Analog low-limit input value**
      - Set range: Min. Range to \((H\cdot\tilde{n}_L)-F.S.10\%\) digit
    - **Analog high-limit input value**
      - Set range: \((L\cdot\tilde{n}_L)+F.S.10\%\) digit to Max. Range
  - **Decimal point**
    - Set range: 0 / 0.0 / 0.00 / 0.000
  - **Low-limit scale value**
    - Set range: -1999 to 9999
  - **High-limit scale value**
    - Set range: -1999 to 9999

- **Display unit**
  - **Set range**
    - SEC / MIN / HOUR

**Notes:**
- Press any key among \(\#\) \(\#\) \(\#\): Press any key anytime for 3 sec. to return to Run mode.
- After entering setting mode, press \(\#\) \(\#\) \(\#\): key anytime for 1.5 sec. to go to the concerned group name.
- If you press the \(\#\) \(\#\) \(\#\): key after changing the setting value of the parameter the setting value will be stored.
- ◼️ ◼️ ◼️ This parameter might not be displayed depending on other parameter settings.
- Shaded parameters are for standard-level users, the others are for high-level users.
  (You can set the user level in parameter 5 group)
- After entering setting mode, press \(\#\) \(\#\) \(\#\): key anytime for 3 sec. to return to Run mode.
- After entering setting mode, press \(\#\) \(\#\) \(\#\): key anytime for 1.5 sec. to go to the concerned group name.
- If you press the \(\#\) \(\#\) \(\#\): key after changing the setting value of the parameter the setting value will be stored.
- Shaded parameters are for standard-level users, the others are for high-level users.
  (You can set the user level in parameter 5 group)
- **Display unit**
  - **Set range**
    - SEC / MIN / HOUR

**Notes:**
- Press any key among \(\#\) \(\#\) \(\#\): Press any key anytime for 3 sec. to return to Run mode.
- After entering setting mode, press \(\#\) \(\#\) \(\#\): key anytime for 1.5 sec. to go to the concerned group name.
- If you press the \(\#\) \(\#\) \(\#\): key after changing the setting value of the parameter the setting value will be stored.
- ◼️ ◼️ ◼️ This parameter might not be displayed depending on other parameter settings.
- Shaded parameters are for standard-level users, the others are for high-level users.
  (You can set the user level in parameter 5 group)
High Accuracy Standard PID Control

- **Input correction**
  - Range: -999 to 0999digit (-199.9 to 999.9)

- **Input digital filter**
  - Range: 000.1 to 120.0 sec.

- **SV low-limit**
  - Range: Low limit input \([-5U\) to \(H-5U\)] digit \(^\circ C / ^\circ F / \%\)

- **SV high-limit**
  - Range: \(L-5U\) +1digit to High limit input \([H-SC\)] \(^\circ C / ^\circ F / \%\)

Control output operation mode

- **Control type**
  - Standard type

Control output selection

- **OUT1 control output selection**
  - Current output

OUT1 SSR drive output type

- **OUT1 SSR drive output type**
  - SSR

OUT1 current output range

- **OUT1 current output range**
  - Set range: \(-200\) to \(1350\)

OUT2 control output selection

- **OUT2 control output selection**
  - Current output

OUT2 current output range

- **OUT2 current output range**
  - Set range: \(-200\) to \(1350\)

Heating control time

- **Heating control time**
  - Set range: 000.1 to 120.0 sec.

Cooling control time

- **Cooling control time**
  - Set range: 000.1 to 120.0 sec.

**OUT1, OUT2 output:**
- In case that OUT1,OUT2 output is relay output type, \(SC\) is not displayed.
- In case that OUT1,OUT2 output is current + SSR drive output type, when OUT1,OUT2 output is set to SSR.
  - Output method of \(a15r\), \(a25r\) is not displayed.
  - In case that OUT1, OUT2 output is SSR drive output model of SSRP function and OUT2 output is current + SSR drive output
    - \(a15r\), \(a25r\) are not displayed.
    - \(a15r\) can set to \(Stnd\), \(CYCL\), \(PHAS\)
    - When \(a25r\) is set to SSR, it is held in \(Stnd\) and parameter is not displayed.
Parameter 4 group

※1: Press any key among [ , , ] key anytime for 3 sec. to return to Run mode.
※After entering setting mode, press [ MODE ] key anytime for 1.5 sec. to go to the concerned group name.
※If you press the [ MODE ] key after changing the setting value of the parameter the setting value will be stored.
※Shaded parameters are for standard-level users, the others are for high-level users.
※This parameter might not be displayed depending on other parameter settings.

Parameter 4 group

Alarm output1 operation mode

Alarm output1 option

Alarm output1 hysteresis

Alarm 1 N.O./N.C.

Alarm 1 ON delay time

Alarm 1 OFF delay time

Alarm output2 operation mode

Alarm output2 option

Alarm output2 hysteresis

Alarm 2 N.O./N.C.

Alarm 2 ON delay time

Alarm 2 OFF delay time

※Displayed only if alarm output 1’s operating mode[AL-1] is not set to OFF.
※Displayed only if alarm output 1’s operating mode[AL-1] is set to high-limit, low-limit high/low-limit or reverse alarm for offset/absolute value.
※Displayed only if alarm output 1’s operating mode[AL-1] is not set to OFF.
※Set range: 0000 to 3600 sec.
※Set range: 0000 to 3600 sec.
※Set range: 0000 to 3600 sec.
※Displayed only if alarm output 2’s operating mode[AL-2] is not set to OFF.
※Set range: 001 to 100digit (000.1 to 100.0)
※Displayed only if alarm output 2’s operating mode[AL-2] is set to high-limit, low-limit high/low-limit or reverse alarm for offset/absolute value.
※Set range: 0000 to 3600 sec.
※Set range: 0000 to 3600 sec.

Parameter 5 group

Parameter 1 group

PAR4

PAR5

PAR1

AL-1

AL-2

AL-A

AL-B

AL-F

DV

NC

NO

ON

OFF

S

S

S

S

S

S

S

S

S

S

S
High Accuracy Standard PID Control

![Diagram of control system components and settings]

- **Alarm output3 operation mode**
  - OFF
  - AL-3
  - LBA

- **Alarm output3 option**
  - AL-3
  - LBA

- **Alarm output3 hysteresis**
  - 001

- **Alarm 3 N.O./N.C.**
  - NO
  - NC

- **Alarm 3 ON delay time**
  - 0000

- **Alarm 3 OFF delay time**
  - 0000

- **LBA time**
  - 0000

- **LBA band**
  - 0002

- **Analog trans. output 1 mode**
  - Pu
  - Su

- **Trans. output 1 low-limit value**
  - -200

- **Trans. output 1 high-limit value**
  - 1350

- **Analog trans. output 2 mode**
  - Pu
  - Su

- **Trans. output 2 low-limit value**
  - -200

- **Trans. output 2 high-limit value**
  - 1350

- **PV trans. output low-limit**
  - -200

- **PV trans. output high-limit**
  - 1350

※Displayed only with option output models that support alarm output 3.

※Displayed if alarm output 3's operating mode[AL-3] is not set to OFF.

※Displayed only if alarm output 3's operating mode[AL-3] is set to high-limit, low-limit high/low-limit or reverse alarm for offset/absolute value.

※Displayed only when alarm output 1 or 2 operation mode[AL-1, AL-2] is loop break alarm[LBA].

※Previous models

※Displayed only for transmission output model.
TK Series

Parameter 5 group

- Comm. address
- Comm. speed
- Comm. parity bit
- Comm. stop bit
- Comm. response waiting time
- Comm. write

- Multi SV
- Digital Input Key
- DI-1 input terminal function
- DI-2 input terminal function
- Manual control, initial MV
- Manual control, preset MV
- Sensor error, MV
- Control stop, MV

Set range: 01 to 99
Set range: 5 to 99ms
Set range: 000.0 to 100.0% (standard control), -100.0 to 100.0% (heating & cooling control)

※1: Press any key among [ ] [ ] [ ] anytime for 3 sec. to return to Run mode.
※2: After entering setting mode, press [MODE] key anytime for 3 sec. to return to Run mode.
※3: After entering setting mode, press [MODE] key anytime for 1.5 sec. to go to the concerned group name.
※4: If you press the [MODE] key after changing the setting value of the parameter the setting value will be stored.
※5: Shaded parameters are for standard-level users, the others are for high-level users.
※6: This parameter might not be displayed depending on other parameter settings.
※7: You can set the user level in parameter 5 group
※8: Displays all models except TK4N, TK4SP.
Parameter Initialization

Press [Mode] to initialize all parameters in memory to default value.
Set [Mode] parameter to [Mode] to initialize all parameters.
In case password function is on, it is required to enter valid password to initialize parameters.
Password is also initialized.

Set range: 0000 (Password function Off), 0002 to 9999

※ Displays all models except TK4N, TK4SP.
## Input type and range

<table>
<thead>
<tr>
<th>Input type</th>
<th>Decimal point</th>
<th>Display</th>
<th>Input range(°C)</th>
<th>Input range(°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermocouple</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K(CA)</td>
<td>1</td>
<td>κC H</td>
<td>-200 to 1350</td>
<td>-328 to 2463</td>
</tr>
<tr>
<td>0.1</td>
<td>κC L</td>
<td>-199.9 to 999.9</td>
<td>-328 to 999.9</td>
<td></td>
</tr>
<tr>
<td>J(IC)</td>
<td>1</td>
<td>jI H</td>
<td>-200 to 800</td>
<td>-328 to 1472</td>
</tr>
<tr>
<td>0.1</td>
<td>jI L</td>
<td>-199.9 to 800.0</td>
<td>-328 to 999.9</td>
<td></td>
</tr>
<tr>
<td>E(CR)</td>
<td>1</td>
<td>εC H</td>
<td>-200 to 800</td>
<td>-328 to 1472</td>
</tr>
<tr>
<td>0.1</td>
<td>εC L</td>
<td>-199.9 to 800.0</td>
<td>-328 to 999.9</td>
<td></td>
</tr>
<tr>
<td>T(CC)</td>
<td>1</td>
<td>τC H</td>
<td>-200 to 400</td>
<td>-328 to 752</td>
</tr>
<tr>
<td>0.1</td>
<td>τC L</td>
<td>-199.9 to 400.0</td>
<td>-328 to 752.0</td>
<td></td>
</tr>
<tr>
<td>B(PR)</td>
<td>1</td>
<td>b Pr</td>
<td>0 to 1800</td>
<td>32 to 3272</td>
</tr>
<tr>
<td>R(PR)</td>
<td>1</td>
<td>r Pr</td>
<td>0 to 1750</td>
<td>32 to 3182</td>
</tr>
<tr>
<td>S(PR)</td>
<td>1</td>
<td>s Pr</td>
<td>0 to 1750</td>
<td>32 to 3182</td>
</tr>
<tr>
<td>N(NN)</td>
<td>1</td>
<td>n nn</td>
<td>-200 to 1300</td>
<td>-328 to 2372</td>
</tr>
<tr>
<td>C(TT)</td>
<td>1</td>
<td>c tt</td>
<td>0 to 2300</td>
<td>32 to 4172</td>
</tr>
<tr>
<td>G(TT)</td>
<td>1</td>
<td>g tt</td>
<td>0 to 2300</td>
<td>32 to 4172</td>
</tr>
<tr>
<td>L(IC)</td>
<td>1</td>
<td>l I H</td>
<td>-200 to 900</td>
<td>-328 to 1652</td>
</tr>
<tr>
<td>0.1</td>
<td>l I L</td>
<td>-199.9 to 900.0</td>
<td>-328 to 999.9</td>
<td></td>
</tr>
<tr>
<td>U(CC)</td>
<td>1</td>
<td>u C H</td>
<td>-200 to 400</td>
<td>-328 to 752</td>
</tr>
<tr>
<td>0.1</td>
<td>u C L</td>
<td>-199.9 to 400.0</td>
<td>-328 to 752.0</td>
<td></td>
</tr>
<tr>
<td>Platinel II</td>
<td>1</td>
<td>Pl I</td>
<td>0 to 1390</td>
<td>32 to 2534</td>
</tr>
<tr>
<td><strong>RTD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cu 50Ω</td>
<td>0.1</td>
<td>Cu 5</td>
<td>-199.9 to 200.0</td>
<td>-328 to 392.0</td>
</tr>
<tr>
<td>Cu 100Ω</td>
<td>0.1</td>
<td>Cu 10</td>
<td>-199.9 to 200.0</td>
<td>-328 to 392.0</td>
</tr>
<tr>
<td>JPt 100Ω</td>
<td>1</td>
<td>JPt H</td>
<td>-200 to 650</td>
<td>-328 to 1202</td>
</tr>
<tr>
<td>0.1</td>
<td>JPt L</td>
<td>-199.9 to 650.0</td>
<td>-328 to 999.9</td>
<td></td>
</tr>
<tr>
<td>DPt 50Ω</td>
<td>0.1</td>
<td>DPt 5</td>
<td>-199.9 to 600.0</td>
<td>-328 to 999.9</td>
</tr>
<tr>
<td>DPt 100Ω</td>
<td>1</td>
<td>DPt H</td>
<td>-200 to 650</td>
<td>-328 to 1202</td>
</tr>
<tr>
<td>0.1</td>
<td>DPt L</td>
<td>-199.9 to 650.0</td>
<td>-328 to 999.9</td>
<td></td>
</tr>
<tr>
<td>Nickel 120Ω</td>
<td>1</td>
<td>Ni 2</td>
<td>-80 to 200</td>
<td>-112 to 392</td>
</tr>
</tbody>
</table>

-1999 to 9999 (Display point will be changed according to decimal point position)

※1: C(TT): Same as existing W5 (TT) type sensor
※2: G(TT): Same as existing W(TT) type sensor

## Front panel display when power is ON

When power is supplied, display will flash for 1 sec. Afterwards, model name and input sensor type will flash twice and then enter into RUN mode.

1. Whole display part
2. Model type display
3. Input sensor type display
4. Run mode
## Factory default

### SV setting [Su]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Su</td>
<td>0</td>
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</tbody>
</table>

### Password input parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory default</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td>0001</td>
</tr>
</tbody>
</table>

### Parameter 1 group [PAR1]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
</tr>
</thead>
<tbody>
<tr>
<td>r - s</td>
<td>rUn</td>
<td>RL 1H</td>
<td>1550</td>
<td>AL 3H</td>
<td>1550</td>
<td>Su - 3</td>
<td>0000</td>
</tr>
<tr>
<td>Su - m</td>
<td>Su - 0</td>
<td>RL 2L</td>
<td>1550</td>
<td>Su - 0</td>
<td>0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ct - R</td>
<td>00</td>
<td>RL 2H</td>
<td>1550</td>
<td>Su - 1</td>
<td>0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL 1L</td>
<td>1550</td>
<td>RL 3L</td>
<td>1550</td>
<td>Su - 2</td>
<td>0000</td>
<td></td>
<td></td>
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</tbody>
</table>

### Parameter 2 group [PAR2]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
</tr>
</thead>
<tbody>
<tr>
<td>H - P</td>
<td>0 100</td>
<td>H - d</td>
<td>0000</td>
<td>H - b</td>
<td>0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C - P</td>
<td>0 100</td>
<td>C - d</td>
<td>0000</td>
<td>C - d</td>
<td>0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H - 1</td>
<td>0000</td>
<td>eESTb</td>
<td>0500</td>
<td>L - Ru</td>
<td>0500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C - 1</td>
<td>0000</td>
<td>kHYS</td>
<td>002</td>
<td>H - Ru</td>
<td>0100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Parameter 3 group [PAR3]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
</tr>
</thead>
<tbody>
<tr>
<td>I n - b</td>
<td>LRAX</td>
<td>H - SC</td>
<td>1000</td>
<td>a - Ft</td>
<td>H - C (heating &amp; cooling)</td>
<td>a - 15F</td>
<td>H - C (heating &amp; cooling)</td>
</tr>
<tr>
<td>Un1  t</td>
<td>0℃</td>
<td>dUn t</td>
<td>0℃</td>
<td>C - ad</td>
<td>H - C (heating &amp; cooling)</td>
<td>a - 15F</td>
<td>H - C (heating &amp; cooling)</td>
</tr>
<tr>
<td>L - r G</td>
<td>0000</td>
<td>L - n - b</td>
<td>0000</td>
<td>L - r G</td>
<td>0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H - r G</td>
<td>1000</td>
<td>arRF L</td>
<td>0001</td>
<td>dte</td>
<td>00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L - S C</td>
<td>0000</td>
<td>h - S C</td>
<td>1350</td>
<td>aUt L</td>
<td>Curr</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Parameter 4 group [PAR4]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
</tr>
</thead>
<tbody>
<tr>
<td>RL - 1</td>
<td>dUC</td>
<td>R2n</td>
<td></td>
<td>LtAb</td>
<td>0000</td>
<td>bPS</td>
<td>96</td>
</tr>
<tr>
<td>RL h</td>
<td>RL - R</td>
<td>R2n</td>
<td></td>
<td>LtAb</td>
<td>002 (003n)</td>
<td>Pt s y</td>
<td>nonE</td>
</tr>
<tr>
<td>R hy</td>
<td>00</td>
<td>R2n</td>
<td></td>
<td>Ruo (Ro - R n)</td>
<td>P u</td>
<td>St p</td>
<td>2</td>
</tr>
<tr>
<td>R in</td>
<td>R3T</td>
<td>R3T</td>
<td></td>
<td>FSL (F5 - L - 1)</td>
<td>- 200</td>
<td>R - 5 y</td>
<td>20</td>
</tr>
<tr>
<td>R h n</td>
<td>0000</td>
<td>R3T</td>
<td></td>
<td>FSH (F5 - H - 1)</td>
<td>1350</td>
<td>Co n - 2</td>
<td>En R</td>
</tr>
<tr>
<td>R fo</td>
<td>0000</td>
<td>R3H</td>
<td></td>
<td>Ras</td>
<td>0000</td>
<td>Rd s</td>
<td>01</td>
</tr>
<tr>
<td>R L 2</td>
<td>03d</td>
<td>R3n</td>
<td></td>
<td>FSL 2</td>
<td>- 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RL 2e</td>
<td>RL - R</td>
<td>R3o n</td>
<td></td>
<td>FSH 2</td>
<td>1350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rh 2y</td>
<td>00</td>
<td>R3o F</td>
<td></td>
<td>Ad s</td>
<td>01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Parameter 5 group [PAR5]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
<th>Parameter</th>
<th>Factory default</th>
</tr>
</thead>
<tbody>
<tr>
<td>AbSu</td>
<td>1</td>
<td>Pr Ru</td>
<td>0000</td>
<td>LC5u</td>
<td>aFF</td>
<td>LCP5</td>
<td>aFF</td>
</tr>
<tr>
<td>d1 - l</td>
<td>St o P</td>
<td>E R u</td>
<td>0000</td>
<td>LCP1</td>
<td>aFF</td>
<td>P y d</td>
<td>0000</td>
</tr>
<tr>
<td>d1 - 1</td>
<td>aFF</td>
<td>St Ru</td>
<td>0000</td>
<td>LCP2</td>
<td>aFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d1 - 2</td>
<td>aFF</td>
<td>St RL</td>
<td>Cont</td>
<td>LCP3</td>
<td>aFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>l R u</td>
<td>AUTO</td>
<td>USE R</td>
<td>St End</td>
<td>LCP4</td>
<td>aFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

※ shaded parameters are only for the new model.
※1: This parameter is for previous models.
## Alarm

### Alarm operation

<table>
<thead>
<tr>
<th>Mode</th>
<th>Name</th>
<th>Alarm operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>—</td>
<td>—</td>
<td>No alarm output</td>
</tr>
<tr>
<td>dVCC</td>
<td>Deviation high-limit alarm</td>
<td>![Image]</td>
<td>If deviation between PV and SV as high-limit is higher than set value of deviation temperature, the alarm output will be ON.</td>
</tr>
<tr>
<td>JdC</td>
<td>Deviation low-limit alarm</td>
<td>![Image]</td>
<td>If deviation between PV and SV as low-limit is higher than set value of deviation temperature, the alarm output will be ON.</td>
</tr>
<tr>
<td>LdC</td>
<td>Deviation high/low-limit alarm</td>
<td>![Image]</td>
<td>If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be OFF.</td>
</tr>
<tr>
<td>PdC</td>
<td>Absolute value high limit alarm</td>
<td>![Image]</td>
<td>If PV is higher than the absolute value, the output will be ON.</td>
</tr>
<tr>
<td>JPd</td>
<td>Absolute value low limit alarm</td>
<td>![Image]</td>
<td>If PV is lower than the absolute value, the output will be ON.</td>
</tr>
</tbody>
</table>

LbR | Loop break Alarm | — | It will be ON when it detects loop break. |
SbR | Sensor break Alarm | — | It will be ON when it detects sensor disconnection. |
HbR | Heater break alarm | — | It will be ON when CT detects heater break. |

* H: Alarm output hysteresis [RHY]

### Alarm option

<table>
<thead>
<tr>
<th>Mode</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rl</td>
<td>R</td>
<td>Standard alarm If it is an alarm condition, alarm output is ON. If it is a clear alarm condition, alarm output is OFF.</td>
</tr>
<tr>
<td>Rl</td>
<td>b</td>
<td>Alarm latch If it is an alarm condition, alarm output is ON and maintains ON status.</td>
</tr>
<tr>
<td>Rl</td>
<td>c</td>
<td>Standby sequence1 If it is an alarm condition, it operates both alarm latch and standby sequence. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, standard alarm operates.</td>
</tr>
<tr>
<td>Rl</td>
<td>d</td>
<td>Alarm latch and standby sequence1 First alarm condition is ignored and from second alarm condition, standard alarm operates. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, alarm latch operates.</td>
</tr>
<tr>
<td>Rl</td>
<td>e</td>
<td>Standby sequence2 First alarm condition is ignored and from second alarm condition, standard alarm operates. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, standard alarm operates.</td>
</tr>
<tr>
<td>Rl</td>
<td>f</td>
<td>Alarm latch and standby sequence2 Basic operation is same as alarm latch and standby sequence1. It operates not only by power ON/OFF, but also alarm setting value, or alarm option changing. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, alarm latch operates.</td>
</tr>
</tbody>
</table>

*Condition of re-applied standby sequence for standby sequence 1, alarm latch and standby sequence 1: Power ON Condition of re-applied standby sequence for standby sequence 2, alarm latch and standby sequence 2: Power ON, changing set temperature, alarm temperature[Rl 1, Rl 2] or alarm operation[Rl 1, Rl 2], switching STOP mode to RUN mode.*
High Accuracy Standard PID Control

Functions

Parameter mask (★)
- This function is able to hide unnecessary parameters to user environment or less frequently used parameters in parameter setting group. You can set this in the integrated device management program (DAQMaster).
- Though masked parameters are not displayed in parameter setting group, the parameter setting values are applied. For more information, refer to the DAQMaster user manual.
- Visit our website (www.autonics.com) to download the DAQMaster program and the user manual.

Ex) The above is masking auto tuning [AT], cooling proportional band [C-P], cooling integral time [C-I], cooling derivative time [C-d] parameters in parameter 2 group.

User parameter group [PRr U] setting (★)
- This function is able to set the frequently used parameters to the user parameter group. You can quickly and easily set parameter settings.
- User parameter group can have up to 30 parameters in the integrated device management program (DAQMaster).

Ex) The above is setting user parameter group in the DAQMaster with alarm output 1 low-limit value [AL1.L], alarm output 1 high-limit value [AL1.H], SV-0 set value [SV-0] parameter of parameter 1 group, heating hysteresis [H-HYS], cooling hysteresis [C-HYS] parameters of parameter 2 group, input correction [IN-B] parameter of parameter 3 group, alarm output 1 hysteresis [A1.HY], alarm output 2 hysteresis [A2.HY] parameters of parameter 4 group.

Auto tuning [AT]
In PID control, auto-tuning determines the control subject’s thermal characteristics and thermal response rate, and then determines the necessary PID time constant. Application of the PID time constant realizes fast response and high precision temperature control.
- Auto-tuning automatically stores PID time constants upon termination. These PID time constants can then be modified by the user to suit their usage environment.
- When auto-tuning is in progress, the AT indicator located on the front of the controller flashes in 1 second intervals. When auto-tuning finishes, the AT indicator automatically goes off and the auto-tuning parameter will return to OFF.

Control output operation mode [OFb]
- Control output modes for general temperature control include heating, cooling, and heating and cooling.
- Heating control and cooling control are mutually opposing operations with inverse outputs.
- The PID time constant varies based on the controlled objects during PID control.
Heating control [HEAT]
Heating control mode: the output will be provided in order to supply power to the load (heater) if PV (Present Value) falls below SV (Setting Value).

Cooling control [COOL]
Cooling control mode: the output will be provided in order to supply power to the load (cooler) if PV (Present Value) rises above SV (Setting Value).

Heating and cooling control [H-SC]
Heating and cooling control mode: heating and cooling with a single temperature controller when it is difficult to control subject temperature with only heating or cooling.

Heating and cooling control mode controls the object using different PID time constants for each heating and cooling.

It is also possible to set heating and cooling control in both PID control or ON/OFF control mode.

Heating/cooling output can be selected among Relay output, SSR drive output and current output depending on model types chosen according to your application environment.

(Note that only standard SSR control is available for SSR drive output in OUT2.)

- OUT1: Selects OUT1 control output.
- OUT2: Selects OUT2 control output.

Control output (OUT1/OUT2) selection

- In case of selecting the Models with current control output, both current and SSR drive outputs are available. You can therefore choose the right output type depending on application environments.
- OUT1: Selects OUT1 control output.
- OUT2: Selects OUT2 control output.

For more information, refer to the user manual.

Proper usage

Simple "Error" diagnosis

- When the load (Heater etc) is not operated

Please check operation of the OUT indicator located in front panel of the unit.

If the OUT indicator does not operate, please check the parameter of all programmed mode.

If OUT indicator is operating, please check the output(Relay, SSR drive voltage) after separating output line from the unit.

- When it displays OPEN during operation

This is a warning that external sensor is open.

Please turn off the power and check the wire state of the sensor. If sensor is not open disconnect sensor line from the unit and short the input +, - terminal. Turn on the power of the unit and check the controller displays room temperature.

If this unit cannot display room temperature, this unit is broken. Please remove this unit and contact our service center. (When the input mode is thermocouple, it is available to display room temperature.)

- In case of indicating "Error" in display

This Error message is indicated in case of damaging inner chip program data by outer strong noise.

In this case, please send the unit to our after service center after removing the unit from system.

Noise protection is designed in this unit, but it does not stand up strong noise continuously. If bigger noise than specified(Max. 2kV) flows in the unit, it can be damaged.

Caution for using

- Please use separated line from high voltage line or power line in order to avoid inductive noise.
- Please install power switch or circuit-breaker in order to cut power supply off.
- The switch or circuit-breaker should be installed near by users.
- This unit is designed for temperature controlling only. Do not apply this unit as a voltage meter or a current meter.
- 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 temperature difference if the resistance of line is different.
- In case of making power line and input signal line close, 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, big capacitive SCR controller)
- Installation environment
  - It shall be used indoor.
  - Altitude Max. 2000m.
  - Pollution Degree 2
  - Installation Category II.