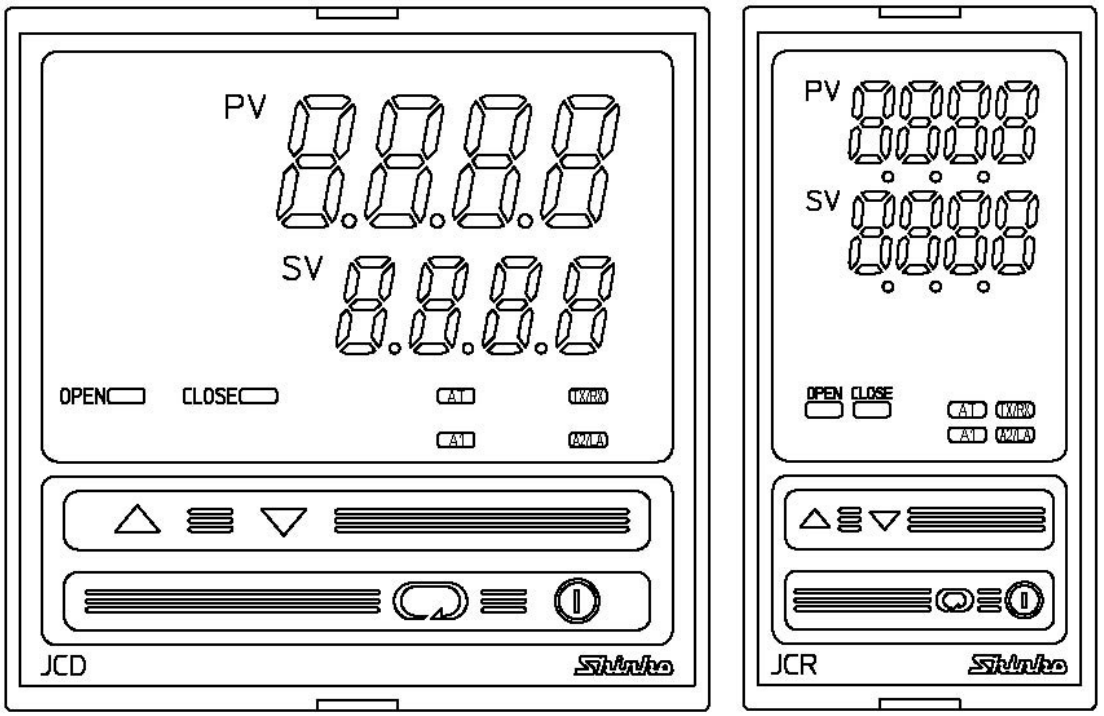
**ON/OFF SERVO**

**DIGITAL INDICATING CONTROLLER**

# JCD-35A, JCR-35A

**INSTRUCTION MANUAL**




Shinko

# Preface

Thank you for the purchase of our microcomputer based ON/OFF servo digital indicating controller JCD-35A or JCR-35A. This manual contains instructions for the mounting, functions, operations and notes when operating the JCD-35A and JCR-35A. To prevent accidents arising from the misuse of this controller, please ensure the operator receives this manual.

### Notes

- This instrument should be used in accordance with the specifications described in the manual. If it is not used according to the specifications, it may malfunction or cause fire.
- Be sure to follow the warnings, cautions and notices. If they are not observed, serious injury or malfunction may occur.
- Specifications, external appearance of the JCD-35A and JCR-35A and the contents of this instruction manual are subject to change without notice.
- Care has been taken to ensure that the contents of this instruction manual are correct, but if there are any doubts, mistakes or questions, please inform our sales department.
- This instrument is designed to be installed within a control panel. If it is not, measures must be taken to ensure that the operator cannot touch power terminals or other high voltage sections.
- Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
- Shinko Technos CO., LTD. is not liable for any damages or secondary damages incurred as a result of using this product, including any indirect damages.

### SAFETY PRECAUTIONS (Be sure to read these precautions before using our products.)

The safety precautions are classified into categories: “Warning” and “Caution”.
Depending on circumstances, procedures indicated by ⚠ Caution may cause serious results, so be sure to follow the directions for usage.

**⚠ Warning** Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

**⚠ Caution** Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

## ⚠ Warning

- To prevent an electric shock or fire, only Shinko or other qualified service personnel may handle the inner assembly.
- To prevent an electric shock, fire or damage to the instrument, parts replacement may only be undertaken by Shinko or other qualified service personnel.

## ⚠ Safety precautions

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after consulting purpose of use with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protection equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel. Also proper periodic maintenance is required.
- This instrument must be used under the conditions and environment described in this manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

**Caution with respect to Export Trade Control Ordinance**

To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument.

In the case of resale, ensure that this instrument is not illegally exported.

# 1. Installation precautions

## ⚠ Caution

**This instrument is intended to be used under the following environmental conditions (IEC61010-1): Overvoltage category Ⅱ, Pollution degree 2**
**Ensure the mounting location corresponds to the following conditions:**

- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 50℃ (32 to 122℉) that does not change rapidly, and without icing
- An ambient non-condensing humidity of 35 to 85%RH
- No large capacity electromagnetic switches or cables through which large current is flowing.
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the unit
- When installing this unit through a control panel, take note that ambient temperature of this unit as well as the control panel must not exceed 50℃. Otherwise the life of electronic components (especially electrolytic capacitors) may be shortened.

**Note: Avoid setting this instrument directly on or near flammable material even though the case of this instrument is made of flame-resistant resin.**

# 2. Wiring precautions

## ⚠ Caution

- Use the solderless terminal with an insulation sleeve in which an M3 screw fits when wiring the JCD-35A or JCR-35A.
- The terminal block of this instrument is designed to be wired from the left side. The lead wire must be inserted from the left side of the terminal, and fastened with the terminal screw.
- Tighten the terminal screw within the specified torque. If excessive force is applied to the screw when tightening, the screw or case may be damaged.
- Do not apply a commercial power source to the sensor connected to the input terminal nor allow the power source to come into contact with the sensor, as the input circuit may be burnt out.
- This controller has no built-in power switch, circuit breaker or fuse. It is necessary to install them near the controller.
  (Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A)
- For a 24V AC/DC of power source, do not confuse polarity when using a direct current (DC).

# 3. Running and maintenance precautions

## ⚠ Caution

- It is recommended that PID auto-tuning be performed on the trial run.
- Do not touch live terminals. This may cause electric shock or problems in operation.
- Turn the power supply OFF before retightening the terminal or cleaning. Working or touching the terminal with the power switched ON may result in severe injury or death due to Electric Shock.
- Use a soft, dry cloth when cleaning the instrument. (Alcohol based substances may tarnish or deface the unit.)
- As the display section is vulnerable, do not strike or scratch it with a hard object or press hard on it.

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**Characters used in this manual**

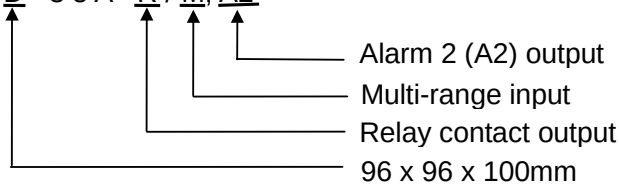
| Indication |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number, ℃/℉ | -1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | ℃ | ℉ |
| Indication |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Alphabet | A | B | C | D | E | F | G | H | I | J | K | L | M |
| Indication |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Alphabet | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |

# 1. Model

## 1.1 Model

Series name, Control output, input and option code, etc are entered where underlined.

(e.g.) J C D - 3 5 A - R / M, A2




**Standard specifications**

| J C ☐– 3 5 A– ☐/ ☐, ☐, ☐ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Series name | D | | | | | | | JCD-35A: W96 x H96 x D100mm |
| | R | | | | | | | JCR-35A: W48 x H96 x D100mm |
| Control action | | 5 | | | | | | ON/OFF servo |
| Alarm 1 (A1) | | | A | | | | | Alarm type can be selected by keypad. *1 |
| Control output | | | | R | | | | Relay contact 1a x 2 (Open/Closed) |
| Input | | | | | M | | | Multi-range *2 |
| Power supply voltage | | | | | | | | 100 to 240V AC (standard) |
| | | | | | | 1 | | 24V AC/DC *3 |
| Option | | | | | | | A2 | Alarm 2 (A2) *4 |
| | | | | | | | LA | Loop break alarm *4 |
| | | | | | | | BK | Color: Black |
| | | | | | | | TC | Terminal cover |

*1: 10 types of alarm (including No alarm action) and Energized/Deenergized can be selected by keypad.

*2: Input types (10 thermocouple, 2 RTD, 2 DC current and 4 DC voltage types) can be selected by keypad.

*3: 100 to 240V AC is standard specification for the supply voltage. However, when ordering 24V AC/DC, enter “1” after the input code.

*4: When A2 and LA output are added together, they utilize common output terminals.

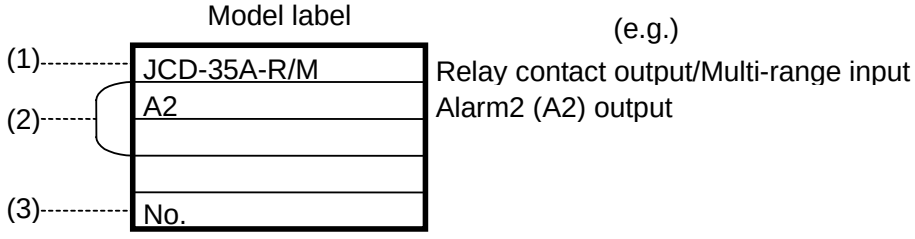
### 1.2 Rated input

| Input type | Input range | | Resolution |
|---|---|---|---|
| K | –200 to 1370 ℃ | –320 to 2500 ℉ | 1℃(℉) |
| | –199.9 to 400.0 ℃ | –199.9 to 750.0 ℉ | 0.1℃(℉) |
| J | –200 to 1000 ℃ | –320 to 1800 ℉ | 1℃(℉) |
| R | 0 to 1760 ℃ | 0 to 3200 ℉ | 1℃(℉) |
| S | 0 to 1760 ℃ | 0 to 3200 ℉ | 1℃(℉) |
| B | 0 to 1820 ℃ | 0 to 3300 ℉ | 1℃(℉) |
| E | –200 to 800 ℃ | –320 to 1500 ℉ | 1℃(℉) |
| T | –199.9 to 400.0 ℃ | –199.9 to 750.0 ℉ | 0.1℃(℉) |
| N | –200 to 1300 ℃ | –320 to 2300 ℉ | 1℃(℉) |
| PL-Ⅱ | 0 to 1390 ℃ | 0 to 2500 ℉ | 1℃(℉) |
| C(W/Re5-26) | 0 to 2315 ℃ | 0 to 4200 ℉ | 1℃(℉) |
| Pt100 | –199.9 to 850.0 ℃ | –199.9 to 999.9 ℉ | 0.1℃(℉) |
| | –200 to 850 ℃ | –300 to 1500 ℉ | 1℃(℉) |
| JPt100 | –199.9 to 500.0 ℃ | –199.9 to 900.0 ℉ | 0.1℃(℉) |
| | –200 to 500 ℃ | –300 to 900 ℉ | 1℃(℉) |
| 4 to 20mA DC | –1999 to 9999 *1, *2 | | 1 |
| 0 to 20mA DC | –1999 to 9999 *1, *2 | | 1 |
| 0 to 1V DC | –1999 to 9999 *1 | | 1 |
| 0 to 5V DC | –1999 to 9999 *1 | | 1 |
| 1 to 5V DC | –1999 to 9999 *1 | | 1 |
| 0 to 10V DC | –1999 to 9999 *1 | | 1 |

*1: For DC input, input range and decimal point place can be changed.
*2: Connect 50Ω shunt resistor (sold separately) between input terminals.

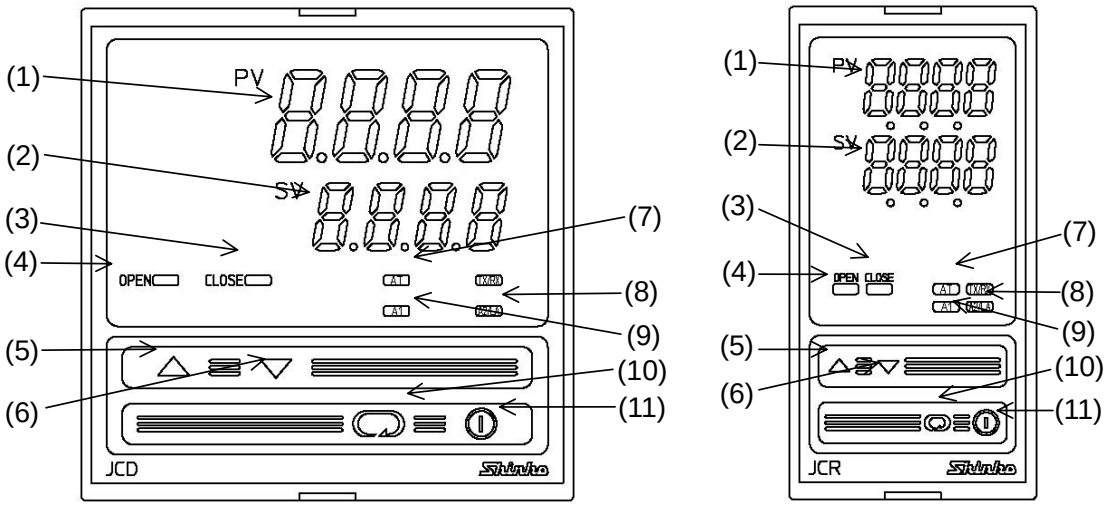
### 1.3 How to read the model label

Model labels are attached to the case and the inner assembly.
**For 24V AC/DC supply voltage, "1" is entered before the option code**.




(1): Model, (2): Option, (3): Serial number

# 2. Name and functions of the sections




(Fig. 2-1)

(1) **PV display**
Indicates the PV (process variable) and setting characters (during setting mode) with a red LED.

(2) **SV display**
Indicates the SV (desired value), Open/Closed output MV (manipulated variable) or set values (during setting mode) with a green LED.

(3) **CLOSED indicator**
When CLOSED output is ON, the yellow LED lights.

(4) **OPEN indicator**
When OPEN output is ON, the green LED lights.

(5) **Increase key** (△)
Increases the numeric value.

(6) **Decrease key** (▽)
Decreases the numeric value.

(7) **AT indicator**
When Auto-tuning or Auto-reset is active, the yellow LED flashes.

(8) **A2/LA indicator**
When A2 output or LA output is ON, the red LED lights.

(9) **A1 indicator**
When A1 output is ON, a red LED lights.

(10) **Mode key** (◎)
Switches the setting mode, and registers the set (or selected) value.
[By pressing the Mode key, set (or selected) value is registered.]

(11) **OUT/OFF key** ( ⓘ )

- When OUT/OFF function is selected during the OUT/OFF key function selection mode, control output can be turned ON or OFF. By pressing OUT/OFF key for approx. 1 second from any mode, control output OFF function initiates.
  Once the control output OFF function is enabled, the function cannot be released even if the power to the instrument is turned OFF and ON again.
  Control output OFF function keeps working.
  To cancel the function, press the OUT/OFF key again for approx. 1 second.

• When Auto/Manual control function is selected during the OUT/OFF key function selection mode, automatic control starts when the power to the controller is turned on. If the OUT/OFF key is pressed in this status, manual control starts.
If the OUT/OFF key is pressed again during manual control, the control reverts to automatic one. However, Auto/Manual function can be switched only in the PV/SV display mode.

## ⚠ Notice

When setting the specifications and functions of this controller, connect terminals 2 and 3 for power supply first, then set them referring to “5. Setup” before performing “3. Mounting to the control panel” and “4. Wiring”.
When changing input specifications, be sure to change them at this stage.

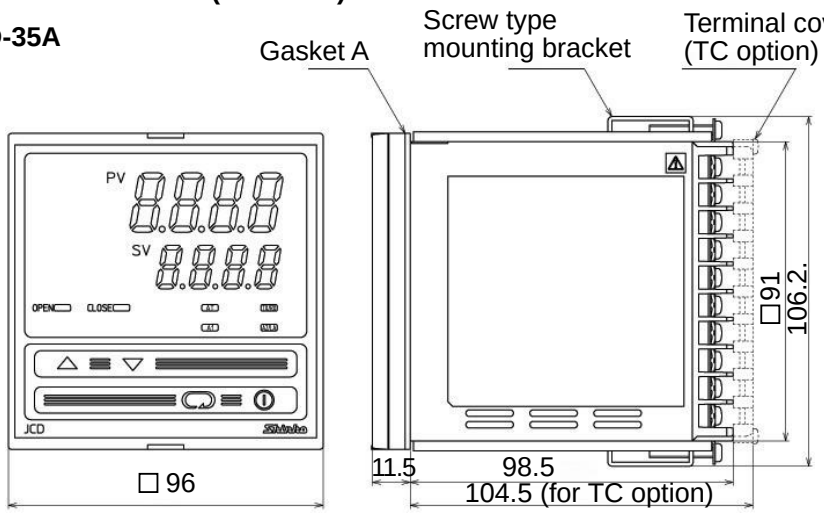
# 3. Mounting to the control panel

### 3.1 Site selection

This instrument is intended to be used under the following conditions (IEC61010-1):
Overvoltage category Ⅱ, Pollution degree 2
Ensure the mounting location corresponds to the following conditions:
(1) A minimum of dust, and an absence of corrosive gases
(2) No flammable, explosive gases
(3) No mechanical vibrations or shocks
(4) No exposure to direct sunlight, an ambient temperature of 0 to 50℃ (32 to 122℉) that does not change rapidly, and without icing
(5) An ambient non-condensing humidity of 35 to 85%RH
(6) No large capacity electromagnetic switches or cables through which large current is flowing
(7) No water, oil or chemicals or where the vapors of these substances can come into direct contact with the unit
(8) When installing this unit through a control panel, take note that ambient temperature of this unit as well as control panel must not exceed 50℃. Otherwise the life of electronic components (especially electrolytic capacitors) may be shortened.

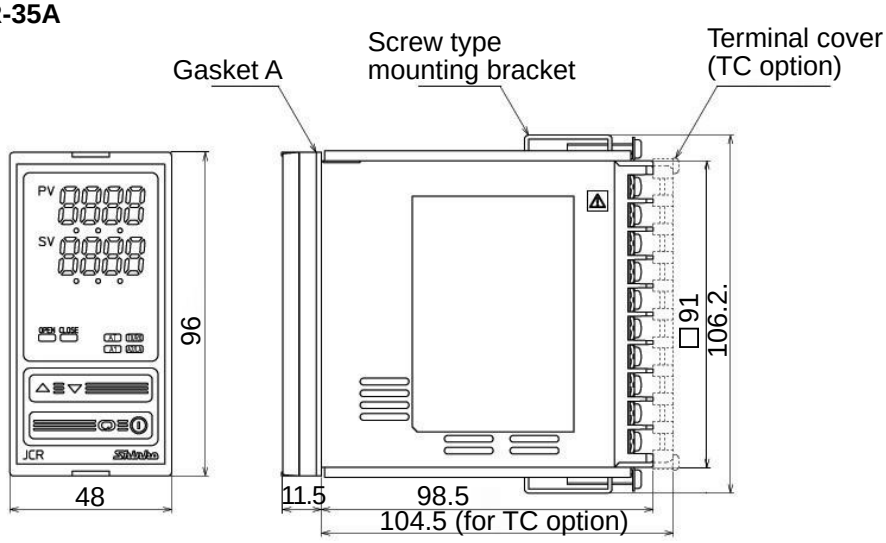
### 3.2 External dimensions (Unit: mm)

• **JCD-35A**




(Fig. 3.2-1)

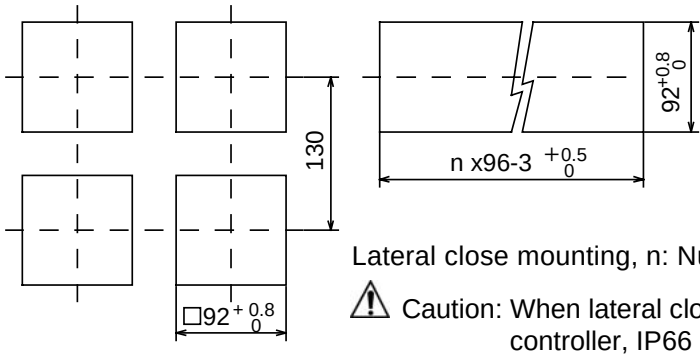
• **JCR-35A**




(Fig. 3.2-2)

**3.3 Panel cutout (Unit: mm)**

• **JCD-35A**

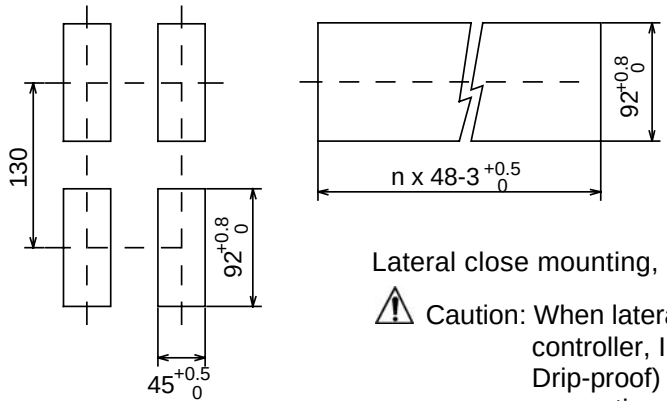



Lateral close mounting, n: Number of units mounted

⚠ Caution: When lateral close mounting is used for the controller, IP66 specification (Dust-proof/ Drip-proof) may be compromised, and all warranties will be invalidated.

(Fig. 3.3-1)

• **JCR-35A**




Lateral close mounting, n: Number of units mounted

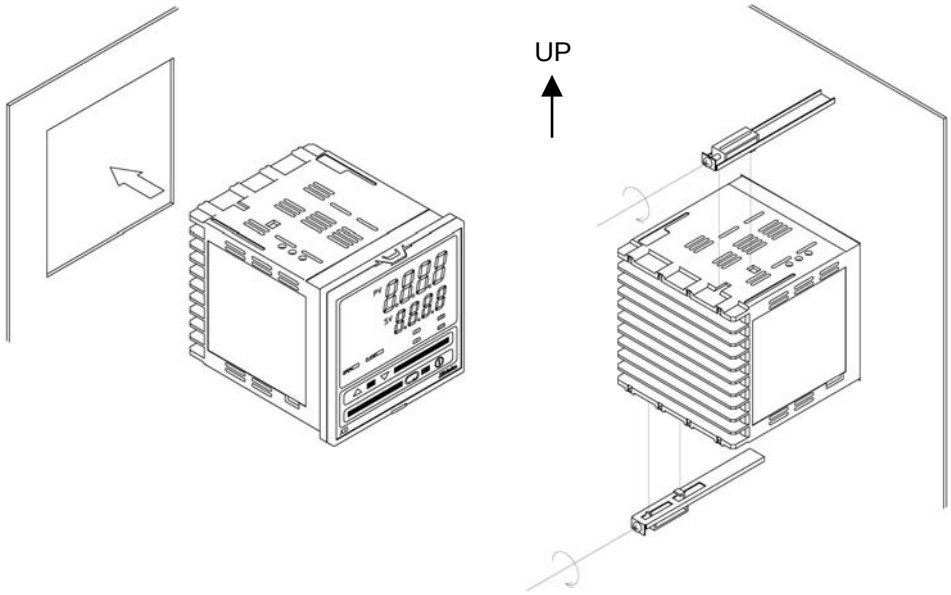
⚠ Caution: When lateral close mounting is used for the controller, IP66 specification (Dust-proof/ Drip-proof) may be compromised, and all warranties will be invalidated.

(Fig. 3.3-2)

### 3.4 Mounting (for the JCD-35A, JCR-35A)

> **⚠ Warning**
>
> As the case is made of resin, do not use excessive force while screwing in the mounting bracket, or the case could be damaged.
> The torque is approximately 0.12N•m.

Mount the controller vertically to the flat, rigid panel to ensure it adheres to the Dust-proof/Drip-proof specification (IP66).
Mountable panel thickness: 1 to 15mm
Insert this unit from the front side of the panel.
Attach the mounting brackets by the holes at the top and bottom of the case and secure the controller in place with the screws.




(Fig. 3.4-1)

# 4. Wiring

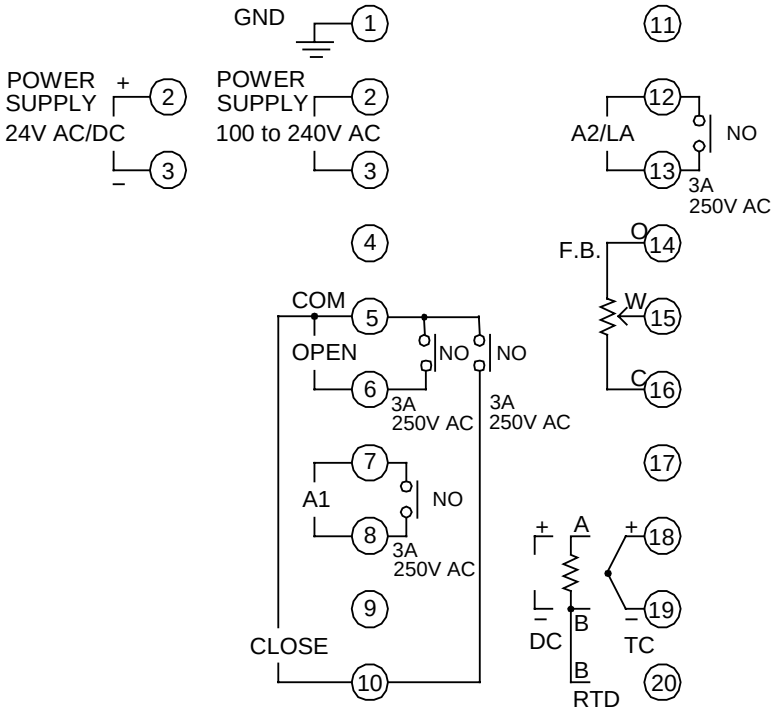
## ⚠ Warning

**Turn the power supply to the instrument off before wiring or checking.**

**Working or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.**

**Moreover, the instrument must be grounded before the power supply to the instrument is turned on.**

### 4.1 Terminal arrangement




- OPEN : OPEN output
- A1 : Alarm 1 output
- CLOSE: CLOSED output
- A2 : Alarm 2 output
- LA : Loop break alarm output
- F.B. : Feed back resistance
- TC : Thermocouple input
- RTD : Resistance temperature detector input
- DC : DC voltage, DC current input

(Fig. 4.1-1)

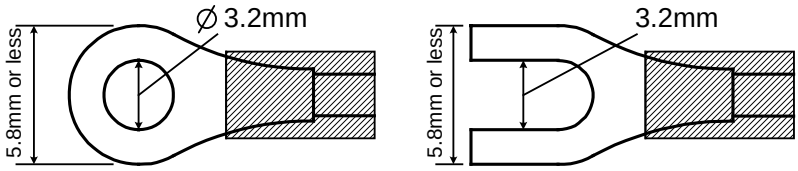
## ⚠ Caution

- The terminal blocks of the JCD-35A and JCR-35A are designed to be wired from the left side.
  The lead wire must be inserted from the left side of the terminal, and fastened with the terminal screw.
- When A2 option and LA option are added together, they utilize common output terminals.

### ■ Lead wire solderless terminal

Use a solderless terminal with an insulation sleeve in which an M3 screw fits as shown below.
The torque is approximately 0.6N・m to 1.0N・m.

| Solderless terminal | Manufacturer | Model | Tightening torque |
|---|---|---|---|
| Y type | Nichifu Terminal Industries CO.,LTD. | TMEV1.25Y-3 | 0.6N•m, Max. 1.0N•m |
| | Japan Solderless Terminal MFG CO.,LTD. | VD1.25-B3A | |
| Round type | Nichifu Terminal Industries CO.,LTD. | TMEV1.25-3 | |
| | Japan Solderless Terminal MFG CO.,LTD. | V1.25-3 | |



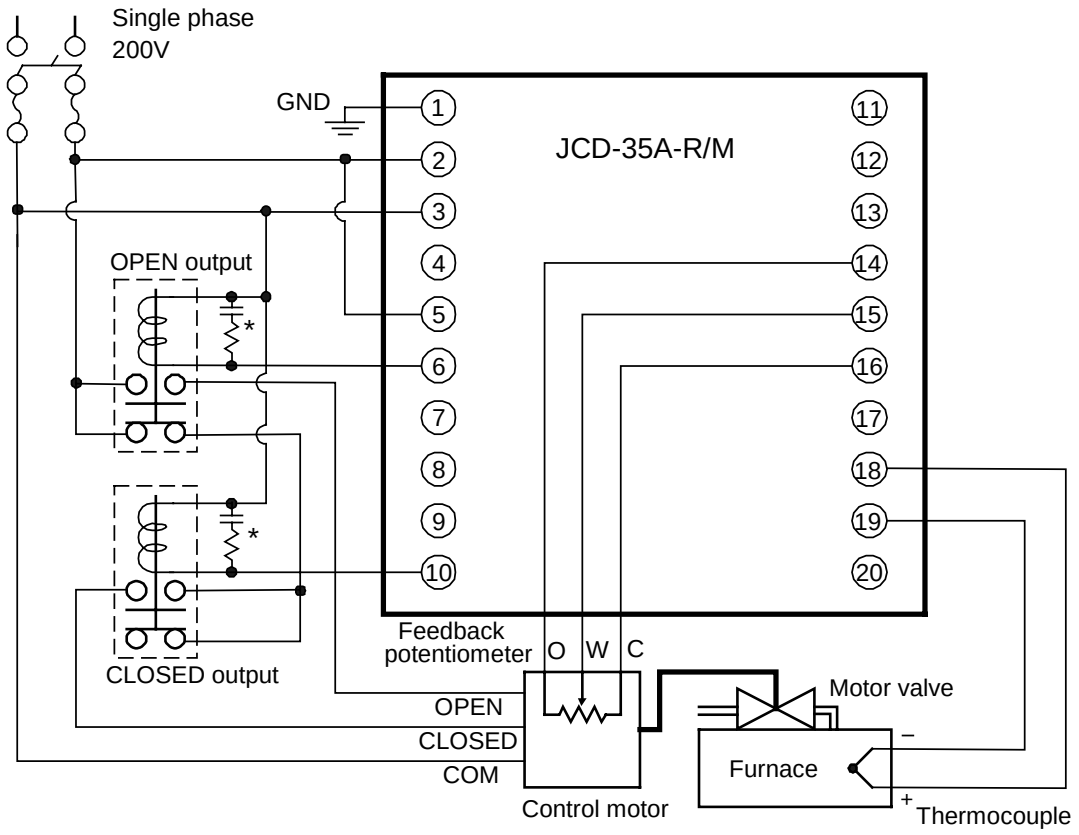

(Fig. 4.1-2)

### 4.2 Wiring example

## ⚠ Caution

- Use a thermocouple and compensating lead wire according to the sensor input specifications of this controller.
- Use a 3-wire RTD system according to the sensor input specifications of this controller.
- This controller has no built-in power switch or fuse. It is necessary to install them in the circuit near the controller externally.
  (Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A)
- For a 24V AC/DC of power source, do not confuse polarity when using a direct current (DC).
- When using a relay contact output type, use a relay according to the capacity of the load to protect the built-in relay contact.
- When wiring, keep input wires (thermocouple, RTD, etc.) away from AC sources or load wires to avoid external interference.
- Use a thick wire (1.25 to 2.0mm$^2$) for grounding.

**[JCD-35A-R/M]**




(Fig. 4.2-2)

* To prevent the unit from harmful effects of unexpected high level noise, it is recommended that a surge absorber be installed between the electromagnetic switch coils.

• **For a 24V AC/DC of power source, do not confuse polarity when using a direct current (DC)**.

# 5. Setup

Setup should occur before using this controller, to set the Input type, Alarm action, Control action, etc. according to the users' conditions.

Default values: Input (K, -200 to1370℃), Reverse (Heating) control action,
Alarm 1 (No alarm action), etc.
(Refer to default values in Chapter "11. Character table".)

When changing default values, follow the procedures in Section "5.1 operation flowchart" and each setting mode from Sections 5.2 to 5.9.

When installing the unit for the first time, it is necessary to adjust feedback resistance of the control motor. Adjust the resistance during the Feedback resistance adjustment mode.

After power is turned on, the unit proceeds to warm-up status.

For the thermocouple and RTD input, the sensor input characters and temperature unit are indicated on the PV display, and the input range high limit value is indicated on the SV display for approximately 3 seconds.

For DC input, the sensor input characters are indicated on the PV display and the scaling high limit value is indicated on the SV display for approximately 3 seconds.

During this time, all outputs and the LED indicators are in OFF status.

After that, the unit proceeds to the PV/SV display mode, the PV display indicates PV (process variable) and the SV display indicates SV (desired value).

(Table 5-1)

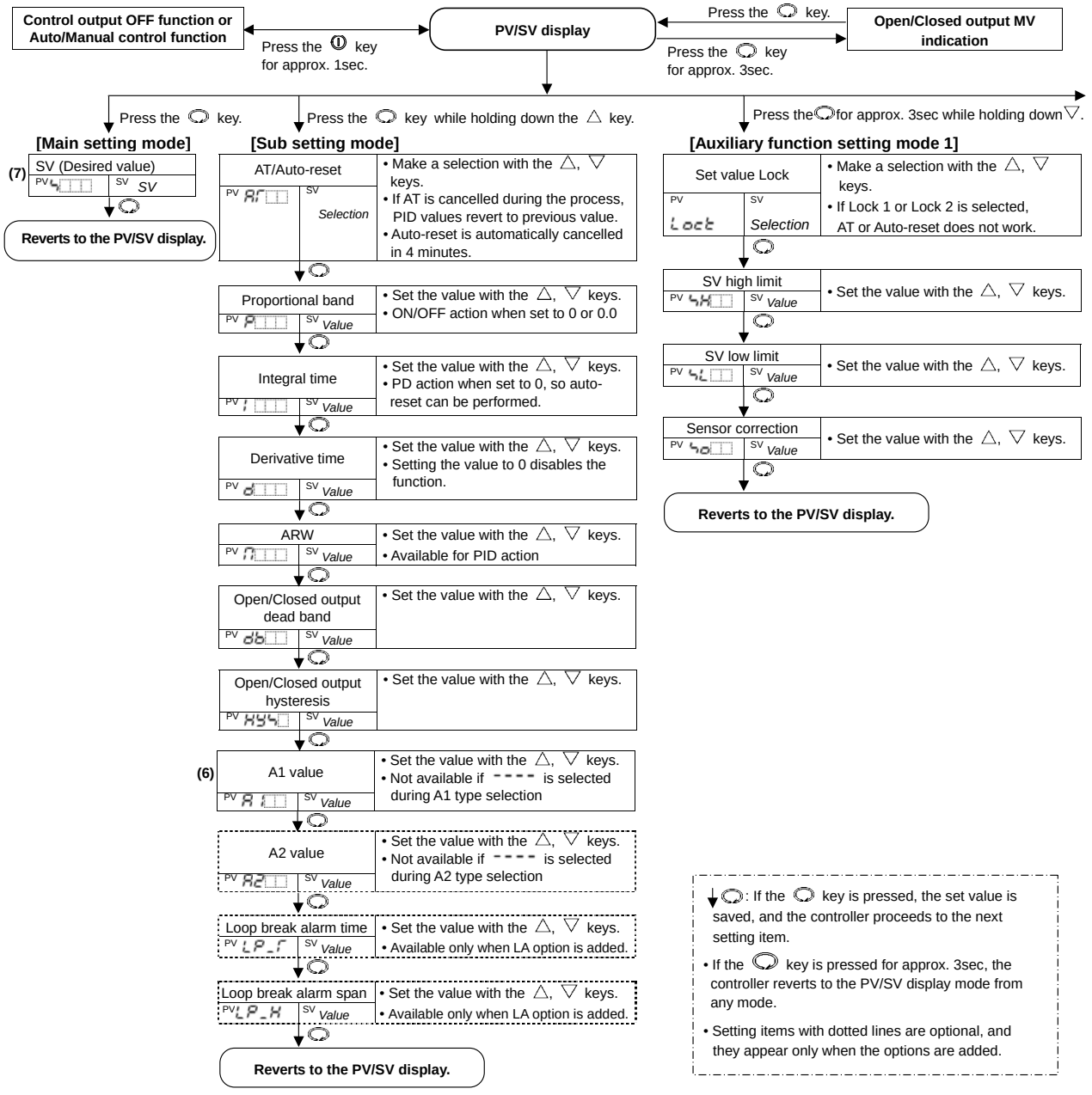
| Sensor input | ℃ | | ℉ | |
|---|---|---|---|---|
| | PV display | SV display | PV display | SV display |
| K | t□□C | 1370 | t□□F | 2500 |
| | t□ .C | 400.0 | t□ .F | 750.0 |
| J | J□□C | 1000 | J□□F | 1800 |
| R | r□□C | 1760 | r□□F | 3200 |
| S | S□□C | 1760 | S□□F | 3200 |
| B | b□□C | 1820 | b□□F | 3300 |
| E | E□□C | 800 | E□□F | 1500 |
| T | T□ .C | 400.0 | T□ .F | 750.0 |
| N | n□□C | 1300 | n□□F | 2300 |
| PL-Ⅱ | PL2C | 1390 | PL2F | 2500 |
| C (W/Re5-26) | c□□C | 2315 | c□□F | 4200 |
| Pt100 | Pt .C | 850.0 | Pt .F | 999.9 |
| | Pt□C | □850 | Pt□F | 1500 |
| JPt100 | JPt.C | 500.0 | JPt.F | 900.0 |
| | JPtC | □500 | JPtF | □900 |
| 4 to 20mA DC | 420A | 9999 Scaling high limit value | | |
| 0 to 20mA DC | 020A | | | |
| 0 to 1V DC | 0□ 1V | | | |
| 0 to 5V DC | 0□5V | | | |
| 1 to 5V DC | 1□5V | | | |
| 0 to 10V DC | 0 10V | | | |

# 5.1 Operation flowchart

## Outline of operation procedure

Set Input type, Alarm (type, value, etc.) and SV (desired value), following the procedures below. Setting item numbers (1) to (7) are indicated on the flowchart.

| | |
|---|---|
| **[Step 1 Operation before run]** | Turn the load circuit power OFF, and turn the power supply to the JCD, JCR-35A ON. |
| **[Step 2 Auxiliary function setting mode 2]** | Set Input type and Alarm type, etc. in Auxiliary function setting mode 2.<br>**(1) Input type**: Select an input type. Refer to "Input type (character indication) and range" on page 17.<br>**(2) A1 type**: Select an alarm type. Refer to "Alarm type" on page 17.<br>[If an alarm type except for "----" is selected, items (3) to (5) will be indicated and they can be set if necessary.]<br>**Note: If an alarm type is changed, the alarm set value becomes 0 (0.0). Therefore it is necessary to set it again.**<br>**(3) A1 action Energized/Deenergized**: Select Alarm 1 action Energized or Deenergized.<br>**(4) A1 hysteresis**: Set A1 hysteresis.<br>**(5) A1 action delayed timer**: Set A1 action delayed time. |
| **[Step 3 Sub setting mode]** | **(6) A1 value**: Set action point of A1 output in the Sub setting mode. |
| **[Step 4 Main setting mode]** | **(7) SV**: Set SV (Desired value) in the Main setting mode. |
| **[Step 5 Run]** | Turn the load circuit power ON. Control action starts so as to keep the control target at the SV (Desired value). |



**Input type (character indication) and range**

| | | | | |
|---|---|---|---|---|
| K | –200 to 1370℃: | E□□C | K | –320 to 2500 ℉: E□□F |
| | –199.9 to 400.0℃: | E□□C | | –199.9 to 750.0℉: E□□F |
| J | –200 to 1000 ℃: | J□□C | J | –320 to 1800 ℉: J□□F |
| R | 0 to 1760 ℃: | r□□C | R | 0 to 3200 ℉: r□□F |
| S | 0 to 1760 ℃: | S□□C | S | 0 to 3200 ℉: S□□F |
| B | 0 to 1820 ℃: | b□□C | B | 0 to 3300 ℉: b□□F |
| E | –200 to 800 ℃: | E□□C | E | –320 to 1500 ℉: E□□F |
| T | –199.9 to 400.0℃: | T□.□C | T | –199.9 to 750.0℉: T□.□F |
| N | –200 to 1300 ℃: | n□□C | N | –320 to 2300 ℉: n□□F |
| PL-Ⅱ | 0 to 1390 ℃: | PL2C | PL-Ⅱ | 0 to 2500 ℉: PL2F |
| C(W/Re5-26) | 0 to 2315 ℃: | c□□C | C(W/Re5-26) | 0 to 4200 ℉: c□□F |
| Pt100 | –199.9 to 850.0℃: | Pt.□C | Pt100 | –199.9 to 999.9℉: Pt.□F |
| JPt100 | –199.9 to 500.0 ℃: | JPt.C | JPt100 | –199.9 to 900.0℉: JPt.F |
| Pt100 | –200 to 850 ℃: | Pt□C | Pt100 | –300 to 1500℉: Pt□F |
| JPt100 | –200 to 500 ℃: | JPtC | JPt100 | –300 to 900℉: JPtF |
| 4 to 20mA DC | –1999 to 9999: | 420A | | |
| 0 to 20mA DC | –1999 to 9999: | 020A | | |
| 0 to 1V DC | –1999 to 9999: | 0.1V | | |
| 0 to 5V DC | –1999 to 9999: | 0.5V | | |
| 1 to 5V DC | –1999 to 9999: | 1.5V | | |
| 0 to 10V DC | –1999 to 9999: | 0.10V | | |

**Alarm type**

High limit alarm: The alarm action is ±deviation setting from the SV. The alarm is activated if the input value reaches the high limit set value. Character indication: H□□□

Low limit alarm: The alarm action is ±deviation setting from the SV. The alarm is activated if the input value goes under the low limit set value. Character indication: L□□□

High/Low limits alarm: Combines High limit and Low limit alarm actions. When input value reaches high limit set value or goes under the low limit set value, the alarm is activated. Character indication: HL□□

High/Low limit range alarm: When input value is between the high limit set value and low limit set value, the alarm is activated. Character indication: oU d□

Process alarm: Within the scale range of the controller, alarm action points can be set at random and if the input reaches the randomly set action point, the alarm is activated.
Character indication: Process high alarm A5□□, Process low alarm rA5□

Alarm with standby function: When the power to the controller is turned on, even if the input enters the alarm action range, the alarm is not activated. (If the controller is allowed to keep running, once the input exceeds the alarm action point, the standby function will be released.)
Character indication:
High limit alarm with standby : H□□□
Low limit alarm with standby : L□□□
High/Low limits alarm with standby : HL□□

Press the ▽ key for approx. 3sec while holding down the △ key.

**[Auxiliary function setting mode 2]**

**(1)** Input type — PV sEnS / SV Selection
- Make a selection with the △, ▽ keys.
- Default value: E□□C

Scaling high limit — PV SCLH / SV Value
- Set the value with the △, ▽ keys.
- Available for DC current, DC voltage input

Scaling low limit — PV SCLL / SV Value
- Set the value with the △, ▽ keys.
- Available for DC current, DC voltage input

Decimal point place — PV dP□□ / SV Selection
- Make a selection with the △, ▽ keys.
- Available for DC current, DC voltage input

PV filter time constant — PV FILT / SV Value
- Set the value with the △, ▽ keys.

Open/Closed output MV high limit — PV oLH□ / SV Value
- Set the value with the △, ▽ keys.
- Not available for ON/OFF action

Open/Closed output MV low limit — PV oLL□ / SV Value
- Set the value with the △, ▽ keys.
- Not available for ON/OFF action

**(2)** A1 type — PV AL 1F / SV Selection
- Make a selection with the △, ▽ keys.
- Default value: ----

A2 type — PV AL2F / SV Selection
- Make a selection with the △, ▽ keys.
- Available when A2 is added

**(3)** A1 action Energized/ Deenergized — PV A 1LA / SV Selection
- Make a selection with the △, ▽ keys.
- Not available if ---- is selected during A1 type selection

A2 action Energized/ Deenergized — PV A2LA / SV Selection
- Make a selection with the △, ▽ keys.
- Not available if ---- is selected during A2 type selection

**(4)** A1 hysteresis — PV A 1HY / SV Value
- Set the value with the △, ▽ keys.
- Not available if ---- is selected during A1 type selection

A2 hysteresis — PV A2HY / SV Value
- Set the value with the △, ▽ keys.
- Not available if ---- is selected during A2 type selection

**(5)** A1 action delayed timer — PV A 1dY / SV Value
- Set the value with the △, ▽ keys.
- Not available if ---- is selected during A1 type selection

A2 action delayed timer — PV A2dY / SV Value
- Set the value with the △, ▽ keys.
- Not available if ---- is selected during A2 type selection

Direct/Reverse control — PV conT / SV Selection
- Make a selection with the △, ▽ keys.
- Default value: REAT

AT bias — PV AT_b / SV Value
- Set the value with the △, ▽ keys.
- Available for thermocouple, RTD input

OUT/OFF key function — PV AAnU / SV Selection
- Make a selection with the △, ▽ keys.

**Reverts to the PV/SV display.**

Press the ◌ key for approx. 3sec while holding down the △ and ▽ keys.

**[Feedback resistance adjustment mode]**

Feedback resistance adjustment — PV AE5□ / SV Adjusted status
- By holding down the △ key for 3sec, feedback resistance is automatically adjusted.

**Reverts to the PV/SV display.**

### 5.2 Main setting mode

If the ◎ key is pressed, main setting mode is selected.
The SV (desired value) can be increased or decreased by pressing the △ or ▽key.
If the ◎ key is pressed, the SV is registered and the controller will revert to the PV/SV display mode.

[SV□□] **SV**
- Sets SV.
- Setting range: SV low limit to SV high limit or
  Scaling low limit value to Scaling high limit value
- Default: 0℃

### 5.3 Sub setting mode

By pressing the ◎ key while holding down the △ key, Sub setting mode can be selected.
The △ or ▽ key increases or decreases the set value (numeric value).
By pressing the ◎ key, the set value is registered and the next setting item is selected.

[AT□□] **AT/Auto-reset setting**
- Sets AT (Auto-tuning) or Auto-reset (offset correction).
- Auto-reset can be performed only during PD and P action.
  (Not available for PI and ON/OFF action)
- Selection item:
  ---- : Auto-tuning/Auto-reset Cancel
  AT□□/rSET : Auto-tuning/Auto-reset Perform
- Default: Both Auto-tuning/Auto-reset Cancel

**[Auto-tuning]**
- **To perform auto-tuning** ("----" has been indicated on the SV display.), press the △ key. "AT□□" will be indicated on the SV display.
  By pressing the ◎ key, Auto-tuning initiates, the AT indicator flashes and the unit reverts to the PV/SV display mode.
- After Auto-tuning ends, the AT indicator goes off, and P, I, D and ARW values are automatically set.
- During auto-tuning, none of the settings can be performed.
- **To cancel auto-tuning during its performance**, return to the Sub setting mode. "AT□□" is indicated on the SV display. Press the ▽ key. "----" will be indicated on the SV display. Then press the ◎ key. Auto-tuning will be cancelled and the AT indicator will go off. Each value of P, I, D, ARW returns to the values before the Auto-tuning was performed.
- If the ⓘ key is pressed during auto-tuning, control output OFF function is activated, and if the ⓘ key is pressed again, PID auto-tuning is cancelled.
- If auto-tuning is not finished 4 hours after starting, it is automatically cancelled.

**[Auto-reset]**
- To perform the auto-reset, ("----" has been indicated on the SV display.), press the △ key. "rSET" will be indicated on the SV display.
  By pressing the ◎ key, Auto-reset will initiate, offset correction immediately starts (The corrected value is automatically set, and the AT indicator flashes.), and the unit reverts to the PV/SV display mode.
- During the 4 minutes of auto-reset performance, other settings cannot be performed to prevent key misoperations.
- After auto-reset ends, AT indicator is turned off and all settings can be carried out.

[P] **Proportional band setting**
• Sets proportional band.
• Setting range: 1 to 1000℃ (1 to 2000℉)
With a decimal point: 0.1 to 999.9℃(0.1 to 999.9℉)
DC input: 0.1 to 100.0%
• Default: 10℃

[I] **Integral time setting**
• Sets the integral time.
Setting the value to 0 disables the function. (PD action)
• Setting range: 0 to 1000 seconds
• Default: 200 seconds

[d] **Derivative time setting**
• Sets the derivative time.
Setting the value to 0 disables the function. (PI action)
• Setting range: 0 to 300 seconds
• Default: 50 seconds

[rn] **ARW (Anti-reset windup) setting**
• Sets the anti-reset windup.
• Available only for PID action
• Setting range: 0 to 100%
• Default: 50%

[db] **Open/Closed output dead band setting**
• Sets Open/Closed output dead band.
• Setting range: 0 to 100%
• Default: 10%

[HYS] **Open/Closed output hysteresis setting**
• Sets Open/Closed output hysteresis.
• Setting range: 0 to 100%
• Default: 1%

[A1] **A1 value setting**
• Sets the action point of A1 output.
Setting the value to 0 or 0.0 disables the function.
(Excluding process high alarm and process low alarm)
• Not available if No alarm action is selected during the A1 type selection
• Setting range: Refer to (Table 5.3-1) on the next page.
• Default: 0℃

[A2] **A2 value setting**
• Sets the action point of A2 output.
Setting the value to 0 or 0.0 disables the function.
(Excluding process high alarm and process low alarm)
• Not available if A2 output option is not added or if No alarm action is selected during the A2 type selection
• Setting range and default value are the same as those of A1 value setting.

| |
|---|
| [LP_T] **LA (Loop break alarm) time setting**<br>• Sets the action time to assess the Loop break alarm.<br>• Available only when Loop break alarm option is added<br>• Setting range: 0 to 200 minutes<br>• Default: 0 minutes |
| [LP_H] **LA (Loop break alarm) span setting**<br>• Sets the action span to assess the Loop break alarm.<br>• Available only when Loop break alarm (option) is added<br>• Setting range: 0 to 150℃ (℉), however, with a decimal point 0.0 to 150.0℃ (℉)<br>For DC input, 0 to 1500<br>(The placement of the decimal point follows the selection.)<br>• Default: 0℃ |

**[Loop break alarm]**

The alarm will be activated when the process variable (PV) does not **rise** as much as the span or more within the time it takes to assess the loop break alarm after the manipulated variable(MV) has reached 100% or the output high limit value.
The alarm will also be activated when the process variable (PV) does not **fall** as much as the span or more within the time it takes to assess the loop break alarm after the manipulated variable (MV) has reached 0% or the output low limit value.
When the control action is Direct (Cooling), read "**fall**" for "**rise**" and vice versa.

**[A1, A2 setting range]**

(Table 5.3-1)

| Alarm type | Setting range | |
|---|---|---|
| High limit alarm | –Input span to Input span ℃(℉) | *1 |
| Low limit alarm | –Input span to Input span ℃(℉) | *1 |
| High/Low limits alarm | 0 to Input span ℃(℉) | *1 |
| High/Low limit range alarm | 0 to Input span ℃(℉) | *1 |
| Process high alarm | Input range low limit to Input range high limit | *2 |
| Process low alarm | Input range low limit to Input range high limit | *2 |
| High limit alarm with standby | –Input span to Input span ℃(℉) | *1 |
| Low limit alarm with standby | –Input span to Input span ℃(℉) | *1 |
| High/Low limits alarm with standby | 0 to Input span ℃(℉) | *1 |

• When the input has a decimal point, the negative low limit value is –199.9, and the positive high limit value is 999.9.

*1: For DC input, the Input span is the same as the scaling span.

*2: For DC input, Input range low (or high) limit value is the same as the scaling low (or high) limit value.

### 5.4 Auxiliary function setting mode 1

In the PV/SV display mode, if the ◯ key is pressed for approx. 3 seconds while holding down the ▽ key, Auxiliary function setting mode 1 can be selected.
The set values can be increased or decreased by pressing the △ or ▽ key.
If the ◯ key is pressed, the set value is registered and the next setting item is selected.

[Lock] **Set value lock selection**
- Mode to lock the set values to prevent setting errors
  The setting item to be locked depends on the selection.
- When selecting Lock, select Lock 1, 2 or 3 after setting the necessary items in the Unlock status.
- Selection item:
  ---- (Unlock): All set values can be changed.
  Loc 1 (Lock 1): None of the set values can be changed.
  Loc2 (Lock 2): Only main set value (SV) can be changed.
  Loc3 (Lock 3): All set values except Input type selection can be changed.
  However, changed data revert to their previous value after the power is turned off because they are not saved in the non-volatile memory.
  **Do not change any setting item in Auxiliary function setting mode 2. If any item in Auxiliary function setting mode 2 is changed, it will affect other setting items such as the SV and Alarm value.**
- Default: Unlock

[SH□□] **SV high limit setting**
- Sets SV high limit.
- Setting range: SV low limit to input range high limit value
  For DC input, SV low limit to scaling high limit value
  (The placement of the decimal point follows the selection.)
- Default: 1370℃

[SL□□] **SV low limit setting**
- Sets SV low limit.
- Setting range: Input range low limit value to SV high limit
  For DC input: Scaling low limit value to SV high limit
  (The placement of the decimal point follows the selection.)
- Default: -200℃

[So□□] **Sensor correction setting**
- Sets the sensor correction value.
  (Effective within the input rated range regardless of the sensor correction value)
  PV = Current actual temperature + Sensor correction value
  (e.g.) If actual temperature is 200℃, and sensor correction value is 2.0℃, PV becomes 202℃.
- Setting range: –100.0 to 100.0℃(℉)
  For DC input: –1000 to 1000
  (The placement of the decimal point follows the selection.)
- Default: 0.0℃

**Sensor correction function**

This corrects the input value from the sensor. When a sensor cannot be set at the exact location where control is desired, the sensor measured temperature may deviate from the temperature in the controlled location.
When controlling with plural controllers, sometimes the measured temperatures (input value) do not concur due to differences in sensor accuracy or dispersion of load capacities. In such a case, the control can be set at the desired temperature by adjusting the input value of sensors.
However, it is effective within the input rated range regardless of the sensor correction value.

### 5.5 Auxiliary function setting mode 2

In the PV/SV display mode, if the ▽ key is pressed for approx. 3 seconds while holding down the △ key, Auxiliary function setting mode 2 can be selected.

The set values can be increased or decreased by pressing the △ or ▽ key.
If the ◎ key is pressed, the set value is registered and the next setting item is selected.

**If Lock 3 has been selected during the Set value lock selection, release Lock 3 to Unlock, and then change each set value in Auxiliary function setting mode 2.**

[INPT] **Input type selection**

- An input type from thermocouple (10 types), RTD (2 types), DC current (2 types), DC voltage (4 types) and the unit ℃/℉ can be selected.
- **When changing the input from DC voltage to other inputs, remove the sensor connected to this controller, then change for the input. If the input is changed with the sensor connected, the input circuit may break.**
- Default: K (–200 to 1370℃)

| Input type | Input range | |
|---|---|---|
| K | K 200C: –200 to 1370℃ | K 200F: –320 to 2500℉ |
| | K 199.9C: –199.9 to 400.0℃ | K 199.9F: –199.9 to 750.0℉ |
| J | J 200C: –200 to 1000℃ | J 200F: –320 to 1800℉ |
| R | r 200C: 0 to 1760℃ | r 200F: 0 to 3200℉ |
| S | S 200C: 0 to 1760℃ | S 200F: 0 to 3200℉ |
| B | b 200C: 0 to 1820℃ | b 200F: 0 to 3300℉ |
| E | E 200C: –200 to 800℃ | E 200F: –320 to 1500℉ |
| T | T 199.9C: –199.9 to 400.0℃ | T 199.9F: –199.9 to 750.0℉ |
| N | n 200C: –200 to 1300℃ | n 200F: –320 to 2300℉ |
| PL-Ⅱ | PL2C: 0 to 1390℃ | PL2F: 0 to 2500℉ |
| C(W/Re5-26) | c 200C: 0 to 2315℃ | c 200F: 0 to 4200℉ |
| Pt100 | Pt 199.9C: –199.9 to 850.0℃ | Pt 199.9F: –199.9 to 999.9℉ |
| JPt100 | JPt199.C: –199.9 to 500.0℃ | JPt199.F: –199.9 to 900.0℉ |
| Pt100 | Pt 200C: –200 to 850℃ | Pt 200F: –300 to 1500℉ |
| JPt100 | JPt 200C: –200 to 500℃ | JPt 200F: –300 to 900℉ |
| 4 to 20mA DC | 420A: –1999 to 9999 | |
| 0 to 20mA DC | 020A: –1999 to 9999 | |
| 0 to 1V DC | 0 1V: –1999 to 9999 | |
| 0 to 5V DC | 0 5V: –1999 to 9999 | |
| 1 to 5V DC | 1 5V: –1999 to 9999 | |
| 0 to 10V DC | 0 10V: –1999 to 9999 | |

[SCLH] **Scaling high limit setting**

- Sets scaling high limit value.
- Available only for the DC input
- Setting range: Scaling low limit value to Input range high limit value
  (The placement of the decimal point follows the selection.)
- Default: 9999

[SCLL] **Scaling low limit setting**
- Sets scaling low limit value.
- Available only for the DC input
- Setting range: Input range low limit value to scaling high limit value
  (The placement of the decimal point follows the selection.)
- Default: –1999

[dP□□] **Decimal point place selection**
- Selects the decimal point place.
- Available only for DC input
- Selection item: □□□0 (No decimal point)
  □□0.0 (1 digit after the decimal point)
  □0.00 (2 digits after the decimal point)
  0.000 (3 digits after the decimal point)
- Default: No decimal point

[FILT] **PV filter time constant setting**
- Sets PV filter time constant.
  However, if the value is set too large, it affects control result due to the delay of response.
- Setting range: 0.0 to 10.0 seconds
- Default: 0.0 seconds

[oLH□] **Open/Closed output MV high limit setting**
- Sets the high limit value of Open/Closed output MV.
- Setting range: Open/Closed output MV low limit value to 100%
- Default: 100%

[oLL□] **Open/Closed output MV low limit setting**
- Sets the low limit value of Open/Closed output MV.
- Setting range: 0% to Open/Closed output MV high limit
- Default: 0%

[AL 1F] **A1 type selection**
- Selects A1 type.
- **If an alarm type is changed, the alarm set value becomes 0 (0.0).**
- Selection item:
  ----: No alarm action
  L□□□: Low limit alarm
  □I d□: High/Low limit range alarm
  rA5□: Process low alarm
  L□□□: Low limit alarm with standby
  H□□□: High limit alarm
  HL□□: High/Low limits alarm
  A5□□: Process high alarm
  H□□□: High limit alarm with standby
  HL□□: High/Low limits alarm with standby
- Default: No alarm action

[AL2F] **A2 type selection**
- Selects A2 type.
- **If an alarm type is changed, the alarm set value becomes 0 (0.0).**
- Available only when A2 option is added
- Selection item, default value are the same as those of A1 type selection.

[A 1LA] **A1 action Energized/Deenergized selection**
- Selects A1 action Energized/Deenergized.
- Not available if No alarm action is selected during the A1 type selection
- Selection item: nonL (Energized)
  rEV5 (Deenergized)
- Default: Energized

[A2LA] **A2 action Energized/Deenergized selection**
- Selects Energized or Deenergized for A2 action.
- Not available if No alarm action is selected during the A2 type selection or if A2 option is not added
- Selection item and default value are the same as those of A1 action Energized/ Deenergized selection.

[A 1HY] **A1 hysteresis setting**
- Sets A1 hysteresis.
- Not available if No alarm action is selected during the A1 type selection
- Setting range: 0.1 to 100.0℃(℉)
  For DC input, 1 to 1000 (The placement of the decimal point follows the selection.)
- Default: 1.0℃

[A2HY] **A2 hysteresis setting**
- Sets A2 hysteresis.
- Not available if No alarm action is selected during the A2 type selection or if A2 option is not added
- Setting range and default value are the same as those of A1 hysteresis setting.

[A 1dY] **A1 action delayed timer setting**
- Sets A1 action delayed timer.
  When setting time has elapsed after the input enters the alarm output range, the alarm is activated.
- Not available if No alarm action is selected during the A1 type selection mode
- Setting range: 0 to 9999 seconds
- Default: 0 seconds

[A2dY] **A2 action delayed timer setting**
- Sets the action delayed timer for A2.
  When setting time has elapsed after the input enters the alarm output range, the alarm is activated.
- Not available if No alarm action is selected during the A2 type selection or if A2 option is not added
- Setting range and default value are the same as those of A1 action delayed timer setting.

[conF] **Direct/Reverse control action selection**
- Selects Reverse (Heating) or Direct (Cooling) control action.
- Selection item: HEAT (Reverse), cooL (Direct)
- Default: Reverse (Heating)

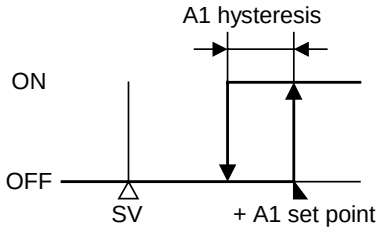
[AT_b] **AT bias setting**
- Sets the bias value when PID auto-tuning is performing.
- Not available for the DC input
- Setting range: 0 to 50℃ (0 to 100℉)
  With a decimal point, 0.0 to 50.0℃ (0.0 to 100.0℉)
- Default: 20℃

[AAnU] **OUT/OFF key function selection**
- Selects the OUT/OFF key function.
- Selection item: oFF (OUT/OFF function),
  AAnU (Auto/Manual control function)
- Default: OUT/OFF function

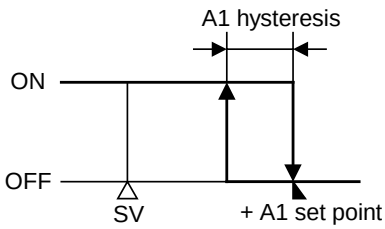
**[Energized/Deenergized]**

When alarm action Energized is selected, the alarm output (between terminals 7-8, or 12-13) is conducted (ON) while the alarm output indicator is lit.
The alarm output is not conducted (OFF) while the alarm output indicator is not lit.
See (Fig. 5.5-1).

When alarm action Deenergized is selected, the alarm output (between terminals 7-8, or 12-13) is not conducted (OFF) while the alarm output indicator is lit.
The alarm output is conducted (ON) while the alarm output indicator is not lit.
See (Fig. 5.5-2).




**High limit alarm (when Energized is set)**
(Fig. 5.5-1)




**High limit alarm (when Deenergized is set)**
(Fig. 5.5-2)

## 5.6 Feedback resistance adjustment mode

To enter the Feedback resistance adjustment mode, press the ⟲ key for approx. 3 seconds while holding down the △ and ▽ keys in the PV/SV display mode.
By holding down the △ key for approx. 3 seconds, the feedback resistance is automatically adjusted.

| [AE5□] **Feedback resistance adjustment** |
|---|
| • Adjusts feedback resistance. |

**Feedback resistance adjustment procedures**

(1) Once the unit enters this mode, control action stops, and Open/Closed output is turned OFF. The SV display indicates [oFF□].

(2) Keep pressing the △ key for approx. 3 seconds. The SV display indicates [AdJ□], and feedback resistance is automatically adjusted as in steps ① to ③.

① Closed output is turned ON for approx. 3 seconds.
② Open output is turned ON. At the moment when the motor valve is fully open, the fully opened input value of the feedback resistance is loaded.
③ Closed output is turned ON. At the moment when the motor valve is fully closed, the fully closed input value of the feedback resistance is loaded.

(3) After automatic adjustment is complete, the SV display indicates [oFF□].

(4) **Press the ⟲ key**. The adjusted value will be registered, and the unit will revert to the PV/SV display mode.

### 5.7 Control output OFF function

**[oFF] Control output OFF function**

- A function to pause the control action or turn the control output of the unused instrument of the plural units OFF even if the power to the instrument is supplied. [oFF] is indicated on the PV display while the function is working.
- Pressing the ⓘ key for approx. 1 second from any mode turns the control output OFF. Pressing the ⓘ key again for approx. 1 second cancels the control output OFF function.
- Once the control output OFF function is enabled, the function cannot be released even if the power to the instrument is turned OFF and ON again.
  To cancel the function, press the ⓘ key again for approx. 1 second.

### 5.8 Auto/Manual control function

**PV/SV display mode (Manual control)**

- To use manual control function, “Auto/Manual control function” must be selected during the OUT/OFF key function selection.
  First, press the ⓘ key. Control can be performed by increasing or decreasing the Open/Closed output MV using the △ or ▽ key.
- The 1st decimal point from the right on the SV display flashes.
- By pressing the ⓘ key again, the mode reverts to the PV/SV display (automatic control) mode.
  Whenever the power to the controller is turned on, automatic control starts.
- If control action is switched from automatic to manual and vice versa, balance/bumpless function works to prevent a sudden change in the Open/Closed output MV (manipulated variable).
- If Auto/Manual control function is selected, control output OFF function is disabled.

### 5.9 Open/Closed output MV (manipulated variable) indication

**Open/Closed output MV indication**

- Open/Closed output MV is indicated on the SV display by pressing the ◎ key for approx. 3 seconds in the PV/SV display mode.
  While Open/Closed output MV is being indicated, the 1st decimal point from the right on the SV display flashes at a cycle of every 0.5 seconds. When the ◎ key is pressed again, the unit reverts to the PV/SV display mode.

# 6. Running

After the unit is mounted to the control panel and wiring is completed, operate the unit following the procedures below.

**(1) Turn the power supply to the JCD-35A, JCR-35A ON.**

For thermocouple and RTD inputs, for approx. 3 seconds after the power is switched ON, sensor input characters and temperature unit are indicated on the PV display, and the input range high limit value is indicated on the SV display. See (Table 6-1).

For the DC input, for approx. 3 seconds after the power is switched ON, sensor input characters are indicated on the PV display, and the scaling high limit value is indicated on the SV display. See (Table 6-1).
However, if the scaling high limit value has been changed during the Scaling high limit setting mode, the changed value is indicated on the SV display.
(During this time, all outputs and the LED indicators are in OFF status)
After that, the input value is indicated on the PV display, and SV is indicated on the SV display and the control starts.
(When the Control output OFF function is working, [oFF□] is indicated on the PV display)

(Table 6-1)

| Input type | ℃ | | ℉ | |
|---|---|---|---|---|
| | PV display | SV display | PV display | SV display |
| K | t□□C | 1370 | t□□F | 2500 |
| | t□ .C | 400.0 | t□ .F | 750.0 |
| J | J□□C | 1000 | J□□F | 1800 |
| R | r□□C | 1760 | r□□F | 3200 |
| S | S□□C | 1760 | S□□F | 3200 |
| B | b□□C | 1820 | b□□F | 3300 |
| E | E□□C | □800 | E□□F | 1500 |
| T | T□ .C | 400.0 | T□ .F | 750.0 |
| N | n□□C | 1300 | n□□F | 2300 |
| PL-Ⅱ | PL2C | 1390 | PL2F | 2500 |
| C (W/Re5-26) | c□□C | 2315 | c□□F | 4200 |
| Pt100 | Pt .C | 850.0 | Pt .F | 999.9 |
| | Pt□C | □850 | Pt□F | 1500 |
| JPt100 | JPt.C | 500.0 | JPt.F | 900.0 |
| | JPtC | □500 | JPtF | □900 |
| 4 to 20mA DC | 420A | Scaling high limit value | | |
| 0 to 20mA DC | 020A | | | |
| 0 to 1V DC | 0□ 1V | | | |
| 0 to 5V DC | 0□5V | | | |
| 1 to 5V DC | 1□5V | | | |
| 0 to 10V DC | 0 10V | | | |

**(2) Input each set value.**

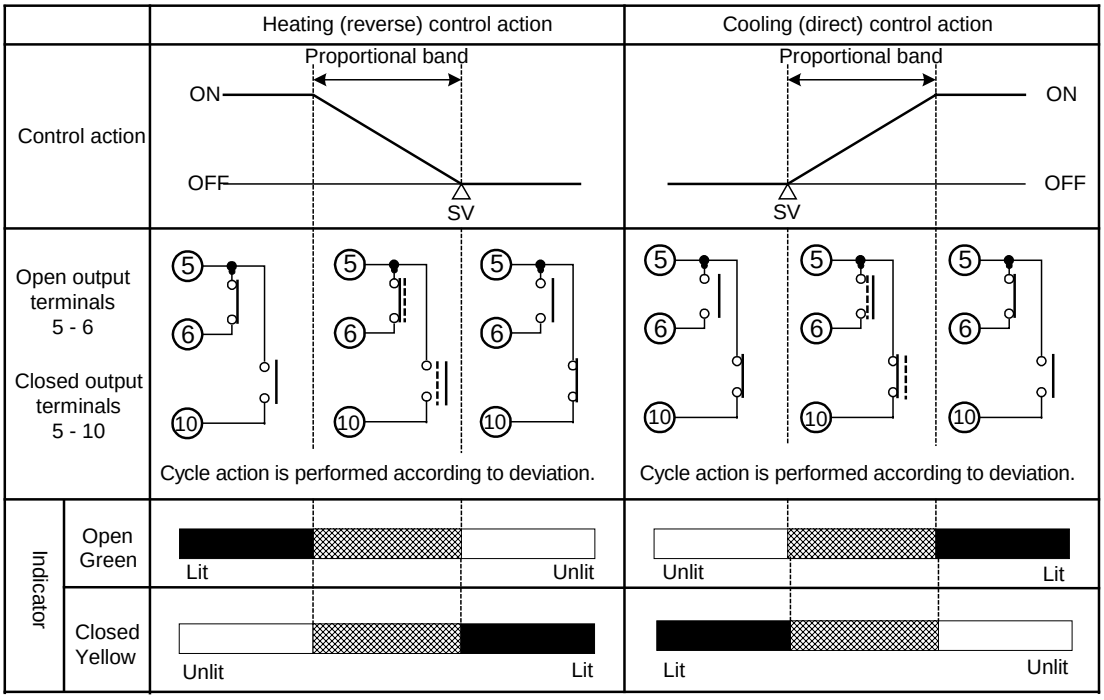
Input each set value, referring to “5. Setup”.

**(3) Turn the load circuit power ON.**

Control action starts so as to keep the control target at the SV (desired value).

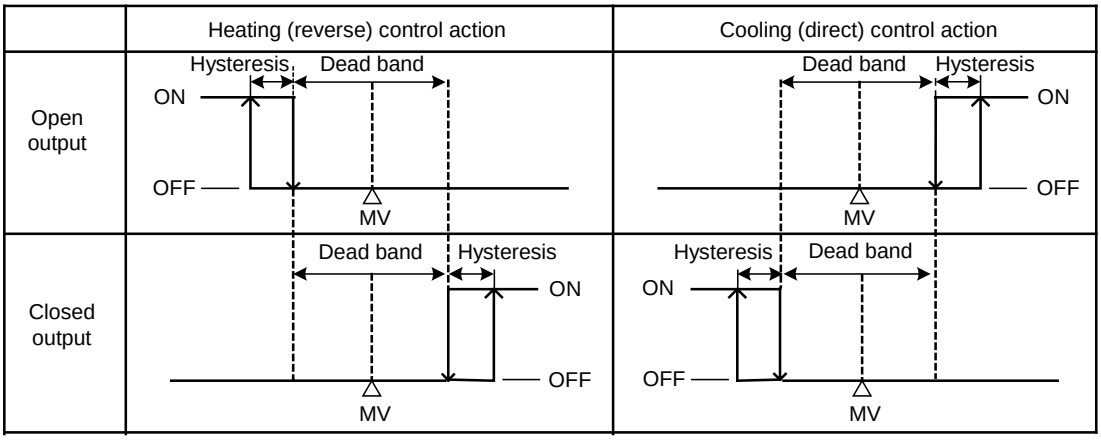
# 7. Action explanation

## 7.1 Standard action

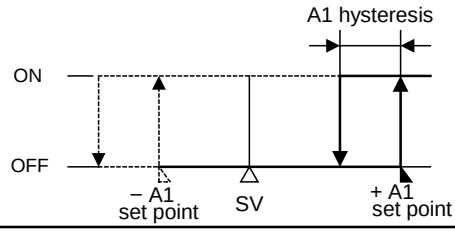
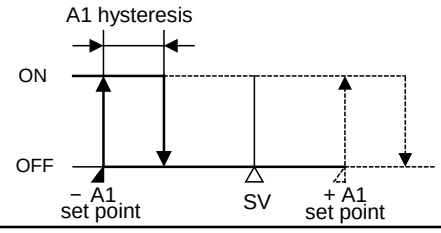
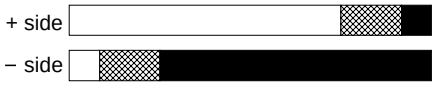
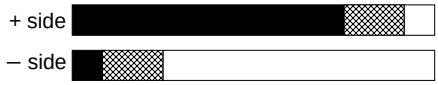
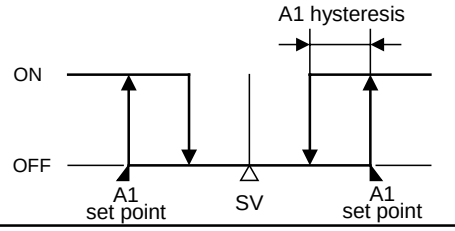
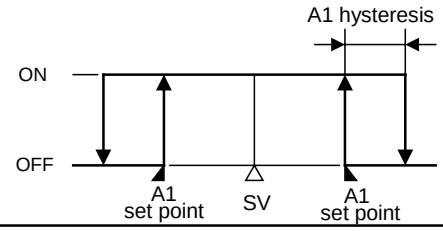
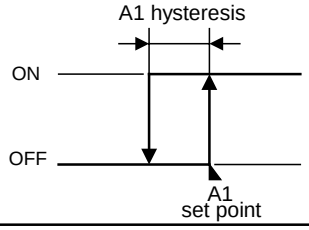
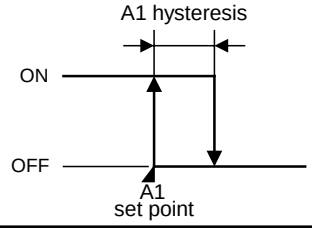
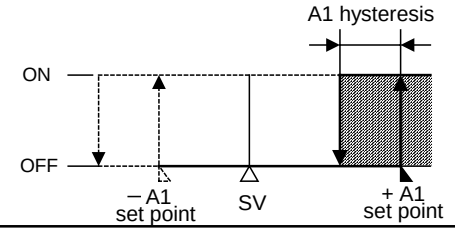
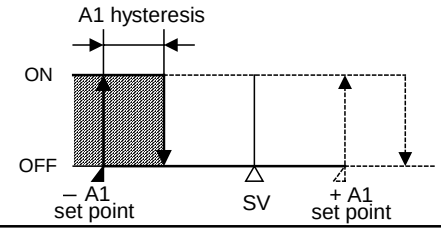
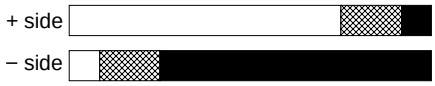
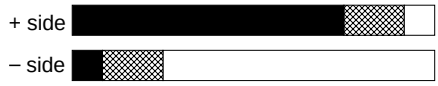


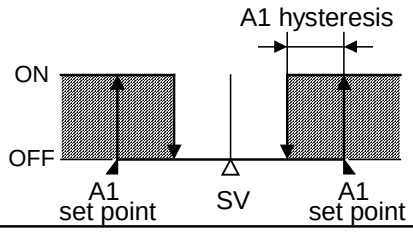

: Acts ON (lit) or OFF (Unlit).

## 7.2 Open/Closed output dead band/hysteresis action



## 7.3 A1 and A2 actions

| | High limit alarm | Low limit alarm |
|---|---|---|
| Alarm action |  |  |
| Alarm output |  |  |
| | High/Low limits alarm | High/Low limit range alarm |
| Alarm action |  |  |
| Alarm output |  |  |
| | Process high alarm | Process low alarm |
| Alarm action |  |  |
| Alarm output |  |  |
| | High limit alarm with standby | Low limit alarm with standby |
| Alarm action |  |  |
| Alarm output |  |  |

| | High/Low limits alarm with standby |
|---|---|
| Alarm action |  |
| Alarm output |  |

: A1 output terminals 7 and 8 are connected.

: A1 output terminals 7 and 8 are connected or disconnected.

: A1 output terminals 7 and 8 are disconnected.

: Standby functions.

For A2 output, use terminals 12 and 13.
A1 and A2 indicators light when their output terminals are connected, and go off when their output terminals are disconnected.

# 8. Control action explanations

## 8.1 PID

### (1) Proportional band (P)

Proportional action is the action which the control output varies in proportion to the deviation between the SV and the PV (process variable).

If the proportional band is narrowed, even if the output changes by a slight variation of the PV (process variable), better control results can be obtained as the offset decreases.

However, if the proportional band is narrowed too much, even slight disturbances may cause variation in the PV (process variable), control action changes to ON/OFF action and the so-called hunting phenomenon occurs.

Therefore, when the PV (process variable) comes to the balanced position near the SV and a constant temperature is maintained, the most suitable value is selected by gradually narrowing the proportional band while observing the control results.

### (2) Integral time (I)

Integral action is used to eliminate offset. When the integral time is shortened, the returning speed to the setting point is accelerated. However, the cycle of oscillation is also accelerated and the control becomes unstable.

### (3) Derivative time (D)

Derivative action is used to restore the change in the PV (process variable) according to the rate of change. It reduces the amplitude of overshoot and undershoot width.

If the derivative time is shortened, restoring value becomes small, and if the derivative time is extended, an excessive returning phenomenon may occur and the control system may oscillate.

## 8.2 PID auto-tuning of this controller

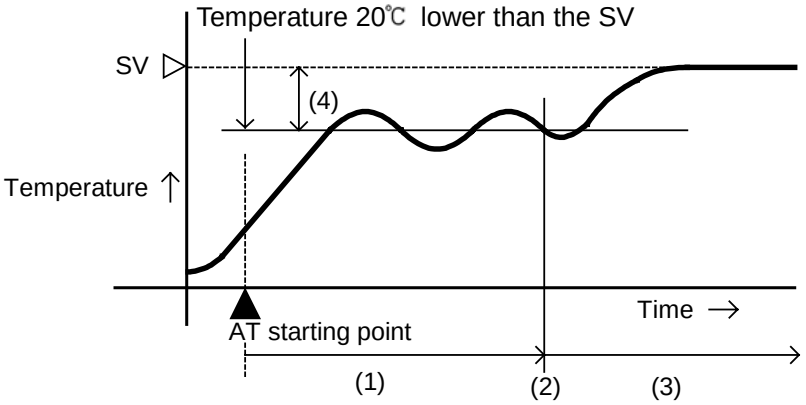
In order to set each value of P, I, D and ARW automatically, the auto-tuning process should be made to fluctuate to obtain an optimal value.

For DC voltage, current input, the AT process will fluctuate around the SV for conditions of (A), (B) and (C).

**Sometimes the auto-tuning process will not fluctuate if auto-tuning is performed at or near room temperature. Therefore auto-tuning might not finish normally.**

**(A) In the case of large difference between the SV and PV (process variable) as the temperature is rising.**

When AT bias is set to 20℃, the AT process will fluctuate at the temperature 20℃ lower than the SV.

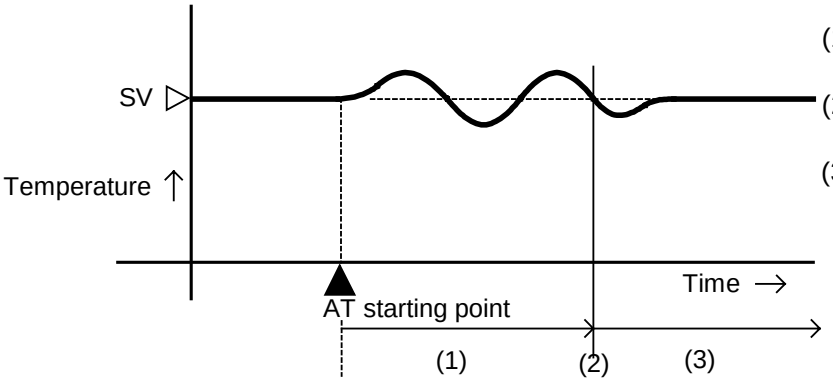



(1) Calculating PID constant
(2) PID constant calculated
(3) Controlled by the PID constant set by auto-tuning.
(4) AT bias value

(Fig. 8.2-1)

**(B) When the control is stable or when control temperature is within ±20℃ of the SV.**

The AT process will fluctuate around the SV.

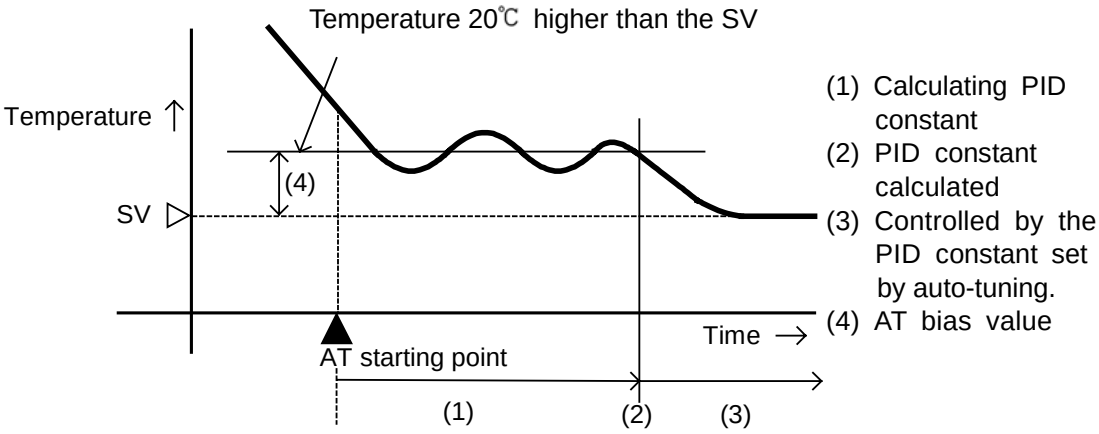



(1) Calculating PID constant
(2) PID constant calculated
(3) Controlled by the PID constant set by auto-tuning.

(Fig. 8.2.2)

**(C) In the case of a large difference between the SV and PV (process variable) as the temperature is falling**

When AT bias is set to 20℃, the AT process will fluctuate at the temperature 20℃ higher than the SV.

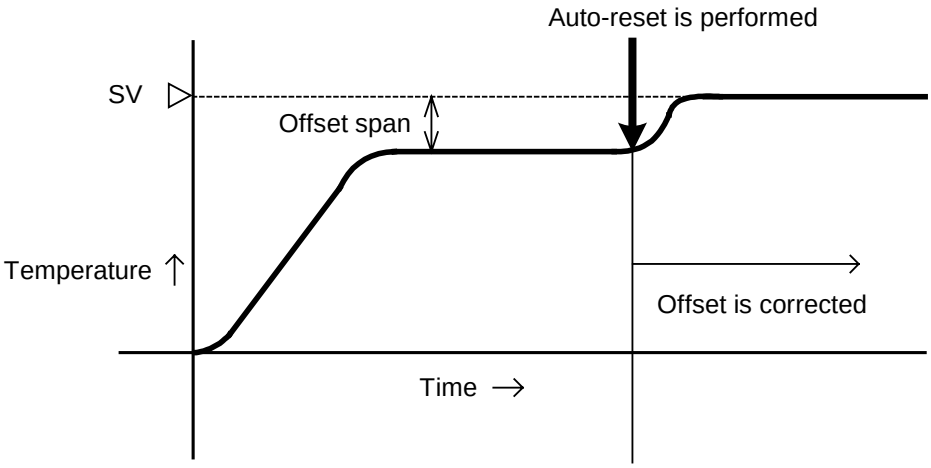



(Fig. 8.2-3)

## 8.3 Auto-reset (offset correction)

Auto-reset is performed to correct the offset at the point at which PV indication is stabilized within the proportional band during the PD action.

Since the corrected value is internally memorized, it is not necessary to perform the auto-reset again as long as the process is the same.




(Fig. 8.3-1)

# 9. Specifications

## 9.1 Standard specifications

**Mounting** : Flush

**Setting** : Membrane sheet key

**Display**

JCD-35A PV display: Red LED 4 digits, character size, 18 x 8 (H x W)mm
SV display: Green LED 4 digits, character size, 12.6 x 6(H x W)mm

JCR-35A PV display: Red LED 4 digits, character size, 11.2 x 5.4 (H x W)mm
SV display: Green LED 4 digits, character size, 11.2 x 5.4 (H x W)mm

**Accuracy (Setting, indication)**

Thermocouple : Within ±0.2% of each input span ±1digit or within ±2℃ (4℉), whichever is greater
However, R, S inputs, 0 to 200℃ (0 to 400℉): Within ±6℃ (12℉)
B input, 0 to 300℃ (0 to 600℉): Accuracy is not guaranteed.
K, J, E, T, N input, less than 0℃ (32℉): Within ±0.4% of each input span ±1digit

RTD : Within ±0.1% of each input span ±1digit or within ±1℃ (2℉), whichever is greater

DC Voltage and Current:
Within ±0.2% of each input span ±1digit

**Rated input**

| Input type | Input range | | Resolution |
|---|---|---|---|
| K | –200 to 1370 ℃ | –320 to 2500 ℉ | 1℃(℉) |
| | –199.9 to 400.0℃ | –199.9 to 750.0℉ | 0.1℃(℉) |
| J | –200 to 1000 ℃ | –320 to 1800 ℉ | 1℃(℉) |
| R | 0 to 1760 ℃ | 0 to 3200 ℉ | 1℃(℉) |
| S | 0 to 1760 ℃ | 0 to 3200 ℉ | 1℃(℉) |
| B | 0 to 1820 ℃ | 0 to 3300 ℉ | 1℃(℉) |
| E | –200 to 800 ℃ | –320 to 1500 ℉ | 1℃(℉) |
| T | –199.9 to 400.0℃ | –199.9 to 750.0℉ | 0.1℃(℉) |
| N | –200 to 1300℃ | –320 to 2300 ℉ | 1℃(℉) |
| PL-Ⅱ | 0 to 1390 ℃ | 0 to 2500 ℉ | 1℃(℉) |
| C(W/Re5-26) | 0 to 2315 ℃ | 0 to 4200 ℉ | 1℃(℉) |
| Pt100 | –199.9 to 850.0℃ | –199.9 to 999.9℉ | 0.1℃(℉) |
| | –200 to 850 ℃ | –300 to 1500 ℉ | 1℃(℉) |
| JPt100 | –199.9 to 500.0℃ | –199.9 to 900.0℉ | 0.1℃(℉) |
| | –200 to 500 ℃ | –300 to 900 ℉ | 1℃(℉) |
| 4 to 20mA DC | –1999 to 9999 *1 *2 | | 1 |
| 0 to 20mA DC | | | |
| 0 to 1V DC | –1999 to 9999 *1 | | 1 |
| 0 to 5V DC | | | |
| 1 to 5V DC | | | |
| 0 to 10V DC | | | |

*1: For DC input, input range and decimal point place are changeable.

*2: 50Ω shunt resistor (sold separately) must be connected between input terminals.

**Input sampling period** : 0.25 seconds

**Input**

Thermocouple : K, J, R, S, B, E, T, N, PL-Ⅱ, C (W/Re5-26)
External resistance, 100Ω or less,
however, for B, 40Ω or less

RTD : Pt100, JPt100, 3-wire system
Allowable input lead wire resistance, 10Ω or less per wire

DC current : 0 to 20mA DC, 4 to 20mA DC
Input impedance, 50Ω
[50Ω shunt resistor (sold separately) must be connected between input terminals]
Allowable input current, 50mA or less
[If 50Ω shunt resistor (sold separately) is used]

DC voltage : 0 to 1V DC:
Input impedance, 1MΩ or more
Allowable input voltage, 5V or less
Allowable signal source resistance, 2kΩ or less
0 to 5V DC, 1 to 5V DC, 0 to 10V DC:
Input impedance, 100kΩ or more
Allowable input voltage, 15V or less
Allowable signal source resistance, 100Ω or less

**Control output**

Relay contact : 1a x 2
Control capacity, 3A 250V AC (resistive load)
1A 250V AC (inductive load cosø=0.4)
Electrical life, 100,000 times

**A1 output**

When A1 action is set as Energized, the alarm action point is set by ±deviation from the SV (desired value) (except Process alarm).
When the input is out of the range, the output turns ON or OFF (in the case of High/Low limit range alarm).
When the alarm action is set as Deenergized, the output acts conversely.

Setting accuracy : The same as the Indication accuracy
Action : ON/OFF action
Hysteresis : Thermocouple, RTD input, 0.1 to 100.0℃ (℉)
DC current, voltage input, 1 to 1000
(The placement of the decimal point follows the selection)
Output : Relay contact 1a
Control capacity, 3A 250V AC (resistive load)
Electrical life, 100,000 times

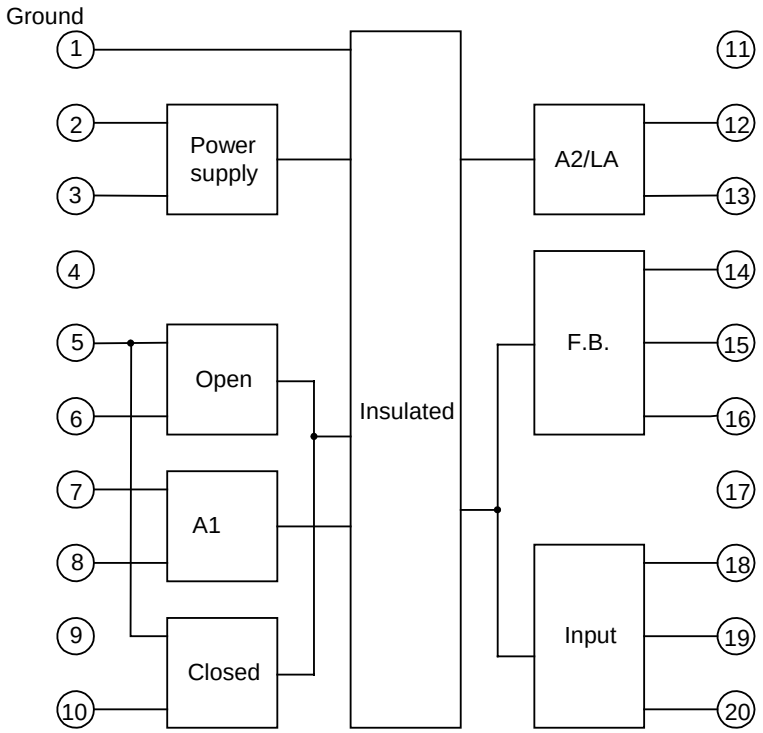
**Control action**

- PID action (with auto-tuning function)
- PI action: When derivative time is set to 0
- PD action (with auto-reset function): When integral time is set to 0
- P action (with auto-reset function): When integral and derivative times are set to 0

Proportional band (P) : Thermocouple, 1 to 1000℃ (1 to 2000℉)
RTD, 0.1 to 999.9℃ (0.1 to 999.9℉)
DC current, voltage, 0.1 to 100.0%
Integral time (I) : 0 to 1000sec (off when set to 0)
Derivative time (D) : 0 to 300sec (off when set to 0)
ARW : 0 to 100%

Open/Closed output dead band : 0 to 100% of the proportional band
Open/Closed output hysteresis : 0 to 100% of the proportional band
Open/Closed output MV high limit, low limit: 0 to 100%

**Feed back resistance**: Within 120Ω to 1.2kΩ
**Supply voltage** : 100 to 240V AC 50/60Hz, 24V AC/DC 50/60Hz
**Allowable voltage fluctuation range**
100 to 240V AC : 85 to 264V AC
24V AC/DC : 20 to 28V AC/DC
**Ambient temperature**: 0 to 50℃ (32 to 122℉)
**Ambient humidity** : 35 to 85%RH (no condensation)
**Power consumption** : Approx. 8VA
**Circuit Insulation configuration**




**Insulation resistance**
10MΩ or more, at 500V DC
**Dielectric strength**
Between input terminal and ground terminal, 1.5kV AC for 1 minute
Between input terminal and power terminal, 1.5kV AC for 1 minute
Between output terminal and ground terminal, 1.5kV AC for 1 minute
Between output terminal and power terminal, 1.5kV AC for 1 minute
Between power terminal and ground terminal, 1.5kV AC for 1 minute
**Weight** : JCD-35A, (approx. 370g), JCR-35A (approx. 250g)
**External dimensions** : JCD-35A, 96 x 96 x 100mm (W x H x D)
JCR-35A, 48 x 96 x 100mm (W x H x D)
**Material** : Case; Flame-resistant resin
**Color** : Case; Light gray
**Drip-proof/Dust-proof**: IP66 for the front face

**Attached functions**

**[Sensor correction function]**

**[Set value lock function]**

**[Input abnormality indication]**

**• Thermocouple or RTD input**

If measured value has exceeded the indication range high limit value, the PV display flashes "- - - -".

If measured value has dropped below the indication range low limit value, the PV display flashes - - - -

If measured value has exceeded the control range, the output is turned OFF. However, for the manual control, the preset MV is outputted.

| Input | Input range | Indication range | Control range |
|---|---|---|---|
| K, T | -199.9 to 400.0℃ | -199.9 to 450.0℃ | -205.0 to 450.0℃ |
| | -199.9 to 750.0℉ | -199.9 to 850.0℉ | -209.0 to 850.0℉ |
| K | -200 to 1370℃ | -250 to 1420℃ | -250 to 1420℃ |
| | -320 to 2500℉ | -370 to 2550℉ | -370 to 2550℉ |
| J | -200 to 1000℃ | -250 to 1050℃ | -250 to 1050℃ |
| | -320 to 1800℉ | -370 to 1850℉ | -370 to 1850℉ |
| R, S | 0 to 1760℃ | -50 to 1810℃ | -50 to 1810℃ |
| | 0 to 3200℉ | -50 to 3250℉ | -50 to 3250℉ |
| B | 0 to 1820℃ | -50 to 1870℃ | -50 to 1870℃ |
| | 0 to 3300℉ | -50 to 3350℉ | -50 to 3350℉ |
| E | -200 to 800℃ | -250 to 850℃ | -250 to 850℃ |
| | -320 to 1500℉ | -370 to 1550℉ | -370 to 1550℉ |
| N | -200 to 1300℃ | -250 to 1350℃ | -250 to 1350℃ |
| | -320 to 2300℉ | -370 to 2350℉ | -370 to 2350℉ |
| PL-Ⅱ | 0 to 1390℃ | -50 to 1440℃ | -50 to 1440℃ |
| | 0 to 2500℉ | -50 to 2550℉ | -50 to 2550℉ |
| C(W/Re5-26) | 0 to 2315℃ | -50 to 2365℃ | -50 to 2365℃ |
| | 0 to 4200℉ | -50 to 4250℉ | -50 to 4250℉ |
| Pt100 | -199.9 to 850.0℃ | -199.9 to 900.0℃ | -210.0 to 900.0℃ |
| | -200 to 850℃ | -210 to 900℃ | -210 to 900℃ |
| | -199.9 to 999.9℉ | -199.9 to 999.9℉ | -211.0 to 1099.9℉ |
| | -300 to 1500℉ | -318 to 1600℉ | -318 to 1600℉ |
| JPt100 | -199.9 to 500.0℃ | -199.9 to 550.0℃ | -206.0 to 550.0℃ |
| | -200 to 500℃ | -207 to 550℃ | -207 to 550℃ |
| | -199.9 to 900.0℉ | -199.9 to 999.9℉ | -211.0 to 999.9℉ |
| | -300 to 900℉ | -312 to 1000℉ | -312 to 1000℉ |

**• DC voltage, DC current input**

If measured value has exceeded the indication range high limit value, the PV display flashes "- - - -".

If measured value has dropped below the indication range low limit value, the PV display flashes "- - - -".

**Indication range**: [Scaling low limit value – Scaling span x 1%] to [Scaling high limit value + Scaling span x 10%]
However, if the input value is out of the range –1999 to 9999, the PV display flashes "- - - -" or "- - - -".

**Control range** : [Scaling low limit value – Scaling span x 1%] to [Scaling high limit value + Scaling span x 10%]

• **DC input disconnection**:

When DC input is disconnected, PV display flashes "- - - -" for 4 to 20mA DC and 1 to 5V DC inputs, and " ‾ ‾ ‾ ‾ " for 0 to 1V DC.

For 0 to 20mA DC, 0 to 5V DC and 0 to 10V DC inputs, the PV display indicates the value corresponding with 0mA or 0V input.

**[Burnout]**

When the thermocouple or RTD input is burnt out, output is turned off (for DC current output type, Output low limit value) and the PV display flashes " ‾ ‾ ‾ ‾ ".

**[Self-diagnosis]**

The CPU is monitored by a watchdog timer, and when an abnormal status is found on the CPU, the controller is switched to warm-up status.

**[Automatic cold junction temperature compensation]**(Thermocouple input type)

This detects the temperature at the connecting terminal between thermocouple and the instrument, and always maintains it at the same status as when the reference junction is located at 0℃ [32℉].

**[Power failure countermeasure]**

The setting data is backed up in non-volatile IC memory.

**[Warm-up indication]**

With thermocouple and RTD input, for approx. 3 seconds after the power is switched ON, sensor input characters and temperature unit are indicated on the PV display, and the input range high limit value is indicated on the SV display. With the DC input, for approx. 3 seconds after the power is switched ON, sensor input characters are indicated on the PV display, and scaling high limit value is indicated on the SV display.

(However, if the scaling high limit value has been changed during the Scaling high limit setting mode, the changed value will be indicated on the SV display.)

**[Auto/Manual control selection]**

If Auto/Manual control function is selected during OUT/OFF key function selection, automatic control can be switched to manual control and vice versa by pressing the OUT/OFF key (⏻ ).

When the control action is changed from automatic to manual control and vice versa, the balance/bumpless function works to prevent sudden change in Open/Closed output MV (manipulated variable).

When the control action is changed from automatic to manual control, the 1st decimal point from the right on the SV display flashes.

The Open/Closed output MV on the SV display can be increased or decreased by pressing the △ or ▽ keys and the control is performed.

(Whenever the power supply to the instrument is turned on, automatic control starts)

**Accessories**: Instruction manual 1 copy
Screw type mounting brackets 1 set
Terminal cover, JCD-35A 2 pieces (when the TC option is added)
JCR-35A 1 piece (when the TC option is added)

## 9.2 Optional specifications

### Alarm 2 (option code: A2)

When A2 action is set as Energized, the alarm action point is set by ±deviation from SV (except Process alarm).

When the input is out of the range, the output turns ON or OFF (in the case of High/Low limit range alarm).

When the alarm action is set as Deenergized, the output acts conversely.

- A2 option and LA (Loop break alarm) option are applied together, they utilize common output terminals.

Setting accuracy: The same as the Indicating accuracy

Action : ON/OFF action

Hysteresis : Thermocouple, RTD input: 0.1 to 100.0℃ (℉)
DC current, voltage input: 1 to 1000 (The placement of the decimal point follows the selection)

Output : Relay contact, 1a
Control capacity, 3A 250V AC (resistive load)
Electrical life, 100,000 times

### Loop break alarm (option code: LA)

Detects the breaking status on the loop such as heater burnout, sensor burnout or actuator trouble.

If LA option and A2 option are applied together, they utilize common output terminals.

Setting range : Loop break alarm time, 0 to 200 minutes
Loop break alarm span,
Thermocouple, RTD: 0 to 150℃(℉), 0.0 to 150.0℃(℉),
DC current, voltage input: 0 to 1500 (The placement of the decimal point follows the selection)

Output : Relay contact 1a, 3A 250V AC (Resistive load)
Electrical life, 100,000 times

### Color Black (option code: BK)

Front panel frame and case: Black

### Terminal cover (option code: TC)

Electrical shock protection terminal cover

# 10. Troubleshooting

If any malfunctions occur, refer to the following items after checking the power of the controller.

> **⚠ Warning**
>
> **Turn the power supply to the instrument off before wiring or checking. Working or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.**

### 10.1 Indication

| Problem | Presumed cause and solution |
|---|---|
| The PV display is indicating [oFF]. | • Control output OFF function is working.<br>Press the OUT/OFF key (⏻) for approx. 1 second to cancel the function. |
| [----] is flashing on the PV display. | • Burnout of thermocouple, RTD or disconnection of DC voltage (0 to 1V DC)<br>Replace each sensor.<br>**How to check whether the sensor is burnt out**<br>[Thermocouple]<br>If the input terminals of the instrument are shorted, and if a value around room temperature is indicated, the instrument is likely to be operating normally, however, the sensor may be burnt out.<br>[RTD]<br>If approx. 100Ω of resistance is connected to the input terminals between A-B of the instrument and between B-B is shorted, and if a value around 0℃ (32℉) is indicated, the instrument is likely to be operating normally, however, the sensor may be burnt out.<br>[DC voltage (0 to 1V DC)]<br>If the input terminals of the instrument are shorted, and if a scaling low limit value is indicated, the instrument is likely to be operating normally, however, the signal wire may be disconnected.<br>• Check whether the input terminal of thermocouple, RTD or DC voltage (0 to 1V DC) is securely mounted to the instrument terminal.<br>Ensure that the sensor terminals are securely connected to the instrument input terminals. |

| Problem | Presumed cause and solution |
|---|---|
| [- - - -] is flashing on the PV display. | • The input signal wire for DC voltage (1 to 5V DC) or DC current (4 to 20mA DC) may be disconnected.<br>Replace the input signal wire.<br>**How to check whether the input signal wire is disconnected**<br>[DC voltage (1 to 5V DC)]<br>If the input to the input terminal of this controller is 1V DC and if a scaling low limit value is indicated, the controller is likely to be operating normally, however, the input signal wire may be disconnected.<br>[DC current (4 to 20mA DC)]<br>If the input to the input terminal of this controller is 4mA DC and a scaling low limit value is indicated, the controller is likely to be operating normally, however, the input signal wire may be disconnected.<br>• Check whether the input signal wire of DC voltage (1 to 5V DC) and DC current (4 to 20mA DC) is securely connected to the input terminal of this controller.<br>Ensure that they are wired properly.<br>• Check whether the polarity of thermocouple or compensating lead wire is correct.<br>• Check whether codes (A, B, B) of the RTD agree with the controller terminals. Ensure that they are wired properly. |
| The value set during the Scaling low limit setting remains on the PV display. | • Check whether the input signal wire for DC voltage (0 to 5V DC, 0 to 10V DC) or DC current (0 to 20mA DC) is disconnected.<br>**How to check whether the input signal wire is disconnected**<br>[DC voltage (0 to 5V DC, 0 to 10V)]<br>If the input to the input terminal of this controller is 0V DC and if scaling low limit value is indicated, the controller is likely to be operating normally, however, the input signal wire may be disconnected.<br>[DC current (0 to 20mA DC)]<br>If the input to the input terminal of this controller is 0mA DC and if scaling low limit value is indicated, the controller is likely to be operating normally, however, the input signal wire may be disconnected.<br>• Check whether the input lead wire terminals for DC voltage (0 to 5V DC, 0 to 10V DC) or DC current (0 to 20mA DC) are securely connected to the instrument input terminals. |
| The indication of the PV display is abnormal or unstable. | • Check whether the sensor input and temperature unit (℃ or ℉) setting are correct.<br>Set the sensor input and the temperature unit properly.<br>• Sensor correcting value is unsuitable.<br>Set it to a suitable value.<br>• Sensor specification is improper.<br>Set the sensor specification properly.<br>• AC may be leaking into the sensor circuit.<br>Use an ungrounded type sensor.<br>• There may be equipment that interferes with or makes noise near the controller.<br>Keep equipment that interferes with or makes noise away from the controller. |
| PV display flashes [Err 1]. | Internal memory is defective.<br>Please contact our main office or dealers. |

### 10.2 Key operation

| Problem | Presumed cause and solution |
|---|---|
| Settings (SV, P, I, D, proportional cycle, alarm, etc.) are impossible.<br>The values do not change by the △ or ▽ key. | • Set value lock (Lock 1 or Lock 2) is selected.<br>Release the lock selection.<br>• PID auto-tuning or auto-reset is performing.<br>Cancel auto-tuning.<br>Auto-reset ends 4 minutes after it has started. |
| The setting indication does not change within the input range even if the △ or ▽ key is pressed, and new values are unable to be set. | • SV high limit or low limit may be set at the point where the value does not change.<br>Set it to a suitable value while in Auxiliary function setting mode 1. |

### 10.3 Control

| Problem | Presumed cause and solution |
|---|---|
| Process variable (temperature) does not rise. | • The sensor is out of order.<br>Replace the sensor.<br>• Check whether the sensor or control output terminals are securely mounted to the instrument input terminals.<br>• Ensure that the wiring of sensor or control output terminals is correct. |
| If the control output remains in an ON status. | • Open/Closed output MV low limit value is set to 100% in Auxiliary function setting mode 2.<br>Set it to a suitable value. |
| If the control output remains in an OFF status. | • Open/Closed output MV high limit value is set to 0% in Auxiliary function setting mode 2.<br>Set it to a suitable value. |

For all other malfunctions, please make inquiries at our agency or us.

# 11. Character table

**Photocopiable material**

**[Main setting mode]**

| Character | Setting item | Default value | Data |
|---|---|---|---|
| SV | SV | 0℃ | |

**[Sub setting mode]**

| Character | Setting item | Default value | Data |
|---|---|---|---|
| AT | AT | Cancel | |
| rSET | Auto-reset | | |
| P | Proportional band | 10℃ | |
| I | Integral time | 200sec | |
| d | Derivative time | 50sec | |
| M | ARW | 50% | |
| db | Open/Closed output dead band | 10% | |
| HYS | Open/Closed output hysteresis | 1% | |
| A1 | A1 value | 0℃ | |
| A2 | A2 value | 0℃ | |
| LP_T | LA (Loop break alarm) time | 0 minutes | |
| LP_H | LA (Loop break alarm) span | 0℃ | |

**[Auxiliary function setting mode 1]**

| Character | Setting item | Default value | Data |
|---|---|---|---|
| Lock | Set value lock | Unlock | |
| SH | SV high limit | 1370℃ | |
| SL | SV low limit | -200℃ | |
| So | Sensor correction | 0.0℃ | |

**[Auxiliary function setting mode 2]**

| Character | Setting item | Default value | Data |
|---|---|---|---|
| SEnS | Input type | K: –200 to 1370℃ | |
| SCLH | Scaling high limit | 9999 | |
| SCLL | Scaling low limit | –1999 | |
| dP | Decimal point place | No decimal point | |
| FILT | PV filter time constant | 0.0 sec | |
| oLH | Open/Closed output MV high limit | 100% | |
| oLL | Open/Closed output MV low limit | 0% | |
| AL 1F | A1 type | No alarm action | |
| AL2F | A2 type | No alarm action | |
| A1LA | A1 action Energized/Deenergized | Energized | |
| A2LA | A2 action Energized/Deenergized | Energized | |
| A1HY | A1 hysteresis | 1.0℃ | |
| A2HY | A2 hysteresis | 1.0℃ | |
| A1dY | A1 action delayed timer | 0 sec | |
| A2dY | A2 action delayed timer | 0 sec | |
| cont | Direct (Cooling)/Reverse (Heating) action | Reverse(Heating) cotrol action | |
| AT_b | AT bias | 20℃ | |
| AAnU | OUT/OFF key function | OUT/OFF function | |

**[Feedback resistance adjustment mode]**

| Character | Setting item | Default value | Data |
|---|---|---|---|
| AES | Feedback resistance adjustment | oFF | |

***** Inquiry *****

For any inquiries about this unit, please contact our agency or the shop where you purchased the unit after checking the following.

| | [Example] |
|---|---|
| • Model ---------- | JCD-35A-R/M |
| • Input type ---------- | K |
| • Option ---------- | A2 |
| • Serial number ---------- | No. xxxxxx |

In addition to the above, please let us know the details of the malfunction, if any, and the operating conditions.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