**WARNING**

If failure or error of this instrument could result in a critical accident of the system, install an external protection circuit to prevent such an accident.

- Do not turn on the power supply until all of the wiring is completed. Otherwise electric shock, fire, or malfunction may result.
- Do not use the instrument within the scope of its specifications. Otherwise fire or malfunction may result.
- Do not use this instrument in the places subject to flammable or explosive gas.
- Do not touch high-voltage blocks such as power supply terminals, etc. Otherwise electric shock may result.
- Never disassemble, repair or modify the instrument. This may cause electric shock, fire, or malfunction.

**CAUTION**

- This is a Class I instrument. In a domestic environment this instrument may cause radio interference, in which case the user is required to take adequate measures.
- This instrument is protected from electric shock by reinforced insulation. Please arrange reinforced insulation to the wires for input signal against the wires for instrument power supply, source of power and loads as far as possible.
- This instrument is manufactured on the assumption that it is used in the condition of being mounted as the instrumentation panel. Therefore, take the necessary measures on the equipment side mounted with this instrument so that the operator or other personnel are not accessible to high-voltage blocks in this instrument such as power supply terminals, etc.
- Always observe precautions described in this manual. Otherwise serious injury or accident may result.
- Conduct all of the wiring in accordance with the local codes and regulations.
- Use a protection device such as a fuse, etc. in the power supply, input or output list, if necessary.
- Do not allow metal fragments or lead wire scraps to fall into this instrument. This may cause electric shock, fire or malfunction.
- Finely tighten each terminal screw at the specified torque. Otherwise electric shock or fire may result.
- Do not place any obstacles around this instrument in order not to impede radiation of heat. And do not leave ventilation holes uncovered.
- Do not connect wires to unused terminals.
- Do not clean the instrument, always turn off the power supply.
- Remove alarms from this instrument using a soft, dry cloth. Do not use a volatile solution such as thinner in order to remove oil or dust contamination or discoloration.
- Do not rub or strike the display unit of this instrument with a hard object.

**Notice**

- This manual is subject to change without prior notice.
- Examples of figures, diagrams and numeric values used in this manual are for a better understanding of the text, but not necessarily assuring the result.
- This manual may not be reproduced or copied in whole or in part without RKC's prior consent.
- RKC assumes no responsibility for any of the following damage which the user or third party may suffer:
- Damage incurred as a result of using this product.
- Damage caused by product failure which cannot be predicted by RKC.
- Other indirect damage.
- In order to use this instrument continuously and safely, periodic maintenance is required. Some of components and parts used in this instrument have a limited service life, or deteriorate over time.

### 1. PRODUCT CHECK

Check whether the delivered product is as specified by referring to the following modal check list.

<table>
<thead>
<tr>
<th>Model code</th>
<th>C100000-#</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control action:</td>
<td>AL</td>
</tr>
</tbody>
</table>

**Input type**

- See input range table "Code".

**Input range**

- See input range table "Code".

**Control output [OUT]**

<table>
<thead>
<tr>
<th>M</th>
<th>Relay contact</th>
<th>V</th>
<th>Voltage level</th>
<th>B</th>
<th>Current to 30mA &amp; DC</th>
<th>G</th>
<th>Gain (for triac driving)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>When control output is trigger output for triac driving, only the first alarm is available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Without hold action.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>With hold action.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>As control loop break alarm only, either the first alarm or second alarm is selected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Accessories**

- Mounting brackets... 2 pcs. | Instruction manual (MMJC-191-3), 1 copy |

### 2. MOUNTING

**WARNING**

In order to prevent electric shock or instrument failure, do not turn on the power supply until all of the wiring is completed.

**Cautions for mounting**

Avoid the following when selecting the mounting location.

- Ambient temperature of less than 0°C (32°F) or more than 50°C (122°F).
- Ambient humidity of less than 45% or more than 90%.
- Rapid change in ambient temperature which may cause condensation.
- Corrosive or inflammable gases.
- Direct vibration or shock to the mainframe.
- Water, oil, chemicals, vapor or steam spills. (Avoid contact with any aqueous, caustic, organic solvents, or aggressive agents)
- Inflation due to high humidity, static electricity, condensation, magnetic fields, or noise.
- Direct airflow from an air conditioner.
- Should be used indoors where the system is not exposed to direct sunlight.
- Not to be accumulated radiation heat.

**Mounting procedures**

- When the controllers are mounted on panel with 1 to 5mm in thickness |
- Mounting the brackets already installed on the controller, insert the controller into the panel front without removing the brackets.
- When the controllers are mounted on panel with 5 to 8mm in thickness |
- Remove the mounting brackets from the controller with a flathead screwdriver. Engage each mounting bracket with holes marked with "S"-"P" on the housing and then insert the controller into the panel from the panel front.

### 3. MOUNTING

**WARNING**

In order to prevent electric shock or instrument failure, do not turn on the power supply until all of the wiring is completed.

If failure or error of this instrument could result in a critical accident of the system, install an external protection circuit to prevent such an accident.

In order to prevent electric shock or instrument failure, protect power line and the input/output lines from high currents by using fuses with appropriate ratings.

**Cautions for wiring**

1. For thermocouple input, use the specified compensation wire.
2. For RTD input, use leads with low resistance and having no resistance differences among the 3 leads.
3. Conduct input signal wiring away from instrument power, electric equipment and power lines to avoid noise induction.
4. Conduct instrument power wiring so as not to be influenced by noise from the electric equipment power. If the instrument may be affected by external noise, a noise filter should be used.
5. Recommended fuse capacity: Rated voltage: 250 V  | Rated current: 1 A | Fuse type: Time-lag fuse
6. About 5 to 6 sec are required as the preparation time for contact output after power on. Use a delay relay when the output line is used for an external interlock circuit.
7. This instrument has no power supply switch nor fuses. Therefore, install the fuse close to the instrument and the switch, if required.
8. To the instrument with power supply of 24 V, please be sure to supply the power from SELV circuit.
9. This instrument is intended to be used under the following environmental conditions. (IEC61010)

**OVERVOLTAGE CATEGORY II "POLUTION DEGREE 2"**

**Terminal configuration**

**Output rated**

- Relay contact output: 250V AC, 1A (Resistive load)
- Voltage output: 0 to 1V DC, (Load resistance 500 Ohm or more)
- Trigger output for triac driving: Zero cross rectifier to medium capacity max driving (100A) (not less)
- Load voltage: 30VAC system, 30VDC system
- Load: Resistive load

**Power supply and Power consumption**

- Power supply: 100 to 240 VAC, 50 to 60 Hz, 10VA max (at 240V AC)
- Power consumption: 10VA (at 115V AC) and 6VA (at 240V AC)
- Load: Resistive load

**Header break alarm function**

- Input characteristics: 2.5 to 0V
- Output current: 0 to 30mA (Class-IP) 0 to 100mA (Class-IB)
- Current consumption: 0.02mA (at 24V DC)
- Input voltage: Normal: 2.5V Max
- Maximum current rating: 120mA
- Minimum current rating: 25mA

**Specifications**

- 2.5 to 0V (Class-IP) 0 to 100mA (Class-IB)
- 0.02mA (at 24V DC)
- 2.5 to 0V (Class-IP) 0 to 100mA (Class-IB)
- 0.02mA (at 24V DC)
- 0.02mA (at 24V DC)
- 0.02mA (at 24V DC)
5. OPERATION

Calling-up procedure of each mode

- Press the SET key.
- Press the SET key for more than 5 sec.

- Pull-up display mode
- Input type code/input range display
- Setting digit shift key
- Set--value decrement key
- ON--value increment key
- Measured--value (PV) display unit (Green)
- Zero.Set--value/SV display unit (Orange)
- Control output (OUT) lamp (Green)
- Auto-tuning (AT) lamp (Green)
- First alarm (ALM1) lamp (Red)
- Second alarm (ALM2) lamp (Red)

This controller, with the power turned ON, displays automatically the input type code on the measuring type (PV) display unit and the input range, on the set--value (SV) display unit, respectively.

Example:
For a controller with the thermocouple input type and input range from 0 to 172°C.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Name</th>
<th>Setting range</th>
<th>Description</th>
<th>Initial value prior to shipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current transformer input</td>
<td>Setting is not possible.</td>
<td>Display input value from the current transformer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTD 1</td>
<td>First alarm</td>
<td>Differential temp. -199°C to +199°C, 0.0 to +999°C</td>
<td>Set alarm serval of first alarm.</td>
<td>50.0 to 250.0</td>
</tr>
<tr>
<td>RTD 2</td>
<td>Second alarm</td>
<td>Differential temp. -20°C to +20°C</td>
<td>Set alarm serval of second alarm.</td>
<td>0.0 to 200.0</td>
</tr>
<tr>
<td>IBA</td>
<td>Heat break alarm</td>
<td>0.0 to 100%</td>
<td>Alarm serval is set referring to input value from the current transformer(℃).</td>
<td>0.0</td>
</tr>
<tr>
<td>LBA</td>
<td>Control loop break alarm</td>
<td>0.1 to 999% ;0.1 to 999%</td>
<td>Control is set “Off”.</td>
<td>0.0</td>
</tr>
<tr>
<td>LdB</td>
<td>DBS</td>
<td>0 to 999°C ;0.1°C</td>
<td>Set the area not supporting LBA, for an LBA disabled function with “0” set.</td>
<td>0.0</td>
</tr>
<tr>
<td>LdL</td>
<td>Auto-tuning</td>
<td>0000</td>
<td>Turns the auto-tuning ON/OFF.</td>
<td>0000</td>
</tr>
</tbody>
</table>

Parameter type

The following parameter symbols are displayed one by one every time the SET key is pressed. However, some parameter symbols may not be displayed depending on the specification.

6. DISPLAY AT ERROR OCCURRENCE

Error display

- RAM failure, Incorrect set data, etc.
- Please contact us or your nearest RKC agent.

Overscale, Underscale

Overscale (Measuring value exceeds the high input display range limit.)
Underscale (Measuring value below the low input display range limit.)

Each status at input abnormality is shown in the following:

Input range table

<table>
<thead>
<tr>
<th>Input type Character</th>
<th>Range</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>T</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>L</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>D</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>X</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>K</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>S</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>N</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>J</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>B</td>
<td>0000</td>
<td>011</td>
</tr>
<tr>
<td>R</td>
<td>0000</td>
<td>011</td>
</tr>
</tbody>
</table>

Example: When a temperature 196°C is changed 290°C.
Press the A key to shift the digit lightly bright to the least significant digit. Press the A key to change "196" to "290", thereby obtaining 290°C. The same applies to set--value decrease.

- Minus(-) value setting: Example: For changing 200 to 100.
- Press the + key to shift to the digit lightly bright to the highest digit. Press the - key to decrement figures in order of "1" to "0".

Setting parameters other than set-value:
- Press the SET key for more than 5 sec. to set controller to the parameter setting mode.
- Press the SET key by the required number of times until the parameter symbol is to be set is displayed.

The setting procedures are the same as those of example 2 to 5 in the above "Setting name: PV(Setting) Settings after the setting is finished in the parameters.

- When no parameter is required, return the controller to the PV/SV display mode.

Key operation caution:
For this controller, the value whose setting was changed is not registered. It is registered for the first time it is shifted to the next parameter by pressing the SET key.
When the controller is not set to the SV setting mode the SV does not light bright or dimly even with the SET key pressed or each value does not light bright or dimly even with the controller moved to the parameter mode, set data lock is activated.
In this case, change the "LDB parameter set--value to "0100".
This controller returns to the PV/SV display mode status if key operation is not performed for more than 1 minute.

- Set data locking
- This controller is equipped with a set data locking function which disables each set--value change by the front key and also the auto--tuning function. Use this function for malfunction prevention at the end of setting.
- Press the SET key by the required number of times to show "LDB" on the measured value (PV) display unit.
- Press the A and B keys in the table at right. Thus the set data lock status can be canceled.

- NOTES
1. Do not change the upper 2 digits “01” of the set--value, as it may cause malfunction.
2. Checking each set value is possible during data lock.

- Cautions for operation
- If any problems arise due to turning on the control system, do not use the auto-tuning function. In this case, set each value to match the controlled object.
- Connect the main signal wiring and then turn ON the power. If the input signal wiring opens, the controller judges that input is disconnected to cause the Sarat output of measured value. (For thermocouple, thermometer down is also available if optional.)
- No influence is exerted on the controller for power failure of 20ms or less. For power failure of 20ms or more, the controller performs the same operation as at the time of power OFF after power recovery (This applies only when alarm action is turned OFF).
- When the set--value (SV) is changed during in the auto-tuning function, suspend the auto-tuning to perform PID control using the values before auto-tuning start.
- When the auto-tuning is suspended halfway, no values of PID and control loop break alarm are changed. (The value before auto-tuning function start is maintained.)

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