1-channel Type Temperature Controller with Built-in SSR
SB1 Installation Manual

1. OUTLINE

SB1 is a 1 channel type temperature controller with built-in SSR designed for flexible heating systems. This product is intended for use with industrial machines, test and measuring equipment. It is not designed for use with medical equipment and nuclear energy.

For detailed handling procedures and key operations, refer to separate installation and operation manuals. This manual describes the mounting, wiring and specifications only.

1.1 Preparing the strapping for pipe wrapping type

Prepare a strapping for pipe wrapping type (not included) fitting the circumference of the pipe. Then attach a banding (head) to an edge of one side of the strapping. Insert the strapping into the through holes of the pipe hanging type fitting for pipe wrapping type. Wrap the pipe with the strapping and then insert the other edge of the strapping from the opposite side and secure it with the banding (refer to the diagram below).

WARNING

- An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument.
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and equipment.
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction can occur and warranty will be void under these conditions.

High temperature caution:

The back side and the heat radiating cover of the SB1 will be hot at a high temperature when power is turned on. Do not touch the surfaces to avoid burning.

1.2 Dimensions

2. MOUNTING

2.1 Mounting Cautions

(1) The instrument is intended to be used under the following environmental conditions:

Unit: °C

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Indoor Use Altitude up to 2000 m</th>
<th>Indoor Use Altitude above 2000 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB1</td>
<td>±20 −10°C</td>
<td>±20 0°C</td>
</tr>
<tr>
<td></td>
<td>10 to +65°C</td>
<td>10 to +65°C</td>
</tr>
</tbody>
</table>

(2) Use this instrument within the following environment conditions:

- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument.
- Do not use the following items at 70°C or more:
  - Fitting and banding for pipe wrapping type
  - Strapping for pipe hanging type

2.2 Mounting procedures

(1) Make sure to mount inside a control panel (indoor use) and put power to the input terminal of the instrument for maintenance and environmental reasons.

- If the ambient temperature rises above 60°C, cool the instrument with a forced air fan, etc.
- Insert the instrument into the stand or rack.

- Excessive induction noise, static electricity, magnetic fields or noise.

Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.

- Do not connect wires to unused terminals as this will interfere with proper operation of the instrument.
- Do not use a soluble solvent such as paint thinner to clean the instrument. Deformation or discoloration will occur if a soluble solvent is used.

To avoid damage to this instrument display, do not run an abrasive material or force front panel with a hard object.

- High alarm with fast reset hold action is used in front panel, alarm does not turn off while hold action is in operation. Take measures to prevent activation of alarm which may occur if the control device fails.

NOTICE

This manual contains all the information that the reader has a fundamental knowledge of the principles of electricity, process control, computer technology and communications.

The figures, diagrams and numerics used in this manual are intended for purpose of illustration.

RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.

RKC is not responsible for damage and/or injury resulting from the use of this instrument made by the user.

- Pedestal mounting is required for safe and proper operation of this instrument. Some components have a limited tolerance of 3 mm from the floor or wall.
- No pollution of this document may be spread, modified, copied, translated, photographed or reproduced without prior written approval from RKC.

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3. WIRING

To prevent electric shock and instrument failure, do not turn on the power unit until the wiring is completed. Make sure that the wiring is correct before applying power to the instrument.

3.1 Wiring Caution:
- For thermocouple input, use the appropriate compensation wire.
- For RTD input, use low resistance lead wires with no difference in resistance between the three lead wires.
- To avoid noise injection, keep input/output signals away from instrument power line, load line and power lines of other equipment.
- If there is electrical noise in the vicinity of the input/output that could affect operation, use a noise filter.
- Shorten the distance between twisted power supply wires to achieve the most effective noise reduction.
- Always install the noise filter on a grounded panel. Minimize the wiring distance between the noise filter output and the instrument power supply terminals to achieve the most effective noise reduction.
- Do not connect fuses or other noise filter output wiring as we will reduce the effectiveness of the noise filter.
- Allow approximately 5 seconds for contact output when the instrument is turned on. Use a delay relay when the output is used for an ordinate digital circuit.
- Power supply wiring must be twisted and have a low voltage drop. The instrument input is not furnished with a power supply switch. When using a power supply switch, locate it near the instrument. To connect a fuse to the instrument externally, select one that matches the wire conditions (such as wire cross-section).
- Recommended fuse rating: Rated voltage 250 V AC, Rated current 25 A.
- Use the connector below (add separately) for the input/output connector (plug side).

Power supply/Event input/output/Communication connector (upper-side) connector:
- Model code: SB1P-C02 (Manufactured by WAGO Corporation: 721-2107037-000)
- Competitive cable diameter: 721-2107037-004
  - Wall thickness: ≤ 0.05 mm
  - Wire dia.: 0.25 mm
  - Ratings: 300 V, 1/2W

Power supply/Event input/output/Communication connector (lower-side) connector:
- Model code: SB1P-C01 (Manufactured by WAGO Corporation: 721-2107037-000)
- Competitive cable diameter: SB1P-C01 (Manufactured by WAGO Corporation: 734-108037-000)
  - Wall thickness: ≤ 0.05 mm
  - Wire dia.: 0.25 mm
  - Ratings: 300 V, 1/2W

- A small screwdriver can be used for wiring.

For isolated device input/output blocks, refer to the following:

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
<th>Name</th>
<th>Function</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB1P-B02</td>
<td>734-230</td>
<td>Push button (Connector operating lever) for Measured input / Control output connector</td>
<td>Used for isolated device input/output blocks</td>
<td>1, 2, 3, 4</td>
</tr>
</tbody>
</table>

4. SPECIFICATIONS

4.1 Measured input

<table>
<thead>
<tr>
<th>Measured input</th>
<th>Digital input/output</th>
<th>Measured input/Control output connector (lower-side) connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Pin No. 6)</td>
<td>(Pin No. 4)</td>
<td>(Pin No. 7)</td>
</tr>
</tbody>
</table>

- The pin No. 6: Unused
- The pin No. 7: Digital output (DO) / Communication function

4.2 Digital output (optional)

<table>
<thead>
<tr>
<th>Number of output</th>
<th>3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output type:</td>
<td>• Triac output (control output)</td>
</tr>
</tbody>
</table>

4.3 Specifications

<table>
<thead>
<tr>
<th>General specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage: 24 V DC (including power supply voltage variation) (5000 Hz) (Rating 24 V DC)</td>
</tr>
<tr>
<td>Power consumption: 4.5 VA max. (at 100 V AC), 0.5 VA or less (at 90 V DC)</td>
</tr>
<tr>
<td>Allowable load current: 7 A</td>
</tr>
<tr>
<td>Allowable ambient temperature: -10 to 60 °C</td>
</tr>
<tr>
<td>Allowable humidity: 0 to 80% RH</td>
</tr>
</tbody>
</table>

5. MODEL CODE

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>SB1P-C01</td>
<td>Operating tool for Measured input / Control output connector (manufactured by WAGO Corporation: 721-2107037-000)</td>
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