Digital Temperature Controller

RZ SERIES

CONTROLER

Reinforced Insulation

RKC INSTRUMENT INC.
Clear Display
Uses large high intensity LED. Clear wide view angle provides outstanding visibility

Digital Temperature Controller
RZ Series

External Dimensions

Long Operation Life
Use of high performance control relay assures long term operation.

Electrical Life
(Relay contact output) : 300,000 operations or more

Mechanical Life
(Relay contact output) : 50,000,000 operations or more

Flexible Output Configuration
This controller can incorporate up to 2 of relay contact output, voltage pulse output, or current output as OUT1 and OUT2, and 1 relay output as OUT3. Each of these outputs can be configured to control output (heat or cool), alarm output (alarm 1 or 2), and HBA output (HBA1 or 2). Output type is freely changeable to meet the requirements of different applications.

Please specify the output type (relay contact, voltage pulse or current) at the time of ordering.

Easy Maintenance
The internal assembly of the RZ Series can be removed from the front.

- Similar construction for RZ100.

Data when used at a rated value. Depending on the operating conditions, there may be some exceptions that we cannot guarantee.

- Applies to the control output relays mounted on OUT1 and OUT2 of RZ400. Depending on the operating conditions, there may be some exceptions that we cannot guarantee.

Heat-side Control Output
Cool-side Control Output
Alarm 1 Output
Alarm 2 Output
HBA 1 Output
HBA 2 Output

Output 1 (OUT1) : Relay contact, Voltage pulse, DC current
Output 1 (OUT1) Assignment
- Heat-side Control Output, Cool-side Control Output
- Alarm 1/Alarm 2 Output, HBA1/HBA2 Output

Output 2 (OUT2) : Relay contact, Voltage pulse, DC current
Output 2 (OUT2) Assignment
- Heat-side Control Output, Cool-side Control Output
- Alarm 1/Alarm 2 Output, HBA1/HBA2 Output

Output 3 (OUT3) : Relay contact
Output 3 (OUT3) Assignment
- Cool-side Control Output
- Alarm 1/Alarm 2 Output, HBA1/HBA2 Output

MADE IN JAPAN
### Specifications

- **48×48mm (1/8 DIN) RZ100**
- **48×96mm (1/4 DIN) RZ400**

#### Output 1 (OUT1)
- Not supplied
- Relay control output
- Voltage output: V
  - 0 to 30VDC
- 0 to 50VDC
- 0 to 100VDC

#### Output 2 (OUT2)
- Not supplied
- Relay control output
- Voltage output: V
  - 0 to 30VDC
- 0 to 50VDC
- 0 to 100VDC

#### CT Input
- Not supplied
- For CT L1 to N (0 to 30A): 2 points
- For CT L2 to S (0 to 10A): 2 points

#### Communication
- 485 (ANSI/RS485)
- MODBUS (protocol)

#### Waterproof/ Dustproof
- Not supplied
- Not supplied

#### Input Range (Quick start codes)
- **Thermocouple**
  - K (0 to 1372°C)/
  - J (0 to 1250°C)
- **CT Input**
  - 0 to 400°C
  - 0 to 1000°C
  - 0 to 2000°F
  - 0 to 3000°F

### PID Control with AT (Code: F/D)
- **Type**
  - Heat/Cool PID control
  - Heat/Cool PID control with AT
  - Heat/Cool PID control with AT for extruder
  - Heat/Cool PID control with AT for extruder (Air cooling type)
  - Heat/Cool PID control with AT (Reverse action)

### Control Method
- **Output Assignment**
  - PID control with AT (Direct action)
  - Heat/Cool PID control with AT
  - Cool-side Output (Heat/Cool PID control with AT)
  - Cool-side Output (Reverse action)

### Input Range
- **Thermocouple K** 0 to 400°C

### Quick Start Codes 2
- **Quick start code** tells the factory to ship with each parameter preset to the values detailed as specified by the customer.

### Model and Suffix Codes

#### Input Range Codes

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Range</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>K (JIS/IEC)</td>
<td>0 to 200°C</td>
<td>K01</td>
</tr>
<tr>
<td></td>
<td>0 to 400°C</td>
<td>K02</td>
</tr>
<tr>
<td></td>
<td>0 to 600°C</td>
<td>K03</td>
</tr>
<tr>
<td></td>
<td>0 to 1000°C</td>
<td>K04</td>
</tr>
<tr>
<td></td>
<td>0 to 1200°C</td>
<td>K05</td>
</tr>
<tr>
<td></td>
<td>0 to 1600°C</td>
<td>K06</td>
</tr>
<tr>
<td></td>
<td>0 to 2000°C</td>
<td>K07</td>
</tr>
<tr>
<td></td>
<td>0 to 2000°F</td>
<td>K08</td>
</tr>
<tr>
<td></td>
<td>0 to 100°C</td>
<td>K09</td>
</tr>
<tr>
<td></td>
<td>0 to 300°C</td>
<td>K10</td>
</tr>
<tr>
<td></td>
<td>0 to 500°C</td>
<td>K11</td>
</tr>
<tr>
<td></td>
<td>0 to 1000°C</td>
<td>K12</td>
</tr>
<tr>
<td></td>
<td>0 to 1300°C</td>
<td>K13</td>
</tr>
<tr>
<td></td>
<td>0 to 1372°C</td>
<td>K14</td>
</tr>
<tr>
<td></td>
<td>0 to 2048°C</td>
<td>K15</td>
</tr>
<tr>
<td></td>
<td>0 to 4000°C</td>
<td>K16</td>
</tr>
<tr>
<td></td>
<td>0 to 0.0°C</td>
<td>K17</td>
</tr>
<tr>
<td></td>
<td>0 to 50.0°C</td>
<td>K18</td>
</tr>
<tr>
<td></td>
<td>0 to 100.0°C</td>
<td>K19</td>
</tr>
<tr>
<td></td>
<td>0 to 200.0°C</td>
<td>K20</td>
</tr>
<tr>
<td></td>
<td>0 to 400.0°C</td>
<td>K21</td>
</tr>
<tr>
<td></td>
<td>0 to 100.0°C</td>
<td>K22</td>
</tr>
<tr>
<td></td>
<td>0 to 200.0°C</td>
<td>K23</td>
</tr>
<tr>
<td></td>
<td>0 to 400.0°C</td>
<td>K24</td>
</tr>
<tr>
<td></td>
<td>0 to 100.0°C</td>
<td>K25</td>
</tr>
<tr>
<td></td>
<td>0 to 200.0°C</td>
<td>K26</td>
</tr>
<tr>
<td></td>
<td>0 to 400.0°C</td>
<td>K27</td>
</tr>
<tr>
<td></td>
<td>0 to 100.0°C</td>
<td>K28</td>
</tr>
<tr>
<td></td>
<td>0 to 200.0°C</td>
<td>K29</td>
</tr>
<tr>
<td></td>
<td>0 to 400.0°C</td>
<td>K30</td>
</tr>
</tbody>
</table>

#### Control Method

<table>
<thead>
<tr>
<th>Code</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>PID control type</td>
</tr>
<tr>
<td>B</td>
<td>Heat/Cool PID control</td>
</tr>
<tr>
<td>C</td>
<td>Heat/Cool PID control with AT</td>
</tr>
<tr>
<td>D</td>
<td>Heat/Cool PID control with AT for extruder</td>
</tr>
<tr>
<td>E</td>
<td>Heat/Cool PID control with AT for extruder (Air cooling type)</td>
</tr>
<tr>
<td>F</td>
<td>Heat/Cool PID control with AT (Reverse action)</td>
</tr>
</tbody>
</table>

#### Output Assignment

<table>
<thead>
<tr>
<th>Code</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cool-side Output</td>
</tr>
<tr>
<td>2</td>
<td>Heat-side Output</td>
</tr>
</tbody>
</table>

### Example of Model Codes and Quick Start Codes

#### Input Range
- **Thermocouple K** 0 to 400°C

#### Quick Start Codes

- **Alarm 1**: Deviation High
- **Alarm 2**: Deviation Low
- **OUT1** and **OUT2**: Cool-side Control Output
- **OUT3**: Heat-side Control Output

### Factory Setting Codes

#### Control Method
- **Heat/Cool PID Control (Water Cooling)**
- **Heat/Cool PID Control (Air Cooling)**

#### Model and Suffix Codes

### Quick Start Codes

#### Alarm 1
- **Deviation High**

#### Alarm 2
- **Deviation Low**

#### Out 1
- **Cool-side Control Output**

#### Out 2
- **Heat-side Control Output**

#### Out 3
- **Heat/Cool PID Control (Water Cooling)**
- **Heat/Cool PID Control (Air Cooling)**
Main Specifications

Input

<table>
<thead>
<tr>
<th>Input type</th>
<th>Thermocouple K, J, T, E, S, R, B, N (US/IEC) PL-5 (NBS), W5Re/W6Re (ASTM), U, L (DIN)</th>
<th>RTD Pt100 (US/IEC), JPt100 (JS) + 3-wire system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling time</td>
<td>2.2/sec</td>
<td></td>
</tr>
<tr>
<td>Influences of external resistance</td>
<td>0.2%/v²/°C (Thermocouple input)</td>
<td></td>
</tr>
<tr>
<td>Notes on input</td>
<td>Maximum 10Ω per wire</td>
<td></td>
</tr>
<tr>
<td>CT1 input</td>
<td>(1) Number of input/outputs = 1 (2) input range = CTL-6-P-N</td>
<td>0.0 to 30.0 A</td>
</tr>
<tr>
<td></td>
<td>(3) Current input, CTL-12-S56-10L-N</td>
<td>0.0 to 100.0 A</td>
</tr>
</tbody>
</table>

PID control (With autotuning)

- Compensation error
- Temperature
- Cold junction

Additional function

- (CT) input
- Sampling time
- Input type: resistance
- Influence of external resistance
- Influence of lead resistance

Measuring accuracy table

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>K, J, T, E, Plas</td>
<td>Lower than -100°C (140°F)</td>
<td>± (2.0°C [3.6°F] + 1 digit)</td>
</tr>
<tr>
<td></td>
<td>-100 to 500°C (140 to 932°F)</td>
<td>± (1.0°C [1.8°F] + 0.2% of Reading + 1 digit)</td>
</tr>
<tr>
<td></td>
<td>500°C (932°F) or higher</td>
<td>± (0.2% of Reading + 1 digit)</td>
</tr>
<tr>
<td>N, R, S</td>
<td>0 to 100°C (32 to 183°F)</td>
<td>± (2.0°C [3.6°F] + 1 digit)</td>
</tr>
<tr>
<td></td>
<td>100 to 200°C (320 to 392°F)</td>
<td>± (1.0°C [1.8°F] + 0.2% of Reading + 1 digit)</td>
</tr>
<tr>
<td></td>
<td>200°C (392°F) or higher</td>
<td>± (0.2% of Reading + 1 digit)</td>
</tr>
<tr>
<td>B</td>
<td>Lower than 400°C (752°F)</td>
<td>± (2.0°C [3.6°F] + 1 digit)</td>
</tr>
<tr>
<td></td>
<td>400°C (752°F) or higher</td>
<td>± (1.0°C [1.8°F] + 0.2% of Reading + 1 digit)</td>
</tr>
<tr>
<td></td>
<td>500°C (932°F) or higher</td>
<td>± (0.2% of Reading + 1 digit)</td>
</tr>
</tbody>
</table>

Control

Control method

- PID control (With autotuning)
- P, PI, PD, ON/OFF control selectable
- Direct action/Reverse action is selectable
- Heat/Cool type PID control (With autotuning)

Setting range

- Proportional band: 110 to 110°C to span ( °C, °F) - Within 9999.9999 (°C) - (PD control when P = 0)
- Integral time: 1 to 3000 sec (PD control when D = 0)
- Derivative time: 1 to 3000 sec (PI control when D = 0)
- Blackout protection: 1 to 100% of heat side proportional band
- *50% of heat side proportional band
- *Invalidity when P = 0.
- * Only cooling side ON/OFF control is not available.
- Anti-Reset Windup(ARW): 1 to 100% of heat side proportional band
- (Integral action is OFF when ARW = 0)
- Proportional cycle time: 0 to 100 sec

Rear Terminals

RZ400

- Power supply input: 100 to 240V AC
- Output 1 (OUT1): (1) Relay contact (2) Voltage pulse
- Output 2 (OUT2): (1) Relay contact (2) Voltage pulse
- Output 3 (OUT3): (1) Relay contact (2) Voltage pulse

RZ100

- Power supply input: 100 to 240V AC
- Output 1 (OUT1): (1) Relay contact (2) Voltage pulse
- Output 2 (OUT2): (1) Relay contact (2) Voltage pulse
- Output 3 (OUT3): (1) Relay contact (2) Voltage pulse

Outlook

Number of outputs: Up to 3 points (OUT1 to OUT3)

Type of relay output: Alarm output, HBA (Heater break alarm) output

Output function

- OUT1 and OUT2: Control output
- OUT3: Control output, Alarm output, HBA output

Additional function

- Fine tuning, Startup tuning, Auto tuning, RUN/STOP

Accessory

Model Code: KCA100-517 | KFB400-58

For more information, please visit: http://www.rkcinst.com/