1. PRODUCT CHECK

SA100L □□□□□□□□□□□ （1）（2）（3）（4）（5）（6）（7）（8）（9）

(1) Input type/Range code
See 11. INPUT CODE TABLES. (P. 10)

(2) Output 1 (Limit output or Transmission output)
M: Relay contact output 7: Current output (0 to 20 mA DC)
6: Current output (4 to 20 mA DC)

(3) Output 2 (Limit output or Alarm output)
N: No output M: Relay contact output
When the output 1 is “7” or “8,” output 2 is fixed to “M.”

(4) Power supply voltage
3: 24 V AC/DC 4: 100 to 240 V AC

(5) Alarm 1 and (6) Alarm 2
N: No alarm G: Deviation high/low alarm 1
A: Deviation high alarm H: Process high alarm
B: Deviation low alarm J: Process low alarm
C: Deviation high/low alarm K: Process high alarm 1
D: Band alarm L: Process low alarm 1
E: Deviation high alarm 1 V: SV high alarm
F: Deviation low alarm W: SV low alarm

(7) Option function
N: No function D: Contact input
5: RS-485 (RKC communication) 6: RS-485 (Modbus)

(8) Waterproof/dustproof
N: No waterproof/dustproof 1: Waterproof/dustproof

(9) Output assignment code
No symbol: Standard output
When the OUT1 is relay contact output;
- OUT1: Limit output 2
- OUT2: OR output of alarm 1 and alarm 2 3

When the OUT1 is current output;
- OUT1: Transmission output
- OUT2: Limit output 2
- OUT2: OR output of alarm 1 and alarm 2 3

02: OUT1: Limit output 2, OUT2: AND output of alarm 1 and alarm 2 3
03: OUT1: Limit output 2, OUT2: Alarm 1 output 3
04: OUT1: Limit output 2, OUT2: OR output of alarm 1 and alarm 2 3
05: OUT1: Limit output 2, OUT2: AND output of alarm 1 and alarm 2 2
06: OUT1: Limit output 2, OUT2: Alarm 1 output 2
07: OUT1: Limit output 2, OUT2: OFF
08: OUT1: Limit output 3, OUT2: OR output of alarm 1 and alarm 2 2
09: OUT1: Limit output 3, OUT2: AND output of alarm 1 and alarm 2 2
10: OUT1: Limit output 3, OUT2: Alarm 1 output 3
11: OUT1: Limit output 3, OUT2: OR output of alarm 1 and alarm 2 2
12: OUT1: Limit output 3, OUT2: AND output of alarm 1 and alarm 2 2
13: OUT1: Limit output 3, OUT2: Alarm 1 output 2
14: OUT1: Limit output 3, OUT2: OFF
16: OUT1: Transmission output, OUT2: Limit output 3

1 With hold action 2 De-energized 3 Energized

2. MOUNTING

To prevent electric shock or instrument failure, always turn off the power before mounting or removing the instrument.

2.1 Mounting Cautions
(1) This instrument is intended to be used under the following environmental conditions. [OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]
(2) Use this instrument within the following ambient temperature and ambient humidity.
- Allowable ambient temperature: 0 to 50 °C
- Allowable ambient humidity: 45 to 85 %RH (Absolute humidity: MAX. W. C 29 g/m³ dry air at 101.3 kPa)
(3) Avoid the following when selecting the mounting location.
- Rapid changes in ambient temperature which may cause condensation.
- Corrosive or inflammable gases.
- Direct vibration or shock to the mainframe.
- Water, oil, chemicals, vapor or steam splashes.

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- Excessive dust, salt or iron particles.
- Excessive induction noise, static electricity, magnetic fields or noise.
- Direct air flow from an air conditioner.
- Exposure to direct sunlight.
- Excessive heat accumulation.

(4) Mounting consideration
- Install the instrument 200 mm away from the main power line.
- If the ambient temperature rises above 50 °C, cool this instrument with a forced air fan, cooler, or the like. However, do not allow cooled air to blow this instrument directly.

2.2 Dimensions

■ External dimension

(Unit: mm)

2.3 Mounting Procedures

■ DIN rail mounting

1. Mounting the socket to the DIN rail. (Fig. 1)
2. Wiring to the socket. Then, mounting the instrument to the socket.
3. Secure the instrument by locking it with the hooks at the top and bottom of the socket. (Fig. 2)

■ Panel cutout

(Unit: mm)

Installation Conditions: The display cannot be seen from the outside of the visual field range. The visual field range of SA100L is 40° to the upper side, and 30° to the lower side from the center of the display vertically.

For mounting of the SA100L, panel thickness must be between 1 to 10 mm.

2.3 Mounting Procedures

■ DIN rail mounting

1. Prepare the panel cutout as specified in 2.2 Dimensions.
2. Insert the instrument through the panel cutout.
3. Insert the mounting frame into the mounting from the rear of the instrument.
4. Push the mounting frame forward until the frame is firmly secured to the panel.
5. Mounting the socket to the instrument.

Panel mounting

1. Please prepare mounting frame and socket with a customer.
2. Panel mounting type: KCA100-59 (RKC product, Sold separately)
3. Recommended socket for panel mounting: AT78051 (Matsushita Denko product)
4. The waterproof/dustproof option on the front of the instrument conforms to IP66 when mounted on the panel.
5. For effective waterproof/dustproof, the gasket must be securely placed between instrument and panel without any gap. If gasket is damaged, please contact RKC sales office or the agent.

3. Wiring

3.1 Wiring Cautions

- For thermocouple input, use the appropriate compensation wire.
- For RTD input, use low resistance lead wire with no difference in resistance between the three lead wires.
- To avoid noise induction, keep input signal wire away from instrument power line, load lines and power lines of other electric equipment.
- If there is electrical noise in the vicinity of the instrument that could affect operation, use a noise filter.
- Shorten the distance between the twisted power supply wire pitches 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 switches to the noise filter output wiring as this will reduce the effectiveness of the noise filter.
- About four seconds are required as preparation time for contact output every time the instrument is turned on. Use a delay relay when the output line is used for an external interlock circuit.
- Power supply wiring must be twisted and have a low voltage drop.
- For an instrument with 24 V power supply, supply power from a SELV circuit.
- This instrument is not furnished with a power supply switch or fuse. Therefore, if a fuse or power supply switch is required, install close to the instrument.
- Recommended fuse rating: Rated voltage 250 V, Rated current 1 A
- Fuse type: Time-lag fuse
- For the current input specification, a resistor of 250 Ω (+0.02 % ±10 ppm, 0.25 W or more) must be connected between the input terminals. If this resistor is installed, close vertical mounting is not possible. This resistor must be provided by the customer.
- The input and output terminals for the voltage pulse output are not isolated. Always use an isolating type SSR. If the grounded type sensor is used, do not ground output wiring. Do not connect any output wires to the terminals with any other output wires.
3.2 Terminal configuration

- **Socket for DIN rail mounting (ATC180041)**

  - **Output terminals**
    - Relay contact terminals
    - OUT2
    - NC
    - NO
  - **Input terminals**
    - TC
    - +
    - −
    - 1
    - 2
  - **Current**
  - **Power terminals**
    - L
    - 100-240 V
    - AC
    - N
    - +
    - −
    - 24 V
    - DC

- **Socket for panel mounting (AT78051)**

  - **Output terminals**
    - Relay contact terminals
    - OUT1
    - NC
    - NO
  - **Input terminals**
    - TC
    - +
    - −
    - 1
    - 2
  - **Current**
  - **Power terminals**
    - L
    - 100-240 V
    - AC
    - N
    - +
    - −
    - 24 V
    - DC

**Option**

Communication function and contact input are optional. Connect connector to bottom of instrument. A connector and connector cable for connecting the input block is necessary to be prepared by the customer.

- Housing: XHP-3 (J.S.T. Mfg. Co., Ltd. product)
- Recommended cable size: AWG30 to 22

- **Connector position**
  - Front
  - The bottom of the instrument

**4. PARTS DESCRIPTION**

- **UP key**
  - Increase numerals.
- **DOWN key**
  - Decrease numerals.
- **Shift & Reset key (<: Shift key, RST: Reset key)**
  - Shift digits when settings are changed.
  - The limit output is released (reset).
- **SET key**
  - Used for parameter calling up and set value registration.

**Communication**

- 1: SG
- 2: T/R (A)
- 3: T/R (B)

**Contact input**

- 1: Di1
- 2: Di2

- Di1: Reset
- Di2: Interlock release

**Indication lamps**

- 1: Measured value (PV) display [Green]
  - Displays PV or various parameter symbols.
- 2: Set value (SV) display [Red]
  - Displays limit set value (SV) or various parameter set values.
- 3: Indication lamps
  - Output lamps (OUT1, OUT2) [Green]
  - OUT1: Lights when output 1 is turned on.
  - OUT2: Lights when output 2 is turned on.
  - EXCD lamp [Red]
  - Lights while a measured value (PV) exceeds the limit set value (SV).
  - Alarm lamps (ALM1, ALM2) [Red]
  - ALM1: Lights when alarm 1 is turned on.
  - ALM2: Lights when alarm 2 is turned on.
- 4: UP key
- 5: DOWN key
- 6: <RST key
- 7: SET key

- To avoid damage to the instrument, never use a sharp object to press keys.
5. SETTING

Input type and input range display
When the instrument is powered on, it immediately confirms the input type and input range.

[Example] Input type: Thermocouple K, Input range: 0 to 1372 °C

SV Setting & Monitor Mode
When the power is turned on, the controller goes to this mode after self-diagnostic. To go to the next parameter, press SET key. In this mode, the following operations are possible.

- Set the limit set value (SV).
- The blinking digit on the SV display indicates which digit can be set.
- Monitor the measured value (PV), limit set value (SV), peak hold value, bottom hold value and time exceeding the time limit.

Input Type Symbol Table

Symbol | Contents of output |
-------|-------------------|
Pu    | Measured value (PV) |
SV    | Set value (SV) |
DEv   | Deviation (DEV) |

Analog output specification

Symbol | Contents of output |
-------|-------------------|
Pu    | Measured value (PV) |
SV    | Set value (SV) |
DEv   | Deviation (DEV) |

Analog output scale high
Setting range: Measured value (PV): Same as input range
Deviation (DEV): −span to +span
Factory set value: Temperature input: 100.0
Voltage input: 100.0

Analog output scale low
Setting range: Measured value (PV): Same as input range
Deviation (DEV): −span to +span
Factory set value: Temperature input: 0.0
Voltage input: 0.0

Alarm Setting

Alarm 1 (ALM1) Setting range: Process alarm, SV alarm: Same as input range.
Factory set value: Temperature input: 50 (50.0)
Voltage input: 5.0

Alarm 1 timer Setting range: 0 to 9999 seconds (0: OFF)
Factory set value: 0

Alarm 2 (ALM2) Setting range: Process alarm, SV alarm: Same as input range.
Factory set value: Temperature input: 50 (50.0)
Voltage input: 5.0

Alarm 2 timer Setting range: 0 to 9999 seconds (0: OFF)
Factory set value: 0

PV bias Setting range: −span to +span
Factory set value: Temperature input: 0 (0.0)
Voltage input: 0.0

PV ratio Setting range: 0.500 to 1500
Factory set value: 1000

Digital filter Setting range: 0 to 100 seconds (0: OFF)
Factory set value: 0

Parameter Setting Mode

Alarm 1 (ALM1) Setting range: Process alarm, SV alarm: Same as input range.
Factory set value: Temperature input: 50 (50.0)
Voltage input: 5.0

Alarm 1 timer Setting range: 0 to 9999 seconds (0: OFF)
Factory set value: 0

Alarm 2 (ALM2) Setting range: Process alarm, SV alarm: Same as input range.
Factory set value: Temperature input: 50 (50.0)
Voltage input: 5.0

Alarm 2 timer Setting range: 0 to 9999 seconds (0: OFF)
Factory set value: 0

PV bias Setting range: −span to +span
Factory set value: Temperature input: 0 (0.0)
Voltage input: 0.0

PV ratio Setting range: 0.500 to 1500
Factory set value: 1000

Digital filter Setting range: 0 to 100 seconds (0: OFF)
Factory set value: 0

Analog output specification

Symbol | Contents of output |
-------|-------------------|
Pu    | Measured value (PV) |
SV    | Set value (SV) |
DEv   | Deviation (DEV) |

Analog output scale high
Setting range: Measured value (PV): Same as input range
Deviation (DEV): −span to +span
Factory set value: Temperature input: 100.0
Voltage input: 100.0

Analog output scale low
Setting range: Measured value (PV): Same as input range
Deviation (DEV): −span to +span
Factory set value: Temperature input: 0.0
Voltage input: 0.0

Set data lock
Setting range: 0 (Unlock) 1 (Lock)
Factory set value: 0000

Setting Lock level

<table>
<thead>
<tr>
<th>Setting</th>
<th>Lock level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>SV and all parameter can be set.</td>
</tr>
<tr>
<td>0001</td>
<td>Only SV and alarms can be set.</td>
</tr>
<tr>
<td>0010</td>
<td>Only setting items other than SV can be set.</td>
</tr>
<tr>
<td>0100</td>
<td>Only setting items other than SV and alarms can be set.</td>
</tr>
<tr>
<td>1010</td>
<td>Only setting items other than SV and alarms can be set.</td>
</tr>
<tr>
<td>1011</td>
<td>Only setting items other than SV and alarms can be set.</td>
</tr>
<tr>
<td>1111</td>
<td>SV and all parameter cannot be set.</td>
</tr>
</tbody>
</table>

If the key is not pressed for more than one minute, the display will automatically return to the SV Setting & Monitor Mode.

Display changes automatically

Input Type/Input Range Display (Display for approx. 4 sec.)
Changing Parameter Settings

Procedures to change parameter settings are shown below.

To store a new value for the parameter, always press the SET key. The display changes to the next parameter and the new value will be stored. A new value will not be stored without pressing SET key after the new value is displayed on the display.

After a new value has been displayed by using the UP and DOWN keys, the SET key must be pressed within one minute, or the new value is not stored and the display will return to the SV setting & Monitor mode.

When the set data is locked, the digits on the SV display are brightly lit and the set value cannot be changed.

Change the limit set value (SV)

Change the limit set value (SV) from 0 °C to 200 °C

1. Select the limit set value (SV) setting

Press the SET key at SV Setting & Monitor Mode until limit set value (SV) setting screen is displayed.

2. Shift the blinking digit

Press the <RST key to blink the hundreds digit. The blinking digit indicates which digit can be set.

3. Change the limit set value

Press the UP key to change the number to 2.

4. Store the limit set value

Press the SET key to store the new set value. The display returns to the PV/SV monitor screen.

Change parameters other than the limit set value (SV)

The changing procedures are the same as those of example 2. to 4. in the above “Change the limit set value (SV).” Pressing the SET key after the setting end shifts to the next parameter. When no parameter setting is required, return the instrument to the SV Setting & Monitor Mode.

6. OPERATION

CAUTIONS

- All mounting and wiring must be completed before the power is turned on. If the input signal wiring is disconnected or short-circuited (RTD input only), the instrument determines that burnout has occurred.
  - Displays:
    - Upscale: Thermocouple input (specify when ordering), RTD input (when input break)
    - Downscale: Thermocouple input (specify when ordering), RTD input (when short-circuited), Voltage input
  - Outputs:
    - Limit output: OFF
    - Alarm action: Both of the Alarm 1 and Alarm 2 actions of this instrument are turned on when burnout occurs regardless of any of the following actions taken (High alarm, low alarm, etc.). In addition, when used for any purposes other than these alarms (event, etc.), set “0000” to the process abnormality action selection (AEo1, AEo2) of “8.7 Function Block 41 (F41), 42 (F42).”
  - A power failure of 20 ms or less will not affect the control action. When a power failure of more than 20 ms occurs, the instrument assumes that the power has been turned off. When power returns, the controller will retain the conditions that existed prior to shut down.
  - The alarm hold action is activated when not only the power is turned on, but also the SV is changed.

6.1 Operation Procedures

1. Prior to starting operation, check that the mounting and wiring have been finished, and that the limit set value (SV) and various parameters have been set.
2. This instrument does not have a power supply switch.
3. If the power is turned ON, the limit signal continues to be output until the <RST key is pressed regardless of a measured value. First, press the <RST key briefly for one (or more seconds*), then start operation.
   * Key operation differs depending on the setting in Reset key operation time selection. (P. 9)

The “peak hold value” and “over time” are reset even when the power is turned OFF.

7. FUNCTIONS

7.1 PV Bias

The value set in the PV bias is added to the input value (actual measured value) to correct the input value. The PV bias is used to correct the individual variations in the sensors or when there is difference between the measured values (PV) of other instruments.

7.2 Digital Filter

This is a software filter which reduces input value variations caused by noise. If the time constant of this filter is set appropriately to match the characteristics of the controlled object and the noise level, the effects of input noise can be suppressed. However, if the time constant is too small, the filter may not be effective, while if the time constant is too large, then the input response may actually deteriorate.

7.3 Set Data Lock (LCK)

The set data lock function permits locking of critical parameters and prevents unauthorized personnel from changing parameters.

7.4 Alarms

Both of the Alarm 1 and Alarm 2 outputs of this instrument are turned on when burnout occurs regardless of any of the following actions taken (High alarm, low alarm, etc.). In addition, when used for any purposes other than these alarms (event, etc.), set “0000” to the process abnormality action selection (AEo1, AEo2) of “8.7 Function Block 41 (F41), 42 (F42).” Each alarm action is shown below.

### Deviation high alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Alarm set value is greater than 0)</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>(Alarm set value is less than 0)</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Deviation low alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Alarm set value is greater than 0)</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>(Alarm set value is less than 0)</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Deviation high/low alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Band alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>(Alarm set value is greater than 0)</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>(Alarm set value is less than 0)</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Process high alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Low</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Process low alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>(Alarm set value is greater than 0)</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>(Alarm set value is less than 0)</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### SV high alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### SV low alarm

<table>
<thead>
<tr>
<th>Condition</th>
<th>PV Output</th>
<th>SV Output</th>
<th>Alarm Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

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8. INITIAL SETTING

### WARNING

Parameters in the Engineering mode should be set according to the application before setting any parameter related to operation. Once the parameters in the Engineering mode are set correctly, those parameters are not necessary to be changed for the same application under normal conditions. If they are changed unnecessarily, it may result in malfunction or failure of the instrument. RKC will not bear any responsibility for malfunction or failure as a result of improper changes in the Engineering mode.

8.1 Go to Engineering Mode

1. Turn on the power to this controller. The instrument goes to the PV/SV monitor after confirming input type symbol and input range.
2. Press the SET key for 2 seconds with the SV Setting & Monitor Mode change the instrument to parameter setting mode.
3. Press the SET key until "LCK" (Set Data Lock display) will be displayed.
4. Press the UP key to change 0 to 1.
5. Press the SET key until "F10" for function block is displayed first.
6. Press the SET key to store the new set value. The display goes to the first parameter in Parameter Setting Mode, and the Engineering Mode is unlocked.
7. Press the <RST key for 2 seconds while pressing the SET key to go to the Engineering Mode. Thus, the symbol "F10" for function block is displayed first.

8.2 Engineering Menu

Display flowcharts in engineering mode are shown in the following.

Do not change to the section parameters and any parameter in the engineering mode which is not described in the engineering menu below. It may result in malfunction or failure of the instrument.

- **Set data lock function display**

8.3 Attention Items in Setting

If any of the following parameter is changed, the relevant set value is initialized or is automatically converted.

- **Before changing the set values, always record all of them (SV setting & monitor mode, parameter setting mode and engineering mode).**
- **After changing the set values, always check all of them (SV setting & monitor mode, parameter setting mode and engineering mode).**

#### When the input type or engineering unit is changed

The set value is initialized.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temperature</td>
<td>Voltage</td>
</tr>
<tr>
<td></td>
<td>input</td>
<td>input</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PV bias</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Digital filter</td>
<td>0.0</td>
</tr>
</tbody>
</table>

#### When the position of the decimal point is changed

When change a decimal point position, it is converted into about set value of a list shown below automatically. Set it in value to use once again.

- **Example and caution of automatic conversion**

Example: When the position of the decimal point changed from 0 to 1 with SLH set to 800 °C.

```
SLH 800
```

(Changed from 800 to 800.0)

Continued on the next page.
Continued from the previous page.

- If the setting range is not between ~1999 and ~9999 regardless of the position of the decimal point, it is limited by the range from ~1999 to ~9999.

Example: Suppose set SLH is 1372 °C, if change decimal point position from 0 to 1.

![](SLH:1372) ⇒ ![](SLH:9999)

If the number of digits below the decimal point is changed in the decreasing direction, the decreased number of digits is omitted.

Example: Suppose SLH is 99.99, if change decimal point position from 0 to 2.

![](SLH:9999) ⇒ ![](SLH:9)

The figures below the decimal point are omitted, and as a result SLH becomes 99.

---

**8.4 Function Block 10 (F10)**

- **Monitor display configuration selection (dCHG)**

  Factory set value: 0000

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>PV/SV display</td>
<td>0002</td>
<td>Only SV display</td>
</tr>
<tr>
<td>0001</td>
<td>Only PV display</td>
<td>0003</td>
<td>Three decimal places (PGdP)</td>
</tr>
</tbody>
</table>

Displays becomes as follows.

<table>
<thead>
<tr>
<th>PV/SV display (dCHG=0000)</th>
<th>Only PV display (dCHG=0002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV SV 50</td>
<td>PV SV 200</td>
</tr>
<tr>
<td>200 50</td>
<td></td>
</tr>
</tbody>
</table>

- **Change settings**

  Example: Change the monitor display configuration selection from "PV/SV display" to "Only PV display."

  1. Change the instrument to the function block symbol display "F10."
  2. Press the SET key at "F10" until "dCHG (Monitor display configuration selection)" is displayed.
  3. Press the UP key to change the number to 1.
  4. Press the SET key to store the new set value. The display goes to the next parameter.

---

**8.5 Function Block 21 (F21)**

(1) **Input type selection (InP)**

Input type (TC/RTD to voltage input or voltage input to TC/RTD) cannot be changed because the hardware is different.

Factory set value varies depending on the instrument specification.

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>TC</td>
<td>0004</td>
<td>Voltage</td>
</tr>
<tr>
<td>0001</td>
<td>J</td>
<td>0005</td>
<td>&quot;0 5 V DC&quot;</td>
</tr>
<tr>
<td>0002</td>
<td>R</td>
<td>0006</td>
<td>&quot;1 5 V DC&quot;</td>
</tr>
<tr>
<td>0003</td>
<td>S</td>
<td>0007</td>
<td>&quot;0 to 10 V DC&quot;</td>
</tr>
<tr>
<td>0008</td>
<td>W5Re/W26Re</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Change settings**

  Example: Change the input type from "K" to "J"

  1. Change the instrument to the function block symbol display.
  2. See 8.1 Go to Engineering Mode (P. 6).
  3. Press the SET key to change the parameter to "dCHG." Then, press the UP key to enter 1 in the units digit of the set value (SV) display.
  4. Press the SET key to store the new set value. The display goes to the next parameter.

(2) **Display unit selection (UnIT)**

 Displays becomes as follows.

<table>
<thead>
<tr>
<th>PV/SV display</th>
<th>Only SV display</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV SV 50</td>
<td>PV SV 200</td>
</tr>
<tr>
<td>200 50</td>
<td></td>
</tr>
</tbody>
</table>

- **Change settings**

  Example: Change the temperature unit of the Heat only type from °C (0000) to °F (0001)

  1. Press the SET key at "F21" until "UnIT" is displayed.
  2. Press the UP key to change the number to 1.
  3. Press the SET key to store the new set value. The display goes to the next parameter.

(3) **Decimal point position (PGdP)**

Factory set value varies depending on the instrument specification.

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>No decimal place</td>
</tr>
<tr>
<td>0001</td>
<td>One decimal place</td>
</tr>
<tr>
<td>0002</td>
<td>Two decimal places</td>
</tr>
<tr>
<td>0003</td>
<td>Three decimal places</td>
</tr>
</tbody>
</table>

Continued on the next page.
8.7 Function Block 41 (F41), 42 (F42)

(1) Alarm 1 type selection (AS1)
Alarm 2 type selection (AS2)

See 8.3 Attention Items in Setting (P. 6).

Factory set value varies depending on the instrument specification.

### Set value
### Description
<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Alarm not provided</td>
<td>0005</td>
<td>Deviation high alarm</td>
</tr>
<tr>
<td>0001</td>
<td>SV high alarm</td>
<td>0006</td>
<td>Deviation low alarm</td>
</tr>
<tr>
<td>0002</td>
<td>SV low alarm</td>
<td>0007</td>
<td>Deviation high/low alarm</td>
</tr>
<tr>
<td>0003</td>
<td>Process high alarm</td>
<td>0008</td>
<td>Band alarm</td>
</tr>
<tr>
<td>0004</td>
<td>Process low alarm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Change settings
Example: Change the SV range from "Deviation high alarm (0005)" to "Deviation low alarm (0006)"
1. Press the UP key to change the number to 6.
2. Press the SET key to store the new set value. The display goes to the next parameter.

(2) Alarm 1 hold action selection (AHo1)
Alarm 2 hold action selection (AHo2)

See 8.3 Attention Items in Setting (P. 6).

Factory set value varies depending on the instrument specification.

### Set value
### Description
<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Without alarm hold action</td>
</tr>
<tr>
<td>0001</td>
<td>Effective when the power is turned on</td>
</tr>
<tr>
<td>0002</td>
<td>Effective when the power is turned on or the SV is changed.</td>
</tr>
</tbody>
</table>

### Change settings
Example: Change the Alarm 1 hold action from "Without alarm hold action (0000)" to "Effective when the power is turned on (0001)"
1. Press the DOWN key to change the number to 4.
2. Press the SET key to store the new set value. The display goes to the next parameter.

(3) Alarm 1 differential gap (AH1)
Alarm 2 differential gap (AH2)

Setting range: 0 (0.0) to span
Factory set value: TC and RTD inputs: 2 (2.0) °C [°F]
Voltage input: 0.2 % of span

### Change settings
Example: Change the Alarm 1 differential gap from "2 °C" to "4 °C"
1. Press the UP key to change the number to 4.
2. Press the SET key to change the number to 4.
3. Press the SET key to store the new set value. The display goes to the next parameter.
(4) Alarm 1 process abnormality action selection (AEo1) 
Alarm 2 process abnormality action selection (AEo2)  

It is judged that the input is abnormal when over-scale or underscale occurs.

For a voltage input of 0 to 5 V DC or 0 to 10 V DC, an over-scale or underscale does not occur when the input breaks, no alarm is turned on.

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Normal processing: The alarm action set by alarm type selection (AS1/AS2) is taken even when the input is abnormal.</td>
</tr>
<tr>
<td>0001</td>
<td>Forcibly turned on when abnormal: The alarm is forcibly turned on regardless of the alarm action set by alarm type selection (AS1/AS2) when the input is abnormal.</td>
</tr>
</tbody>
</table>

Factory set value: 
Alarm 1 not provided: 0000, Alarm 1 provided: 0001  
Alarm 2 not provided: 0000, Alarm 2 provided: 0001

● Change settings
Example: Change the Alarm 1 process abnormality action selection from "Normal processing (0000)" to "Ficibly turned on when abnormal (0001)"
1. Press the SET key at "F41" until "AEo1" is displayed.
2. Press the UP key to change the number to 1.
3. Press the SET key to store the new set value. The display goes to the next parameter.

(5) Alarm 1 interlock selection (ILS1) 
Alarm 2 interlock selection (ILS2)  

Factory set value: 0000

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Without alarm interlock</td>
</tr>
<tr>
<td>0001</td>
<td>With alarm interlock</td>
</tr>
</tbody>
</table>

● Change settings
Example: Change the Alarm 1 interlock selection from "Without alarm interlock (0000)" to "With alarm interlock (0001)"
1. Press the SET key at "F41" until "ILS1" is displayed.
2. Press the UP key to change the number to 1.
3. Press the SET key to store the new set value. The display goes to the next parameter.

(6) Alarm 1 timer setting (ATS1) 
Alarm 2 timer setting (ATS2)  

Setting range: 0 to 60 seconds  
Factory set value: 0

● Change settings
Example: Change the Alarm 1 timer setting from "0 second" to "30 seconds"
1. Press the SET key at "F41" until "ATS1" is displayed.
2. The blinking digit indicates which digit can be set. Press the <RST key to move to the tens digit.
3. Press the UP key to change the number to 3.
4. Press the SET key to store the new set value. The display goes to the next parameter.

8.8 Function Block 51 (F51)  
(1) Limit action type selection (oS)  

Factory set value: 0000

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Limit action [high limit]</td>
</tr>
<tr>
<td>0001</td>
<td>Limit action [low limit]</td>
</tr>
</tbody>
</table>

● Change settings
Example: Change the Limit action type from "Limit action [high limit] (0000)" to "Limit action [low limit] (0001)"
1. Press the SET key at "F51" until "oS" is displayed.
2. Press the UP key to change the number to 1.
3. Press the SET key to store the new set value. The display goes to the next parameter.

(2) Limit action differential gap (oH)  
Setting range: 0 (0.0) to span  
Factory set value: TC and RTD inputs: 2 (2.0) °C [°F]  
Voltage input: 0.2 % of span

The setting procedure is the same as the Alarm differential gap. (P. 8)

(3) Limit action hold action selection (LHo)  
Factory set value: 0000

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Without hold action</td>
</tr>
<tr>
<td>0001</td>
<td>Effective when the power is turned on.</td>
</tr>
</tbody>
</table>

The setting procedure is the same as the (1) Limit action type selection. (P. 9)

(4) Limit action process abnormality action selection (LEo)  
Factory set value: 0000

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Normal processing</td>
</tr>
<tr>
<td>0001</td>
<td>Forcibly turned on when abnormal</td>
</tr>
</tbody>
</table>

The setting procedure is the same as the (1) Limit action type selection. (P. 9)

(5) Limit action at the time of power ON (LPoW)  
Factory set value: 0001

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Limit action output turned OFF at the time of power ON.</td>
</tr>
<tr>
<td>0001</td>
<td>Limit action output turned ON at the time of power ON.</td>
</tr>
</tbody>
</table>

The setting procedure is the same as the (1) Limit action type selection. (P. 9)

(6) <RST key operation time selection (rTIM)  
Factory set value: 0001

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Press for one second.</td>
</tr>
<tr>
<td>0001</td>
<td>Press once.</td>
</tr>
</tbody>
</table>

The setting procedure is the same as the (1) Limit action type selection. (P. 9)

(7) Reset action selection (rSEL)  
Factory set value: 0000

<table>
<thead>
<tr>
<th>Set value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>All data is reset with each monitoring screen.</td>
</tr>
<tr>
<td>0001</td>
<td>Each data is reset with each monitoring screen.</td>
</tr>
</tbody>
</table>

The setting procedure is the same as the (1) Limit action type selection. (P. 9)

8.9 Exit Engineering Mode

1. Transfer to function block symbol display (F□□□) after each parameter is set.
2. Press the "<RST key while pressing the SET key for 2 seconds to change to the SV Setting & Monitor Mode from the Engineering Mode.
3. Press the SET key for 2 seconds with the SV Setting & Monitor Mode change the instrument to Parameter Setting Mode.
4. Press the SET key to change to the set data lock function display (LCK).
5. Press the <RST key to flash the most significant digit on the set value (SV) display.  
6. Press the DOWN key to change 1 to 0 in the most significant digit.
7. Press the SET key to lock the Engineering Mode. The display changes to the first parameter in Parameter Setting Mode.
8. Press the SET key for 2 seconds to change the Parameter Setting Mode to the SV Setting & Monitor Mode. Thus, the initialization ends.
9. ERROR DISPLAYS

- **Self-diagnostic error**
  - **Upper display**
  - **Lower display**
  - **Description**
  - **Solution**
  - Adjusted data error
  - EEROM error
  - A/D conversion error
  - RAM check error
  - Watchdog timer error
  - Program busy

When two or more errors occur simultaneously, the error code numbers are totaled and displayed as one number.

- **Overscale and Underscale**
  - **Upper display**
  - **Description**
  - **Solution**
  - PV is outside of input range.
  - PV is above the high input display range limit.
  - PV is below the low input display range limit.

**WARNING**

To prevent electrical shock, always turn off the power before replacing the sensor.

10. SPECIFICATIONS

- **Input**
  - PLII (NBS)
  - W5Re/W26Re (ASTM-E988-96)
  - U, L (DIN43710-1985)
  - JPt100 (JIS-C1604-1997, JIS-C1604-1981 Pt100)
  - PLII (NBS)

- **RTD**
  - Pt100 (JIS-C1604-1997)
  - JP100 (JIS-C1604-1997, JIS-C1604-1981 Pt100)

- **Voltage**
  - 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC

- **Display accuracy**
  - Thermocouple: ±(1 % of displayed value + 1 digit) or ±2°C [°F]
  - RTD: ±(0.3 % of displayed value + 1 digit) or ±0.8 °C [°F]
  - Voltage: ±(0.3 % of span + 1 digit)

- **Output (OUT1, OUT2)**
  - Relay contact: 240 V AC, 3A (Resistive load) 1c contact, Electric life 300,000 times or more (Rated load)
  - Current: 0 to 20 mA DC, 4 to 20 mA DC (OUT1 only) (Load resistance: 400 Ω or less, Resolution: 10 bits or more)

- **Communication function (Option)**
  - Interface: Based on RS-485, EIA standard
  - Protocol: RKC communication, Modbus

- **Contact input (Option)**
  - Dry contact input: At open 500 kΩ or more, At close 10 Ω or less

- **Power supply voltage**
  - 100 to 240 V AC: 85 to 264 V AC (50/60 Hz) [Power supply voltage range]
  - Rating: 100 to 240 V AC
  - 24 V AC: 21.6 to 26.4 V AC (50/60 Hz) [Power supply voltage range]
  - Rating: 24 V AC

- **Power consumpton**
  - 100 to 240 V AC: 4 VA max. (at 100 V AC), 7 VA max. (at 240 V AC)
  - 24 V AC: 4 VA max.
  - 24 V DC: 100 mA max.

11. INPUT RANGE TABLES

- **TC/RTD**
  - **Input type**
  - **Input range**
  - **Code**

  - **Type**
  - **Range**
  - **Code**

- **Voltage/current**
  - **Input range**
  - **Code**

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