SRS0 Series
(SRS1/SRS3/SRS4/SRS5)
Digital Controller
Instruction Manual (Detailed Version)

Thank you for purchasing a Shimaden product. After making sure the product fits the desired description, you should carefully read the instruction manual and get a good understanding of the contents before attempting to operate the device.

Request

The instruction manual should be kept in a handy place where the end user can refer to it when necessary.

Preface

This instruction manual (detailed version) was written for those who perform wiring, installation, operation, and routine maintenance for the SRS0 (SRS1/SRS3/SRS4/SRS5) Series.
This manual contains a description of the operating method, functions, wiring, mounting method, and precautions when handling the SRS0 (SRS1/SRS3/SRS4/SRS5) Series (hereinafter referred to as the SRS0 Series unless a separate description is required). You should, therefore, keep it handy to refer to it when operating and handling the device.
Be sure to observe all precautions and adhere to the procedures provided herein.

SHIMADEN CO., LTD.

MSRS0-E01-G
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Contents

1. Safety rules

Safety rules, precautions concerning equipment damage, additional instructions and notes are written based on the following headings.

⚠ WARNING: Matters that could result in injury or death if instructions are not followed.
⚠ CAUTION: Matters that could result in equipment damage if instructions are not followed.
Note: Additional instructions or notes.

⚠ WARNING

The SRS0 Series digital controllers are control instruments designed for industrial use to control temperature, humidity and other physical values.
You should either take appropriate safety measures or avoid using for control that could have a serious effect on human life.
The manufacturer shall not be liable for an accident that results if used without taking appropriate safety measures.

- The digital controller should be used so the terminal elements in the control box, etc., are not touched by humans.
- Do not remove the controller from its case, or insert your fingers or electric conductors inside the case. Doing so could result in electric shock accident involving death or serious injury.
- Be sure to turn off power while performing wiring. Failure to do so could result in electric shock.
- After wiring, do not touch terminal elements or other charged parts while they are conducting electricity. Failure to do so could result in electric shock.

⚠ CAUTION

If there is danger of damage to any peripheral device or equipment due to failure of the controller, you should take appropriate safety measures such as mounting a fuse or overheating prevention device.
The manufacturer shall not be liable for an accident that results if used without taking appropriate safety measures.

- Controller labels and alert mark ⚠
  Alert marks ⚠ are printed on the terminal label of the case. **You could be shocked if you touch charged parts. The alert marks are provided to call your attention to this.**

- Provide a switch or breaker as a means of cutting off power for external power circuit connected to the power terminal of the controller. Mount a switch or breaker near the controller where the operator can get to it easily and label it as an electrical breaker for the controller. Use a switch or breaker that conforms to requirements of IEC60947.

- Fuses
  The controller does not have a built-in fuse. Be sure to mount a fuse on the power circuit connected to the power terminal.
  Provide a fuse between the switch or breaker and the controller. Mount on the L side of the power terminal.
  Fuse rating/characteristics: 250 V AC, 0.5 A/medium time-lagged type or time-lagged type
  Use a fuse that conforms to requirements of IEC60127.

- Voltage/current of load connected to the output terminal and EV terminal should be within the rating.
  Using voltage/current that exceeds the rating could shorten the life of the controller by raising the temperature, and could result in equipment failure. For rating, see “11. Specifications.”
  Connect equipment that conforms to requirements for IEC61010 to the output terminal.

- Do not apply voltage/current other than rated input to the input terminal. Doing so could shorten product life and lead to equipment failure. For rating, see “11. Specifications.”
  If the input is voltage or current, connect equipment that conforms to IEC61010 to the input terminal.
  There are draft holes in the controller for heat to escape from. Do not allow foreign matter such as metal to get into the holes. Doing so could result in equipment failure or fire.

- Do not allow the draft holes to become clogged with dust, etc.
  Doing so could shorten the life of the product due to temperature rise or insulation deterioration, and could result in equipment failure or fire. For space between instruments, see “3-3. External dimensions and panel cutout.”

- Repeating endurance tests such as dielectric strength, noise resistance and surge resistance could negatively affect the controller.

- The user should absolutely not modify or use the controller other than the way it was intended.

- It takes 30 minutes to display the correct temperature after applying power to the digital controller. (Therefore, turn the power on more than 30 minutes prior to the operation.)

- To ensure safety and maintain the functions of this device, do not disassemble this device.
  If this device must be disassembled for replacement or repair, contact your dealer.

2. Introduction

2-1. Preliminary check

The controller has undergone sufficient quality control inspections, but you should check the specification code/appearance and make sure you have all the accessories to make sure nothing is missing or damaged.
Compare the specification code on the case with the following to make sure it is the product you ordered.

(1) Model code check

Item	Code	Specification
1. Series	SRS1-	48 × 48 DIN size digital controller
	SRS3-	96 × 96 DIN size digital controller
	SRS4-	96 × 48 DIN size digital controller
	SRS5-	48 × 96 DIN size digital controller
2. Control output	Y-	Contact 240 V AC 2.5 A
	I-	Current 4–20 mA max. 600Ω
	P-	SSR drive voltage 12 V DC 20 mA
	V-	Voltage 0–10 V max. 2 mA
3. Program	N	None
	P	1 pattern 10 steps
4. Event	1	2 points 240 V AC 1.0 A Common
5. Remark	0	Without
	6	Voltage input (V)
	9	With

(2) Accessories check

Instruction manual (A3 size paper × 2): 1 copy

Note: In the event you want to inquire about a product defect, missing accessory or other matter, please contact your nearest Shimaden agent.

2-2. Notes on use

Do not press front panel keys with a hard or pointed object. Press lightly with your fingertips.
To clean, wipe lightly with a dry cloth. Do not use solvents such as thinner.

3. Installation and wiring

3-1. Installation site (environmental conditions)

Environmental conditions for operations

The controller is designed to be used under the following conditions. Observe the following environmental conditions when using:

1) Must be used indoors
2) Max. elevation: 2000 m
3) Ambient temperature: -10–50°C
4) Ambient humidity: Max. 90%RH, no dew condensation
5) Transient over voltage category: II
6) Pollution class: 2 (IEC 60664)

⚠ CAUTION

Do not use the controller in the following locations.
Doing so could lead to equipment failure, damage or fire.

- Places exposed to flammable or corrosive gases, oil mist, or excessive dust that could cause insulation to deteriorate.
- Places subject to vibration or impact
- Places near strong electric circuit or places subject to inductive interference
- Places exposed to water dripping or direct sunlight
- Places where the controller is struck directly by air from heater or air conditioner

3-2. Mounting

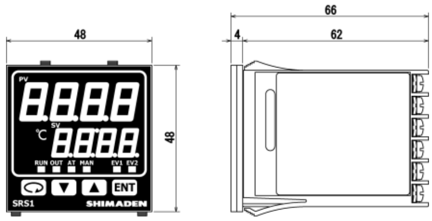
⚠ CAUTION

In order to maintain safety and function, do not remove the case from the controller.
If the case of the controller has to be removed for replacement/repair, contact your nearest Shimaden agent.

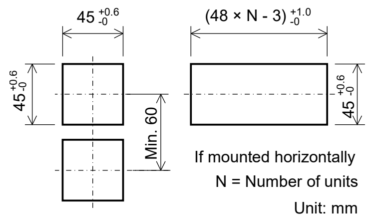
1) Cut a hole for mounting the controller in the panel by referring to “3.3. External dimensions and panel cutout.”
2) The panel thickness should be 1.0–3.5 mm.
3) The controller is provided with tabs for mounting. Insert as is from the front surface of the panel.
4) Controllers of the SRS0 Series are designed for mounting on the panel. Be sure to mount on the panel.
5) If mounted in series, provide ventilation so ambient temperature does not exceed 50°C due to temperature rise caused by heat generation.

3-3. External dimensions and panel cutout

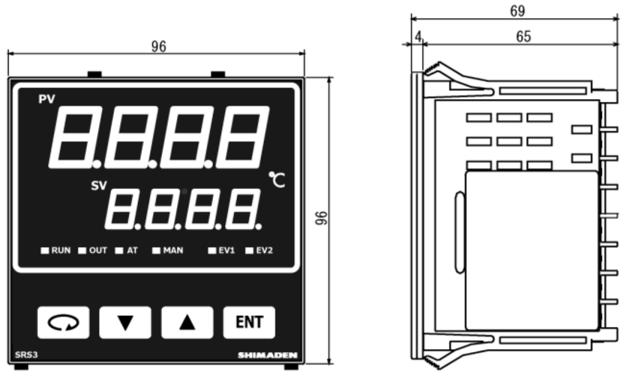
SRS1



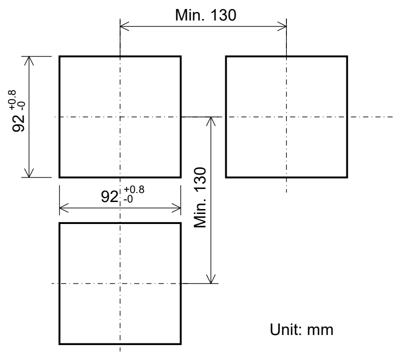
Panel cutout



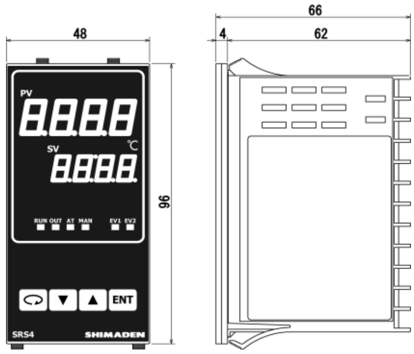
SRS3



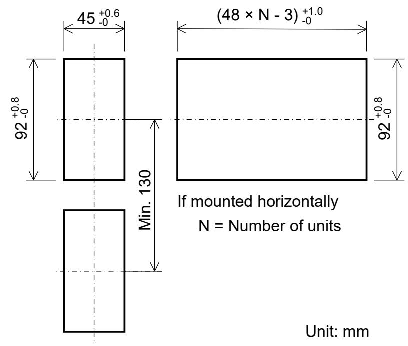
Panel cutout



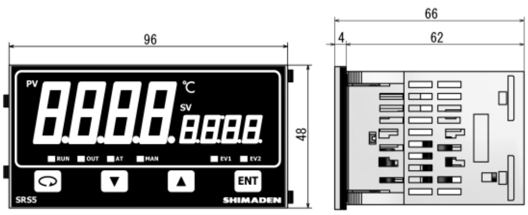
SRS4

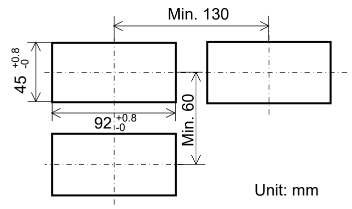


Panel cutout



SRS5





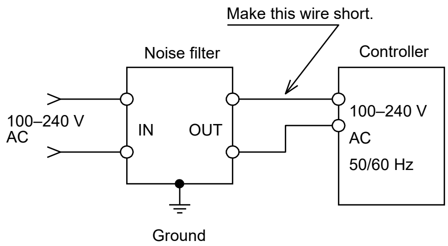
3-4. Wiring

> **⚠ WARNING**
> - Be sure to turn off power before wiring. Failure to do so could result in electric shock.
> - After wiring, do not touch terminal elements or other charged parts while conducting electricity. Failure to do so could result in electric shock.

Take the following precautions when wiring:

1) Wire in accordance with the terminal layout of section 3-5 and the terminal arrangement table of section 3-6. After wiring, check and make sure the wiring is correct.
2) Crimp-type terminals fit M3 screws. Use crimp-type terminals that are no wider than 6 mm.
3) For thermocouple input, use a compensating conductor that matches the type of thermocouple.
4) For RTD input, resistance for lead wires should be a maximum of 10Ω per wire. All 3 wires should have the same resistance.
5) Input signal wires must not be accommodated with a strong electric circuit in the same conduit or duct.
6) Using shielded wiring (single point grounding) is effective for static induction noise.
7) Making input wiring short and twisting at regular intervals is effective for electromagnetic induction noise.
8) For power supply, use wiring or cable with sectional area of at least 1 mm² that offers the same performance as 600 V vinyl insulated wiring.
9) Securely fasten the terminal element screw. Fastening torque: 0.5 N·m (5 kgf·cm)
10) Counter measure against lightning surge will be required for signal line over 30m
11) If the instrument appears to be easily affected by power supply noise, use a noise filter to prevent malfunctioning. Mount the noise filter on the grounded panel and make the wire connection between the noise filter output and power line terminals of the controller as short as possible.

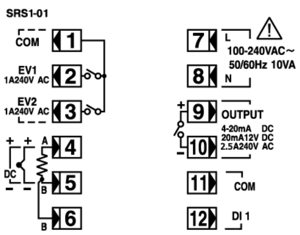
Recommended noise filter: TDK RSEL-2003W



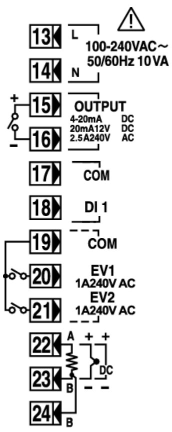
3-5. Terminal layout

Wire in accordance with the following terminal layout and terminal arrangement table.

SRS1



SRS3/SRS4/SRS5



3-6. Terminal arrangement table

Name of terminal	Description	Terminal No. SRS1	Terminal No. SRS3/4/5
Power supply	100–240 V AC 100–240 V AC	7 8	13 14
Input	RTD: A, thermocouple/voltage: + RTD: B, thermocouple/voltage: - RTD: b	4 5 6	22 23 24
Control output 1	Contact: NO, SSR drive voltage/voltage/current: + Contact: NO, SSR drive voltage/voltage/current: -	9 10	15 16
Event output	COM EV1 EV2	1 2 3	19 20 21
External control input/DI	COM DI1	11 12	17 18

Note 1: With thermocouple/voltage input, do not connect anything to SRS1 terminal 6 nor SRS3/4/5 terminal 24, as doing so will cause an error.

3-7. Operation preparations

Before operating the controller, you should first check the wiring and carry out the following by screen group setting method.
There is however no need to change the settings that have been set at the factory or already been made by the manufacturer.

1. Wiring check
   Make sure the wiring to the connection terminals is correct. Incorrect wiring could result in burnout.

2. Power ON
   Turn on the operating power. The displays, etc., light when power is supplied to the controller.

3. Measuring range setting
   Select code from Measuring Range Codes of “5-10 Measuring range codes setting screen” of 5 screen group and enter.

4. Input temperature unit setting
   For TC/Pt input, select temperature unit of “5-11 Input temperature unit setting screen” of 5 screen group and enter.

5. Input scaling setting
   Set input scaling on “5-12 and 5-13 Input scaling lower/higher limit value setting screen” of 5 screen group and enter.
   Scaleover points can be set with given set values.

6. For mV/V input, set lower and higher limit values of display contents for input signal on “5-14 and 5-15 Display scaling lower/higher limit value setting screen” of 5 screen group. Set the position of a decimal point for said display contents on “5-16 Decimal point position setting screen” of 5 screen group.

7. Control mode (PID) setting
   For ON-OFF (2 position) action, select OFF by “2-1 Output PID1 proportional band setting screen” of 2 screen group and enter. Sets hysteresis by “2-2 Output PID1 hysteresis setting screen.” If using auto tuning (AT) with other than ON-OFF hysteresis, this setting operation is not required.

8. Control output characteristics setting
   Select RA (for heating) or DA (for cooling) according to output specification (heating/cooling) on “5-3 Output characteristics setting screen” of 5 screen group and enter.

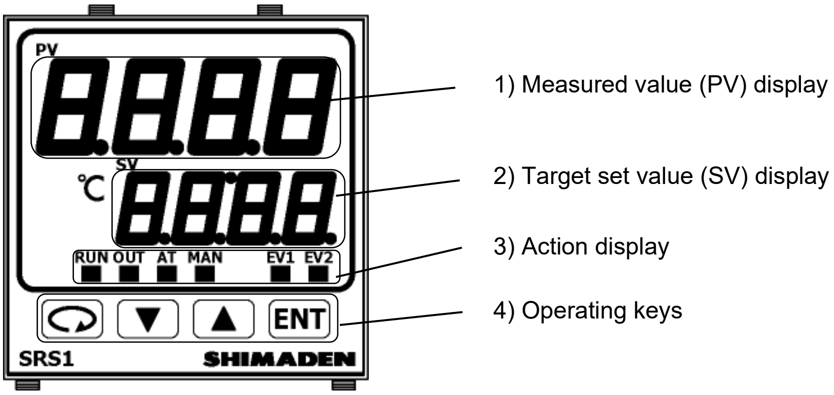
9. Event type setting
   Select types of event on “4-1 and 4-7 Event 1/2 type setting screen” of 4 screen group and enter. Set the event occurrence level on “0-10 and 0-11 FIX event 1/2 (EV1/EV2) set value setting screen” of 0 screen group and enter.

10. Control execution
    Select RUN on “0-1 Reset action setting screen” of 0 screen group and enter to start control.

11. Auto tuning execution
    If not ON-OFF action, select ON on “0-12 Auto tuning (AT) action control screen” of 0 screen group and enter to execute auto tuning.

Note:
Precaution concerning initialization by data modification
Modifying measuring range code or type of event initializes related setting values (data). The data must therefore be set again.

4. Names and functions of parts on front panel



Name	Function
1) Measured value (PV) display	1. Measured value display LED (red) ● Displays current measured value (PV) on basic screen (screen 0-0). ● Displays type of parameter on each respective parameter display screen.
2) Target set value (SV) display	2. Target value display LED (green) ● Displays current target set value (SV) on basic screen (screen 0-0). ● Displays setting values on each respective parameter setting screen.
3) Action display	Displays status of controller. ● RUN: Action display LED (green) Off: Control halt status (standby or reset) On: Running by fixed value control status (FIX) Flashing: Running by program control status (RUN) ● OUT: Control output (green) For output by contact or SSR drive voltage: Off: Output is OFF. On: Output is ON. For voltage/current output: Off when output is 0% and On when output is 100%. In other cases, flashes at intervals of 0.5 seconds (multiples of 0.5 sec.). ● AT: Auto tuning LED (green) Off: Auto tuning not executed On: Auto tuning standby Flashing: Auto tuning being executed ● MAN: Manual control LED (green) Off: Automatic control operating status Flashing: Manual control operating status ● EV1: Event output 1 (orange) ● EV2: Event output 2 (orange) Off: Event output is OFF. On: Event output is ON.
4) Operating keys	●: Parameter key Displays the next screen in various screen groups. ● ▼: Down key Decrements setting values. ● ▲: Up key Increments setting values. ● ENT: Enter key Enters setting values. Displays various screen groups if no SV values are being modified on the basic screen.

5. Parameter diagram and setting

5-1. Parameter diagram

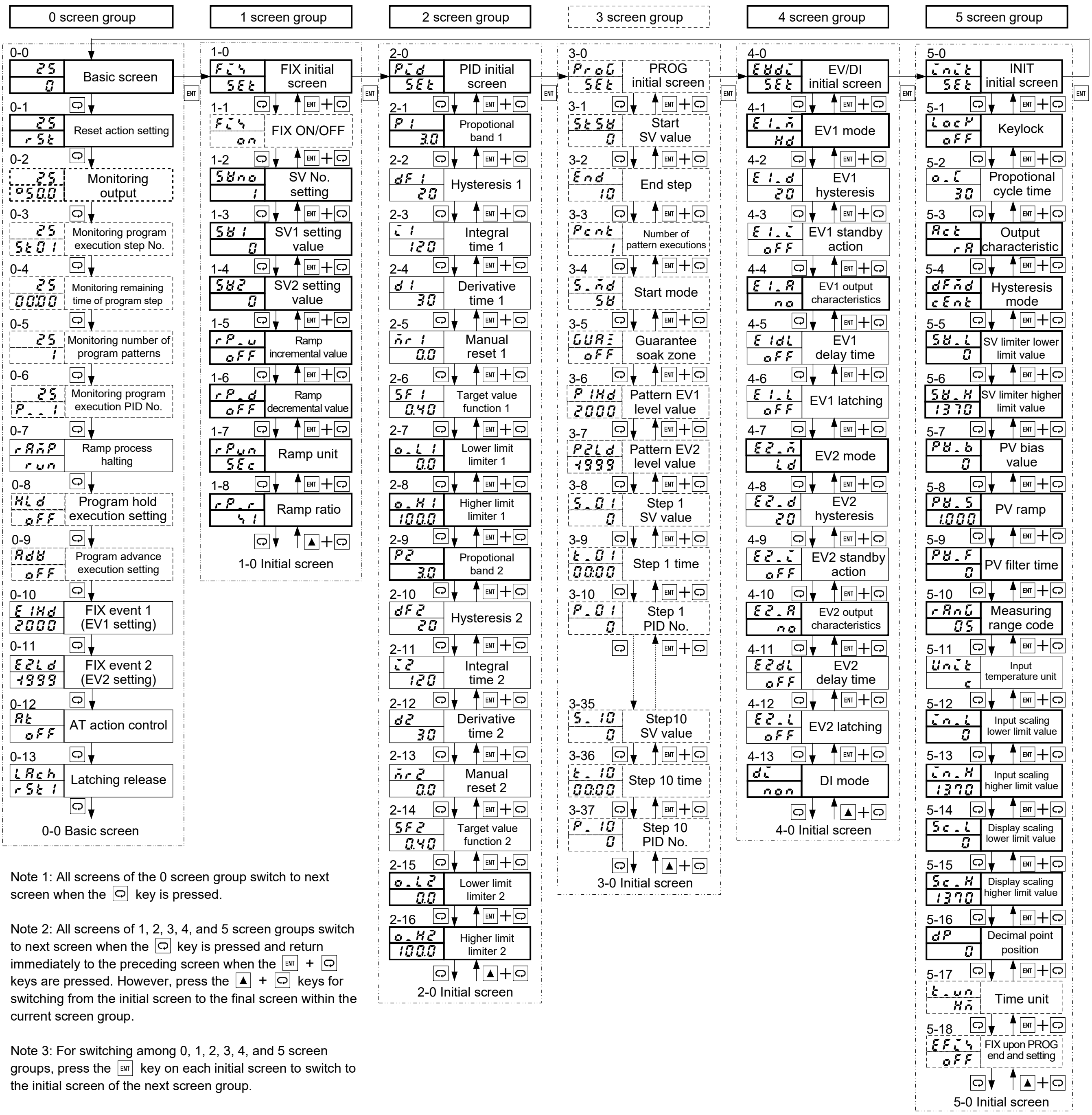
The overview of the parameter diagram is as follows. The windows of the various screens are divided as follows.
The number at the top left of the window is the screen No.

Screen always displayed by key

Screen displayed when concerned optional item is added

Screen to be shown or hidden according to the setting

Monitor screen (without 3 minutes auto return)



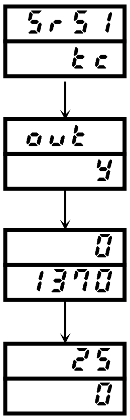
Note 1: All screens of the 0 screen group switch to next screen when the ⟲ key is pressed.

Note 2: All screens of 1, 2, 3, 4, and 5 screen groups switch to next screen when the ⟲ key is pressed and return immediately to the preceding screen when the ENT + ⟲ keys are pressed. However, press the ▲ + ⟲ keys for switching from the initial screen to the final screen within the current screen group.

Note 3: For switching among 0, 1, 2, 3, 4, and 5 screen groups, press the ENT key on each initial screen to switch to the initial screen of the next screen group.

5-2. Display when power is applied

When power is applied, the initial screen displays each screen for about 1 sec. and switches to the basic screen of screen group 0 as shown in the following figure.



Series name (5r51, 5r53, 5r54, 5r55)
Input type (tc : thermocouple, Pt : RTD, mV: Voltage [mV]、V : Voltage [V])

Indicates control output
OUT output type (Y: Contact, P: SSR drive voltage, V: Voltage, I : Current)

Lower limit value of selected measuring range
Higher limit value of selected measuring range

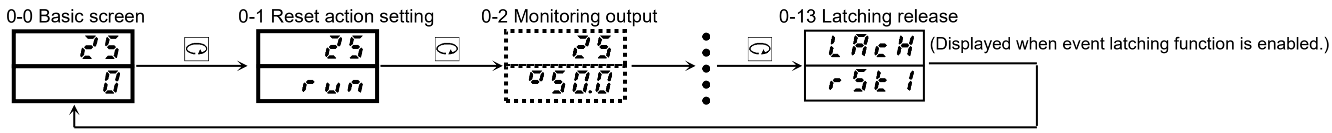
0-0 basic screen, 0 screen group from here
Measured value (PV): Switches to screen for setting various functions by operation key from “0-0 Basic screen.”
Target set value (SV): For screen sequence, see parameter diagram on previous page.

5-3. Switching screens

Screen group 0: Screen group primarily set by end users
Screen group 1: Target set value setting screen group (multi SV)
Screen group 2: Screen group that sets PID constant
Screen group 3: Displayed if equipped with programming function (optional)
Screen group 4: Screen group that sets event and DI functions
Screen group 5: Initial setting screen group

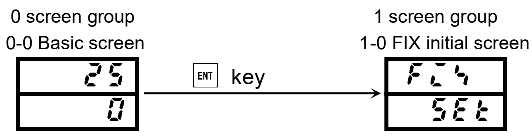
(1) Switching screens within screen group 0

Each time the ↻ key is pressed the screen display switches to the next screen.
If pressed when the last screen is displayed, returns to the “0-0 Basic screen.”



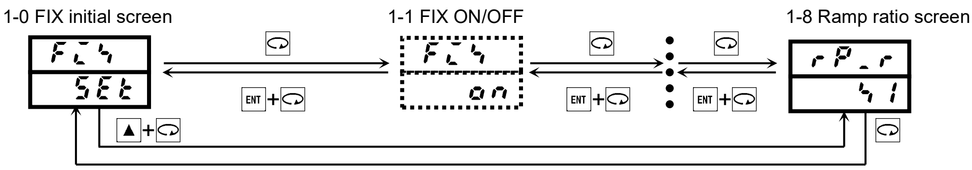
(2) Switching between screen group 0 and screen group 1

Pressing the ENT key on the basic screen of screen group 0 switches to “1-0 FIX initial screen” of screen group 1.



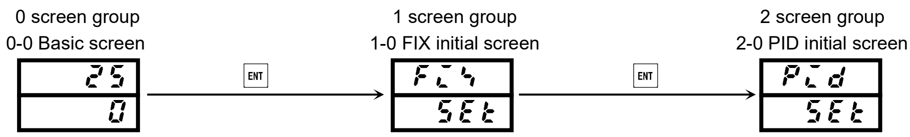
(3) Switching screens within screen group 1

Each time the ↻ key is pressed on the “1-0 FIX initial screen” in screen group 1, the screen display switches to the next screen. If pressed when the last screen is displayed, returns to the “1-0 FIX initial screen.”
With screen group 1, each time the ENT + ↻ keys (▲ + ↻ keys only on the initial screen) are pressed, the screen is switched in the reverse direction.



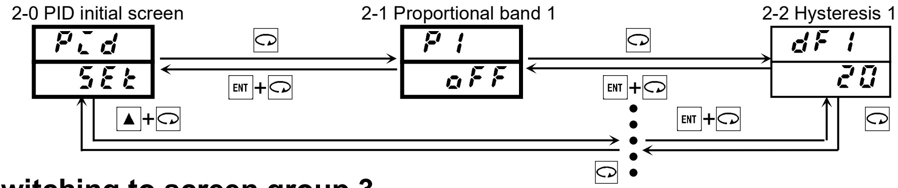
(4) Switching to screen group 2

Pressing the ENT key on the “1-0 FIX initial screen” switches to the “2-0 PID initial screen” of screen group 2.



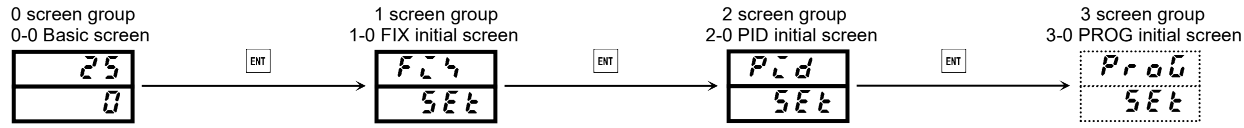
(5) Switching screens within screen group 2

Each time the ↻ key is pressed the screen display switches from the various initial screens to the next screen. If pressed when the last screen is displayed, returns to the “2-0 PID initial screen.” With screen group 2, each time the [ENT] + ↻ keys ([▲] + ↻ keys only on the initial screen) are pressed, the screen is switched in the reverse direction.



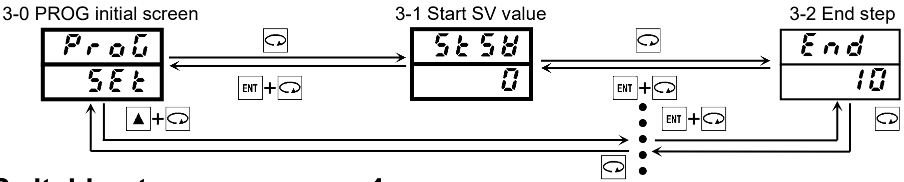
(6) Switching to screen group 3

Screen group 3 is the program screen group. It is not displayed unless it is set as an optional item.
Pressing the [ENT] key on the “2-0 PID initial screen” switches to the “3-0 PROG initial screen” of screen group 3.



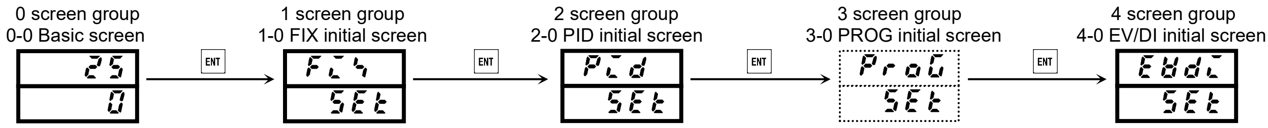
(7) Switching screens within screen group 3

Each time the ↻ key is pressed the screen display switches from the various initial screens to the next screen. If pressed when the last screen is displayed, returns to the “3-0 PROG initial screen.” With screen group 3, each time the [ENT] + ↻ keys ([▲] + ↻ keys only on the initial screen) are pressed, the screen is switched in the reverse direction.



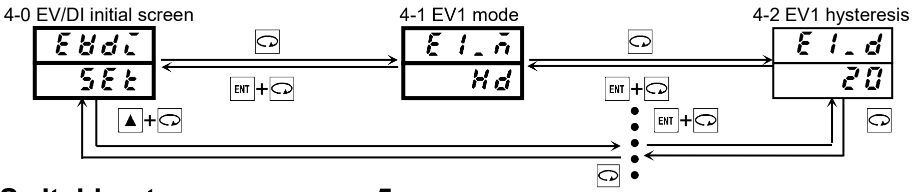
(8) Switching to screen group 4

Pressing the [ENT] key on the “3-0 PROG initial screen” switches to the “4-0 EV/DI initial screen” of screen group 4.



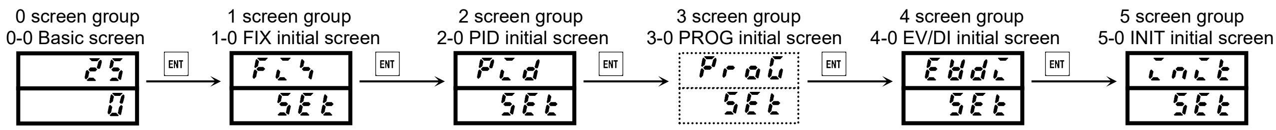
(9) Switching screens within screen group 4

Each time the ↻ key is pressed the screen display switches from the various initial screens to the next screen. If pressed when the last screen is displayed, returns to the “4-0 EV/DI initial screen.” With screen group 4, each time the [ENT] + ↻ keys ([▲] + ↻ keys only on the initial screen) are pressed, the screen is switched in the reverse direction.



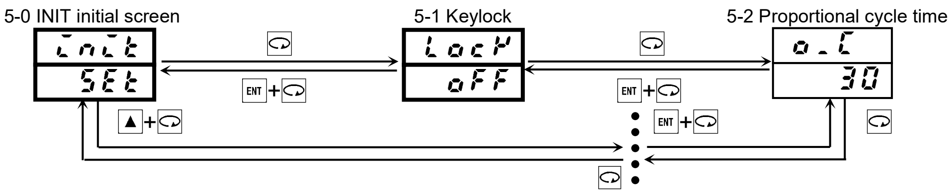
(10) Switching to screen group 5

Screen group 5 is the initial setting screen group. Various settings are made prior to using the controller. Pressing the [ENT] key on the “4-0 EV/DI initial screen” switches to “5-0 INIT initial screen” of screen group 5. Further pressing the [ENT] key switches to the basic screen.



(11) Switching screens within screen group 5

Each time the ↻ key is pressed the screen display switches from the various initial screens to the next screen. If pressed when the last screen is displayed, returns to the “5-0 INIT initial screen.” With screen group 5, each time the [ENT] + ↻ keys ([▲] + ↻ keys only on the initial screen) are pressed, the screen is switched in the reverse direction.



(12) Set data modification

Data is modified on the various screens by pressing the ▲ or ▼ key. The modified data is entered by pressing the ENT key.

5-4. Auto return function

If no key operation is conducted for 3 minutes on the various screens (with the exception of the “0-2 Output monitoring screen,” “0-3 Execution step No. monitoring screen,” “0-4 Remaining time of program step monitoring screen,” “0-5 Number of pattern executions monitoring screen,” or “0-6 Execution PID No. monitoring screen”), the mode automatically returns to the “0-0 Basic screen” of screen group 0 (auto return).

5-5. Screen group 0 setting

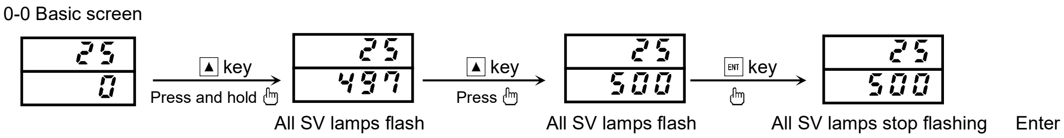
The flow is given in “6. Screen explanation and setting items.” This section however primarily contains a description of how to make settings.

As for the key operation method, the ⟲ key switches to the next screen. The settings are selected with the ▲ key or ▼ key on the various setting screens and entered with the ENT key.
Pressing the ENT key is however not required for modifying output values on the output monitoring screen for manual adjustment.

(1) Setting target set values (SV)

1. To set target set values (SV), press and hold the ▲ key or ▼ key on the “0-0 Basic screen” to cause all SV lamps to flash. Then, press the ▲ key or ▼ key to increment or decrement the SV value (Pressing and holding causes the SV value to increase or decrease continuously with accelerating speed of change.). When the desired target set value is reached, enter by pressing the ENT key.
2. When the setting is entered, the SV lamps of the target set value stop flashing. Target values cannot be set while auto tuning (AT) is being executed. To set target values, you must first cancel auto tuning.

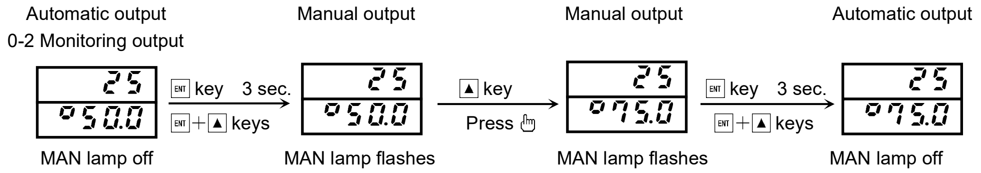
Example: Set target set value to 500°C.



(2) Manual setting of control output

1) Output monitoring screen (OUT) and switching and setting automatic/manual output

To toggle between automatic and manual, press and hold the ENT key at least 3 seconds on the “0-2 Output monitoring screen” or press the ENT and ▲ keys simultaneously.
During manual output, the MAN lamp flashes and it goes off during the automatic output operation.
Pressing the ▲ key or ▼ key on the output monitoring screen during manual output enables you to set the manual output values.
To return to automatic output, press and hold the ENT key at least 3 seconds or press the ENT and ▲ keys simultaneously.



1. If output value is 100.0%, 999.9 is displayed on the output monitoring screen and the decimal point of ° flashes.
2. If output is contact or SSR drive voltage and the proportional band (P) setting is OFF, the output value is 0.0% or 100.0%.
3. If output is voltage or current and the proportional band (P) setting is OFF, the output value is the lower limit value or higher limit value of the output limiter set.

Note 1: Manual output cannot be selected while automatic tuning (AT) is being executed. To select manual output, you must first cancel AT.
Note 2: If MAN is selected in “4-13 DI mode setting screen,” external control input (DI) has a priority and manual output change cannot be conducted in 0-2 screen.

2) Supplementary explanation for use of manual control output

The correlation of the “0-2 Output monitoring screen” and automatic/manual output is as follows:

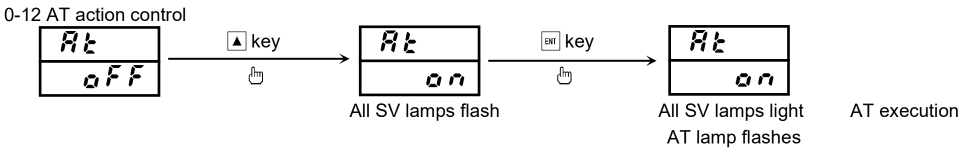
1. Output when automatic output is changed to manual is balanceless bumpless action, and the output value prior to the change is displayed. When manual is changed to automatic, it becomes bumpless action except if measured value (PV) is outside the proportional band.
2. If power supply is cut off and turned back on, control output action continues in automatic or manual mode, whichever was set when the power was shut off.
   Note: You can switch to another screen in the manual mode as well, but you should note that control output is also manual mode. When the MAN LED lamp is flashing, the controller is in manual output mode (MAN).
3. Manual output (MAN) is canceled if RUN is switched to RST.
   MAN operation is possible only in RUN mode.

(3) Auto tuning (AT)

Function that automatically processes and sets parameter P.I.D. for PID control. Processing time varies according to control.

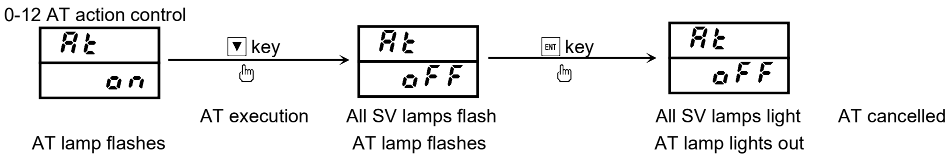
1) AT execution

Pressing the ▲ key on the "0-12 AT action control screen" causes the oFF display at the bottom to change to on and all SV lamps to flash.
Pressing the ENT key then executes AT. All SV lamps light and the AT lamp flashes.
When AT is executed, ON/OFF output action is repeated several times according to increment or decrement of measured values toward target set value. The PID value is saved in the internal memory and the action ends. Control based on the PID value in the memory simultaneously starts and the AT lamp lights out.



2) Cancellation of AT

To cancel AT before it finishes, select oFF with the ▼ key on the "0-12 AT action control screen." When the ENT key is pressed, AT is cancelled. All SV lamps light and the AT lamp then lights out.



Note: If AT is canceled before completion, PID value is not changed.

3) AT cannot be executed

AT cannot be executed under any of the following conditions:

1. Control output is manual. (AT screen not displayed)
2. Standby (AT screen not displayed)
3. Measured value (PV) is scaleover. (AT screen not displayed)
4. Control output proportional band (P) is OFF. (AT screen not displayed)
5. If lock No. 2 or 3 is set on the key lock screen. (Not possible on AT screen, but possible with DI)

4) AT cancellation during execution

AT is canceled during execution under any of the following conditions:

1. If 200 continuous minutes elapse while output value is 0% or 100%.
2. When PV is scaleover.
3. When switched to standby action.

5) AT when in program mode

1. AT is not executed during ramp step execution, unless the ramp step is executed in the hold action mode.
2. AT ends when the final step is completed, even if the set number of executing program is 2 or more.
3. AT ends when all AT actions based on PID No. are completed before the final step ends.

(4) Reset (RST)/run (RUN)

The controller is equipped with reset mode for temporarily halting controller execution.
This operation mode is switched on the "0-1 Standby setting screen" or by DI operation.

If RUN1 or RUN2 is selected on the "4-13 DI mode setting screen," external control input (DI) is given priority and settings cannot be made on the 0-1 screen.

1. The RUN lamp is lit green while the controller is operating, and goes off upon entering the reset mode.
2. Controller output for reset is 0%.
3. When reset is executed during auto tuning (AT), the auto tuning is canceled.
4. When reset is executed in the manual output mode, the manual output mode is canceled.
5. When the power is turned off while the controller is in reset mode, reset mode continues when the power is turned back on.
6. If event standby action is specified when switching to run mode (RUN) from reset mode (RST), the specified standby action is executed.
7. If event latching is not engaged in the reset mode, alarms (Hd, Ld, od, id, HA, LA) are not output.

(5) Event setting

Types of event must be set before setting event values.
Modifying the event type codes however initializes setting values (data) related to events.

1) Types of event (alarm type) setting

Select event type code from among non, Hd, Ld, od, id, HA, LA, So, run, rot1, StPS, PtnS, EndS, HoLd, ProG, u_SL, d_SL, or GUA on the "4-1 EV1 type setting screen" of screen group 4 with the ▲ key or ▼ key and enter the event type with
the ENT key.
Set event type of EV2 on the "4-7 EV2 type setting screen" in the same manner. The types of event for which event values can be set are the following 6 types:

Event type (alarm type) code:

Hd: higher limit deviation	Ld: lower limit deviation
od: outside higher/lower limit deviation	id: inside higher/lower limit deviation
HA: higher limit absolute value	LA: lower limit absolute value

If an event type (alarm type) code other than the above is selected, event values cannot be set.

2) Event values setting

Event values are set on the "0-10 FIX EV1 set values setting screen" and "0-11 FIX EV2 set values setting screen."
Event values are displayed when one of the previously mentioned 6 types of events is selected.
Event values are set within the following setting range by pressing the ▲ key or ▼ key on the 0-10 or 0-11 screen.
When the event value setting has been decided, enter by pressing the ENT key and all SV lamps light.

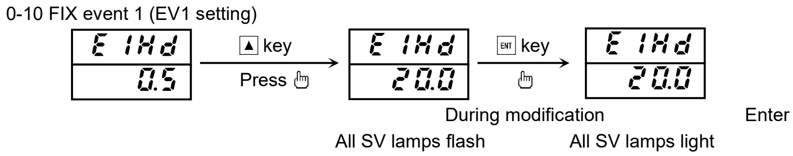
Setting range:

Higher limit deviation or lower limit deviation:	-1999–2000 digits
Outside or inside higher/lower limit deviation:	0–2000 digits
Higher limit absolute value or lower limit absolute value:	Within measuring range

Note: Definition of digit

Used as a minimum unit for industrial amounts such as °C and %RH.
If input temperature range is 0.0–200.0, 1 digit = 0.1°C.
If input temperature range is 0–1200, 1 digit = 1°C.

Event values cannot be set during auto tuning (AT) execution. AT must first be canceled.



(6) Multi SV (target set values)

1) Multi SV

You can set 2 types of target set values (SV). (SV1, SV2)
SV values are set on the "1-3 FIX control SV1 setting screen" and "1-4 FIX control SV2 setting screen" and execution SV No. is selected on the "1-2 Execution SV No. selection screen."
PID No. during multi SV is SV1/PID1 and SV2/PID2.

2) External selection switching of multi SV

If equipped with external control input DI, when SV is allocated to DI, execution SV can be selected from SV1 or SV2 by DI input.
Using 1 point of DI, SV is allocated on the "4-13 DI1 mode setting screen."
Please refer to the "8-4. External control input (DI)."

6. Screen explanation and setting items

0-0 Basic screen

25
0

Initial values: 0 or measuring range lower limit values
Setting range: Within measuring range (within SV limiter)

Measured value (PV) is displayed at the top and target set value (SV) is displayed/modified on the bottom.
For details, see 5-5, section (1).

1-0 Initial screen FLS / SEt — ENT → **2-0 Initial screen** PId / SEt — ENT → **3-0 Initial screen** ProG / SEt → **4-0 Initial screen** EVdI / SEt — ENT → **5-0 Initial screen** InIt / SEt — ENT → 0-0

0-1 Reset action setting screen

25
rSt

Initial value: rSt (rSt)
Setting range: rSt, run (run)

Display only if the “4-13 DI mode setting screen” is set to RUN1 or RUN2.
rSt (reset): Action stop, run (run): Selects execution action.
For reset action, see 5-5, section (4).

0-2 Output (OUT) monitoring screen

25
o50.0

Displays measured value (PV) on the top and control output value of output on the bottom.
Output is monitored when in automatic mode and setting is modified when in manual mode.
Manual output setting range: 0.0–100.0 (%)

*** Output monitoring screens (OUT) and automatic/manual output**
- You can toggle between automatic and manual by pressing and holding the ENT key for at least 3 seconds on the output screen, or you can press the ENT and ▲ keys simultaneously.
- The MAN lamp flashes during manual output.

For details, see 5-5, section (2).

0-3 Execution step No. monitoring screen

25
St01

Displays execution step No. during program operation.
SV decimal point flashes when in hold (HLD) mode.

0-4 Remaining time of step monitoring screen

25
00:00

Displays remaining time of step during program operation.
SV decimal point flashes when in hold (HLD) mode.

0-5 Number of pattern executions monitoring screen

25
1

Displays number of patterns executed during program operation.
SV decimal point flashes when in hold (HLD) mode.

0-6 Execution PID No. monitoring

25
P_ _1

Displays PID No. being executed.
Displayed only in RUN mode.
SV decimal point flashes when in hold (HLD) mode.

0-7 Ramp process halting screen

rAmP
run

Initial value: run
Setting range: StoP, run
Note: Displayed during ramp process.

Halts ramp process.
Note: For information on ramp value setting, see 1-5–1-8 screens.

0-8 Hold execution setting screen

HLd
oFF

You can turn hold ON/OFF during program operation.
The program is temporarily halted by hold ON.

0-9 Advance execution setting screen

AdV
oFF

You can execute advance during program operation.
If ON is selected, the step currently being executed is completed and the program forcibly jumps to the next step.

FIX event values setting

FIX event is an event of fixed value control (FIX mode). Program control event values are set by the program screen group.

0-10 FIX event 1 (EV1) set value setting screen

E1Hd
2000

Event No. and type of event are displayed on the top.
Initial value:
Higher limit deviation alarm (Hd): 2000 (digit)
Lower limit deviation alarm (Ld): -1999 (digit)
Outside higher/lower limit deviation alarm (od): 2000 (digit)
Inside higher/lower limit deviation alarm (id): 2000 (digit)
Higher limit absolute value alarm (HA): Measuring range higher limit value
Lower limit absolute value alarm (LA): Measuring range lower limit value
Setting range:
Higher/lower limit deviation alarm: -1999–2000 (digit)
Outside or inside higher/lower limit deviation alarm: 0–2000 (digit)
Higher/lower limit absolute value alarm: Within measuring range

Displayed when EV1 alarm code Hd–LA are assigned, and action point of allocated alarm type is set.
For details, see 5-5, section (5).
The screens are masked in the program mode (FIX OFF).

0-11 FIX event 2 (EV2) set value setting screen

E2Ld
-1999

Same as 0-10 screen above except EV2 instead of EV1.
The screens are masked in the program mode (FIX OFF).

0-12 Auto tuning (AT) action control screen

At
oFF

Initial value: oFF
Setting range: oFF, on

AT is executed by on selection and is canceled by oFF selection.
This screen is not displayed for manual output or for output 1 proportional band (P) OFF setting.
Not displayed if STANDBY is set for 0-1 standby action setting screen. During AT execution, key operation other than AT cancel and key lock setting is not accepted.
For AT action, see 5- 5, section (3).

0-13 Latching release screen

LAch
rSt1

Initial value: rSt1
Setting range: rSt1, rSt2, ALL
Note: Displayed only when event latching is selected.

If event latching is ON, even if event conditions no longer exist after event action, the event continues to be output. (Event selfhold)
Cancels self-hold of the event.
Setting and corresponding event No:
rSt1: EV1, rSt2: EV2
ALL: EV1, EV2, and all
If latching can be canceled, all SV lamps on the concerned setting screen flash. Pressing the ENT key cancels the concerned event.

To 0-0 Basic screen

FIX control (fixed value control) setting

0-0 Basic screen

ENT — Setting related to multi SV (target set values) for fixed value control

1-0 FIX setting initial screen

FIX / SEt

Displayed by pressing the ENT key on the basic screen.
Fixed value for no programming function.
This setting is done when using multiple target set values (multi SV fixed value control).

1-1 FIX control ON/OFF switching screen

FIX / on

Displayed only when equipped with programming function.
Can be switched to fixed value control.
Initial value: on
Setting range: on, oFF
On: fixed value control, oFF: Program control

1-2 Execution SV No. setting screen

SVno / 1

Displays execution SV No. used by fixed value control.
Initial value: 1
Setting range: 1–2

1-3 Target set values SV1 setting screen

SV 1 / 0

Sets target set values used by fixed value control.
Initial value: 0
Setting range: Within SV limiter range

1-4 Target set values SV2 setting screen

SV2 / 0

Same as 1-3 screen above except SV2 instead of SV1.
Sets target set values used by fixed value control.

1-5 Ramp higher limit value setting screen

rP_u / oFF

Sets incremental ramp value (RAMP Up).
Initial value: oFF
Setting range: oFF, 1–9999 digits

Sets variation (incremental value) so that changing SV No. does not cause a sudden change of load and gradually changes the target value.

1-6 Ramp lower limit value setting screen

rP_d / oFF

Sets decremental ramp value (RAMP Down).
Initial value: oFF
Setting range: oFF, 1–9999 digits

Sets variation (decremental value) so that changing SV No. does not cause a sudden change of load and gradually changes the target value.

1-7 Ramp unit setting screen

rPun / SEc

Sets ramp value unit.
Initial value: SEc
Setting range: SEc, min

1-8 Ramp ratio setting screen

rP_r / ×1

Sets ramp ratio.
Initial value: ×1
Setting range: ×1 (×1), ×0.1 (×0.1)

To 1-0 Initial screen

PID setting

PID setting screen group

With the SRS0 Series, you can have 2 types of PID constants.
In the case of fixed value control (FIX), target set values **SV1 and SV2 correspond to PID1 and PID2 respectively.**
In the case of program control, an execution PID No is allocated to each step.

1-0 FIX setting initial screen

ENT — Pressing the ENT key on the 1-0 screen switches to the PID setting screen.

2-0 PID initial screen

PId / SEt

There are no setting items for this screen. Pressing the key displays the initial setting screen, "2-1 Output PID1 proportional band (P) setting screen."
Pressing the ▲ + keys displays the last screen, "2-16 Output PID2 higher limit output limiter setting screen."

2-1 Output PID1 proportional band (P) setting screen

P 1 / 3.0

Initial value: 3.0 (%)
Setting range: oFF, 0.1–999.9 (%)

There is basically no need to set if auto tuning (AT) is executed.
For information on proportional band, see 8-2, section (1).
If oFF is set, ON-OFF (2 position) action is set.

2-2 Output PID1 hysteresis (dF) setting screen

dF 1 / 20

Initial value: 20 (digit)
Setting range: 1–999 (digit)

Sets "hysteresis" for ON–OFF action.
Displayed if P = oFF is set on 2-1 screen.

2-3 Output PID1 integral time (I) setting screen

I 1 / 120

Initial value: 120 (seconds)
Setting range: oFF, 1–6000 (seconds)

There is basically no need to set if auto tuning (AT) is executed.
For information on integral time, see 8-2, section (2).
This screen is not displayed when P = oFF.

2-4 Output PID1 derivative time (D) setting screen

d 1 / 30

Initial value: 30 (seconds)
Setting range: oFF, 1–3600 (seconds)

There is basically no need to set if auto tuning (AT) is executed.
This screen is not displayed when P = oFF.
For information on derivative time, see 8-2, section (3).

2-5 Output 1 PID1 manual reset (MR) setting screen

Mr 1 / 0.0

Initial value: 0.0 (%)
Setting range: -50.0–50.0 (%)

Conducts offset correction for when I = oFF. (P/PD action)
This screen is not displayed when P = oFF.
For information on manual reset, see 8-2, section (4).

2-6 Output PID1 target set value function (SF) setting screen

SF 1 / 0.40

Initial value: 0.40
Setting range: oFF, 0.01–1.00

Used for suppressing overshoot and undershoot for expert PID.
Overshoot for SF = 1.00 is minimal. With SF = oFF, there is ordinary PID action without expert PID. This screen is not displayed when P = oFF.
For information on target set value function (SF), see 8-2, section (5).

To 2-7 screen

2-7 Output PID1 lower limit output limiter setting screen

Initial value: 0.0 (%)
Setting range: 0.0–99.9 (%)

Sets control output lower limit value.
For information on output limiter, see 8-3, section (1).

2-8 Output PID1 higher limit output limiter setting screen

Initial value: 100.0 (%)
Setting range: (o_L1 set value) + 0.1–100.0 (%)

Sets control output higher limit value.

2-9 Output PID2 proportional band (P) setting screen

Initial value: 3.0 (%)
Setting range: oFF, 0.1–999.9 (%)

Same as output proportional band 1 setting screen.

2-10 Output PID2 hysteresis (dF) setting screen

Initial value: 20 (digit)
Setting range: 1–999 (digit)

Sets "hysteresis" for ON–OFF action.
Displayed if P = oFF is set on 2-9 screen.

2-11 Output PID2 integral time (I) setting screen

Initial value: 120 (seconds)
Setting range: oFF, 1–6000 (seconds)

Same as output integral time 1 setting screen.
This screen is not displayed when P = oFF.

2-12 Output PID2 derivative time (D) setting screen

Initial value: 30 (seconds)
Setting range: oFF, 1–3600 (seconds)

Same as output derivative time 1 setting screen.
This screen is not displayed when P = oFF.

2-13 Output PID2 manual reset (MR) setting screen

Initial value: 0.0 (%)
Setting range: -50.0–50.0 (%)

Conducts offset correction for when I = oFF (P/PD action).
This screen is not displayed when P = oFF.
For information on manual reset, see 8-2, section (4).

2-14 Output PID 2 target set value function setting screen

Initial value: 0.40
Setting range: oFF, 0.01–1.00

Same as output target set value function 1 setting screen.
This screen is not displayed when P = oFF.

2-15 Output PID2 lower limit output limiter setting screen

Initial value: 0.0 (%)
Setting range: 0.0–99.9 (%)

Sets control output lower limit value.

2-16 Output PID2 higher limit output limiter setting screen

Initial value: 100.0 (%)
Setting range: (o_L2 set value) + 0.1–100.0 (%)

Sets control output higher limit value.

To 2-0 screen

Program setting

2-0 PID initial screen

Pressing the ENT key on the 2-0 screen switches to the program initial screen.

3-0 Program initial screen

There are no setting items for this screen. Pressing the key displays the initial setting screen, "3-1 Start SV setting screen."
Pressing the ▲ + keys displays the last screen, "3-37 Step 10 PID No. setting screen."

3-1 Start SV setting screen

Initial value: 0
Setting range: Within SV limiter

Sets SV value where program starts.
If SV limiter is changed and exceeds the SV limiter range, the SV value conforms to the SV limiter value.

3-2 Final step setting screen

Initial value: 10
Setting range: 1–10

When the final step No. is changed and falls below the step No. being executed, the program ends or switches to the initial step upon the completion of the step being executed.

3-3 Number of pattern executions setting screen

Initial value: 1
Setting range: 1–9999

Sets number of times concerned pattern is executed.
When the number is changed and falls below the current number of the program being executed, the program ends after completion of the final step.

3-4 Start mode setting screen

Initial value: SV
Setting range: SV, PV

Sets program start mode.
Setting the mode to SV leads to the program starting from the start SV value. Setting the mode to PV under certain conditions leads to the PV start function activation, and eliminates waste of time.
(For details, refer to "8-6 Start SV")

3-5 Guarantee soak zone setting screen

Initial value: oFF
Setting range: oFF, 1–999 digit

Sets guarantee soak zone.
Setting the zone to oFF disables the guarantee soak.
(For details, refer to "8-7 Guarantee soak")

3-6–3-7 Pattern event level value setting screen

Initial value:
- Higher limit deviation alarm (Hd): 2000 (digit)
- Lower limit deviation alarm (Ld): -1999 (digit)
- Outside higher/lower limit deviation alarm (od): 2000 (digit)
- Inside higher/lower limit deviation alarm (id): 2000 (digit)
- Higher limit absolute value alarm (HA): Measuring range higher limit value
- Lower limit absolute value alarm (LA): Measuring range lower limit value

Setting range:
- Higher/lower limit deviation alarm: -1999–2000 (digit)
- Outside or inside higher/lower limit deviation alarm: 0–2000 (digit)
- Higher/lower limit absolute value alarm: Within measuring range

Displayed when an alarm is assigned to the concerned event code, and sets program operation event action points.
This screen is not displayed when no alarm is assigned.

To 3-8 screen

3-8 Step 1 SV setting screen

S_01
0

Initial value: 0
Setting range: Within SV limiter

Sets SV value of the concerned step.
The display changes from [S_01] to [S_10] according to the step (up to the final step).
If SV limiter is changed and exceeds the SV limiter range, the SV value conforms to the SV limiter value.

3-9 Step 1 time setting screen

t_01
00:00

Initial value: 00:00
Setting range: 00:00–99:59

Sets duration of the concerned step.
The display changes [t_01] to [t_10] according to the step (up to the final step).
The unit of the duration is set on the "5-17 Time unit setting screen."

3-10 Step 1 PID No. setting screen

P_01
0

Initial value: 0
Setting range: 0–2

Sets PID No. of the concerned step.
The display changes from [P_01] to [P_10] according to the step (up to the final step).
Setting the PID No. to 0 inherits the number used in the previous step.
When step 1 is assigned 0, the program operates at PID No. 1.

Continues to the "3-37 Step 10 PID No. setting screen."

3-37 Step 10 PID No. setting screen

P_10
0

To 3-0 screen

Event (EV)/DI settings

For information on standby action, see 8-1, section (3).

3-0 PROG initial screen

Pressing the ENT key on the 3-0 screen switches to the event (EV)/DI initial screen.

4-0 Event (EV)/DI initial screen

EVdi
SEt

There are no setting items with this screen. Pressing the ⟲ key displays the initial setting screen, "4-1 Event 1 (EV1) type setting screen"
and pressing the ▲ + ⟲ keys displays the last screen, "4-13 DI mode setting screen."

4-1 Event 1 (EV1) type setting screen

E1_n
Hd

Initial value: Hd (higher limit deviation)
Setting range: non, Hd, Ld, od, id, HA, LA, So, run, rot1, StPS, PtnS, EndS, HoLd, ProG, u_SL, d_SL, GUA

Selected types of event are set in accordance with the event type code table of 4-2.
4-2–4-6 screens are displayed when alarm type code is **Hd, Ld, od, id, HA or LA**.

4-2 Event 1 hysteresis setting screen

E1_d
20

Initial value: 20 (digit)
Setting range: 1–999 (digit)

Sets ON-OFF hysteresis for event 1.
Displayed when event type code is **Hd, Ld, od, id, HA, or LA**.

To 4-3 screen

Event type code table (used by 4-1 and 4-7)

Code	Event action type	Remark
non (non)	No selection	
Hd (Hd)	Higher limit deviation alarm	EV1 initial value
Ld (Ld)	Lower limit deviation alarm	EV2 initial value
od (od)	Outside higher/lower limit deviation alarm	
id (id)	Inside higher/lower limit deviation alarm	
HA (HA)	Higher limit absolute value alarm	
LA (LA)	Lower limit absolute value alarm	
So (So)	Scale over	
run (run)	RUN signal	
rot1 (rot1)	Control output inverted output	For control output Y only (contact only)
StPS (StPS)	Step signal	For program control only
PtnS (PtnS)	Pattern signal	For program control only
EndS (EndS)	Program end signal	For program control only
HoLd (HoLd)	Hold signal	For program control only
ProG (ProG)	Program signal	For program control only
u_SL (u_SL)	Upslope signal	For program control only
d_SL (d_SL)	Downslope signal	For program control only
GUA (GUA)	Guarantee soak	For program control only

4-3 Event 1 standby action code setting screen

E1_i
oFF

Initial value: oFF
Setting range: oFF, 1, 2, 3

Sets type of standby action for event 1 from code table.
Displayed when event type code is **Hd, Ld, od, id, HA, or LA.**

Standby action code table (used by 4-9)

Code	Description of standby action
oFF	Non standby
1	When power is applied/When RST→RUN
2	When power is applied/When RST→RUN/ When SV is modified
3	Control mode (non standby)

4-4 Event 1 output characteristics setting screen

E1_A
no

Initial value: no
Setting range: no, nc
no: Normally open (output conductivity for event ON)
nc: Normally closed (output conductivity for event OFF)

Selects whether contact output for event action is conductive or nonconductive.
Event output for power OFF is nonconductive for both no and nc.

4-5 Event 1 delay time setting screen

E1dL
oFF

Initial value: oFF
Setting range: oFF, 1–9999 (seconds)

Outputs alarm after set time has elapsed from when event factor occurred.
Displayed when event type code is **Hd, Ld, od, id, HA, or LA.**

4-6 Event 1 latching setting screen

E1_L
oFF

Initial value: oFF
Setting range: oFF, on
oFF: Latching function unabled
on: Latching function enabled

With the event latching function, the alarm continues to be output even if there are no event conditions after event action. (Event self-hold)
Displayed when event type code is **Hd, Ld, od, id, HA, or LA.**

4-7 Event 2 (EV2) type setting screen

E2_n
Ld

Initial value: Ld (lower limit deviation value)
Setting range: non, Hd, Ld, od, id, HA, LA, So, run, rot1, StPS, PtnS, EndS, HoLd, ProG, u_SL, d_SL, GUA

Types of events selected for EV2 are set from **the event type code table of 4-2** just as with EV1.
4-8–4-12 screens are displayed when alarm type code is **Hd, Ld, od, id, HA or LA**.

To 4-8 screen

4-8 Event 2 action hysteresis setting screen

E2_d
20

Initial value: 20 (digit)
Setting range: 1–999 (digit)

Sets ON-OFF hysteresis of EV2 just like EV1.
Displayed when alarm type code is **Hd, Ld, od, id, HA, or LA.**

4-9 Event 2 standby action code setting screen

E2_c
oFF

Initial value: oFF
Setting range: oFF, 1, 2, 3

Sets type of standby action for EV2 from **the standby action code table of 4-3** just like EV1.
Displayed when event type code is **Hd, Ld, od, id, HA, or LA.**

4-10 Event 2 output characteristics setting screen

E2_A
no

Initial value: no
Setting range: no, nc

Set just like EV1.

4-11 Event 2 delay time setting screen

E2dL
oFF

Initial value: oFF
Setting range: oFF, 1–9999 (seconds)

Set just like EV1.

4-12 Event 2 latching setting screen

E2_L
oFF

Initial value: oFF
Setting range: oFF, on

Set just like EV1.

4-13 DI mode setting screen

di
non

Initial value: non
Setting range: non, run1, run2, mAn, At, SV, rAmP, ACt, L_rS, ProG,
HLd, AdV

Select/set according to usage objective of external input (DI).

DI mode allocation type code

Code	External control input allocation type	Detection
non	No selection	
run1	RUN/RST	Level
run2	RUN/RST	Edge
mAn	MAN: Manual output	Level
At	AT: Auto tuning execution	Edge
SV	SV: External selection	Level
rAmP	Ramp process halting	Level
ACt	Output output characteristics (RA/DA)	Level
L_rS	L_rS: Total unlatching	Edge
ProG	ProG: Program	Level
HLd	HLd: Hold signal	Level
AdV	AdV: Advance	Edge

To 4-0 screen

Initial settings

4-0 Event (EV)/DI initial screen

Pressing the ENT key on the 4-0 screen switches to “5-0 INIT initial screen.”

5-0 INIT initial screen

init
SEt

There are no setting items with this screen. Pressing the key displays the initial setting screen, “5-1 Keylock setting screen,” and pressing the ▲ + keys displays the final screen, “5-18. FIX upon PROG end and setting screen.”

To 5-1 screen

5-1 Keylock setting screen

LocK
oFF

Initial value: oFF
Setting range: oFF, 1, 2, 3

Locks items you don’t want to be modified.
To unlock, select oFF.
Data cannot be changed for a locked screen.

Lock No. and locked range are as follows:

Lock No.	Locked range
oFF	Unlock (all data can be modified)
1	All data locked except screen group 0 and SV
2	All data locked except SV
3	Only keylock setting can be modified

*** The “0-13 Latching release screen” cannot be key-locked.**

5-2 Proportional cycle time setting screen

o_C
30

Initial value: Contact output: 30 (seconds),
SSR drive voltage output: 3 (seconds)
Setting range: 1–120 (seconds)

Sets control output proportional cycle time.
Not displayed when output type is voltage or current.
For information on proportional cycle time, see 8-3, section (2).

5-3 Output characteristics setting screen

Act
rA

Initial value: rA (rA)
Setting range: rA, dA (dA)

Sets characteristics of control output.
rA: Reverse characteristics (for heating)
dA: Direct characteristics (for cooling)
For information on control output characteristics, see 8-3, section (3).

5-4 Hysteresis mode

dFmd
cEnt

Sets hysteresis mode when ON/OFF action is selected.
The set mode will be reflected in OUT/PID 1–2.

Initial value: CENT (cEnt)
Setting range: CENT/SVOF (SVoF)/SVON (SVon)

CENT: Mode for making the center position of hysteresis SV value
SVOF: Mode for making the output OFF position of hysteresis SV value
SVON: Mode for making the output ON position of hysteresis SV value

5-5 SV limiter lower limit value setting screen

SV_L
0

Initial value: Lower limit value of measuring range
Setting range: Lower limit value of measuring range to higher limit value of measuring range - 1 digit

Sets lower limit value to make setting range of target value fall within measuring range.
(Able to prevent incorrect setting in danger range, etc.)

5-6 SV limiter higher limit value setting screen

SV_H
1370

Initial value: Higher limit value of measuring range
Setting range: **Lower limit value of SV limiter + 1 digit to higher limit value of measuring range**

Sets higher limit value to make setting range of target value fall within measuring range.
(Able to prevent incorrect setting in danger range, etc.)

> Note: For SV limiter setting, the lower limit value is given preference to ensure that lower limit value is less than higher limit value. Consequently, higher limit value cannot be set less than lower limit value + 1 digit.

If Sc_L, Sc_H, in_L, or in_H is changed, the respective values are set for
SV_L/SV_H.

5-7 PV bias value setting screen

PV_b
0

Initial value: 0 (digit)
Setting range: -1999–2000 (digit)

Used for compensating input error of sensors, etc.
When bias is applied, control is also executed according to the bias.

5-8 PV ramp setting screen

PV_S
1.000

Initial value: 1.000 (times)
Setting range: 0.500–1.500 (times)

Sets PV ramp.

To 5-9 screen

5-9 PV filter time setting screen

PV_F
0

Initial value: 0 (seconds)
Setting range: 0–9999 (seconds)
Used to alleviate the effect if input varies radically or noise is superimposed.
Filter does not function if set to 0 seconds.

5-10 Measuring range code setting screen

rAnG
05

Initial value: Multi 05
Setting range: Selected from “7. Measuring range codes.”

Combination of input type and measuring range is set by the code.
Setting cannot be changed during control action

> Note: Stop control action to change setting on **5-10–5-16 screen.**
> Changing the setting initializes related parameters, so the parameters need to be reconfigured.

5-11 Input temperature unit setting screen

UniT
c

Initial value: c (c)
Setting range: c, F (F)

Temperature unit for sensor input is set to c (°C) or F (°F).
Not displayed if linear input (mV, V) is selected.
K (K) is displayed if measuring range code is 14–15 (in kelvin).

5-12 Input scaling lower limit value setting screen

in_L
0

Initial value: 0 (digit)
Setting range:
For linear range:
Selected from the input types shown in the measuring range code table
Others:
Selected from the measuring ranges shown in the measuring range code table

5-13 Input scaling higher limit value setting screen

in_H
1370

Initial value: 1370 (digit)

Setting range:
For linear range:
Selected from input types shown in the measuring range code table
Others:
Minimum setting is 10 digit/Maximum setting is within measuring range
Selected from measuring ranges shown in the measuring range code table

Setting the input range also limits the measuring range of the selected range.

To 5-14 screen

5-14 Display scaling lower limit value setting screen

Sc_L
0

Initial value: 0 (digit)
Setting range: -1999–9989 (digit)

Sets display scaling lower limit value for linear input (mV, V).
Cannot be set by monitoring screen for sensor input.

5-15 Display scaling higher limit value setting screen

Sc_H
1370

Initial value: 1370 (digit)
Setting range: (Sc_L set value) + 10 to (Sc_L set value) + 10000

Sets display scaling higher limit value for linear input (mV, V).
Cannot be set by monitoring screen for sensor input.

5-16 Decimal point position setting screen

dP
0

Initial value: No decimal point (0)
Setting range:
For linear input:
No decimal point (0) to 3 digits following decimal point (0.000)
Others:
No decimal point (0) to 1 digit following decimal point (0.0)

Sets decimal point position for display scaling.
Range with no decimal point cannot be set by monitor alone.

5-17 Time unit setting screen

t_un
Hm

(Displayed only when programming function is selected)
Initial value: Hm (Hm)
Setting range: Hm, mS (mS)

Sets time unit used by programming function.
Hm: Hour/minute, mS: Minute/second

5-18 FIX upon PROG end and setting screen

EFiy
oFF

(Displayed only when programming function is selected)
Initial value: oFF
Setting range: oFF, oN

Sets whether to proceed to the FIX mode upon program completion.

To 5-0 screen

Setting Example:

Range to be measured	Range code / Measuring range		Input scaling 5-12 Lower limit value	Input scaling 5-13 Higher limit value	Display scaling 5-14 Lower limit value	Display scaling 5-15 Higher limit value	Display range
10 to 1000 °C	05	0 to 1370 °C	10	1000	Unsettable		10 to 1000 °C
0 to 10 mV	72	-10 to 50 mV	0	10	0.0	100.0	0.0 to 100.0 %
1 to 5 V	86	0 to 10 V	1.0	5.0	0.0	100.0	0.0 to 100.0 %
4 to 20-mA	86	0 to 10 V	1.0	5.0	0.0	100.0	0.0 to 100.0 %
0 to 20-mA	86	0 to 10 V	0.0	5.0	0.0	100.0	0.0 to 100.0 %

For current input, install input terminals of the specified receiving impedance (250Ω) and use code 86 (0 to 10V).
The display range of sensor input will be the higher limit value from the lower limit value of the input scaling.

7. Measuring range codes

Select measuring range from the following table.

Note: Changing the code initializes all data related to measuring range. Change setting after switching to reset mode from the 0-1 screen.

Input type			Code	Measuring range (°C)	Measuring range (℉)
Multi-input	Thermocouple	B	01 *1	0–1800°C	0–3300 ℉
		R	02 *6	-50–1700°C	0–3100 ℉
		S	03 *6	0–1700°C	0–3100 ℉
		K	04 *2	-199.9–800.0°C	-300–1500 ℉
			05	0–1370°C	0–2500 ℉
		E	06	0–700°C	0–1300 ℉
		J	07 *2	-200–600°C	-320–1100 ℉
		T	08 *2	-270–400°C	-450–750 ℉
		N	09 *6	0–1300°C	0–2300 ℉
		PL II	10 *3	0–1300°C	0–2300 ℉
		C(WRe5-26)	11	0–2300°C	0–4200 ℉
		U	12 *2	-199.9–400.0°C	-300–750 ℉
		L	13	0.0–600.0°C	0–1100 ℉
	Kelvin	K	14 *4	10.0–350.0K	
		AuFe-Cr	15 *5	0.0–350.0K	
	RTD	Pt100	33	-200–600°C	-300–1100 ℉
			34	-199.9–300.0°C	-300–600 ℉
	mV	-10–50 mV	72	Display scaling range: -1999–9999 digit Span: 10-9999 digit	
Voltage	V	0–10 V	86		

Display accuracy TC: ± (0.3%FS + 1digit + 2°C)
Pt: ± (0.3%FS +1 digit + 0.1°C)
mV, V: ± (0.3%FS + 1digit)

*1 Accuracy guarantee is not applicable to 400°C (752°F) or below.
Accuracy of indicated values is 400 – 800°C (752 – 1472°F) is ± (0.5%FS + 1digit + 2°C)
*2 Accuracy of indicated values below -100°C (-148°F) is ± (1.5%FS + 1digit + 2°C)
*3 Accuracy of indicated values ± (1.5%FS + 1digit + 2°C)
*4 Accuracy temperature range:
10 – 30K: ± (2.5%FS + 1digit + 2°C)
30 – 70K: ± (1.5%FS + 1digit + 2°C)
70 – 350K: ± (1.0%FS + 1digit + 2°C)
*5 Accuracy of indicated values is ± (1.0%FS + 1digit + 2°C)
*6 Accuracy of indicated values below 200°C (392°F) is ± (0.5%FS + 1digit + 2°C)
Note: TC: Temperatures below -273 °C (-459 °F) or R.T.D.: Temperatures below -240 °C (-400 °F) are subject to scaleover display.
Thermocouple: With or without a decimal point is selectable for TC and Pt.

Note: Unless otherwise designated, the factory default settings are as follows:

Input range	Code	Measuring range
Multi-input	05	K 0–1370°C
Voltage input	86	0–10 V

8. Explanation of functions

This section contains a description of operation not covered in “5-5. Screen group 0 setting.”

8-1. Events

(1) Alarm action

1) Deviation alarm

Sets alarm action points for deviation of measured values (PV) from target set values (SV).
For example, to trigger an alarm when measured value (PV) is 30°C or more and target set value is 20°C, the higher limit deviation alarm is set to 10°C.
Or to trigger an alarm when measured value (PV) is 30°C or less and target set value is 100°C, the lower limit deviation alarm is set to -70°C.
This is convenient if you want alarm action point to be in accordance with deviation from target set values. The setting range is -1999–2000 digits.

2) Absolute value alarm

Sets alarm action point by absolute value. Higher limit absolute value alarm and lower limit absolute value alarm can be set at any point within measuring range.
For example, to trigger an alarm when measured value reaches 50°C or higher, set the higher limit absolute value alarm to 50°C.
Or to trigger an alarm when measured value reaches 20°C or lower, set the lower limit absolute value alarm to 20°C.

3) Standby action

If event standby action is set to 1 (or 2), an event is not output even if the measured value is in the alarm action area (ON area) when power is applied, standby is canceled, or target set value is changed.
Once outside the alarm action area (OFF area) and standby action is canceled, an event is output when it once again enters the alarm action area.

4) Non-standby action

If event standby action is set to OFF and 3, an event is always output when the measured value is within the alarm action area.

5) Control mode

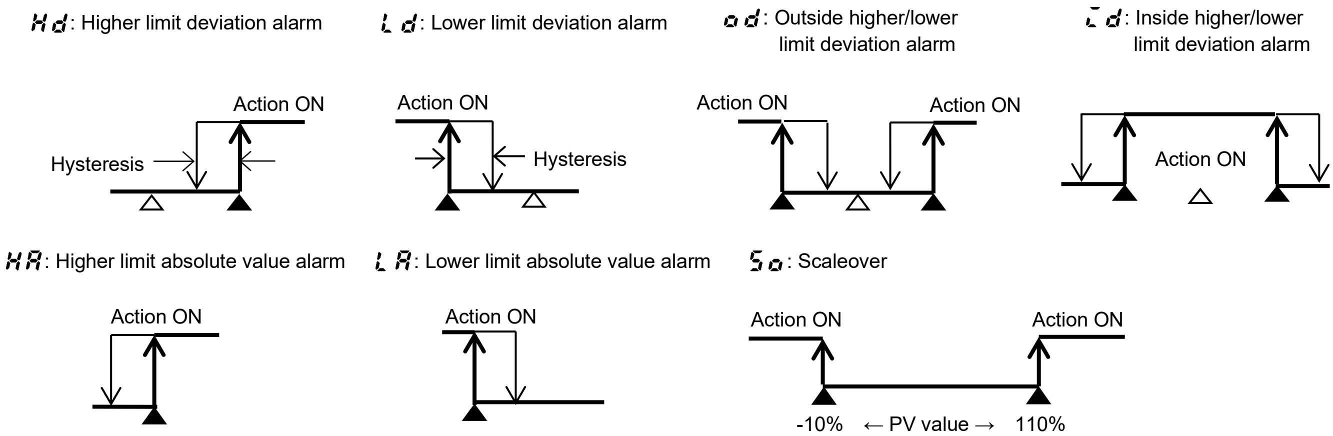
If standby action is set to 3, alarm is not triggered when scaleover occurs.

(2) Event standby action selection

The following are supplementary explanations of operation with “4-3 and 4-9 Event 1/2 standby action code setting screen” of screen group 4.
1. If using event output as an alarm, set from 1 or 2 of standby action code table.
2. If using event output for control, set 3 (control mode). If 3 is set, however, event output remains OFF for abnormal input.
3. If set to 1, standby action functions when power is applied or standby is cancelled.
4. If set to 2, standby action functions when power is applied, when standby is canceled and when execution SV is changed.
Note 1: Standby action is canceled immediately if changed to OFF or 3 during standby action.
Note 2: When scaleover occurs, standby action is canceled.

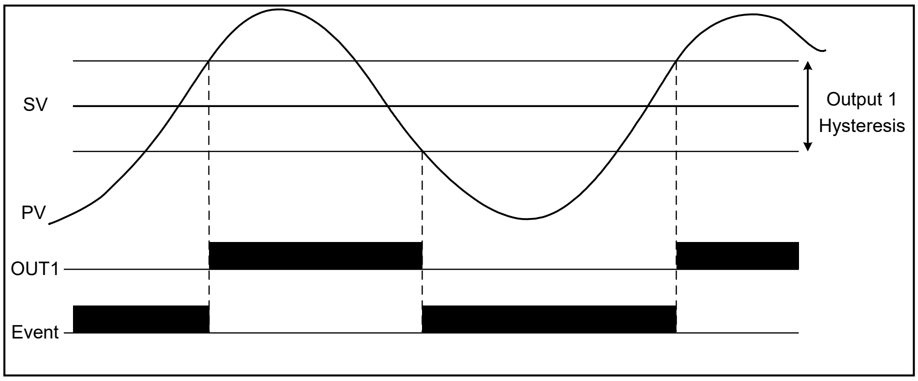
(3) Event selection alarm action diagrams

The following diagrams describe alarm actions selected for event (EV1/EV2).
△: SV value
▲: Alarm action point setting value



(4) Control output inverted output

If equipped with contact output for control output, inverted output can be executed for control output by selecting rot1 (control output inverted output) for the event code. Output is, however, OFF for both control output and event when the power is off.
Also, inverted output for control output can be executed as well during standby.



(5) Event status output action

1) run	(RUN)	RUN signal:	Output during program mode when the program is controlled by fixed value control (FIX mode) action.
2) StPS	(STPS)	Step signal:	Output for 1 second each time step in program control execution is completed.
3) PtnS	(PTNS)	Pattern signal:	Output for 1 second each time pattern in program control execution is completed.
4) EndS	(ENDS)	Program end signal:	Output for 1 second when program control execution is completed. (Output even if program is forcibly completed halfway.)
5) HoLd	(HOLD)	Hold signal:	Output when holding (temporary halt of program) during program control.
6) ProG	(PROG)	Program signal:	Output when set to program mode.
7) u_SL	(U_SL)	Upslope signal:	Output during upslope step execution during program control.
8) d_SL	(D_SL)	Downslope signal:	Output during downslope step execution during program control.
9) GUA	(GUA)	Guarantee soak signal:	Output when guarantee soak is engaged.

8-2. P.I.D.

(1) P (proportional action)

Sets percentage at which control output varies for measuring range. The size of control output varies in proportion to the difference between PV value and SV value.
The slighter the proportional band is, the more intense output variation and proportional action are. If it is too slight, control vibrates and the results of control are similar to ON-OFF action.

(2) I (integral time)

Function that corrects offset (constant deviation) produced by proportional band. The longer the integral time, the weaker the corrective action and the shorter the time, the stronger the action is, but control may vibrate due to integral hunting.

(3) D (derivative time)

Enhances stability by estimating change in control output and suppressing integral overshoot.
The longer the derivative time, the stronger derivative action is, but control results may be similar to vibration.

(4) MR (manual reset)

During PID action, offset is automatically corrected by integration (“I”), but if “I” is OFF, offset is not corrected. If so, offset can be corrected by manually increasing/decreasing output. This is called “manual reset.”

(5) SF (target value function)

This function determines the strength of the overshoot preventing function when operating expert PID.
Expert PID suppresses overshoot by conducting operation for predicting and canceling the amount of overshoot by referring to values such as the PID value and the variation of PV value until the target set value (SV) (or the proportional band) is reached. Target value function is effective only when there is an integral operation (PI, PID operation).

SF= OFF: Expert PID does not function and normal PID operates.
SF= 1.00: Minimize overshoot for expert PID control.
SF → Small: Overshoot preventing function works limitedly.
SF → Large: Overshoot preventing function works fully.

8-3. Control output

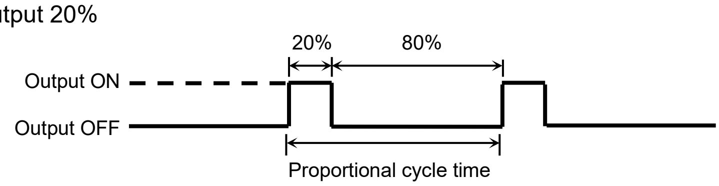
(1) Lower limit and higher limit limiter setting

1) Output limiter limits minimum and maximum values of control output and helps secure minimum temperature, suppress control overshoot, and achieve other objectives.
2) Lower limit value is given priority for output limiter setting. If minimum value is set above the higher limit value, the higher limit value forcibly becomes the lower limit value + 1%.
Higher limit value cannot be set less than lower limit value + 1%.

(2) Proportional cycle

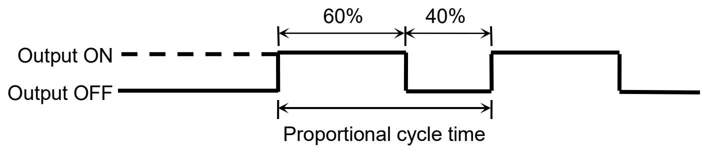
The correlation between proportional cycle time and control output are as shown in the following figure.
(This figure illustrates the case of heat action.)

1) Output 20%



During the time equivalent to 20% when proportional cycle time is 100%, output is ON and is OFF for the time equivalent of the remaining 80%.

2) Output 60%



During the time equivalent to 60% when proportional cycle time is 100%, output is ON and is OFF for the time equivalent of the remaining 40%.

(3) Control output characteristics

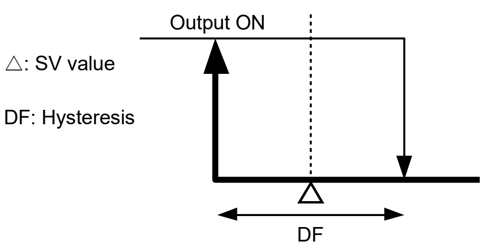
For heating, set to RA (reverse action) and for cooling set to DA (direct action).

(4) Two-position action

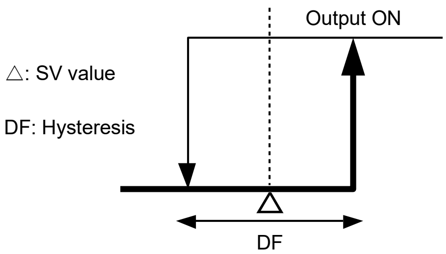
When conducting two-position action, frequent switching of output ON/OFF is prevented by utilizing hysteresis.

1) Hysteresis mode is CENT (cEnt):

RA action

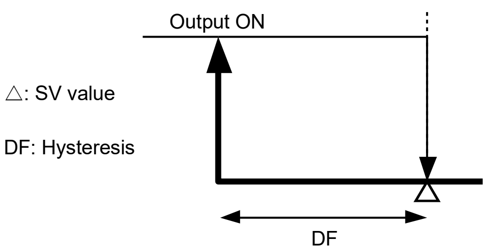


DA action

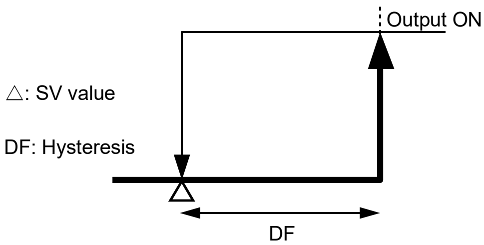


2) Hysteresis mode is SVOF (SVoF):

RA action

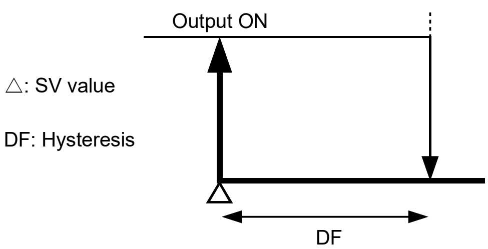


DA action

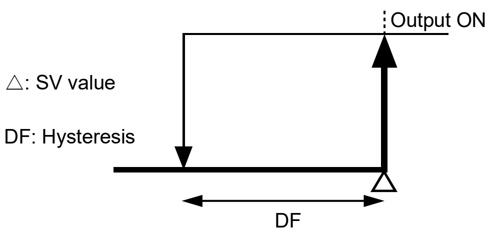


3) Hysteresis mode is SVON (SVon):

RA action



DA action



8-4. External control input (DI)

Input must be retained for at least 500 ms to receive external control input of the SRS0 Series.
Assignment of functions by DI input is conducted on the “4-13 DI mode setting screen.”
Function assigned to DI cannot be conducted by key operation. (DI input is prioritized.)
However, AT and unlatching can be conducted by key operation even if assigned to DI.

(1) Controller action execution (RUN1)

You can toggle between controller action execution/stop. Level action.

DI input OFF: Switches to the reset (stop) mode. SRS0 stops action.
DI input ON: Switches to the RUN (execution) mode. PID operation control is executed (program control execution).

Note: If DI is ON when power is applied, switches immediately to the RUN (execution) mode.

(2) Controller action execution (RUN2)

The RUN (execution) and reset (stop) modes are switched each time DI input is turned ON (edge action).

Note: If DI is ON when power is applied, does not switch immediately to the RUN (execution) mode.

(3) Manual output (MAN)

Switches to manual output. Level action.

DI input OFF: Ordinary feedback control action is executed.
DI input ON: Control output is executed manually; feedback control is not executed.

(4) Auto tuning execution (AT)

Auto tuning can be executed from outside. Edge action.

Once DI input is turned ON, auto tuning is executed.
If SV No. is switched by DI during AT execution, it is not applied until AT is finished.
AT in the RUN (execution) mode cannot be released by DI. Front key is used for releasing AT in the RUN (execution) mode (0-12 screen).

(5) SV selection (SV)

Set values of SV1–SV2 can be switched to execution SV. DI is level action.

DI	Selected SV No.
0	1
1	2

Execution SV No. and execution PID No. correspond with each other as SV1/PID1 and SV2/PID2.

(6) Output characteristic (ACT)

Switches output characteristics of control output (RA/DA).

When DI input OFF: RA (heating)
When DI input ON: DA (cooling)

(7) Program (PROG)

Switches FIX (fixed value control) and PROG (program) modes. Level action.

DI input OFF: Fixed value control (FIX mode)
DI input ON: Program (PROG) mode

(8) Hold signal (HLD)

Program execution can be halted from outside. Level action.
DI input ON: Stops program step time.

(9) Advance (ADV)

During program control execution, once DI input is turned ON, the current step is completed, and operation forcibly advances to the next step (edge action).

(10) Total unlatching (L_RS)

Events can be unlatched from outside. Edge action.
Once DI is turned ON, all event output is unlatched. Event output is however not unlatched if event output conditions have been satisfied.

8-5. Change in position of decimal point

Position of decimal point can be changed for linear input and for TC and RTD range with decimal point.
You should keep in mind that operation differs for TC and RTD range when using linear input.

(1) Change in position of decimal point for linear input

Sets position of decimal point to be displayed.
If changing position of decimal point from 0.0 to 0.000, display scaling changes from 0.0–100.0 to 0.000–1.000.

(2) Change in position of decimal point of TC/RTD range

Display of places below the decimal point can be switched to display or mask.
If changing position of decimal point from 0.0 to 0, the places below the decimal point are rounded off before being masked.
If changing position of decimal point from 0 to 0.0, the places below the decimal point are displayed again.
Things requiring special attention:

- Parameter values affected by range change (digit) also change similarly.
  Example: If range is “4” (PV bias)

	[Position of decimal point: 0.0] → Change →	[Position of decimal point: 0] → Change again →	[Position of decimal point: 0.0]
Measuring range lower limit value:	-199.9	-200	-199.9
Measuring range higher limit value:	400.0	400	400.0
PV bias:	20.5	21	21.0

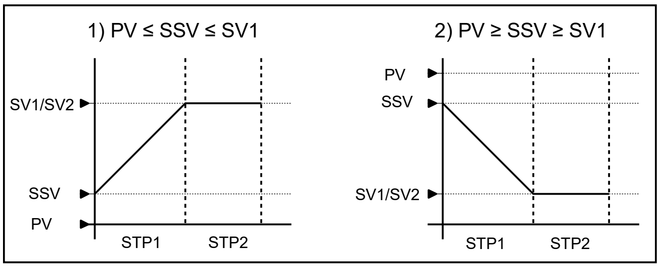
  Note: As described above, after changing the position of the decimal point, the value may not revert to the original value when the position of the decimal point is changed back.
- When measurement range is changed, the position of the decimal point returns to the default position.
- If position of decimal point is 0, display accuracy is not guaranteed.

8-6. Start SV

When the start step of the program operation is controlled by ramp control, if the start SV value greatly differs from PV value, the action time may be wasted. To prevent this, the start SV value may conform to the PV value when starting the operation.

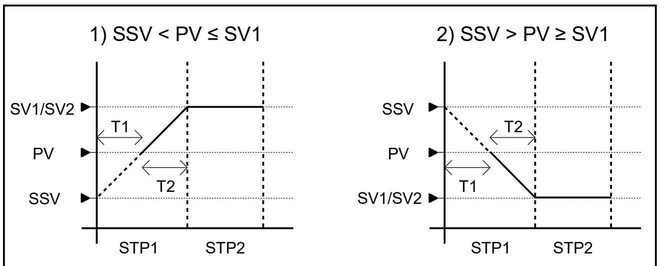
(1) When start SV function is invalid

When PV value does not fall between start SV value (SSV) and target step 1 SV value (SV1)



(2) When start SV function is valid

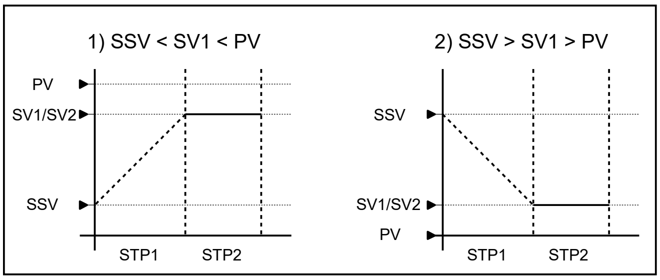
When PV value falls between start SV value (SSV) and target step 1 SV value (SV1)



T1: By eliminating this duration, starts from PV value.
T2: Step 1 executing duration

(3) When start SV function is valid and start step is skipped

When PV value exceeds target step 1 SV value (SV1)

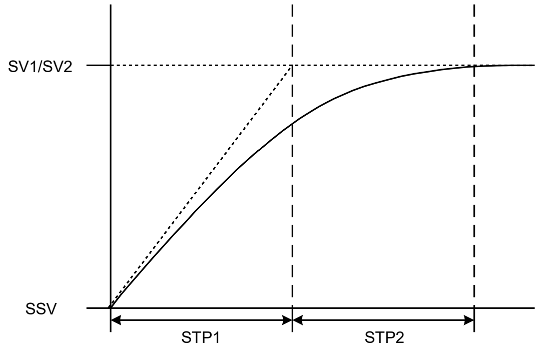


8-7. Guarantee soak (GUA)

When the operation switches from ramp step to flat step, if PV deviates from the designated guarantee soak zone, the next step does not start. This function guarantees a sufficient duration during which the flat step is executed.

(1) When OFF

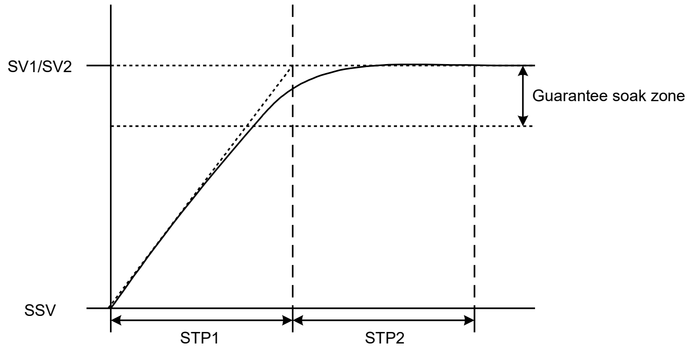
Even when PV has yet to reach SV1, the operation switches to step 2 after the step 1 duration has elapsed.



(2) When guarantee soak zone is set

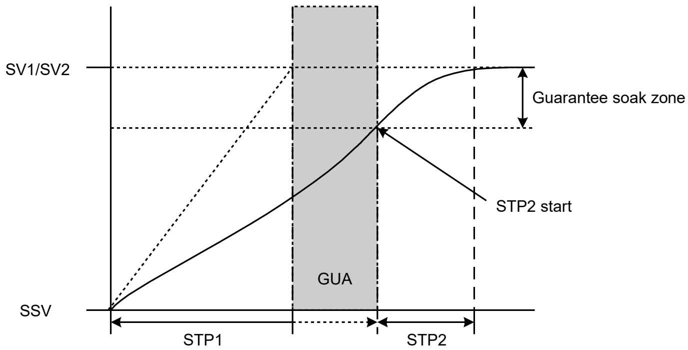
1) When the discrepancy between SV ramp and PV is small

Only when PV falls within the guarantee soak zone, the operation switches to step 2 after the step 1 duration has elapsed.



2) When the discrepancy between SV ramp and PV is large

When PV has yet to reach the guarantee soak zone after the step 1 duration has elapsed, guarantee soak (GUA) is executed until the PV reaches the zone.



Note: Guarantee soak (GUA) is executed even when step 1 is flat (SSV = SV1), as well as when step duration is set to 00:00 under certain required conditions.

9. Causes and remedy of trouble and errors

9-1. Causes and remedy of trouble

Problem	Cause	Remedy
1) Error message is displayed.	See “Causes and remedy of errors.”	See “Causes and remedy of errors.”
2) Displayed measured value (PV) seems to be incorrect.	1) Set measuring range code is different from that of input sensor/input signal. 2) Erroneous wiring to input terminals of sensor.	1) Check if set measuring range code is the same as input signal. 2) Check wiring to input terminals of sensor.
3) Front panel display goes off and does not function.	1) Problem with power supply and/or wiring connection. 2) Something is wrong with the instrument.	1) Inspect power supply/wiring connections and check wiring. 2) Inspect, repair or replace the instrument.
4) Keys do not work.	1) Key lock is in effect. 2) Operation is being executed. 3) Something is wrong with the instrument.	1) Cancel key lock. 2) Stop the operation (RST) on 0-1 screen to change parameters that cannot be modified during operation execution (RUN). 3) Inspect, repair or replace the instrument.
5) ON-OFF action of control output is too fast.	1) ON-OFF “hysteresis range” is too narrow.	1) Widen ON-OFF “hysteresis range.”

9-2. Causes and remedy of errors

(1) Abnormal measured input

Screen display	Problem	Cause	Remedy
HHHH (HHHH)	Higher limit scaleover	1) Break in thermocouple input wiring. 2) Break in RTD input A wiring. 3) Input measured value exceeded higher limit of measuring range by 10%.	1) Check thermocouple input wiring for possible break. If there is nothing wrong with wiring, replace thermocouple. 2) Check RTD input A terminal wiring for possible break. If there is nothing wrong with wiring, replace RTD. 3) For voltage or current input, check the measurement signal transmission unit. Check if set measuring range code is the same as input signal. 4) Check if input scaling setting is adequate.
LLLL (LLLL)	Lower limit scaleover	Input measured value fell below lower limit of measuring range by 10%.	1) Check for measurement input wiring for reverse polarity or possible break. 2) Check if input scaling setting is adequate.
b--- (b---)	Break in RTD input wiring	1) Break in B wiring 2) Multiple break in ABB wiring	Check RTD input ABB terminal wiring for possible break. If there is nothing wrong with wiring, replace RTD.
CJHH (CJHH)	Higher limit scaleover of cold junction (CJ) of thermocouple input	Ambient temperature has exceeded 80°C.	1) Reduce ambient temperature to the level provided in the environment conditions for the product. 2) If ambient temperature has not exceeded 80°C, examine the instrument.
CJLL (CJLL)	Lower limit scaleover of cold junction (CJ) of thermocouple input	Ambient temperature has fallen below -20°C.	1) Raise ambient temperature to the level provided in the environment conditions for the product. 2) If ambient temperature has not fallen below -20°C, examine the instrument.

When the controller does not operate as intended and you suspect it may be broken, read the instruction manual and inspect once again.

If there is something wrong with the controller or there is something you do not understand, contact your nearest Shimaden dealer.

10. Parameter setting record

For the sake of convenience, you should record your settings and selections.
Initial values for code 05 (K) are given here.

Screen No.	Parameter (item)/screen		Initial value	Setting/selection	Record
0-0	Basic screen (SV)	0 (0)	0		
0-1	Reset action setting screen		rSt		
0-2	Output monitoring				
0-3	Execution step No. monitoring				
0-4	Remaining time of step monitoring				
0-5	Number of pattern executions monitoring				
0-6	PID execution monitoring				
0-7	Ramp process halt	rAmP (rAmP)	run		
0-8	Hold	HLd (HLd)	oFF		
0-9	Advance	AdV (AdV)	oFF		
0-10	FIX event 1 set value setting	E1Hd (E1Hd)	2000		
0-11	FIX event 2 set value setting	E2Ld (E2Ld)	-1999		
0-12	AT action	At (At)	oFF		
0-13	Latching release	LAch (LAch)	rSt 1		
1-0	FIX initial screen	FiX (FiX)	SEt		
1-1	FIX ON/OFF	FiX (FiX)	on		
1-2	SV No.	SVNo. (SVno)	1		
1-3	SV1 setting	SV1 (SV1)	0		
1-4	SV2 setting	SV2 (SV2)	0		
1-5	Ramp incremental value	rP_u (rP_u)	oFF		
1-6	Ramp lower limit value	rP_d (rP_d)	oFF		
1-7	Ramp unit	rPun (rPun)	SEc		
1-8	Ramp ratio	rP_r (rP_r)	x 1		
2-0	Initial screen	Pid (Pid)	SEt		
2-1	OUT PID1 P	P1 (P1)	3.0		
2-2	OUT PID1 hysteresis	dF1 (dF1)	2.0		
2-3	OUT PID1 I	i1 (i1)	120		
2-4	OUT PID1 D	d1 (d1)	30		
2-5	OUT PID1 manual reset	mr1 (mr1)	0.0		
2-6	OUT PID1 target value function	SF1 (SF1)	0.40		
2-7	OUT PID1 lower limit limiter	o_L1 (o_L1)	0.0		
2-8	OUT PID1 higher limit limiter	o_H1 (o_H1)	100.0		
2-9	OUT PID2 P	p2 (P2)	3.0		
2-10	OUT PID2 hysteresis	dF2 (dF2)	2.0		
2-11	OUT PID2 I	i2 (i2)	120		
2-12	OUT PID2 D	d2 (d2)	30		
2-13	OUT PID2 manual reset	mr2 (mr2)	0.0		
2-14	OUT PID2 target value function	SF2 (SF2)	0.40		
2-15	OUT PID2 lower limit limiter	o_L2 (o_L2)	0.0		
2-16	OUT PID2 higher limit limiter	o_H2 (o_H2)	100.0		
3-0	Initial screen	ProG (ProG)	SEt		
3-1	Start SV value	StSV (StSV)	0		
3-2	End step	End (End)	10		
3-3	Number of pattern executions	Pcnt (Pcnt)	1		
3-4	Start mode	S_md (S_md)	SV		
3-5	Guarantee soak	GUAZ (GUAZ)	oFF		
3-6	Pattern EV1 level value	P1Hd (P1Hd)	2000		
3-7	Pattern EV2 level value	P2Ld (P2Ld)	-1999		
3-8	Step 1 SV value	S_01 (S_01)	0		
3-9	Step 1 time	t_01 (t_01)	0:00		
3-10	Step 1 PID No.	P_01 (P_01)	0		
3-11	Step 2 SV value	S_02 (S_02)	0		
3-12	Step 2 duration	t_02 (t_02)	0:00		
3-13	Step 2 PID No.	P_02 (P_02)	0		
3-14	Step 3 SV value	S_03 (S_03)	0		
3-15	Step 3 time	t_03 (t_03)	0:00		
3-16	Step 3 PID No.	P_03 (P_03)	0		
3-17	Step 4 SV value	S_04 (S_04)	0		
3-18	Step 4 time	t_04 (t_04)	0:00		
3-19	Step 4 PID No.	P_04 (P_04)	0		
3-20	Step 5 SV value	S_05 (S_05)	0		
3-21	Step 5 time	t_05 (t_05)	0:00		
3-22	Step 5 PID No.	P_05 (P_05)	0		
3-23	Step 6 SV value	S_06 (S_06)	0		
3-24	Step 6 time	t_06 (t_06)	0:00		
3-25	Step 6 PID No.	P_06 (P_06)	0		

Screen No.	Parameter (item)/screen		Initial value	Setting/selection	Record
3-26	Step 7 SV value	S_07 (S_07)	0		
3-27	Step 7 time	t_07 (t_07)	0:00		
3-28	Step 7 PID No.	P_07 (P_07)	0		
3-29	Step 8 SV value	S_08 (S_08)	0		
3-30	Step 8 time	t_08 (t_08)	0:00		
3-31	Step 8 PID No.	P_08 (P_08)	0		
3-32	Step 9 SV value	S_09 (S_09)	0		
3-33	Step 9 time	t_09 (t_09)	0:00		
3-34	Step 9 PID No.	P_09 (P_09)	0		
3-35	Step 10 SV value	S_10 (S_10)	0		
3-36	Step 10 time	t_10 (t_10)	0:00		
3-37	Step 10 PID No.	P_10 (P_10)	0		
4-0	Initial screen	EVdi (EVdi)	SEt		
4-1	Event 1 type	E1_m (E1_m)	Hd		
4-2	Event 1 hysteresis	E1_d (E1_d)	20		
4-3	Event 1 standby action	E1_i (E1_i)	oFF		
4-4	Event 1 output characteristics	E1_A (E1_A)	no		
4-5	Event 1 delay time	E1dL (E1dL)	oFF		
4-6	Event 1 latching	E1_L (E1_L)	oFF		
4-7	Event 2 type	E2-m (E2_m)	Ld		
4-8	Event 2 hysteresis	E2-d (E2_d)	20		
4-9	Event 2 standby action	E2-I (E2_i)	oFF		
4-10	Event 2 output characteristics	E2_A (E2_A)	no		
4-11	Event 2 delay time	E2dL (E2dL)	oFF		
4-12	Event 2 latching	E2_L (E2_L)	oFF		
4-13	DI mode	Di (di)	non		
5-0	Initial screen	init (init)	SEt		
5-1	Keylock setting	LocK (LocK)	oFF		
5-2	Proportional cycle time	o_C (o_C)	Y:30, P:3		
5-3	Output characteristics	Act (Act)	rA		
5-4	Hysteresis mode	dFMd (dFMd)	cEnt		
5-5	SV limiter lower limit value	SV_L (SV_L)	0		
5-6	SV limiter higher limit value	SV_H (SV_H)	1370		
5-7	PV bias value	PV_b (PV_b)	0		
5-8	PV ramp	PV_S (PV_S)	1.000		
5-9	PV filter time	PV_F (PV_F)	0		
5-10	Measuring range code	rAnG (rAnG)	Multi: 05		
5-11	Input temperature unit	Unit (Unit)	c		
5-12	Input scaling lower limit value	in_L (in_L)	0		
5-13	Input scaling higher limit value	in_H (in_H)	1370		
5-14	Display scaling lower limit value	Sc_L (Sc_L)	0		
5-15	Display scaling higher limit value	Sc_H (Sc_H)	1370		
5-16	Decimal point position	dP (dP)	0		
5-17	Time unit	t_Un (t_Un)	Hn		
5-18	Transition to FIX upon PROG end and setting	EFiX (EFiX)	oFF		

11. Specifications

■ Display

Digital display:	Measured value (PV):	7-segment red LED, 4 digits	
	Target set value (SV):	7-segment green LED, 4 digits	
	Action display:	LED lamp display:	Color
	Auto tuning (AT):	Lights during standby (flashes during execution):	Green
	Action display (RUN):	Lights during fixed value control operation (FIX):	Green
		Flashes during program RUN program control operation (RUN):	Green
	Control output (OUT):	Lights during contact or SSR drive voltage output:	Green
		For voltage/current output, lights when output is 100%	
		In other cases, flashes at intervals of 0.5 sec. (multiples of 0.5 sec.).	
	Manual control output (MAN):	Flashes during manual output is ON:	Green
	Event (EV1, EV2):	Lights during event output:	Orange
Display resolution:	Differs according to input range (0.001, 0.01, 0.1, 1)		
Display accuracy:	TC: ±(0.3%FS + 1 digit + 2°C)		
	Pt: ±(0.3%FS + 1 digit + 0.1°C)		
	mV: ±(0.3%FS + 1 digit)		
	V: ±(0.3%FS + 1 digit)		
Display cycle:	500 ms		

■ Setting

Setting method:	By operating 4 front panel keys(⟲, ▼, ▲, ENT)
Input range setting:	Input range used within measuring range is settable by given input scaling.
SV limiter:	Settable within both input scaling range and display scaling range.
Setting lock:	OFF, 3-stage setting (1–3)

■ Input

● Input common specification

Input type:	Multi range input
Input scaling:	Settable within measuring range (The minimum input span is 10 digits)
Decimal point position:	Without, settable from 0.1, 0.01, or 0.001 (With or without a decimal point is selectable for TC and Pt.)
PV bias:	-1999–2000 digits
PV ramp:	0.500–1.500 times input value
PV filter:	OFF, 0–9999 sec.
Scaleover display:	LLLL, HHHH
Isolation:	Uninsulated from system and DI, but insulated from other input

● Thermocouple input (TC)

Input type:	B, R, S, K, E, J, T, N, PLII, C(WRe5-26), AuFe-Cr, {U,L (DIN43710) }
Display range:	Within input scaling range (provided that minimum temperature does not fall below -273.15°C) With or without a decimal point is selectable.
Input resistance:	500kΩ or above
Cold junction compensation:	Internal
Internal cold junction compensation accuracy:	±2°C (18–28°C)
Burnout function:	Only upscale
External resistance tolerable range:	100Ω or below

● RTD input

Input type:	Pt100, 3-wire type
Display range:	Within input range setting (provided that minimum temperature does not fall below -240°C) With or without a decimal point is selectable.
Lead wire tolerable resistance range:	Below 10Ω/1 wire (All wires should have the same resistance.)
Measured current:	Approx. 0.17 mA

● Voltage input

Input type:	-10–50 mV DC, 0-10 V DC
Display scaling range:	-1999–9999 digits
Display scaling span:	10–9999 digits
Input resistance:	500kΩ or above

■ Control mode

Expert PID control with auto-tuning function

No. of SV:	2
No. of PID:	2 classes
Proportional band:	OFF, 0.1–999.9% (ON–OFF action when OFF)
Integral time:	OFF, 1–6000 sec. (P or PD action when OFF)
Derivative time:	OFF, 1–3600 sec. (P or PI action when OFF)
Manual reset:	-50.0–50.0% (Valid when I = OFF)
ON-OFF hysteresis:	1–999 digits (Valid when P = OFF)
Proportional cycle:	1–120 sec., 1 sec. step
Control output characteristics:	Reverse/direct selectable
Manual output:	0.0–100.0 %, 0.1% step
Output update cycle:	500 ms
Manual control:	Balanceless/bumpless action (switch through front panel key switch or external control input [DI])
Output setting range:	0.0–100.0%
Setting resolution:	0.1%

■ **Control output**

Contact (Y):	Contact (1a), 240V AC, 2.5 A: Resistive load/1 A: Inductive load
SSR drive voltage (P):	12 V ± 1.5 V DC (max. load current 20 mA)
Current (I):	4–20 mA, max. load resistance 600Ω
Voltage (V):	0–10 V, max. current 2 mA
Output resolution:	10000 digits

■ **Event output (EV)**

No. of output: Standard 2 points (EV1–EV2)
Constant rating: Contact (1a), 240 V AC, 1 A: Resistive load (common)
Function:

Display:	Action
Hd:	Higher limit deviation value action
Ld:	Lower limit deviation value action
od:	Outside higher/lower limit deviation action
id:	Inside higher/lower limit deviation action
HA:	Higher limit absolute value action
LA:	Lower limit absolute value action
SO:	Scaleover
RUN:	Control execution
ROT1:	Control output inverted output (contact output only)
STPS:	Step signal
PTNS:	Pattern signal
ENDS:	Program end signal
HOLD:	Hold signal
PROG:	Program signal
U_SL:	Upslope signal
D_SL:	Downslope signal
GUA:	Guarantee soak

● Setting range

Absolute value: Within both measuring range and PV limiter (both higher and lower limit)
Deviation: -1999–2000 digits (both higher and lower limit)
Higher/lower deviation: 0–2000 digits (both inside and outside)
Action: ON-OFF action
Hysteresis: 1–999 digits
Action delay time: OFF, 1–9999 sec.
Standby action: Separate setting (separate output), selectable from any of 4 types below
1) Without
2) Standby 1 (when starting power, when RST ON → OFF)
3) Standby 2 (when starting power, when RST ON → OFF, when execution SV is changed)
4) Standby 3 (Does not output when there is input abnormality.)
Latching: Selection from Yes/No
Output characteristics: Selection from NO/NC
Output update cycle: 500 ms
Isolation: Insulated from all input and output (uninsulated within EV)

■ **External control input (DI)**

No. of input: Standard 1 point
Input type: Level input, edge input
Input rating: Voltage 5 V DC (2.5 mA/1 input)
Input action: Non-voltage contact or open collector
Input holding time: 500 ms
Function:

Display:	Action:	Input type
RUN1:	Starts control when ON:	Level
RUN2:	Starts control when ON:	Edge
MAN:	Manual control output mode:	Level
AT:	AT execution:	Edge
SV:	SV switch:	Level
RAMP:	Ramp halt:	Level
ACT:	Output characteristics:	Level
L_RS:	Event latching release:	Edge
PROG:	Program switch:	Level
HLD:	Hold signal:	Level
ADV:	Advance signal:	Edge

■ **Program (option)**

No. of pattern: 1
No. of step: 10
Power failure compensation: Without
Guarantee soak zone: oFF, 1–999 digits
Time accuracy: Set value × 0.3%

■ **General specifications**

Data storage:	By non-volatile memory (EEPROM)
● Operating ambient	
Ambient temperature:	-10–50°C
Humidity range:	Below 90%RH (no condensation) Derating from 50°C
Storage temperature:	-20–65°C
Over voltage category:	II
Elevation:	Max. 2000 m
Pollution class:	2 (IEC 60664)
Supply voltage:	100–240 V AC ± 10% (50/60 Hz)
● Power consumption:	10 VA
● Input noise removal ratio:	Normal mode: 50 dB or above (50/60 Hz) Common mode: 120 dB or above (50/60 Hz)
● Applicable standard:	Safety: IEC61010-1 and EN61010-1 EN IEC 61010-2-030 EMC: EN61326-1
● Power supply short-break time:	Within 50 ms, normal action continuation (when 200V)
● Insulation resistance:	Input-output terminal and power terminal interval, 500 V DC, 20MΩ or above
● Dielectric strength:	Input-output terminal and power terminal interval, 2300 V AC, 1 min.
● Material of case:	Resin mold (UL94V-1 equivalent)
● External dimensions:	SRS1: H48 × W48 × D66 mm, panel depth: 62 mm SRS3: H96 × W96 × D69 mm, panel depth: 65 mm SRS4: H96 × W48 × D66 mm, panel depth: 62 mm SRS5: H48 × W96 × D66 mm, panel depth: 62 mm
● Mounting:	Panel flush mounting
● Applicable panel thickness:	1.0–3.5 mm
● Panel cutout:	SRS1: H45 × W45 mm SRS3: H92 × W92 mm SRS4: H92 × W45 mm SRS5: H45 × W92 mm
● Weight:	SRS1: Approx. 88 g SRS3: Approx. 180 g SRS4: Approx. 115 g SRS5: Approx. 115 g

* With regard to the technical details of products, please contact your nearest Shimaden dealer.

Temperature and Humidity Control Specialists

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