# SRS10A Series
## (SRS11A / SRS12A / SRS13A / SRS14A)

### Digital Controller

# Instruction Manual (Detailed Version)

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

## 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, and routine maintenance for the SRS10A (SRS11A/SRS12A/SRS13A/SRS14A) Series.
This manual contains a description of the operating method, functions, wiring, mounting method, and precautions when handling the SRS10A (SRS11A/SRS12A/SRS13A/SRS14A) Series (hereinafter referred to as the SRS10A Series unless a separate description is required). You should, therefore, keep it handy to refer to it when operating and handling the equipment.
Be sure to observe all precautions and adhere to the procedures provided herein.

# SHIMADEN CO., LTD.

# 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 SRS10A 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 or 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: 250V AC, 0.5A/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 contoller by raising the temperature, and could result in equipment failure. For rating, see "12. 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 "12. 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.
● ·This controller is being designed for a panel-mounted type. IP66 standard protection is only applicable for the front panel of SRS12A. Do not use in any environment where water or solids in excess of IEC60529 may get inside or when the device is not facing the front.

# 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.
The SRS10A Series offers a selection of two codes: SRS11A and SRS12A/13A/14A.

### (1) Model code check

(SRS11A model code)
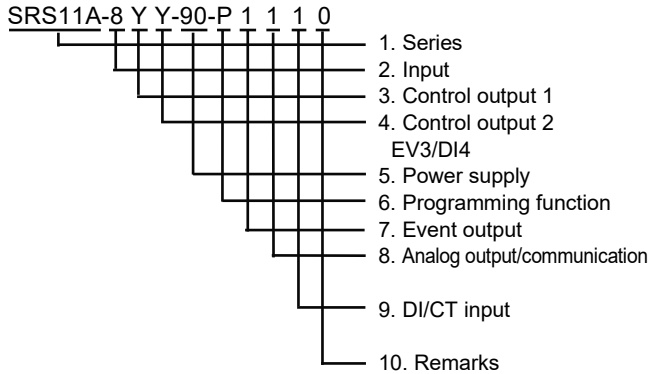
SRS11A-8 Y Y-90-P 1 1 1 0

| | |
|---|---|
| 1. Series | **SRS11A** |
| 2. Input | 8: Multi-input, thermocouple, R.T.D., voltage (mV) 6: Voltage (V) |
| 3. Control output 1 | Y: Contact  I: Current  P: SSR drive voltage  V: Voltage |
| 4. Control output 2 | N: None  Y: Contact  I: Current  P: SSR drive voltage  V: Voltage |
| EV3/DI4 | E: Event output 1 point (EV3)  D: External control input 1 point (DI4) |
| 5. Power supply | 90: 100-240V AC  08: 24V AC/DC |
| 6. Programming function | N: None  P: With (4 patterns, max. 32 steps) |
| 7. Event output | 0: None  1: Event output 2 points (EV1, EV2) |
| 8. Analog output/communication | 0: None  3: Voltage (0 ~ 10 mV)  4: Current (4 ~ 20 mA) |
| | 6: Voltage (0 ~ 10 V)  5: communication (RS-485) |
| 9. DI/CT input | 0: None  1: CT 2 points input (Can be selected if control output 1 or 2 is Y, P.) |
| | 2: External control input 3 points (DI1, DI2, DI3) |
| 10. Remarks | 0: None  9: With |

(SRS12A/SRS13A/SRS14A model code)
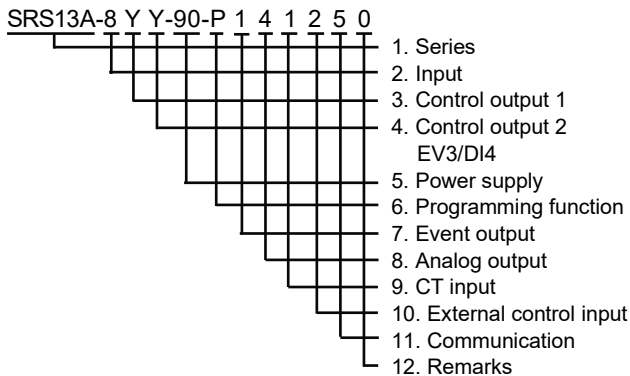
SRS13A-8 Y Y-90-P 1 4 1 2 5 0

| | |
|---|---|
| 1. Series | **SRS12A, SRS13A or SRS14A** |
| 2. Input | 8: Multi-input, thermocouple, R.T.D., voltage (mV) 6: Voltage (V) |
| 3. Control output 1 | Y: Contact  I: Current  P: SSR drive voltage  V: Voltage |
| 4. Control output 2 | N: None  Y: Contact  I: Current  P: SSR drive voltage  V: Voltage |
| EV3/DI4 | E: Event output 1 point (EV3)  D: External control input 1 point (DI4) |
| 5. Power supply | 90: 100-240V AC |
| 6. Programming function | N: None  P: With (4 patterns, max. 32 steps) |
| 7. Event output | 0: None  1: Event output 2 points (EV1, EV2) |
| 8. Analog output | 0: None  3: Voltage (0 ~ 10 mV)  4: Current (4 ~ 20 mA)  6: Voltage (0 ~ 10 V) |
| 9. CT input | 0: None  1: CT 2 points input (Can be selected if control output 1 or 2 is Y, P.) |
| 10. External control input | 0: None  2: Control input 3 points (DI1, DI2, DI3) |
| 11. Communication | 0: None  5: Communication (RS-485) |
| 12. Remarks | 0: None  9: With |

### (2) Accessories check

| | |
|---|---|
| Instruction manual (A3 size paper × 2) | 1 copy |
| Unit seals | 1 sheet |

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: 2000m
③ Ambient temperature: -10 to 50°C
④ Ambient humidity: Max. 90%RH, no 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 external dimentions and panel cutout in section 3-3.
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 SRS10A Series are designed for mounting on the panel. Be sure to mount on the panel.
⑤ Be sure to install this product with the attached gasket. In case if the gasket is broken or falls off, please replace it with the designated one.
⑥ If mounted in series, provide ventilation so ambient temperature does not exceed 50°C due to temparature rise caused by heat generation.

## 3-3. External dimensions and panel cutout

SRS11A
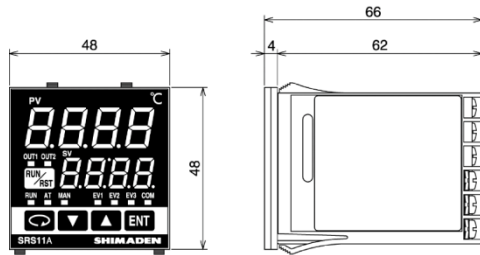


Panel cutout

$45^{+0.6}_{-0}$  $(48 \times N-3)^{+1.0}_{-0}$

$45^{+0.6}_{-0}$  $45^{+0.6}_{-0}$

Min. 60

If mounted horizontally
N=Number of units

Unit: mm

SRS12A



Panel cutout

Min. 100

$68^{+0.7}_{-0}$

$68^{+0.7}_{-0}$  Min. 100

Unit: mm

SRS13A



Panel cutout

Min. 130

$92^{+0.8}_{-0}$

$92^{+0.8}_{-0}$  Min. 130

Unit: mm

SRS14A



Panel cutout

$45^{+0.6}_{-0}$  $(48 \times N-3)^{+1.0}_{-0}$

$92^{+0.8}_{-0}$  $92^{+0.8}_{-0}$

Min. 130

If mounted horizontally
N=Number of units

Unit: mm

5
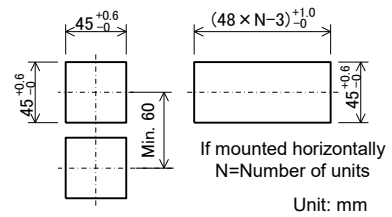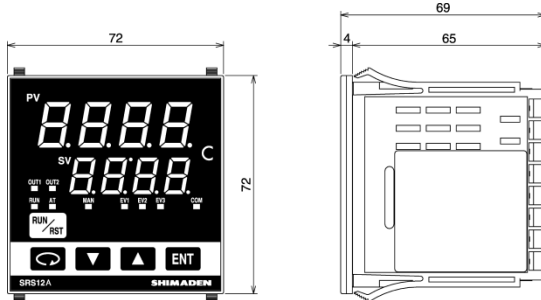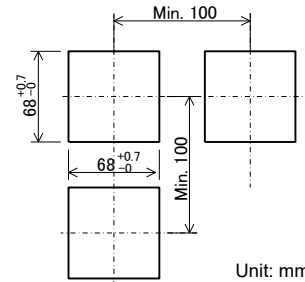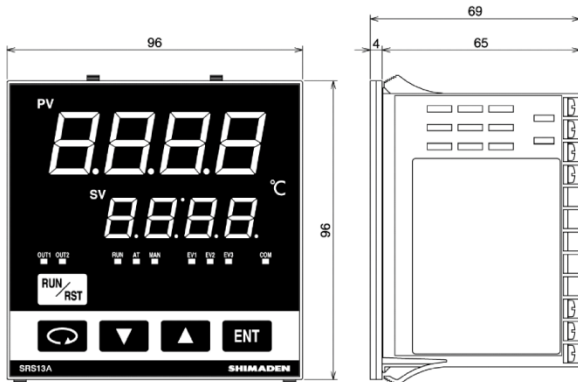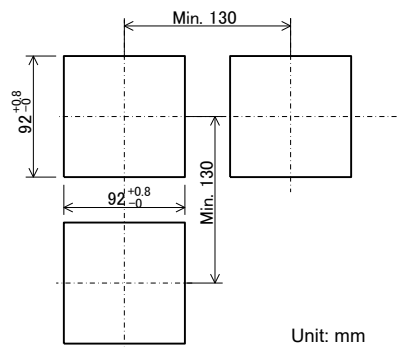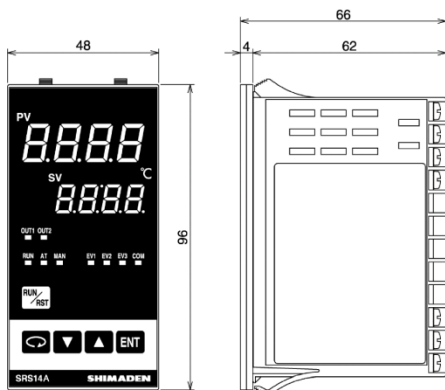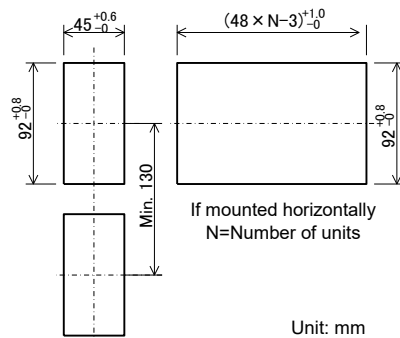
**External dimensions of current detector for heater break alarm (CT)**

| TYPE:QCC01 | TYPE:QCC02 |
|---|---|
| 0 ~ 30A (CTL-6-S) | 0 ~ 50A (CTL-12-S36-8) |



Unit: mm
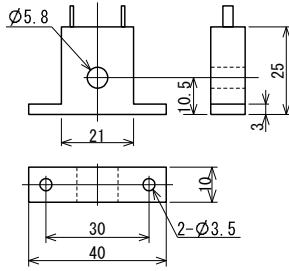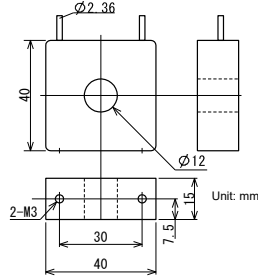
## 3-4 Wiring

┌─────────────── ⚠ **CAUTION** ───────────────┐

● 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 R.T.D. input, resistance for lead wires should be a maximum of 5Ω 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 600V vinyl insulated wiring.
⑨ Securely fasten the terminal element screw.　　Fastening torque: 0.5 N·m (5kgf·cm)
⑩ 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.
⑪ Countermeasure against lightning surge will be required for signal line over 30m.

Recommended noise filter:
TDK RSEL-2003W
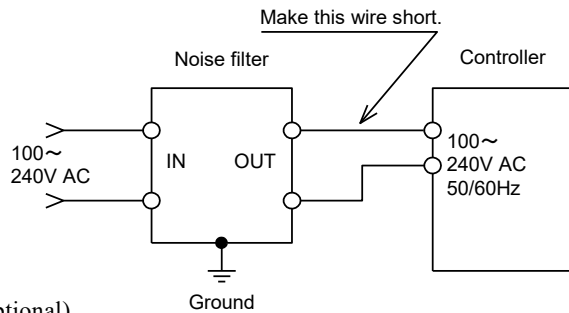


⑫ Current transformer (CT) connection method (CT input optional)



To CT input terminal of controller (no polarity)

Heater (load) wire

CT
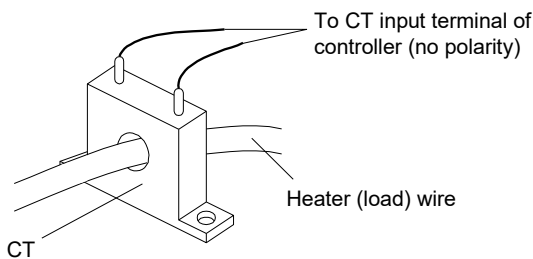
Pass one of the load lines through the dedicated CT hole.
Wire from the CT secondary side terminal to the CT input terminal of the SRS10A Series.
There are 2 combinations of CT connection terminals for the SRS10A Series, which can detect current for 2 heater combinations.

## 3-5. Terminal layout

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

**SRS11A**
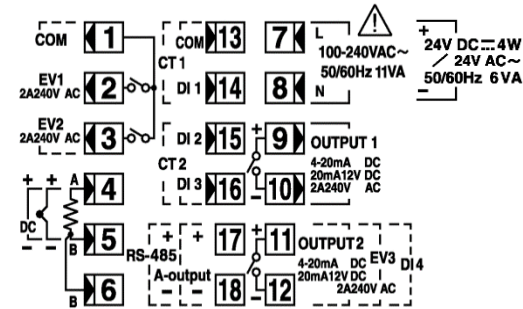
**SRS13A/SRS14A**
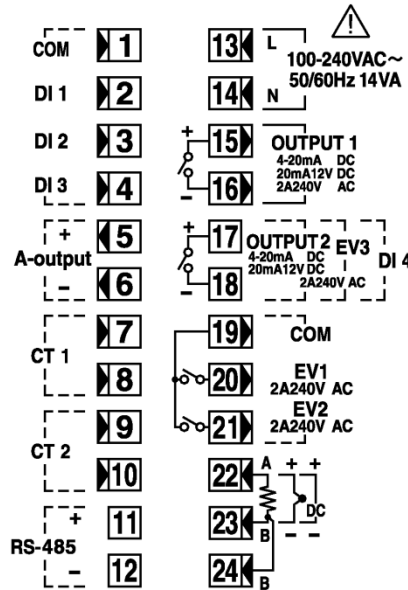
**SRS12A**
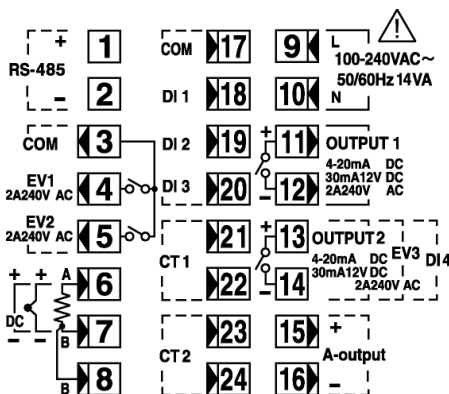
## 3-6. Terminal arrangement table

| Name of terminal | Description/code | Terminal No. | | |
|---|---|---|---|---|
| | | SRS11A | SRS12A | SRS13A/14A |
| Power supply | 100-240V AC: L | 7 | 9 | 13 |
| | 100-240V AC: N | 8 | 10 | 14 |
| | 24V AC/24V DC: + | 7 | -- | -- |
| | 24V AC/24V DC: – | 8 | -- | -- |
| Input | R.T.D: A, thermocouple / voltage / current: + | 4 | 6 | 22 |
| | R.T.D: B, thermocouple / voltage / current: – | 5 | 7 | 23 |
| | R.T.D: B | 6 | 8 | 24 |
| Control output 1 | Contact: NO, SSR drive voltage / voltage / current: + | 9 | 11 | 15 |
| | Contact: NO, SSR drive voltage / voltage / current: – | 10 | 12 | 16 |
| Control output 2 (optional) | Contact: NO, SSR drive voltage / voltage / current: + | 11 | 13 | 17 |
| | Contact: NO, SSR drive voltage / voltage / current: – | 12 | 14 | 18 |
| Event output (optional) | COM | 1 | 3 | 19 |
| | EV1 | 2 | 4 | 20 |
| | EV2 | 3 | 5 | 21 |
| | EV3 | 11-12 | 13-14 | 17-18 |
| CT input (optional) | CT1 input | 13-14 | 21-22 | 7-8 |
| | CT2 input | 15-16 | 23-24 | 9-10 |
| External control input / DI (optional) | COM | 13 | 17 | 1 |
| | DI1 | 14 | 18 | 2 |
| | DI2 | 15 | 19 | 3 |
| | DI3 | 16 | 20 | 4 |
| | DI4 | 11-12 | 13-14 | 17-18 |
| Analog output (optional) | + | 17 | 15 | 5 |
| | – | 18 | 16 | 6 |
| Communication (optional) | RS-485: + | 17 | 1 | 11 |
| | RS-485: – | 18 | 2 | 12 |

Note1: With thermocouple / voltage / current input, shorting across B and B terminal will cause an error.

Note2: The following optional function of the SRS10A Series are limited to exclusive selection.

SRS11A: Only one among control output 2, event output 3 and external control input DI4 can be selected. Either CT input or external control input DI1 – 3 can be selected. Either analog output or communication can be selected.

SRS12A : Only one among control
SRS13A    output 2, event output 3 and
SRS14A    external control input DI4 can be selected.

## 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 "4-61 Measuring range codes setting screen" of 4 screen group and enter.
Select temperature unit of "4-62 Input unit setting screen" of 4 screen group and enter.
For current, voltage and mV input, set lower limit value, higher limit value and position of decimal point of display contents for input signal.
(You should also select by 4-63, 4-64 and 4-65 screens by code.)

*4.* **Control mode (PID) setting**

For ON-OFF (2 position) action, select OFF by "2-1. Output 1 PID1 proportional band setting screen" of 2 screen group and enter.
Sets hysteresis by "2-2. Output 1 PID1 hysteresis setting screen."
If equipped with output 2, set by same method.
If using auto tuning (AT) with other than ON-OFF hysteresis, this setting operation is not required.

*5.* **Control output characteristics setting**

Select RA (for heating) or DA (for cooling) according to output specification (heating/cooling) on "4-49 Output 1 output characteristics setting screen" and "4-52 Output 2 output characteristics setting screen" of 4 screen group and enter.

*6.* **Event type setting**

If equipped with event, select types of event on "4-3, 4-8and 4-13 Event type setting screen" of 4 screen group and enter.

*7.* **Analog output setting**

If equipped with analog output, select items to be output as analog signals on "4-24 Analog output type setting screen" of 4 screen group and enter.

*8.* **Precaution concerning initialization by data modification**

Modifying measuring range code, type of event or type of analog output initializes related setting values (data). The data must therefore be set again.

# 4. Names and functions of parts on front panel



① Measured value (PV) display

② Target set value (SV) display

③ Action display

④ Operating keys

| Name | Function |
|---|---|
| ① Measured value (PV) display | (1) Measured value display LED (red)<br>• Displays current measured value (PV) on basic screen (screen 0-0).<br>• Displays type of parameter on each respective parameter display screen. |
| ② Target set value (SV) display | (2) Target value display LED (green)<br>• Displays current target set value (SV) on basic screen (screen 0-0).<br>• Displays setting values on each respective parameter setting screen. |
| ③ Action display | Displays status of controller.<br>• RUN: Action display LED (green)<br>    Off: Control halt status (standby or reset)<br>    On: Running by fixed value control status (FIX)<br>    Flashing: Running by program control status (RUN)<br>• AT: Auto tuning LED (green)<br>    Off: Auto tuning not executed<br>    On: Auto tuning standby<br>    Flashing: Auto tuning being executed<br>• MAN: Manual control LED (green)<br>    Off: Automatic control operating status<br>    Flashing: Manual control operating status<br>• OUT1: Control output 1 (green)<br>• OUT2: Control output 2 (green)<br>    For output by contact or SSR drive voltage:<br>      Off: Output is OFF.<br>      On: Output is ON.<br>    For voltage/current output:<br>      Brightness changes according to the output ratio.<br>      (Light illuminates brightly when output is 100% and dimly when output is 0%.)<br>• EV1: Event output 1 (orange)<br>• EV2: Event output 2 (orange)<br>• EV3: Event output 3 (orange)<br>    Off: Event output is OFF.<br>    On: Event output is ON.<br>    Note: Always off when event output is not selected as an optional item.<br>• COM: Communication mode (green)<br>    Off: Communication LOC mode<br>    On: Communication COM mode<br>    Note: Always off if communication function is not selected as an optional item. |
| ④ Operating keys | • ⟳ : Parameter key<br>    Displays the next screen in various screen groups<br>    Pressing and holding for at least 3 seconds on 0-0 screen displays 4-0 initial settings screen group.<br>• ▼ : Down key<br>    Decrements setting values.<br>• ▲ : Up key<br>    Increments setting values.<br>• ENT : Enter key<br>    Enters setting values.<br>    Displays various screen groups if no SV values are being modified on the basic screen.<br>• RUN/RST : RUN/RST key<br>    Pressing and holding for at least 2 seconds in STBY (RST) status switches to EXE (RUN).<br>    Pressing and holding for at least 2 seconds during EXE (RUN) switches to STBY (RST).<br>    status.<br>    Fixed value control (FIX mode)    STBY: Standby status    EXE: Control execution status<br>    Program control (PROG mode)    RST: Reset status    RUN: Program execution status |

# 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 operation, etc. | ⌐┈┐ Screen displayed when concerned optional item is added |
| ☐ Screen to be shown or hidden according to the setting | ▓ Programming function / communication function related screens. Screens explained by respective function instruction manuals |
| ⌐┈┐ No monitor screen (3 minutes auto return) | |

**0 screen group** | **1 screen group** | **2 screen group** | **3 screen group** | **4 screen group**

⟲ 3 seconds

**0 screen group**

- 0-0 `25.0 / 0.0` Basic screen
- 0-1 `25.0 / StS` Standby setting
- 0-2 `25.0 / o 50.0` Monitoring OUT1
- 0-3 `25.0 / o 50.0` Monitoring OUT2
- 0-4 `25.0 / StO 1` Monitoring program execution step No.
- 0-5 `25.0 / 00.00` Monitoring remaining time of program step
- 0-6 `25.0 / 1` Monitoring number of program patterns
- 0-7 `25.0 / P . . 1` Monitoring program execution PID No.
- 0-8 `HLd / oFF` Program hold execution setting
- 0-9 `Rdu / oFF` Program advance execution setting
- 0-10 `HC . 1 / 10.0` Monitoring heater current 1
- 0-11 `HC . 2 / 5.0` Monitoring heater current 2
- 0-12 `E 1Hd / 20.00` FIX EVENT 1 EV1 setting
- 0-13 `E2Ld / 199.9` FIX EVENT 2 EV2 setting
- 0-14 `E3Hd / 200.0` FIX EVENT 3 EV3 setting
- 0-15 `Rt / oFF` AT execution
- 0-16 `SPtn / 1` Monitoring program start pattern
- 0-17 `LRch / rSt 1` Latching release

0-0 Basic screen

**1 screen group**

- 1-0 `Fi S / SEt` FIX initial screen
- 1-1 `Fi S / on` FIX ON/OFF
- 1-2 `SUno / 1` SV No. setting
- 1-3 `SU 1 / 0` SV1 setting value
- 1-4 `SU2 / 0` SV2 setting value
- 1-5 `SU3 / 0` SV3 setting value

1-0 Initial screen

**2 screen group**

PID1 screen group

- 2-0 `Pid 1 / SEt` PID1 initial screen
- 2-1 `1 . P 1 / 3.0` OUT1 proportional band
- 2-2 `1dF 1 / 2.0` OUT1 hysteresis
- 2-3 `1 . i 1 / 120` OUT1 integral time
- 2-4 `1 . d 1 / 30` OUT1 derivative time
- 2-5 `1 r 1 / 0.0` OUT1 MR
- 2-6 `1SF 1 / 0.40` OUT1 SF
- 2-7 `1oL 1 / 0.0` OUT1 lower limit limiter
- 2-8 `1oH 1 / 100.0` OUT1 higher limit limiter
- 2-9 `2 . P 1 / 3.0` OUT2 proportional band
- 2-10 `2dF 1 / 2.0` OUT2 hysteresis
- 2-11 `2 . i 1 / 120` OUT2 integral time
- 2-12 `2 . d 1 / 30` OUT2 derivative time
- 2-13 `2db 1 / 0.0` OUT2 dead band (DB)
- 2-14 `2SF 1 / 0.40` OUT2 SF
- 2-15 `2oL 1 / 0.0` OUT2 lower limit limiter
- 2-16 `2oH 1 / 100.0` OUT1 higher limit limiter

2-0 Initial screen

PID2 screen group

- 2-0 `Pid2 / SEt`
- 2-1 `1 . P2 / 3.0`
- 2-2 `1dF2 / 2.0`
- 2-3 `1 . i 2 / 120`
- 2-4 `1 . d2 / 30`
- 2-5 `1 r2 / 0.0`
- 2-6 `1SF2 / 0.40`
- 2-7 `1oL2 / 0.0`
- 2-8 `1oH2 / 100.0`
- 2-9 `2 . P2 / 3.0`
- 2-10 `2dF2 / 2.0`
- 2-11 `2 . i 2 / 120`
- 2-12 `2 . d2 / 30`
- 2-13 `2db2 / 0.0`
- 2-14 `2SF2 / 0.40`
- 2-15 `2oL2 / 0.0`
- 2-16 `2oH2 / 100.0`

2-0 Initial screen

PID3 screen group

- 2-0 `Pid3 / SEt`
- 2-1 `1 . P3 / 3.0`
- 2-2 `1dF3 / 2.0`
- 2-3 `1 . i 3 / 120`
- 2-4 `1 . d3 / 30`
- 2-5 `1 r3 / 0.0`
- 2-6 `1SF3 / 0.40`
- 2-7 `1oL3 / 0.0`
- 2-8 `1oH3 / 100.0`
- 2-9 `2 . P3 / 3.0`
- 2-10 `2dF3 / 2.0`
- 2-11 `2 . i 3 / 120`
- 2-12 `2 . d3 / 30`
- 2-13 `2db3 / 0.0`
- 2-14 `2SF3 / 0.40`
- 2-15 `2oL3 / 0.0`
- 2-16 `2oH3 / 100.0`

2-0 Initial screen

**3 screen group**

- 3-0 Initial screen

Program screen group

See programming function instruction manual

**4 screen group**

- 4-0 Initial screen

Initial setting screen group

See following page

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 and 4 screen groups switch to next screen when the ⟲ key is pressed and return immediately to the preceding screen when the RUN RUN/RST key is pressed.

Note 3. For switching among the 0 screen group, 1 screen group, 2 screen group and 3 screen group, pressing the ENT key switches to the initial screen of the next screen group.

Note 4. Besides the initial screen of the 2 screen group, pressing and holding the ENT key for at least 2 seconds switches to the initial screen of the next PID No. in the 2 screen group.

Note 5. To switch between the 0 screen group and 4 screen group, pressing and holding the ⟲ key for at least 3 seconds in the 0-0 basic screen of the 0 screen group or 4-0 initial screen of the 4 screen group, switches to the other screen group.

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**0-0 Basic screen**

↕ 3 seconds

**4 screen group**

**4-0** `Unit SEt` — Initial screen

**Column 1:**

**4-1** `LocK oFF` — Key lock setting

**4-2** `StbY oFF` — Event at STBY setting

**4-3** `E1_n Hd` — EV1 mode setting

**4-4** `E1_d 2.0` — EV1 hysteresis setting

**4-5** `E1_t oFF` — EV1 standby action setting

**4-6** `E1_L oFF` — EV1 latching setting

**4-7** `E1_A no` — EV1 output characteristics setting

**4-8** `E2_n Ld` — EV2 mode setting

**4-9** `E2_d 2.0` — EV2 hysteresis setting

**4-10** `E2_t oFF` — EV2 standby action setting

**4-11** `E2_L oFF` — EV2 latching setting

**4-12** `E2_A no` — EV2 output characteristics setting

**4-13** `E3_n non` — EV3 mode setting

**4-14** `E3_d 2.0` — EV3 hysteresis setting

**4-15** `E3_t oFF` — EV3 standby action setting

**4-16** `E3_L oFF` — EV3 latching setting

**4-17** `E3_A no` — EV3 output characteristics setting

**4-18** `Hbn1 out1` — Heater 1 alarm mode setting

**4-19** `C1Hb oFF` — Heater 1 break alarm setting

**4-20** `C1HL oFF` — Heater 1 loop alarm setting

**4-21** `Hbn2 out1` — Heater 2 alarm mode setting

**4-22** `C2Hb oFF` — Heater 2 break alarm setting

**4-23** `C2HL oFF` — Heater 2 loop alarm setting

→ 4-24 screen

**Column 2:**

**4-24** `Ao_n PV` — Analog output type setting

**4-25** `Ao_L 0.0` — Analog output scaling lower limit value setting

**4-26** `Ao_H 800.0` — Analog output scaling higher limit value setting

**4-27** `AL_L 0.0` — Analog output limiter lower limit setting

**4-28** `AL_H 100.0` — Analog output limiter higher limit setting

**4-29** `d1_n non` — DI1 mode setting

**4-30** `d2_n non` — DI2 mode setting

**4-31** `d3_n non` — DI3 mode setting

**4-32** `d4_n non` — DI4 mode setting

**4-33** `conn Loc` — Communication mode setting

**4-34** `Addr 1` — Communication address setting

**4-35** `dAtA 7E1` — Communication data format setting

**4-36** `SchA StS` — Communication start character setting

**4-37** `ChV Add` — Communication BCC operation/protocol type setting

**4-38** `bPS 9600` — Communication speed setting

**4-39** `dELY 20` — Communication delay time setting

**4-40** `nEn EEP` — Communication memory mode setting

**4-41** `ConV con1` — Communication mode types

**4-42** `nS_n SV` — Communication master mode setting

**4-43** `n_SL 0` — Communication master control output scaling lower limit value setting

**4-44** `n_SH 8000` — Communication master control output scaling higher limit value setting

**4-45** `S_Ad 1` — Communication master mode start slave address setting

**4-46** `E_Ad 1` — Communication master mode finish slave address setting

→ 4-47 screen

**Column 3:**

**4-47** `Unit 0300` — Communication master mode write data address setting

**4-48** `o_C1 30` — Output 1 proportional cycling time setting

**4-49** `Act1 rA` — Output 1 characteristics setting

**4-50** `SoF1 oFF` — Output 1 soft start time setting

**4-51** `o_C2 30` — Output 2 proportional cycling time setting

**4-52** `Act2 rA` — Output 2 characteristics setting

**4-53** `SoF2 oFF` — Output 2 soft start time setting

**4-54** `SV_L 0.0` — SV limiter lower limit value setting

**4-55** `SV_H 800.0` — SV limiter higher limit value setting

**4-56** `Ptnc 4` — Number of program patterns setting

**4-57** `t_un Hn` — Program time unit setting

**4-58** `PV_b 0.0` — PV bias value setting

**4-59** `PV_G 0.00` — PV gain compensation value setting

**4-60** `PV_F 0` — PV filter time setting

**4-61** `rAnG 05` — Measuring Range Codes setting

**4-62** `Unit c` — Temperature unit setting

**4-63** `Sc_L 0.0` — Input scaling lower limit value setting

**4-64** `Sc_H 100.0` — Input scaling higher limit value setting

**4-65** `dP 0.0` — Input decimal point setting

**4-66** `dSP PVSV` — Basic screen display mode

**4-67** `dFnd cEnt` — Hysteresis mode

**4-68** `P_ni oFF` — Parameter Initialization

→ 4-0 Initial screen

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## 5-2. Display when power is applied

When power is applied, the initial screen when power is applied 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 ($5r$ $11$, $5r$ $12$, $5r$ $13$, $5r$ $14$)
Input type ($tc$ : thermocouple, $Pt$ : R.T.D., $\bar{n}H$: Voltage [mV], $HH$: Voltage [V])
(For current mA input, select voltage input after providing receiving impedance of 250Ω externally.)

Indicates control output 1
OUT1 output type ($y$: Contact, $P$: SSR drive voltage, $H$: Voltage, $\bar{L}$ :Current)

Indicates control output 2
OUT2 output type ($y$, $P$, $H$, $\bar{L}$)    Displayed if $y$, $P$, $H$, $\bar{L}$ is selected for OUT2.

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.
You can set PV/SV to be displayed or masked by the settings of "4-66. Basic screen display mode."

## 5-3. Switching screens

Within 0 screen: 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). See "Programming Function Instructions."
Screen group 4: Screen group primarily set by manufacturer / equipment maker. (Initial setting screen group)
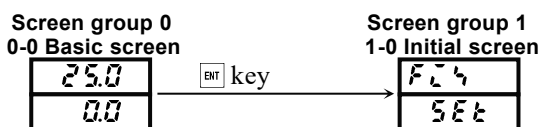
### (1) Switching screens within screen group 0

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.

**0-0 Basic screen**   **0-1 Standby screen**   **0-2 Output 1 monitoring**   **0-17 Latching release screen**
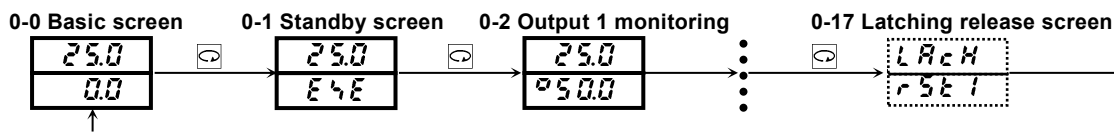
### (2) Switching between screen group 0 and screen group 1
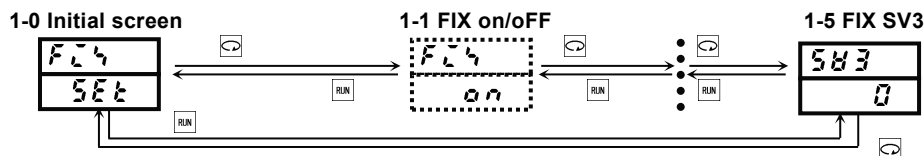
Pressing the ⟨ENT⟩ key on the basic screen of screen group 0 switches to "1-0 initial screen" of screen group 1.

**Screen group 0**
**0-0 Basic screen**          **Screen group 1**
                              **1-0 Initial screen**
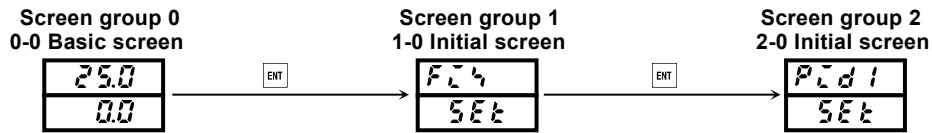
### (3) Switching screens within screen group 1

Each time the ⟳ key is pressed on the "1-0 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 initial screen."
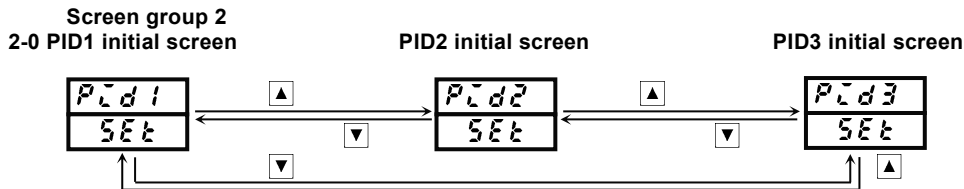With screen group 1, each time the ⟨RUN⟩ key is pressed, the screen is switched in the reverse direction.

**1-0 Initial screen**          **1-1 FIX on/oFF**          **1-5 FIX SV3**

## (4) Switching to screen group 2

Pressing the ⊞ key on the "1-0 initial screen" switches to the "2-0 initial screen" of screen group 2.

**Screen group 0**
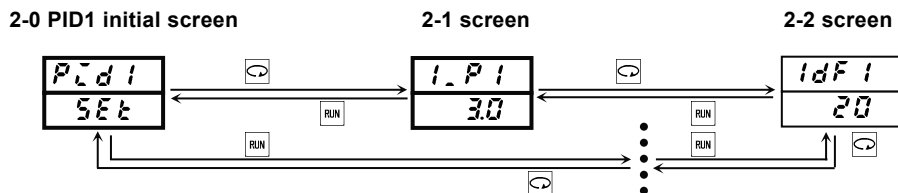**0-0 Basic screen**  →(ENT)→  **Screen group 1**
**1-0 Initial screen**  →(ENT)→  **Screen group 2**
**2-0 Initial screen**

```
25.0          FїϞ          Pїd1
 0.0          SEϨ          SEϨ
```

## (5) Switching screens within screen group 2

The "2-0 initial screen" in screen group 2 is the PID1 setting initial screen. Each time the ▲ key is pressed, the setting initial screen switches PID2→PID3→PID1. Pressing the ▼ key switches PID1→PID3→PID2.

**Screen group 2**
**2-0 PID1 initial screen**  ◄─▲/▼─►  **PID2 initial screen**  ◄─▲/▼─►  **PID3 initial screen**

```
Pїd1          Pїd2          Pїd3
SEϨ           SEϨ           SEϨ
```

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 initial screen."
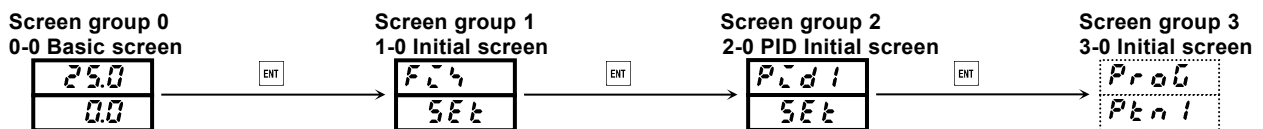With screen group 2, each time the RUN key is pressed, the screen is switched in the reverse direction.

**2-0 PID1 initial screen**  ◄─⟳/RUN─►  **2-1 screen**  ◄─⟳/RUN─►  **2-2 screen**

```
Pїd1          1._P1         1dF1
SEϨ           3.0            20
```

## (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 ⊞ key on the "2-0 initial screen" switches to the "3-0 initial screen" of screen group 3.
Further pressing the ⊞ key switches to the basic screen.

**Screen group 0**
**0-0 Basic screen**  →(ENT)→  **Screen group 1**
**1-0 Initial screen**  →(ENT)→  **Screen group 2**
**2-0 PID Initial screen**  →(ENT)→  **Screen group 3**
**3-0 Initial screen**

```
25.0          FїϞ          Pїd1          ProG
 0.0          SEϨ          SEϨ           Ptn1
```

For more information on the programming function, see the "Programming Function Instructions."

## (7) Switching to screen group 4

Screen group 4 is the initial setting screen group. Various settings are made prior to using the controller.
Pressing the ⟳ key on the basic screen of screen group 0 for at least 3 seconds switches to "4-0 initial screen" of screen group 4.
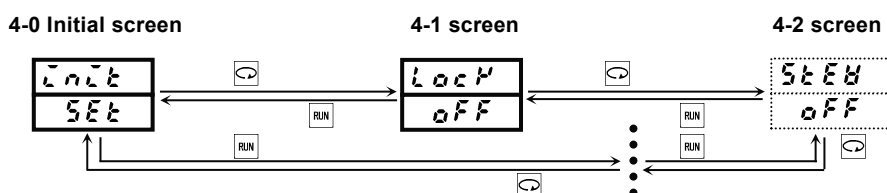Pressing the ⟳ key on the "4-0 initial screen" of screen group 4 for at least 3 seconds switches to the basic screen of screen group 0.

**Screen group 0**
**0-0 Basic screen**  ◄─⟳ key At least 3 seconds─►  **Screen group 4**
**4-0 Initial screen**

```
25.0          їnїϨ
 0.0          SEϨ
```
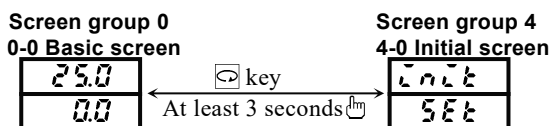
## (8) Switching screens within screen group 4

Each time the ⟳ key is pressed screen display switches from the initial screens to the next screen. If pressed when the last screen is displayed, returns to the "4-0 initial screen."
With screen group 4, each time the RUN key is pressed, the screen is switched in the reverse direction.

**4-0 Initial screen**  ◄─⟳/RUN─►  **4-1 screen**  ◄─⟳/RUN─►  **4-2 screen**

```
їnїϨ          LocϞ          StEϬ
SEϨ           oFF           oFF
```

## (9) Set data modification

Data is modified on the various screens by pressing the ▲ or ▼ key. The modified data is entered by pressing the ⊞ 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 1 monitoring screen", "0-3 output 2 monitoring screen", "0-4 step No. monitoring screen", "0-5 remaining time of step monitoring screen", "0-6 number of pattern execution monitoring screen", "0-7 Execution PID No. monitoring screen", "0-10 heater current 1 monitoring screen" or "0-11 heater current 2 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 description 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 the ▲ key or ▼ key on the "0-0 basic screen." Pressing and holding the key causes the decimal point of the lowest digit to flash, and the value is incremented or decremented. When the desired target set value is reached, enter by pressing the ENT key.
*2.* When the setting is entered, the decimal point of the lowest digit of the target set value stops 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 500.0°C.**

**0-0 Basic screen**



Decimal point flashes　　Decimal point flashes　　Decimal point stops flashing　Enter
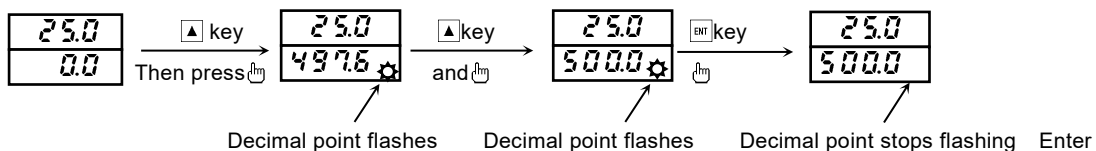
\* If the target set values (SV) are masked in the "4-66. Basic screen display mode," SV values cannot be modified.

### (2) Manual setting of control output

#### 1) Output monitoring screen (OUT1/OUT2) and switching and setting automatic/manual output

To toggle between automatic and manual, press and hold the ENT key on the "0-2 output 1 monitoring screen" or "0-3 output 2 monitoring screen" or press the ENT key 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 for 3 seconds or press the ENT and ▲ keys simultaneously.

Automatic output　　　　Manual output　　　　Manual output　　　　Automatic output
**0-2 Output monitoring screen**
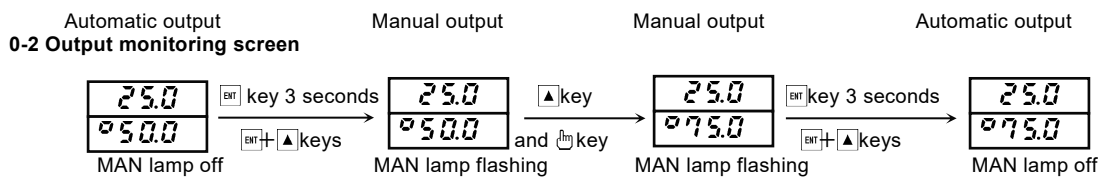


① Changing output action of either output 1 or output 2 to manual automatically changes the other to manual. Similarly, changing one to auto also automatically changes the other to automatic as well.
② If output of output 1 is 100.0%, ⌐9.9.9 is displayed on the output 1 monitoring screen and the decimal point of ⌐ flashes.
③ If output of output 2 is 100.0%, ⌐9.9.9 is displayed on the output 2 monitoring screen and the decimal point of ⌐ flashes.
④ 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%.
⑤ 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.
NOTE1: Manual output cannot be changed while automatic tuning (AT) is being executed. To change, you must first cancel AT.
NOTE2: If MAN is selected in "4-29 – 4-32 DI mode setting screen", external control input 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 1 monitoring screen" and "0-3 output 2 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 change value 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 monitor LED is flashing, the controller is in manual output mode (MAN).
③ Manual output (MAN) is canceled if EXE (RUN) is switched to Stby (Rst).
  • MAN operation is possible only in EXE (RUN) mode.

## (3) Auto tuning (AT)

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

### 1) AT execution

Pressing the ▲ key on the "0-15 AT action control screen" causes the $oFF$ display at the bottom to change to $on$ and the decimal point of the smallest digit to flash.
Pressing the ENT key then executes AT. The decimal point stops flashing and the AT lamp flashes.
When AT is executed, ON/OFF hysteresis of output is repeated several times according to increment or decrement of measured values. 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 stops flashing.

**0-15 AT action control screen**



Decimal point flashes      Decimal point stops flashing      **AT execution**
                          AT lamp flashes
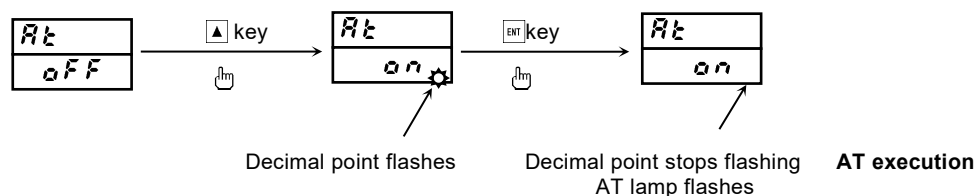
### 2) Cancellation of AT

To cancel AT before it finishes, select ▼ with the $oFF$ key on the "0-15 AT action control screen." When the ENT key is pressed, AT is cancelled. The decimal point and the AT lamp then stop flashing.

**0-15 AT action control screen**



Decimal point stops flashing   AT execution   Decimal point flashes   Decimal point stops flashing   **AT canceled**
AT lamp flashes                               AT lamp flashes         AT lamp stops flashing
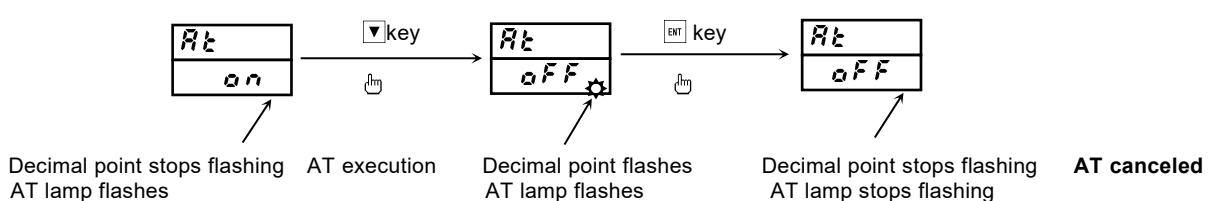
Note: If AT is canceled before completeion, PID value is not changed.

### 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 1 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)
⑥ If AT screen is masked or locked. (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 action for 2-output specifications**

With 2-output specifications, AT action changes according to RA/DA characteristics as follows:

① When OUT1/2 characteristics differ (RA/DA or DA/RA)
   PID constant is same value for both output 1 and output 2.

② RA characteristics for both OUT1/OUT2 or DA characteristics for both OUT1/OUT2
   AT action is executed for output 1 only; OUT2 during AT execution is 0% output or output limiter lower limit value.

NOTE: During AT execution, any setting change cannot be conducted except for cancellation of AT, change to standby mode, key
      rock setting and change of transmission mode.

## (4) Standby (STBY) / execution (EXE)

The controller is equipped with a standby mode for temporarily halting controller execution.
This operation mode is switched on the "0-1 standby action setting screen."
In the case of fixed value control (FIX mode), STBY (standby) / EXE (execution) is displayed.
In the case of program control (PROG mode), RST (reset: stop) / RUN (program execution) is displayed.
If EXE1 (RUN1) or EXE2 (RUN2) is selected on the "4-29 – 4-32 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 it goes off during standby.
② Controller output for standby is 0%.
③ When standby is executed, auto tuning (AT) is canceled.
④ When standby is executed in the manual input mode, the manual input mode is canceled.
⑤ When the power is turned off while the controller is in standby mode, standby mode continues when the power is turned back on.
⑥ If event standby action is specified when switching to execution mode (EXE) from standby mode (StbY), the specified standby
      action is executed.
⑦ If event latching is not engaged in the standby 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 types of event code however initializes setting values (data) related to events.

### 1) Types of event (alarm type) setting

Select type code from among **Hd, Ld, od, id, HA, LA, So, EXE(run), rot1, HC1, HC2, StPS, PtnS, EndS, HoLd, ProG, u_SL,
d_SL, GUA** on the "4-3 event 1 type setting screen of screen" group 4 with the ▲ key / ▼ key and enter the event type with the
ENT key.
Set event 2 and event 3 on the "4-8 event 2 type setting screen" and "4-13 event 3 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 code other than the above is selected, event values cannot be set.

**2) Event values setting**

Event values are set on the "0-12 FIX event 1 setting values setting screen", "0-13 FIX event 2 setting values setting screen" and "0-14 FIX event 3 setting values setting screen." Type of event is displayed when one of the previously mentioned 6 types of events is selected.

Event values are set by selecting setting range by pressing the ▲ key / ▼ key on the 0-12, 0-13 or 0-14 screen.

When the event value setting has been decided, enter by pressing the ᴇɴᴛ key and the decimal point stops flashing.

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

* Definition of unit
  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.

**0-12 FIX event 1 setting values setting screen**



Decimal point flashes    During modification    Decimal point stops flashing    Enter
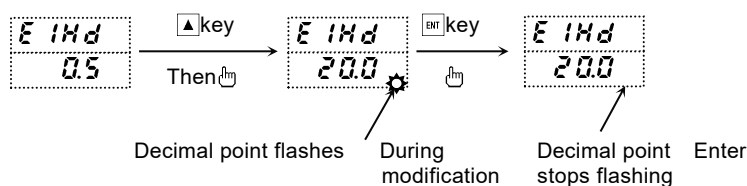
## (6) Multi SV (target set values)

**1) Multi SV**

You can set 3 types of target set values (SV). (SV1, SV2, SV3)

SV values are set on the "1-3 – 1-5 FIX control SV1 – SV3 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, SV2/PID2 and SV3/PID3.

**2) External selection switching of multi SV**

If equipped with external control input DI, if ESV2 is allocated to DI, execution SV can be selected from among SV1 – SV3 by DI input.

Using 2 points of DI, DI to be used for SV selection is allocated on "4-29, 4-30 DI1 and DI2 mode setting screen."

ESV2 can be allocated only to DI1 or DI2.

# 6. Screen explanation and setting items

**0-0**  basic screen  ⟳ 3 seconds

```
25.0
0.0
```

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 (1).

**Screens registered with the specified screen call function**

```
8.8.8.8.
8.8.8.8.
```
⟳ 0-0 **Basic Screen**

RUN ✋  ENT ✋

**4-0 Initial screen**
```
ініt
SEt
```

**1-0 Initial screen**
```
Fіҁ
SEt
```
ENT →
**2-0 Initial screen**
```
Pіd 1
SEt
```
→
**3-0 Initial screen**
```
ProG
Ptn 1
```
ENT → 0-0 **Basic Screen**

**0-1**  **Standby action setting screen**

```
25.0
EҁE
```

Initial value: EXE (EҁE)
Setting range: StbY (StbY), EXE

Display only if the "4-29 – 4-32 DI mode setting screen" is set to EXE1 or EXE2.
StbY (standby): Action stop, EXE: Selects execution action.
For program operation, rSt (rSt/reset), run (run/run) setting.
For standby action, see 5-5 (4).

**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**

```
Adᴠ
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.

**0-2**  **Output 1 (OUT1) monitoring screen**

```
25.0
o50.0
```

Displays measured value (PV) at the top; on the bottom the output 1 control output value 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 (OUT1/OUT2) 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 1 or output 2 screen, or you can press the ENT and ▲ keys simultaneously.
● When either the output 1 or output 2 mode is changed (to automatic or manual), the other changes automatically.
● The MAN lamp flashes during manual output.
  For details, see 5-5 (2).

**0-10**  **Heater current 1 monitoring screen**

```
HC_1
50.0
```

Displayed if optionally equipped with heater break/loop alarm; displays current value of heater 1 (CT1).
(No setting item)
Because this is a monitoring screen, auto return does not function.
--- : Displayed when stable current value could not be read.

**0-11**  **Heater current 2 monitoring screen**

```
HC_2
30.0
```

Just as with the heater current 1 monitoring screen, displays current value of heater current 2 (CT2).

**0-3**  **Output 2 (OUT2) monitoring screen**

```
25.0
o50.0
```

Displays measured value (PV) at the top; on the bottom the output 2 control output value is monitored when in automatic mode and setting is modified when in manual mode.
Manual output setting range: 0.0 – 100.0 (%)
Displayed if optionally equipped with output 2.
For details, see 5-5 (2).

The following 0-4 - 0-6, 0-8, 0-9, 0-16 screens are optional screens for the programming function.
The screens are not displayed if not equipped with the programming function.

**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.

**0-12**  **FIX event 1 (EV1) setting value setting screen**

```
E 1Hd
200.0
```

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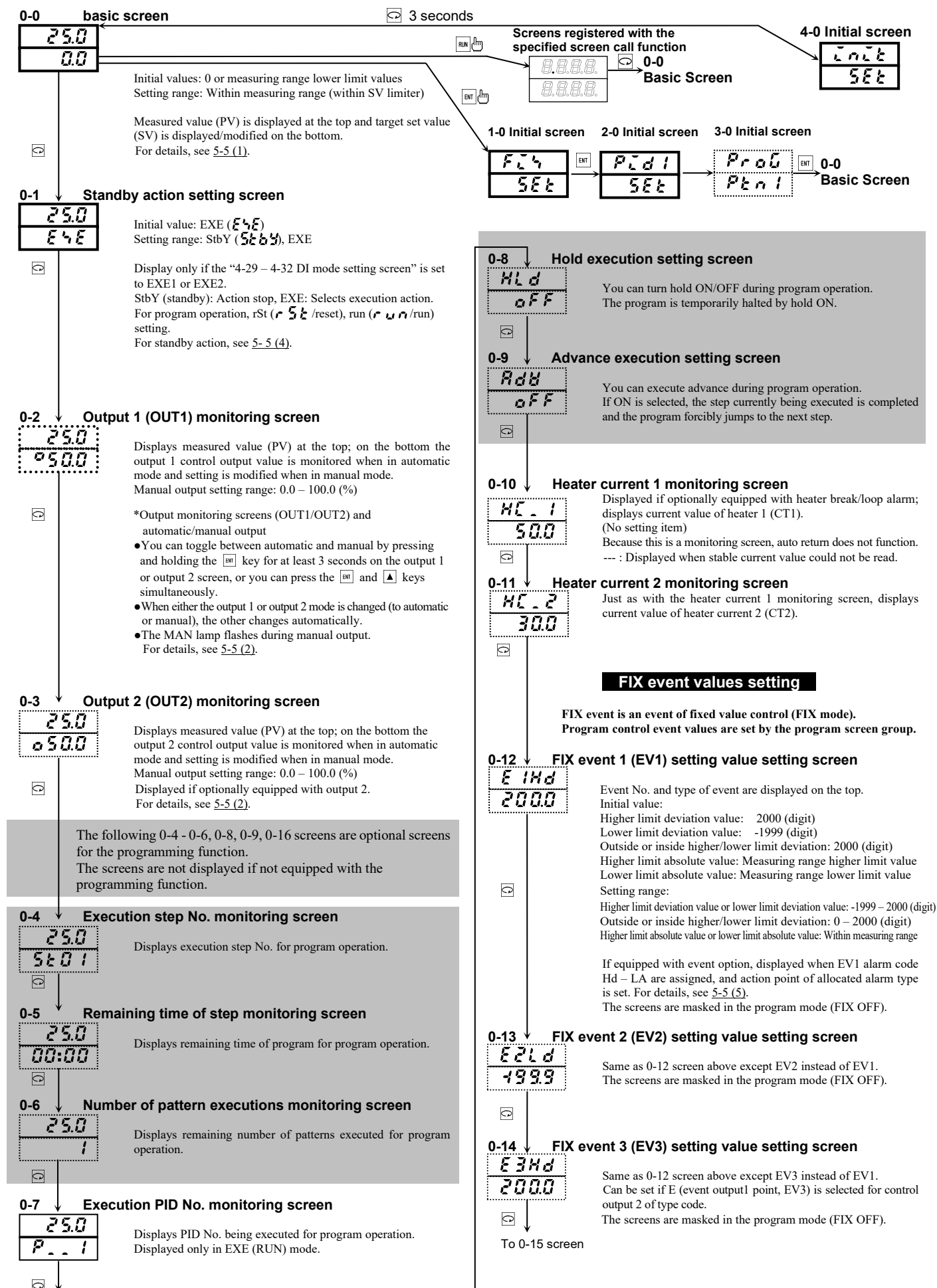Higher limit absolute value or lower limit absolute value: Within measuring range

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

**0-4**  **Execution step No. monitoring screen**

```
25.0
St01
```

Displays execution step No. for program operation.

**0-5**  **Remaining time of step monitoring screen**

```
25.0
00:00
```

Displays remaining time of program for program operation.

**0-13**  **FIX event 2 (EV2) setting value setting screen**

```
E2Ld
-1999
```

Same as 0-12 screen above except EV2 instead of EV1.
The screens are masked in the program mode (FIX OFF).

**0-6**  **Number of pattern executions monitoring screen**

```
25.0
1
```

Displays remaining number of patterns executed for program operation.

**0-14**  **FIX event 3 (EV3) setting value setting screen**

```
E3Hd
200.0
```

Same as 0-12 screen above except EV3 instead of EV1.
Can be set if E (event output1 point, EV3) is selected for control output 2 of type code.
The screens are masked in the program mode (FIX OFF).

**0-7**  **Execution PID No. monitoring screen**

```
25.0
P__1
```

Displays PID No. being executed for program operation.
Displayed only in EXE (RUN) mode.

To 0-15 screen

**0-15**    Auto tuning (AT) action control screen

```
Rt
oFF
```

Initial value: oFF
Setting range: oFF, on

AT is executed by on selection and is cancelled 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, key lock setting and communication mode is not accepted.
For AT action, see 5- 5 (3).

**0-16**    **Start pattern No. monitoring screen**

```
SPtn
1
```

Not displayed if there is no programming function.
Initial value: 1
Setting range: 1, 2, 3, 4
         Differs according to number of patterns (max. 1, 2, 4)

Displays/sets starting pattern No.

**0-17**    **Unlatching screen**

```
LRch
rSt1
```

Initial value: rSt1
Setting range: rSt1, rSt2, rSt3, 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 self-hold)
Cancels self-hold of the event.

Setting and corresponding event No:
rSt1 : EV1,   rSt2 : EV2,   rSt3 : EV3,
ALL : EV1, EV2, EV3

If latching can be canceled, the decimal point for the lowest digit on the concerned setting screen flashes. Pressing the ENT key cancels the concerned event.

**To 0-0 Basic screen**

---

### FIX control (fixed value control) setting

**0-0 Basic screen**

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.
Set to multi SV fixed value control in using multiple target set values.

**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 – 3

**1-3**    **Target set values SV1 setting screen**

```
SV1
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.

To 1-5 screen

---

**1-5**    **Target set values SV3 setting screen**

```
SV3
0
```

Same as 1-3 screen above except SV3 instead of SV1.
Sets target set values used by fixed value control.

**To 1-0 screen**

---

### PID setting

**PID setting screen group**
With the SRS10A Series, you can have 3 types of PID constants.
In the case of fixed value control (FIX), target set values SV1, SV2 and SV3 correspond to PID1, PID2 and PID3 respectively.
In the case of program control, an execution PID No is allocated to each step.

**1-0**    **FIX setting initial screen**

Pressing the ENT key on the 1-0 screen switches to the PID1 setting screen.

**2-0**    **PID initial screen**

PID1          PID2          PID3          PID1

```
Pid1      Pid2      Pid3
SEt       SEt       SEt
```

                 2-1 screen      2-1 screen

The numbers at the end of the upper display are PID No.s that correspond to SV1, SV2 and SV3 respectively.
Pressing the ▲ key displays the screen in the order of
                 PID1→PID2→PID3→PID1.
Pressing the ▼ key displays the screen in the order of
                 PID1→PID3→PID2→PID1.
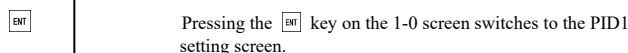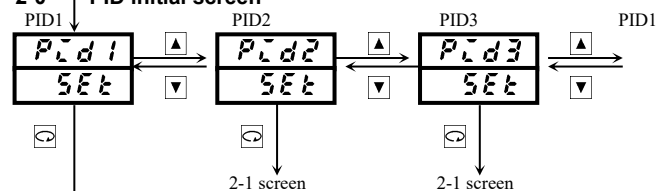Pressing the ENT key on these screens switches to screen group 3 (equipped with programming function) or the basic screen.

There are no setting items for this screen. Pressing the key displays the initial output 1 PID1 proportional band (P) setting screen.
Pressing the RUN key displays the last output 2 higher limit setting screen.

Note : Set PID2 and PID3 on the 2-0 – 2-16 screens just as with PID1.

**2-1**    **Output 1 PID1 proportional band (P) setting screen**
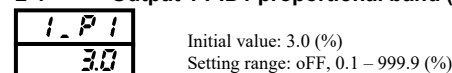
```
1.P1
3.0
```

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 8-3 (1). If oFF is set, ON-OFF (2 position) action is set.

**2-2**    **Output 1 PID1 hysteresis (dF) setting screen**

```
1dF1
2.0
```

Initial value: 20 (digit)
Setting range: 1 – 999 (digit)
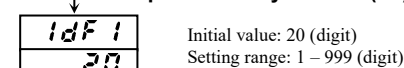
Sets "hysteresis" for ON–OFF action.
Displayed if P = oFF is set on 2-1 screen.

Actions differ depending upon 4-67 Hysteresis modes set.

**2-3**    **Output 1 PID1 integral time (I) setting screen**

```
1.I1
120
```

Initial value: 120 (seconds)
Setting range: oFF, 1 – 6000 (seconds)
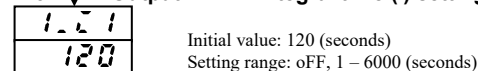
There is basically no need to set if auto tuning (AT) is executed.
For information on integral time, see 8-3 (2).
This screen is not displayed when P = OFF.

To 2-4 screen

**2-4**      **Output 1 PID1 derivative time (D) setting screen**

```
1.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 8-3, section (3).

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

```
1mr 1
  0.0
```

Initial value: 0.0%; 2- output specification: -50.0 (%)
Setting range: -50.0 – 50.0 (%)

Offset is conducted when I = oFF. (P/PD action)
This screen is not displayed when P = oFF.
For information on manual reset, see 8-3, section (4).

**2-6**      **Output 1 PID1 target set value function (SF) setting screen**

```
1SF 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.

**2-7**      **Output 1 PID1 lower limit output limiter setting screen**

```
1oL 1
  0.0
```

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

Sets control output 1 lower limit value.
For information on output limiter, see 8-4 (1).

**2-8**      **Output 1 PID1 higher limit output limiter setting screen**

```
1oH 1
100.0
```

Initial value: 100.0 (%)
Setting range: (1oL1 setting value) + 0.1 – 100.0 (%)

Sets control output 1 higher limit value.

**2-9**      **Output 2 PID1 proportional band (P) setting screen**

```
2.P 1
  3.0
```

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

Same as output 1 proportional band setting screen.
Displayed if optionally equipped with output 2.

**2-10**      **Output 2 PID1 hysteresis (dF) setting screen**

```
2dF 1
  2.0
```

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.

Actions differ depending upon 4-64 Hysteresis modes set.

**2-11**      **Output 2 PID1 integral time (I) setting screen**

```
2.c 1
 120
```

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

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

**2-12**      **Output 2 PID1 derivative time (D) setting screen**

```
2.d 1
  30
```

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

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

To 2-13 screen

**2-13**      **Output 2 dead band (DB) setting screen**

```
2db 1
  0.0
```

Initial value: 0 (digit)
Setting range: -1999 – 5000 (digit)

Sets action position of output 2 for target set values.
For information on dead band, see section 8-4 (3).

**2-14**      **Output 2 PID 1 target set value function setting screen**

```
2SF 1
 0.40
```

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

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

**2-15**      **Output 2 PID1 lower limit output limiter setting screen**

```
2oL 1
  0.0
```

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

Sets control output 2 lower limit value.

**2-16**      **Output 2 PID1 higher limit output limiter setting screen**

```
2oH 1
100.0
```

Initial value: 100.0 (%)
Setting range: (2oL1 setting value) + 0.1 – 100.0 (%)

Sets control output 2 higher limit value.

**To 2-0 screen**

---

### Initial settings screen

**Initial settings screen group (screen group 4)**

**0-0 Basic screen**

Pressing and holding the ⊙ key for at least 3 seconds on the
0-0 basic screen displays the 4-0 initial screen.

⊙ 3 seconds

**4-0**      **Initial screen**

```
Init
 SEt
```

There are no setting items with this screen. Pressing the ⊙ key
displays the initial setting screen 4-1 key lock setting screen
and pressing the RUN key displays the last screen 4-62 input decimal
point setting screen.

**4-1**      **Key lock 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, SV and communication mode |
| 2 | All data locked except SV and communication mode |
| 3 | Only key lock setting can be modified |

\* The "0-17 latching release screen" cannot be key-locked.

---

### Event settings

**4-2**      **Event at STBY setting screen**

```
StE8
 oFF
```

Initial value: OFF
Setting range: OFF, ON

Sets switch of event output ON/OFF during stanby.
oFF : Event output is OFF (excluding status output).
oN : Event is output if the conditions for event action are met.

Note: This does not apply when standby action is set to Control
Mode (standby action code 3 settable at "4-5 EV1 Standby
Action", "4-10 EV2 Standby Action" and "4-15 EV3 Standby
Action"). If event type is status, event can be output during
stanby.

To 4-3 screen

## 4-3 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, EXE (run),
rot1, HC1, HC2, StPS, PtnS, EndS, hoLd, ProG,
u_SL, d_SL, GUA

Selected types of event are set in accordance with the code table on the next page.

4-3 – 4-17 is not displayed when event output is not selected.

### Event type code (used by 4-8 and 4-13)

| Code | | Event Action Mode | Remarks |
|---|---|---|---|
| n o n | (non) | No selection | |
| H d | ( Hd) | Higher limit deviation | EV1 initial values |
| L d | ( Ld) | Lower limit deviation | EV2 initial values |
| o d | ( od) | Outside higher/lower limit deviation | |
| i d | ( id) | Inside higher/lower limit deviation | |
| H A | ( HA) | Higher limit absolute value | |
| L A | ( LA) | Lower limit absolute value | |
| S o | ( So) | Scaleover | |
| E x E | (EXE) | EXE signal (fixed value control being executed) | For fixed value control only |
| r u n | (run) | RUN signal (program being executed) | For program control only |
| r o t 1 | (rot1) | Output 1 inverted output | Contact output only |
| HC 1 | (HC1) | Heater 1 break/loop alarm | Only when optionally equipped |
| HC 2 | (HC2) | Heater 2 break/loop alarm | Only when optionally equipped |
| S t P S | (StPS) | Step signal | For program control only |
| P t n S | (PtnS) | Pattern signal | For program control only |
| E n d S | (EndS) | Program end signal | For program control only |
| H o L d | (HoLd) | Hold signal | For program control only |
| P r o G | (ProG) | Program signal | For program control only |
| u _ S L | (u_SL) | Up slope signal | For program control only |
| d _ S L | (d_SL) | Down slope signal | For program control only |
| G U A | (GUA) | Guarantee soak | Program control only |

## 4-4 Event 1 action hysteresis setting screen

```
E1_d
 2.0
```

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

Sets ON-OFF hysteresis for event 1.
Displayed when alarm type code is **Hd, Ld, od, id, HA, LA, HC1, or HC2.**

## 4-5 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 alarm type code is **Hd, Ld, od, id, HA, LA, HC1, or HC2.**

### Standby action code (used by 4-10 and 4-15)

| Code | Description of standby action |
|---|---|
| o F F | No standby |
| 1 | When power is applied, STBY(RST) →EXE(RUN) |
| 2 | When power is applied, STBY(RST)→EXE(RUN), SV modification |
| 3 | Control mode (no standby) |

For HC1/HC2, only OFF or 1 can be selected.
Standby action when power is applied only.

## 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 event continues to be output even if there are no event conditions after event action. (Event self-hold)
Displayed when alarm type code is **Hd, Ld, od, id, HA, LA, HC1, HC2.**

## 4-7 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.

To 4-8 screen

## 4-8 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, EXE (run),
rot1, HC1, HC2, 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 4-3 just as with EV1.

## 4-9 Event 2 action hysteresis setting screen

```
E2_d
 2.0
```

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

Sets ON-OFF hysteresis of event 2 just like EV1.
Displayed when alarm type code is **Hd, Ld, od, id, HA, LA, HC1, or HC2.**

## 4-10 Event 2 standby action code setting screen

```
E2_i
 oFF
```

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

Sets type of standby action for event 2 from the standby action code table of 4-5 just like EV1.
Displayed when alarm type code is **Hd, Ld, od, id, HA, LA, HC1, or HC2.**
For **HC1/HC2,** only oFF or 1 can be selected.

## 4-11 Event 2 latching setting screen

```
E2_L
 oFF
```

Initial value: oFF
Setting range: oFF, on

Set just like EV1.

## 4-12 Event 2 output characteristics setting screen

```
E2_A
  no
```

Initial value: no
Setting range: no, nc

Set just like EV1.

## 4-13 Event 3 (EV3) type setting screen

```
E3_n
 ExE
```

Initial value: EXE (run)
Setting range: non, Hd, Ld, od, id, HA, LA, So, EXE (run),
rot1, HC1, HC2, StPS, PtnS, EndS,
HoLd, ProG, u_SL, d_SL, GUA

Types of events selected for EV3 are set from the event type code table of 4-3 just as with EV1.
4-13 – 4-17 screen is displayed if control output2 is selected as event output (EV3).

## 4-14 Event 3 action hysteresis setting screen

```
E3_d
 2.0
```

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

Sets ON-OFF hysteresis of event 3 just like EV1 .
Displayed when alarm type code is **Hd, Ld, od, id, HA, LA, HC1, or HC2.**

## 4-15 Event 3 standby action code setting screen

```
E3_i
 oFF
```

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

Sets type of standby action for event 3 from the standby action code table of 4-5 just like EV1.
Setting conditions are same as for EV1.

## 4-16 Event 3 latching setting screen

```
E3_L
 oFF
```

Initial value: oFF
Setting range: oFF, on

Set just like EV1.

## 4-17 Event 3 output characteristics setting screen

```
E3_A
  no
```

Initial value: no
Setting range: no, nc

Set just like EV1.

To 4-18 screen

## Heater break/loop alarm settings

Can be used if event option and CT input option is equipped.

**4-18**    **Heater 1 break/loop alarm mode setting screen**

```
HbA1
out1
```

Initial value: out1
Setting range: out1, out2

Sets control output by which heater break/loop alarm is output by current detection by CT1.
Can be set only for control output Y or P.
4-18 – 4-23 will be displayed if output of control output 1 or 2 is Y or P, and CT input is selected at the same time.

**4-19**    **Heater 1 break alarm action value setting screen**

```
C1Hb
oFF
```

Initial value: oFF
Setting range: oFF, 0.1 – 50.0 (A)

Sets current value of heater break alarm detected by CT1.
When control output is ON, an alarm is output if the current value detected by CT1 is lower than the setting.

**4-20**    **Heater 1 loop break alarm action value setting screen**

```
C1HL
oFF
```

Initial value: oFF
Setting range: oFF, 0.1 – 50.0 (A)

Sets current value of heater loop alarm detected by CT1.
When control output is OFF, an alarm is output if the current value detected by CT1 is higher than the setting.

**4-21**    **Heater 2 break/loop alarm mode setting screen**

```
HbA2
out1
```

Initial value: out1
Setting range: out1, out2

Sets control output by which heater break/loop alarm is output by current detection by CT2.
Can be set only for control output Y or P.

**4-22**    **Heater 2 break alarm action value setting screen**

```
C2Hb
oFF
```

Initial value: oFF
Setting range: oFF, 0.1 – 50.0 (A)

Sets current value of heater break alarm detected by CT2.
When control output is ON, an alarm is output if the current value detected by CT2 is lower than the setting.

**4-23**    **Heater 2 loop break alarm action value setting screen**

```
C2HL
oFF
```

Initial value: oFF
Setting range: oFF, 0.1 – 50.0 (A)

Sets current value of heater loop alarm detected by CT2.
When control output is OFF, an alarm is output if the current value detected by CT2 is higher than the setting.

## Analog output settings

**4-24**    **Analog output type setting screen**

```
Ao_A
PV
```

Initial value: PV ($PV$)
Setting range: PV, SV ($SV$), out1 ($out1$), out2 ($out2$)

Item to be output as analog signal is set from among 4 items: measured value (PV), target set values (SV), control output 1 (out1) and control output 2 (out2).
4-24 – 4-28 is not displayed if analogue output is not selected.

**4-25**    **Analog output scaling lower limit value setting screen**

```
Ao_L
0.0
```

Initial value: 0.0
    (For PV/SV, measuring range lower limit value; out1/out2 is 0.0)
Setting range: When PV or SV is selected, within measuring range
    When out1 or out2 is selected: 0.0 – 100.0 (%)

Minimum values of analog output signal (0mV, 4mA, 0V) are set as scaling minimum value to be output.

**4-26**    **Analog output scaling higher limit value setting screen**

```
Ao_H
800.0
```

Initial value: 800.0
    (For PV/SV, measuring range higher limit value; out1/out2 is 100.0)
Setting range: When PV or SV is selected, within measuring range
    When out1 or out2 is selected: 0.0 – 100.0 %

Maximum values of analog output signal (10mV, 20mA, 10V) are set as scaling maximum value to be output.

Inverse scaling is possible for Ao_L > Ao_H.
(Min. H-L=±1 count)

Characteristics by analog output scaling are as follows:



For Ao_L < Ao_H      For Ao_L > Ao_H
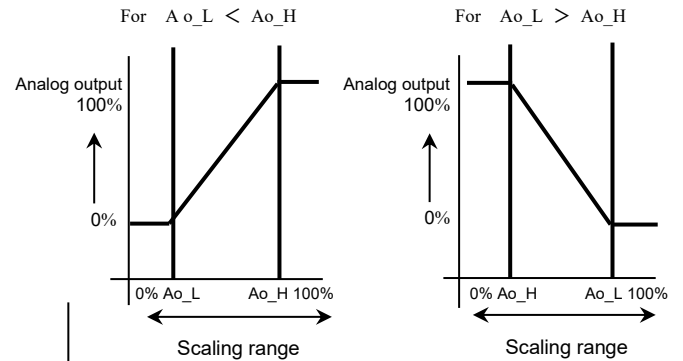
**4-27**    **Analog output limiter lower limit value setting screen**

```
AL_L
0.0
```

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

Sets lower limit value of analog output.

**4-28**    **Analog output limiter higher limit value setting screen**

```
AL_H
100.0
```

Initial value: 100.0 (%)
Setting range: (AL_L setting value) + 0.1 – 100.0 (%)

Sets higher limit value of analog output.

## External control input DI settings

**4-29**    **DI1 mode setting screen**

```
dI_A
non
```

Initial value: non
Setting range: non, EXE1(run1), EXE2(run2), mAn, At, ESV2, ACt1, ACt2, ProG, HLd, AdV, Ptn2, Ptn3, L_rS

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

4-29 – 4-32 is not displayed if DI (external control input ) is not selected.

**DI mode allocation type code (used by 4-30, 4-31, 4-32)**

| Code | External control input allocation type | Allocation possible DI No. | Detection |
|---|---|---|---|
| non | No selection | | |
| EXE1 (run1) | EXE/STBY (FIX fixed value control) RUN/RST (program control) | 1, 2, 3, 4 | Level |
| EXE2 (run2) | EXE/STBY (FIX fixed value control) RUN/RST (program control) | 1, 2, 3, 4 | Edge |
| mAn | MAN: Manual output | 1, 2, 3, 4 | Level |
| At | AT: Auto tuning execution | 1, 2, 3, 4 | Edge |
| ESV2 | ESV2: External selection 2bit | 1, 2 | Level |
| ACt1 | Output 1 output characteristics RA/DA) | 1, 2, 3, 4 | Level |
| ACt2 | Output 2 output characteristics RA/DA) | 1, 2, 3, 4 | Level |
| ProG | ProG: Program | 1, 2, 3, 4 | Level |
| HLd | HLd: Hold signal | 1, 2, 3, 4 | Level |
| AdV | AdV: Advance | 1, 2, 3, 4 | Edge |
| Ptn2 | Ptn2: Start pattern selection 2bit | 1, 2 | Level |
| Ptn3 | Ptn3: Start pattern selection 3bit | 1 | Level |
| L_rS | L_rS: Total unlatching | 1, 2, 3, 4 | Edge |

If ESV2/Ptn2 is allocated to DI1, DI2 cannot be selected.
If Ptn3 is allocated to DI1, DI2 and DI3 cannot be selected.
A single type of code cannot be allocated to more than one DI.

**4-30** | **DI2 mode setting screen**

`d2_n`
`non`

Initial value: non
Setting range: non, EXE1(run1), EXE2(run2), mAn, At, ESV2, ACt1, ACt2, ProG, HLd, AdV, Ptn2, L_rS

Set just like 4-29 DI1 mode.
If ESV2/Ptn2 is assigned to DI2, DI3 cannot be selected.

**4-31** | **DI3 mode setting screen**

`d3_n`
`non`

Initial value: non
Setting range: non, EXE1(run1), EXE2(run2), mAn, At, ACt1, ACt2, ProG, HLD, AdV, L_rS

Set just like 4-29 DI1 mode.

**4-32** | **DI4 mode setting screen**

`d4_n`
`non`

Initial value: non
Setting range: non, EXE1(run1), EXE2(run2), mAn, At, ACt1, ACt2, ProG, HLD, AdV, L_rS

Set just like 4-29 DI1 mode.
Displayed if D (external control input 1 point (DI4)) is selected for control output 2.

### Communication settings

**For communication function, see the Communications Interface Instruction Manual.**
**4-33 – 4-47 is displayed if communication function is selected.**

**4-33** | **Communication mode setting screen**

`conn`
`Loc`

Initial value: Loc (`Loc` [local])
Setting range: Loc, Com (`Con` [Com])

Can be changed from Com to Loc with the front surface key.
Communication is made possible by mode displayed on bottom.

**4-34** | **Communication address setting screen**

`Addr`
`1`

Initial value: 1
Setting range: StoP, mASt, 1 – 255

Sets device No. when multiple controllers are connected for communication.
Setting to StoP suspends master function.

**4-35** | **Communication data format setting screen**

`dAtA`
`7E1`

Initial value: 7E1
Setting range: 7E1, 7E2, 7n1, 7n2, 8E1, 8E2, 8n1, 8n2

Sets data format for communications.

| ASCII RTU | Data length | Parity | Stop bit | Shima den | MODBUS ASCII | RTU |
|---|---|---|---|---|---|---|
| 7E1 | 7 bits | Even | 1 bit | ○ | ○ | - |
| 7E2 | 7 bits | Even | 2 bits | ○ | ○ | - |
| 7n1 | 7 bits | None | 1 bit | ○ | ○ | - |
| 7n2 | 7 bits | None | 2 bits | ○ | ○ | - |
| 8E1 | 8 bits | Even | 1 bit | ○ | - | ○ |
| 8E2 | 8 bits | Even | 2 bits | ○ | - | ○ |
| 8n1 | 8 bits | None | 1 bit | ○ | - | ○ |
| 8n2 | 8 bits | None | 2 bits | ○ | - | ○ |

**4-36** | **Start character setting screen**

`SchA`
`StX`

Initial values: StX (`StX`)
Setting range: StX, Att (`Att`)
Sets whether to use StX or Att (@) as the start characters of the communications format.
Valid only for Shimaden protocol.

**4-37** | **BCC operation/protocol type setting screen**

`ChK`
`Add`

Initial value: Add
Setting range: non, Add, Add2, Xor, Lrc, cr16

Selects BCC operation type and protocol type.

| Operation | Description |
|---|---|
| non | None (Shimaden protocol) |
| Add | Add operation (Shimaden protocol) |
| Add2 | 2's complement after add operation (Shimaden protocol) |
| Xor | Exclusive OR (Shimaden protocol) |
| Lrc | LRC (MODBUS ASCII) |
| cr16 | CRC-16 (Modobus RTU) |

To 4-38 screen

---

**4-38** | **Communication speed setting screen**

`bPS`
`9600`

Initial value: 9600 (bps)
Setting range: 1200, 2400, 4800, 9600, 1920, 3840

Sets communication speed.
1200 - 9600 : 1200(bps) – 9600(bps),
1920 : 19200(bps), 3840 : 38400(bps)

**4-39** | **Communication delay time setting screen**

`dELY`
`20`

Initial value: 20
Setting range: 1 – 100

Sets delay time from when communication command is received till transmission.
Delay time = Setting value × 0.512 msec

**4-40** | **Communication memory mode setting screen**

`nEn`
`EEP`

Initial value: EEP (`EEP`)
Setting range: EEP, rAm (`rAn`), r_E (`r_E`)

Format for writing data in EEPROM and RAM during communication is set from the following table.

| Type | Writing process |
|---|---|
| EEP | Writing entirely in EEPROM |
| rAn | Writing entirely in RAM |
| r_E | Writing SV, OUT1 and OUT2 in RAM and others in EEPROM |

**4-41** | **Communications mode type setting screen**

`ConK`
`con1`

Initial value: COM1
Setting range: COM1, COM2

If keys are operated during writing by communication, set to COM1.

| Communication mode types | COM1 | | COM2 | |
|---|---|---|---|---|
| Communications mode | COM | LOC | COM | LOC |
| Key operation | Possible | Possible | Not possible | Possible |
| Communication writing | Possible | Possible | Possible | Not possible |

**4-42** | **Communication master mode setting screen**

`nS_n`
`SV`

4-42 – 4-47 screens are displayed only when master mode is selected on the 4-34 communication address setting screen.
Initial value: SV
Setting range: SV, PV, out1, o1SC, out2, o2SC

**4-43** | **Communication master control output scaling lower limit value setting screen**

`n_SL`
`0`

Displayed only when O1SC/O2SC is selected on the 4-42 Master mode setting screen.
Initial value: Lower limit value of measuring range
Setting range: -1999 – 9989

**4-44** | **Communication master control output scaling higher limit value setting screen**

`n_SH`
`8000`

Displayed only when O1SC/O2SC is selected on the 4-42 Master mode setting screen.
Initial value: Higher limit value of measuring range
Setting range: (M_SL setting value) + 10 – 9999

**4-45** | **Communication master mode start slave address setting screen**

`S_Ad`
`1`

Initial value: 1
Setting range: bcAS, 1 – 255
bcAs: Broadcast

**4-46** | **Communication master mode end slave address setting screen**

`E_Ad`
`1`

Not displayed for bcAS (broadcast)
Initial value: 1
Setting range: Start address – start address + 30

**4-47** | **Communication master mode write-in data address setting screen**

`writ`
`0300`

Initial value: 0300 (H)
Setting range: 0000 (H) – FFFF (H)
Setting in hexadecimal notation.

To 4-48 screen

**4-48**    **Output 1 proportional cycling time setting screen**

```
o_C1
  30
```

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

Sets control output 1 proportional cycling time.
Not displayed when output type is voltage or current.
For information on proportional cycling time, see 8-4 (2).

**4-49**    **Control output 1 characteristics setting screen**

```
Act1
  rA
```

Initial value: rA ( r A )
Setting range: rA, dA ( d A )

Sets characteristics of control output.
rA: Reverse characteristics (for heating)
dA: Direct characteristics (for cooling)
For information on control output characteristics, see 8-4 (3).

**4-50**    **Control output 1 soft start time setting screen**

```
SoF1
 oFF
```

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

Sets soft start time that gradually changes output.
Does not function if oFF is set.
For details, see 8-6.

**4-51**    **Output 2 proportional cycling time setting screen**

```
o_C2
  30
```

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

Sets control output 2 proportional cycling time.
Displayed if Y, P is selected for control output 2.

**4-52**    **Control output 2 characteristics setting screen**

```
Act2
  rA
```

Initial value: dA ( d A )
Setting range: rA ( r A ), dA

Sets characteristics of control output.
r A (RA) : Reverse characteristics (for heating)
d A (DA) : Direct characteristics (for cooling)
Displayed if Y, I, P, V is selected for control output 2.

**4-53**    **Control output 2 soft start time setting screen**

```
SoF2
 oFF
```

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

Sets soft start time that gradually changes output.
Does not function if oFF is set.
For details, see 8-6.
Displayed if Y, I, P, V is selected for control output 2.

**4-54**    **SV limiter lower limit setting screen**

```
Sv_L
 0.0
```

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

If using setting range of target values below measuring range:
Set lower limit value.
(Able to prevent incorrect setting in danger range, etc.)

**4-55**    **SV limiter higher limit setting screen**

```
Sv_H
800.0
```

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

If using setting range of target values below measuring range:
Sets higher limit value.
(Able to prevent incorrect setting in danger range, etc.)

Note: For SV limiter setting, the lower limit value is given
preference when SV limiter lower limit value is less than
higher limit value. Consequently, higher limit cannot be
set less than lower limit value + 1 count.

If Sc_L/Sc_H are changed, the respective values are set for
SV_L/SV_H.

**4-56**    **Number of patterns setting screen**
(Displayed only when programming function is selected)

```
Ptnc
   4
```

Initial value: 4
Setting range: 1, 2, 4

Sets number of patterns used by programming function.

To 4-57 screen

**4-57**    **Time unit setting screen**
(Displayed only when programming function is selected)

```
t_un
  Hm
```

Initial value: Hm ( H m )
Setting range: Hm, mS ( m S )

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

**4-58**    **PV bias value setting screen**

```
Pv_b
 0.0
```

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
compensated value.

**4-59**    **PV gain compensation value setting screen**

```
Pv_G
0.00
```

Initial value: 0.00 (%)
etting range: -5.00 – 5.00 (%)

Used for compensating input gain error of sensors, etc.
When gain compensation is applied, control is also executed
according to the compensated value.

**4-60**    **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.

**4-61**    **Measuring range code setting screen**

```
rAnG
  05
```

Initial value: Multi: 05, voltage: 86
Setting range: Selected from "Chapter 7: Measuring Range Codes."

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

Note: Setting cannot be changed during control action on
4-61 – 4-65 screen.

**4-62**    **Input 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 15 – 18 (in kelvin).
Modification of unit is only possible when in standby mode.

**4-63**    **Input scaling lower limit value setting screen**

```
Sc_L
 0.0
```

Initial value: 0.0 (digit)
Setting range: -1999 – 9989 (digit)

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

**4-64**    **Input scaling higher limit value setting screen**

```
Sc_H
100.0
```

Initial value: 100.0
Setting range: (Sc_L setting value) + 10 – (Sc_L setting value)
+ 10,000

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

**4-65**    **Input decimal point position setting screen**

```
dP
0.0
```

Initial value: 1 digit following decimal point (0.0)
Setting range: No decimal point (0) – 3 digits following
decimal point (0.000)
Except for linear input, no decimal point (0) – 1 digit following
decimal point (0.0)

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

To 4-66 screen

**4-66** | **Basic screen display mode**

```
 dSP
PVSV
```

Initial value: PVSV (PVSV)
Setting range: PVSV / PV (PV) / SV (SV)
                    /ALRM (ALrm)

PVSV  : Normal display (both PV and SV displayed)
PV     : PV value only displayed
           (SV value cannot be modified on basic screen)
SV     : SV value only displayed (PV value masked)
ALRM : When an alarm is issued, the PV value and "ALM*"
           are displayed alternately on the basic screen.
           (*:1～3)

**4-67** | **Hysteresis mode**

```
dFnd
cEnt
```

Sets hysteresis mode when ON/OFF action is selected.
The set mode will be reflected in all of the following:
OUT1/2 and PID1/2/3.
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
For details, see 8-4 (4).

**4-68** | **Parameter Initialization**

```
Pini
oFF
```

Initializes execution bank parameter and put it to factory
shipment status.

Initial value: oFF
Setting range: Off, oN

Cannot be changed during execution.
Display is returned to "oFF" after initialization.

**To 4-0 screen**

25

# 7. Measuring Range Codes

Select measuring range from the following table.
Note:Changing the code initializes all data related to measuring range.
　　　Change setting with standby mode on 0-1 screen.

| Input type | | | Code | | Measuring range (°C) | Measuring range (°F) |
|---|---|---|---|---|---|---|
| Universal-input | Thermocouple | B | 01 | *1 | 0 ~ 1800 °C | 0 ~ 3300 °F |
| | | R | 02 | | 0 ~ 1700 °C | 0 ~ 3100 °F |
| | | S | 03 | | 0 ~ 1700 °C | 0 ~ 3100 °F |
| | | K | 04 | *2 | -199.9 ~ 400.0 °C | -300 ~ 750 °F |
| | | | 05 | | 0.0 ~ 800.0 °C | 0 ~ 1500 °F |
| | | | 06 | | 0 ~ 1200 °C | 0 ~ 2200 °F |
| | | E | 07 | | 0 ~ 700 °C | 0 ~ 1300 °F |
| | | J | 08 | | 0 ~ 600 °C | 0 ~ 1100 °F |
| | | T | 09 | *2 | -199.9 ~ 200.0 °C | -300 ~ 400 °F |
| | | N | 10 | | 0 ~ 1300 °C | 0 ~ 2300 °F |
| | | PLⅡ *3 | 11 | | 0 ~ 1300 °C | 0 ~ 2300 °F |
| | | C(WRe5-26) | 12 | | 0 ~ 2300 °C | 0 ~ 4200 °F |
| | | U *4 | 13 | *2 | -199.9 ~ 200.0 °C | -300 ~ 400 °F |
| | | L *4 | 14 | | 0 ~ 600 °C | 0 ~ 1100 °F |
| | Kelvin | K | 15 | *5 | 10.0 ~ 350.0 K | 10.0 ~ 350.0 K |
| | | AuFe-Cr | 16 | *6 | 0.0 ~ 350.0 K | 0.0 ~ 350.0 K |
| | | K | 17 | *5 | 10 ~ 350 K | 10 ~ 350 K |
| | | AuFe-Cr | 18 | *6 | 0 ~ 350 K | 0 ~ 350 K |
| | R.T.D | Pt100 | 30 | | -100.0 ~ 350.0 °C | -150.0 ~ 650.0 °F |
| | | | 31 | | -200 ~ 600 °C | -300 ~ 1100 °F |
| | | | 32 | | -100.0 ~ 100.0 °C | -150.0 ~ 200.0 °F |
| | | | 33 | *7 | -50.0 ~ 50.0 °C | -50.0 ~ 120.0 °F |
| | | | 34 | | 0.0 ~ 200.0 °C | 0.0 ~ 400.0 °F |
| | | JPt100 | 35 | | -200 ~ 500 °C | -300 ~ 1000 °F |
| | | | 36 | | -100.0 ~ 100.0 °C | -150.0 ~ 200.0 °F |
| | | | 37 | *7 | -50.0 ~ 50.0 °C | -50.0 ~ 120.0 °F |
| | | | 38 | | 0.0 ~ 200.0 °C | 0.0 ~ 400.0 °F |
| | | | 39 | | -100.0 ~ 350.0 °C | -150.0 ~ 650.0 °F |
| | | Pt100 | 40 | | -199.9 ~ 550.0 °C | -300 ~ 1000 °F |
| | | | 41 | | 0.0 ~ 350.0 °C | 0.0 ~ 650.0 °F |
| | | | 42 | | 0.0 ~ 550.0 °C | 0 ~ 1000 °F |
| | | JPt100 | 45 | | -199.9 ~ 500.0 °C | -300 ~ 1000 °F |
| | | | 46 | | 0.0 ~ 350.0 °C | 0.0 ~ 650.0 °F |
| | | | 47 | | 0.0 ~ 500.0 °C | 0 ~ 1000 °F |
| | mV | -10 ~ 10mV | 71 | | Initial value: 0.0 ~ 100.0  Input scaling setting range: -1999 ~ 9999  Span: 10 ~ 10,000 digit  Decimal point position: None, 1/2/3 digits following decimal point  Lower limit value is less than higher limit value.  NOTE:  If the difference between the higher limit value and lower limit value is less than +10 digit or higher than +10,000 digit, the higher limit value is automatically changed to + 10 digit or +10,000 digit.  The higher limit value cannot be set less than lower limit value +10 digit or higher than +10,000 digit.  For current input, install input terminals of the specified receiving impedance (250 Ω) and use code 84 (0 ~ 20 mA) or 85 (4 ~ 20 mA). | |
| | | 0 ~ 10mV | 72 | | | |
| | | 0 ~ 20mV | 73 | | | |
| | | 0 ~ 50mV | 74 | | | |
| | | 10 ~ 50mV | 75 | | | |
| | | 0 ~ 100mV | 76 | | | |
| Voltage | V | -1 ~ 1V | 81 | | | |
| | | 0 ~ 1V | 82 | | | |
| | | 0 ~ 2V | 83 | | | |
| | | 0 ~ 5V | 84 | | | |
| | | 1 ~ 5V | 85 | | | |
| | | 0 ~ 10V | 86 | | | |

Thermocouple: B, R, S, K, E, J, T, N, C: JIS/IEC　　　R.T.D. Pt100: JIS/IEC JPt100
*1. Thermocouple B: Accuracy guarantee not applicable to 400°C (752°F) or below.
*2. Thermocouple K, T, U: Accuracy of those readings below -100°C is ± (0.7% FS + 1digit)
*3. Thermocouple PLII: Platinel
*4. Thermocouple U, L: DIN 43710
*5. Thermocouple K (Kelvin) accuracy　　　　　　　　　　*6. Thermocouple Metal-chromel (AuFe-Cr) (Kelvin) accuracy
　10.0 ~ 30.0 K　± (2.0%FS + 40°C + 1digit)　　　　　　　0.0 ~ 30.0 K　± (0.7%FS + 6°C + 1digit)
　30.0 ~ 70.0 K　± (1.0%FS + 14°C + 1digit)　　　　　　　30.0 ~ 70.0 K　± (0.5%FS + 3°C + 1digit)
　70.0 ~ 170.0 K　± (0.7%FS + 6°C + 1digit)　　　　　　　70.0 ~ 170.0 K　± (0.3%FS + 2.4°C + 1digit)
　170.0 ~ 270.0 K　± (0.5%FS + 3°C + 1digit)　　　　　　　170.0 ~ 280.0 K　± (0.3%FS + 2°C + 1digit)
　270.0 ~ 350.0 K　± (0.3%FS + 2°C + 1digit)　　　　　　　280.0 ~ 350.0 K　± (0.5%FS + 2°C + 1digit)
*7. R.T.D. : accuracy is ± (0.3%FS + 1digit)

NOTE: Unless otherwise specified, the measuring range will be set as follows when shipped from the factory:

| Input | Standard/rating | Measuring range |
|---|---|---|
| Multi input | K thermocouple | 0.0 ~ 800.0°C |
| Voltage (V) | 0 ~ 10V DC | 0.0 ~ 100.0 |

# 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) of 30°C or more when 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) of 30°C or less when 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 digit.

#### 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), when power is applied, an event is not output even if the measured value is in the alarm action area (ON area) for target setting value change or standby cancel.
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 during scaleover.

### (2) Event standby action selection

The following are supplementary explanations of operation with "4-5, 4-10 and 4-15 event code standby action 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.
• **NOTE1: Standby action is canceled immediately if changed to OFF or 3 during standby action.**
  **NOTE2: During scaleover, standby action is canceled.**

### (3) Event selection alarm action diagrams

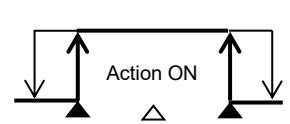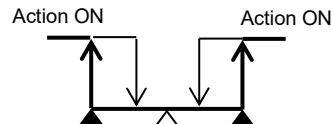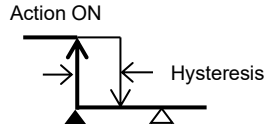The following are alarm action diagrams for selecting event (EV1/EV2/EV3).
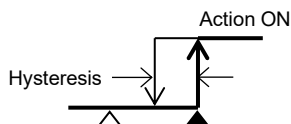△ : SV value
▲ : Alarm action point setting value



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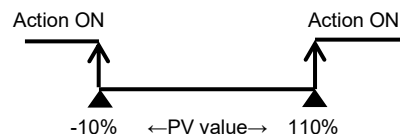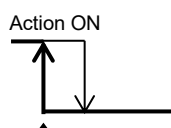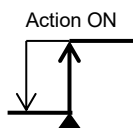
## (4) Output 1 inverted output

If equipped with contact output for output 1, inverted output can be executed for output 1 by selecting *rot 1* (output 1 inverted output) for the event code. Output is, however, OFF for both output 1 and event when the power is off.
Also, inverted output for output 1 can be executed as well during standby.
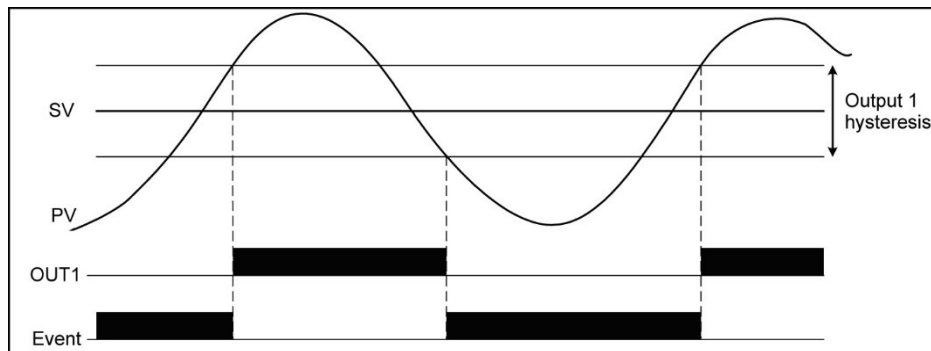


## (5) Event status output action

| | | | |
|---|---|---|---|
| ① | *EXE* | EXE signal | Fixed value control (FIX mode) output during control action. |
| ② | *run* | RUN signal | Output during program execution during program control. |
| ③ | *HC1* | HC1 | Output during alarm action of either heater 1 break/loop. |
| ④ | *HC2* | HC2 | Output during alarm action of either heater 2 break/loop. |
| ⑤ | *StPS* | STPS | Step signal    Ouput for 1 second each time step in program control execution is completed. |
| ⑥ | *PtnS* | PTNS | Pattern signal    Ouput for 1 second each time pattern in program control execution is completed. |
| ⑦ | *EndS* | ENDS | Program end signal    Output for 1 second when program control execution is completed. (Output even if program is forcibly completed halfway.) |
| ⑧ | *Hold* | HOLD | Hold signal    Output when holding (temporary halt of program) during program control. |
| ⑨ | *ProG* | PROG | Program signal    Output when set to program mode. |
| ⑩ | *u_SL* | U_SL | Up slope signal    Output during up slope step execution during program control. |
| ⑪ | *d_SL* | D_SL | Down slope signal    Output during down slope step execution during program control. |
| ⑫ | *GUA* | GUA | Guarantee soak signal    Output when guarantee soak is engaged. |

# 8-2. Heater break/loop alarm

Heater break/loop alarm can be used only in control output Y (contact) or P (SSR drive voltage output).
Heater break/loop alarm becomes effective if CT input or event output is equipped.
Heater break alarm outputs an alarm if the current value detected by CT when control output is ON is lower than the setting.
Heater break check is disabled if control output is OFF. Heater break status in the latest output-ON period is maintained.
Heater loop alarm also outputs an alarm if the current value detected by CT when control output is OFF is higher than the setting.
Heater loop check is disabled if control output is ON. Heater loop status in the latest output-OFF period is maintained.
In the SRS10A series, 2 points of CT input is equipped if the CT input option is selected.
Any break of 2 heating stages control heater or three-phase heater can be detected by using two CT.

For 2 heating stages



For three-phase
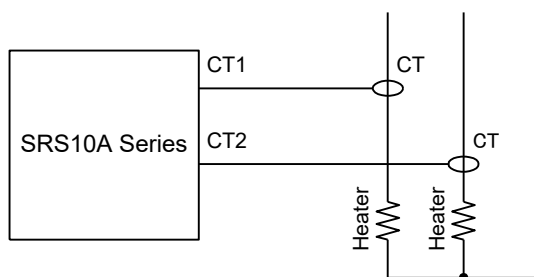


| Broken area | A | B | C |
|---|---|---|---|
| CT1 | Detectable | Undetectable | Detectable |
| CT2 | Undetectable | Detectable | Detectable |
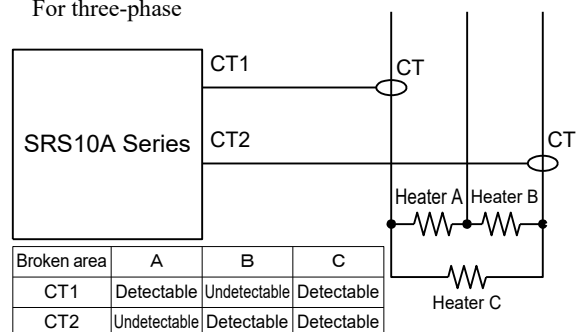
# 8-3. P.I.D.
## (1) P (Proportional action)

Sets percentage at which control output varies for measuring range. The size of control output varies according to ratio of PV value to SV value.
Slight proportional band variation results in strong proportional action. 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)

With PID action "I" is automatically offset, but if "I" is OFF, it is not offset. If so, it can be offset 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 the PID value and the variation of PV value when it reached the targeted setting value (SV) (or the proportional band).

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.

# 8-4. Control output

## (1) Lower limit and higher limit limiter setting

① Output limiter limits minimum and maximum values of control output and helps securing minimum temperature and suppress control overshoot.

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 cycling time

The correlation between proportional cycling time and control output are as shown in the following figure.

**①Output 20%**
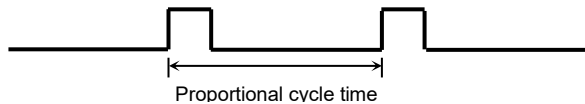
During the time equivalent to 20% when proportional cycling time is 100%, output is ON and is OFF for the time equivalent of the remaining 80%.

**②Output 60%**
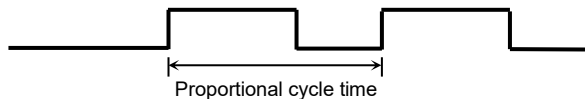
During the time equivalent to 60% when proportional cycling time is 100%, output is ON and is OFF for the time equivalent of the remaining 40%.

## (3) Control output characteristics

Control output characteristics can be set independently for output 1 and output 2.

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

### Output characteristics

Control output with 2-output characteristics is as shown in the following figure. ① is heating/cooling control and ② is heat + heat control.

**①2-output heating/cooling action output characteristics**

**②2-output heating/cooling action output characteristics**

Control output 1: Solid line
Control output 2: Dotted line

△ : Target set values (SV)　　▲ : DB (dead band)
Dead band: Shifts proportional band of control output2 for setting value.

## (4) Two-position action

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

**①Hysteresis mode is CENT (cEnt):**

RA action

DA action

△ : SV value
DF: Hysteresis

△ : SV value
DF: Hysteresis
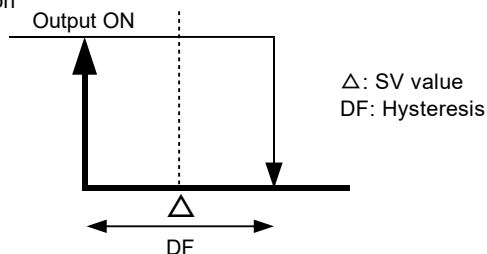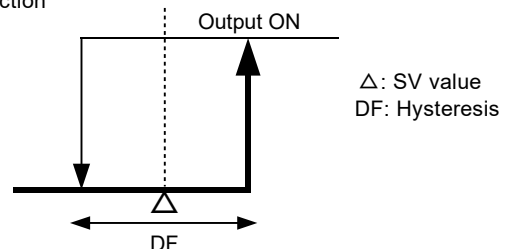
②**Hysteresis mode is SVOF (5⊔oF):**
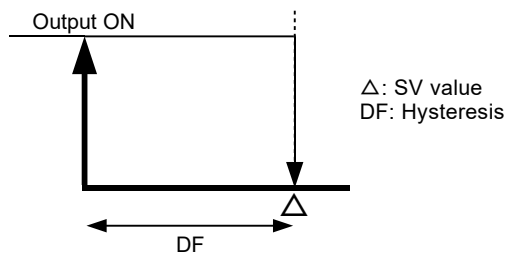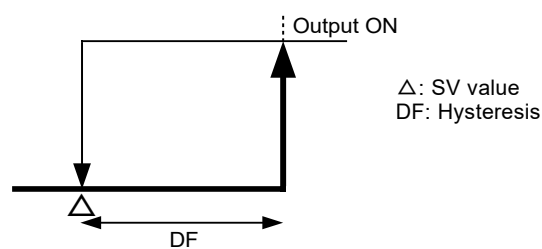
RA action



DA action



③**Hysteresis mode is SVON (5⊔on):**

RA action



DA action



△: SV value
DF: Hysteresis
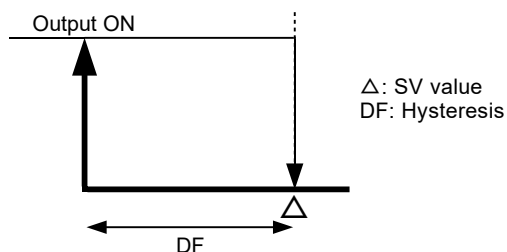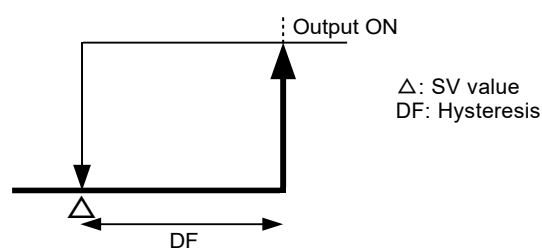
## 8-5. External control input (DI)

Input must be retained for at least 250 ms to receive external control input of the SRS10A Series.
Assignment by DI input is conducted on the "4-29 – 4-32 DI mode setting screens."
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 EXE1 (RUN1)
You can toggle between controller action execution/stop. Level action.

DI input OFF: Switches to standby (reset). SRS10A stops action.
DI input ON: Controller action is executed. PID operation control is executed (program control execution).

・**NOTE: If DI is ON when power is applied, controller action is executed immediately after power is applied.**

### (2) Controller action execution EXE2 (RUN2)
Execution/stop is switched each time DI input is turned ON. (edge action).

**NOTE: If DI is ON when power is applied, controller action is not executed immediately after power is applied.**

### (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 execution cannot be released by DI. Front key is used for releasing AT in execution (0-15 screen).

### (5) SV external selection (ESV2)
Setting values of SV1 – SV3 can be switched to SV being executed. DI is level action using 2 points. Assignment to DI1 or DI2 can be set.
Assigning/setting SV external selection to DI1 automatically allocates it to DI2 as well, so DI2 cannot be selected.
Assigning/setting SV external selection to DI2 automatically allocates it to DI3 as well, so DI3 cannot be selected.

When assigned to DI1

| DI2 | DI1 | Selected SV No. |
|-----|-----|-----------------|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 2 |
| 1 | 1 | 3 |

When assigned to DI2

| DI3 | DI2 | Selected SV No. |
|-----|-----|-----------------|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 2 |
| 1 | 1 | 3 |

SV No. and PID No. being executed correspond to SV1/PID1, SV2/PID2, and SV3/PID3.

**(6) Output 1 output characteristic (ACT1)**
Switches output characteristics of control output 1 (RA/DA).
When DI input OFF : RA (heating)
When DI input ON : DA (cooling)

**(7) Output 2 output characteristic (ACT2)**
Switches output characteristics of control output 2 (RA/DA).
When DI input OFF : RA (heating)
When DI input ON : DA (cooling)

**(8) Program (PROG)**
You can switch FIX(fixed value control) and PROG(program) mode. Level action.
DI input OFF: FIX (fixed value control) mode
DI input ON: Program (PROG) mode

**(9) Hold signal (HLD)**
Program execution can be halted from outside. Level action.
DI input ON: Stops program step time.

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

**(11) Start pattern external selection 2 bits (PTN2)**
You can select the program start pattern. DI is level action using 2 points. Assigment to DI1 or DI2 can be set.
Assigning/setting start pattern selection to DI1 automatically assigns it to DI2 as well, so DI2 cannot be selected.
Assigning/setting start pattern selection to DI2 automatically assigns it to DI3 as well, so DI3 cannot be selected.

When assigned to DI1

| DI2 | DI1 | Start pattern No. |
|-----|-----|-------------------|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 2 |
| 1 | 1 | 3 |

When assigned to DI2

| DI3 | DI2 | Start pattern No. |
|-----|-----|-------------------|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 2 |
| 1 | 1 | 3 |

Start pattern No.2 is executed if start pattern No.3 is selected and number of pattern is set to 2 on 4-56 screen.

**(12) Start pattern external selection 3 bits (PTN3)**
You can select the program start pattern. DI is level action using 3 points; only DI1 can be assigned/set.
Assigning/setting start pattern selection 3 bits to DI1 automatically assigns it to DI2 and DI3 as well, so DI2 and DI3 cannot be selected.

| DI3 | DI2 | DI1 | Start pattern No. |
|-----|-----|-----|-------------------|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 2 |
| 0 | 1 | 1 | 3 |
| 1 | 0 | 0 | 4 |
| 1 | * | * | 4 |

* SPT No. 4 regardless of ON/OFF.
Start pattern No.2 is executed if start pattern No.3 or No.4 is selected and number of pattern is set to 2 on 4-56 screen.

**(13) 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.

## 8-6. Soft start

Soft start is a function that gradually increases control output by set time when power is applied, standby is canceled and operation is normally reset from scaleover. It is effective for preventing excessive current from being supplied to the heater, etc.

**(1) Conditions that trigger soft start**
① When power is applied in the automatic output mode, standby is canceled or normal reset from scaleover.
② When P (proportional band) is other than OFF on "2-1, 2-9 proportional band setting screen. "
③ When soft start time setting on "4-50, 4-53 soft start time setting screen" is not OFF.

**(2) Conditions that cancel soft start**
① When soft start time has elapsed normally.
② When output values of soft start are higher than PID operation output values.
③ When soft start time is changed to OFF.
④ When switched to manual mode.
⑤ When AT (auto tuning) is executed.
⑥ When P (proportional band) is changed to OFF.
⑦ When control output characteristics are changed.
⑧ When in standby mode.

## 8-7. Change in position of decimal point

Position of decimal point can be changed for linear input, TC of decimal point and RTD range.
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, input 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 (UNIT) also change similarly.

Example: If range is "5" (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 | 0.0 | 0 | 0.0 |
| Measuring range higher limit value | 800.0 | 800 | 800.0 |
| PV bias | 20.5 | 21 | 21.0 |

* 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.

## 8-8. Specified screen call function

The specified screen call function is a function that allows you to quickly switch to the registered screen by registering the screen.

### (1) How to register the specified screen

① Display the target screen.
② Press [ENT]+[RUN] to register the screen. (Up to 6 screens)
③ The decimal point on the left digit of the PV display is displayed, and "$SEt$*" is displayed on the SV digit for 1 second.
④ Completion of registration.

Example: When E1 level value and E2 level value are registered.

| E.1Hd | | E.1Hd | 1 sec | E.1Hd | | E.2Ld | | E.2Ld | 1 sec | E.2Ld |
|---|---|---|---|---|---|---|---|---|---|---|
| 200.0 | [ENT]+[RUN] | SEt 1 | | 200.0 | [⟲] | -199.9 | [ENT]+[RUN] | SEt 2 | | -199.9 |

Note:
1. Screens of the program screen group cannot be registered.
2. Monitor screens cannot be added.
3. Up to 6 screens can be added.

### (2) How to use the registration screen

① Display the basic screen.
② Press [RUN].
③ The registered screen is displayed.
④ By pressing [⟲], the registered next screen is displayed (up to 6 screens).
⑤ After completing the registration screen, press [⟲] to return to the basic screen.

Example: Screen transition when E1 level value and E2 level value are registered.

| 25.0 | | E.1Hd | | E.2Ld | | 25.0 |
|---|---|---|---|---|---|---|
| 0.0 | [RUN] | 200.0 | [⟲] | -199.9 | [⟲] | 0.0 |

### (3) Conditions for canceling the registration screen

1. Press [ENT]+[RUN] while the registration screen is displayed.
2. The registered screen becomes a non-display condition.
   For example, the event 1 level value screen registered above will be hidden if the event 1 type is set to "NON", so the registration will be canceled at that point.

# 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 "Error Codes, Causes and Remedies." |
| ② Displayed measured value (PV) seems to be incorrect. | ① Set measuring range code is different from that of input sensor / input signal.<br>② Erroneous wiring to input terminals of sensor. | ① Check if set measuring range code is correct for input signal.<br>② Cortect 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.<br>② Something is wrong with the instrument. | ① Inspect power supply / wiring connections and check wiring.<br>② Inspect, repair or replace the instrument. |
| ④ Keys do not work. | ① Key lock is in effect.<br>② Communication is set to Com during communication.<br>③ Something is wrong with the instrument. | ① Cancel key lock.<br>② Set communication to local (Loc).<br>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<br>(HHHH) | Higher limit scaleover | ① Break in thermocouple input wiring.<br>② Break in R.T.D. input A wiring.<br>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.<br>② Check R.T.D. input A terminal wiring for possible break. If there is nothing wrong with wiring, replace R.T.D.<br>③ For voltage or current input, check the measurement signal transmission unit. Check if set measuring range code is correct for input signal. |
| LLLL<br>(LLLL) | Lower limit scaleover | Input measured value fell below lower limit of measuring range by 10%. | Check for measurement input wiring for reverse polarity or possible break. |
| b ---<br>( b - - -) | Break in R.T.D. input wiring | ① Break in B wiring<br>② Multiple break in ABB wiring | Check R.T.D. input ABB terminal wiring for possible break. If there is nothing wrong with wiring, replace R.T.D. |
| CJHH<br>(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.<br>② If ambient temperature has not exceeded 80°C, examine the controller. |
| CJLL<br>(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.<br>② If ambient temperature has not fallen below -20°C, examine the controller. |

### (2) Heater break/loop alarm errors

| Screen display | Problem | Cause | Remedy |
|---|---|---|---|
| HbHH<br>(HbHH) | Heater current sensor CT input value has exceeded 55.0A. | Excessive current | ① Reduce the current.<br>② Inspect the controller. |
| HbLL<br>(HbLL) | Something is wrong with the instrument. | Something is wrong with the instrument. | Inspect, repair or replace 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 mask/lock function

## 10-1. Overview

Mask or key lock can be set for the various parameters.
The factory setting is "all disp" (display).
There are however limits, so you should keep this point in mind.
    &lt;Note&gt;
- PID-related parameter are managed by 1 set of PID No. 1 to No. 3.
  Example) If output 1 proportional band is changed, output 1 proportional band is similarly changed for PID No. 1 to No. 3.
- Pattern-related parameters are managed by 1 set of pattern 1 to pattern 4.
  Example) If the start SV value setting is changed, the start SV value is similarly changed for pattern 1 to pattern 4.
- Step-related parameters are managed by 1 set of all steps.
  Example) If the step SV value setting is changed, all steps of step SV value are similarly changed for pattern 1 to pattern 4.
- The settings cannot be changed for the various monitor screen of the user setting screen group. Always displayed.
- The settings cannot be changed for the EXE/STBY (RUN/RST) switching screen of the user setting screen group. Always displayed.
- The "dp" in the far right digit of the SV display lights when ordinary parameter settings screen is displayed for locked parameters.
- If turned from OFF to ON on the M0-1 screen, the mask/lock setting of all parameters is reset to "disp" (display).

Please note that the function of each parameter is still valid even in masked/locked state by mask/lock function and can be operated by communication or DI.

## 10-2. Parameter diagram

The overview of the parameter mask/lock diagram is as follows. The windows of the various screens are divided as follows. The number at the top of the window is the screen No.
To switch to the mask/lock setting mode, press and hold ▲+▼ on the "4-0 INIT screen" for at least 2 seconds when on standby (reset).
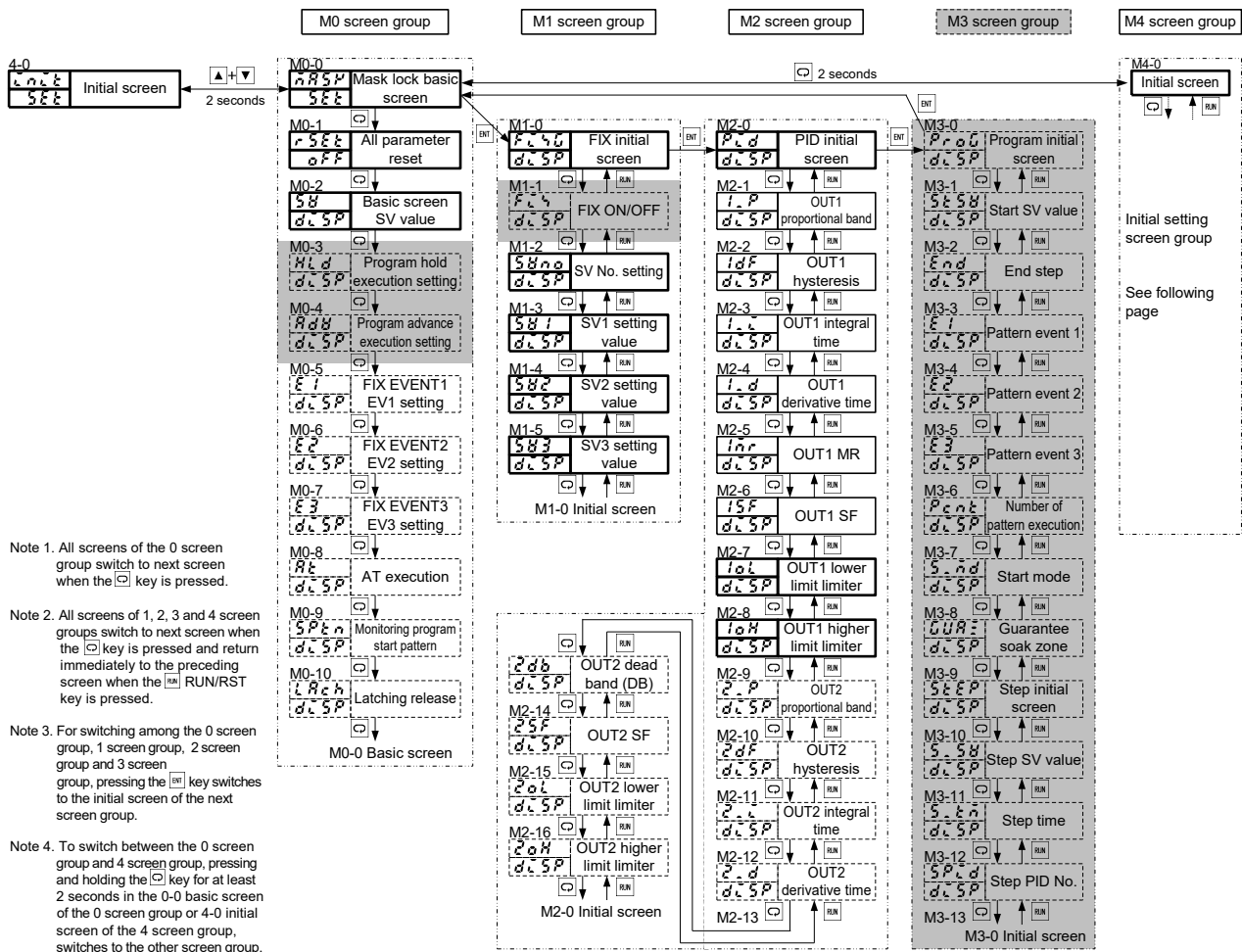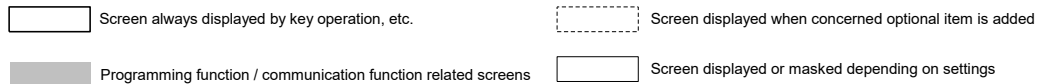


Note 1. All screens of the 0 screen group switch to next screen when the ⟳ key is pressed.

Note 2. All screens of 1, 2, 3 and 4 screen groups switch to next screen when the ⟳ key is pressed and return immediately to the preceding screen when the RUN/RST key is pressed.

Note 3. For switching among the 0 screen group, 1 screen group, 2 screen group and 3 screen group, pressing the ENT key switches to the initial screen of the next screen group.

Note 4. To switch between the 0 screen group and 4 screen group, pressing and holding the ⟳ key for at least 2 seconds in the 0-0 basic screen of the 0 screen group or 4-0 initial screen of the 4 screen group, switches to the other screen group.

※ In the "M0-2 Basic screen SV value", parameter can be set oFF/Lock only.
           oFF :key-lock disabled
           Lock :key-lock enabled
               Note:M0-2 screen display can be set in the "4-63 Basic display mode"

**M0-0 Mask lock basic screen** → (2 seconds) → M4 screen group

**Column 1 (4-18 screen)**
- M4-0 — Init / diSP — Initial screen
- M4-1 — LocK / diSP — Key lock setting
- M4-2 — StAY / diSP — Event at STBY setting
- M4-3 — E1_n / diSP — EV1 mode setting
- M4-4 — E1_d / diSP — EV1 hysteresis setting
- M4-5 — E1_c / diSP — EV1 standby action setting
- M4-6 — E1_L / diSP — EV1 latching setting
- M4-7 — E1_A / diSP — EV1 output characteristics setting
- M4-8 — E2_n / diSP — EV2 mode setting
- M4-9 — E2_d / diSP — EV2 hysteresis setting
- M4-10 — E2_c / diSP — EV2 standby action setting
- M4-11 — E2_L / diSP — EV2 latching setting
- M4-12 — E2_A / diSP — EV2 output characteristics setting
- M4-13 — E3_n / diSP — EV3 mode setting
- M4-14 — E3_d / diSP — EV3 hysteresis setting
- M4-15 — E3_c / diSP — EV3 standby action setting
- M4-16 — E3_L / diSP — EV3 latching setting
- M4-17 — E3_A / diSP — EV3 output characteristics setting

**Column 2 (4-34 screen)**
- M4-18 — Hbn1 / diSP — Heater 1 alarm mode setting
- M4-19 — C1Hb / diSP — Heater 1 break alarm setting
- M4-20 — C1HL / diSP — Heater 1 loop alarm setting
- M4-21 — Hbn2 / diSP — Heater 2 alarm mode setting
- M4-22 — C2Hb / diSP — Heater 2 break alarm setting
- M4-23 — C2HL / diSP — Heater 2 loop alarm setting
- M4-24 — Ao_n / diSP — Analog output type setting
- M4-25 — Ao_L / diSP — Analog output scaling lower limit value setting
- M4-26 — Ao_H / diSP — Analog output scaling higher limit value setting
- M4-27 — AL_L / diSP — Analog output limiter lower limit setting
- M4-28 — AL_H / diSP — Analog output limiter higher limit setting
- M4-29 — d1_n / diSP — DI1 mode setting
- M4-30 — d2_n / diSP — DI2 mode setting
- M4-31 — d3_n / diSP — DI3 mode setting
- M4-32 — d4_n / diSP — DI4 mode setting
- M4-33 — conn / diSP — Communication mode setting
- M4-34 — Addr / diSP — Communication address setting

**Column 3 (4-52 screen)**
- M4-35 — dAtA / diSP — Communication data format setting
- M4-36 — SchA / diSP — Communication start character setting
- M4-37 — ChP / diSP — Communication BCC operation/protocol type setting
- M4-38 — bPS / diSP — Communication speed setting
- M4-39 — dELY / diSP — Communication delay time setting
- M4-40 — nEn / diSP — Communication memory mode setting
- M4-41 — ConP / diSP — Communication mode types
- M4-42 — nS_n / diSP — Communication master mode setting
- M4-43 — n_SL / diSP — Communication master control output scaling lower limit value setting
- M4-44 — n_SH / diSP — Communication master control output scaling higher limit value setting
- M4-45 — S_Ad / diSP — Communication master mode start slave address setting
- M4-46 — E_Ad / diSP — Communication master mode finish slave address setting
- M4-47 — urct / diSP — Communication master mode write data address setting
- M4-48 — o_C1 / diSP — Output 1 proportional cycling time setting
- M4-49 — Act1 / diSP — Output 1 characteristics setting
- M4-50 — SoF1 / diSP — Output 1 soft start time setting
- M4-51 — o_C2 / diSP — Output 2 proportional cycling time setting

**Column 4 (4-0 Initial screen)**
- M4-52 — Act2 / diSP — Output 2 characteristics setting
- M4-53 — SoF2 / diSP — Output 2 soft start time setting
- M4-54 — S8_L / diSP — SV limiter lower limit value setting
- M4-55 — S8_H / diSP — SV limiter higher limit value setting
- M4-56 — Ptnc / diSP — Number of program patterns setting
- M4-57 — t_un / diSP — Program time unit setting
- M4-58 — P8_b / diSP — PV bias value setting
- M4-59 — P8_G / diSP — PV gain compensation value setting
- M4-60 — P8_F / diSP — PV filter time setting
- M4-61 — rAnG / diSP — Measuring Range Codes setting
- M4-62 — Unit / diSP — Temperature unit setting
- M4-63 — Sc_L / diSP — Input scaling lower limit value setting
- M4-64 — Sc_H / diSP — Input scaling higher limit value setting
- M4-65 — dP / diSP — Input decimal point setting
- M4-66 — dSP / diSP — Basic screen display mode
- M4-67 — dFnd / diSP — Hysteresis mode
- M4-68 — Pini / diSP — Parameter Initialization

## 10-3. Mask/lock setting contents

### (1) Settings for various parameters

diSP: Displays parameter setting screen.

MASK: Masks parameter setting screen.

LocK: Displays parameter setting screen but keys are locked.
The "dp" on the far right of the SV display lights to indicate key lock.

### (2) Settings for each screen group

diSP: Setting diSP on the M1-0, M2-0, M3-0, M4-0 screens displays the target screen group.
Setting contents for the various parameters are applied.

MASK: Setting MASK on the M1-0, M2-0, M3-0, M4-0 screens masks the target screen group.
- Setting MASK on the M1-0 screen masks the M1-1 – M1-5 and 1 screen group.
- Setting MASK on the M2-0 screen masks the M2-1 – M2-16 and 2 screen group.
- Setting MASK on the M3-0 screen masks the M3-1 – M3-12 and 3 screen group.
- Setting MASK on the M4-0 screen masks the M4-1 – M4-68 and 4 screen group.

LocK: Setting LocK on the M1-0, M2-0, M3-0, M4-0 screens locks the keys of the target screen group.
Parameters set to MASK are masked and parameters set to diSP / LocK are displayed but the keys are locked.

### (3) Mask/lock initialization

If turned from OFF to ON on the M0-1 all parameters reset screen, mask/lock is reset for all parameter and becomes diSP.

# 11. 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) | 0.0 | | |
| 0-1 | Standby action (FIX) | EXE (EᶜᴇE) | EᶜᴇE | | |
| | Reset action (program) | RST (rSt) | rSt | | |
| 0-2 | Output 1 monitoring | | | | |
| 0-3 | Output 2 monitoring | | | | |
| 0-4 | Execution step No. monitoring | | | | |
| 0-5 | Remaining time of step monitoring | | | | |
| 0-6 | Number of pattern executions monitoring | | | | |
| 0-7 | PID execution monitoring | | | | |
| 0-8 | Hold | HLd (HLd) | oFF | | |
| 0-9 | Advance | AdV (AdV) | oFF | | |
| 0-10 | Monitoring heater current 1 | HC_1 (HC_1) | | | |
| 0-11 | Monitoring heater current 2 | HC_2 (HC_2) | | | |
| 0-12 | Event 1 setting value setting | E1Hd (E1Hd) | 200.0 | | |
| 0-13 | Event 2 setting value setting | E2Ld (E2Ld) | -199.9 | | |
| 0-14 | Event 3 setting value setting | E3Hd (E3Hd) | 200.0 | | |
| 0-15 | AT action | At (At) | oFF | | |
| | | | | | |
| 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) | 0.0 | | |
| 1-4 | SV2 setting | SV2 (SV2) | 0.0 | | |
| 1-5 | SV3 setting | SV3 (SV3) | 0.0 | | |
| | | | | | |
| PID No.1 | | | | | |
| 2-0 | Initial screen | Pid1 (Pid1) | SEt | | |
| 2-1 | OUT1 PID P | 1_P1 (1_P1) | 3.0 | | |
| 2-2 | OUT1 hysteresis | 1dF1 (1dF1) | 2.0 | | |
| 2-3 | OUT1 PID I | 1_i1 (1_i1) | 120 | | |
| 2-4 | OUT1 PID D | 1_d1 (1_d1) | 30 | | |
| 2-5 | OUT1 manual reset | 1mr1 (1mr1) | 0.0 | | |
| 2-6 | OUT1 PID target value function | 1SF1 (1SF1) | 0.40 | | |
| 2-7 | OUT1 lower limit limiter | 1oL1 (1oL1) | 0.0 | | |
| 2-8 | OUT1 higher limit limiter | 1oH1 (1oH1) | 100.0 | | |
| 2-9 | OUT2 PID P | 2_P1 (2_P1) | 3.0 | | |
| 2-10 | OUT2 hysteresis | 2dF1 (2dF1) | 2.0 | | |
| 2-11 | OUT2 PID I | 2_i1 (2_i1) | 120 | | |
| 2-12 | OUT2 PID D | 2_d1 (2_d1) | 30 | | |
| 2-13 | OUT2 dead band | 2db1 (2db1) | 0.0 | | |
| 2-14 | OUT2 PID target value function | 2SF1 (2SF1) | 0.40 | | |
| 2-15 | OUT2 lower limit limiter | 2oL1 (2oL1) | 0.0 | | |
| 2-16 | OUT2 higher limit limiter | 2oH1 (2oH1) | 100.0 | | |
| | | | | | |
| PID No.2 | | | | | |
| 2-0 | Initial screen | Pid2 (Pid2) | SEt | | |
| 2-1 | OUT1 PID P | 1_P2 (1_P2) | 3.0 | | |
| 2-2 | OUT1 hysteresis | 1dF2 (1dF2) | 2.0 | | |
| 2-3 | OUT1 PID I | 1_i2 (1_i2) | 120 | | |
| 2-4 | OUT1 PID D | 1_d2 (1_d2) | 30 | | |
| 2-5 | OUT1 manual reset | 1mr2 (1mr2) | 0.0 | | |
| 2-6 | OUT1 PID target value function | 1SF2 (1SF2) | 0.40 | | |
| 2-7 | OUT1 lower limit limiter | 1oL2 (1oL2) | 0.0 | | |
| 2-8 | OUT1 higher limit limiter | 1oH2 (1oH2) | 100.0 | | |
| 2-9 | OUT2 PID P | 2_P2 (2_P2) | 3.0 | | |
| 2-10 | OUT2 hysteresis | 2dF2 (2dF2) | 2.0 | | |
| 2-11 | OUT2 PID I | 2_i2 (2_i2) | 120 | | |
| 2-12 | OUT2 PID D | 2_d2 (2_d2) | 30 | | |
| 2-13 | OUT2 dead band | 2db2 (2db2) | 0.0 | | |
| 2-14 | OUT2 PID target value function | 2SF2 (2SF2) | 0.40 | | |
| 2-15 | OUT2 lower limit limiter | 2oL2 (2oL2) | 0.0 | | |
| 2-16 | OUT2 higher limit limiter | 2oH2 (2oH2) | 100.0 | | |
| | | | | | |
| PID No.3 | | | | | |
| 2-0 | Initial screen | Pid3 (Pid3) | SEt | | |
| 2-1 | OUT1 PID P | 1_P3 (1_P3) | 3.0 | | |
| 2-2 | OUT1 hysteresis | 1dF3 (1dF3) | 2.0 | | |
| 2-3 | OUT1 PID I | 1_i3 (1_i3) | 120 | | |
| 2-4 | OUT1 PID D | 1_d3 (1_d3) | 30 | | |
| 2-5 | OUT1 manual reset | 1mr3 (1mr3) | 0.0 | | |
| 2-6 | OUT1 PID target value function | 1SF3 (1SF3) | 0.40 | | |
| 2-7 | OUT1 lower limit limiter | 1oL3 (1oL3) | 0.0 | | |
| 2-8 | OUT1 higher limit limiter | 1oH3 (1oH3) | 100.0 | | |

| Screen No. | Parameter (item)/screen | | Initial value | Setting/selection | Record |
|---|---|---|---|---|---|
| 2-9 | OUT2 PID P | 2_P3 (`2_P3`) | 3.0 | | |
| 2-10 | OUT2 hysteresis | 2dF3 (`2dF3`) | 2.0 | | |
| 2-11 | OUT2 PID I | 2_i3 (`2_i3`) | 120 | | |
| 2-12 | OUT2 PID D | 2_d3 (`2_d3`) | 30 | | |
| 2-13 | OUT2 dead band | 2db3 (`2db3`) | 0.0 | | |
| 2-14 | OUT2 PID target value function | 2SF3 (`2SF3`) | 0.40 | | |
| 2-15 | OUT2 lower limit limiter | 2oL3 (`2oL3`) | 0.0 | | |
| 2-16 | OUT2 higher limit limiter | 2oH3 (`2oH3`) | 100.0 | | |
| | | | | | |
| 4-0 | Initial screen | init (`init`) | SEt | | |
| 4-1 | Key lock setting | LocK (`LocK`) | oFF | | |
| 4-2 | Event at STBY setting | StEV (`StEV`) | oFF | | |
| 4-3 | Event 1 type | E1_m (`E1_m`) | Hd | | |
| 4-4 | Event 1 hysteresis | E1_d (`E1_d`) | 2.0 | | |
| 4-5 | Event 1 standby action | E1_i (`E1_i`) | oFF | | |
| 4-6 | Event 1 latching | E1_L (`E1_L`) | oFF | | |
| 4-7 | Event 1 output characteristics | E1_A (`E1_A`) | no | | |
| 4-8 | Event 2 type | E2-m (`E2_m`) | Ld | | |
| 4-9 | Event 2 hysteresis | E2-d (`E2_d`) | 2.0 | | |
| 4-10 | Event 2 standby action | E2-i (`E2_i`) | oFF | | |
| 4-11 | Event 2 latching | E1_L (`E2_L`) | oFF | | |
| 4-12 | Event 2 output characteristics | E1_A (`E2_A`) | no | | |
| 4-13 | Event 3 type | E3-m (`E3_m`) | non | | |
| 4-14 | Event 3 hysteresis | E3-d (`E3_d`) | 2.0 | | |
| 4-15 | Event 3 standby action | E3-i (`E3_i`) | oFF | | |
| 4-16 | Event 3 latching | E3_L (`E3_L`) | oFF | | |
| 4-17 | Event 3 output characteristics | E3_A (`E3_A`) | no | | |
| 4-18 | HB1 break/loop alarm mode | Hbm1 (`Hbm1`) | out 1 | | |
| 4-19 | HB1 break alarm setting | C1Hb (`C1Hb`) | oFF | | |
| 4-20 | HB1 loop alarm setting | C1HL (`C1HL`) | oFF | | |
| 4-21 | HB2 break/loop alarm mode | Hbm2 (`Hbm2`) | out 1 | | |
| 4-22 | HB2 break alarm setting | C2Hb (`C2Hb`) | oFF | | |
| 4-23 | HB2 loop alarm setting | C2HL (`C2HL`) | oFF | | |
| 4-24 | Analog output type | Ao_m (`Ao_m`) | PV | | |
| 4-25 | Analog output scaling lower limit | Ao_L (`Ao_L`) | 0.0 | | |
| 4-26 | Analog output scaling higher limit | Ao_H (`Ao_H`) | 800.0 | | |
| 4-27 | Analog output limiter lower limit | AL_L (`AL_L`) | 0.0 | | |
| 4-28 | Analog output limiter higher limit | AL_H (`AL_H`) | 100.0 | | |
| 4-29 | DI1 mode | D1_m (`d1_m`) | non | | |
| 4-30 | DI2 mode | D2_m (`d2_m`) | non | | |
| 4-31 | DI3 mode | D3_m (`d3_m`) | non | | |
| 4-32 | DI4 mode | D4_m (`d4_m`) | non | | |
| 4-33 | Communication mode setting | comm (`comm`) | Loc | | |
| 4-34 | Communication address | Addr (`Addr`) | 1 | | |
| 4-35 | Communication data format | dAtA (`dAtA`) | 7E1 | | |
| 4-36 | Start character | SchA (`SchA`) | StS | | |
| 4-37 | BCC operation/protocol type | ChK (`ChK`) | Add | | |
| 4-38 | Communication speed | bPS (`bPS`) | 9600 | | |
| 4-39 | Communication delay time | dely (`dELY`) | 20 | | |
| 4-40 | Communication memory mode | mem (`mEm`) | EEP | | |
| 4-41 | Communication mode types | Comk (`ComK`) | con 1 | | |
| 4-42 | Communication master mode | mS_m (`mS_m`) | SV | | |
| 4-43 | Communication master control output scaling lower limit value | m_SL (`m_SL`) | 0 | | |
| 4-44 | Communication master control output scaling higher limit value | m_SH (`m_SH`) | 8000 | | |
| 4-45 | Start slave address | S_Ad (`S_Ad`) | 1 | | |
| 4-46 | End slave address | E_Ad (`E_Ad`) | 1 | | |
| 4-47 | Write-in data address | writ (`writ`) | 0300 | | |
| 4-48 | Output 1 proportional cycling time | o_C1 (`o_C1`) | Y:30, P:3 | | |
| 4-49 | Output 1 output characteristics | Act1 (`Act1`) | rA | | |
| 4-50 | Output 1 soft start time | SoF1 (`SoF1`) | oFF | | |
| 4-51 | Output 2 proportional cycling time | o_C2 (`o_C2`) | Y:30, P:3 | | |
| 4-52 | Output 2 output characteristics | Act2 (`Act2`) | dA | | |
| 4-53 | Output 2 soft start time | SoF2 (`SoF2`) | oFF | | |
| 4-54 | SV limiter lower limit value | SV_L (`SV_L`) | 0.0 | | |
| 4-55 | SV limiter higher limit value | SV_H (`SV_H`) | 800.0 | | |
| 4-56 | Number of patterns setting | Ptnc (`Ptnc`) | 4 | | |
| 4-57 | Time unit | t_Un (`t_Un`) | Hn | | |
| 4-58 | PV bias value | PV_b (`PV_b`) | 0.0 | | |
| 4-59 | PV gain compensation | PV_G (`PV_G`) | 0.00 | | |
| 4-60 | PV filter time | PV_F (`PV_F`) | 0 | | |
| 4-61 | Measuring range code | rAnG (`rAnG`) | Multi: 05 V : 86 | | |
| 4-62 | Input temperature unit | Unit (`Unit`) | c | | |
| 4-63 | Input scaling lower limit | Sc_L (`Sc_L`) | 00 | | |
| 4-64 | Input scaling higher limit | Sc_H (`Sc_H`) | 8000 | | |
| 4-65 | Input scaling decimal point position | dP (`dP`) | 00 | | |
| 4-66 | Basic screen display mode | dSP (`dSP`) | PVSV | | |
| 4-67 | Hysteresis mode | dFMd (`dFMd`) | cEnt | | |
| 4-68 | Parameter Initialization | Pini (`Pini`) | oFF | | |

# 12. Specifications

## ■ Display
- **Digital display** : Measured value (PV) / 7-segments red LED, 4 digits
  Target set value (SV) / 7-segments green LED, 4 digits
- **Display accuracy** : ±(0.25%FS + 1digit)
  Does not include cold junction temperature compensation tolerance of thermocouple input. For details on accuracy, see "7. Measuring Range Codes."
- **Range for maintaining display accuracy** : 23°C±5°C (18~28°C)
- **Display resolution** : Differs according to measuring range (0.001, 0.01, 0.1, 1)
- **Measured value display range** : -10%~110% of measuring range
  Pt -200~600°C range is -240~680°C.
  JPt -200~500°C range is -240~570°C.
- **Display update cycle** : 0.25 seconds
- **Action display/color** : 9 types, LED lamp display
  Control output (OUT1, OUT2) / Green
  Event (EV1, EV2, EV3) / Orange
  Auto tuning (AT) / Green
  Manual control output (MAN) / Green
  Action display (RUN) / Green
  Communication (COM) / Green

## ■ Setting
- **Setting method** : By operating 5 front panel keys (▢, ▼, ▲, ENT, RUN)
- **Target value setting range** : Same as measuring range (except within setting limiter)
- **Setting limiter** : high/low individually set, optional within measuring range (lower limit value less than higher limit value)
- **Key lock** : No lock, 3-stage setting

## ■ Input
- **Type of input** : Universal (TC, Pt, mV) or voltage (V)
- **Thermocouple** : B, R, S, K, E, J, T, N, PLⅡ, C(WRe5-26), {U, L(DIN43710)}, Metal-chromel (AuFe-Cr)
  **Input resistance** : Min. 500kΩ
  **External resistance tolerance** : Max. 100Ω
  **Burnout function** : Standard feature (up scale)
  **Cold junction compensation accuracy** : ±2°C (ambient temperature within 5~45°C) ±3°C when closely-mounted is series
- **R.T.D.** : Pt100/JPt100 3-wire type
  **Amperage** : 0.25 mA
  **Lead wire tolerable resistance** : Max. 5Ω per wire (resistance for all wires must be equal)
- **Voltage mV** : -10~10, 0~10, 0~20, 0~50, 10~50, 0~100mV DC
  **V** : -1~1, 0~1, 0~2, 0~5, 1~5, 0~10 V DC
  **Input resistance** : Min. 500kΩ
  Current input (0 ~ 20, 4 ~ 20 mA DC) handled by external receiving impedance (250Ω, sold separately)
- **Input scaling function** : Scaling during voltage (mV, V) possible
  **Scaling range** : -1999~9999 digit
  **Span** : 10~10,000 digit
  **Position of decimal point** : None, 1, 2, 3 digits below decimal point
- **Sampling cycle** : 0.25 seconds
- **PV bias** : -1999~2000 digit
- **PV filter** : 0 ~ 9999 seconds
- **PV gain** : -5.00~+5.00%, gain compensation possible
- **Isolation** : Not isolated during input and system DI/CT input. Isolated for others.

## ■ Control
- **Control mode**
  **With 1 output** : Expert PID control with auto tuning function
  **With 2 output** : Expert PID control with auto tuning function PID (output1) + PID (output2)
- **Type of control type/rating** (both output 1/2) : Contact / 1a 240V AC 2A (resistive load) 1.2A (inductive load)
  SSR drive voltage / 12V±1.5V DC (max. load current 30 mA)
  Current / 4~20 mA DC (max. load resistance 600Ω)
  Voltage / 0~10V DC (max. load current 2 mA)
  **Control output resolution** : Control output 1: Approx. 0.008% (1/13000)
  Control output 2: Approx. 0.008% (1/13000)
  **Control output accuracy** : Control output 1: ±1.0%FS (5~100% output)
  Control output 2: ±2.0%FS (5~100% output)

- **Control output 1**
  **Proportional band (P)** : OFF, 0.1~999.9% (ON-OFF action by OFF)
  **Integral time (I)** : OFF, 1~6000 seconds (P or PD action by OFF)
  **Derivative time (D)** : OFF, 1~3600 seconds (P or PI action by OFF)
  **Target value function** : OFF, 0.01~1.00
  **Hysteresis mode** : Select from the following 3 types CENT mode, SVOF mode, or SVON mode
  **ON-OFF hysteresis** : 1~999 digit (enabled when P = OFF)
  **Manual reset** : -50.0~50.0% (enabled when I = OFF)
  **Higher/lower limit output limiter** : Lower limit 0.0~99.9%, higher limit 0.1~100.0% (Lower limit value less than higher limit value)
  **Proportional cycle** : 1~120 seconds (contact or SSR drive voltage output)

- **Control output 2 (option)**
  **Proportional band (P)** : OFF, 0.1~999.9% (ON-OFF action by OFF)
  **Integral time (I)** : OFF, 1~6000 seconds (P or PD action by OFF)
  **Derivative time (D)** : OFF, 1~3600 seconds (P or PI action by OFF)
  **Target value function** : OFF, 0.01~1.00
  **Hysteresis mode** : Select from the following 3 types CENT mode, SVOF mode, or SVON mode
  **ON-OFF hysteresis** : 1~999 digit (enabled when P = OFF)
  **Dead band** : -1999~5000 (digit)
  **Higher/lower limit output limiter** : Lower limit 0.0~99.9%, higher limit 0.1~100.0% (Lower limit value less than higher limit value)
  **Proportional cycle** : 1~120 seconds (contact or SSR drive voltage output)

- **Manual control**
  **Output setting range** : 0.0~100.0%
  **Setting resolution** : 0.1%
  **Manual-auto switching** : Balanceless bumpless (within proportional band range)
- **Soft start** : Set separately for output 1 and output 2; OFF, 1~120 seconds
- **AT point** : SV value in execution
- **Control output characteristics** : RA (reverse characteristics) / DA (direct characteristics), front panel keys, switch by communication
  Set separately for output 1 and output 2
  RA (reverse characteristics): Heating
  DA (direct characteristics): Cooling
- **Isolation** : Contact output: Isolation for all
  Not isolated for SSR drive voltage, current, voltage and during analog output. Isolated for other (however 1-way output not isolated during 2-way output for SSR drive voltage, voltage, current and voltage output)

## ■ Event output (option, max. 3 point)
- **Number of output points** : 3 points: EV1, EV2 and EV3
  No exclusive selection for EV1 and EV2
  Exclusive selection of EV3 for control output 2 and DI4
- **Types of event** : Select from among the following 21 types for EV1, EV2 and EV3:

| | | | |
|---|---|---|---|
| non | No selection | LA | Lower limit absolute value |
| Hd | Higher limit deviation | So | Scaleover |
| Ld | Lower limit deviation | EXE | EXE signal |
| od | Outside higher/lower limit deviation | rot1 | Output 1 inverted output |
| id | Inside higher/lower limit deviation | HC1 | Heater 1 break/loop |
| HA | Higher limit absolute value | HC2 | Heater 2 break/loop |

The following 9 types are valid for program mode only:

| | | | |
|---|---|---|---|
| run | RUN signal | Hold | Hold signal |
| StPS | Step signal | ProG | Program signal |
| PtnS | Pattern signal | u.SL | Up slope signal |
| EndS | Program end signal | d.SL | Down slope signal |
| GUA | Guarantee soak | | |

- **Event setting range** : Absolute value (both higher/lower limit), within measuring range
  Deviation (both higher/lower limit), -1999~2000 digit
  Higher/lower limit deviation (inside/outside), 0~2000 digit
- **Event action** : ON-OFF action
- **Hysteresis** : 1~999 digit
- **Standby action** : Selected from among the following 4 types
  No standby
  Standby 1  Standby when power is applied and when STBY (RST) switches to EXE (RUN).
  Standby 2  Standby when power is applied and when STBY (RST) switches to EXE (RUN) and standby when executed SV value changes.
  No standby control action   No alarm output for abnormal input
- **Output type/rating** : Contact (EV1/EV2, 1a × 2 points common, EV3 1a independent) /240V AC, 2A (resistive load)
- **Output updating cycle** : 0.25 seconds
- **Latching function** : ON/OFF selection
- **Output characteristics** : NO/NC selection
- **Isolation** : Isolation for all

## ■ Programming function (option)
- **Number of patterns** : Max. 4 (can be set to 1, 2 or 4)
- **Number of steps** : Max. 8 (4 patterns), 16 (2 patterns) 32 (1 pattern), total number of steps = 32
- **Number of PID types** : Max. 3
- **Time setting** : 0 minutes, 0 seconds~99 minutes, 59 seconds per step
  Or 0 hours, 0 minutes~99 hours, 59 minutes per step
- **Setting resolution** : 1 minute or 1 second
- **Time accuracy** : ± (setting time x 0.005 + 0.25 seconds)
- **Setting pattern for each step** : SV, step time, PID No.
- **Number of pattern executions** : Max. 9999
- **PV start** : ON/OFF
- **Hold** : Front panel key input, external control input or communication
- **Advance** : Front panel key input, external control input or communication
- **Power failure compensation** : None (Setting contents are maintained and elapsed time, execution step and number of executions are reset.)
- **Guarantee soak zone** : OFF, 1~999 digit

■ **External control input/DI (option)**
● **Number of inputs** SRS11A : Max. 4 points
  Exclusive selection with 3 points CT input (DI1, DI2, DI3)
  Exclusive selection with 1 point (DI4), control output 2 and event output (EV3)
  SRS12A/SRS13A/SRS14A : Max. 4 points
  Exclusive selection with 3 points (DI1, DI2, DI3)
  Exclusive selection with 1 point (DI4), control output 2 and event output (EV3)

● **Type of DI allocation** : Selected for each DI from among the following 14 types:
  No allocation, EXE1 (RUN1), EXE2 (RUN2), MAN, AT, ESV2, ACT1, ACT2, PROG, HLD, ADV, PTN2, PTN3, L_RS
● **Action input** : Non-voltage contact or open collector
  (Level action) approx. 5V DC, 1mA or less
● **Minimum level holding time** : 0.25 seconds
● **Isolation** : Isolated except during DI, input, system, CT input

■ **CT input (option) (for heater break / loop alarm)**
  2-point detection; exclusive selection with DI1, DI2 and DI3 for SRS11A
  No exclusive selection for SRS12A, SRS13A and SRS14A
● **Types of current detection target** : Allocation for OUT1 and OUT2 is possible.
  However, this can be selected only when output type is contact or SSR drive voltage.
● **Current detection method** : By CT sensor (sold separately)
● **Current capacity** : 30A/50A (CT sensor sold separately)
● **Current setting range** : OFF, 0.1~50.0 A (alarm action off when set to OFF)
● **Setting resolution** : 0.1A
● **Current display range** : 0.0~55.0 A
● **Display accuracy** : ±2.0 A (for sine wave 50 Hz)
● **Alarm action** : Heater break detection when control output ON:
  Alarm output ON
  Heater loop alarm detection when control output OFF:
  Alarm output ON
● **Alarm output** : Output for event by event assignment
● **Minimum time for action confirmation** : 0.25 seconds for both ON and OFF (each 0.5 second)
● **Alarm maintain mode** : Latching function ON/OFF
● **Standby action** : Selection of no (oFF) or yes (1)
  Standby when power applied only
● **Sampling cycle** : 125 msec
● **Isolation** : Isolated except during CT input, input, system and DI

■ **Communication function (option)**
  Exclusive selection with analog output for SRS11A
● **Type of communication** : EIA standard RS-485
● **Communication system** : 2-line half duplex start-stop synchronization system
● **Communication speed** : 1200, 2400, 4800, 9600, 19200, 38400 bps
● **Data format** : Select from among 7E1, 7E2, 7N1, 7N2, 8E1, 8E2, 8N1, 8N2
● **Communication delay time** : 1~100 (x 0.512 msec)
● **Max. number of connections** : 32 including host
● **Communication address** : 1~255
● **Communication code** : ASCII, MODBUS RTU binary code only
● **Communication Protocol** : Shimaden standard protocol / MODBUS ASCII, RTU
● **Other** : Start character and BCC operating method can be selected.
● **Communication memory mode** : Select from among EEP, RAM and E_R
● **Communication mode types** : Select between COM1 and COM2
● **Communication master mode** : Can be used as master device when using multiple digit communication
  **Master control output scaling lower limit** : -1999~9989 (digit)
  **Master control output scaling higher limit** : lower limit+10~9999 (digit)
  **Start slave address setting** : Broadcast, 1~255
  **End slave address setting** : Start address ~ start address +30
  **Write-in data address setting** : 0000H~FFFFH
● **Communication distance** : Max. 500 m (differs according to conditions)
● **Isolation** : Isolation for all

■ **Analog output (option)**
  Exclusive selection with communication for SRS11A
● **Number of output points** : 1 point
● **Types of output** : Select from among measured value, target set values (execution SV), control output 1 and control output 2.
● **Output signal/rating** : 4~20 mA DC (max. load resistance 300Ω)
  0~10V DC (max. load current 2 mA)
  0~10mV DC (output resistance 10Ω)
● **Output scaling** : Within measuring range or output range
  Inversed scaling possible
● **Output limiter** : Lower limit 0.0~99.9%, higher limit 0.1~100.0%
  (Lower limit value less than higher limit value)
● **Output accuracy** : ±0.3%FS (for display value)
● **Output resolution** : Approx. 0.01% (1/10000)
● **Output updating cycle** : 0.25 seconds
● **Isolation** : No isolation with control output P, I and V

■ **General specifications**
● **Data storage** : Non-volatile memory (EEPROM)
● **Ambient conditions for operations**
  **Temperature** : -10~50°C
  **Humidity** : Max. 90%RH (no dew condensation)
  **Elevation** : Max. 2000 m above sea level
  **Overvoltage Category** : Ⅱ
  **Pollution class** : 2 (IEC60664)
● **Storage temperature** : -20~65°C
● **Supply voltage** : 100~240V AC±10%, 50/60Hz
  24V AC/DC±10% (Available only for SRS11A)
● **Power consumption** : SRS11A  Max. 11VA for 100~240V AC
  4W for 24V DC, 6VA for 24V AC
  SRS12A/13A/14A  Max. 14VA for 100~240V AC
● **Input/noise removal ratio** : Normal mode minimum 50dB (50/60 Hz)
● **Insulation resistance** : Between input/output terminals and power terminal
  Min. 500V DC, 20 MΩ
● **Dielectric strength** : Between input/output terminals and power terminal,
  2300V AC, 1 minute
  Between input and Y output, 2300V AC, 1 minute
  Between input and P·I·V output, 500V AC, 1 minute
● **Applicable standards**
  **Safety** : IEC61010-1 and EN61010-1
  EN IEC 61010-2-030
  **EMC** : EN61326-1
● **Construction (IP-rating)** : Only SRS12A conforms to IP66 Dust-proof and Drip-proof front panel (Panel thickness :1.2-3.2mm)
● **Material of case** : PC resin molding (equivalent of UL94V-0)
● **External dimensions**
  SRS11A : H48×W48×D66 mm (in panel 62mm)
  SRS12A : H72×W72×D69 mm (in panel 65mm)
  SRS13A : H96×W96×D69 mm (in panel 65mm)
  SRS14A : H96×W48×D66 mm (in panel 62mm)
● **Mounting** : Push-in panel (one-touch mount)
● **Panel thickness** : 1.0~3.5mm
● **Panel cutout**
  SRS11A : H45×W45 mm
  SRS12A : H68×W68 mm
  SRS13A : H92×W92 mm
  SRS14A : H92×W45 mm
● **Weight**
  SRS11A : Approx. 120 g
  SRS12A : Approx. 190 g
  SRS13A : Approx. 220 g
  SRS14A : Approx. 160 g

The contents of this manual are subject to change without notice.