

Preface

Thank you for purchasing Shimaden product. Before using this product, make sure that you read thoroughly the precautions on safety, installation site and wiring in order to use it safely and correctly. This manual contains the requisite minimum information. For parameter value, initial value, and other details, please refer to the Manual for Digital Controller SRS11A/12A/13A/14A Series. The Manual for Digital Controller SRS11A/12A/13A/14A Series, Programming Function Manual (optional) and Communication Manual (optional) may be downloaded free from the company website <http://www.shimaden.co.jp>.

Accessories 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 ensure nothing is missing or damaged.
- SRS10A digital controller: 1 unit
 - Instruction manual (A3 size paper × 2): 1 copy
 - Unit seals: 1 set
 - Terminal resistor for communication (optional): 1 pc.

Safety Precautions



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 this product for control purposes where failure could have a serious effect on human life. The manufacturer shall not be liable for accidents that result from use 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 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.

Consent on use

The warranty period for SRS10A Series is one year after the purchase. In principle, avoid use of the product under the following places/conditions. Should you use the controller under the following places/situations, be sure to use it with the proper rating and level of performance and make sure to use the controller correctly while taking appropriate safety measures in order to avoid accidents.

- Outside
- Places exposed to chemical contamination, electrical disturbance, and/or mechanical stress
- Places which are not specified as an appropriate installation site in the instruction manual or catalog
- When used for nuclear facilities, air facilities, space facilities, railway facilities, vehicle facilities, medical equipment, and facilities which are controlled by separate regulations
- Facilities in which failure of the product would constitute a danger to human life or property
- When used in application or facilities which require a high level of safety



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 from use without taking appropriate safety measures.

- Controller labels and alert mark Alert marks are printed on the terminal label of the case. **You could receive an electrical shock if you touch charged parts. The alert mark is provided to call your attention to this danger.**
- 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 access it easily and label it as an electrical breaker for the controller. Use a switch or breaker that conforms to requirements of IEC60947.
- Fuses
 - The controller does not have a built-in fuse. Be sure to mount a fuse on the power circuit connected to the power terminal. Provide a fuse between the switch or breaker and the controller. Mount on the L side of the power terminal. Fuse rating/characteristics: 250 V AC, 0.5 A/medium time-lagged type or time-lagged type
 - Use a fuse that conforms to requirements of IEC60127.
- Voltage/current of load connected to the output terminal and EV terminal should be within the rating. Using voltage/current that exceeds the rating could shorten the life of the controller by raising the temperature and could result in equipment failure. For rating, see "12. Specifications."
- 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."
- Do not allow the ventilation 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.
- 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 in any other way than 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.

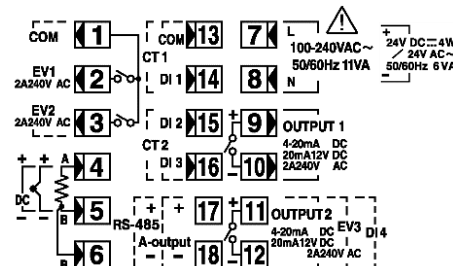
Wiring

Take the following precautions when wiring:

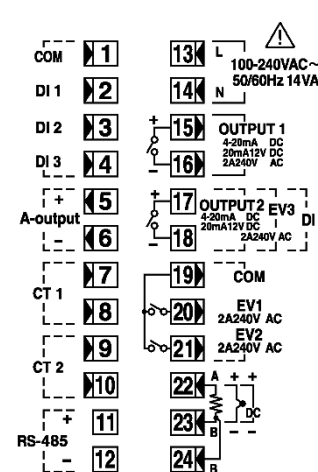
- Wire in accordance with the "terminal layout." After wiring, check and make sure the wiring is correct.
- Crimp-type terminals fit M3 screws. Use crimp-type terminals that are no wider than 6 mm.
- For thermocouple input, use a compensating lead wire that matches the type of thermocouple.
- For R.T.D. input, resistance for lead wires should be a maximum of 5Ω per wire. All 3 wires should have the same resistance.
- Input signal wires must not be accommodated with a strong electric circuit in the same conduit or duct.
- Using shielded wiring (single point grounding) is effective for static induction noise.
- Making input wiring short and twisting at regular intervals is effective for electromagnetic induction noise.
- For power supply, use wiring or cable with sectional area of at least 1 mm² that offers the same or higher performance as 600 V vinyl insulated wiring.
- Securely fasten the terminal element screw. Fastening torque: 0.5 N·m (5 kgf·cm)
- 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.
- Countermeasure against lightning surge will be required for signal line over 30m.

Terminal layout

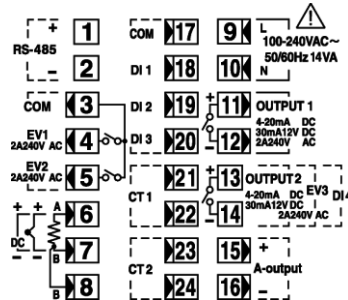
SRS11A



SRS13A/SRS14A



SRS12A



Installation site (environmental conditions)



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 strong vibration or impact
 - Places near strong electrical 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
- The controller is designed to be used under the following conditions. Observe the following environmental conditions:
- Indoor use
 - Max. elevation: 2,000 m
 - Ambient temperature: -10 to 50°C
 - Ambient humidity: Max. 90%RH, no condensation
 - Transient over voltage category: II
 - Pollution class: 2 (IEC 60664)

External dimensions and panel cutout

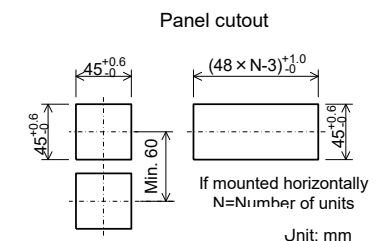
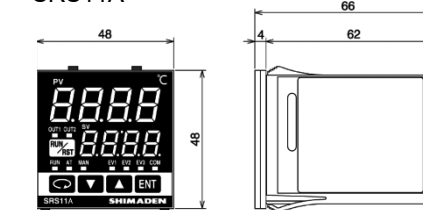


Caution

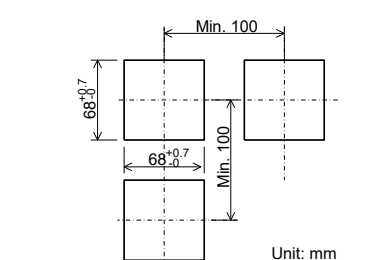
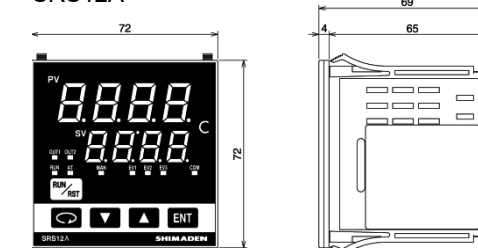
In order to maintain safety and function, do not remove the case from the controller. If the case of the controller has to be removed for replacement/repair, contact your nearest Shimaden agent.

- Cut a hole for mounting the controller in the panel by referring to external dimensions and panel cutout.
- The panel thickness should be 1.0–3.5 mm.
- The controller is provided with tabs for mounting. Insert as is from the front surface of the panel.
- SRS10A Series controllers are designed for mounting on a panel: Be sure to mount the controller on a suitable panel.
- 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.
- If mounted in series, provide ventilation so ambient temperature does not exceed 50°C due to temperature rise caused by heat generation.

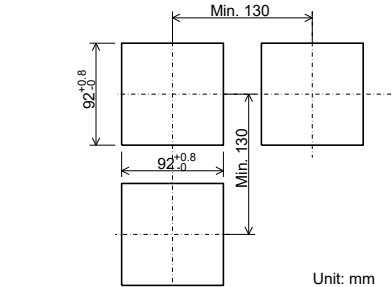
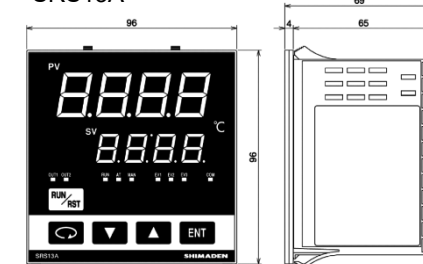
SRS11A



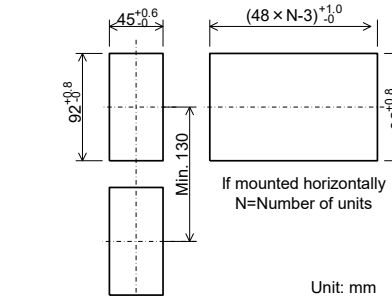
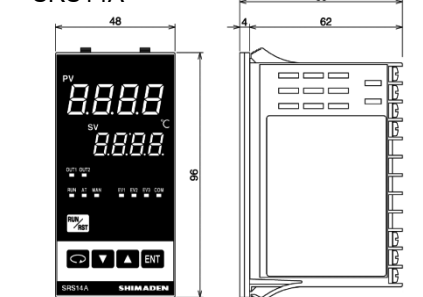
SRS12A



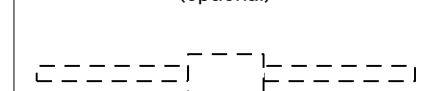
SRS13A



SRS14A



Terminal resistor for communication (optional)



Product specification code check

Compare the specification code on the case with the following to make sure it is the product you ordered.

CODE SELECTION TABLE

Item	Code	Specification
1. Series	SRS11A-	48×48 DIN size Digital Controller
2. Input	8	Universal-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 (optional)	N-	None
	Y-	Contact
	I-	Current
	P-	SSR drive voltage
	V-	Voltage
	E-	Event output 1 point (EV3)
5. Power supply	90-	100–240V AC±10% 50/60Hz
	08-	24V AC/DC ±10% 50/60Hz
6. Programming function (optional)	N	None
	P	With (max. 4 patterns, 32 steps)
7. Event output (optional)	0	None
	1	Event output 2 point (EV1, EV2)
8. Analog output/communication function (optional)	0	None
	3	0–10mV DC Output resistance: 10Ω
	4	4–20mA DC Load resistance: 300Ω or lower
	6	0–10V DC Load current: 2mA or lower
	5	RS-485*1
9. External input control signal (DI)/CT input (optional)	0	None
	1	CT input 2 points (CT sold separately)*2
	2	Control input 3 points (DI1, DI2, DI3)
10. Remarks	0	None
	9	With

*1 Shimaden protocol, MODBUS protocol

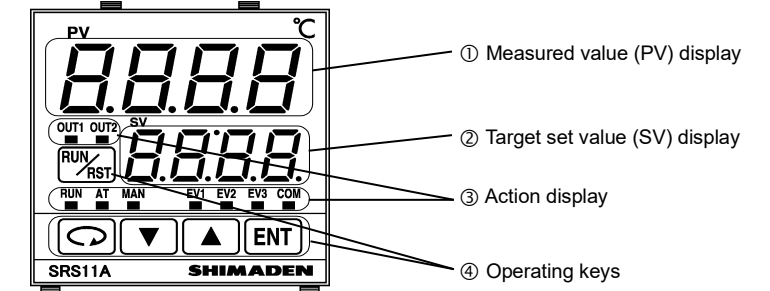
*2 Can be selected if control output 1 or 2 is Y, P.

Item	Code	Specification
1. Series	SRS12A-	72×72mm
	SRS13A-	96×96mm
	SRS14A-	96×48mm
2. Input	8	Universal-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 (optional)	N-	None
	Y-	Contact
	I-	Current
	P-	SSR drive voltage
	V-	Voltage
	E-	Event output 1 point (EV3)
5. Power supply	90-	100–240V AC±10% 50/60Hz
	08-	24V AC/DC ±10% 50/60Hz
6. Programming function (optional)	N	None
	P	With (max. 4 patterns, 32 steps)
7. Event output (optional)	0	None
	1	Event output 2 point (EV1, EV2)
8. Analog output (optional)	0	None
	3	0–10mV DC Output resistance: 10Ω
	4	4–20mA DC Load resistance: 300Ω or lower
	6	0–10V DC Load current: 2mA or lower
	5	RS-485*1
9. CT input (optional)	0	None
	1	CT input 2 points (CT sold separately)*2
10. External input control signal (optional)	0	None
	2	Control input 3 points (DI1, DI2, DI3)
11. Communication function (optional)	0	None
	5	RS-485*1
12. Remarks	0	None
	9	With

*1 Shimaden protocol, MODBUS protocol

*2 Can be selected if control output 1 or 2 is Y, P.

Names and functions of parts on front panel

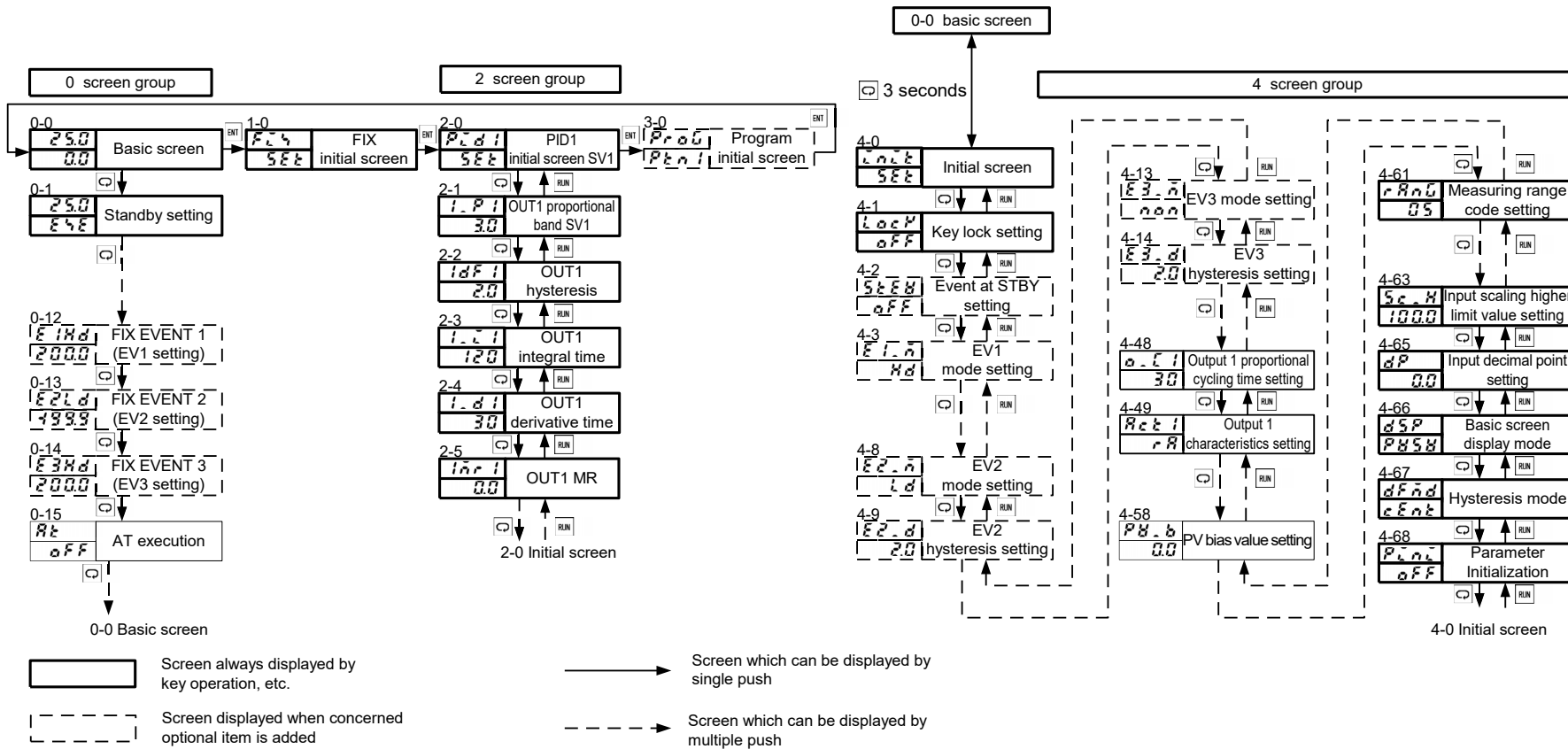


Name	Function
① Measured value (PV) display	(1) Measured value display LED (red) • Displays current measured value (PV) on basic screen (screen 0-0). • Displays type of parameter on each respective parameter display screen.
② Target set value (SV) display	(2) Target value display LED (green) • Displays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

Error message

Screen display	Problem	Cause	Remedy
HHHH (HHHH)	Higher limit scaleover	① Break in thermocouple input wiring ② Break in R.T.D. input A terminal wiring ③ Input measured value exceeded higher limit of measuring range by 10%.	① Check thermocouple input wiring for possible break. If there is nothing wrong with wiring, replace thermocouple. ② Check R.T.D. input A terminal wiring for possible break. If there is nothing wrong with wiring, replace R.T.D. ③ For voltage or current input, check the measurement signal transmission unit. Check if setting of measuring range code is correct for input signal.
LLLL (LLLL)	Lower limit scaleover	Measured input value fell below the lower limit of the measuring range by 10%.	Check for measurement input wiring for reverse polarity or possible break, etc.
b--- (b---)	Break in R.T.D. input wiring	① Break in B wiring 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.
EHH (CJHH)	Higher limit scaleover of cold junction (CJ) of thermocouple input	Ambient temperature has exceeded 80°C.	① Reduce ambient temperature to the level provided in the environment conditions for the product. ② If ambient temperature has not exceeded 80°C, inspect the controller.
ELL (CJLL)	Lower limit scaleover of cold junction (CJ) of thermocouple input	Ambient temperature has fallen below -20°C.	① Reduce ambient temperature to the level provided in the environment conditions for the product. ② If ambient temperature has not fallen below -20°C, inspect the controller.
HbHH (HbHH)	Heater current sensor CT input value has exceeded 55.0A.	Excessive current	① Reduce the current. ② Inspect the controller.
HbLL (HbLL)	Something is wrong with the instrument.	Something is wrong with the instrument.	Inspect, repair or replace the instrument.

Parameter Schematic Diagram



Measuring Range Codes

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
		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
		PL II	*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	0-100 °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
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	
JPt100	34		0.0-200.0 °C	0.0-400.0 °F	
	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	
Pt100	38		0.0-200.0 °C	0.0-400.0 °F	
	39		-100.0-350.0 °C	-150.0-650.0 °F	
	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	
	43		-199.9-500.0 °C	-300-1000 °F	
JPt100	44	0.0-350.0 °C	0.0-650.0 °F		
	45	0.0-500.0 °C	0-1000 °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 digit		
	0-10mV	72	Input scaling setting range: -1999-9999 digit		
	0-20mV	73	Span: 10-10,000 digit		
	0-50mV	74	Decimal point position: None, 1/2/3 digits following decimal point		
	10-50mV	75	Lower limit value is less than higher limit value.		
0-100mV	76				
Voltage	V	-1-1V	81	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 automatically changes to +10 digit or +10,000 digit. The higher limit value cannot be set less than the lower limit value +10 digit or higher than +10,000 digit. For current input, select input voltage, install the specified receiving impedance (250Ω) to input terminals, and use code 84 (0-20 mA) or 85 (4-20 mA).	
		0-1V	82		
		0-2V	83		
		0-5V	84		
		1-5V	85		
0-10V	86				

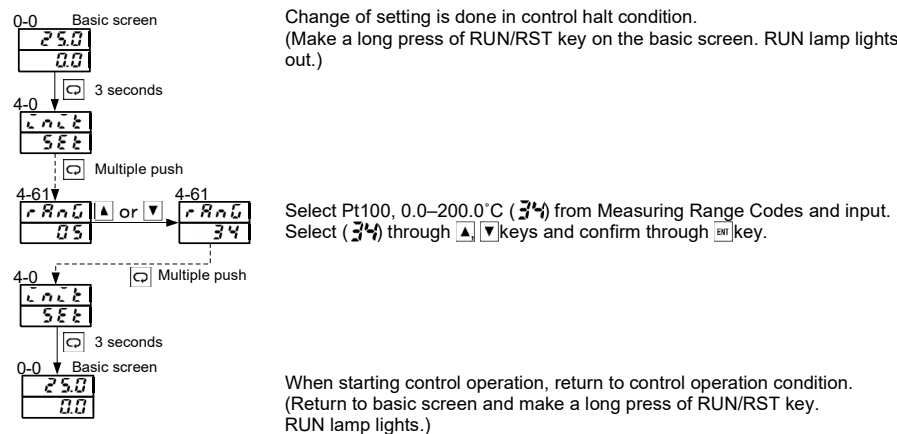
Setting of Various Parameters

Display the various parameters, select the desired value through Δ , ∇ keys and confirm through ENT key.

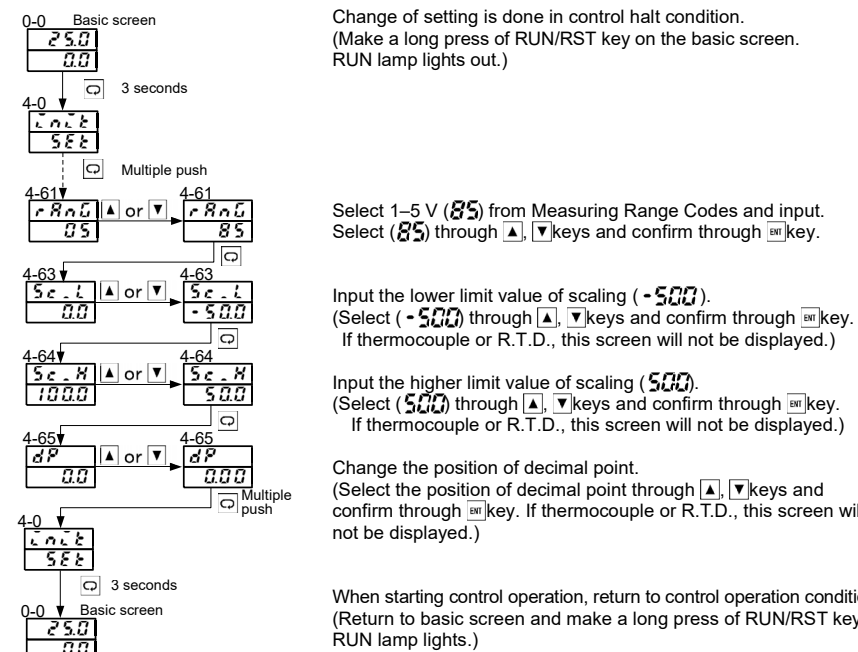
INPUT TYPE AND MEASURING RANGE SETTING

Input type and scaling are set according to the sensor connected to this equipment. By changing these parameters, registered data are initialized.

Example 1) When input is Pt100, 0.0-200.0°C:



Example 2) When input is 1-5 V DC, and scaling is -5.00-5.00:

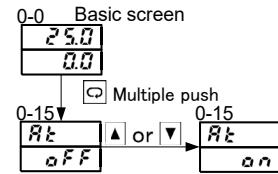


Operation Mode Setting

This shows the setting method of operation mode, the PID Control and ON/OFF (2-positions) Control.

PID CONTROL MODE

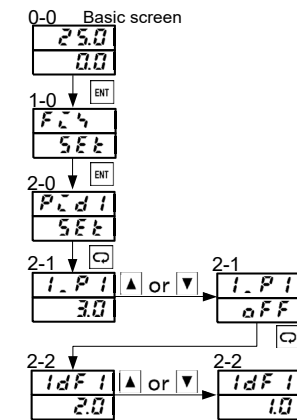
When shipped from our factory, PID control mode is set.
Execute auto-tuning (automatic PID calculation) according to the following procedures.



While in AT execution, AT lamp lights and system operation is actually executed. Execute under the condition that all systems are operable.
When AT lamp lights out, it is a sign that AT has ended. After AT ends, P/I/D/MR parameter is overwritten with the appropriate value.

ON/OFF (2-POSITION) CONTROL MODE

In switching to ON/OFF control mode, please set proportional band (P) to OFF.



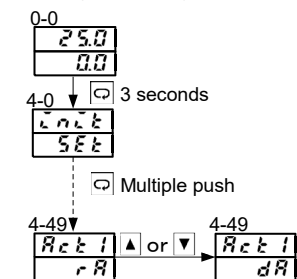
Set to OFF proportional band that corresponds to SV No.
(Select OFF through \downarrow key and confirm through ENT key.)

Set "hysteresis" while on ON-OFF operation.
(Select "hysteresis" through \uparrow , \downarrow keys and confirm through ENT key.)

OUTPUT CHARACTERISTICS SWITCHING

This shows the switching setting method of control output characteristics.

Example) In switching control output from heating to cooling characteristics.



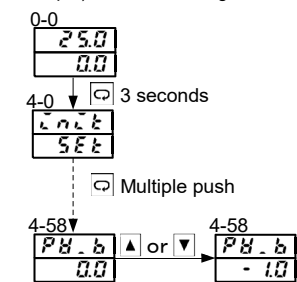
◆ Characteristics Code
Heating (humidification) characteristics: **rR**
Cooling (dehumidification) characteristics: **dR**

Changing control output characteristics from heating to cooling.
(Select **dR** through \uparrow , \downarrow keys and confirm through ENT key.)

PRESENT VALUE (PV) CORRECTION

This shows the correction method of measured value (PV).

Example) When correcting error due to a temperature sensor error of +1.0°C through this equipment's function.



On the PV bias value setting screen, subtraction correction is made by +1.0°C.
(Select **-1.0** by \uparrow , \downarrow keys and confirm by ENT key.)

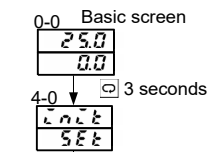
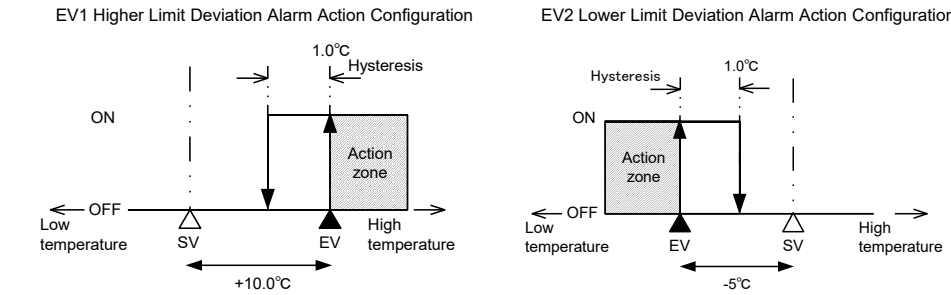
Event Output Setting

This shows Event Action Mode Setting and Action Position Setting Method.

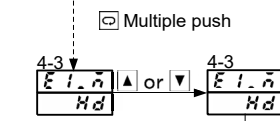
Before setting Event Action Position, first set Event Action Mode.

By changing Event Action Mode, registered data related to the event are initialized.

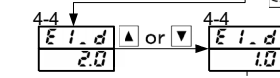
Example) When measured value (PV) is set at target value (SV) +10.0°C for Event Output 1 (EV1), -5°C for Event Output 2 (EV2) and operated at hysteresis 1.0°C.



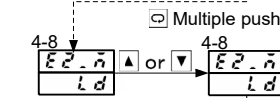
◆ Event Action Mode
Refer to Alarm Action Configuration and Event Type Codes



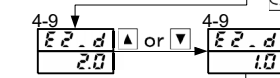
Set Action Mode Of Event Output 1 (EV1) to higher limit deviation alarm (**Hd**).
(Select **Hd** through \uparrow , \downarrow keys and confirm through ENT key.)



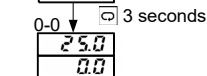
Set hysteresis of Event Output 1 ON position and OFF position.
(Select **1.0** through \uparrow , \downarrow keys and confirm through ENT key.)



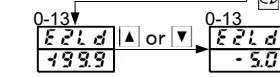
Set Event 2 (EV2) Action Mode to lower deviation alarm (**Ld**).
(Select **Ld** through \uparrow , \downarrow keys and confirm through ENT key.)



Set hysteresis of Event Output 2 ON position and OFF position.
(Select **1.0** through \uparrow , \downarrow keys and confirm through ENT key.)



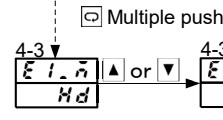
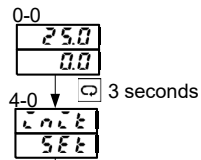
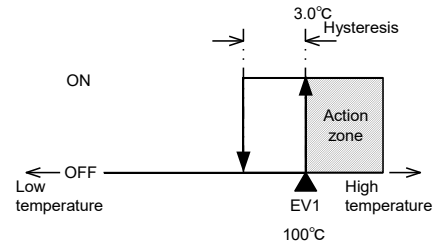
Set Event Output 1 Action Point at target value (SV) +10.0°C.
(Select **10.0** through \uparrow , \downarrow keys and confirm through ENT key.)



Set Event Output 2 Action Point at target value (SV) -5.0°C.
(Select **-5.0** through \uparrow , \downarrow keys and confirm through ENT key.)

Example) When operating Event Output 1 at hysteresis 3.0°C if measured value (PV) exceeds 100.0°C:

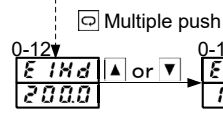
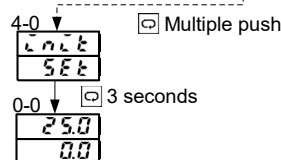
EV1 Higher Limit Absolute Value Alarm Configuration



Set Action Mode of Event Output 1 (EV1) to higher limit absolute value (**HA**).
(Select **HA** through \uparrow , \downarrow keys and confirm through ENT key.)



Set hysteresis of ON position and OFF position of Event Output 1.
(Select **3.0** through \uparrow , \downarrow keys and confirm through ENT key.)



Set action point of Event Output 1 at 100.0°C.
(Select **100.0** through \uparrow , \downarrow keys and confirm through ENT key.)

EVENT TYPE CODE (USE IN 4-3 SCREEN, 4-8 SCREEN AND 4-13 SCREEN)

Code	Types of event	Remarks
non (non)	No selection	
Hd (Hd)	Higher limit deviation	EV1 initial values
Ld (Ld)	Lower limit deviation	EV2 initial values
od (od)	Outside higher/lower limit deviation	
id (id)	Inside higher/lower limit deviation	
HA (HA)	Higher limit absolute value	
LA (LA)	Lower limit absolute value	
So (So)	Scaleover	
EXE (EXE)	EXE signal (fixed value control being executed)	Only for fixed value control
run (run)	RUN signal (program being executed)	Only for program control
rot1 (rot1)	Output 1 inverted output	Only for contact output
HC1 (HC1)	Heater 1 break/loop alarm	Only when optionally equipped
HC2 (HC2)	Heater 2 break/loop alarm	Only when optionally equipped
StPS (StPS)	Step signal	Only for program control
PtnS (PtnS)	Pattern signal	Only for program control
EndS (EndS)	Program end signal	Only for program control
Hold (HoLd)	Hold signal	Only for program control
ProG (ProG)	Program signal	Only for program control
u_SL (u_SL)	Up slope signal	Only for program control
d_SL (d_SL)	Down slope signal	Only for program control
GUA (GUA)	Guarantee soak	Only for program control