

## Digital Indicator SD17 Series Instruction manual (Basic version)



Please ensure that this instruction manual is given to the final user of the instrument.

## 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 Digital Indicator SD17 Manual (Detailed Version).

The Digital Indicator SD17 Series Instruction Manual (Detailed Version) 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

and make sure you have all the accessories to ensure nothing is missing or damaged.

- |  |          |         |
|--|----------|---------|
| • SD17 digital indicator-----                                  | code/app | 1 unit  |
| • Instruction manual (Basic Version)(A3 & A4 size paper x 1) - |          | 1 copy  |
| • Unit label seal-----   |          | 1 sheet |
| • Terminal resistor  |          |         |
| (When selecting Communication option RS-485)-----              |          | 1 pc.   |

## Safety Cautions



### WARNING

- The SD17 Series digital indicator are designed for industrial use to control temperature, humidity and other physical values. Do not apply this instrument to other objects in a way that may cause grave effects on human safety.
- In using this product, be certain to house it, for example, in a control panel, so that the terminals cannot come into contact with personnel.
- Do not take this instrument out of its case or put your hand or any conductor inside the case. Such conduct may lead to an accident that endangers life or causes serious injury due to electric shock.

## Consent on use

The warranty period for SD17 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.
- 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.
- 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.
- 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.
- Voltage/current of load connected to the output terminal and EV terminal should be within the rating. Using voltage/current that exceeds the rating could shorten the life of the controller by raising the temperature and could result in equipment failure. For rating, see "11. Specifications."
- The unit connected to the output terminal should conform to the requirements of IEC61010-1.
- Do not apply over-rated voltage or current to the input terminal. That will cause the risk of the instrument being damaged and its life reduced.
  - As for the rating, please refer to "11. Specification."
  - In case the input type is voltage (mV or V) or current (4 - 20mA), the unit connected to the output terminal should conform to the requirements of IEC61010-1.
- Take care to prevent metal or other foreign matter from obstructing the ventilating hole for heat radiation. It will cause damage to the instrument and may even result in fire.
- Do not block the ventilating hole. Also avoid dust accumulation. Any rise in temperature or insulation failure may result in a risk of the instrument being damaged and its life reduced. As for the clearance space for installing the instrument, refer to " External dimensions and panel cutout."
- Repeating withstanding tests on voltage, noise, surging may lead to the deterioration of the instrument, so please be careful.
- Strictly refrain from remodeling and using the instrument improperly.
- It takes 30 minutes to display the correct temperature after applying power to the digital Indicator. (Therefore, turn the power on more than 30 minutes prior to the operation.)

## Introduction

### ■ Check before use

Although the instrument passes through quality checks before shipment, when the instrument is delivered, please confirm the type code number, check the external conditions and the list of accessories to make sure that there is no apparent damage or discrepancy.

Item	Code	Specifications	
1.Series	SD17-	48 x 96 DIN size Digital Indicator	
2.Input (Note 1)	8	Universal-input • Thermocouple • R.T.D (Pt100, Jpt100) • Voltage (input impedance 500K $\Omega$ min.) 0 – 10mV DC 0 – 5, 1 – 5, 0 – 10 V DC	Refer to “Measuring range code table” for details. In case voltage input, scaling/reverse scaling is available. (Note 2)
	4	Current 4 – 20mA DC An external receiving resistor is provided.	
3.Power supply	90-	100 – 240V AC $\pm$ 10% (50/60Hz)	
	08-	24V AC (50/60Hz) / DC $\pm$ 10%	
4.Alarm output (option)	0	Without	
	1	Separate setting / separate output 2-point (a-contact, “COM” used commonly) Contact rating 240V AC 1.5A/resistive load	
5.Analog output or sensor power supply (option) (Note 3)	0	Without	
	3	0 – 10mV DC Output resistance 10 $\Omega$	
	4	4 – 20mA DC Load resistance 300 $\Omega$ max.	
	6	0 – 10V DC Load current 1mA max.	
	8	Sensor power supply 24V $\pm$ 3V DC 25mAmax.	
6.Communication function (option)	0	Without	
	5	RS-485: Shimaden standard protocol / MODBUS	
	7	RS-232C: Shimaden standard protocol / MODBUS	
7.Display (11–segment LED)	0	11–segment red LED	Alarm action: display blinking
	1	11–segment red and white LED's	Alarm action: display color switching and / or display blinking
8.Remarks	0	Without	
	9	with	


**Note 1** The instrument supports full universal input; however please select one of two codes, as an external receiving resistor (250 $\Omega$ ) is supplied for current input. If no external receiving resistor is required, select code 8.

**Note 2** Scaling range: -1999 – 9999 digit  
Span: 10 – 10000 digit

**Note 3** When the 08 power supply code (24V AC/DC) is selected, the sensor power supply cannot be selected.

## Installation and wiring

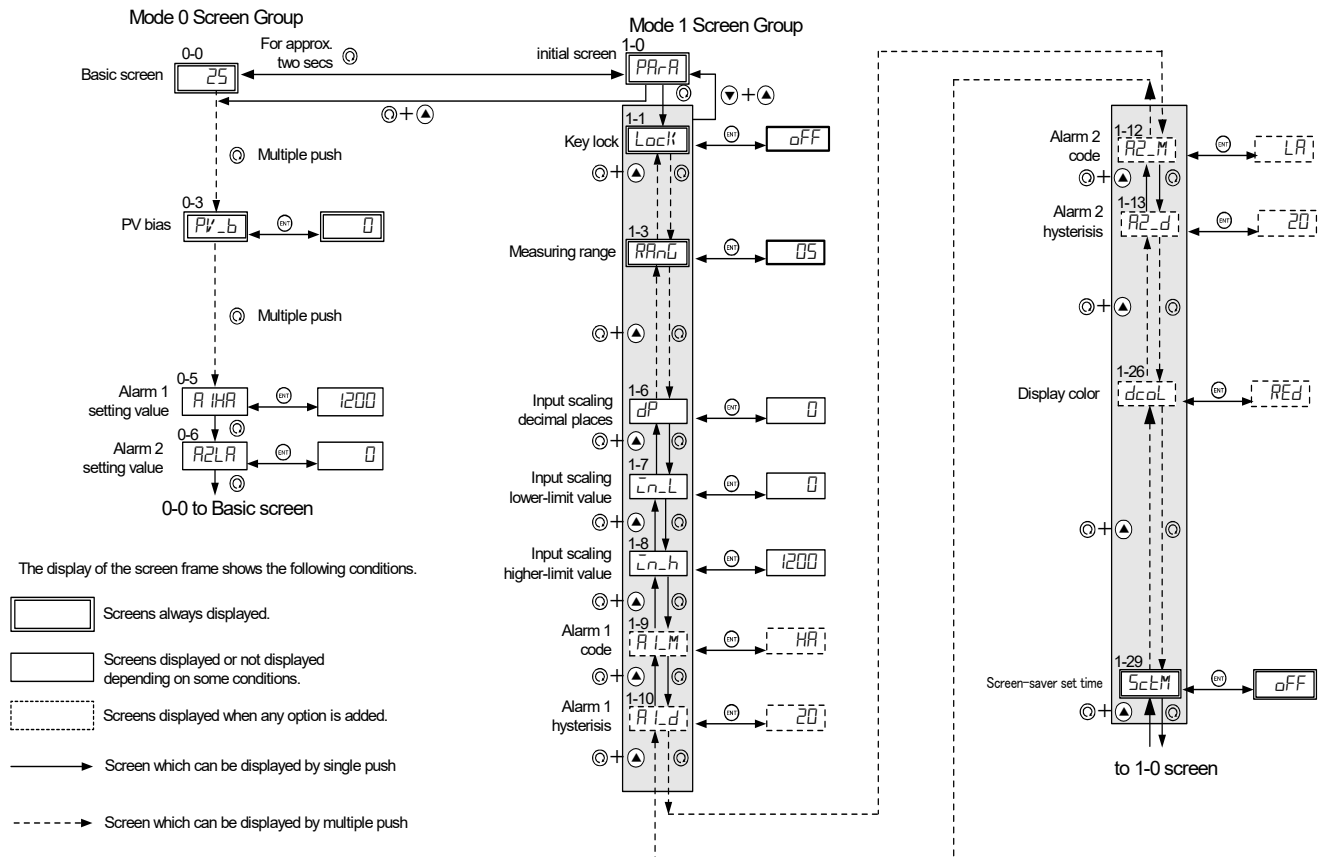
### ■ Installation site (environmental conditions)

 CAUTION
Do not install the instrument in such environmental conditions as those listed below. Otherwise, damage may be caused to the instrument, even resulting in fire.
<ul style="list-style-type: none"> <li>● Flammable or corrosive gas, oil soot or dust that deteriorates the insulation is generated or abundant.</li> <li>● Ambient temperature is below.</li> <li>● Ambient humidity is higher than 90% RH, or below dew point.</li> <li>● Strong vibrations or impacts are generated or transferred.</li> <li>● High-voltage power lines exist in the neighborhood, or induction interference.</li> <li>● Exposure to direct sunlight or dew drops.</li> <li>● The elevation is above 2000m.</li> <li>● The environmental conditions fall under transient over voltage category II of IEC 60664, and the pollution degree is "2".</li> <li>● Cut a fitting hole by referring to the panel cutout dimensions in section 2-3. The applicable thickness of the panel is 1.0 – 4.0mm.</li> <li>● As the SD17 is a panel installation type indicator, use it by mounting on a panel.</li> </ul>

## Parameter schematic diagram

Please download the Instruction Manual (Detailed Version) from our website to refer to all except for following setting.

- Input range, Measuring range setting
- Alarm output setting
- PV bias setting



### Measuring range code table

Input type	code	Measuring range (°C)	Measuring range (°F)	Note		
Universal Input (Note 1)	Thermocouple	B	0 - 1800	0 - 3300	Note 2	
		R	0 - 1700	0 - 3100		
		S	0 - 1700	0 - 3100		
		K	04	-199.9 - 800.0	-300 - 1500	
			05	0 - 1200	0 - 2200	
		E	0 - 700	0 - 1300		
		J	0 - 600	0 - 1100		
		T	-199.9 - 300.0	-300 - 600	Note 3	
		N	0 - 1300	0 - 2300		
		U	-199.9 - 300.0	-300 - 600	Note 3	
		L	0 - 600	0 - 1100		
		C(WRe5-26)	0 - 2300	0 - 4200		
R.T.D	Pt	31	-199.9 - 600.0	-300 - 1100	Note 4	
		32	-100.0 - 100.0	-150.0 - 200.0		
	JPt	33	-199.9 - 500.0	-300 - 1000	Note 4	
		34	-100.0 - 100.0	-150.0 - 200.0		
Voltage	0 - 10mV	71	0.0 - 100.0 Scaling available Scaling range:-1999 - 9999 digit Span:10 - 10000 digit			
	0 - 5V	81				
	1 - 5V	82				
	0 - 10V	83				
Current	4 - 20mA	95				

**Note 1** In case universal input type is selected, K (Code 05, 0 - 1200°C) is set at factory default.

**Note 2** The accuracy of 400°C or below 752°F of thermocouple B is not guaranteed.

**Note 3** The accuracy of thermocouple T or U is  $\pm(0.5\%FS+1\text{digit})$  at above -100°C and 0°C or below, and  $\pm(1\%FS+1\text{digit})$  at -100°C or below.

**Note 4** In case of Pt (Code 31) or JPt (Code 33), scale over occurs at -240.0°C (-400°F)

### Alarm output code table

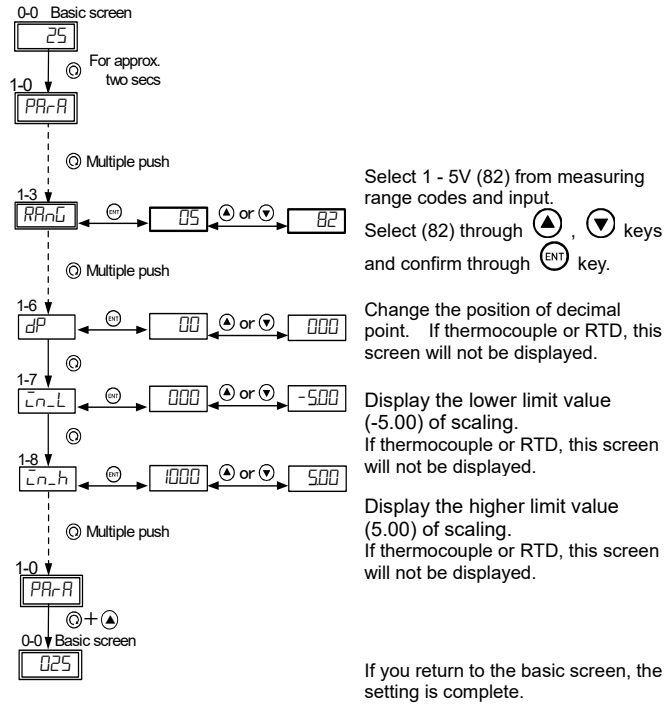
<b>Non</b> (Non)	None
<b>HA</b> (HA)	Higher-limit absolute value
<b>LA</b> (LA)	Lower-limit absolute value
<b>HA_L</b> (HA_L)	Higher-limit absolute value (with latching)
<b>LA_L</b> (LA_L)	Lower-limit absolute value (with latching)
<b>So</b> (So)	Scale over

## Setting of various parameters

### ◆ Input range, Measuring range setting

Input type and scaling are set according to the sensor connected to this equipment.

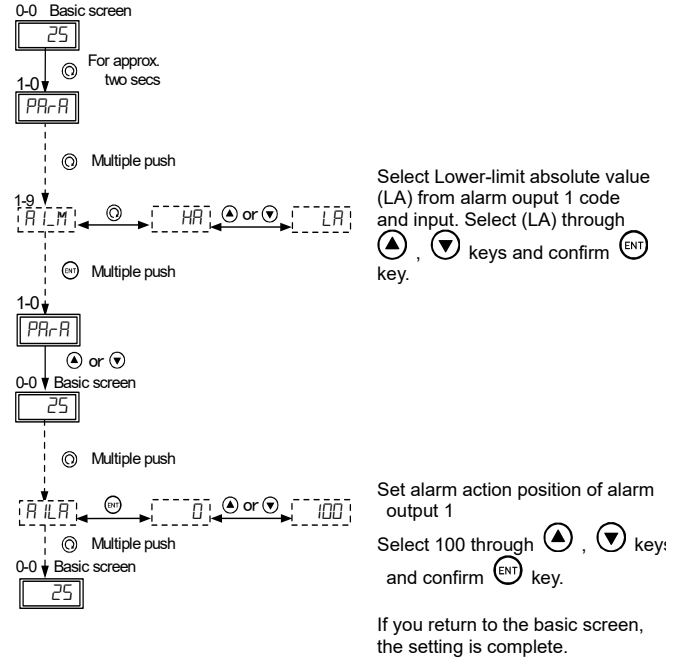
Example) When input is 1 to 5V, and scaling is -5.00 to 5.00



### ◆ Alarm output setting

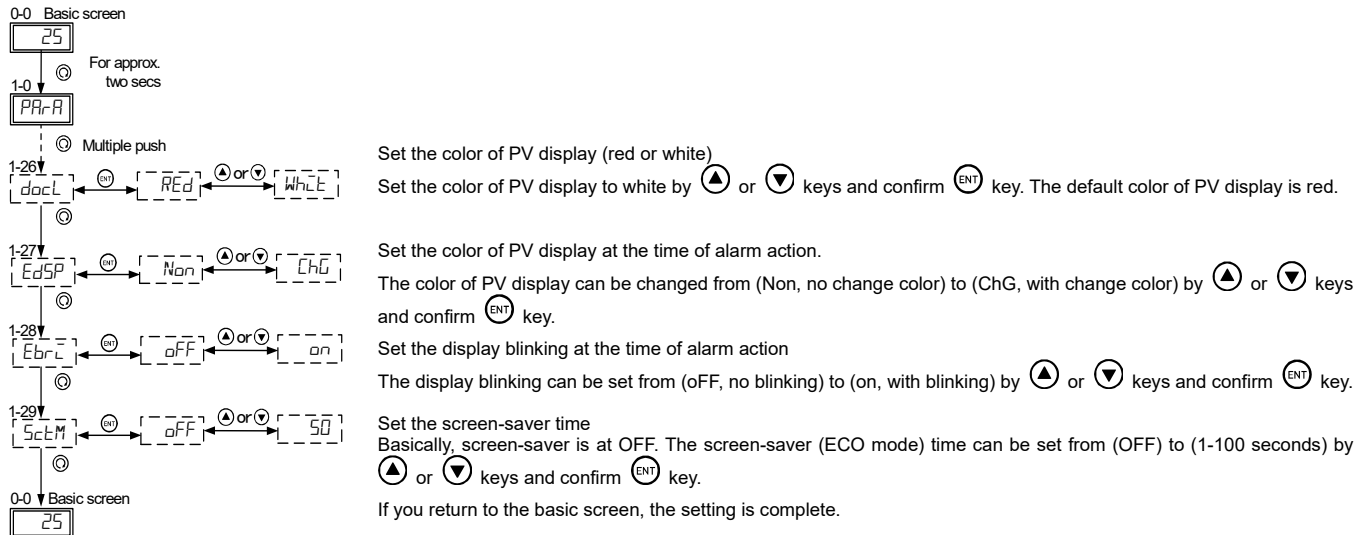
This shows alarm action mode setting and action position setting method.

Example) When alarm output 1 operate the lower-limit alarm at below 100C



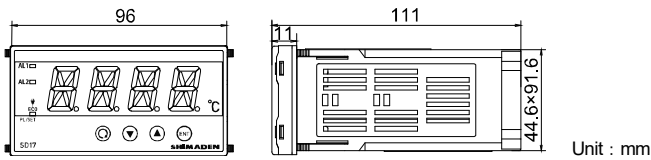
### ◆ Display setting

This shows the color of PV display, the color of PV display change, the display blink setting and screen-saver setting method.

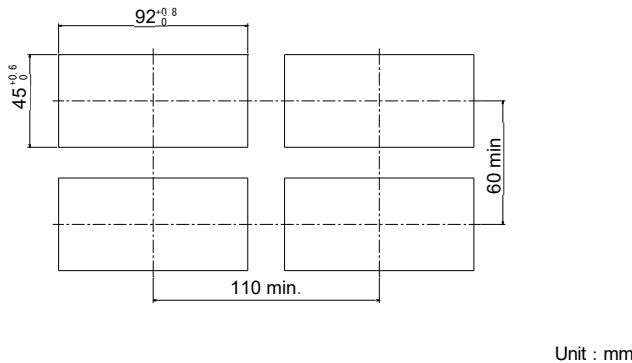


Terminal resistor  
 (When selecting communication option RS-485)

### External dimensions



### Panel cutout

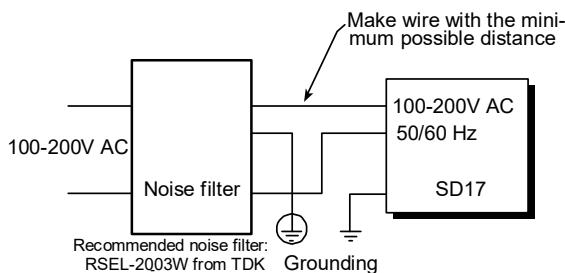


### Wiring

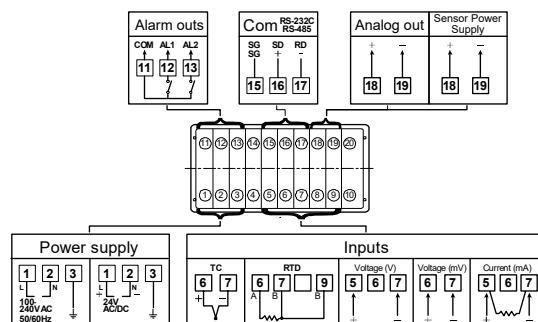
**WARNING**

- When wiring the unit, be sure to cut the power supply OFF, or there will be a risk of electric shock.
- Make sure the protective conductor terminal (⊕) is grounded. Otherwise, a serious electric shock may result.
- After completing the wiring, do not touch the terminals and electrically charged parts while the power is ON.

- Make wiring according to the layout in " Terminal arrangement."
- Use ring tongue terminals of 7mm or narrower width to meet M3.5 screws.
- In case of thermocouple input, use a compensation wire with the type of thermocouple selected. The external resistance should be 100Ω or less.
- In case of R.T.D. input, the resistance value per lead wire should be 5Ω or less, and all three wires should have the same resistance value.
- Avoid arranging the input signal line to pass through the same conduit or duct with high-voltage power lines.
- The shield wire (one-point grounding) is effective to eliminate electrostatic induction noises.
- An effective way to eliminate the magnetic induction noises is to twist the input wire in short and equal intervals.
- For the source power connection, use a wire or cable having a cross-section of 1mm<sup>2</sup> or larger, and a performance capacity equivalent to 600V vinyl insulation wire.
- The grounding wire should have a cross-section of 2mm<sup>2</sup> or larger, and the grounding work should ensure a ground resistance of 100Ω or less.
- The symbol ⊕ expresses the functional earth terminal. Please connect it to the ground as much as possible to avoid the adverse impact from noise.
- Screw the terminal connection securely. Tightening torque 1.1 Nm (11kgf cm)
- Noise filter  
In case the instruments are affected by the power supply noise, install a noise filter to avoid operational errors. Mount the noise filter on the grounded panel and connect the noise filter output and the power supply terminal of the indicator with the minimum possible distance.

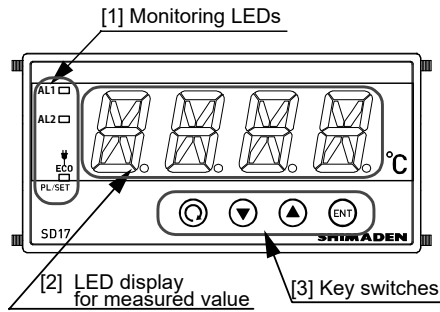


### Terminal arrangement



## Names and functions for front panel

### Names



### Functions

#### [1] Monitoring LEDs

- AL1 (Alarm 1) output monitoring LED (red)  
The LED lights when the assigned alarm is ON.
- AL2 (Alarm 2) output monitoring LED (red)  
The LED lights when the assigned alarm is ON.
- PL/SET (parameter setting) monitoring LED (green)  
The LED lights when the screen displayed is not the basic screen (0-0)  
The LED lights blink when it is the screen-saver feature.

#### [2] LED display for measured value (red,white(option))

- The current PV value is displayed on the basic screen (0-0).
- The type of parameters is displayed on each parameter display screen.
- The set value is displayed on each parameter setting screen.

#### [3] Key switches

	<b>Parameter key</b> <ul style="list-style-type: none"> <li>● On a display screen, shifts the screen to the next.</li> <li>● Switches from Mode 0 screen group/Mode 1 screen group to Mode 1 screen group/Mode 0 screen group. By pressing this key for two seconds or longer on screen 0-0 or screen 1-0, shifts to the screen 1-0 or to the screen 0-0 respectively.</li> </ul>
	<b>Down key</b> On a setting screen, decrements the value. The last digit decimal point blinks until the value is registered by pressing the Entry key.
	<b>Up key</b> On a setting screen, increments the value. The last digit decimal point blinks until the value is registered by pressing the Entry key.
	<b>Entry key</b> <ul style="list-style-type: none"> <li>● On a setting screen, registers the value that is modified by the Up/Down key. The last digit of the decimal point blinks until this registration by pressing the Entry key.</li> <li>● Shifts between a display screen and the setting screen. In this case, the light of the last digit of decimal point goes out.</li> </ul>

## Error messages

One of the following error messages is displayed on the basic screen (0-0):

HHHH	When the thermocouple or A of R.T.D. is burnt out. Also indicated when the PV value exceeds the higher-limit of the measuring range by about 10%.
LLLL	When the B of R.T.D. (terminal No.7) is burnt out. When the PV value is below the lower-limit of the measuring range by about 10%, for such a reason as the reverse polarity of the input wiring type.
b---	When the B of the R.T.D. (terminal No.9) is burnt out, or two or more wires of A, B, B are broken.
[JHH	When the cold junction (CJ) is abnormal on the higher side in the thermocouple input.
[JLL	When the cold junction (CJ) is abnormal on the lower side in the thermocouple input.

The contents of this manual are subject to change without notice.  
Temperature and Humidity Control Specialists

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