Digital Position-Proportional Controllers
E5EZ-PRR

A position proportional control model for the E5□Z-PRR series

- Just 78mm depth
- All types of input: temperature input type, analog (current, voltage) input type
- Makes use of high-visibility LCD, with three lines of 4-digit display, for simplicity and clarity
- 3 lines of display to observe PV/ SV/ MV (percentage of valve's opening), clearly displaying the state of control (operations)
- Event input enables the selection of multi configurations as well as a start/ stop function
- Alarm delay function
- Communications function
- Able to choose floating control or closed control. In floating control, position proportional control can be realized without a potentiometer
- Equipped with a manual output function (equipped with an automatic/ manual key)

48×96×78 (W×H×D)

⚠ Refer to the "Safety Precautions" on page 52.

Model Number Structure

■ Model Number Legend

E5EZ - PRR2□□
1 2 3 4 5 6

1. Control method
P: Valve control

2. Control output 1
R: Relay (OPEN)

3. Control output 2
R: Relay (CLOSE)

4. Alarm output
2: 2 alarm outputs

5. Option

Blanks:	Not available
01:	RS-232C
03:	RS-485
B:	2 event inputs

6. Input Type
T: Temperature
L: Analog input (current, voltage)

Ordering Information

Size	Power Supply Voltage	Input Type	Control Method	Number of alarm points	Communication Function	Event Input	Model
1/8DIN 48×96×78 (W×H×D)	100 to 240 VAC	Temperature Input Type	Valve Control	2	None	None	E5EZ-PRR2T
						2 points	E5EZ-PRR2BT
					RS-232C	None	E5EZ-PRR201T
					RS-485		E5EZ-PRR203T
		Analog (Current, Voltage) Input Type			None	None	E5EZ-PRR2L
						2 points	E5EZ-PRR2BL
					RS-232C	None	E5EZ-PRR201L
					RS-485		E5EZ-PRR203L

■ Accessories (Order Separately)

Unit Label

Model	Y92S-L1

■ Input Range

• Thermocouples / Platinum Resistance Thermometer

Input Type	Platinum resistance thermometer					Thermocouple												ES1B Infrared temperature sensor				Analog input
Name	Pt100			JPt100		K		J		T		E	L	U		N	R	S	B	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C	0 to 50mV
Temperature range (°C)	850 / -200	500.0 / -199.9	100.0 / 0.0	500.0 / -199.9	100.0 / 0.0	1300 / -200	500.0 / -20.0	850 / -100	400.0 / -20.0	400 / -200	400.0 / -199.9	600 / 0	850 / -100	400 / -200	400.0 / -199.9	1300 / -200	1700 / 0	1700 / 0	1800 / 400	70 / 10	120 / 60	165 / 115	260 / 140	Usable in the following ranges by scaling: -1999 to 9999 or -199.9 to 999.9
Setting number	0	1	2	3	4	5	6	7	8	9	22	10	11	12	23	13	14	15	16	17	18	19	20	21

The applicable standards for input types are as follows.

K:GB/T2814-98 R:GB/T1598-98

J,L:GB/T4994-98 S:GB/T3772-98

T,U:GB/T2903-98 B:GB/T2902-99

E:GB/T4993-98 JPt100,Pt100:GB/T5977-99

N:GB/T17615-98

Shaded settings are the default settings.

• Models with Analog Inputs

Parameters	Current [mA]		Voltage [V]		
	4 to 20	0 to 20	1 to 5	0 to 5	0 to 10
Setting number	0	1	2	3	4
Minimum Set Unit (Target Value, Alarm)	(Scanning, according to the location of the decimal point)				

indicates factory settings.

■ Optional Functions

Type	Performance
RS-232C	Communications' Baud Rate: 1200/2400/4800/9600/19200bps
RS-485	Communications' Baud Rate: 1200/2400/4800/9600/19200bps
Event Input	ON: Maximum of 1KΩ OFF: Minimum of 100KΩ

Specifications

■ Ratings

Power supply voltage		100 to 240VAC, 50/60Hz
Operating voltage range		85% to 110% of the designated source voltage
Power consumption		10VA (10W)
Sensor input		Temperature input type Thermocouple: K, J, T, E, L, U, N, R, S,B Platinum Resistance Thermometer: Pt100,JPt100 Infrared temperature sensor: 10 to 70°C, 60 to 120°C, 115 to 165°C, 140 to 260°C Analog signal input: 0 to 50mV Analog (current, voltage) input type Current input: 4 to 20mA,0 to 20mA Voltage input: 1 to 5V, 0 to 5V, 0 to 10V
Control output	**Relay output (OUT1,OUT2)**	SPST-NO,250VAC 1A (including start-up currents) electrical life: 100,000 operations, minimum applicable load: 5V 10mA
Potentiometer input		100Ω to 2.5KΩ
Alarm output		SPST-NO,250VAC 2A (resistive load) electrical life: 100,000 operations, minimum applicable load: 1V, 1mA.
Event input	**Contact input**	ON: 1kΩ max., OFF: 100 kΩ min.
	Non-contact input	ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max.
		Outflow current: Approx. 7 mA per point
Control method		2-PID control
Setting method		Digital setting using front panel keys
Indication method		7-segment digital display and individual indicators Character height: PV: 9mm; SV: 7mm; MV: 6.8mm
Other functions		According to controller model
Ambient operating temperature		-10 to 55°C (with no icing or condensation)
Ambient operating humidity		25% to 85%
Storage temperature		-25 to 65°C (with no icing or condensation)

■ Communications Specifications

Transmission path connection	RS-485: Multiple points RS-232C: Point-to-point
Communications method (see note 1)	RS-485 (two-wire, half duplex)/RS-232C
Synchronization method	Start-stop synchronization
Baud rate	1,200/2,400/4,800/9,600/19,200bps
Transmission code	ASCII
Data bit length (see note 2)	7 or 8 bits
Stop bit length (see note 2)	1 or 2 bits
Error detection	Vertical parity (none, even, odd) Block check character (BCC)
Flow control	Not available
Interface	RS-485/RS-232C
Retry function	Not available

Specifications

■ Characteristics

Indication accuracy	Thermocouple: (displayed value ±0.5 % or ±1°C, whichever is largest) ±1 digit max. (see note 1) Platinum Resistance Thermometer: (displayed value ±0.5 % or ±1°C, whichever is largest) ±1 digit max. Analog Input: ±0.5% FS ±1 digit max. Potentiometer Input: ±5% FS ±1 digit max.		
Influence of temperature (See note 2.) **Influence of voltage (See note 2.)**	R, S, and B thermocouple inputs: (±1% of PV or ±10°C, whichever is greater) ±1 digit max. Other thermocouple inputs: (±1% of PV or ±4°C, whichever is greater) ±1 digit max. *±10°C for -100°C or less for K sensors Platinum resistance thermometer inputs: (±1% of PV or ±2°C, whichever is greater) ±1 digit max. Analog inputs: (±1% of FS) ±1 digit max.		
Proportional band (P)	0.1 to 999.9°C (unit: 0.1 EU)		
Integral time (I)	0 to 3999 s (in units of 1s) With floating control, 1 to 3999 s		
Derivative time (D)	0 to 3999 s (in units of 1s)		
Control period	1 to 99 s (in units of 1s)		
Manual reset value	-10.0% to 110.0% (in units of 0.1%)		
Alarm settings range	-1999 to 9999 (decimal point position depends on input type)		
Sampling period	500 ms		
Insulation resistance	20MΩ min, 2 seconds (500 VDC)		
Dielectric strength	2000VAC,50 or 60Hz for 1min (at different stages of charging)		
Vibration resistance (Error)	10 to 55Hz, 20m/s² for 10min each in X,Y, and Z directions		
Shock resistance (Error)	100m/s²,3 times each in 3		
Weight	Controller : Approx. 260g		
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000 operations)		
EMC	Emission enclosure:	EN55011(GB/T 6113.1,2)	1 group, type A
	Emission AC mains:	EN55011(GB/T 6113.1,2)	1 group, type A (see note 2)
	Immunity ESD:	IEC61000-4-2(GB/T 17626.2)	4kV contact discharge (series 2) 6kV air discharge (series 3)
	Immunity RF interference:	IEC61000-4-3(GB/T 17626.3):	10V/m, 80MHz-1GHz (series)
	Immunity-conducted disturbance:	EC61000-4-6(GB/T 17626.6):	3V(0.15-80MHz) (series 3)
	Surges (shocks):	IEC61000-4-5(GB/T 17626.5):	2kV power supply line (series 3) 1kV I/O signal line (series 4)
Pending standards	UL61010C-1,CSA C22.2 No.1010.1 meets the requirements of EN61326,EN61010-1(IEC61010-1)		

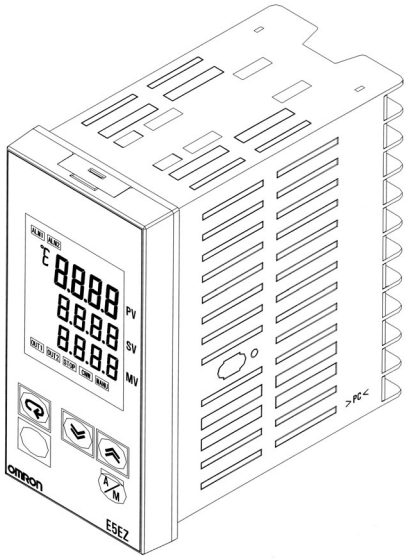
Note 1: The indication accuracy of K thermocouples in the -200 to 1300°C range, T and N thermocouples at a temperature of -100°C max., and U and L thermocouples at any temperature is ±2°C ±1 digit maximum. The indication accuracy of the B thermocouple at a temperature of 400°C max. is not specified. The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max.

2: For E5EZ-PRR□03-model products, in order to satisfy the conduction and emission specifications of EN61326CLASSA, a magnetic ring (TDK:ZAT1730-0730) should be added to the communications line between the K3SC unit and the controller.

Dimensions

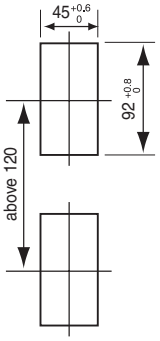
Note: All figures are in mm, unless otherwise stated.

■ Main Unit

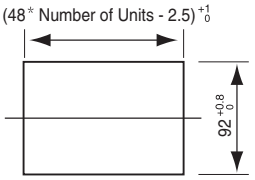


- **Dimensions of Panel's Grooves**

Independent Installation (Unit: mm)



Simultaneous Multiple Installations (Unit: mm)

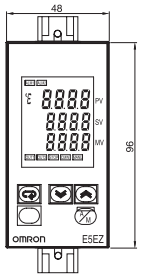


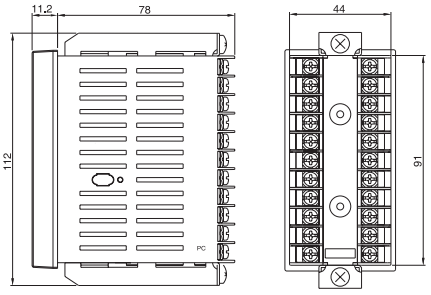
- During installation, please insert a temperature gauge into the grooves on the panel (thickness of 1 to 8 mm), and insert the metallic components for installation into the fixing hooks at the bottom and the top of the rear cover.
- Please ensure that the screws to metallic components are even and locked.
- When doing multiple installations, please ensure that the temperature gauge remains within the specified temperature range.

- **Package Content**

- 1 Temperature Gauge
- 2 Metallic Components For Installation
- 1 Operating Manual
- 1 Quality Certificate

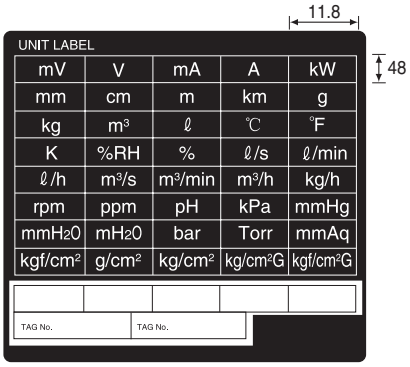
During removal, please use a screwdriver to remove the clips on the top and bottom of the front covering panel, and then remove the temperature gauge's front panel.





- **Unit Labels (Order Separately)**

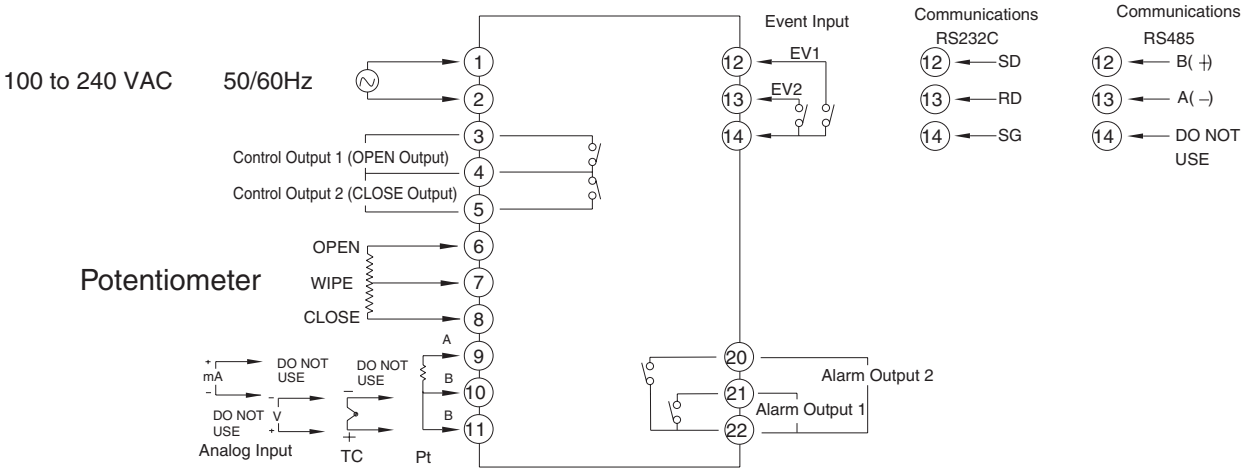
Y92S-L1 Type



Wiring Terminals

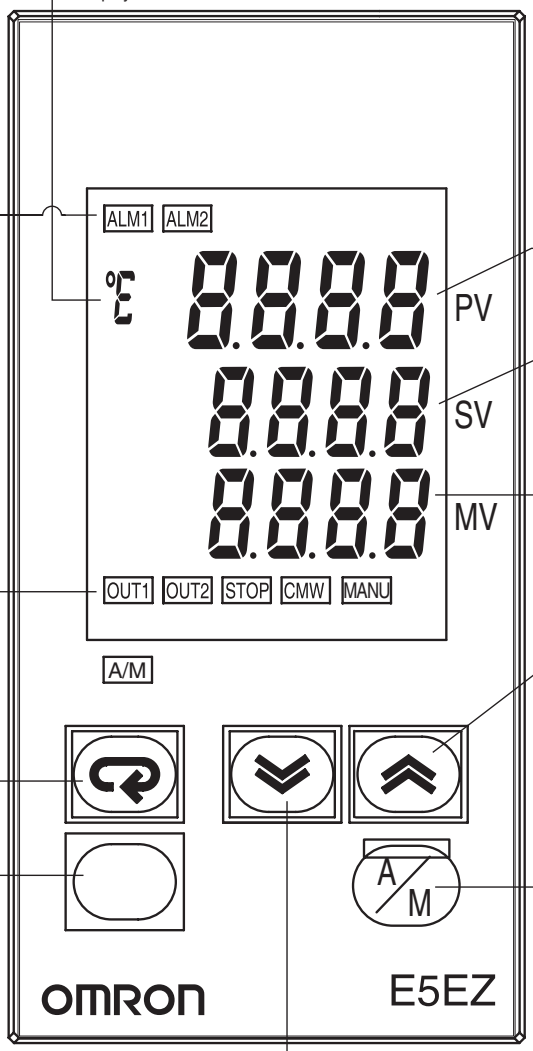
- Standard insulation is applied to the temperature gauge's I/O sections. If reinforced insulation is required, connect the input and output terminals to a device without any exposed current-carrying parts, or to a device with standard insulation suitable for the maximum operation voltage of the power supply I/O section.
- For E5EZ-PRR□03-model products, in order to satisfy the conduction and emission specifications of EN61326CLASSA, a magnetic ring (TDK: ZAT1730-0730) should be added to the communications line between the K3SC unit and the controller.

■ E5EZ-PRR



Nomenclature

■ E5EZ-PRR



Temperature Unit

The temperature unit is displayed when the display unit parameter is set to temperature.
The value selected for the temperature units parameter determines the unit displayed.
When set to ˚C, ℃ is displayed, and when set to ˚F, ℉ is displayed.

Operation Indicator

1. ALM1 (Alarm 1): Illuminated when Alarm 1 output is on.
   ALM2 (Alarm 2): Illuminated when Alarm 2 output is on.
2. OUT1, OUT2 Control Output 1(OPEN) and 2(CLOSE)
   Illuminated when control output 1 and/ or control output 2 are on.
3. STOP (Stop)
   Illuminated when operations are stopped.
   Illuminated during controls when time input or the start/ stop function is stopped. Not illuminated in any other cases.
4. CMW (Communications Writing Control)
   Illuminated when communications writing is enabled. Not illuminated in any other cases.
5. MANU (Manual Control)
   Illuminated during manual mode. Not illuminated in any other cases.

Mode Key

Press this level key to select parameters.

Level Key

Press this key to select the setting level.
The sequence of setting level selection is: operation level←→Adjustment level, Initial input level←→ Communications setting level.

No. 1 Display

Displays the process value or the designated data type.
Fully illuminated for approximately one second upon start-up.

No. 2 Display

Displays setting values, reading values, and input values.
Fully illuminated for approximately one second upon start-up.

No. 3 Display

When valve opening display is on, it displays the percentage of the valve's opening.
No display when valve opening display is switched off.

Up Key

Every time that this key is pressed, the figure shown in No. 2 Display will increase. Changes in the displayed value accelerate as the time that the button is pressed decreases. In manual mode, pressing the ⩓ key will switch on control output 1 (open side output).

Automatic/ Manual Key

This automatic/ manual key makes the switch between automatic mode and manual mode. When this key is pressed for at least 1 second (unrelated to the time at which the key is released), the unit will switch modes.

Down Key

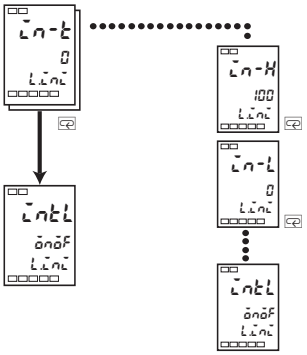
Every time that this key is pressed, the figure shown in No. 2 Display will decrease. Changes in the displayed value accelerate as the time that the key is pressed decreases. In manual mode, pressing the ⩔ key will switch on control output 2 (closed side output).

Operation

In the past, sensor input types, alarm types, and control time for controllers were set using the DIP switch. Now, these hardware settings can be performed with the parameters in the setting level. The ◯ and ⇆ keys are used to switch between setting levels, with the level determined by the amount of time the key is pressed. Two examples of typical setup procedures follow.

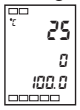
• Typical Examples

Changes in Set Values



When there are multi parameters, press down on the mode key until all necessary parameters have been selected.

Changes in Data



Changes can be made to data on displays with the ▲▼ key.

• Typical Example 1

Input Type	: 5K thermocouple -200˚C to 1300˚C
Control Method	: PID Control
Alarm 1 Type	: Upper limit of 2 (deviation)
Alarm Value 1	: 20˚C (deviation)
Set value	: 100˚C

Setup Steps

Connect the power supply

Initial setting level

Set the input type

Set the alarm type

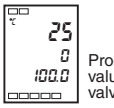
Operation level

Set the alarm value

Begin operations

Connect the power supply

Operation level



Process value/ set value/percentage of valve opening

Press the ◯ key for at least 3 seconds

Control stops

Initial setting level

Check input type

Input type 5

Check alarm type

Alarm 1

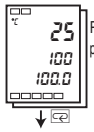
Alarm 2

Press the ◯ key for at least 1 second

Control starts

Operation level

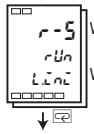
Press the ▲▼ key, and designate the set value as 100˚C



Process value/ set value/ percentage of valve opening

100˚C

Confirm that control is operating



While running run

While stopped stop

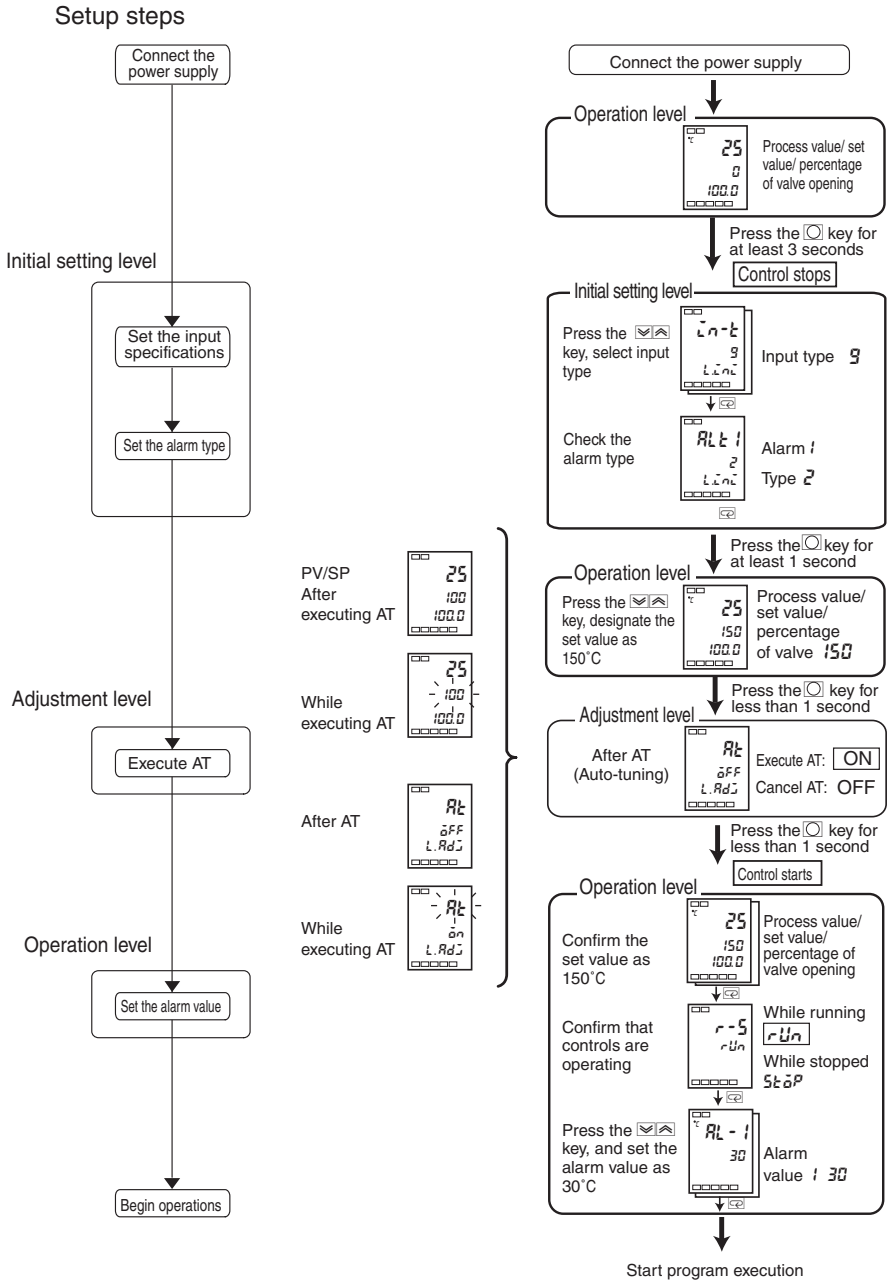
Press the ▲▼ key, and set the alarm value as 20˚C

Alarm value 120

Begin operations

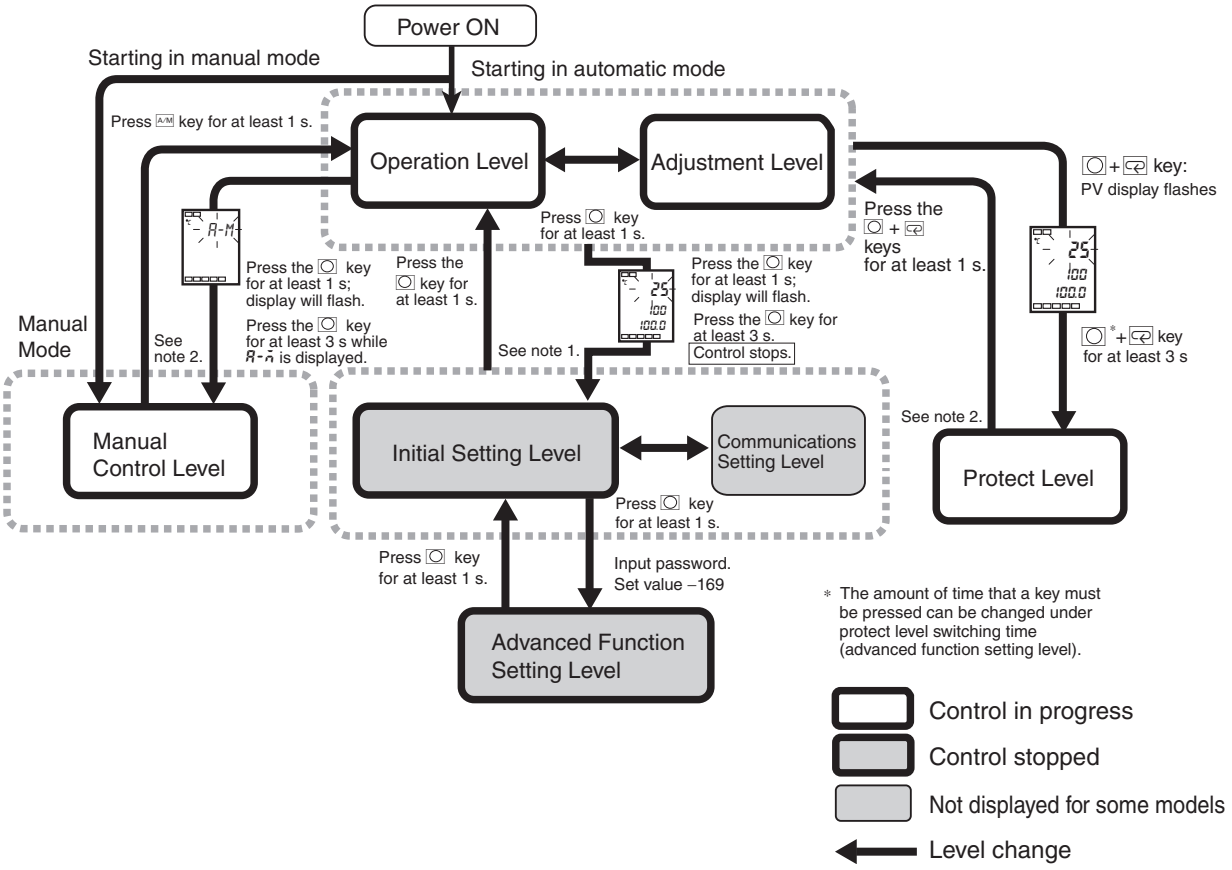
• Typical Example 2

Input type	: 9T thermocouple -200˚C to 400˚C
Control method	: PID control
Execute AT (auto-tuning) to calculate the PID constant	
Alarm 1 type	: Upper limit of 2
Set value	: 150˚C



■ Setting Level Configuration and Panel Key Operations

Parameters are split into groups, which are referred to as levels. Each of the set values (set items) in these levels are referred to as parameters. E5EZ-PRR parameters are categorized into the following 7 levels:



Note1: When returning from the initial setting lever to the operation level, the operation level's initial value will be displayed.

2: When returning from the protect level to the operation level, the operation level's initial value will be displayed.

	Control operating	Control stops
Protect level	❍	–
Operation level	❍	–
Adjustment level	❍	–
Manual control level	❍	–
Initial setting level	–	❍
* Advanced function setting level	–	❍
Communications setting level		❍

*: Set the initial/ communications protection parameter in protect level to 0, in order to activate the advanced function setting level.

❍: Indicates items that can be set. In these cases, the initial setting level, communications setting level, and advanced function setting level can only be used when controls are stopped. Please take note of the fact that when any one of these three levels is selected, the controller's output will be stopped.

With the exception of operation level, the present level will be on display. No. 3 Display will show the following when switching between set values:

Third Display	Level's Name
Manual MV	Manual control level
L.Prt	Protect level
No display	Operation level
LAdJ	Adjustment level
L.InI	Initial setting level
L.Con	Communications setting level
LAdu	Advanced function setting level

■ Descriptions of Each Level

• Protect Level

- In order to switch to this level, it is necessary to press the ◯ and ⏎ keys simultaneously for at least 3 seconds. This level is used to prevent unnecessary or accidental revisions to the parameters. The protected level is not displayed, so that no changes can be made to parameters within this level.

• Operation Level

- Once a power supply is connected, this level is displayed. It is possible to switch from this level to protect level, initial setting level, and adjustment level.
- During regular operations, this level is selected. It is possible to view process value and MV during operations, as well as viewing and revising set values, alarm values, and upper and lower limits.

• Adjustment Level

- In order to switch to this level, press the ◯ key for less than 1 second.
- Input in this level is used in controlling set values and shifted values. This level contains parameters used in setting up AT (autotuning), communications writing enabling/ disabling, hysteresis, multi-SP, input shift, and PID constants. It is possible to switch from this level to the peak parameters in the initial setting level, protect level, or operation level.

• Manual Control Level

- Pressing the A/M key for at least 1 second in operations/ adjustment level will place you in manual mode and bring you to manual control level. During manual operations, nothing besides process value/ set value/ percentage of valve opening (manual MV) can be displayed. In manual control, with process value/ set value/ percentage of valve opening (manual MV) displayed, pressing the A/M key for at least 1 second will move you into automatic mode and switch you to the operation level, displaying operation level's initial data. In this mode, it is possible to perform MV manual operations.

• Initial Setting Level

- To switch to this level, it is necessary to press the ◯ key in operation level or adjustment level for at least 3 seconds. One second later, the PV display will flash. This level is used for designating input types, selecting control methods and control times, as well as setting direct/ reverse operations and alarm types. From this level, it is possible to switch to the advanced function setting level or communications setting level. Press the ◯ key for at least 1 second to return to operation level. Press the ◯ key for less than 1 second to switch to the communications setting level.

• Advanced Function Setting Level

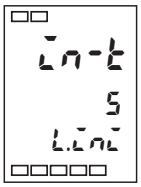
- In order to activate the advanced function setting level, set protect level's initial setting/ communications protection to 0, and then input the password (-169) in the input initial setting level.
- It is possible to switch from this level to the initial setting level.
- This level is used to set the display mode, event input assignment, standby sequence, alarm hysteresis, and alarm delay.

• Communications Setting Level

- To switch to this level, press the ◯ key in the initial setting level for less than 1 second. When using the communications function, the conditions of communication are to be set in this level. Communications with a personal computer (host computer) allows set values to be read and written, and manipulated variables to be monitored.

■ Setting the Type of Input

Types of input include thermocouple, platinum resistance thermometer, infrared temperature sensor, and analog inputs. Please set your input type in accordance with the sensor to be used. Product specifications also include multi input types, such as thermocouples/ plastic resistance thermometers, and analog input types, resulting in differences between set values. Please confirm the model that you are using.



Input Types 5

Table of Input Types

Input Type	Name	Set value	Set Range of Temperature Input	
Platinum Resistance Thermometer	Pt100	0	-200 to 850 (°C)	/ -300 to 1500 (°F)
		1	-199.9 to 500.0 (°C)	/ -199.9 to 900.0 (°F)
		2	0.0 to 100.0 (°C)	/ 0.0 to 210.0 (°F)
	JPt100	3	-199.9 to 500.0 (°C)	/ -199.9 to 900.0 (°F)
		4	0.0 to 100.0 (°C)	/ 0.0 to 210.0 (°F)
Thermocouple	K	5	-200 to 1300 (°C)	/ -300 to 2300 (°F)
		6	-20.0 to 500.0 (°C)	/ 0.0 to 900.0 (°F)
	J	7	-100 to 850 (°C)	/ -100 to 1500 (°F)
		8	-20.0 to 400.0 (°C)	/ 0.0 to 750.0 (°F)
	T	9	-200 to 400 (°C)	/ -300 to 700 (°F)
		22	-199.9 to 500.0 (°C)	/ -199.9 to 700.0 (°F)
	E	10	0 to 600 (°C)	/ 0 to 1100 (°F)
	L	11	-100 to 850 (°C)	/ -100 to 1500 (°F)
	U	12	-200 to 400 (°C)	/ -300 to 700 (°F)
		23	-199.9 to 500.0 (°C)	/ -199.9 to 700 (°F)
	N	13	-200 to 1300 (°C)	/ -300 to 2300 (°F)
	R	14	0 to 1700 (°C)	/ 0 to 3000 (°F)
	S	15	0 to 1700 (°C)	/ 0 to 3000 (°F)
	B	16	100 to 1800 (°C)	/ 300 to 3200 (°F)
Infrared temperature sensor, ES1B	10°C to 70°C	17	0 to 90 (°C)	/ 0 to 190 (°F)
	60°C to 120°C	18	0 to 120 (°C)	/ 0 to 240 (°F)
	115°C to 165°C	19	0 to 165 (°C)	/ 0 to 320 (°F)
	140°C to 260°C	20	0 to 260 (°C)	/ 0 to 500 (°F)
Analog Input	0 to 50 mV	21	The scaling usage range is either -1999 to 9999 or -199.9 to 999.9	

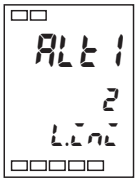
- **Initial value of "5"**

	Input Type	Specifications	Set value	Set Range of Input
Analog Input Type	Current Input	4 to 20mA	0	Use the following scales based on the range of measurements: -19999 to 9999 -199.9 to 999.9 -19.99 to 99.99 -1.999 to 9.999
		0 to 20mA	1	
	Voltage Input	1 to 5V	2	
		0 to 5V	3	
		0 to 10V	4	

- **Initial value of "0"**

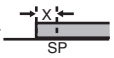
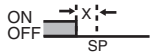
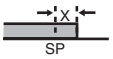
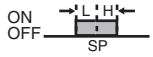
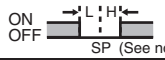
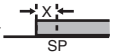
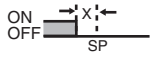
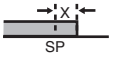
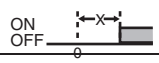
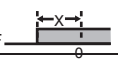
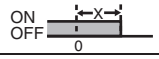
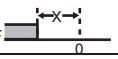
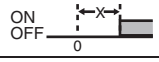
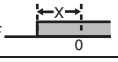
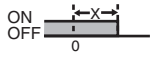
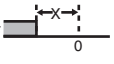
■ Alarm Types

- The conditions of alarm output are jointly determined by Alarm Type and Alarm Hysteresis.
- Below is an explanation of the alarm type, alarm value, upper alarm limit, and lower alarm limit parameters.



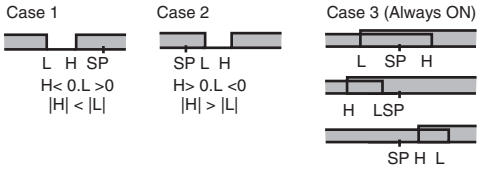
Alarm *1*

Type *2*

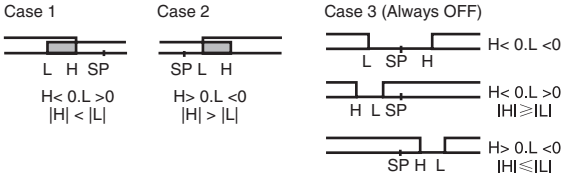
Set values	Type	Alarm output operation	
		When X is positive	When X is negative
0	Alarm function OFF	Output OFF	
1 See note 1.	Upper-and lower-limits		See note 2.
2	Upper limits		
3	Lower limits		
4 See note 1.	Upper-and lower-limits		See note 3.
5 See note 1.	Upper-and lower-limit with standby sequence		See note 4.
6	Upper-limit with standby sequence		
7	Lower-limit with standby sequence		
8	Absolute-value upper-limits		
9	Absolute-value lower-limits		
10	Absolute-value upper-limit with standby sequence		
11	Absolute-value lower-limit with standby sequence		

Note: 1. Upper and lower limits can be set independently for each alarm point, represented by L and H. The set values are 1, 4, and 5.

2. Set value: 1, Upper-and lower-limit



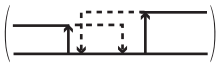
3. Set value: 4, Upper-and lower-limit range



4. Set value: 5, Upper-and lower-limit with standby sequence

*for the upper and lower alarm limits above
- In case 1 and 2, if there are any overlaps in the upper and lower limits for hysteresis, the alarm will always be OFF.

Example of case 1 and case 2: in case 3, the alarm will always be OFF.



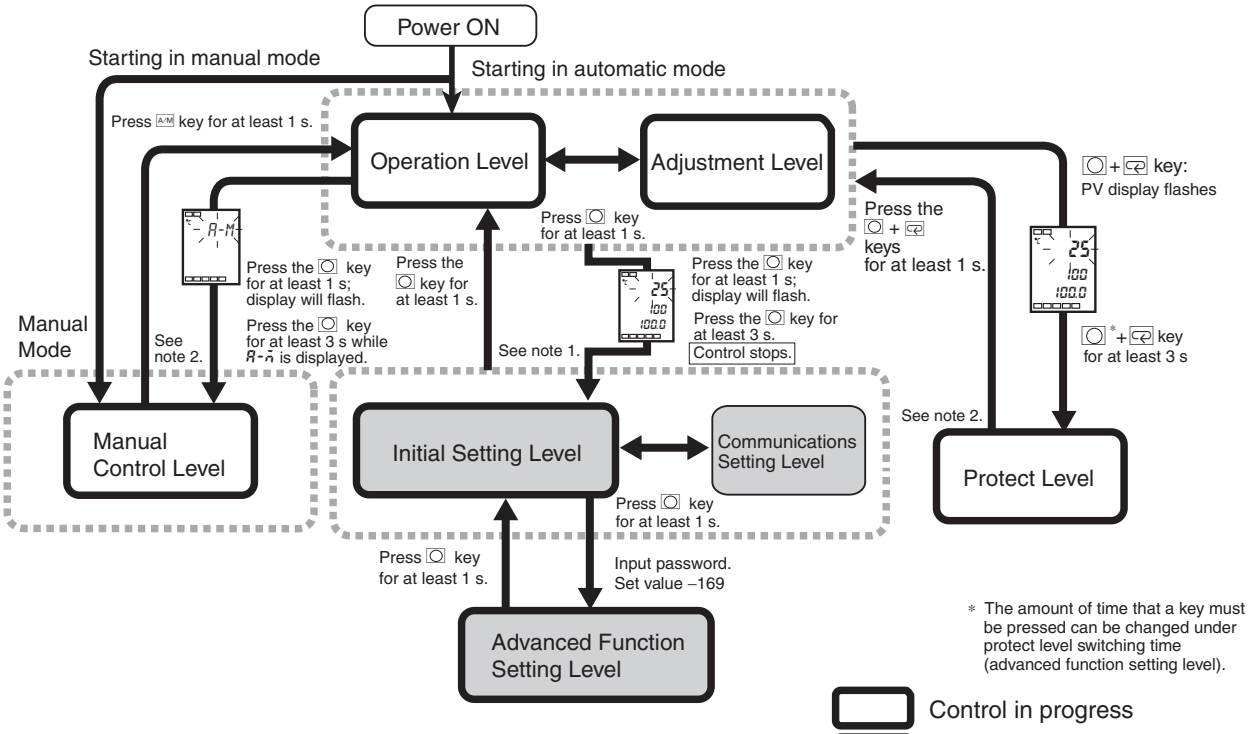
5. Set value: 5, Upper-and lower-limit with standby sequence

If there are any overlaps in the upper and lower limits for hysteresis, the alarm will always be OFF.

There are alarm types 1 to 2 (initial setting level), and settings should be made independently for each alarm.
The initial value is 2: upper limit.

■ Parameters

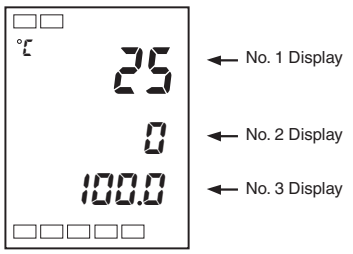
Parameters related to setting items for each level are marked in boxes in the following flowchart and brief descriptions are given as required. After finishing each setting, press the mode key to return to the beginning of each level.

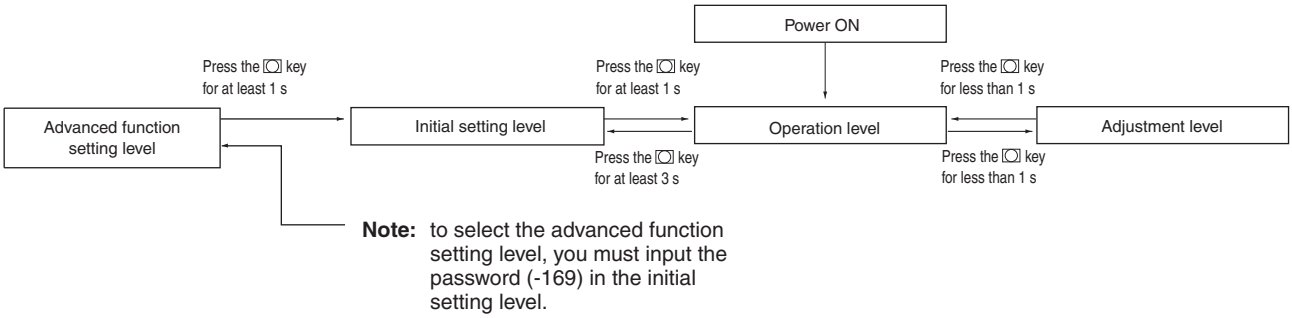


Note 1: When returning from the initial setting lever to the operation level, the operation level's initial value will be displayed.

2: When returning from the protect level to the operation level, the operation level's initial value will be displayed.

Display

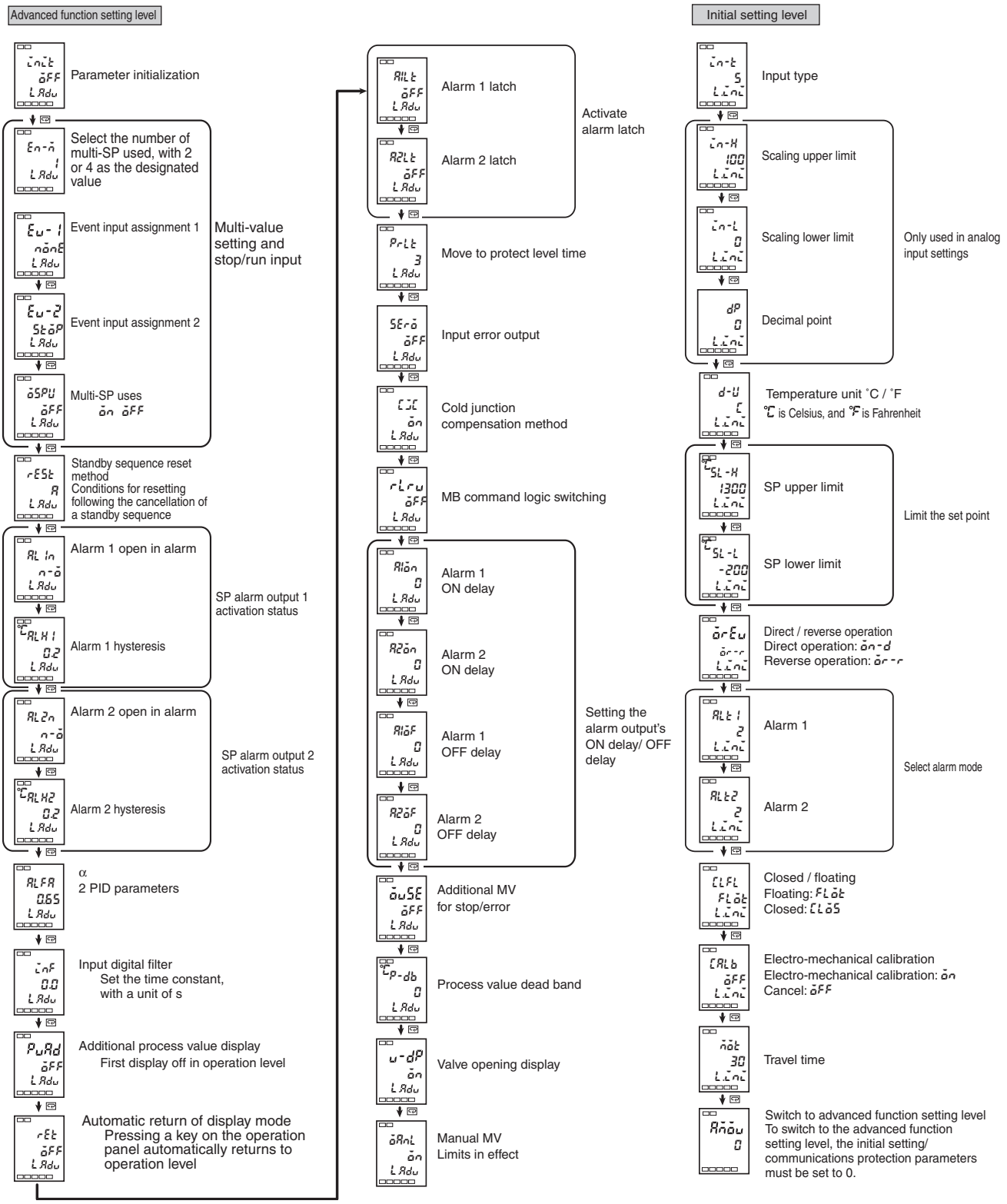


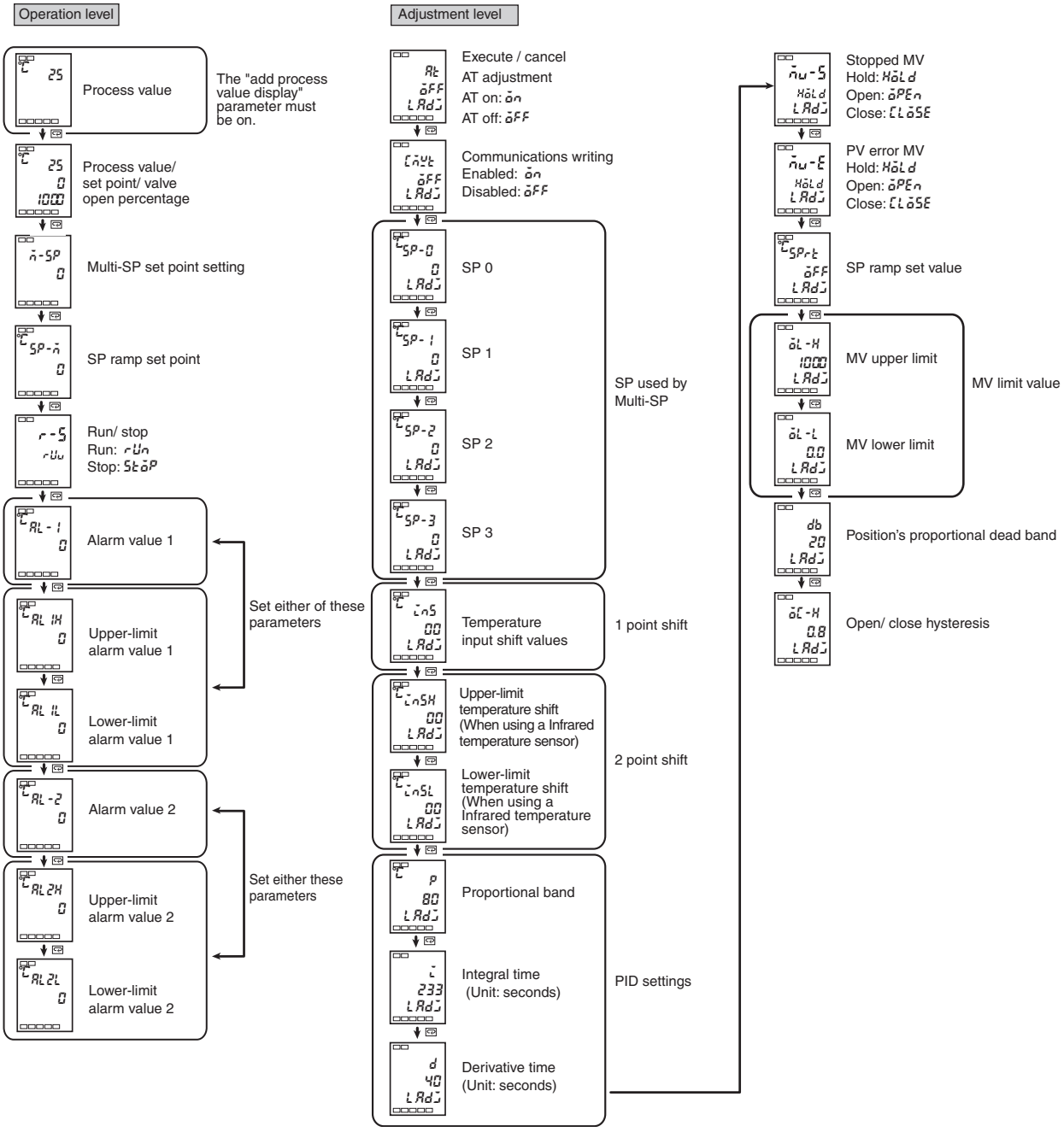


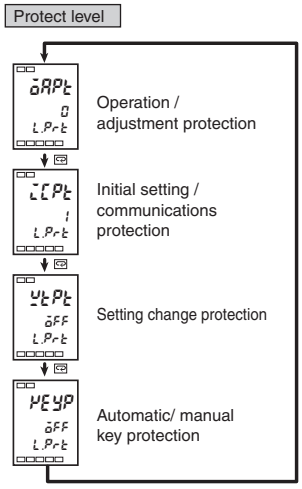
Note: to select the advanced function setting level, you must input the password (-169) in the initial setting level.

■ Parameters

- In each level, if you press the mode key on the final parameter, you will return to the parameter at the top of the level.




Operation level
Process value
The "add process value display" parameter must be on.
Process value/ set point/ valve open percentage
Multi-SP set point setting
SP ramp set point
Run/ stop
Run:
Stop:
Alarm value 1
Upper-limit alarm value 1
Lower-limit alarm value 1
Set either of these parameters
Alarm value 2
Upper-limit alarm value 2
Lower-limit alarm value 2
Set either these parameters
Adjustment level
Execute / cancel
AT adjustment
AT on:
AT off:
Communications writing
Enabled:
Disabled:
SP 0
SP 1
SP 2
SP 3
SP used by Multi-SP
Temperature input shift values
1 point shift
Upper-limit temperature shift (When using a Infrared temperature sensor)
Lower-limit temperature shift (When using a Infrared temperature sensor)
2 point shift
Proportional band
Integral time (Unit: seconds)
Derivative time (Unit: seconds)
PID settings
Stopped MV
Hold:
Open:
Close:
PV error MV
Hold:
Open:
Close:
SP ramp set value
MV upper limit
MV lower limit
MV limit value
Position's proportional dead band
Open/ close hysteresis



■ Operation/ Adjustment Protection

The relationship between the set values and the range of protection is as shown below.

Mode	Set Values			
	0	1	2	3
Present value	❍	❍	❍	❍
Set value	◎	◎	◎	❍
Others	◎	◎	×	×
Adjustment level	◎	×	×	×

◎ : Can be displayed/ changed
❍ : Can be displayed
× : Cannot be displayed/ no changes in level allowed

- When the set value is 0, there is no protective function.
- The initial value is 0.

■ Initial Setting/ Communications Protection

This protect level restricts movement to the initial setting, communications setting, and advanced function setting levels.

Set Value	Initial setting level	Communications
0	Able to switch (able to switch to the advanced functions setting level)	Able to switch
1	Able to switch (unable to switch to the advanced functions setting level)	Able to switch
2	Able to switch	Unable to switch

- Default setting: 1.

■ Setting Change Protection

Places restrictions on changes to settings with keys.

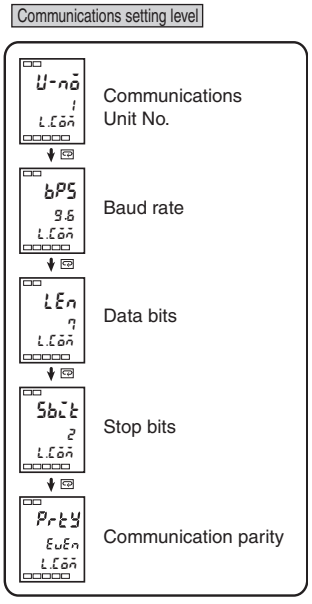
oFF: Able to use unit keys to change settings.

on: Unable to use unit keys to change settings, but this level can be changed.

■ Automatic/ Manual Key Protection

Set Value	Automatic/ Manual Operations	
oFF	Automatic/ Manual	Able to switch
on	Automatic/ Manual	Unable to switch

- Initial value is "oFF".



■ Setting Communications Parameters

Configures the E5EZ-PRR's communications specifications, so that its communications with the host computer can be configured properly. In a layout where one point communicates with multiple points, in addition to all of the communication unit numbers, all other settings should match. Each unit must have a single communication unit number set for it.

Parameters	Character display	Set (monitor) value	Setup	Initial value	Unit
Communications Unit No.	U-no	0 to 99		1	None
Baud rate	bPS	1.2, 2.4, 4.8, 9.6, 19.2	1.2, 2.4, 4.8, 9.6 19.2	9.6	Kbps
Data bits	LEn	7, 8		7	Length
Stop bits	SbiT	1, 2		2	Bit
Communication parity	PrtY	None, even, odd	nonE, EuEn odd	Even	None

■ Trouble shooting

When an error occurs, the main display alternately shows an error signal and the current item for display.

This section explains how to inspect an error signal, as well as corresponding rectification measures.

S.Err Input Error

• Meaning

The figure inputted has exceeded the designated input range (the designated range is between -1999 (-199.9) to 9999 (999.9)).

• Rectification Measures

Check to make sure that the input line has not been connected incorrectly, unplugged, a short-circuit, or is incompatible with this input type.

If there are no problems with the line type or the connection, power off and then restart the unit. If the display remains unchanged, it will be necessary to change the E5EZ-PRR. If the display is recovered, the root of the problem may have been that noise from the energy flow was affecting the control system. Check for any such noise.

• Operations with Errors

The control output will be determined according to the designated value for error MV.

The alarm output function will be the same as it is when the upper limit is crossed.

After setting I/O error (advanced function setting level) on, alarm 1's output will be activated in cases of error.

In process value or process value/ set value/ valve open percentage display mode, error information will be displayed.

cccc / ɔɔɔɔ Display Range Exceeded

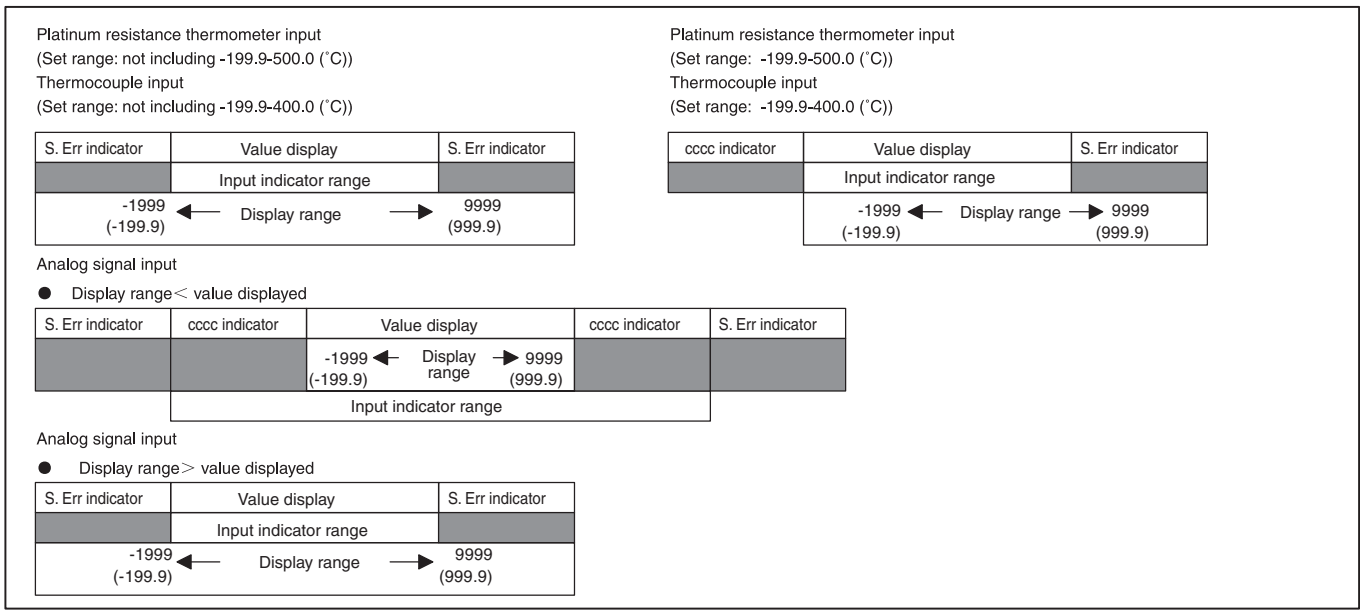
• Meaning

Even though this is not really an error, when the range of control exceeds the range of display (-1999 (-199.9) to 9999 (999.9)), and the process value is beyond the range of display, this signal will appear.

- Will display cccc when the figure is less than -1999 (-199.9).
- Will display ɔɔɔɔ when the figure is more than 9999 (999.9).

• Operations with Errors

Control will continue and operations will remain normal. In process value or process value/ set value/ valve open percentage display mode, error information will be displayed.



E111 Memory Errors

- **Meaning**

There has been an error in the internal memory.

- **Rectification Measures**

Power off and then restart the unit. If the display remains unchanged, it will be necessary to change the E5EZ-PRR. If the display is recovered, the root of the problem may have been that noise from the energy flow was affecting the control system. Check for any such noise.

- **Operations with Errors**

Control output and alarm output will be shut off.

---- Potentiometer Input Errors

- **Meaning**

Errors appear in potentiometer input. Valve opening has exceeded its regular range of -10% to 110%.

- **Rectification Measures**

Check to see if there have been any wiring errors, burnouts, or short-circuits in the potentiometer.

If there are no problems with the wiring, you can restart the power supply. If the display remains unchanged, it will be necessary to change the E5EZ-PRR.

If the display, the root of the problem may have been interference, which should be avoided in the future.

- **Operations with Errors**

The control output will be determined according to the designated value for error MV.

Alarm output will operate as normal.

Err Electro-Mechanical Calibration Error

- **Meaning**

Electro-mechanical calibration was not properly completed.

- **Rectification Measures**

After confirming the potentiometer and the wiring of the motor driving valve, perform electro-mechanical calibration again.

- **Operations with Errors**

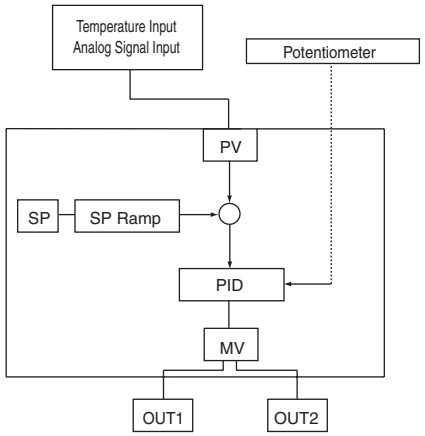
Control output and alarm output are OFF.

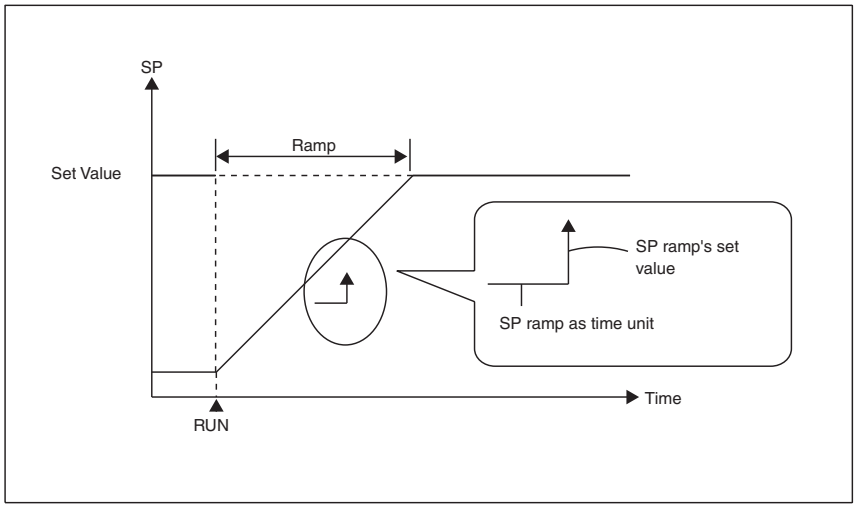
Ceramic Furnace Position Proportional Control

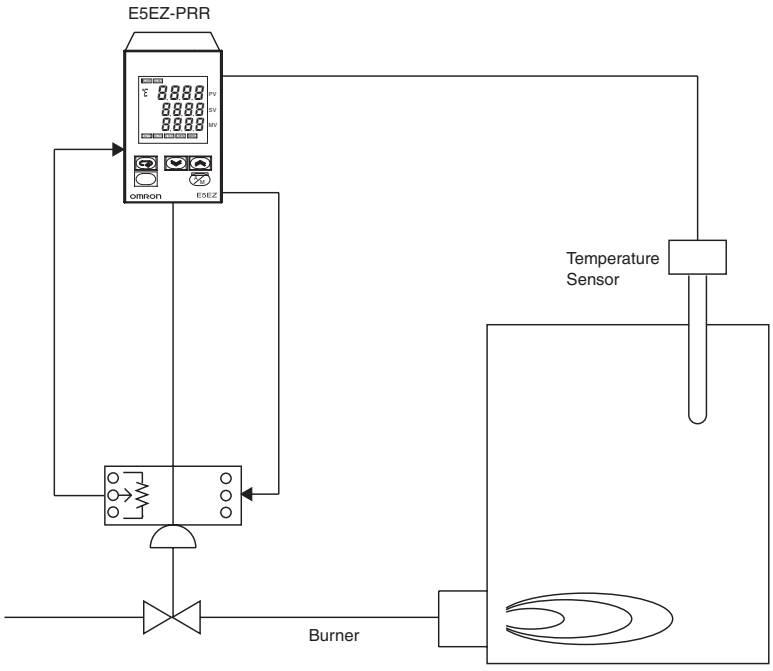
Reading the extent of the valve's opening with a potentiometer, and using open and close tuning control is referred to as position proportional control or on/ off servo control.

■ Examples of Application

When using position proportional methods to control gas combustion furnace valves, position proportional control should be applied. See the following figure for measurement devices:



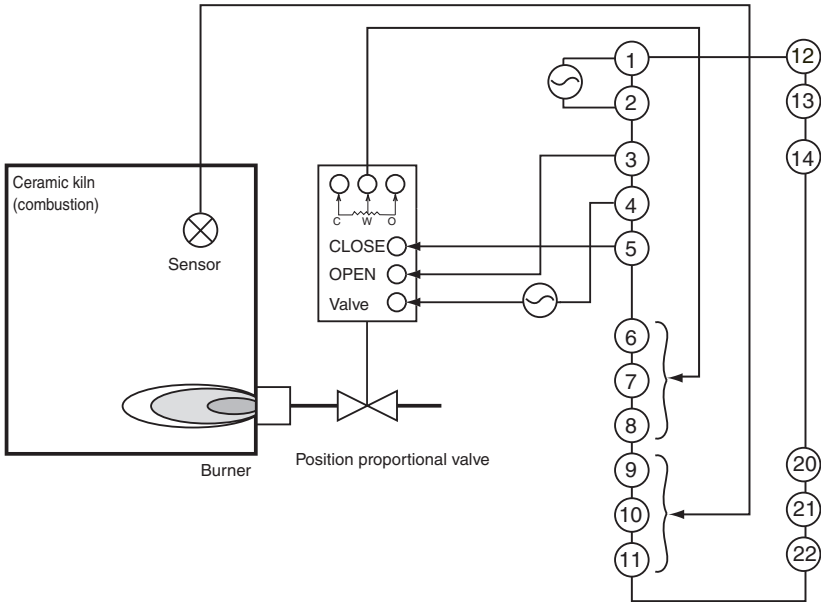




Note: The SP ramp function allows limits to be placed on temperature changes which control the temperature within a specific range. This is useful for ceramic furnace, in which severe temperature changes may cause damage or corruption.

■ Wiring

Input should be connected to terminals 9, 10, and 11 depending upon input type. The Out 1 terminal links to the position proportional valve's open side and the Out 2 terminal links to its closed side.

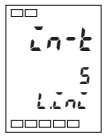


■ Settings

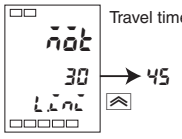
Select a position proportional control model, and perform floating control using a position proportional valve with a travel time (time from being totally open to being totally closed) of 45 seconds. Then, use the SP ramp function to make gradual changes to the process value at rates of 10.0°C/ minute. The relevant data and content of the settings are as shown below:

Direct/ reverse operation	= oPEr: Reverse operation (initial value)
Closed/ floating	= FLoAt: Floating (initial value)
Travel time	= 45 seconds
SP ramp set values	= "10"

Here, the travel time and SP ramp values are set. Initial values are used for all others.

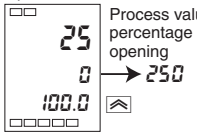


1. Press the ◯ key for at least 3 seconds to switch from the operation level to the initial setting level.



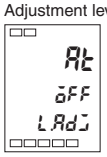
2. Press the ⇆ key multiple times, and select mAt: travel time. Press the ⇈ key, making the set value 45.

Operation level

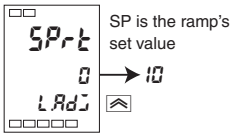


3. Press the ◯ key for at least 1 second, returning to the operation level. The process value/ set value/ percentage of valve opening will be displayed. Press the ⇈ key, setting the target value as 250.

Adjustment level



4. Press the ◯ key for less than 1 second to switch from operation level to → adjustment level.



5. Press the ⇆ key multiple times, and select SPrt: SP ramp set value. Press the ⇈ key, making the set value 10.

■ Adjustment

For adjustments to PID, please execute AT.

■ Fixed Settings for Position Proportional Control

After selecting position proportional control, it is possible to use closed/ floating, electro-mechanical calibration, travel time, position proportional dead band, switch hysteresis, potentiometer input error, and process value dead band.

• Closed/ Floating

- Closed Control
  Connect the potentiometer to perform valve opening feedback control.
- Floating Control
  Control in which no feedback is provided by a potentiometer on the valve's opening, so that control can be performed without a potentiometer.

• Electro-Mechanical Calibration and Travel Time

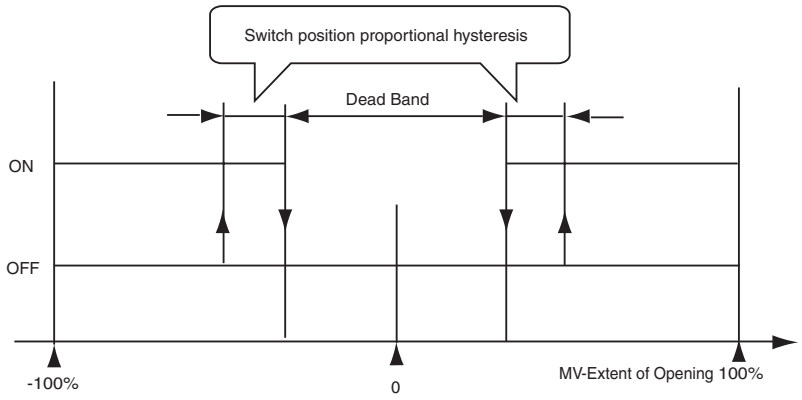
Just like in closed control, or in floating control where a valve's opening is to be monitored, electro-mechanical calibration is to be performed when a potentiometer is connected. The valve's travel time, from being completely open to being completely closed, is also set for self-measuring.

In cases of floating control where a potentiometer is not connected, it will be necessary to manually set the travel time. Set the time required for the valve to go from complete openness to complete closure under travel time.

• Position Proportion Dead Band Switch and Position Proportional Hysteresis

The valve output period (the time it takes the OPEN output and CLOSE output switch to go from ON to OFF) is set as the position proportional dead band, and hysteresis is set as switch hysteresis.

Its relationship with the extent of the valve's opening is as shown below:



• PV Dead Band

When the process value is within the PV dead band, control is controlled according to the logic that the process value = set value. This function is meant to prevent unnecessary output in cases where the process value approaches the set value.

• Potentiometer Input Error

When the potentiometer produces an error during closed control, this is a function that chooses to stop control or switch to floating control, allowing control to continue.