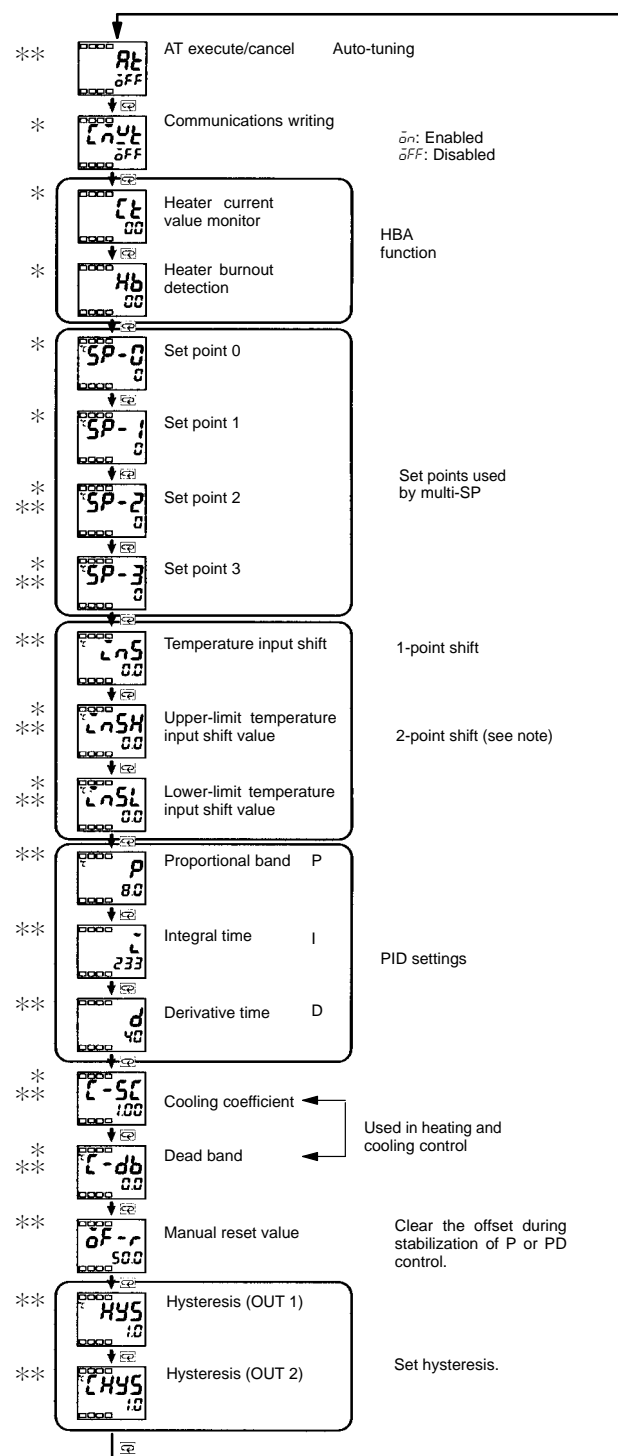


## Adjustment Level



The 2-point shift setting is only possible when the input type is a non-contact temperature sensor.

**Note:** These diagrams show all the parameters that may be displayed. Depending on the specifications of the model used, there may be some parameters that are not displayed. The following symbols are used to distinguish between these parameters.

- : Displayed for all models regardless of the settings of other parameters.
- \*: Not displayed for some models.
- \*\* : Depending on the settings of other parameters, may not be displayed.

## Protect Level



Operation/adjustment protection

Restricts display and modification of menus in the operation and adjustment levels.



Initial setting/communications protection

Restricts display and modification of menus in the initial setting, operation level and adjustment levels.



Setting change protection

Protects changes to setups by operating the front panel keys.

## Operation/Adjustment Protection

The following table shows the relationship between set values and the range of protection.

Level		Set value			
		0	1	2	3
Operation level	PV	○	○	○	○
	PV/SP	⊙	⊙	⊙	○
	Other	⊙	⊙	X	X
Adjustment level		⊙	X	X	X

When this parameter is set to "0," parameters are not protected.

Default setting: 0

⊙ : Can be displayed and changed

○ : Can be displayed

X : Cannot be displayed and move to other levels not possible

## Initial Setting/Communications Protection

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

Set value	Initial setting level	Communications setting level	Advanced function setting level
0	○	○	○
1	○	○	X
2	X	X	X

Default setting: 1

○ : Move to other levels possible

X : Move to other levels not possible

## Setting Change Protection

This protect level protects setup from being changed by operating the keys on the front panel.

Set value	Description
OFF	Setup can be changed by key operation.
ON	Setup cannot be changed by key operation. (The protect level, can be changed.)

Default setting: OFF






## Communications Setting Level

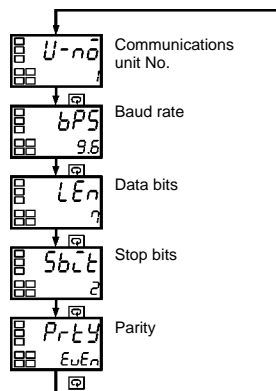
Set the E5AN/E5EN/E5CN/E5GN communications specifications in the communications setting level. For setting communications parameters, use the E5AN/E5EN/E5CN/E5GN panel. The communications parameters and their settings are listed in the following table.

Parameter	Displayed characters	Set (monitor) value	Set value
Communications unit No.	U <sub>no</sub>	0 to 99	0 <b>1</b> to 99
Baud rate	b <sub>PS</sub>	1.2/2.4/4.8/9.6/19.2 (kbps)	1.2/2.4/4.8/9.6 <b>19.2</b>
Data bits	L <sub>En</sub>	7/8 (bit)	<b>7</b> /8 (bit)
Stop bits	S <sub>bt</sub>	1/2	1 <b>2</b> (bit)
Parity	P <sub>ty</sub>	None, even, odd	n <sub>on</sub> E/ <b>E</b> UEN/odd

**Note:** The highlighted values indicate default settings.

Before executing communications with the E5AN/E5EN/E5CN/E5GN, set the communications unit No., baud rate, etc., through key operations as described below. As for other operations, refer to relevant Operation Manual.

1. Press the  key for at least three seconds in the "operation level." The level moves to the "initial setting level."
2. Press the  key for less than one second. The "initial setting level" moves to the "communications setting level."
3. Pressing the  key advances the parameters as shown in the following figure.
4. Press the  or  keys to change the parameter setups.



**Note:** On the E5AN/E5EN/E5GN, the  Key is the  Key.

Set each communications parameter to match those of the communicating personal computer.

## ■ Troubleshooting

When an error occurs, an error code will be displayed on the No. 1 display. Check the contents of an error and take appropriate countermeasures.

No. 1 display	Type of error	Countermeasures
S <sub>Err</sub>	Input error	Check the wiring of inputs for miswiring, disconnections, short-circuits, and the input type.
E <sub>!!!</sub>	Memory error	First, turn the power OFF then back ON again. If the display remains the same, the Unit must be repaired. If the display is restored, then a probable cause can be external noise affecting the control system. Check for external noise.
c <sub>ccc</sub>	Display range over	Though not error, this is displayed when the process value exceeds the display range when the control range is larger than the display range.
ccc <sub>c</sub>		<ul style="list-style-type: none"> <li>• When less than "-1999" (-199.9) c<sub>ccc</sub></li> <li>• When larger than "9999" (999.9) ccc<sub>c</sub></li> </ul>
H <sub>Err</sub>	HB error	First, turn the power OFF then back ON again. If the display remains the same, the E5EN/E5CN/E5GN must be repaired. If the display is restored, then a probable cause can be electrical noise affecting the control system. Check for electrical noise.

**Note:** Error will be displayed only when the display is set for the PV or PV/SP.

### Communications Unit No. (U<sub>no</sub>)

When communicating with the host computer, the unit number must be set in each Temperature Controller so that the host computer can identify each Temperature Controller. The number can be set in a range from 0 to 99 in increments of 1. The default setting is 1. When using more than one Unit, be careful not to use the same number twice. Duplicate settings will cause malfunction. This value becomes valid when the power is turned OFF and ON again.

### Baud Rate (b<sub>PS</sub>)

Use this parameter to set the speed of communications with the host computer. It can be set to one of the following values; 1.2 (1200 bps), 2.4 (2400 bps), 4.8 (4800 bps), 9.6 (9600 bps), and 19.2 (19200 bps).

This setting becomes valid when the power is turned OFF and ON again.

### Data Bits (L<sub>En</sub>)

Use this parameter to change the communications data bit length to 7 bits or 8 bits.

### Stop Bits (S<sub>bt</sub>)

Use this parameter to change the communications stop bit to 1 or 2.

### Parity (P<sub>ty</sub>)

Use this parameter to set the communications parity to None, Even, or Odd.

# Fuzzy Self-tuning

The fuzzy self-tuning (ST) is a function that automatically calculates an optimum PID constant depending on items to be controlled.

## ■ Feature

The Temperature Controller determines when to execute this fuzzy self-tuning.

## ■ Functions

SRT: Performs PID tuning according to the step response method when the SP is changed.

### Requirements for SRT Functionality

The ST will be executed according to the step response method when the following conditions are satisfied when operation is started or when the SP is changed.

When operation is started	When SP is changed
<ol style="list-style-type: none"> <li>1. The SP at the startup is different from the SP at the time the previous SRT was executed. (See note.)</li> <li>2. The temperature upon startup is smaller than the SP in the reverse operation and larger than the SP in the direct operation.</li> <li>3. Restarting of operation is not due to an input error.</li> </ol> <p><b>Note:</b> The "SP that existed when the previous SRT was executed" refers to the SP used for obtaining the PID constant in the previous SRT.</p>	<ol style="list-style-type: none"> <li>1. The SP after change is different from the SP at the time the previous SRT was executed. (See note.)</li> <li>2. In the reverse operation, the value obtained by deducting the SP before change from the SP after change is larger than the ST stable range. In the direct operation, the value obtained by deducting the SP after change from the SP before change is larger than the ST stable range.</li> <li>3. The SP change width is larger than the current proportional band <math>\times 1.27 + 4</math>.</li> <li>4. The temperature is in the stable state. (It can be in the balanced state if no output is generated when the power is turned ON.)</li> </ol>

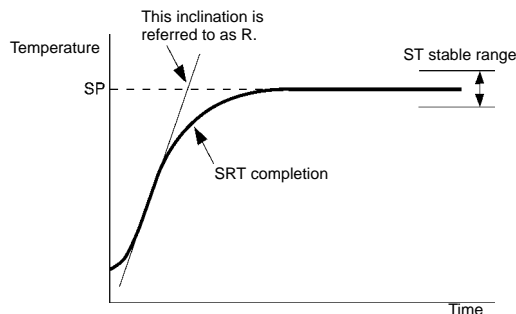
If the SP is changed while SRT is being executed and if SRT completion conditions are satisfied, no PID change will take place.

### Stabilization State

Measured values remain in the stable range for a certain period of time.

### Balanced State

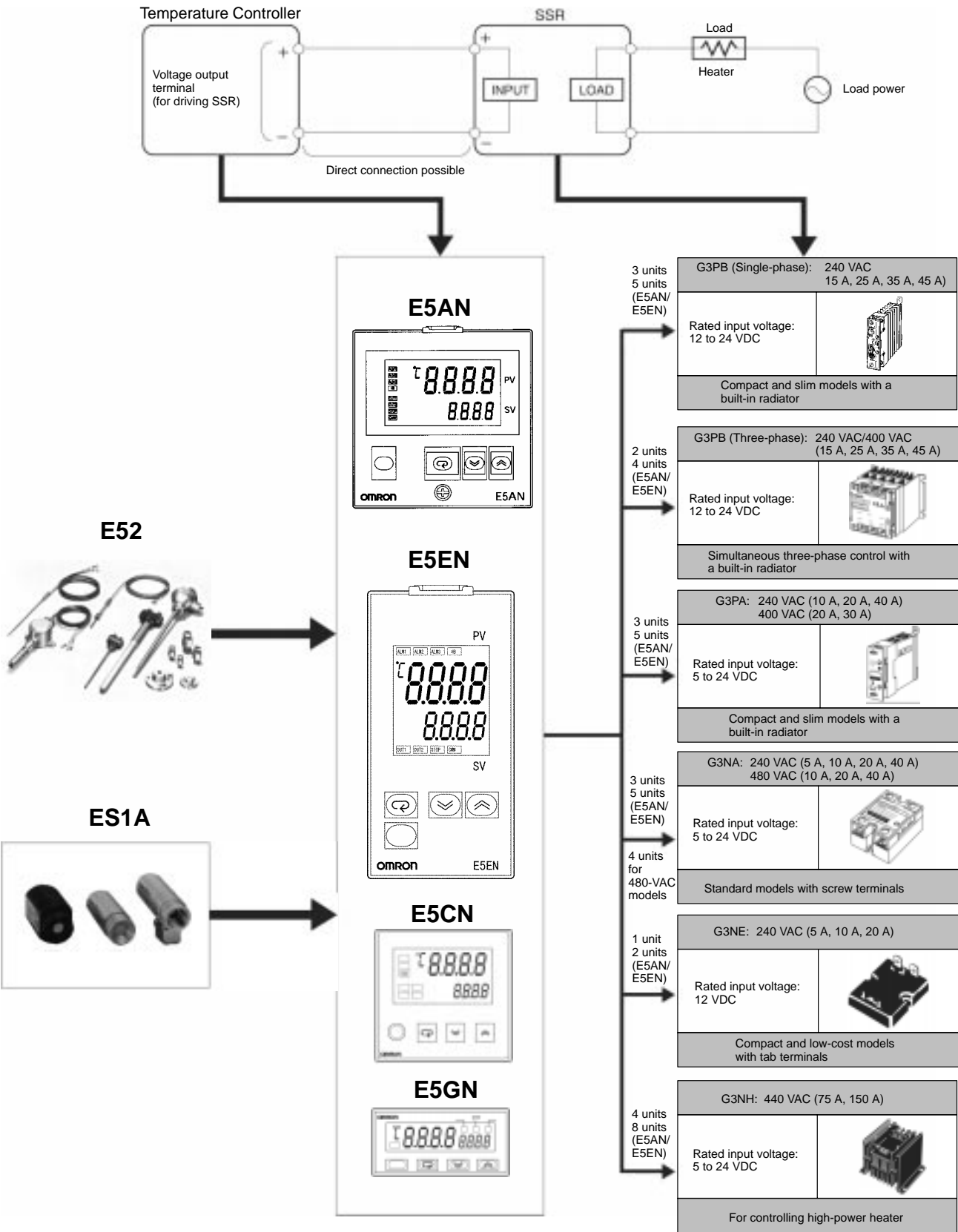
Output is 0% for 60 seconds and measured values fluctuate within the width of the stable range.



Peripheral Devices

■ Temperature Sensor / SSR

Connection Example with SSR



## Responding to All Demands for Temperature Control in Wide Application Range

### ■ ES1A Non-contact Temperature Sensor

Replaces the K-type thermocouple with no modification required.

Available soon.



**Note:** Refer to the ES1A Datasheet (H106) for more details.

#### Only One-tenth the Size of OMRON's Conventional Model

The ES1A-A is as compact as 14 x 18.6 x 34 (W x H x D) mm and can be built into machines and equipment with ease.

#### No Power Supply Required

The ES1A Series has electromotive output that is as high as the output of the thermocouple, thus allowing direct connection to the thermocouple input terminal of the Temperature Controller without requiring any external power supply.

#### Available for High Ambient Temperatures

The ES1A Series performs accurate measurement without being influenced by the ambient temperature. In particular, the ES1A-C with air purge function can operate at an ambient temperature of up to 120°C.

ES1A-A	-25 to 70°C
ES1A-B	-25 to 100°C
ES1A-C with air purge function	-25 to 120°C

### ■ G3PB SSC for Three-phase Heaters

Compact, low-cost model for three-phase heater control.



**Note:** Refer to the G3PB Datasheet (J112) for more details.

#### Saves 40% on Installation Space

The G3PB is dedicated to three-phase heater control and saves 40% on installation space compared with three single-phase models mounted closely side-by-side.

(This comparison is based on the use of three G3PA-240B-VD models and one G3PB-245B-3-VD.)

### ■ E52-series Temperature Sensors

#### Offers a Wide Variety of High-precision Temperature Sensors

- Used as Sensors for Temperature Controllers.
- Ensures easy selection of the most suitable model according to the temperature, place, and environment.
- Offers a wide variety of models that are different in type, appearance, length, and terminal shape.
- Low-cost models and dedicated models, as well as general-purpose models, are available.

**Note:** Refer to the E52 Datasheet (H097) for more details.

