

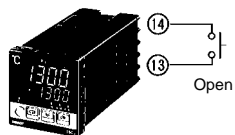


**Set Point 1 Setting:  $SP1$** 

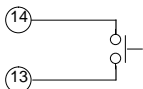
Use the Down and Up Keys to set the set point 1. It is possible to set the value regardless of whether the set value presently selected is on SP0 or SP1.

**E5CJ**

The set point can be selected by opening or short-circuiting the EV1 terminals (terminals 13 and 14).

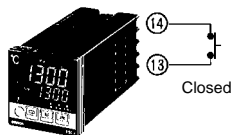


Set point 0 (SP0)

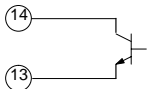
**Contact Input**

ON: The resistance is 1 k $\Omega$  max. when short-circuited.

OFF: The resistance is 100 k $\Omega$  min. when opened.



Set point 1 (SP1)

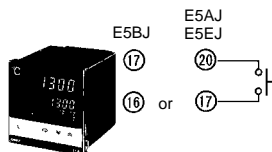
**No-contact Input (Open Collector)**

ON: The residual voltage is 3 V min.

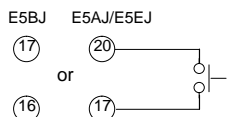
OFF: The current leakage is 1 mA max.

**E5AJ/E5BJ/E5EJ**

The set point can be selected by opening or short-circuiting the EV1 terminals (terminals 17 and 20). In the case of the E5BJ, however, the terminals 16 and 17 of which should be opened or short-circuited instead.

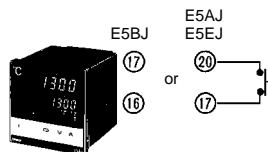


Set point 0 (SP0)

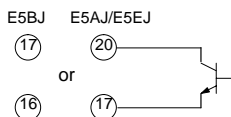
**Contact Input**

ON: The resistance is 1 k $\Omega$  max. when short-circuited.

OFF: The resistance is 100 k $\Omega$  min. when opened.



Set point 1 (SP1)

**No-contact Input (Open Collector)**

ON: The residual voltage is 3 V max.

OFF: The current leakage is 1 mA max.

**Heater Current Value Display:  $IL$** 

The display range is 0.0 to 55.0 A. FFFF will be displayed if the current exceeds 55.0 A. When the control output is ON, the current flowing to the heater is measured and displayed. If the control output is, however, turned ON for less than 190 ms, the current flow will not be measured and the current previously measured will be displayed.

**Heater Burnout Alarm Value Setting:  $Hb$** 

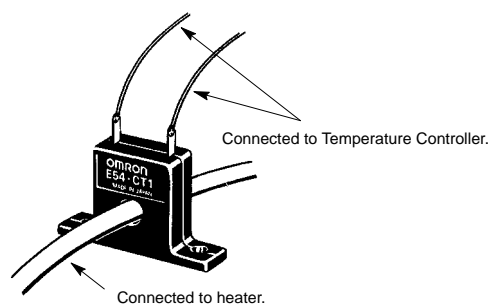
The current value to detect heater burnout can be set within a range of 0.0 to 50.0 A.

The current value is factory-set to 0.0 A. Check the normal heater current and the current at the time of heater burnout from the heater current value display, and set the set value to the mean value of the current values (i.e., set value = (normal current value + heater burnout current)  $\div$  2).

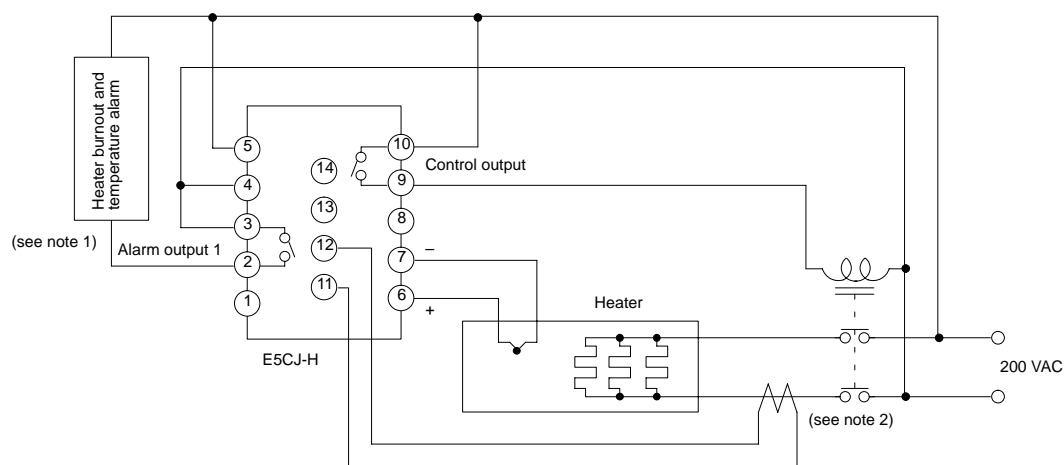
If the difference between the normal heater current and heater burnout current is small, heater burnout detection will not be stable. For stable detection, the difference in current must be 1.0 A minimum if the heater input is less than 10.0 A and 2.5 A minimum if the heater input is 10.0 A or more.

**Note:**

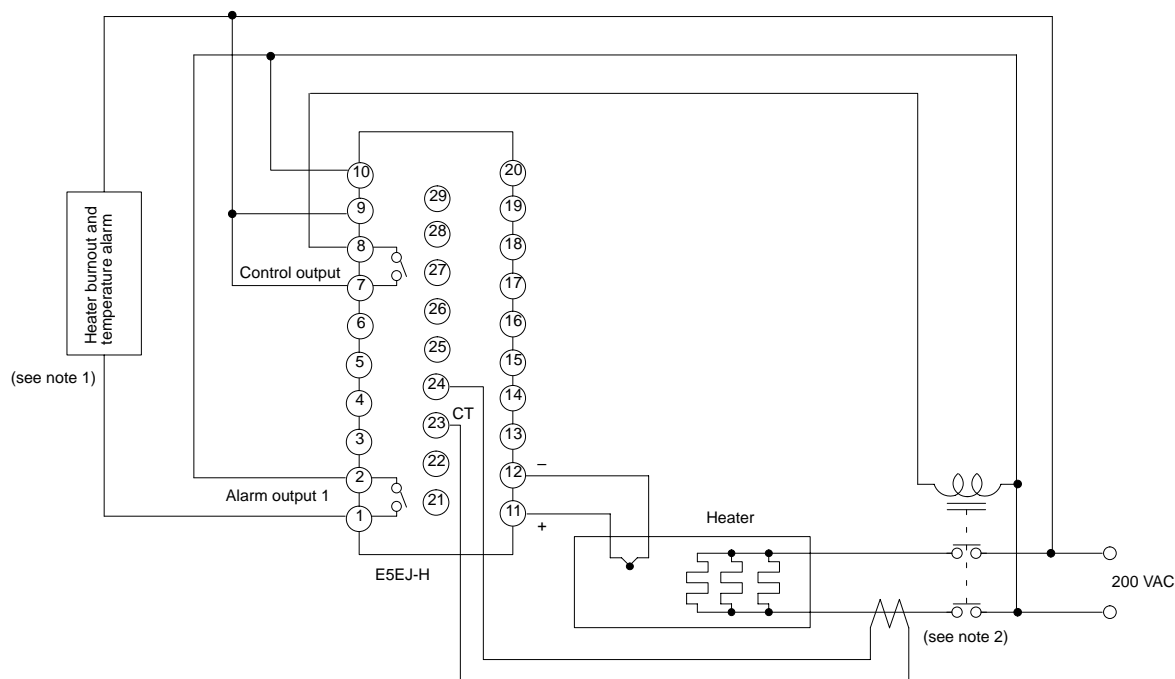
1. Do not allow a current exceeding 50 A to flow in the CT; the maximum continuous heater current is 50 A.
2. Set the value to 0.0 A if the heater burnout alarm is not used, in which case the alarm will not function at all.

**Current Transformer Connections**

## E5CJ-H



## E5EJ-H



- Note:**
1. Alarm 1 is used as heater burnout alarm and temperature alarm for models incorporating a heater burnout alarm.
  2. Wire through the hole of the Current Transformer. The Current Transformer and the Temperature Controller can be connected regardless of polarity.

- Set the alarm mode selector 1 to 0 (i.e., no alarm function is ON) so that alarm output 1 will output only heater burnout alarms.
- If the difference in current is small, increase the apparent electrical current by increasing the number of turns of the heater wire around the CT. The current displayed by the heater current value display increases in proportion to the number of turns of the heater wire.
- Use the K2CU-F□□A-□GS (incorporating gate input terminals) for detecting three-phase heater burnout.

**Output Retention Reset**

Once the heater burnout alarm detects heater burnout, alarm output 1 will turn ON. To turn OFF alarm output 1, set the heater burnout alarm value to 0.0 A or turn off the Temperature Controller and then turn on the Temperature Controller.

- If the control mode is 2-PID with fuzzy self-tuning, the parameters  $P$ ,  $\bar{I}$ ,  $d$ , or  $\bar{\sigma}Fr$  will not be displayed (i.e., there is no need to set these parameters). Fuzzy self-tuning always adjusts all PID constants to optimum values inside the Temperature Controller.

#### Proportional Band: $P$

When the character " $P$ " is displayed on the PV display, the proportional band (P constant) can be changed using the Up and Down Keys. The new value will be displayed on the SV display. It can be set in a range from 0.1° to 999.9°C/°F in units of 0.1°C/°F. The value is factory-set to 8.0°C/°F. However, the E5□J-F (Fahrenheit Model) is factory-set to 14.4 °F.

#### Integral Time : $\bar{I}$

When the character " $\bar{I}$ " is displayed on the PV display, the integral time (I constant) can be changed using the Up and Down Keys. It can be set in a range from 0 to 3,999 seconds in units of 1 second. The value is factory-set to 233 seconds.

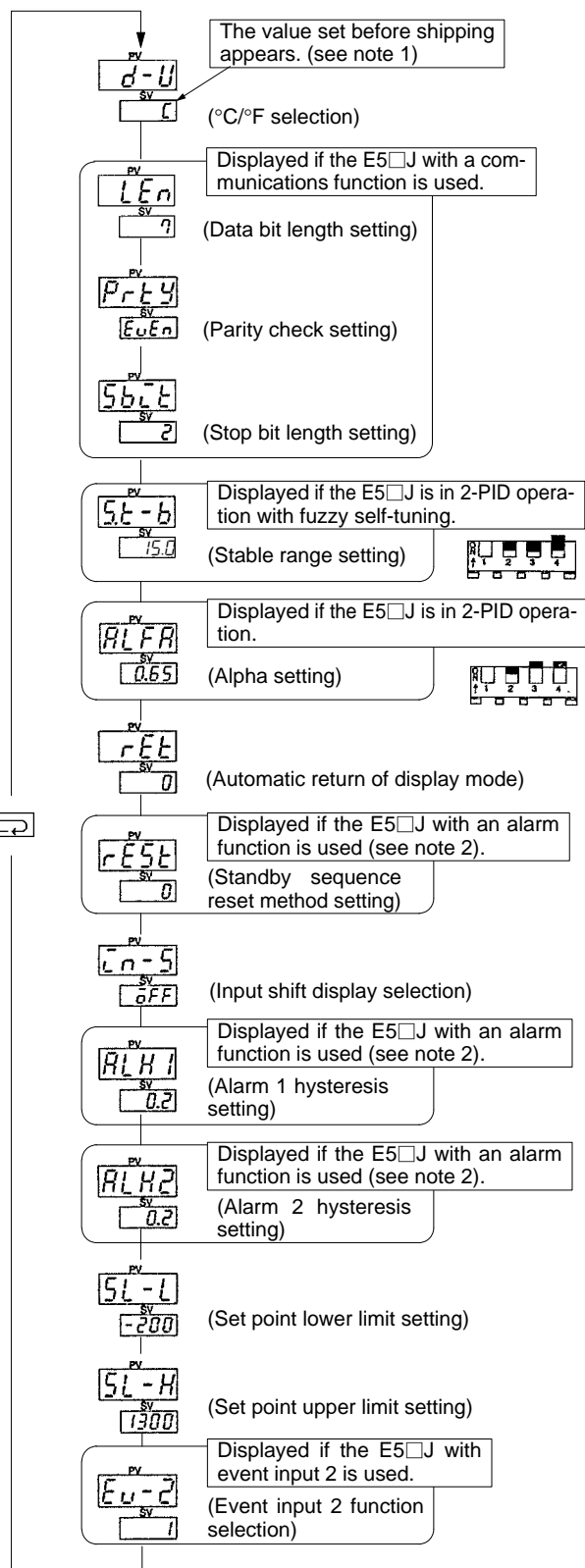
#### Derivative Time : $d$

When the character " $d$ " is displayed on the PV display, the derivative time (D constant) can be changed using the Up and Down Keys. It can be set in a range from 0 to 3,999 seconds in units of 1 second. The value is factory-set to 40 seconds.

#### Manual Reset Value Setting (%) : $\bar{\sigma}Fr$

The necessary output value in stable state will be set within a range of 0.0% to 100.0%. The output value is factory-set to 50.0%. In P or PD mode (i.e., when I is 0), the Temperature Controller will be balanced with a deviation value between the set point and process value. This deviation value is called the offset. By changing the manual reset value, the offset can be eliminated.

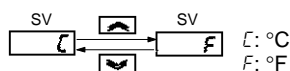
## ■ Engineering Level Parameters



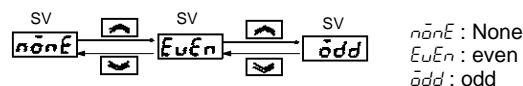
- Note:**
- The E5□J-□□□□-F values set before shipping are different. Refer to the *E5□J Operation Manual (Z103)*.
  - The value will not be displayed if the alarm mode switch is set to 0 or if the E5□J does not incorporate any alarm.

**d-U °C/°F Selection**

To change the temperature display unit from °C to °F, press the Up Key so that *F* will be displayed in the set value display.

**P-r-y Parity Check**

Use this parameter to change the communications parity check.

**E5□J with Communications Function**

The communications specifications of the E5□J are as follows:

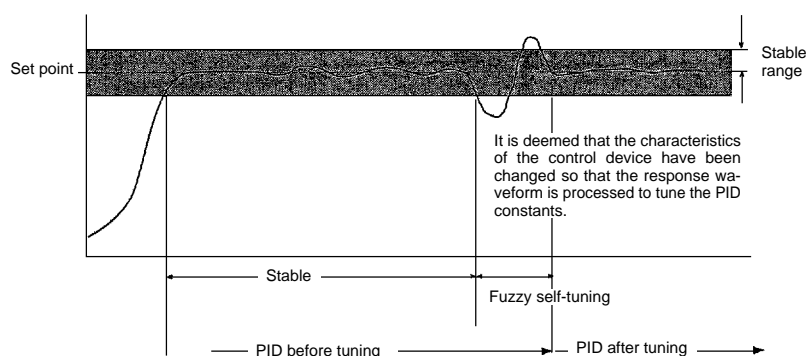
- Data bit length: ASCII 7- (set before shipping) or 8-bit code
- Parity check: None, even (set before shipping), or odd
- Stop bit length: 1 or 2 (set before shipping)
- Use the following parameters to change the above setting.

**LEn Data Bit Length**

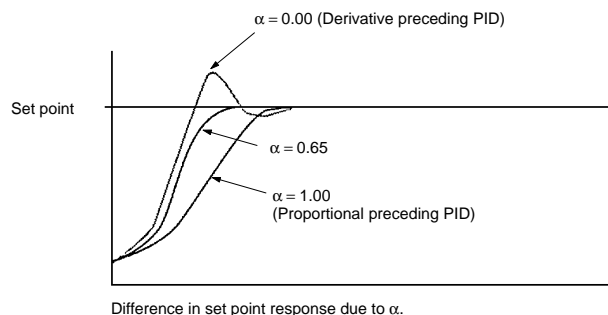
Use this parameter to change the communications data bit length.

**Stable Range (°C/°F)**

This parameter is used to decide conditions under which fuzzy self-tuning operates and can be set within a range of 0.1 to 999.9. If the absolute value of the deviation (the difference between the process value and set point) is within the stable range, temperature control operation is deemed smooth and fuzzy self-tuning will not start.

**PLFR (α) PID Control Type**

By adjusting internal parameter  $\alpha$  of 2-PID within a range of 0.00 to 1.00, PID control such as derivative preceding PID or proportional 2-PID (I-PD) control will be possible.



To increase the set point response speed, decrease the value of parameter  $\alpha$ . If the value of parameter  $\alpha$  is decreased, however, the overshooting value will increase.

**rEt Automatic Return of Display Mode (Return Time)**

By setting automatic return of display mode, the display will return to the normal operation display (on level 0 displaying the process value or set point) if no key is operated for the time set with this parameter. The return time can be set within a range of 0 to 99 s. If the return time is set to 0 s, this function will not work. The return time is set to 0 s before shipping.