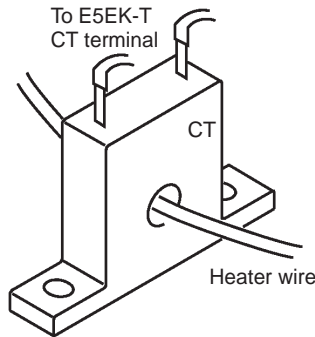


How to Use the Heater Burnout Alarm

- On a standard type controller, the HBA (heater burnout alarm) function can be used only when the assignment destination of the output function “control output (heat)” is set to pulsed output.
- When using the HBA function, assign output function “heater burnout alarm” to control outputs 1/2 or auxiliary outputs 1/2.

Heater burnout detection



- Heater burnout detection works as follows:
 - (1) Connect the current transformer (CT) to terminal Nos.15 and 17, and insert the heater lead through the CT hole.
 - (2) When current flows through this lead, the current transformer generates AC current proportional to the current value. The E5EK-T measures this AC current to calculate the current flowing to the heater.
 - (3) If the heater is burned out, the current measured at the current transformer decreases. This value is compared with the value set as the heater burnout set value and is output as the heater burnout alarm.
- Set the heater burnout set value in the “heater burnout alarm” parameter. To verify the current value of the current transformer, use the “heater current monitor” parameter.
- When you are not using the HBA function, set the “heater burnout alarm” parameter to “0.0 (disabled)”.

HBA latch/release

- When the HBA latch function is set to “ON”, the heater burnout alarm is held until either of the following measures is taken:
 - a Set the heater burnout set value to “0.0A” (default).
 - b Reset the controller.
(Turn the controller’s power OFF then back ON again.)
- To enable the HBA latch function, set the “HBA latch” parameter to “ON”.

Operating conditions

- Turn the heater power supply ON at the same time as or before turning the E5EK-T power supply ON. If the heater power supply is turned ON after turning the E5EK-T power supply ON, the heater burnout alarm is output.
- Control is continued even when the heater burnout alarm is output. (That is, the controller attempts to control the heater as if the heater burnout alarm has not occurred.)
- The heater burnout alarm is detected only if the control output is continuously ON for 190 ms minimum.
- The rated current value may sometimes differ slightly from the actual current value flowing to the heater. Verify the current value in an actual operating state in the “heater current monitor” parameter.
- If there is little difference between the current in a normal state and the current in a burnout state, detection may become unstable. On a heater of current 10.0 A or less, maintain a difference of 1.0 A mini-

mum. On a heater of current 10.0 A minimum, maintain a difference of 2.5 A minimum.

- The heater burnout alarm function cannot be used when the heater is controlled by a phase control system or by a cycle control system. Also, the heater burnout alarm function cannot be applied on 3-phase heaters.

To detect heater burnout on a 3-phase heater, use the K2CU-F□□A-□GS (with gate input terminal). (For details, see the respective product catalog.)

How to calculate the heater burnout set value

- Calculate the set value by the following formula:

$$\text{Set value} = \frac{(\text{current value at normal operation} + \text{current value at burnout})}{2}$$

- Set the current value at burnout when two or more heaters are connected to the CT to the value at the time that the heater having the smaller(est) current value burns out (the value when one of the heaters burns out with all heaters at the same current).
- Make sure that the following condition is satisfied:

Heater of current 10.0 A or less

Current value at normal operation - current value at heater burnout ≥ 1 A

When resultant current is less than 1 A, detection is unstable.

Heater of current 10.0 A minimum

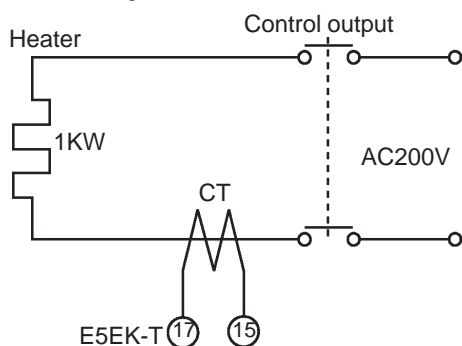
Current value at normal operation - current value at heater burnout ≥ 2.5 A

When resultant current is less than 2.5 A, detection is unstable.

- The set value can be set within the range 0.1 to 49.9 A. Heater burnout is not detected when the setting is “0.0” or “50.0”. When the setting is “0.0”, the heater burnout alarm is set to “OFF,” and when the setting is “50.0”, the heater burnout alarm is set to “ON.”
- Set the total current value at normal heater operation to 50 A or less. When set to 55.0 A minimum, [F F F F] is displayed in the “heater current monitor” parameter.

Examples of use

Example 1 : when using a 200 VAC, 1 kW heater



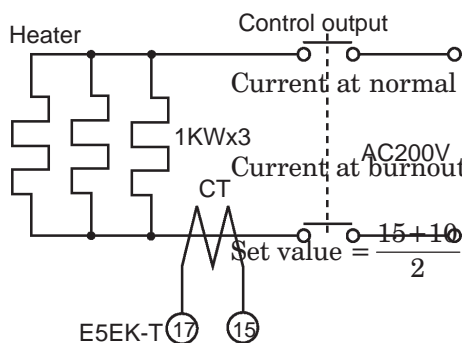
$$\text{Current at normal operation} = \frac{1000}{200} = 5\text{A} (< 10\text{A})$$

$$\text{Current at heater burnout} = 0\text{A}$$

$$\text{Set value} = \frac{5+0}{2} = 2.5\text{A}$$

$$\begin{aligned} &(\text{current at normal operation} - \text{current at heater burnout}) \\ &= 5 - 0 = 5\text{A} (\geq 1\text{A}) \end{aligned}$$

Example 2 : when using three 200 VAC, 1 kW heaters



$$\text{Current at normal operation} = \frac{1000}{200} \times 3 = 15\text{A} (\geq 10\text{A})$$

$$\text{Current at burnout of one heater} = \frac{1000}{200} \times 2 = 10\text{A}$$

$$\text{Set value} = \frac{15+10}{2} = 12.5\text{A}$$

$$\begin{aligned} &(\text{current at normal operation} - \text{current at heater burnout}) \\ &= 15 - 10 = 5\text{A} (\geq 2.5\text{A}) \end{aligned}$$

Parameters

Symbol	Parameter Name: Mode	Description
CL	Heater current monitor : Level 1	Heater current value monitor
HB	Heater burnout detection : Level 1	Heater burnout detection
HbL	Heater burnout latch : Option	Heater burnout detection alarm latch