OMRON

Temperature Controller

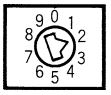
E5AW

DIN-sized (96 X 96-mm) Temperature Controller Featuring Automatic PID Tuning Function

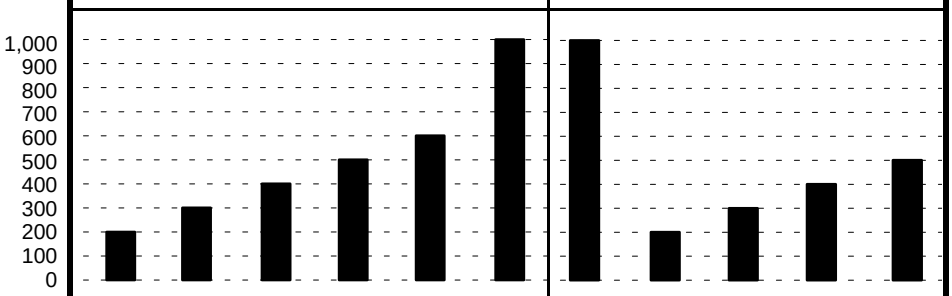
- Simultaneous PV and SV displays.
- Multiple temperature scale ranges allow easy selection for application.
- Field-selectable temperature ranges in °C and °F.
- Tamper-proof settings, sensor compensation, and controller diagnostics.
- Includes 8-function temperature range alarm.
- Nonvolatile memory.
- Selectable operation mode (ON/OFF or PID).

Ordering Information

■ Thermocouple Types

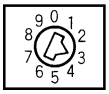


Temperature range selector (set to 2 at factory)

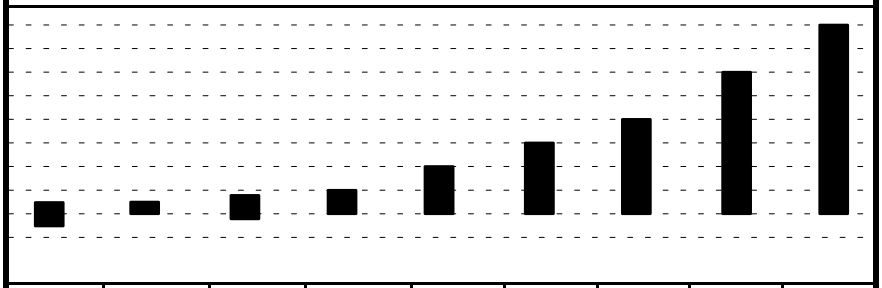


Input			K (CA) Chromel-alumel						J (IC) Iron-constantan				
Range			0 to 200	0 to 300	0 to 400	0 to 500	0 to 600	0 to 999	0 to 999	0 to 200	0 to 300	0 to 400	0 to 500
Setting			0	1	2	3	4	5	6	6	7	8	9
Indication			°C	°C	°C/°F	°C/°F	°C/°F	°C/°F	°F	°C	°C	°C/°F	°C/°F
Resolution (°C/°F)			1										
ON/OFF or PID operation	Without heater burnout alarm	Contact output	E5AW-R1KJ										
		Voltage output	E5AW-Q1KJ										
	With heater burnout alarm	Contact output	E5AW-RHKJ										
		Voltage output	E5AW-QHKJ										

■ Temperature Resistance (Platinum-resistance) Thermometer Types



Temperature range selector (set to 3 at factory)



Input			JPt100/Pt100 (Platinum resistance thermometer)						
Range			-50 to 50	0.0 to 50.0	-20 to 80	0.0 to 99.9	0 to 200	0 to 300	0 to 400	0 to 600	0 to 800
Setting			0	1	2	3	4	5	6	7	8
Indication			°C	°C	°C	°C/°F	°C/°F	°C	°C/°F	°F	°F
Resolution (°C/°F)			1	0.1	1	0.1	1				
ON/OFF or PID operation	Without heater burnout alarm	Contact output	E5AW-R1P								
		Voltage output	E5AW-Q1P								
	With heater burnout alarm	Contact output	E5AW-RHP								
		Voltage output	E5AW-QHP								

Note: 1. Supply voltage of the standard type is 100 to 240 VAC. When 24 VDC/VAC Type is needed, add “24 VDC/VAC” after the model name
(example: E5AW-R1KJ 24 VDC/VAC).
2. Models set to display in degrees Fahrenheit (°F) can be ordered by adding “-F” to the end of the model number (example: E5AW-R1KJ-F). The scale indication switch will then be set to °F prior to shipment from the factory.

Specifications

■ Temperature Controller

Ratings

Supply voltage	100 to 240 VAC or 24 VDC/VAC, 50/60 Hz
Operating voltage range	85% to 110% of rated supply voltage
Power consumption	Approximately 8 VA (approx. 4 VA at 24 VAC, approx. 3 W at 24 VDC)
Relay control output	3 A, 250 VAC (resistive load), SPDT
Voltage control output	12 VDC, 20 mA (with short-circuit protection)
Alarm output	1 A, 250 VAC (resistive load), SPST-NO

Characteristics

Setting and display accuracy	±0.5% full scale ±1 digit max. (The setting and display temperatures coincide because there is no relative error between them.)
Hysteresis	0.2% of full scale (during ON/OFF operation)
Proportional band	0% to 99%
Integral time (Reset time)	0 to 99 minutes
Derivative time (Rate time)	0 to 9.9 minutes
Anti-reset windup (ARW)	0% to 99%
Alarm output setting range	0 to full-scale for all alarm modes except the absolute-value alarm mode*
Proportional period	2/20 s (switch-selectable)
Sampling period	500 ms (Output change period: 2 s, Indication change period: 2 s)
Insulation resistance	20 MΩmin. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 minute between current-carrying terminals of different polarity
Vibration	Malfunction durability: 2 to 55 Hz, 2G 10 minutes each in X, Y, and Z directions Mechanical durability: 10 to 55 Hz, 0.75 mm double amplitude 2 hrs each in X, Y, and Z directions
Shock	Malfunction durability: 100 m/s^2 3 times each in 6 directions Mechanical durability: 300 m/s^2 3 times each in 6 directions
Life expectancy	Mechanical: 10,000,000 operations min. (Contact Output Types) Electrical: 100,000 operations min. (Contact Output Types)
Ambient operating temperature	-10° to 55°C (with no icing)
Ambient storage temperature	-25° to 65°C (with no icing)
Ambient humidity	35% to 85% (with no condensation)
Enclosure ratings	Front panel: IEC IP 50 Rear Panel: IEC IP20 Terminals: IEC IP00
Approvals	UL (File no. E68487) CSA (File no. LR59623) SEV
Weight	Approx. 300 g (without Adapter)

*Set values must be within the allowable range limits for alarm values, control outputs, etc. If the calculated value proves to be out of range, select another range. The calculation is as follows:

Minimum scale range $\leq T_{set} \leq X \leq$ maximum scale range

Where:

T_{set} = Set temperature, and

X = Alarm value.

Heater Burnout Alarm

Maximum heater current	5/10/30 A, single-phase (selectable)
Heater current setting range	20% to 100% of maximum heater current
Heater current setting sensitivity	15% max. of maximum heater current
Heater burnout alarm output	1 A, 250 VAC (resistive load) SPST-NO

■ Current Transformer

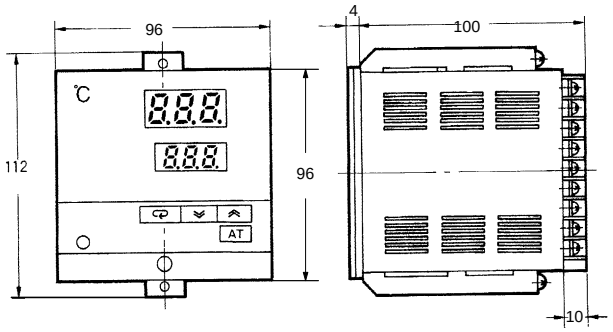
Included in the Heater Burnout Alarm Types.

Maximum heater current	50 A
Momentary non-saturation current	100 A
Instantaneous safe current	500 A
Dielectric strength	1,000 VAC
Vibration	50 Hz (10G)
Weight	Approx. 14 g

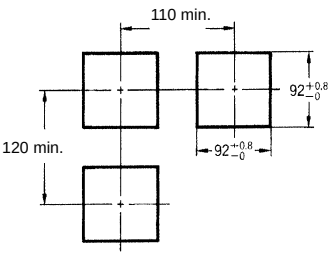
Dimensions

Note: All units are in millimeters.

■ Temperature Controller



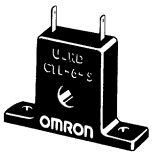
Panel Cutout

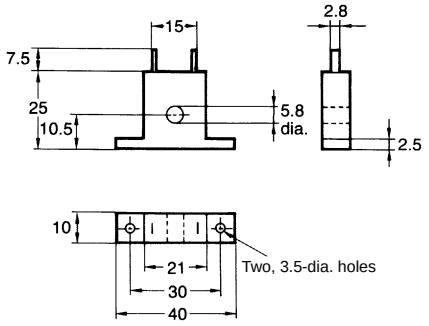


Note: 1. Recommended panel thickness is 1 to 8 mm.

2. Because mounting brackets are attached to the top and bottom of a Temperature Controller, close side-by-side mounting is possible. Provide a center-to-center distance of at least 120 mm between two adjacent temperature controllers when mounted vertically, and at least 110 mm when horizontally mounted.

■ Current Transformer



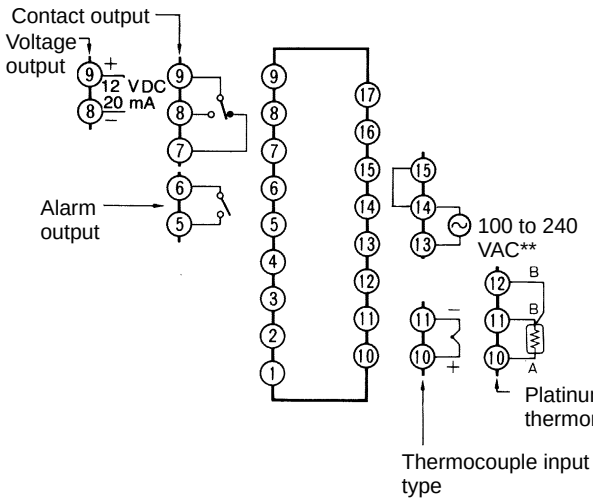


Installation

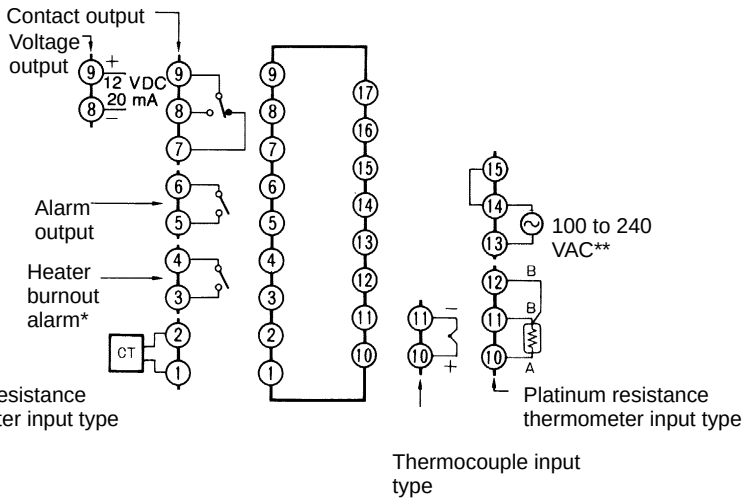
■ Wiring

The voltage output (20 mA, 12 VDC) is not electrically insulated from internal circuits.

Alarm Output Type (E5AW)

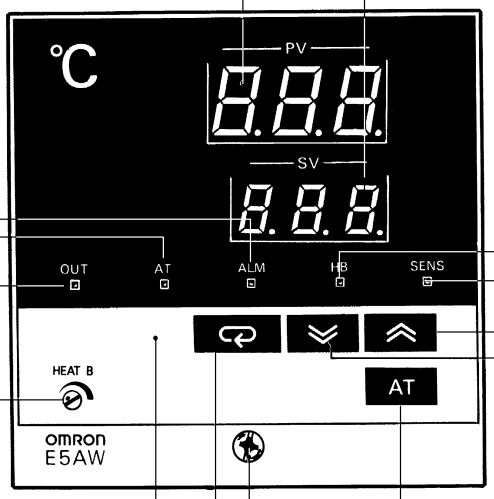


Heater Burnout Alarm Type (E5AW-H)



*The heater burnout alarm relay is also energized when a sensor failure has occurred.
**The connection of 24 VAC/VDC type is as shown below.

Nomenclature



Process Value (PV) Display
Displays the process temperature or the name of the parameter whose set value is displayed in the SV display. Also displays an error indication in the event of malfunction.

Set Value (SV) Display
Displays the temperature set values or other parameters.

Alarm Output Indicator
Lights when the alarm output is ON.

Auto-tuning Indicator
Flashes on and off about every second during auto-tuning operation.

Control Output Indicator
Lights while the control output is ON.

Heater Burnout Current Adjustment
Sets the current value at which heater burnout should be detected. (This control is not provided on models that do not have the heater burnout alarm.)

Hidden Protection Switch
When pressed, this hidden switch enables the up, down, and auto-tuning keys even if the internal protect switch is on.

Heater Burnout Indicator
Lights when the heater has burned out, and remains lit until the power is turned OFF. While this indicator is lit, the heater burnout alarm relay is ON. (This indicator is not provided on models that do not have the heater burnout alarm.)

Sensor Error Indicator
Lights if a failure has occurred in the temperature sensor (e.g. thermocouple or platinum resistance thermometer). When the fault is remedied, it goes off. While this indicator is lit, the heater burnout alarm is ON. (This indicator is not provided on models that do not have the heater burnout alarm.

Auto-tuning (AT) Key
To enter auto-tuning mode, press this key for 2 seconds during PID operation. To exit auto-tuning mode, press the key for 2 seconds.

Up Key
Pressed to increment set temperature or alarm value settings. Value will increment continuously if key is held down. This key is disabled when the protection switch is ON.

Display Key
Used to shift the display to the next parameter.

Draw-out Screw

Down Key
Pressed to decrement set temperature or alarm value settings. Value will decrement continuously if key is held down. This key is disabled when the protection switch is ON.

Note: Tear off the protective sheet after installation.

Operation

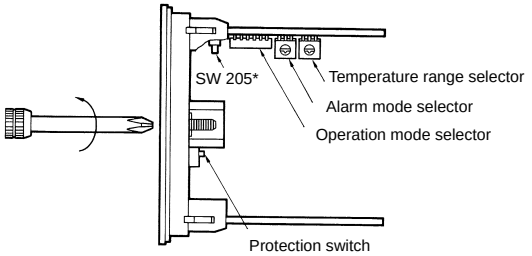
NOTICE: Always turn off the power supply to the Temperature Controller before changing any switch settings.

■ Accessing Switches and Selectors

Various functions of the temperature controller are set by the switches provided inside the device. To gain access to these switches, the housing must be removed. Loosen the draw-out screw with a Phillips screwdriver, and slide the housing off.

NOTICE: Do not touch SW205.
This switch is for factory inspection only. Operation errors may occur if the setting of SW 205 is altered.

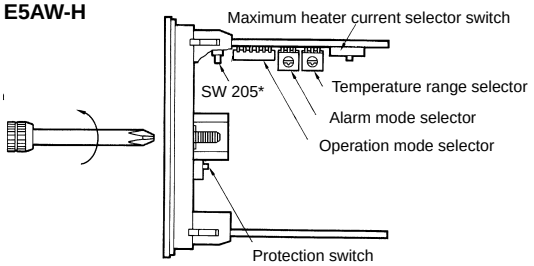
E5AW Loosen the draw-out screw and pull the Temperature Controller out.



*SW205 must be set to inward position.

Bottom view

E5AW-H



*SW205 must be set to inward position.

Bottom view

■ Setting Procedure: Step 1

Set the desired temperature range using on the temperature range selector. Any of various ranges can be selected, depending on the model. These ranges and the corresponding switch settings are shown in the following tables. Refer to *Ordering Information* for graphic representations of these ranges.

Thermocouple Types

In centigrade, the display can indicate temperature 10% beyond the set temperature range. In Fahrenheit, the display can indicate temperatures from 5% below the range to 10% above the range.

If you are working in Fahrenheit, do not set the temperature range selector to a setting for which a range does not exist.

Setting	Sensor	Unit	°F	°C
0	K (CA)	1 degree	Do not set.	0 to 200
1				0 to 300
2			0 to 400	0 to 400
3			0 to 500	0 to 500
4			0 to 600	0 to 600
5			0 to 999	0 to 999
6	J/L (IC)		0 to 999	0 to 200
7			Do not set.	0 to 300
8			0 to 400	0 to 400
9			0 to 500	0 to 500

Temperature Resistance Thermometer Types

Do not set the temperature range selector to setting 9. Doing so will result in an error message (FFF or ZZZ). Also, do not set the temperature range selector to a setting for which a range does not exist.

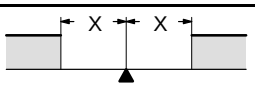
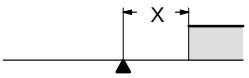
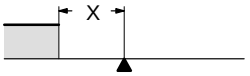
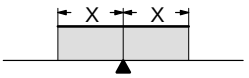
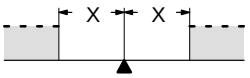
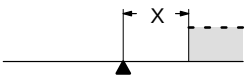
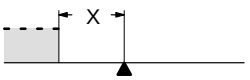
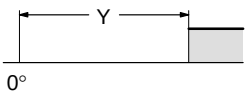
If the range is changed from one with to 0.1 degree increment to one with to 1 degree, the set temperature and alarm value will increase by a factor of ten. When a change is made in the opposite direction, these values will be reduced by a factor of one tenth. Be sure to check the set temperature and alarm values whenever the temperature range has been changed.

In centigrade, the display can indicate temperatures up to 10% beyond the set temperature range. In Fahrenheit, the display can indicate temperatures from 5% below the range to 10% above the range.

Setting	Unit	°F	°C
0	1 degree	Do not set.	-50 to 50
1	0.1 degree		0.0 to 50.0
2	1 degree		-20 to 80
3	0.1 degree	0.0 to 99.9	0.0 to 99.9
4	1 degree	0 to 200	0 to 200
5		Do not set.	0 to 300
6		0 to 400	0 to 400
7		0 to 600	Do not set.
8		0 to 800	Do not set.
9		Do not set.	

■ Setting Procedure: Step 2

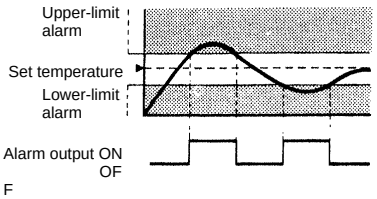
Set the alarm mode selector to the desired mode. The selector is set to 2 at the factory. The triangles indicate the relative value of the set temperature. X's indicate the alarm value and the Y indicates any value within the set temperature range. The standby sequence is described below. (Alarm output is ON within the shaded areas.)

Switch setting	Mode	Alarm output
0 or 9	Alarm off	OFF
1	Upper and lower limits	
2	Upper limit only	
3	Lower limit only	
4	Inverse upper and lower limits	
5	Upper and lower limits with standby sequence	
6	Upper limit only with standby sequence	
7	Lower limit only with standby sequence	
8	Absolute-value	

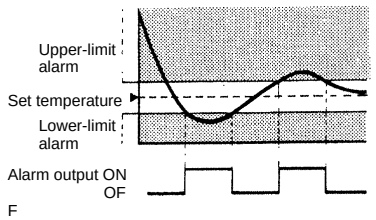
Standby Sequence

The standby sequence operates when power is applied to the Temperature Controller.

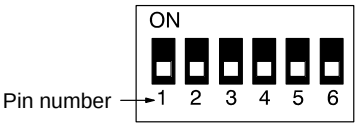
When temperature rises from the set temperature



When temperature falls below the set temperature.



■ Setting Procedure: Step 3



Function	Pin number	Pin setting	Control setting
Operation mode	1	ON	PID operation
		OFF	ON/OFF operation
Proportional period	2	ON	2 seconds
		OFF	20 seconds
Control output	3	ON	Normal (cooling)
		OFF	Reverse (heating)
Parameter display*	4	ON	Enabled
		OFF	Disabled
Temperature sensor	5	ON	K,L/Pt100**
		OFF	K, J/JPt100**
Indication	6	ON	°F
		OFF	°C

*When the operation mode is set to PID operation (pin 1 is ON), setting values of P, I, D, and ARW remain effective even if the parameter display function is disabled (pin 4 is OFF). When the value of P is 0, however, the device operates as if in ON/OFF mode, making the values of I, D, and ARW invalid. Input shift values are in effect even when they are not displayed. (See *Pin 4: Control Parameter Indication*)

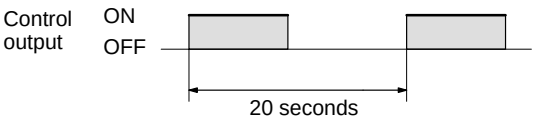
**Japan Industrial Standard (JIS) Pt100 is now called JPt100, reflecting a change in the standard. Likewise, J-DIN is now called L.

Pin 1: Operation Mode

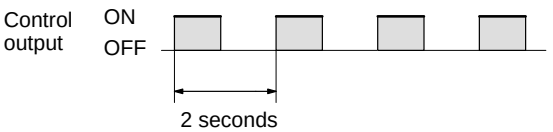
Turn pin 1 OFF for ON/OFF Controller operation and ON for PID operation. Changes in the control output for both ON/OFF and PID operation are provided under *Pin 3: Control Output*.

Pin 2: Proportional Period

This pin is effective only for PID operation (i.e., when pin 1 is ON). Turn pin 2 OFF to establish a proportional period of 20 seconds when using the Temperature Controller's relay output or an external contact.



If a quick response is required, turn pin 2 ON to establish a proportional period of 2 seconds. This step is necessary even when using solid-state relays (SSR) to establish a quick response. If a 2-second proportional period is used with a relay control output, the life of the relay will be greatly reduced.



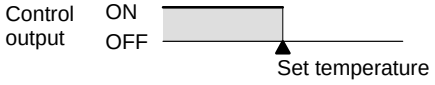
Pin 3: Control Output

The control output can be set for either normal (direct) or reverse operation. Turn pin 3 ON for normal operation; OFF for reverse operation. Normal operation is used when the Temperature Controller is used to control cooling devices, such as a freezer; reverse operation is used to control heating devices.

The action of the control output for both ON/OFF and PID operation is shown below

ON/OFF Operation

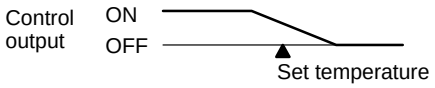
Reverse output: Pin 3 OFF



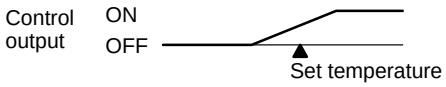
Normal (direct) output: Pin 3 ON

PID Operation

Reverse output: Pin 3 OFF



Normal (direct) output: Pin 3 ON



Pin 4: Control Parameter Indication

When not using auto-tuning, set pin 4 to ON. The display, up, and down keys can then be used to set the values of P, I, D, ARW, and input shift.

In the auto-tuning mode, pin 4 may be set to either ON or OFF. To view a value which was set automatically, however, switch it to ON. The P, I ,D , ARW, and input shift values remain effective even when pin 4 is OFF.

An input shift can be set to offset the temperature displayed on the Temperature Controller from the measured temperature, allowing for fine adjustments in the controlled temperature without changing the set temperature. This can be done to correct known sensor calibration errors, to correct for differences between the work-piece temperature and the sensor temperature, or to align the temperature display in a multizone, multicontroller application, e.g., at ambient temperature.

An input shift can be set between -99° and 99° (F or C), except for ranges set to 0.1 degree, in which case the input shift can be set between-9.9° and 9.9°.

Example

Offset display	Offset	Sensor temperature	Displayed temperature
0	None	100°C	100°C
9	9°C	100°C	109°C
-16	-16°C	100°C	84°C

Note: The offset value remains effective even after pin 4 has been set to OFF. If the compensation operation is not needed, be sure to set the offset value to 0.

To set an input shift, turn ON pin 4 and press the display key until 0 is displayed to indicate an input shift of 0. (If an input shift has previously been set, the set value will initially be displayed instead.) Then press the up and down keys to set the desired value.

To cancel an input shift, the value in memory must be set to 0. It is not sufficient to merely turn OFF pin 4.

Note that an input shift changes the value of the controlled temperature when used in a closed-loop system. For example, with a set temperature and display of 100°C and an input shift set at 10°C, the controlled temperature will be 90°.

Pin 5: Temperature Sensor Standard

The type of temperature sensor can be set to match the Temperature Controller to the thermocouple or platinum (Pt100) sensor being used. Turn pin 5 ON to use K, L, or Pt100; turn it OFF to use K, J, or JPt100.

Pin 6: Indication

Turn pin 6 ON to work and display in Fahrenheit; turn it OFF to work and display in centigrade. Note that some of the temperature ranges available on the temperature range selector vary depending on whether Fahrenheit or centigrade is used.

■ Setting Procedure: Step 4

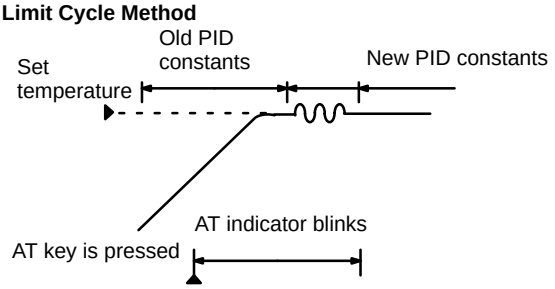
Auto-tuning Operation

Pressing the auto-tuning key for more than 2 seconds causes the Auto-tuning indicator to flash on and off and to start auto-tuning operation. When completed, the indicator goes off and the optimal PID values are set automatically. Note that, during auto-tuning, you cannot change set values. When in ON/OFF operation (when pin 1 of the mode selector is set to OFF), auto-tuning is disabled.

Aborting Auto-tuning

To cease auto-tuning, press the auto-tuning key for more than 2 seconds. The auto-tuning indicator then goes off and auto-tuning is aborted. The set values revert to their previous values.

Limit Cycle Method



Limit cycle method:
The optimum PID constants are calculated by this method by varying the control output variable and generating external oscillation.

Note:
1. The auto-tuning function can be executed at any time: during power-up, during temperature changes, or after operation has stabilized.
2. The optimum PID values may not be obtained from some objects.
3. Do not use the auto-tuning function when hunting is not desirable.

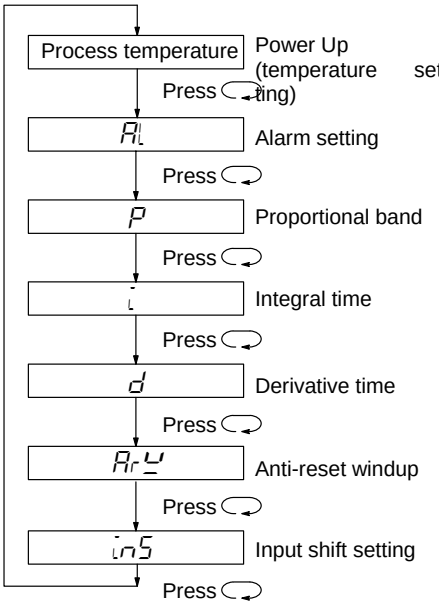
■ Setting Procedure: Step 5

Display

One of the features of this model is a simultaneous display of the PV and SV. You can set the desired SV for the parameter indicated on the PV display.

When power is ON, the process value (PV) indicator displays 0 for 4 seconds before the E5AW starts operating. To set values, use the up and down keys. (The following values are default, set before shipment: AL = 0 (°C/F), P =3(%), I =4 (min.), d = 4 (1/10 min.), ArU = 50 (%)

The value to be set can be selected using the display key. The current parameter is shown in the PV display.



Note

1. AL is skipped without being displayed when the alarm function is not set (when the Alarm mode selector (located internally) is set 0 or 9).
2. P, I, d, and ArU are skipped without being displayed when operation mode selector 1 (for the ON/OFF mode) is OFF or switch 4 (control parameter display mode) is OFF (these switches are located internally and set to a default of OFF before shipment). Note that even if there is no parameter display, each set value is effective in the PID mode. When P is 0, the controller is in the ON/OFF mode and I, d, and ArU are skipped without being displayed.
3. in5 is skipped without being displayed when switch 4 (control parameter display mode) is OFF. Note, however, that the input value setting is effective.

Alarm (AL)

An alarm temperature value can be set with AL. In normal operation, set the deviation range value for the set temperature. If an absolute alarm temperature value is desired, set the absolute value. Use the up and down keys to set the values when AL is displayed. No characters are displayed when the alarm function is not selected. The default set values for the upper limit alarm and the alarm temperature before shipment are set to 0°C/°F.

Proportional Band (P)

When P is displayed, the up and down keys can be used to set a proportional band in the SV display. The P value can be set in the range 0% to 99% of the full scale in units of 1%. The default set before shipment is 3%.

Integral time (Reset time) (I)

When I is displayed, the up and down keys can be used to set a time in the range from 0 to 99 minutes in steps of 1 minute. The default set value before shipment is 4 minutes.

Derivative time (Rate time) (d)

When d is displayed, the up and down keys can be used to set a differential time value in the range from 0.0 to 9.9 minutes in steps of 0.1 minute. The default value before shipment is 0.4 minute. Note that, however, the indicator displays 4 without the decimal.

Anti-reset Windup (ArU)

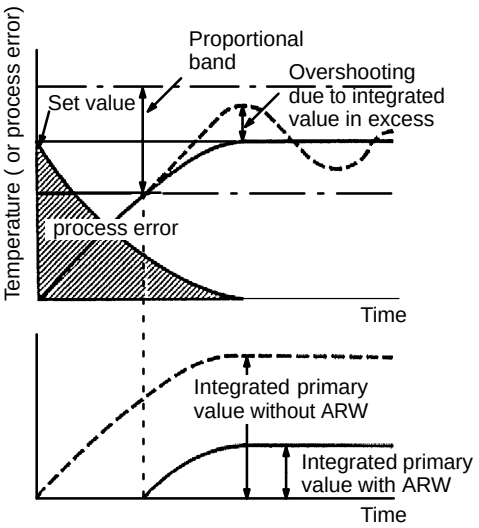
When ArU is displayed, the up and down keys can be used to set an anti-reset value in a range from 0% to 99% in steps. The default set value before shipment is 50%.

Note : ARW Function

An integral value controlling PID or PI operation can be obtained by integrating the process error from the beginning of operation. Therefore when the process temperature reaches about the set temperature, a large value must be integrated, causing overshooting. The ARW function prevents the controller from overshooting by excluding from calculation the process error prior to the lower limit (point A, in controlling heating operations), starting calculation from point A, and in the proportional band, adding the expected convergent value to the integrated value. When the overshooting value is large as a result of controlling, a small ARW value should be set. Note that, however, if the ARW value is too small, more time is required for the controller to reach the set value.

Input Shift Setting (in5)

When in5 is displayed, the up and down keys can be used to set an input shift value. Refer to *Setting Procedure: Step 4 Pin 4: Control Parameter Indication* for further details.



■ Setting Procedure: Step 6

Heater Burnout Alarm Setting

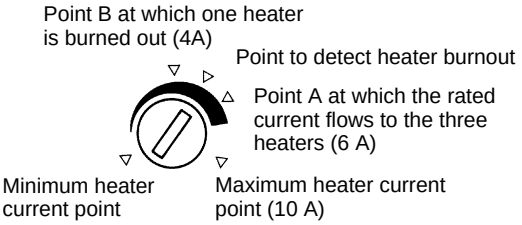
The maximum heater current selector provides a choice of 5, 10, or 30 A. The selector is located inside the device and can only be accessed by removing the housing. (The selector is set to the 5 A position at the factory.)

As an example, suppose three heaters each rated at 200 VAC, 400 W are connected in parallel. The Temperature Controller is to produce a heater burnout alarm if any of the heaters burn out.

Since the total current that can flow through the heaters is 6 A (=400 W/ 200 V x 3 heaters), set the heater current selector to the 10 A position. Then turn the heater current setting adjustment (HEAT B on the lower left of the front panel) clockwise to find the point (A) at which the burnout alarm is generated. (Note that this alarm, once generated, is retained until the power to the Temperature Controller is turned off. To cancel the alarm, turn off the power and then back on again.)

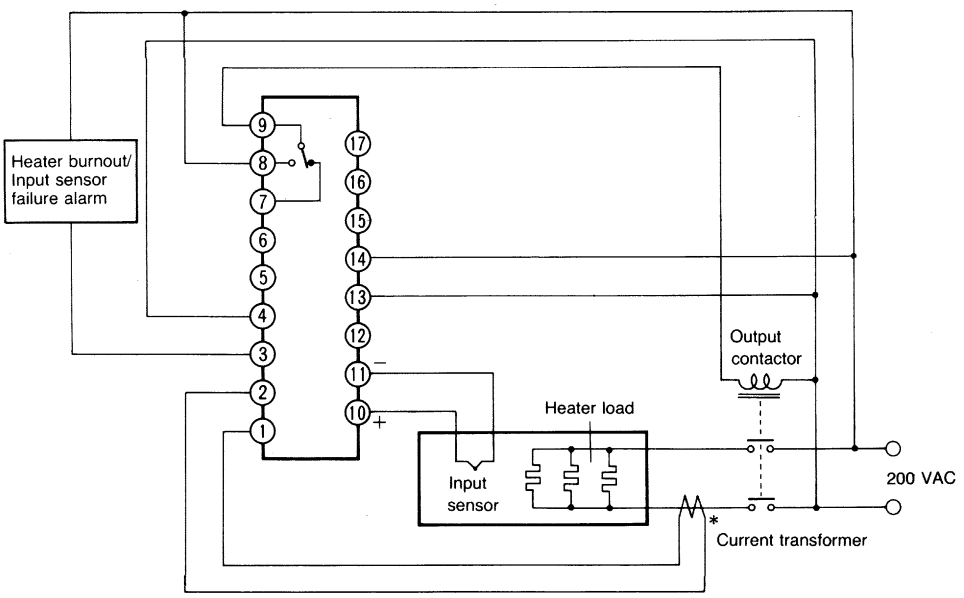
Next, remove one of the heaters. The total current that can flow through the heaters is now 4 A. From the minimum, leftmost position, turn the control clockwise again to find the point (B) at which the heater burnout alarm is generated.

Set the control midway between these two points (points A and B).



- Note that the difference between the two current values must be at least 15% of the maximum heater current; otherwise, stable detection cannot be performed.
- The Temperature Controller and the heaters are not necessarily supplied with power from the same power source. However, to detect the heater burnout, the heater must be powered on sumultaneously or earlier than the Temperature Controller.
- The alarm output is not retained if burnout has been detected in the thermocouple or platinum resistance thermometer. The alarm is stopped when a recovery occurs.
- The heater burnout alarm function cannot be used when the heaters are controlled by the phase control method.
- The heater burnout alarm function cannot be used when the heaters are supplied power by a three-phase AC supply.

Connection Example for Heater Burnout Alarm Function (E5AW-H)

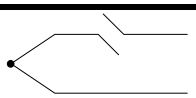


*This wiring must be passed through the hole of the special current transformer. The current transformer can be connected to the input sensor in any polarity.

■ Operation in Response to Sensor Failure

The following tables show the displays and outputs conditions that will result from various breaks and short circuits in sensor wiring.

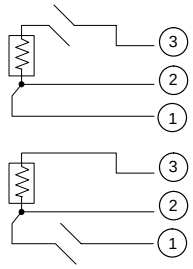
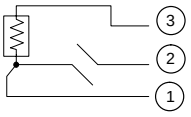
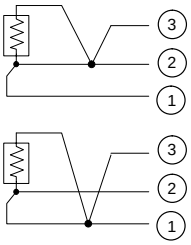
Thermocouple Types

Condition		Display	Control output
Break in wiring		FFF flashes	OFF

Note: When the input is short-circuited, the room temperature is displayed.

Resistance Thermometer Types

Note: The resistance of the platinum resistance thermometer is 100 Ω at 0°C. It increases to about 140 Ω at 100°C.

Condition		Display	Control output
Break in wiring		FFF flashes	OFF
		flashes	OFF
	Breaks in 2 or 3 wires	FFF flashes	OFF
Short circuit		flashes	OFF

■ Error Messages

The Temperature Controller is provided with a self-diagnostic function that will result in the following messages when errors are detected.

An alarm output is generated according to the alarm mode setting when the message FFF is displayed or flashes on the display, indicating that the temperature has exceeded the set temperature range. An alarm output is also generated when the message ¿¿¿ displayed or flashes on the display, indicating that the temperature has fallen below the set temperature range.

Message	Cause	Control Output
FFF	The temperature has risen beyond the set temperature range.	Normal control output (cooling): ON Reverse control output (heating): OFF
¿¿¿	The temperature has fallen below the set temperature range.	Normal control output (cooling): OFF Reverse control output (heating): ON
FFF (flashing)*	1. Thermocouple or platinum temperature-resistance thermometer has failed. 2. The temperature has risen excessively beyond the set temperature range.	OFF
¿¿¿ (flashing)*	1. Platinum temperature-resistance thermometer has failed. 2. Polarities (positive and negative) of thermocouple have been reversed. 3. The temperature has fallen excessively below the set temperature range.	OFF
E11 or E33*	Memory has failed (E11) or A/D converter has failed (E33). If it is not possible to recover by turning the power on and off, the Temperature Controller must be repaired.	OFF (Alarm output is also OFF.)

*Key operations are disabled.

Precautions

Installation

- Do not install where subject to corrosive gases, excessive dust, etc.
- Do not install where subject to excessive vibration or shock, contact with water or oil, or high temperatures.
- Do not install in the vicinity of equipment that generates high-frequency noise, such as high-frequency welders.

Mounting

- Attach the pair of mounting brackets supplied to the top and bottom of the Temperature Controller, and secure them with the mounting screws using a Phillips screwdriver.
- Turn the screwdriver clockwise to tighten each mounting screw until the ratchet of each mounting bracket makes a clicking sound.

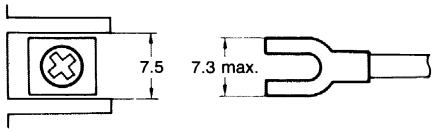
Note: All the models of the E5AW-series temperature controllers conform to the DIN 43700 standard. Recommended panel thickness is 1 to 8 mm.

Wiring

- Do not tighten the terminal screw with excessive force.

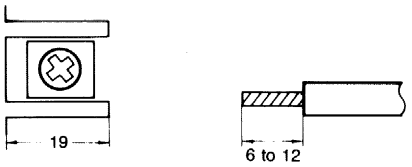
Solderless Terminals

- Use M3.5 solderless terminals with the Temperature Controller's M3.5 self-rising pressure-plate screws.



Solder-dipped Leads

- Strip the lead wires 6 to 12 mm and carefully arrange the wire tips.



Application in Sequenced Circuits

- Several seconds are required from power application until the control output is activated. Be sure to allow an adequate start-up period when using the Temperature Controller in sequenced circuits for temperature control systems.

Sensor Input Connection

- To prevent the lead wires connecting the sensor to the Temperature Controller from being affected by noise, separate them from the power lines and load lines.
- Use the specified compensating conductors for the Thermocouple Type temperature controllers.
- Use lead wires with a low resistance for the Resistance-Thermometer (esp., platinum resistance thermometer) Type temperature controllers.

Other Precautions

- The case is not designed to be opened. Do not attempt to open it.
- To clean the case, use a neutral detergent or alcohol. Do not use organic solvents, such as thinners or benzene, or strong acid or alkali.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. H44-E1-1A **In the interest of product improvement, specifications are subject to change without notice.**

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