Digital Temperature Controllers
E5CZ

Next-generation Digital Temperature Controller

- Depth of only 78 mm.
- Various temperature inputs: thermocouple, platinum resistance thermometer, infrared temperature sensor, and analog inputs.
- Auto-tuning and self-tuning are available. Auto-tuning is possible even while self-tuning is being executed.
- Heating or heating/cooling control is available.
- Start/stop function.
- CE marking and UL/CSA approval.
- Models with optional functions and current output added to the series.

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

48 × 48 × 78 mm (W × H × D)

Model Number Structure

■ Model Number Legend

E5CZ- □ **2** □ □
1 2 3 4

1. **Output type**
   R: Relay
   Q: Voltage (for driving SSR)
   C: Current
2. **Number of alarms**
   2: Two alarms
3. **Option Unit**
   Blank: Not available
   M: Option Unit can be mounted
4. **Power supply voltage**
   Blank: 100 to 240 VAC
   D: 24 VAC/VDC

Ordering Information

■ List of Models

Size	Power supply voltage	Number of alarm points	Control output	Option Unit	Model
1/16 DIN 48 × 48 × 78 mm (W × H × D)	100 to 240 VAC	2	Relay	Not Available	E5CZ-R2
			Voltage for driving SSR	Not Available	E5CZ-Q2
			Relay	Available	E5CZ-R2M
			Voltage for driving SSR	Available	E5CZ-Q2M
			Current	Available	E5CZ-C2M
	24 VAC/VDC	2	Relay	Available	E5CZ-R2MD
			Voltage for driving SSR	Available	E5CZ-Q2MD
			Current	Available	E5CZ-C2MD

■ Option Units

The E5CZ-□2M provides communications or event input functionality when one of the following Option Units is mounted.

Functions			Model
Communications	Heater burnout		E53-CNH03N
Communications			E53-CN03N
	Heater burnout	Event inputs	E53-CNHBN
		Event inputs	E53-CNBN

■ Accessories (Order Separately)

Current Transformers (CTs)

Model	E54-CT1	E54-CT3
Hole diameter	5.8 dia.	12.0 dia.

Specifications

■ Ratings

Power supply voltage		100 to 240 VAC, 50/60 Hz	24 VAC/VDC, 50/60 Hz
Operating voltage range		85% to 110% of rated supply voltage	
Power consumption		7 VA	5 VA, 3 W
Sensor input		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 Voltage input: 0 to 50 mV	
Control output	**Relay output**	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations	
	Voltage output	12 VDC $^{+15\%}/_{-20\%}$ (PNP), max. load current: 21 mA, with short-circuit protection circuit	
	Current output	4 to 20 mA DC, load: 600 Ω max., resolution: approx. 2,600	
Alarm output		SPST-NO, 250 VAC, 1 A (resistive load), electrical life: 100,000 operations	
Event input	**Contact input**	ON: 1 kΩ 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 or ON/OFF control	
Setting method		Digital setting using front panel keys	
Indication method		7-segment digital display and single-lighting indicators Character height: PV: 10.0 mm; SV: 6.5 mm	
Other functions		According to Controller model	
Ambient operating temperature		–10 to 55°C (with no condensation or icing)	
Ambient operating humidity		25% to 85%	
Storage temperature		–25 to 65°C (with no condensation or icing)	

■ Input Ranges

Platinum Resistance Thermometer Input

Input type	Pt100			JPt100	
Temperature range	–200 to 850°C	–199.9 to 500.0°C	0.0 to 100.0°C	–199.9 to 500.0°C	0.0 to 100.0°C
Setting number	0	1	2	3	4

Thermocouple Input

Input type	K		J		T		E	L	U		N	R	S	B
Temperature range	–200 to 1300°C	–20 to 500°C	–100 to 850°C	–20.0 to 400.0°C	–200 to 400°C	–199.9 to 400.0°C	0 to 600°C	–100 to 850°C	–200 to 400°C	–199.9 to 400.0°C	–200 to 1300°C	0 to 1700°C	0 to 1700°C	100 to 1800°C
Setting number	5	6	7	8	9	22	10	11	12	23	13	14	15	16

Shaded setting indicates the default setting.

ES1B Infrared Temperature Sensor

Input type	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C
Temperature range	0 to 90°C	0 to 120°C	0 to 165°C	0 to 260°C
Setting number	17	18	19	20

Analog Input

Input type	0 to 50 mV
Setting range	Usable in the following ranges by scaling: –1999 to 9999 or –199.9 to 999.9
Setting number	21

Applicable standards by input type are as follows:

K: GB/T 2814-98
J,L: GB/T 4994-98
T,U: GB/T 2903-98
E: GB/T 4993-98
N: GB/T 17615-98
R: GB/T 1598-98
S: GB/T 3772-98
B: GB/T 2902-99
JPt100, Pt100: GB/T 5977-99

■ Characteristics

Indication accuracy	Thermocouple: (±0.5% of indicated value or ±1°C, whichever is greater) ±1 digit max. (See note 1.) Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever is greater) ±1 digit max. Analog input: ±0.5% FS±1 digit max. CT input: ±5% FS±1 digit max.
Influence of temperature (See note 2.)	R, S, and B thermocouple inputs: (±1% of PV or ±10°C, whichever is greater) ±1 digit max.
Influence of voltage (See note 2.)	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.
Hysteresis	0.1 to 999.9 EU (in units of 0.1 EU)
Proportional band (P)	0.1 to 999.9 EU (in units of 0.1 EU)
Integral time (I)	0 to 3999 s (in units of 1 s)
Derivative time (D)	0 to 3999 s (in units of 1 s)
Control period	1 to 99 s (in units of 1 s)
Manual reset value	0.0% to 100.0% (in units of 0.1%)
Alarm setting range	–1999 to 9999 (decimal point position depends on input type)
Sampling period	500 ms
Insulation resistance	20 MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50 or 60 Hz for 1min (between current-carrying terminals of different polarity)
Vibration resistance	10 to 55 Hz, 20 m/s^2 for 10 min in X, Y and Z directions
Shock resistance	100 m/s^2, 3 times each in 3 axes, 6 directions
Weight	Approx. 150 g
Memory protection	EEPROM (non-volatile memory) (number of write operations: 100,000)
EMC	Enclosure Emission: EN 55011 (GB/T 6113.1,2) Group 1 Class A AC Mains Emission: EN 55011 (GB/T 6113.1,2) Group 1 Class A ESD Immunity: IEC 61000-4-2 (GB/T 17626.2) 4 kV contact discharge (level 2) 8 kV air discharge (level 3) RF-interference Immunity: IEC 61000-4-3 (GB/T 17626.3): 10 V/m, 80 MHz to 1 GHz (level 3) Conducted Disturbance Immunity: IEC 61000-4-6 (GB/T 17626.6): 3 V (0.15 to 80 MHz) (level 3) Burst Immunity: IEC 61000-4-5 (GB/T 17626.5): 2 kV powerline (level 3) 2 kV I/O signalline (level 4)
Applicable standards	UL 61010C-1, CSA C22.2 No.1010.1 Conforms to EN 61326, EN 61010-1 (IEC 61010-1).

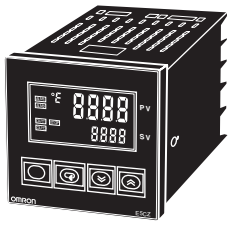
Note 1. The indication accuracy of K thermocouples in the –200 to 1300°C range, T and N thermocouples at a temperature of –100°C max. and U and L thermocouples at any temperature is ±2°C ±1 digit maximum. The indication accuracy of the B thermocouples at a temperature of 400°C max. is not specified.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

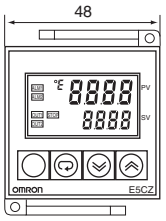
2. Conditions: Ambient temperature: –10°C to 23°C to 55°C, Voltage range: –15% to +10% of rated voltage.

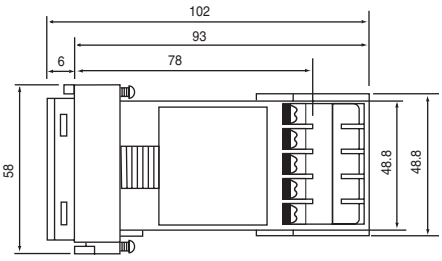
3. When using the E53-CN03N or E53-CNBN Option Unit with the E5CZ-C2M or E5CZ-C2M to satisfy the Class A limit for the radiated interference field strength test, always connect a ZCAT2235-1030 Clamp Filter (manufactured by TDK) to the power line of the Temperature Controller.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

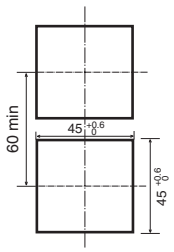




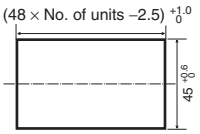


Panel Cutouts

Mounted separately



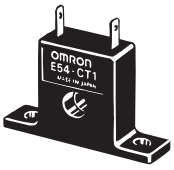
Group Mounted

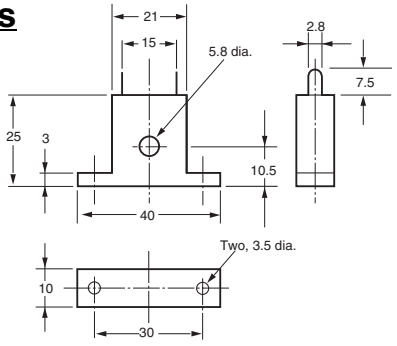


- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers when they are group mounted.)
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

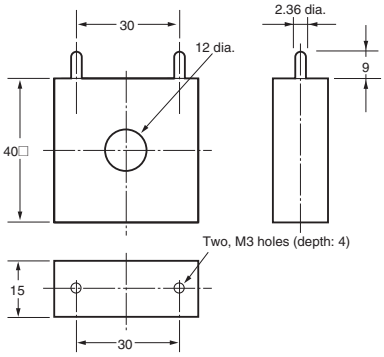
Current Transformers

E54-CT1



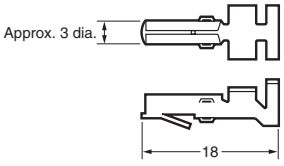


E54-CT3

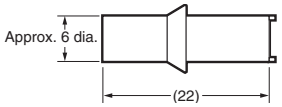


E54-CT3 Accessories

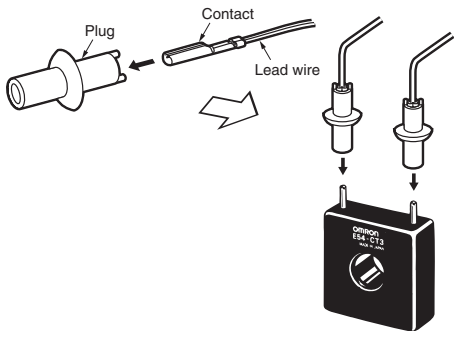
• Contact



• Plug

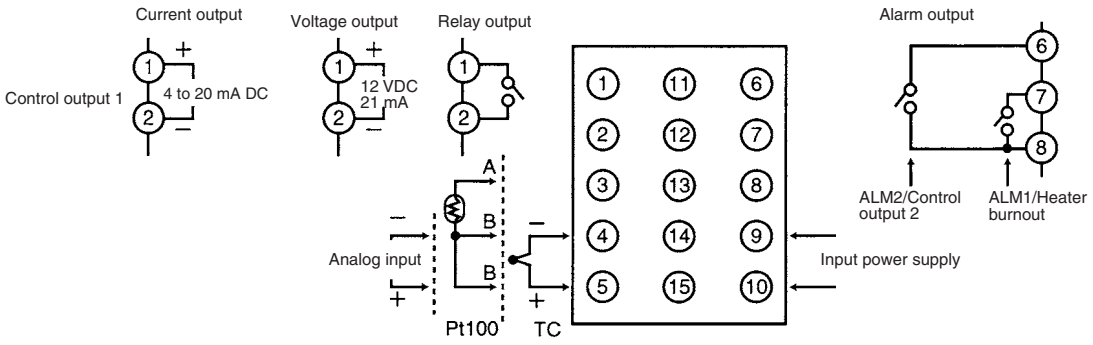


Connection Example



Wiring Terminals

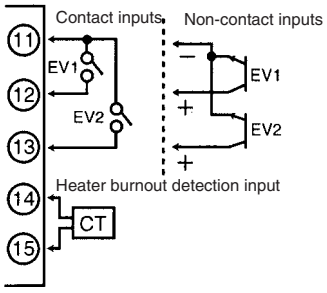
- The voltage output (control output) is not electrically insulated from the internal circuits. When using a grounded thermocouple, do not connect the control output terminals to the ground. If the control output terminals are connected to the ground, errors will occur in the measured temperature values as a result of leakage current.



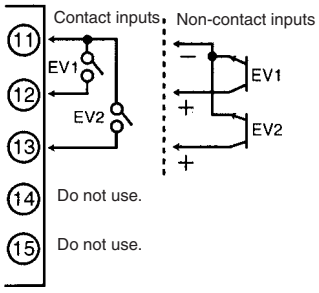
Two input power supplies are available: 100 to 240 VAC or 24 VDC.

Option Units

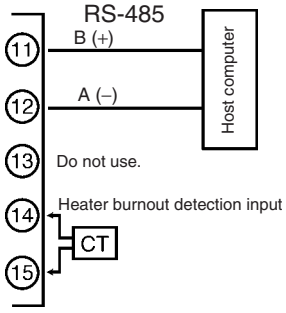
E53-CNHBN
Event Inputs/Heater Burnout Detection



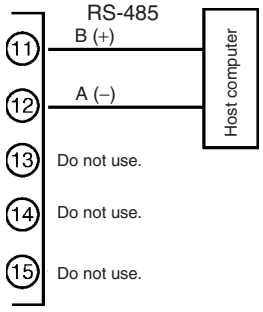
E53-CNBN
Event Inputs



E53-CNH03N
Communications/Heater Burnout Detection



E53-CN03N
Communications



Communications

Interface:	RS-485
Synchronization:	Start-stop (asynchronous)
Communications:	Half duplex
Baud rate:	1.2/2.4/4.8/9.6/ 19.2 kbps

Event Inputs

Contact Inputs
ON: 1 kΩ max., OFF: 100 kΩ min.
Non-Contact Inputs
ON: residual voltage of 1.5 V max.
OFF: leakage current of 0.1 mA max.

Heater Burnout Alarm

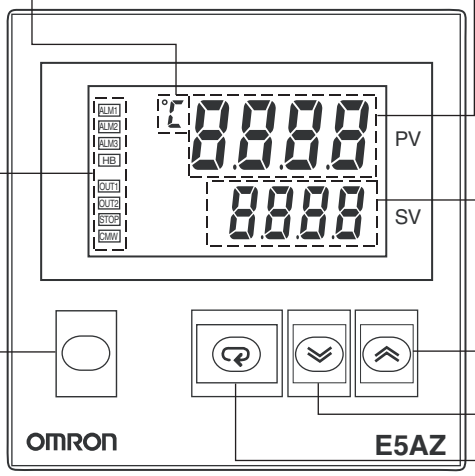
Maximum heater current: 50 A AC
Input current indication accuracy: ±5% FS ±1 digit max.
Heater burnout alarm setting range: 0.1 to 49.9 A, in 0.1 A increments

Nomenclature

E5AZ

Operation Indicators

1. ALM1 (alarm 1)
   Lights when the alarm 1 output is ON.
   ALM2 (alarm 2)
   Lights when the alarm 2 output is ON.
   ALM3 (alarm 3)
   Lights when the alarm 3 output is ON.
2. HB (heater burnout alarm display)
   Lights when a heater burnout is detected.
   The heater burnout alarm can be held ON by setting the heater burnout latch. To reset, turn the power supply OFF and then ON or set the heater burnout alarm value to 0.0 A.
3. OUT1, OUT2 (control output 1, control output 2)
   Lights when control output 1 or control output 2 (cool) is ON.
   However, if control output 1 is a current output, OUT1 will always be not lit.
4. STOP (stop)
   Lights when control of the E5AZ has been stopped. During control, this indicator lights when an event or the run/stop function has become stopped. Otherwise, this indicator is not lit.
5. CMW (communications writing control)
   Lights when communications writing is enabled and is not lit when it is disabled.



Temperature Unit
The temperature unit is displayed when the display unit parameter is set to a temperature. Indication is determined by the currently selected "temperature unit" parameter set value. When this parameter is set to "°C," "C" is displayed, and when set to "°F," "F" is displayed.

No. 1 Display
Displays the process value or parameter type.

No. 2 Display
Displays the set point, manipulated variable, or set value (setup) of the parameter.

Up Key
Each press of this key increases values displayed on the No.2 display. Holding down this key continuously increases values.

Down Key
Each press of this key decreases values displayed on the No.2 display. Holding down this key continuously decreases values.

Mode Key
Press this key to select parameters within each level.

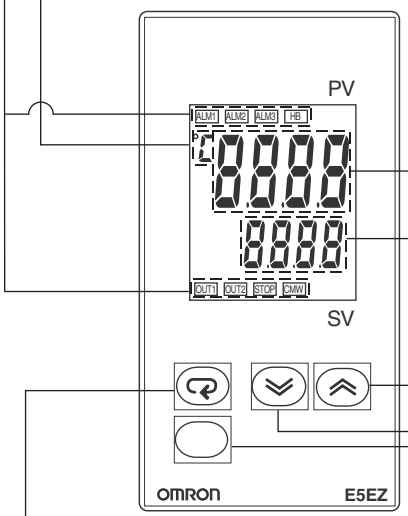
Level + Mode Keys
This key combination sets the E5AZ to the "protect level."

Level Key
Press this key to select the setup level. The setup level is selected in order "operation level" ⟷ "adjustment level," "initial setting level" ⟷ "communications setting level."

E5EZ

Operation Indicators

1. ALM1 (alarm 1)
   Lights when the alarm 1 output is ON.
   ALM2 (alarm 2)
   Lights when the alarm 2 output is ON.
   ALM3 (alarm 3)
   Lights when the alarm 3 output is ON.
2. HB (heater burnout alarm display)
   Lights when a heater burnout is detected.
   The heater burnout alarm can be held ON by setting the heater burnout latch. To reset, turn the power supply OFF and then ON or set the heater burnout alarm value to 0.0 A.
3. OUT1, OUT2 (control output 1, control output 2)
   Lights when control output 1 or control output 2 (cool) is ON.
   However, if control output 1 is a current output, OUT1 will always be not lit.
4. STOP (stop)
   Lights when control of the E5EZ has been stopped.During control, this indicator lights when an event or the run/stop function has become stopped. Otherwise, this indicator is not lit.
5. CMW (communications writing control)
   Lights when communications writing is enabled and is not lit when it is disabled.



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No. 2 Display
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Down Key
Each press of this key decreases values displayed on the No.2 display. Holding down this key continuously decreases values.

Level Key
Press this key to select the setup level. The setup level is selected in order "operation level" ⟷ "adjustment level," "initial setting level" ⟷ "communications setting level."

Level + Mode Keys
This key combination sets the E5EZ to the "protect level."

Mode Key
Press this key to select parameters within each level.

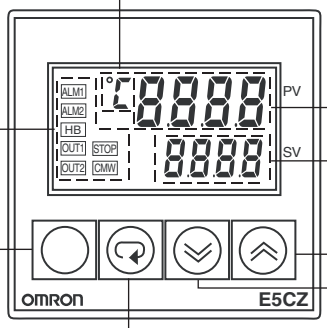
E5CZ

Operation Indicators

1. ALM1 (alarm 1)
   Lights when the alarm 1 output is ON.
   ALM2 (alarm 2)
   Lights when the alarm 2 output is ON.
2. HB (heater burnout alarm display)
   Lights when a heater burnout is detected.
   The heater burnout alarm can be held ON by setting the heater burnout latch. To reset, turn the power supply OFF and then ON or set the heater burnout alarm value to 0.0 A.
3. OUT1, OUT2 (control output 1, control output 2)
   Lights when control output 1 or control output 2 (cool) is ON.
   However, if control output 1 is a current output, OUT1 will always be not lit.
4. STP (stop)
   Lights when control of the E5CZ has been stopped.
   During control, this indicator lights when an event or the run/stop function has become stopped. Otherwise, this indicator is not lit.
5. CMW (communications writing control)
   Lights when communications writing is enabled and is not lit when it is disabled.

Temperature Unit

The temperature unit is displayed when the display unit parameter is set to a temperature. Indication is determined by the currently selected "temperature unit" parameter set value. When this parameter is set to "°C," "C" is displayed, and when set to "°F," "F" is displayed.



No. 1 Display

Displays the process value or parameter type.

No. 2 Display

Displays the set point, manipulated variable, or set value (setup) of the parameter.

Up Key

Each press of this key increases values displayed on the No.2 display. Holding down this key continuously increases values.

Down Key

Each press of this key decreases values displayed on the No.2 display. Holding down this key continuously decreases values.

Mode Key

Press this key to select parameters within each level.

Level + Mode Keys

This key combination sets the E5CZ to the "protect level."

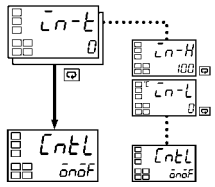
Level Key

Press this key to select the setup level. The setup level is selected in order "operation level" ←→ "adjustment level," "initial setting level" ←→ "communications setting level."

Operation

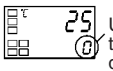
PID Control Using Autotuning

Changing Parameters



indicates that there is a parameter. Keep on pressing the mode key until the desired parameter is selected.

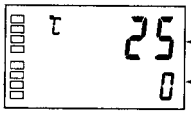
Changing Set Values



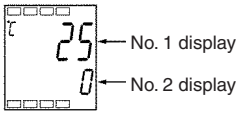
Use the ▼ or ▲ keys to change the set value displayed in the setup menu.

Display

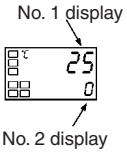
E5AZ



E5EZ



E5CZ



Typical Example

Input type:	4 T thermocouple –200 to 400°C
Control method:	PID control
ST (self-tuning):	OFF Calculate PID constants by AT (auto-tuning).
Alarm type:	2 upper limit
Alarm value 1:	30°C (For setting deviation)
Set point:	150°C

Setup procedure

Power ON

Set input specifications

Set control specifications

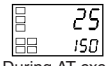
Self-tuning

Check control period

Check alarm type

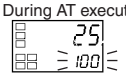
PV/SP

After AT execution.



Set the set point

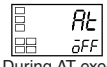
During AT execution.



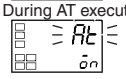
While AT is being executed, SP will flash.

AT execution

After AT execution.



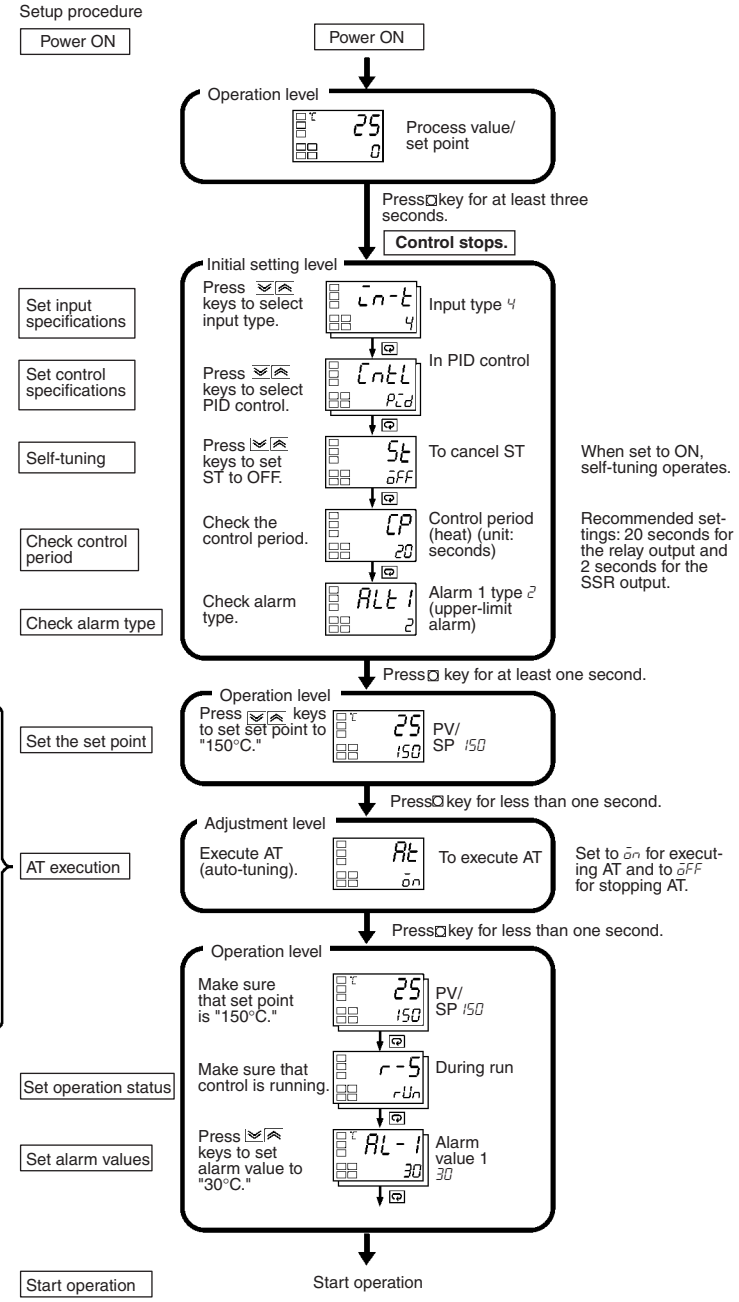
During AT execution.



Set operation status

Set alarm values

Start operation

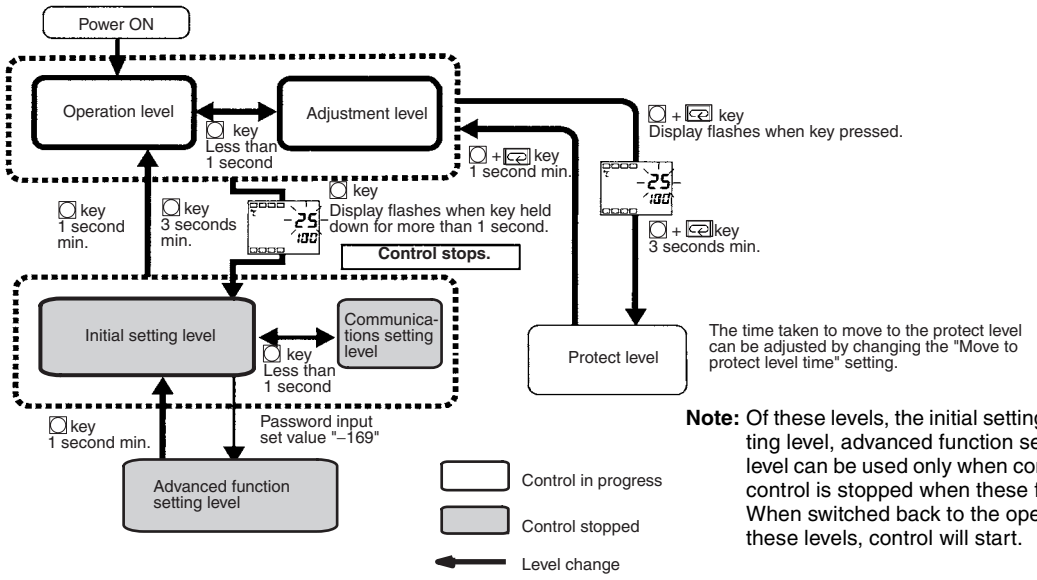


■ Specification Setting after Turning ON Power

Outline of Operation Procedures

Key Operation

In the following descriptions, all the parameters are introduced in the display sequence. Some parameters may not be displayed depending on the protect settings and operation conditions.



Note: Of these levels, the initial setting level, communications setting level, advanced function setting level and calibration level can be used only when control has stopped. Note that control is stopped when these four levels are selected. When switched back to the operation level from one of these levels, control will start.

Description of Each Level

Operation Level

This level is displayed when you turn the power ON. You can move to the protect level, initial setting level and adjustment level from this level.

Normally, select this level during operation. During operation, the process value, set point and manipulated variable can be monitored, and the alarm value and upper- and lower-limit alarms can be monitored and modified.

Adjustment Level

To select this level, press the key once for less than one second.

This level is for entering set values and offset values for control. This level contains parameters for setting the set values, AT (auto-tuning), communications writing enable/disable, hysteresis, multi-SP, input shift values, heater burnout alarm (HBA) and PID constants. You can move to the top parameter of the operation level or initial setting level from here.

Initial Setting Level

To select this level, press the key for at least three seconds in the operation level. This level is for specifying the input type, selecting the control method, control period, setting direct/reverse action and alarm type. You can move to the advanced function setting level or communications setting level from this initial setting level. To return to the operation level, press the key for at least one second. To move to the communications setting level, press the key once for less than one second.

Protect Level

To select this level, simultaneously press the and keys for at least 3 seconds. This level is to prevent unwanted or accidental modification of parameters. Protected levels will not be displayed, and so the parameters in that level cannot be modified.

Communications Setting Level

To select this level, press the key once for less than one second in the initial setting level. When the communications function is used, set the communications conditions in this level. Communicating with a personal computer (host computer) allows set points to be read and written, and manipulated variables to be monitored.

Advanced Function Setting Level

To select this level, you must enter the password (“-169”) in the initial setting level.

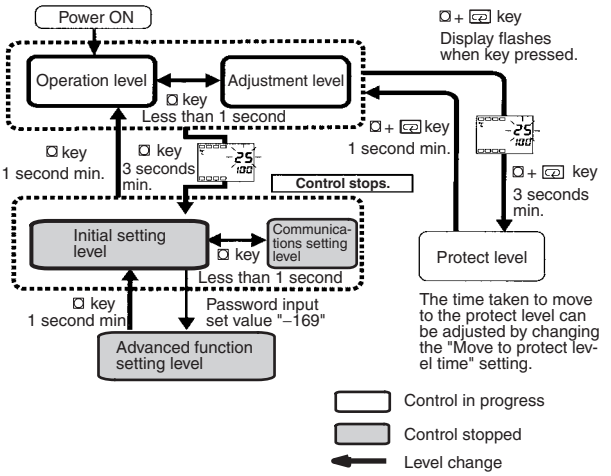
You can move only to the calibration level from this level.

This level is for setting the automatic return of display mode, MV limiter, event input assignment, standby sequence, alarm hysteresis, ST (self-tune) and to move to the user calibration level.

Specification Setting after Turning ON Power

Initial Setting Level

This level is used for setting basic specifications of the Temperature Controller. Using this level, set the input type for selecting the input to be connected such as the thermocouple or platinum resistance thermometer and set the range of set point and the alarm mode.

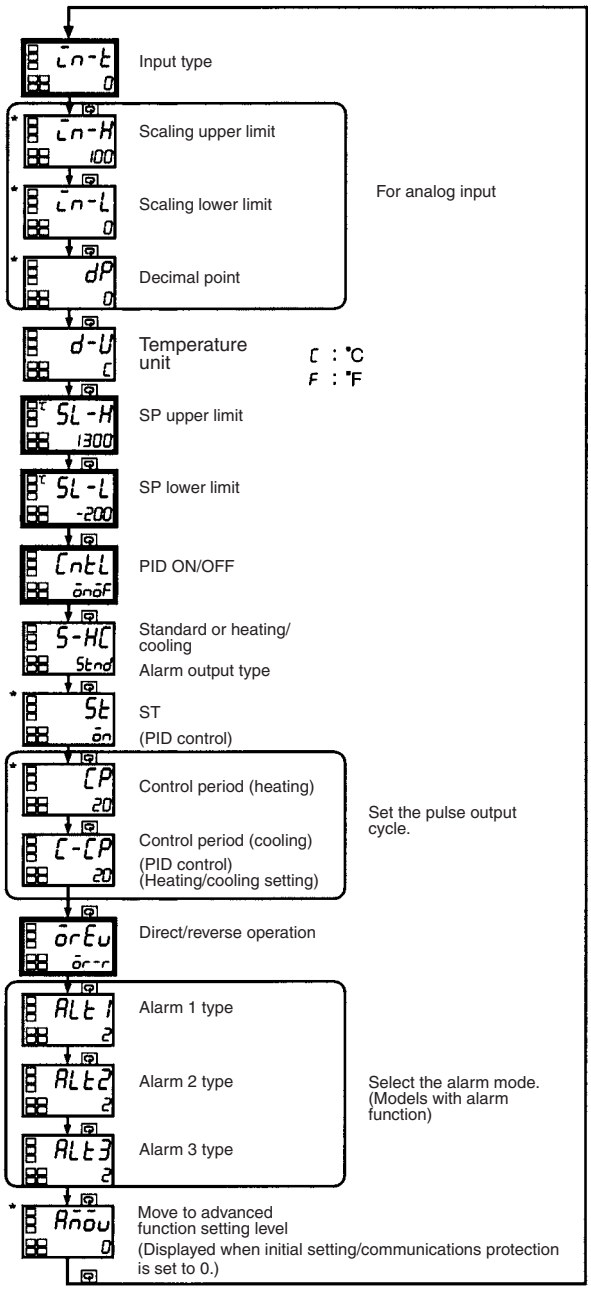


The move from the operation level to the initial setting level, press ◯ key for three seconds or more.

The initial setting level is not displayed when “initial/communications protection” is set to “2.” This initial setting level can be used when “initial setting/communications protection” is set to “0” or “1.”

The “scaling upper limit,” “scaling lower limit,” and “decimal point” parameters are displayed when an analog voltage input is selected as the input type.

Initial setting level



To return to the operation level, press the ◯ key for longer than one second.

* Not displayed as default setting.

Input Type

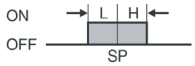
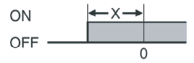
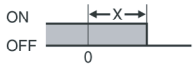
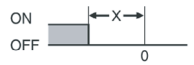
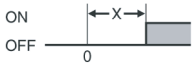
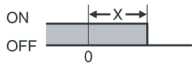
When selecting the input type, follow the specifications listed in the following table.

	Specifications	Set Value	Input Temperature Range
Platinum resistance thermometer input	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 input	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 400.0 (°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 2300 (°F)
		23	–199.9 to 400.0 (°C)/199.9 to 700.0 (°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 to 70°C	17	0 to 90 (°C)/0 to 190 (°F)
	60 to 120°C	18	0 to 120 (°C)/0 to 240 (°F)
	115 to 165°C	19	0 to 165 (°C)/0 to 320 (°F)
	140 to 260°C	20	0 to 260 (°C)/0 to 500 (°F)
Analog input	0 to 50 mV	21	One of the following ranges depending on the results of scaling: 1999 to 9999, 199.9 to 999.9

Note: The initial setting is 5: –200 to 850°C/–300 to 2300°F.

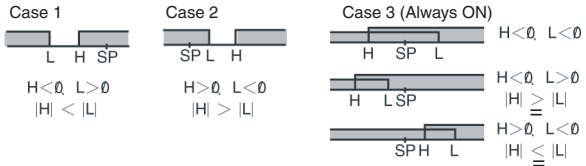
Alarm Types

Select the alarm type from the 12 types listed in the following table.

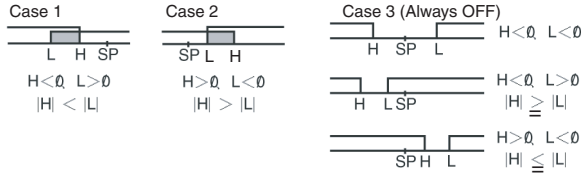
Set Value	Alarm Type	Alarm Output Operation	
		When X is positive	When X is negative
0	Alarm function OFF	Output OFF	
1 (See note 1.)	Upper- and lower-limit (deviation)		(See note 2.)
2	Upper-limit (deviation)		
3	Lower-limit (deviation)		
4 (See note 1.)	Upper- and lower-limit range (deviation)		(See note 3.)
5 (See note 1.)	Upper- and lower-limit with standby sequence (deviation)	 (See note 5.)	(See note 4.)
6	Upper-limit with standby sequence (deviation)		
7	Lower-limit with standby sequence (deviation)		
8	Absolute-value upper-limit		
9	Absolute-value lower-limit		
10	Absolute-value upper-limit with standby sequence		
11	Absolute-value lower-limit with standby sequence		

Note 1: With set values 1, 4 and 5, the upper and lower limit values can be set independently for each alarm type, and are expressed as "L" and "H."
Following operations are for cases when an alarm set point is "X" or negative.

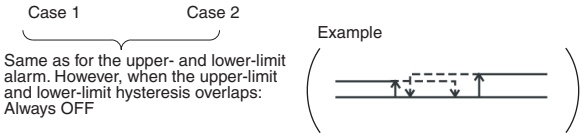
2: Set value: 1, Upper- and lower-limit alarm



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



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

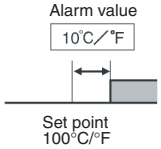


5: Set value: 5, Upper- and lower-limit with standby sequence alarm. Always OFF when the upper-limit and lower-limit hysteresis overlaps.
Set the alarm types for alarm 1 and alarm 2 independently in the initial setting level. The default setting is 2 (upper limit). With the E5AZ/E5EZ, perform settings similarly for alarm 3.

Example: When the alarm is set ON at 110°C/°F or higher.

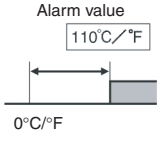
When an alarm type other than the absolute-value alarm is selected

(For alarm types 1 to 7)
The alarm value is set as a deviation from the set point.



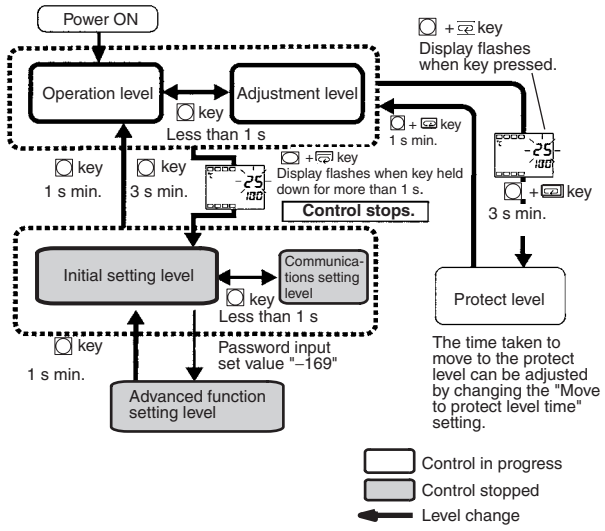
When the absolute-value alarm is selected

(For alarm types 8 to 11)
The alarm value is set as an absolute value from the alarm value of 0°C/F.



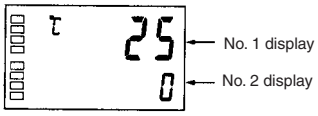
Parameters

Parameters related to setting items for each level are marked in boxes in the flowcharts and brief descriptions are given as required. At the end of each setting item, press the mode key to return to the beginning of each level.

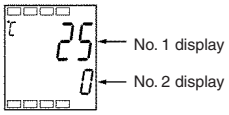


Display

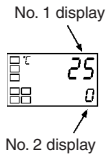
E5AZ

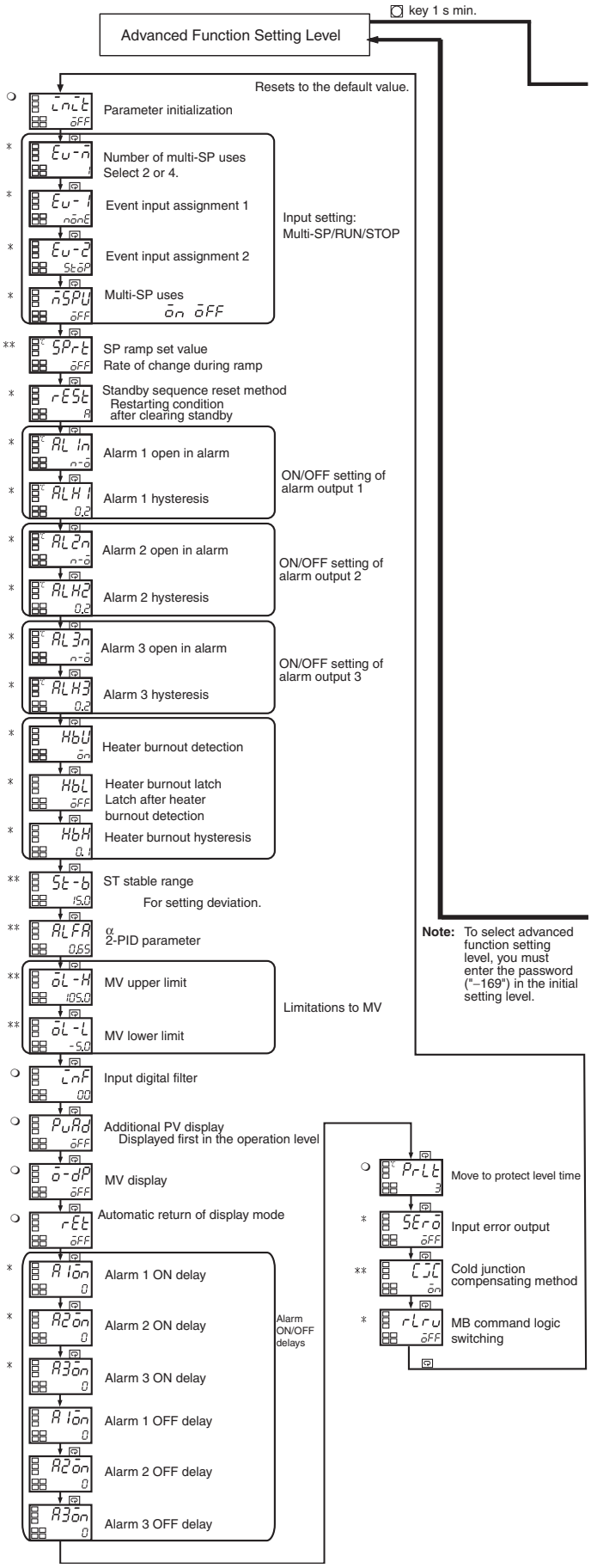


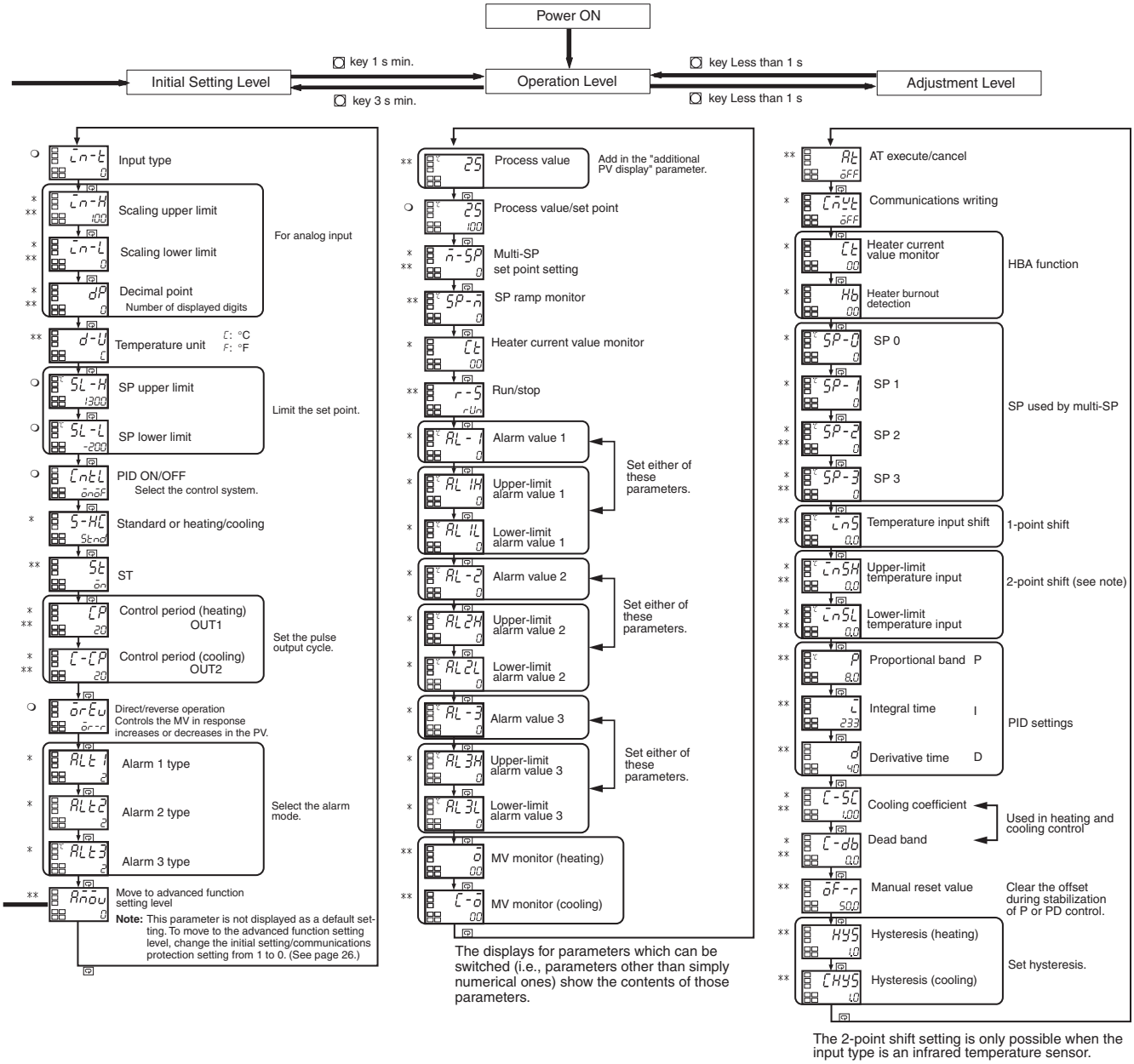
E5EZ



E5CZ







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.

Input Shift

All points in the sensor range are shifted by the value set as the temperature input shift value.

Example

Input shift setting	Temperature measured by sensor	Temperature display
0 (no shift)	100°C	100°C
10 (shifted +10°C)	100°C	110°C
−10 (shifted −10°C)	100°C	90°C

Protect Level

Operation/adjustment protection
Restricts displaying and modifying menus in operation, adjustment, and manual control levels.

Initial setting/communications protection
This protect level restricts movement to the initial setting, communications setting, and advanced function setting 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

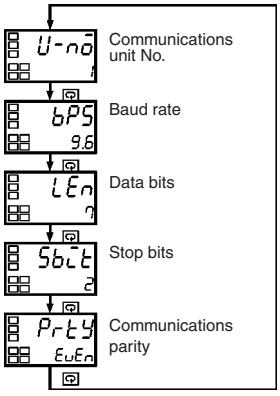
Set the E5AZ/E5EZ/E5CZ communications specifications in the communications setting level. For setting communications parameters, use the E5AZ/E5EZ/E5CZ panel. The communications parameters and their settings are listed in the following table.

Parameter	Displayed characters	Set (monitor) value	Set value
Communications unit No.	U-no	0 to 99	0.**1** to 99
Baud rate	bPS	1.2/2.4/4.8/9.6/19.2 (kbps)	1.2/2.4/4.8/**9.6**/19.2
Data bits	LEn	7/8 (bit)	**7**/8 (bit)
Stop bits	Sbit	1/2	1/**2** (bit)
Parity	Prty	None, even, odd	non**E**/**Even**/odd

Note: The highlighted values indicate default settings.

Before executing communications with the E5AZ/E5EZ/E5CZ, 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 E5AZ/E5EZ, the ◯ key is the ⬭ key.

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

Communications Unit No. (U-no)

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 (bPS)

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 (LEn)

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

Stop Bits (Sbit)

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

Communications parity (Prty)

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

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	Contents	Countermeasure	Output status	
			Control output	Alarm output
S.Err (S. Err)	Input error (See note.)	Check that the input wiring is correct, that there is no disconnection or short-circuit, and that the input type is correct. (Thermocouple input short-circuits cannot be detected.)	OFF	Handled as abnormally high temperature
	A/D converter error (See note.)	After noting the error, reset the power. If the display does not change, replacement is necessary. If the error is removed, it is possible that the original error was caused by noise. Check that there are no possible sources of noise.	OFF	OFF
E111 (E111)	Memory error	Reset the power. If the display does not change, replacement is necessary. If the error is removed, it is possible that the original error was caused by noise. Check that there are no possible sources of noise.	OFF	OFF
H.Err (H. Err)	HB error (See note.)		OFF	OFF

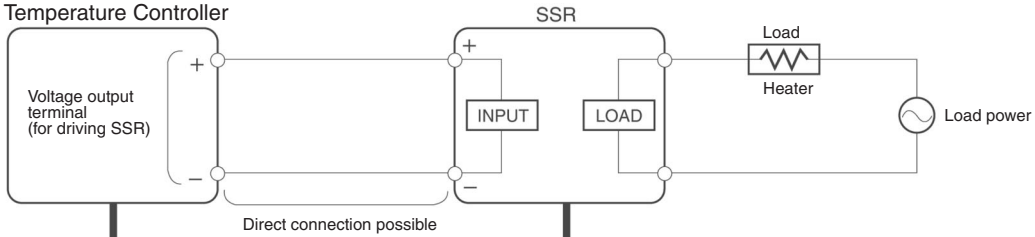
Note 1. If the input is within the range for which control is possible but outside the displayable range (–1999 (–199.9) to 9999 (999.9)), cccc will be displayed if the value is less than –1999 (–199.9), and jjjj will be displayed if it is greater than 9999 (999.9). Control output and alarm output will operate normally for either of these displays. Refer to the relevant User's Manual for details on the ranges for which control is possible.

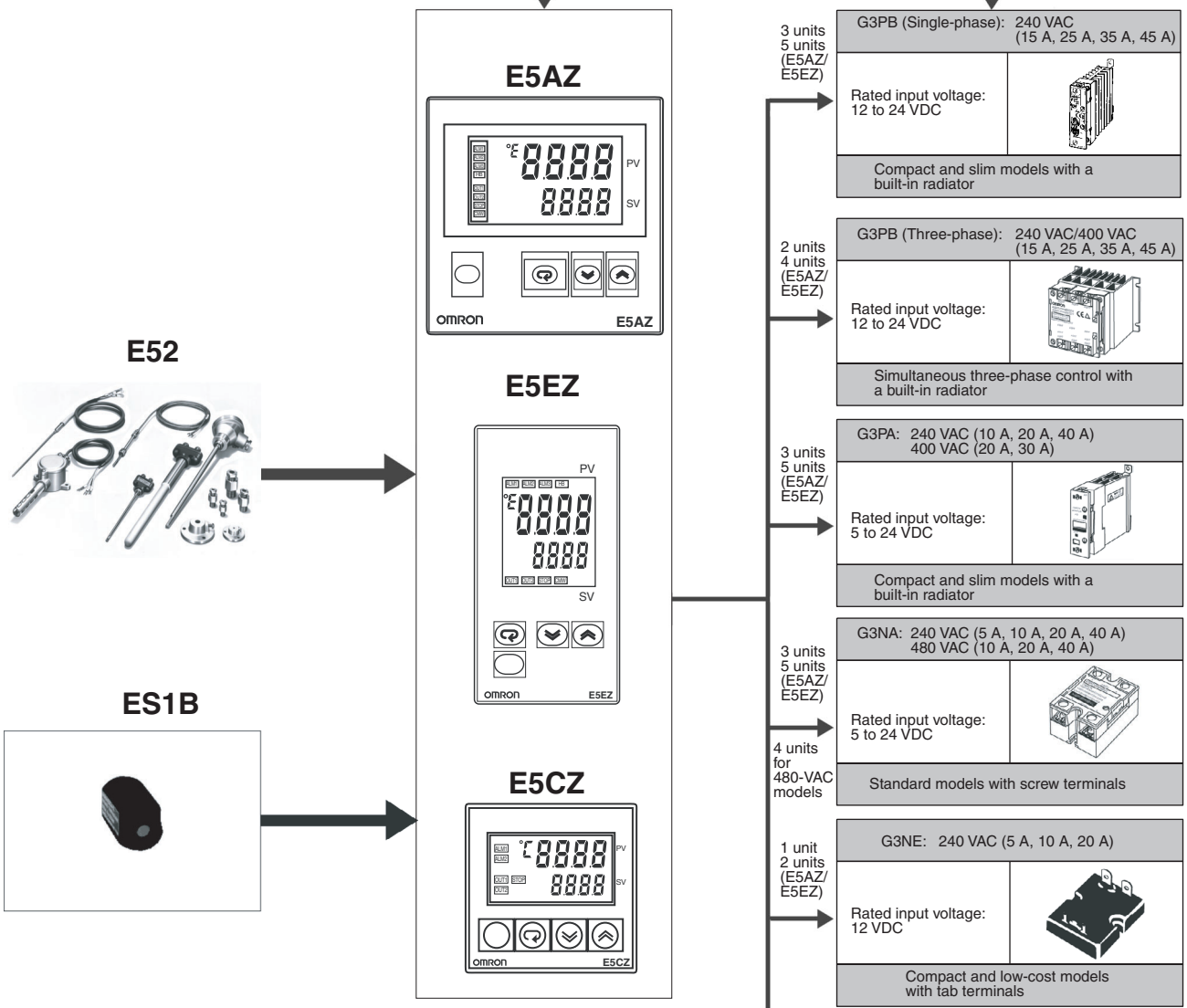
2. These errors are displayed only when the Controller is set to display the present value or the present value and the set value. They are not displayed in other statuses.

Peripheral Devices

■ Temperature Sensor / SSR

Connection Example with SSR





Number of Connectable SSRs

	A: G3PB (Single-phase) G3PA	B: G3PB (Three-phase)	C: G3NA (See note.)	D: G3NE	E: G3NH
E5AZ/EZ	5 units	4 units	5 units	2 units	4 units
E5CZ	3 units	2 units	3 units	1 unit	8 units

Note: 480 VAC models: 4 units

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5. Orders. Omron will accept no order less than $200 net billing.
6. Governmental Approvals. Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. Taxes. All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. Financial. If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. Shipping; Delivery. Unless otherwise expressly agreed in writing by Omron:
    a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
    b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
    c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
    d. Delivery and shipping dates are estimates only; and
    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. Claims. Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. Warranties. (a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See http://www.omron247.com or contact your Omron representative for published information.
14. Limitation on Liability; Etc. OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
15. Indemnities. Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. Property; Confidentiality. Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. Export Controls. Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information.
18. Miscellaneous. (a) Waiver. No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) Assignment. Buyer may not assign its rights hereunder without Omron's written consent. (c) Law. These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) Amendment. These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) Severability. If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) Setoff. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) Definitions. As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

1. Suitability of Use. Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
   (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
   (ii) Use in consumer products or any use in significant quantities.
   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
   (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
   NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. Programmable Products. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. Performance Data. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. Change in Specifications. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. Errors and Omissions. Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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