Digital Temperature Controllers

E5□Z SERIES

Compact design, Dual PV-SP display with easy communication

Advanced Industrial Automation

OMRON

Omron is the world's largest supplier of temperature controllers. What sets these controllers apart from competition is that they include Omron's legendary control performance, reliability, superb quality, and compact dimensions as standard.

Omron also offers a comprehensive range of solid-state relays (SSRs) that provides the perfect load switching for temperature control applications.

Omron's temperature controller and solid-state relays - a powerful combination!

Sensor

TC

Control

SSR

Switching

Load

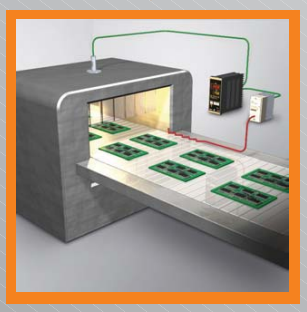
NEW E5□Z Series
E5AZ/ E5EZ/ E5CZ

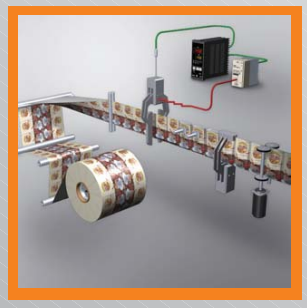
- Multiple inputs types
- Auto & self-tuning
- Heating and/ or cooling

Solid-state relays (SSRs)

- **Panel mounting type**
  - G3NA
  - G3PA/ G3PB/ G3NH
  - G3NE
- **Socket mounting type**
  G3R/ G3F/ G3B/ G3H

The perfect solution





OMRON

Digital Temperature Controller
E5AZ

New Generation of Digital Temperature Controller

- Depth of only 78mm.
- 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.
- Event input allows multiple SP selection and run/stop function.
- Modular output cards.
- Time delay alarm function.
- Communication function.
- Conforms to UL, CSA and IEC safety standards as well as CE marking.

96(W) x 96(H) x 78 (D) mm

Model Number Structure

■ Model Number Legend

E5AZ – □ 3 □ □
1 2 3

1. Output type
R: Relay
Q: Voltage (for driving SSR)
C: Current
A: Others

2. Heater burnout alarm
Blank: Not available
H: Available

3. Option
Blank: Not available
01: RS-232C
03: RS-485
B: 2 event input
M: Option unit can be mounted

Ordering Information

■ E5AZ Standard Models

Size	Power supply voltage	Number of alarm points	Control outputs	Heater burnout alarm	Model
1/4 DIN 96(W) x 96(H) x 78(D) mm	100 to 240 VAC	3	Relay	No	E5AZ-R3
			Voltage (for driving SSR)	No	E5AZ-Q3
			Current	No	E5AZ-C3
			Additional Control output	No	E5AZ-A3

Specifications

■ Ratings

Supply voltage		100 to 240 VAC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		10W (10VA)
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, 160 to 260°C Voltage input: 0 to 50mV
Control output	**Relay output**	SPST-NO, 250VAC, 5A (resistive load), electrical life: 100,000 operations
	Voltage output	12 VDC +15%/-20% (PNP), max. load current: 40mA, with short-circuit protection circuit
	Current output	4 to 20mA DC, load: 600Ω max., resolution: approx. 2,600
Alarm output		SPST-NO, 250VAC, 2A (resistive load), electrical life: 100,000 operations
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 indicator Character height: PV:15.0mm; SV: 9.5mm
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 .0 to 500.0°C	-100 to 850°C	-20 .0 to 400.0°C	-200 to 400°C	-199.9 to 400°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	K10 to 70°C	K60 to 120°C	K115 to 165°C	K140 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 50mV
Temperature 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

Output Module

Type	Model	Rating and performance
Relay	E53-AZR	250 VAC, 5A (resistive load), electrical life: 100,000 operations
Voltage	E53-AZQ	12 VDC, 40mA PNP type
Current	E53-AZC	4 to 20mA DC, load: 600Ω max, resolution: approx. 2,600

Communication Module

Type	Model	Performance
RS-232C	E53-AZ01	Half-duplex: 1200/2400/4800/9600/19200 bps ASC II
RS-485	E53-AZ03	Full-duplex

Other Module

Type	Model	Rating and performance
Event input	E53-AZB	ON: Max. 1KΩ OFF: Min. 100KΩ
Option board	E53-AZM	Expansion for E53-AZH and E53-AZ01 or E53-AZ03 or E53-AZB
Heater burnout detection	E53-AZH	Using CT to detect heater burnout

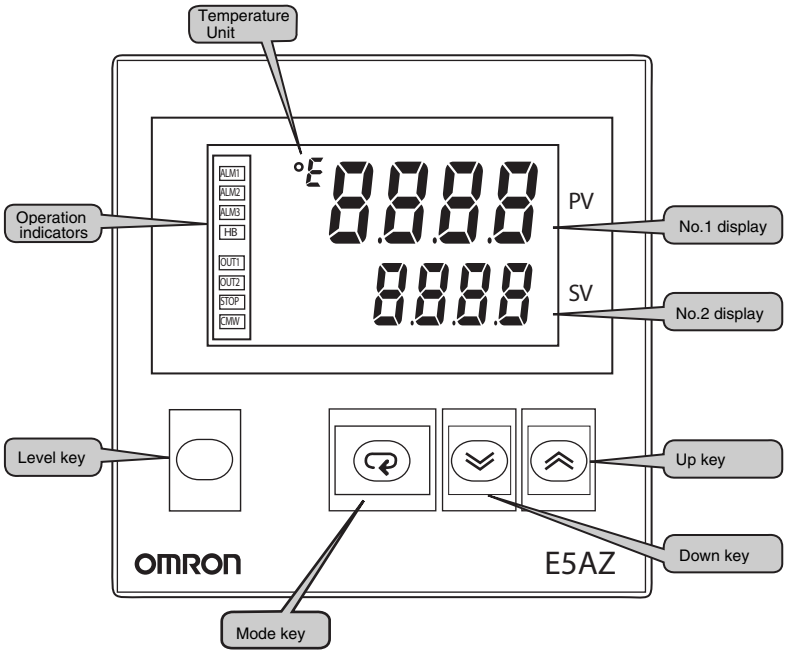
■ Characteristics

Indication accuracy	Thermocouple: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. (see note 1) Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. Analog input: ±0.5% FS ±1 digit max. CT input: ±0.5% FS ±1 digit max.
Hysteresis	0.1 to 999.9°C (in units of 0.1°C)
Proportional band (P)	0.1 to 999.9°C (in units of 0.1°C)
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)
Input sampling period	500ms
Insulation resistance	20MΩ min. (at 500 VDC)
Dielectric strength	2000VAC, 50 or 60 Hz for 1 min (between different charging terminal)
Vibration resistance	10 to 55 Hz, 20m/s^2 for 10 min in X,Y, Z directions
Shock resistance	100m/s^2, 3 times each in 3 axes, 6 directions
Weight	Approx. 310g / accessories approx. 100g
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)
EMC	Emission Enclosure: EN55011(GB/T 6113.1,2) Group1 class A Emission AC Mains: EN55011(GB/T 6113.1,2) Group1 class A (see note 2) Immunity ESD : IEC61000-4-2(GB/T 17626.2) 4kV contact discharge (level 2) 8kV air discharge (level 3) Immunity RF-interference: IEC61000-4-3(GB/T17626.3): 10V/m, 80MHz-1Ghz (level 3) Immunity Conducted Disturbance: IEC61000-4-6(GB/T17626.6): 10V (0.15-80MHz) (level 3) Immunity Burst: IEC61000-4-5(GB/T17626.5): 2kV power-line (level 3) 2kV I/O signal-line (level 4)
Applicable standards	UL61010C-1, CSA C22.2 No.1010.1 Conforms to EN61326, EN61010-1(IEC61010-1)

Note1: The indication of K thermocouples in the -200 to 1300°C range, and 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 of the R and S thermocouples at a temperature of 200°C max. is ±3°C±1 digit maximum.

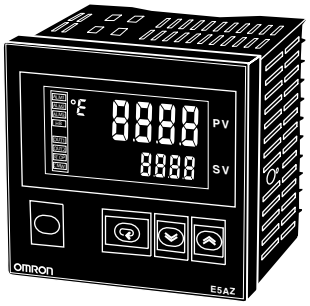
Note2: For E5□Z-□3□03, in order to fulfill EN61326 Class A standard, add a magnetism link (TDK: ZAT1730-0730) between K3SC and the controller.

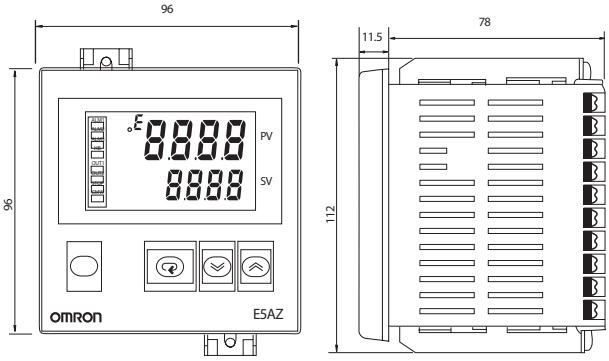
Nomenclature

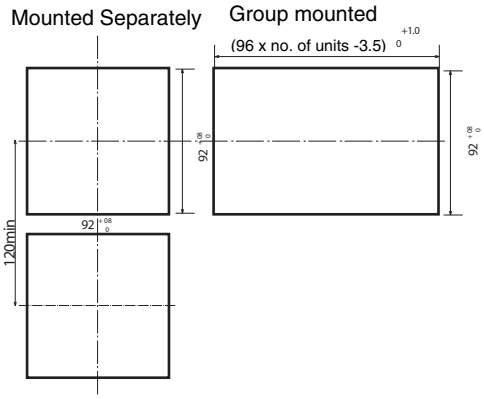


Dimensions

Note: All units are in millimeters unless otherwise indicated.





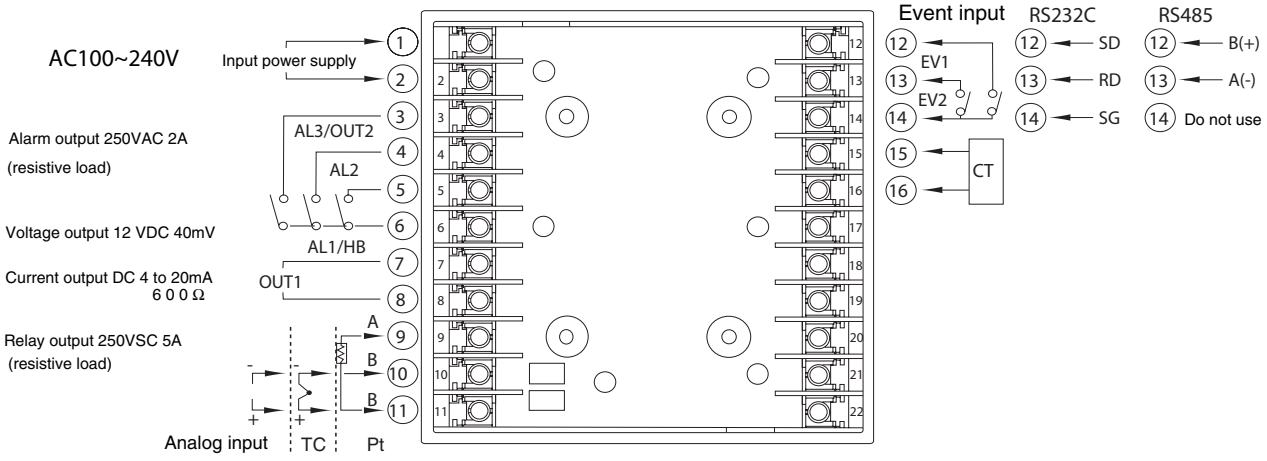


- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers when they are group mounted).
- When two or more E5AZs controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

Wiring Terminals

- The voltage output (control output) is not electrically insulated from the internal circuits. When using a grounding thermocouple, do not connect any of 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.

- Standard insulation is applied to the power supply I/O sections. If reinforced insulation is required, connect the input and output terminals to a device without any exposed current-carrying parts or to a device with standard insulation suitable for maximum operation voltage of the power supply I/O section.



Digital Temperature Controller
E5EZ

New Generation of Digital Temperature Controller

- Depth of only 78mm
- 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.
- Event input allows multiple SP selection and run/stop function.
- Modular output cards.
- Time delay alarm function
- Communication function
- Conforms to UL, CSA and IEC safety standards as well as CE marking.

48(W) x 96(H) x 78 (D) mm

Model Number Structure

■ Model Number Legend

E5EZ – □ 3 □ □
1 2 3

1. Output type
R: Relay
Q: Voltage (for driving SSR)
C: Current
A: Others

2. Heater burnout alarm
Blank: Not available
H: Available

3. Option
Blank: Not available
01: RS-232C
03: RS-485
B: 2 event inputs
M: Option unit can be mounted

Ordering Information

■ E5EZ Standard Models

Size	Power supply Voltage	Number of alarm points	Control outputs	Heater burnout alarm	Model
1/8 DIN 48(W) x 96(H) x 78(D) mm	100 to 240 VAC	3	Relay	No	E5EZ-R3
			Voltage (for driving SSR)	No	E5EZ-Q3
			Current	No	E5EZ-C3
			Additional Control output	No	E5EZ-A3

Specifications

■ Ratings

Supply voltage		100 to 240 VAC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		10W (10VA)
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, 160 to 260°C Voltage input: 0 to 50mV
Control output	**Relay output**	SPST-NO, 250VAC, 5A (resistive load), electrical life: 100,000 operations
	Voltage output	12 VDC +15%/-20% (PNP), max. load current: 40mA, with short-circuit protection circuit
	Current output	4 to 20mA DC, load: 600Ω max., resolution: approx. 2,600
Alarm output		SPST-NO, 250VAC, 2A (resistive load), electrical life: 100,000 operations
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 indicator Character height: PV:14.0mm; SV: 9.5mm
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

Inputtype	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 default setting

ES1B Infrared Temperature Sensor

Inputtype	K10 to 70°C	K60 to 120°C	K115 to 165°C	K140 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

Inputtype	0 to 50mV
Temperature 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

Output Module

Type	Model	Rating and performance
Relay	E53-AZR	250 VAC, 5A (resistive load), electrical life: 100,000 operations
Voltage	E53-AZQ	12 VDC, 40mA PNP type
Current	E53-AZC	4 to 20mA DC, load: 600Ω max, resolution: approx. 2,600

Communication Module

Type	Model	Performance
RS-232C	E53-AZ01	Half-duplex: 1200/2400/4800/9600/19200 bps ASC II
RS-485	E53-AZ03	Full-duplex

Other Module

Type	Model	Rating and performance
Event input	E53-AZB	ON: Max. 1KΩ OFF: Min. 100KΩ
Option board	E53-AZM	Expansion for E53-AZH and E53-AZ01 or E53-AZ03 or E53-AZB
Heater burnout detection	E53-AZH	Using CT to detect heater burnout

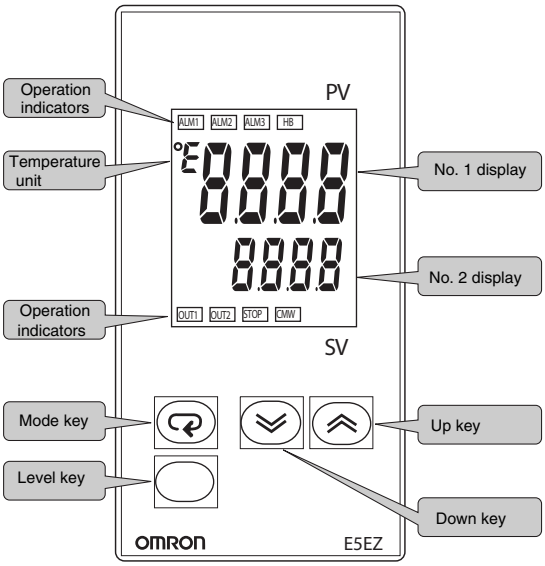
■ Characteristics

Indication accuracy	Thermocouple: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. (see note 1) Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. Analog input: ±0.5% FS ±1 digit max. CT input: ±0.5% FS ±1 digit max.
Hysteresis	0.1 to 999.9°C (in units of 0.1°C)
Proportional band (P)	0.1 to 999.9°C (in units of 0.1°C)
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)
Input sampling period	500ms
Insulation resistance	20MΩ min. (at 500 VDC)
Dielectric strength	2000VAC, 50 or 60 Hz for 1 min (between different charging terminal)
Vibration resistance	10 to 55 Hz, 20m/s² for 10 min in X,Y, Z directions
Shock resistance	100m/s², 3 times each in 3 axes, 6 directions
Weight	Approx. 260g / accessories approx. 100g
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)
EMC	Emission Enclosure: EN55011(GB/T 6113.1,2) Group1 class A Emission AC Mains: EN55011(GB/T 6113.1,2) Group1 class A (see note 2) Immunity ESD : IEC61000-4-2(GB/T 17626.2) 4kV contact discharge (level 2) 8kV air discharge (level 3) Immunity RF-interference: IEC61000-4-3(GB/T17626.3): 10V/m, 80MHz-1Ghz (level 3) Immunity Conducted Disturbance: IEC61000-4-6(GB/T17626.6): 10V (0.15-80MHz) (level 3) Immunity Burst: IEC61000-4-5(GB/T17626.5): 2kV power-line (level 3) 2kV I/O signal-line (level 4)
Applicable standards	UL61010C-1, CSA C22.2 No.1010.1 Conforms to EN61326, EN61010-1(IEC61010-1)

Note1: The indication of K thermocouples in the -200 to 1300°C range, and 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 of the R and S thermocouples at a temperature of 200°C max. is ±3°C±1 digit maximum.

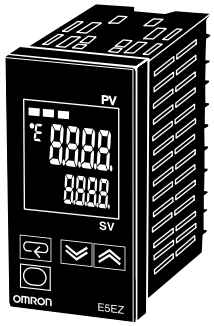
Note2: For E5□Z-□3□03, in order to fulfill EN61326 Class A standard, add a magnetism link (TDK: ZAT1730-0730) between K3SC and the controller.

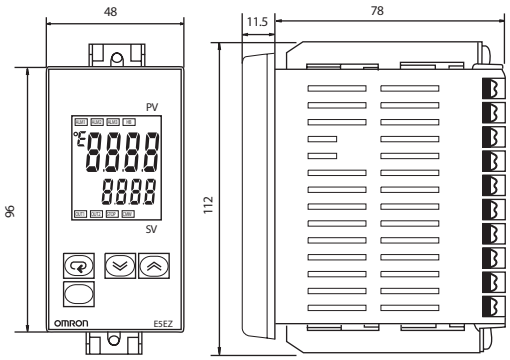
Nomenclature



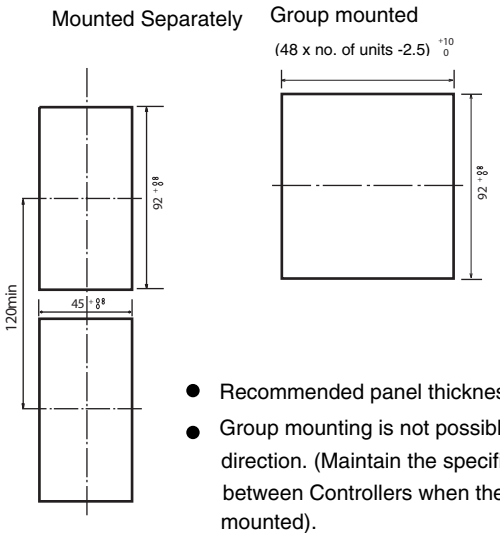
Dimensions

Note: All units are in millimeters unless otherwise indicated.





Panel Cutouts

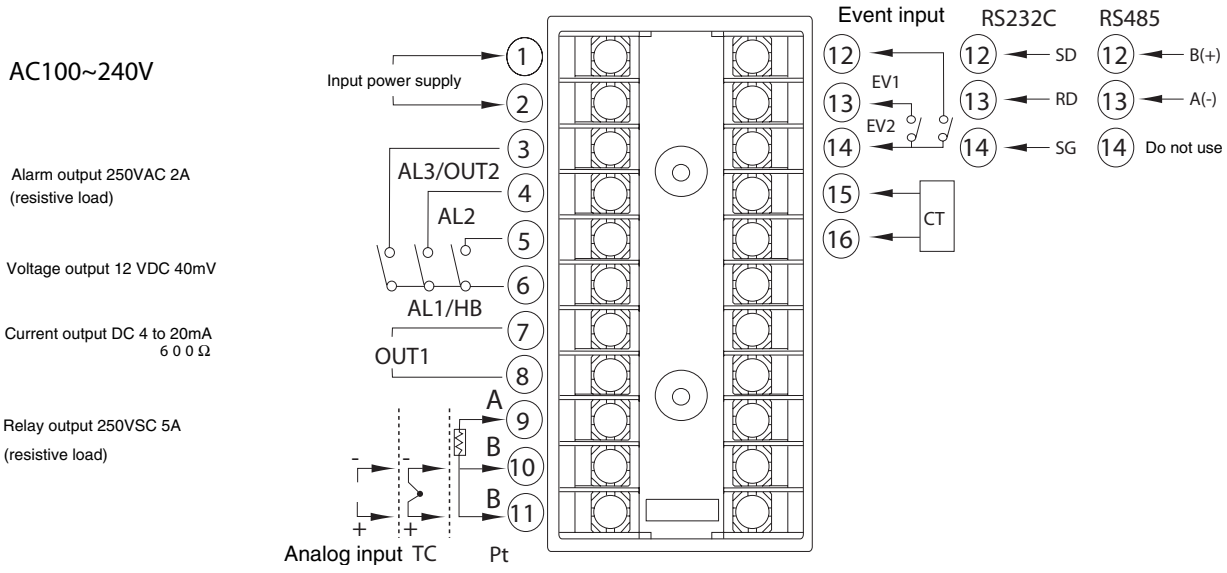


- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers when they are group mounted).
- When two or more E5EZs controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

Wiring Terminals

- The voltage output (control output) is not electrically insulated from the internal circuits. When using a grounding thermocouple, do not connect any of 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.

- Standard insulation is applied to the power supply I/O sections. If reinforced insulation is required, connect the input and output terminals to a device without any exposed current-carrying parts or to a device with standard insulation suitable for maximum operation voltage of the power supply I/O section.



Digital Temperature Controller
E5CZ

New Generation of Digital Temperature Controller

- Depth of only 78mm
- 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
- Conforms to UL, CSA and IEC safety standards as well as CE marking.

48(W) x 48(H) x 78 (D) mm

Ordering Information

■ E5CZ Standard Models

Size	Power supply voltage	Number of alarm points	Control outputs	Heater burnout alarm	Model
1/16 DIN 48(W) x 48(H) x 78(D) mm	100 to 240 VAC	2	Relay	No	E5CZ-R2
			Voltage (for driving SSR)	No	E5CZ-Q2

■ 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 default setting

ES1B Infrared Temperature Sensor

Input type	K10 to 70°C	K60 to 120°C	K115 to 165°C	K140 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 50mV
Temperature 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

Specifications

■ Ratings

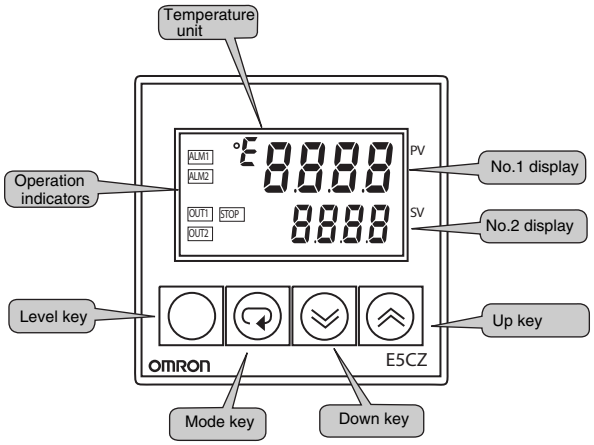
Supply voltage		100 to 240 VAC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		7W (7VA)
Sensor input		Thermocouple: K, J, T, E, L, U, N, R, S, B Platinum resistance thermometer: Pt100, JPt100 Infrared temperature sensor: 10 to 70°C, 60 to 120°C, 115 to 165°C, 160 to 260°C Voltage input: 0 to 50mV
Control output	**Relay output**	SPST-NO, 250VAC, 3A (resistive load), electrical life: 100,000 operations
	Voltage output	12 VDC +15%/-20% (PNP), max. load current: 21mA, with short-circuit protection circuit
Alarm output		SPST-NO, 250VAC, 1A (resistive load), electrical life: 100,000 operations
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 indicator Character height: PV:10.0mm; SV: 6.5mm
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)

■ Characteristics

Indication accuracy	Thermocouple: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. (see note) Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. Analog input: ±0.5% FS ±1 digit max.
Hysteresis	0.1 to 999.9°C (in units of 0.1°C)
Proportional band (P)	0.1 to 999.9°C (in units of 0.1°C)
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)
Input sampling period	500ms
Insulation resistance	20MΩ min. (at 500 VDC)
Dielectric strength	2000VAC, 50 or 60 Hz for 1 min (between different charging terminal)
Vibration resistance	10 to 55 Hz, 20m/s² for 10 min in X,Y, Z directions
Shock resistance	100m/s², 3 times each in 3 axes, 6 directions
Weight	Approx. 150g
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)
EMC	Emission Enclosure: EN55011(GB/T 6113.1,2) Group1 class A Emission AC Mains: EN55011(GB/T 6113.1,2) Group1 class A Immunity ESD : IEC61000-4-2(GB/T 17626.2) 4kV contact discharge (level 2) 8kV air discharge (level 3) Immunity RF-interference: IEC61000-4-3(GB/T17626.3): 10V/m, 80MHz-1Ghz (level 3) Immunity Conducted Disturbance: IEC61000-4-6(GB/T17626.6): 10V (0.15-80MHz) (level 3) Immunity Burst: IEC61000-4-5(GB/T17626.5): 2kV power-line (level 3) 2kV I/O signal-line (level 4)
Applicable standards	UL61010C-1, CSA C22.2 No.1010.1 Conforms to EN61326, EN61010-1(IEC61010-1)

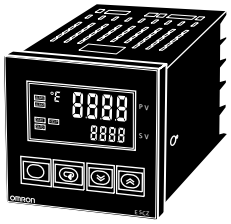
Note: The indication of K thermocouples in the -200 to 1300°C range, T and N thermocouples at a temperature of -100°C max., and U and L thermocouples at any temperature is ±2°C±1 digit maximum. The indication accuracy of the B thermocouples at a temperature of 400°C max. is not specified. The indication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

Nomenclature



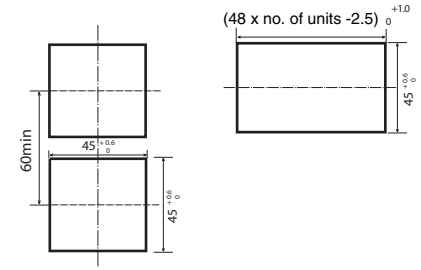
Dimensions

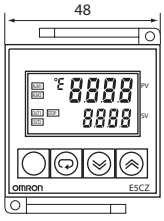
Note: All units are in millimeters unless otherwise indicated.

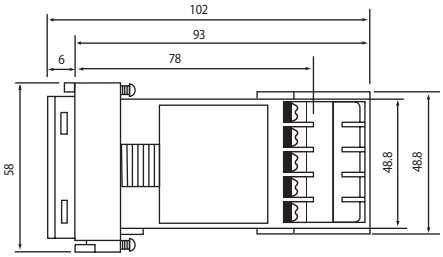


Panel Cutouts

Mounted Separately Group mounted





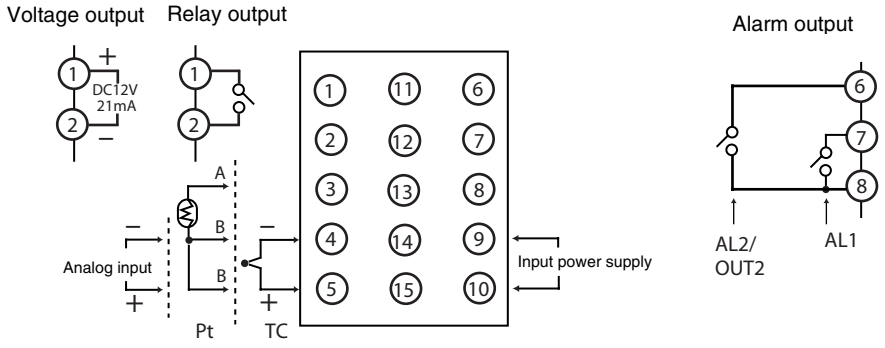


- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers when they are group mounted).
- When two or more E5CZs controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

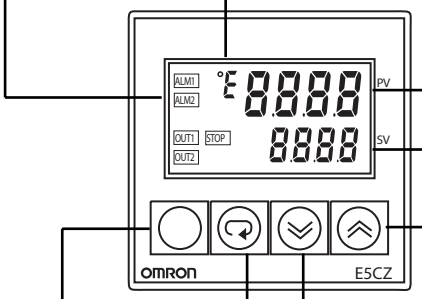
Wiring Terminals

- The voltage output (control output) is not electrically insulated from the internal circuits. When using a grounding thermocouple, do not connect any of 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.

- Standard insulation is applied to the power supply I/O sections. If reinforced insulation is required, connect the input and output terminals to a device without any exposed current-carrying parts or to a device with standard insulation suitable for maximum operation voltage of the power supply I/O section.



E5CZ



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.

Operation Indicators

1. ALM1 (alarm 1)
   Lights when alarm 1 output is ON
   ALM2 (alarm 2)
   Lights when alarm 2 output is ON.
2. OUT1, OUT2 (control output 1, control output 2)
   Lights when control output 1 and/or control output 2 (cool) are ON.
   However, if control output 1 is current output, OT1 will always be unlit.
3. STOP (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 out.

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

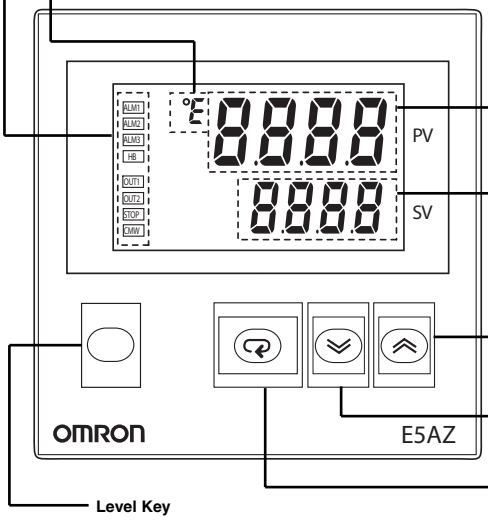
This key combination sets the E5CZ to the "protect level."

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."

Nomenclature

E5AZ



Operation Indicators

1. ALM1 (alarm 1)
   Lights when alarm 1 output is ON.
   ALM2 (alarm 2)
   Lights when alarm 2 output is ON.
   ALM3 (alarm 3)
   Lights when alarm 3 output is ON.
2. HB (heater burnout alarm display)
   Lights when a heater burnout is detected.
   The heater burnout alarm remains ON by setting the heater burnout latch. T o reset, turn the power supply OFF and then ON or set the heater burnout alarm value to "0.0A."
3. OUT1, OUT2 (control output 1, control output 2)
   Lights when control output 1 and/or control output 2 (cool) are ON.
   However , if control output 1 is current output, OUT1 will always be unlit.
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 out.
5. CMW (communications writing control)
   Lights when communications writing is enabled and is out 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.

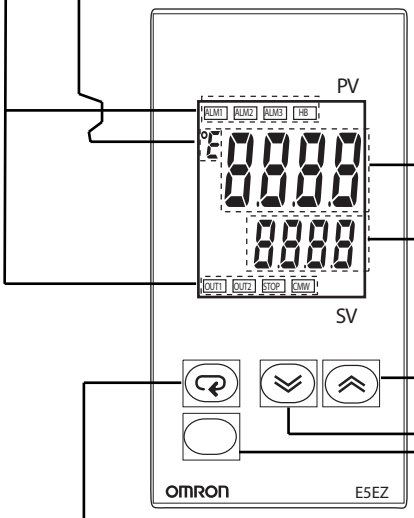
Level + Mode Keys

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 alarm 1 output is ON.
   ALM2 (alarm 2)
   Lights when alarm 2 output is ON.
   ALM3 (alarm 3)
   Lights when alarm 3 output is ON.
2. HB (heater burnout alarm display)
   Lights when a heater burnout is detected.
   The heater burnout alarm remains ON by setting the heater burnout latch. T o reset, turn the power supply OFF and then ON or set the heater burnout alarm value to "0.0A."
3. OUT1, OUT2 (control output 1, control output 2)
   Lights when control output 1 and/or control output 2 (cool) are ON.
   However , if control output 1 is current output, OUT1 will always be unlit.
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 out.
5. CMW (communications writing control)
   Lights when communications writing is enabled and is out 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.

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.

Operation

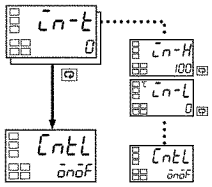
■ Initial Setup

On previous Controllers, sensor input type, alarm type and control period were set on DIP switches. These hardware settings are now set in parameters in setup menus. The ◯ and ⮌ keys are used to switch between setup menus, and the amount of time that you hold the keys down for determines which setup menu you move to. This section describes two typical examples.

1. ON/OFF Control

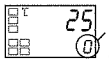
Typical Application Examples

Changing Parameters



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

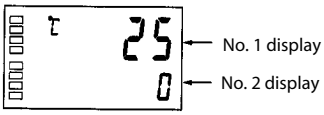
Changing Set V alues



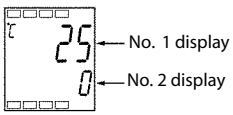
Use the ⮟ or ⮝ keys to change the set value displayed in the setup menu.

Display

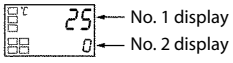
E5AZ



E5EZ



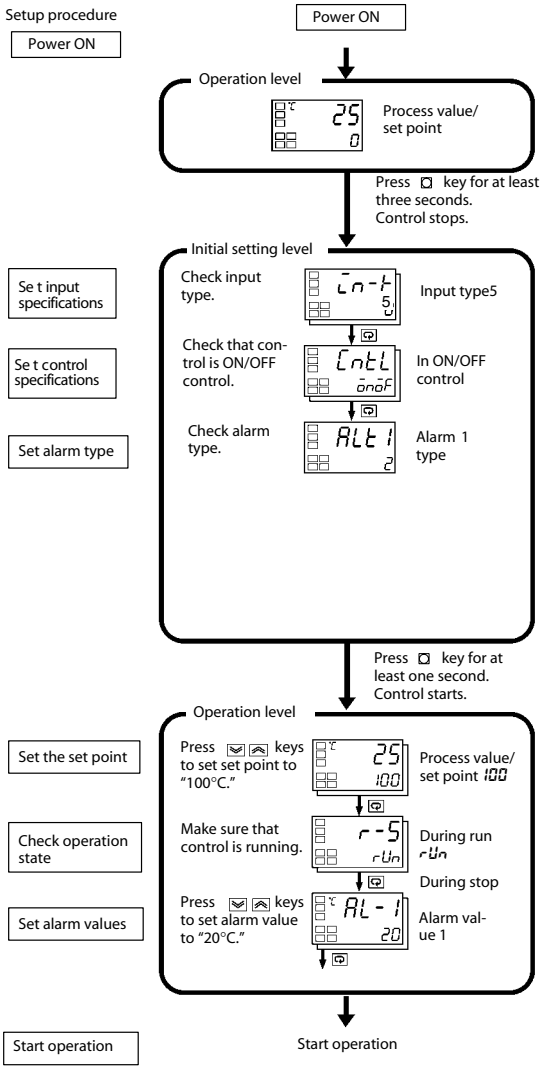
E5CZ



Typical Example

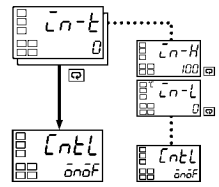
Input type :	5 K thermocouple -200 to 1300°C
Control method:	ON/OFF control
Alarm type:	2 upper limit
Alarm value 1:	20°C (For setting deviation)
Set point:	100°C

Change only the alarm value 1 and set point.
The rest must be left as default settings.



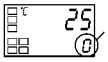
2. PID Control Using Auto-tuning

Changing Parameters



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

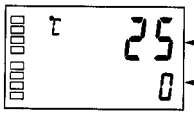
Changing Set Values



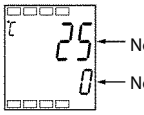
Use the ▼ or ▲ keys to change the set value displayed in the setup menu.

Display

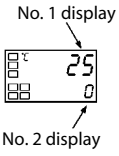
E5AZ



E5EZ



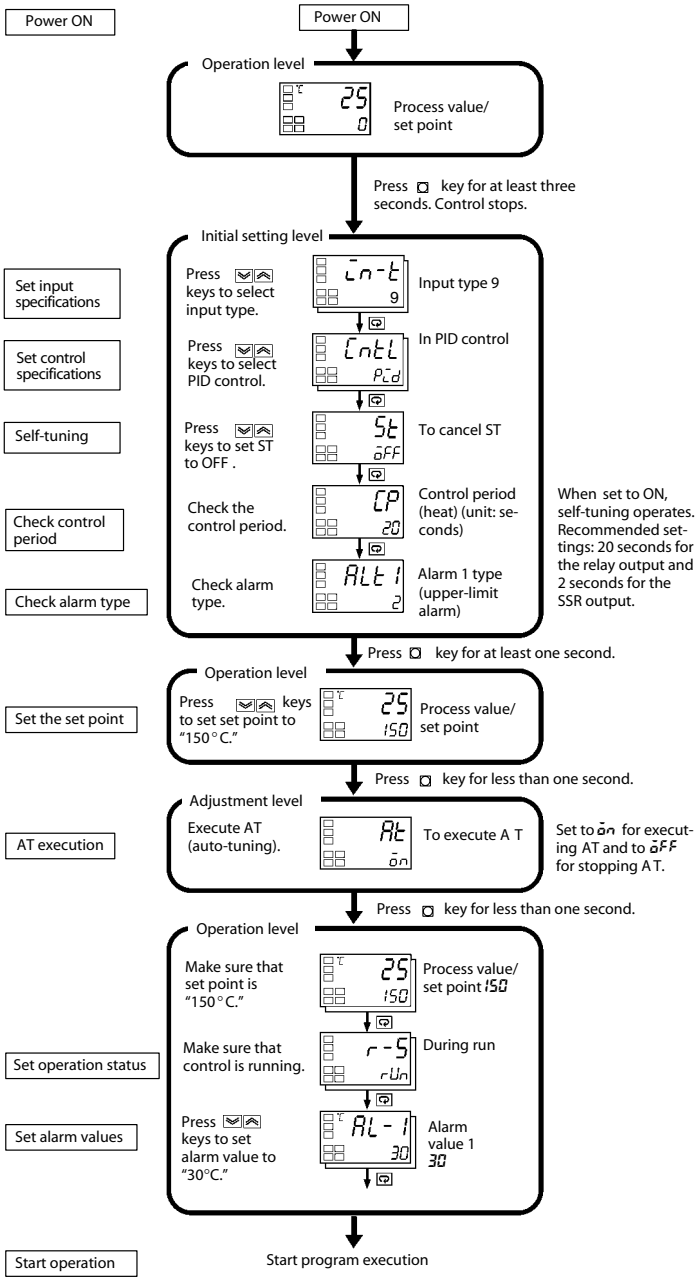
E5CZ



Typical Example

Input type: 9 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

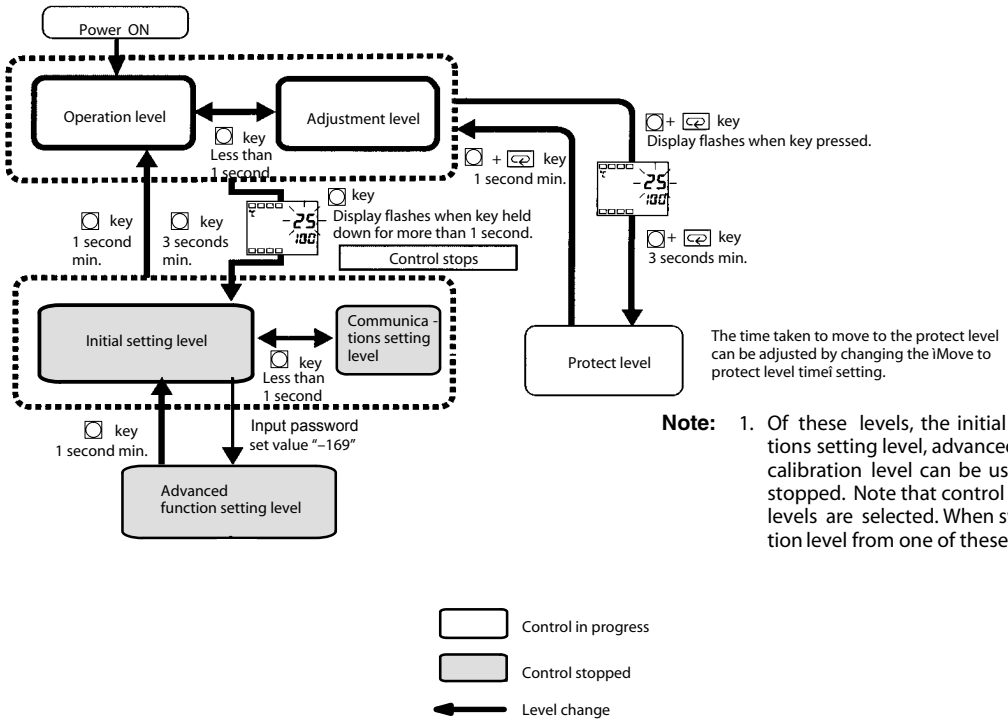


Specification Setting after Turning ON Power

■ Outline of Operation Procedures

Key Operation

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



Note: 1. 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.

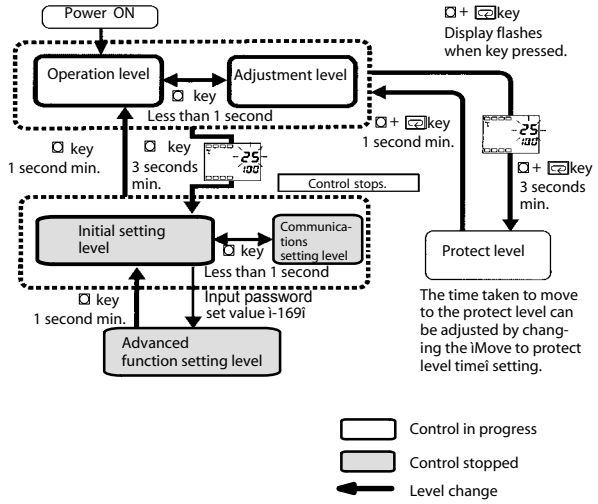
You can move only to the calibration level from this level.

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.

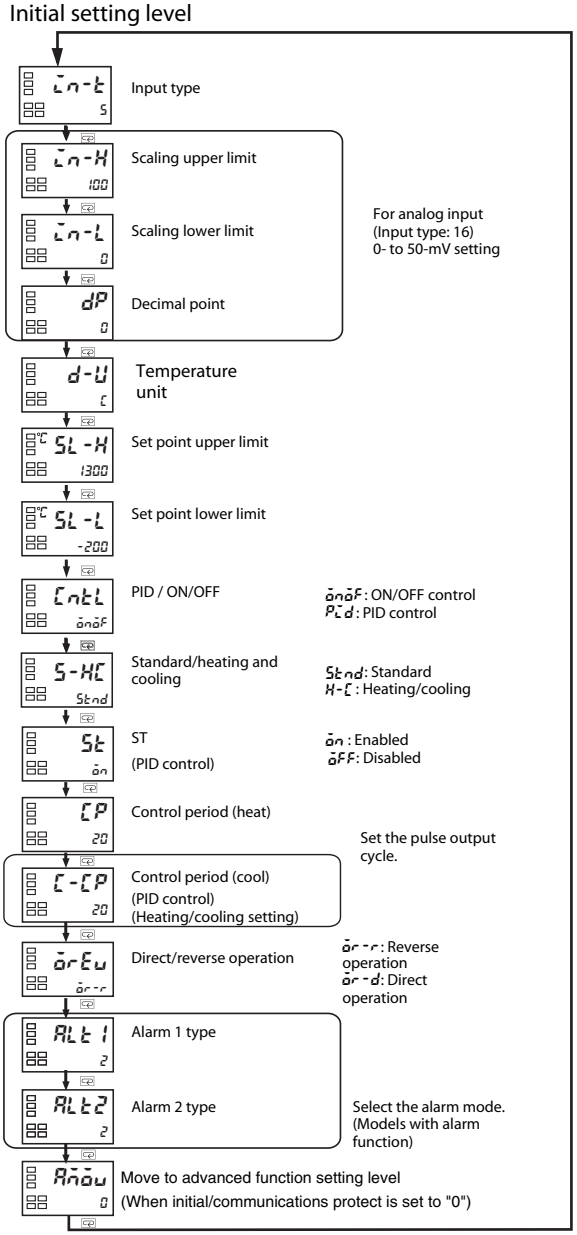


The move from the operation level to the initial setting level, press ◯ key for three seconds or more.

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

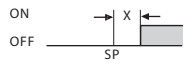
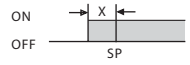
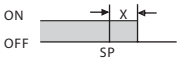
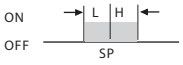
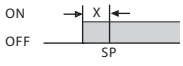
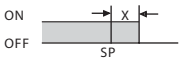
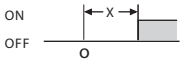
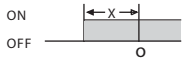
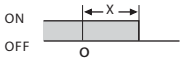
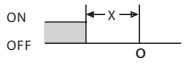
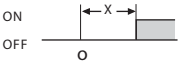
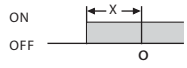
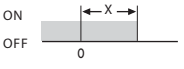
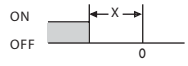
When selecting the input type, follow the specifications listed in the following table.

			Input Temperature Range	
Platinum Resistance Thermometer Input Type	Pt100	0	-200~850 (°C)	/-300~1500 (°F)
		1	-199.9~500.0 (°C)	/-199.9~900.0 (°F)
		2	0.0~100.0 (°C)	/0~210.0 (°F)
	JPt100	3	-199.9~500.0 (°C)	/-199.9~900.0 (°F)
		4	0.0~100.0 (°C)	/0.0~210.0 (°F)
Thermocouple Input Type	K	5	-200~1300 (°C)	/-300~2300 (°F)
		6	-20.0~500.0 (°C)	/0.0~900.0 (°F)
	J	7	-100~850 (°C)	/-100~1500 (°F)
		8	-20.0~400.0 (°C)	/0.0~750.0 (°F)
	T	9	-200~400 (°C)	/-300~700 (°F)
		22	199.9~400.0 (°C)	/199.9~ 700.0 (°F)
	E	10	0~600 (°C)	/0~1100 (°F)
	L	11	-100~850 (°C)	/-100~1500 (°F)
	U	12	-200~400 (°C)	/-300~700 (°F)
		23	-199.9~400.0 (°C)	/199.9~700.0 (°F)
	N	13	-200~1300 (°C)	/-300~2300 (°F)
	R	14	0~1700 (°C)	/0~3000 (°F)
	S	15	0~1700 (°C)	/0~3000 (°F)
	B	16	100~1800 (°C)	/300~3200 (°F)
Non-contact Temperature Sensor ES1B	10~70°C	17	0~90 (°C)	/0~190 (°F)
	60~120°C	18	0~120 (°C)	/0~240 (°F)
	115~165°C	19	0~165 (°C)	/0~320 (°F)
	140~260°C	20	0~260 (°C)	/0~500 (°F)
Analog input	0~50mV	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

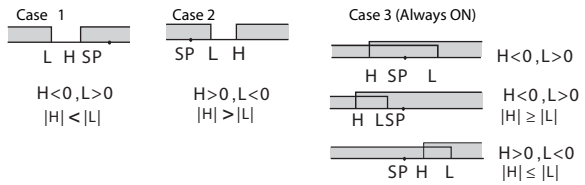
Select alarm types out of the 12 alarm types listed in the following table.

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		

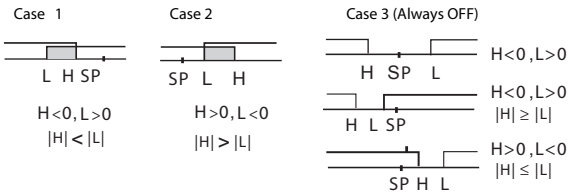
Note 1: With set values 1, 4 and 5, the upper and lower limit values can be set independently for each alarm type, and are expressed as "L" and "H".

Following operations are for cases when an alarm set point is "X" or negative.

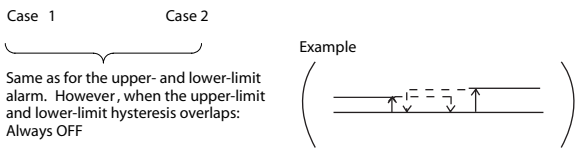
Note 2: Set value: 1, Upper- and lower-limit alarm



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



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



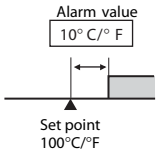
Note 5: Set value: 5, Upper- and lower-limit with standby sequence alarm. Always OFF when the upper-limit and lower-limit hysteresis overlaps.

Set the alarm types for alarm 1 and alarm 2 independently in the initial setting level. The default setting is 2 (upper limit).

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

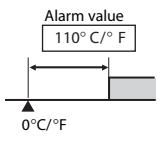
When an alarm type other than the absolute-value alarm is selected

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



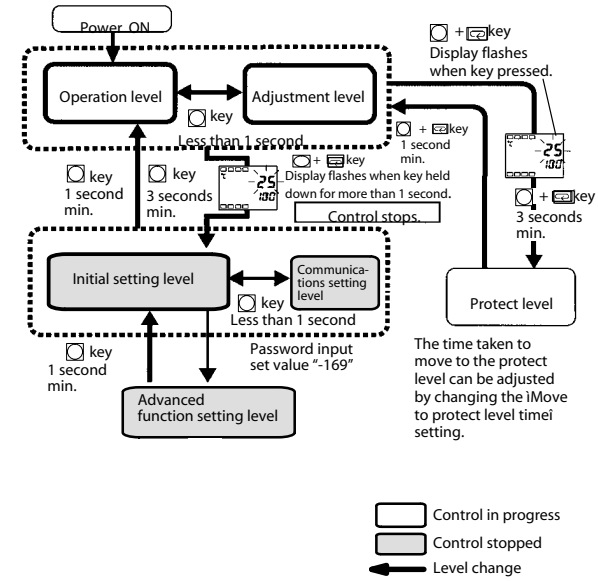
When the absolute-value alarm is selected

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



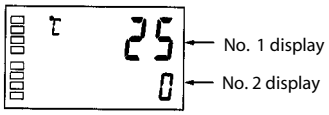
■ Parameters

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.

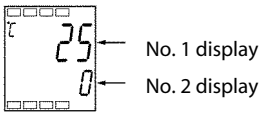


Display

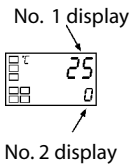
E5AZ

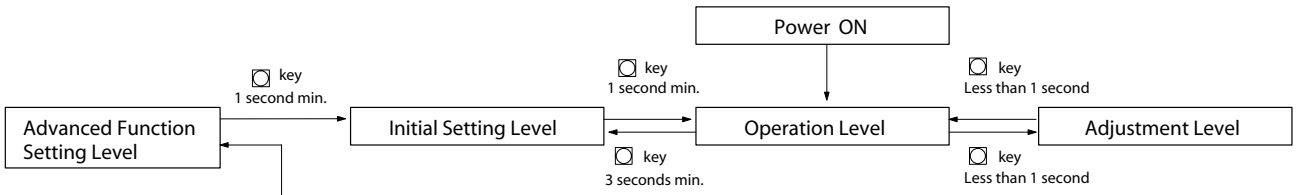


E5EZ



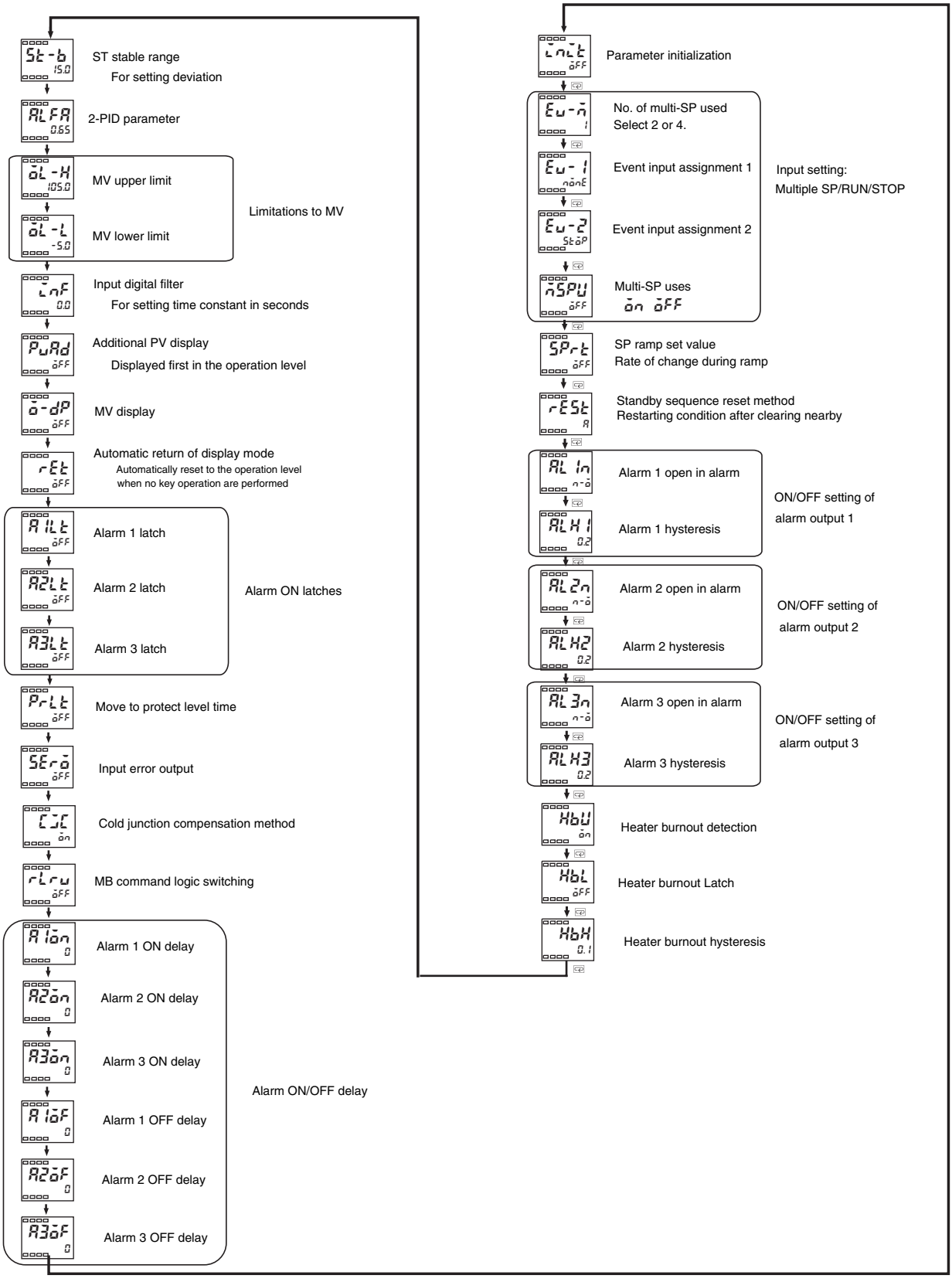
E5CZ



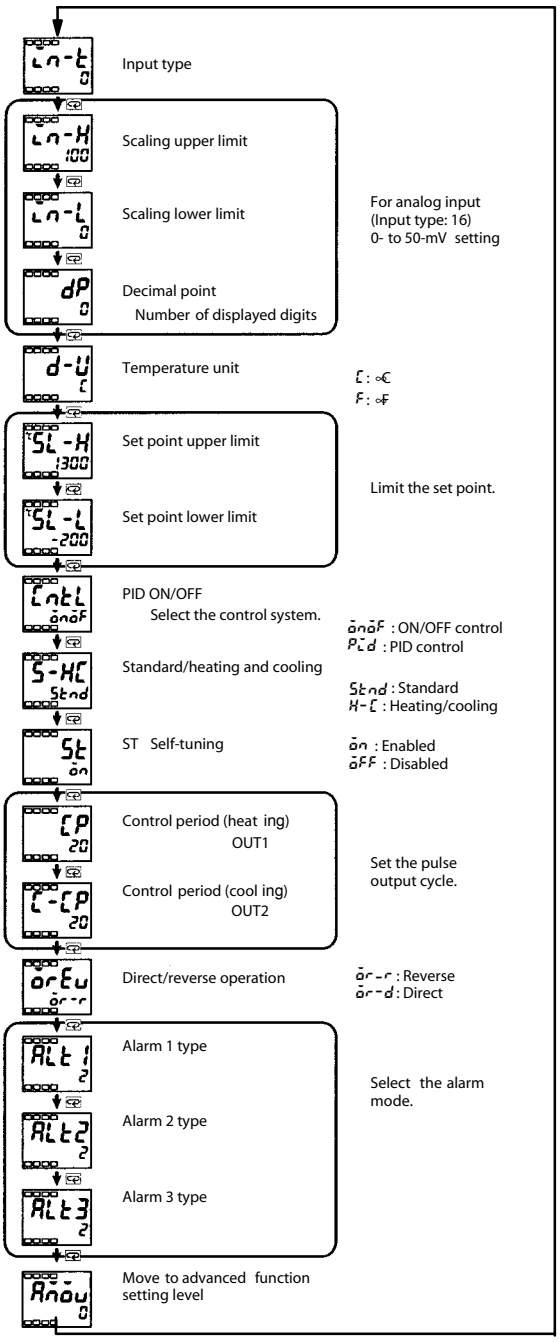


Note: To select advanced function setting level, you must enter the password ("-169") in the initial setting level.

Advanced Function Setting Level

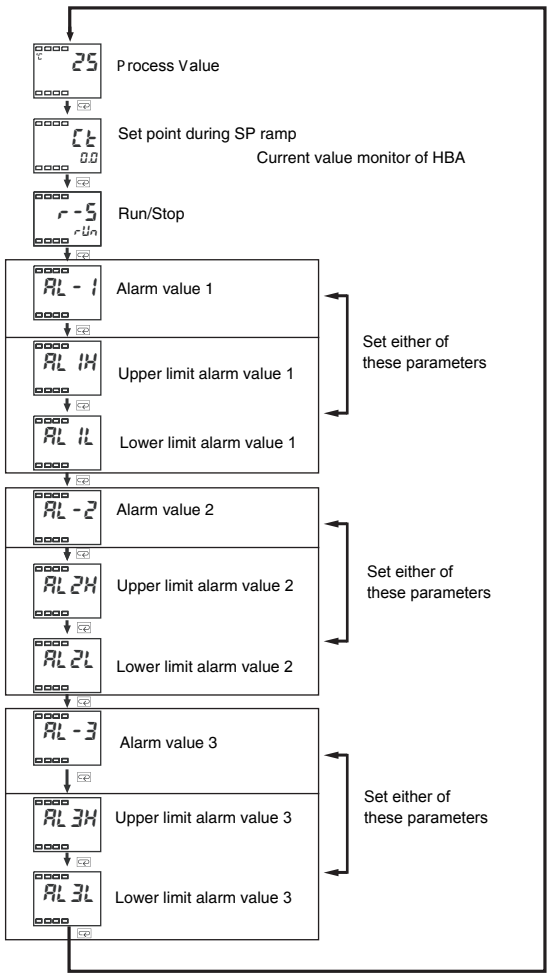


Initial Setting Level

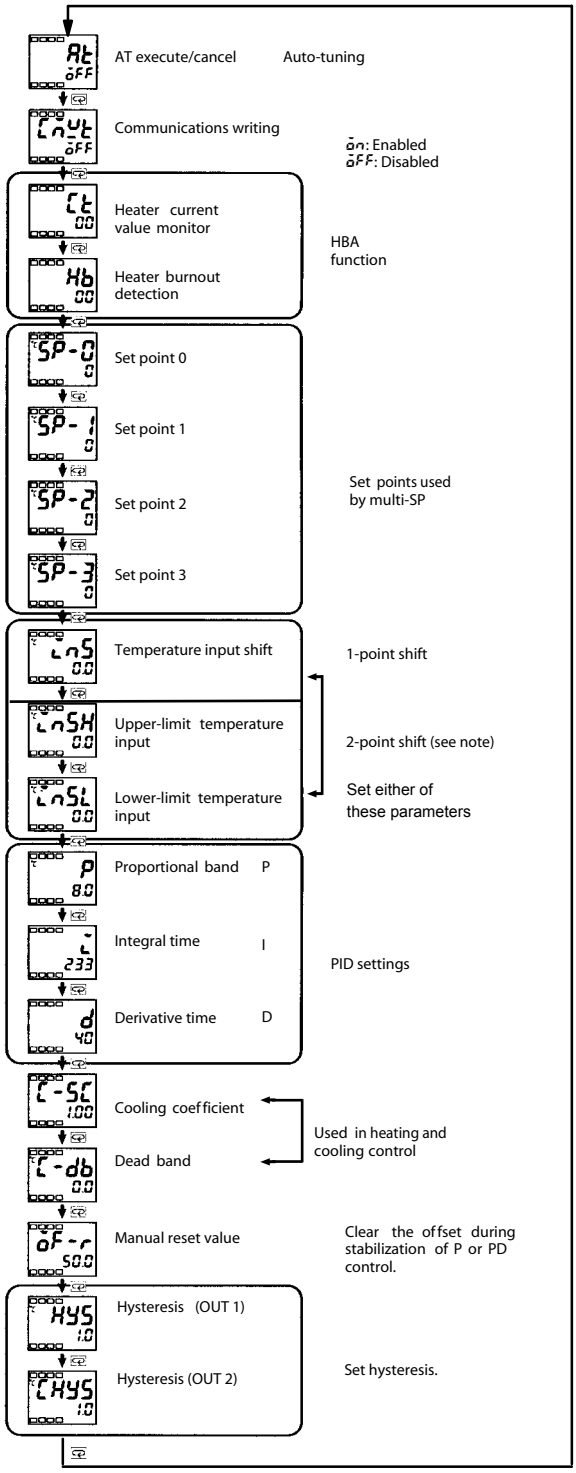


Note: To select advanced function setting level, you must enter the password ("-169") in the initial setting level.

Operation Level

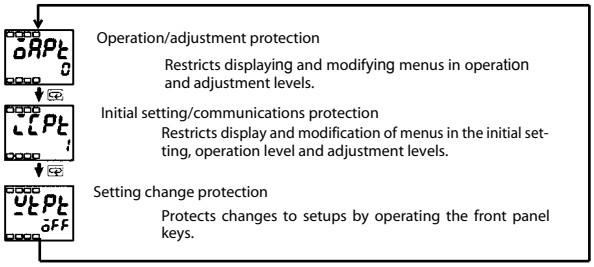


Adjustment Level



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

Protect Level



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

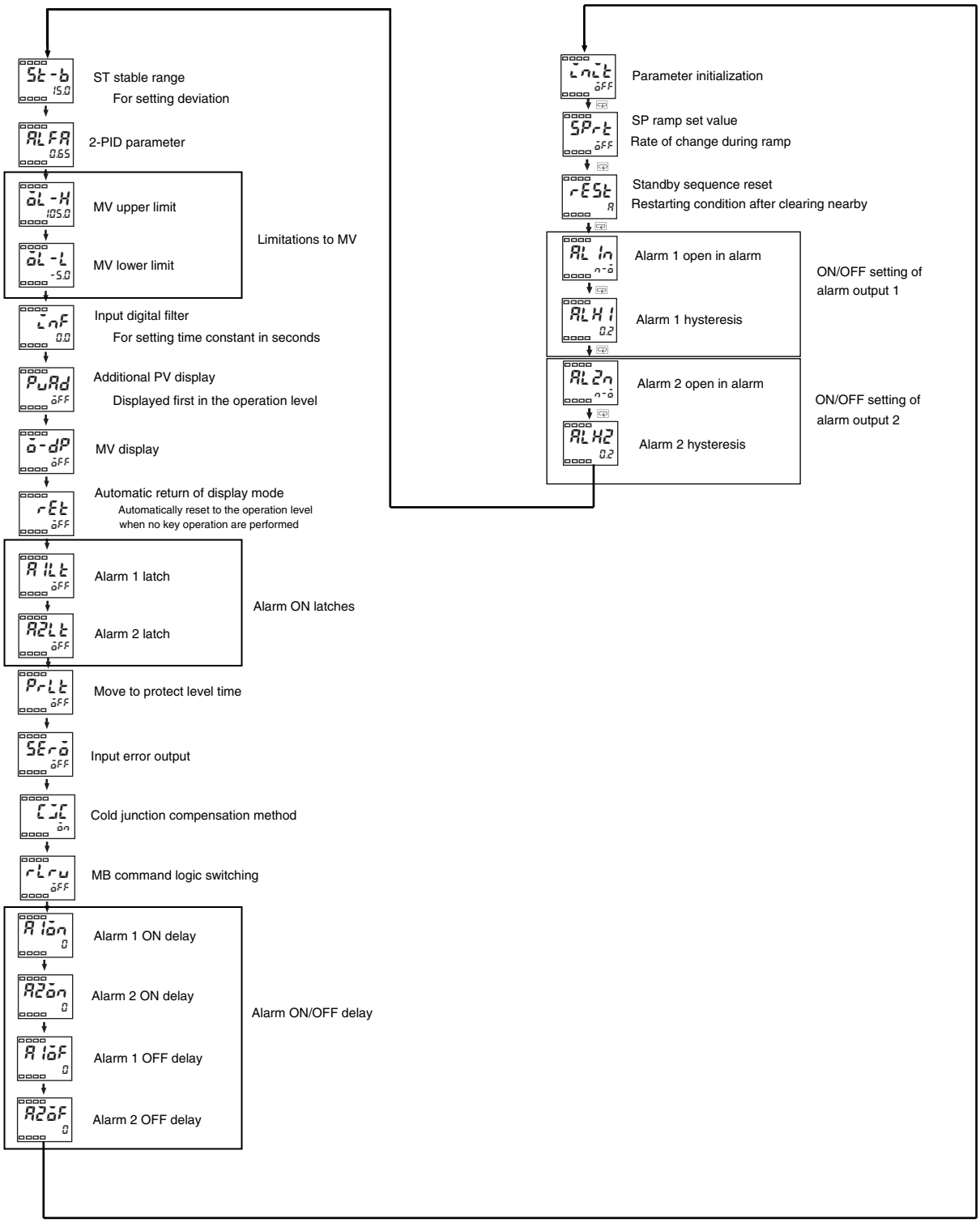
Setting Change Protection

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

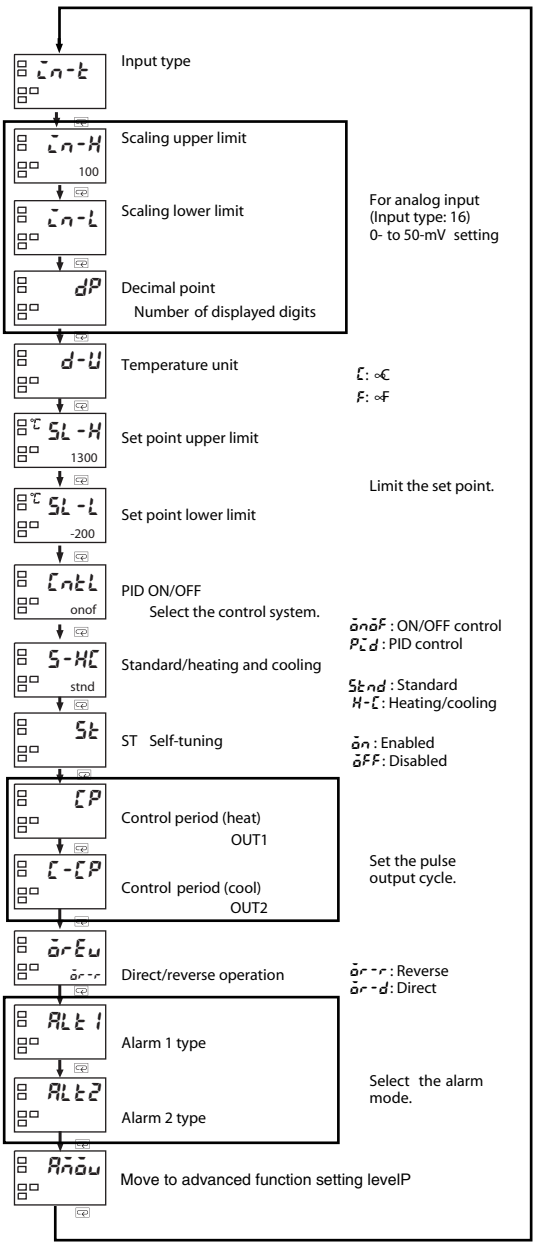
Set value	Description
OFF	Setup can be changed by key operation.
ON	Setup cannot be changed by key operation. (The protect level can be changed.)

Default setting: OFF

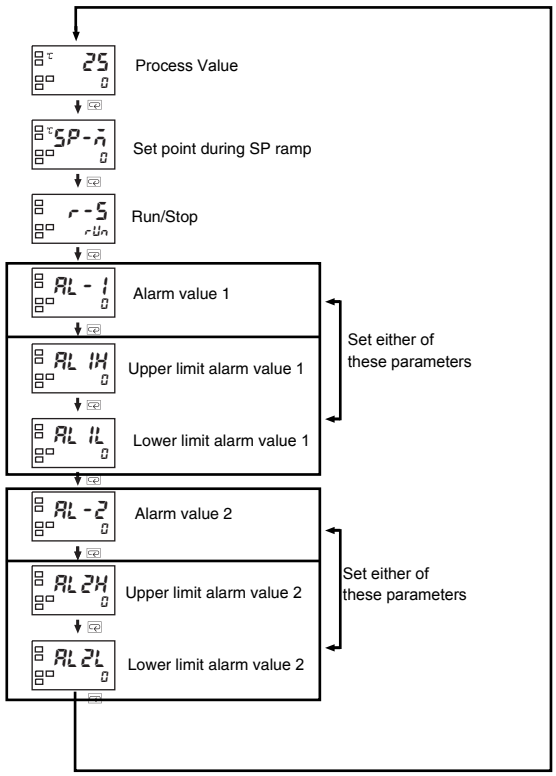
Advanced Function Setting Level



Initial Setting Level

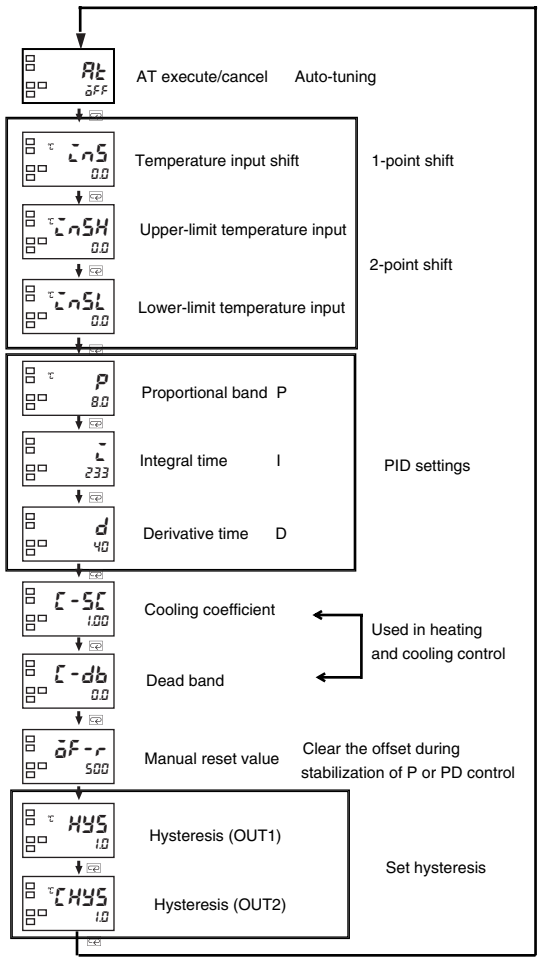


Operation Level

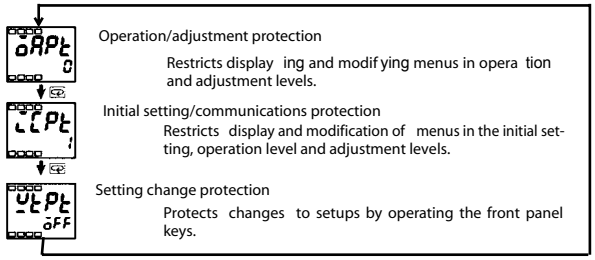


Note: To select advanced function setting level, you must enter the password ("-169") in the initial setting level.

Adjustment Level



Protect Level



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

■ Troubleshooting

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

No. 1 display	Type of error	Countermeasures
S.Err	Input error	Check the wiring of inputs for miswiring, disconnections, short-circuits, and the input type.
E111	Memory error	First, turn the power OFF then back ON again. If the display remains the same, the Unit must be repaired. If the display is restored, then a probable cause can be external noise af fecting the control system. Check for external noise.
cccc	Display range over	Though not error , this is displayed when the process value exceeds the display range when the control range is larger than the display range. • When less than "-1999" (–199.9) cccc • When larger than "9999" (999.9) ɔɔɔɔ
ɔɔɔɔ		
H.Err	HB error	First, turn the power OFF then back ON again. If the display remains the same, the Temperature Controller must be repaired. If the display is restored, then a probable cause can be electrical noise affecting the control system. Check for electrical noise.

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

Self-tuning

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

■ Feature

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

■ Functions

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

Requirements for SRT Functionality

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

When operation is started	When SP is changed
1. The SP at the startup is different from the SP at the time the previous SRT was executed. (See note.) 2. The temperature upon startup is smaller than the SP in the reverse operation and larger than the SP in the direct operation. 3. Restarting of operation is not due to an input error.	1. The SP after change is different from the SP at the time the previous SRT was executed. (See note.) 2. In the reverse operation, the value obtained by deducting the SP before change from the SP after change is larger than the ST stable range. In the direct operation, the value obtained by deducting the SP after change from the SP before change is larger than the ST stable range. 3. The SP change width is larger than the current proportional band x 1.27 + 4. 4. The temperature is in the stable state. (It can be in the balanced state if no output is generated when the power is turned ON.)

Note: The "SP that existed when the previous SRT was executed" refers to the SP used for obtaining the PID constant in the previous SRT.

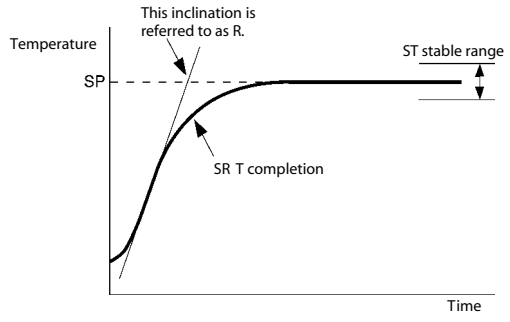
If the SP is changed while SRT is being executed and if SRT completion conditions are satisfied, no PID change will take place.

Stabilization State

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

Balanced State

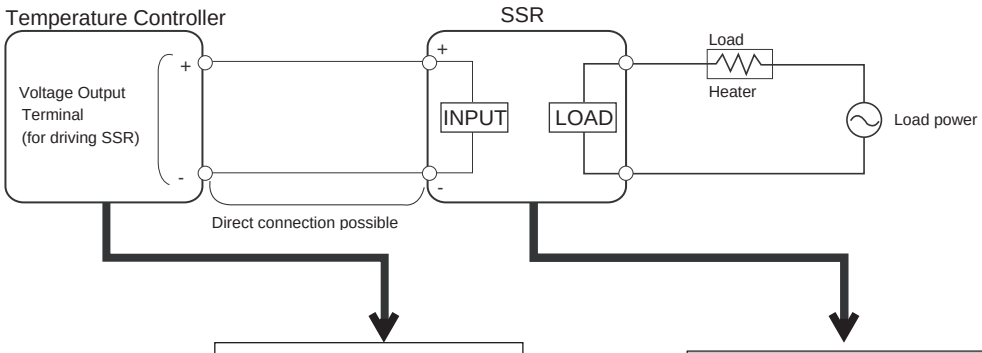
Output is 0% for 60 seconds and measured values fluctuate within the width of the stable range.



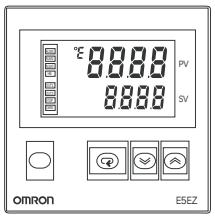
Peripheral Devices

■ Temperature Sensor / SSR

Connection Example with SSR



E5AZ



E5EZ

12VDC 40mA

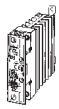
E5CZ

12VDC 20mA

3 units
5 units

G3PB (Single-phase): 240 VAC (15A, 25A, 35A, 45A)

Rated input voltage: 12 to 24 VDC



Compact and slim models with a built-in radiator

2 units
4 units

G3PB (Three-phase): 240 V AC/400 VAC (15 A, 25 A, 35 A, 45 A)

Rated input voltage: 12 to 24 VDC

Simultaneous three-phase control with a built-in radiator

3 units
5 units

G3PA: 240 VAC (10A, 20A, 40A) 480 VAC (20A, 30A)

Rated input voltage: 12 to 24 VDC

Compact and slim models with a built-in radiator

3 units
5 units

G3NA: 240 V AC (5 A, 10 A, 20 A, 40 A) 480 V AC (10 A, 20 A, 40 A)

Rated input voltage: 5 to 24 VDC

Standard models with screw terminals

1 unit
2 units

G3NE: 240 V AC (5 A, 10 A, 20 A)

Rated input voltage: 12 VDC

Compact and low-cost models with tab terminals

4 units
8 units

G3NH: 440 V AC (75 A, 150 A)

Rated input voltage: 5 to 24 VDC

For controlling high-power heater

Precautions

■ General Precautions

The user must operate the product according to the performance specifications described in the operation manuals.
Before using the product under conditions which are not described here or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.
Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

■ Safety Precautions

⚠ CAUTION

Installation Precautions

Do not touch any of the terminals while the power is being supplied. Doing so may occasionally result in minor electric shock.

Do not allow pieces of metal or wire cuttings to get inside the Temperature Controller. Failure to do so may occasionally result in minor electric shock, fire, or damage to equipment.

Do not attempt to disassemble, modify, or repair the Temperature Controller or touch any internal components. Doing so may occasionally result in minor electric shock, fire or damage to equipment.

Do not use the Temperature Controller in locations subject to flammable or explosive gas. Doing so may occasionally result in minor injury due to explosion.

If the output relay is used beyond its life expectancy, its contacts may occasionally become fused or burned. Always consider the actual application conditions and be sure to use the output relay within its rated load and electrical life expectancy. The life expectancy of the output relay varies considerably according to its switching capacity and operating conditions.

Do not use the Temperature Controller at loads greater than the rated value. Doing so may result in burning or other damage.

Use power supply voltage within the specified range. Failure to do so may result in burning or other damage.

Fire may occasionally occur if terminal screws become loose. Tighten the terminal screws using a torque between 0.74 and 0.90 N m.

Make setting for the Temperature Controller that are suitable for the controller system. Failure to do so may result in unexpected operation occasionally resulting in damage to equipment or personal injury.

Prepare a circuit with an overheating prevention alarm and take other safety measures to ensure safe operation in the event of a malfunction. Loss of operational control due to malfunction may result in a serious accident.

■ Precaution for Safe Use

In order to ensure the safe operation, observe the following precautions.

1. Do not use the Temperature Controller in the following locations.
   - Locations exposed to radiated heat from heating devices
   - Locations subject to direct sunlight
   - Locations subject to temperatures or humidity outside the range specified in the specification
   - Locations subject to condensation as the result of severe changes in temperature
   - Locations subject to corrosive or flammable gases
   - Locations subject to dust (especially iron dust) or salts
   - Location subject to exposure to water, oil or chemicals
   - Locations subject to shock or vibration
2. Use and store the Temperature Controller within the rated ambient temperature and humidity. When two or more Temperature Controllers are mounted horizontally close to each other or vertically next to one another, the internal temperature will increase due to heat radiated by the Temperature Controllers and the service life will decrease. In such as a case, use forced cooling by fans or other means of air ventilation to cool down the Temperature Controllers. When providing forced cooling, however, be careful not to cool down the terminal sections alone to avoid measurement errors.
3. Allow enough space around the Temperature Controller to ensure proper heat dissipation. Do not block the ventilating holes.
4. Check polarities and orientation when connecting terminals. Not doing so may result in malfunction.
5. When wiring the E5AZ, E5EZ, or E5CZ, use crimp terminals with the specified dimensions (M3.5, width 7.2mm max.).
6. Do not use empty terminals.
7. To avoid inductive noise, keep the wiring for the Temperature Controllerís terminal board away from power cables carry high voltages or large current. Also, do not wire power lines together with or parallel to Temperature Controller wiring. Using shielded lines to separate pipes and ducts is recommended. Attach surge absorbers or noise filter to peripheral devices that may generate noise, such as inductance devices (e.g. motors, transformers, solenoids, magnetic coils etc.). if using a noise filter with the power supply, in addition to confirming the voltage and the current, mount the power supply as near as possible to the Temperature Controller. Set up the Temperature Controller, along with its power supply, as far as possible from devices that generate strong, high-frequency waves (high-frequency welders, high-frequency machine etc.) and devices that generate surges.
8. Set up the power supply so that the voltage will reach the rated voltage within 2 seconds after turning ON.
9. Allow at least 30 minutes for the Temperature Controller to warm up.
10. When using auto-tuning, turn ON power for the load (e.g. heater) at the same time as or before supplying power to the Temperature Controller. If the power is turn ON for the Temperature Controller before turning ON power for the load, auto-tuning will not be performed properly and optimum control will not be achieved.
11. In order that power can be turn OFF in an emergency by the person operating the Temperature Controller, install the appropriate switches and circuit breakers and label them accordingly.

12. With the E5AZ, E5EZ, or E5CZ, when drawing out the Temperature Controller body, do not touch or apply excessive force. After the body is drawn out do not touch the terminals or electronic parts. When inserting, make sure that electronic parts do not come in contact with the case.
13. Use alcohol to clean the Temperature Controller. Do not use thinner or other solvent-based substances.

■ Precautions for Correct Use

Service Life

1. Use the Temperature Controller within the following temperature and humidity ranges:
   Temperature: –10°C to 55°C (with no icing or condensation)
   Humidity: 25% to 85%
   If the Controller is installed inside a control board, the ambient temperature must be kept to under 55∞C, including the temperature around the Controller.
2. The service life of the electronic devices like Temperature Controllers is determined not only by the number of times the relay is switched but also by the service life of internal electronic components. Component service life is affected by the ambient temperature: the higher the temperature, the shorter the service life and, the lower the temperature, the longer the service life. Therefore, the service life can be extended by lowering the temperature of the Temperature Controller.
3. When two or more Temperature Controllers are mounted horizontally close to each other or vertically next to one another, the internal temperature will increase due to heat radiated by the Temperature Controller and the service life will decrease. In such a case, use forced cooling by fans or other means of air ventilation to cool down the Temperature Controllers. When providing forced cooling, however, be careful not to cool down the terminals sections alone to avoid measurement errors.

Measurement Accuracy

1. When extending or connecting the thermocouple lead wire, be sure to use compensating wires that match the thermocouple types.
2. When extending or connecting the lead wire of the platinum resistance thermometer, be sure to use wires that have low resistance.
3. When wiring the platinum resistance thermometer to the Temperature Controller, keep the wire route as short as possible. Separate this wiring away from the power supply wiring and load wiring to avoid inductive or other forms of noise.
4. Mount the Temperature Controller so that it is horizontally level.
5. If the measurement accuracy is low, check to see that if input shift has been set correctly.

Operating Precautions

1. It takes approximately four seconds for the outputs to turn ON after the power is turned ON. Due consideration must be given to this time when incorporating Temperature Controllers in a sequence circuit.
2. When using auto-tuning, turn ON power for the load (e.g., heater) at the same time as or before supplying power to the Temperature Controller. If power is turned ON for the Temperature Controller before turning ON power for the load, auto-tuning will not be performed properly and optimum control will not be achieved.
3. When starting operation after the Temperature Controller has warmed up, turn OFF the power and then turn it ON again at the same time as turning ON power for the load. (Instead of turning the Temperature Controller OFF and ON again, switching from STOP mode to RUN mode can also be used.)
4. If the Temperature Controller is used close to radios, television sets or wireless devices, it may affect reception.
5. In the case of Temperature Controllers with alarm outputs, alarm output may not be generated properly when an abnormality occurs in the device. It is suggested that a separate alarm device be incorporated in the system.
6. To ensure proper performance, parameters of the Temperature Controllers are set to default values before they are shipped. Change these parameters depending on actual applications. If left unchanged, the Temperature Controller will operate under the default settings.

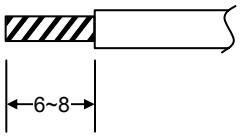
Crimp Terminal Connection

Use crimp terminals that match M3.5 screws. M3.5 x 8 self-rising screws are used.

Be careful not to excessively tighten the terminals screws.

Soldering Connection

The self-rising screws provide easy soldering connection. Strip the lead wire by a length of 6 to 8 mm and properly treat the terminal tip.



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

Cat. No. H01P-E-01 **In the interest of product improvement, specifications are subject to change without notice.**

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