E5ZN Operation

Nomenclature

E5ZN (Orders for the E5ZN series will not be accepted after March 31, 2019.)

• The E5ZN is a Temperature Controller that features the ability to be built into equipment.

• The E5ZN is equipped with RS-485 communications, so process values can be monitored and parameters can be read or written from the host system.

• The Terminal Unit can be separated from the Controller, so maintenance can be performed on the Controller without changing the wiring.

• If two or more Controllers are connected to the same host system, use an expansion Terminal Unit and close mounting to safe space and reduce wiring.

Standard Model   Expansion Model

Terminal Unit

Controller   Front panel
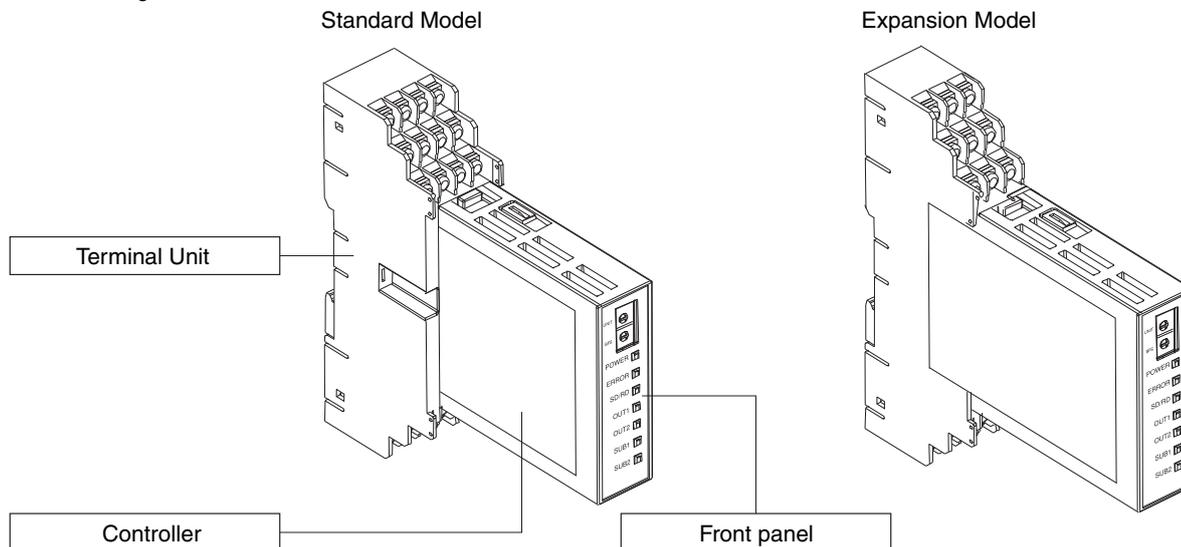
Using Setting Switches

Front Panel

UNIT

BPS

POWER

ERROR

SD/RD

OUT1

OUT2

SUB1

SUB2

OMRON E5ZN

Unit Number Switch

Set the unit number to identify the Controller connected to the host system and to the Setting Display Unit (E5ZN-SDL).
The unit number is hexadecimal.
Switch settings 0 to F correspond to unit numbers 00 to 15.

Setting	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Unit number	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15

▲ Default setting

Set a different unit number for each E5ZN if more than one is connected using RS-485 communications.
Communications cannot be performed if the same unit number is used more than once on the same line.

Baud Rate

Set the baud rate of the Controller to match the baud rate of the host system.

Setting	0	1	2	3	4	5	6	7	8	9
Baud rate (bps)	4800	9600	19200	38400	Do not set.					

▲ Default setting

Operation Indicators

• POWER
  Lights when power is turned ON.

• ERROR
  Lights when an input error (e.g., memory error or input error for any channel) occurs.

• SD/RD (Send Data/Receive Data)
  Light during communications with the host.

• OUT1, OUT2 (Control Output 1, Control Output 2)
  Light when the control output 1 or the control output 2 functions are ON.

• SUB1, SUB2 (Auxiliary Output 1, Auxiliary Output 2)
  Light when the auxiliary output 1 or the auxiliary output 2 functions are ON.

Mounting

Dimensions

Note: All units are in millimeters unless otherwise indicated.

The following figure shows the Terminal Unit mounted.
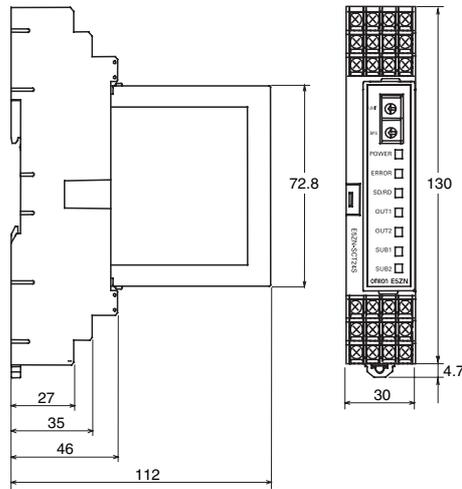
Terminal Unit
E5ZN-SCT24S (See note 1.)
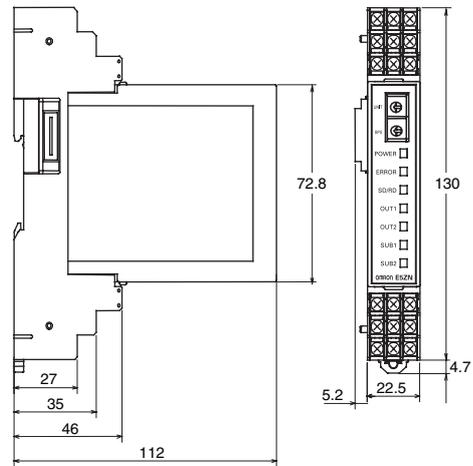
Terminal Unit
E5ZN-SCT18S (See note 2.)

Note: 1. Always use this Terminal Unit if individual Controllers are used.
   2. Use this Terminal Unit from the second Controller on if two or more Controllers are mounted side by side.

Mounting Terminal Units Together

From 0 to 15 Expansion Terminal Units (E5ZN-SCT18S) can be connected to a standard Terminal Unit (E5ZN-SCT24S). Terminal Units can be mounted together by interlocking their side connectors.
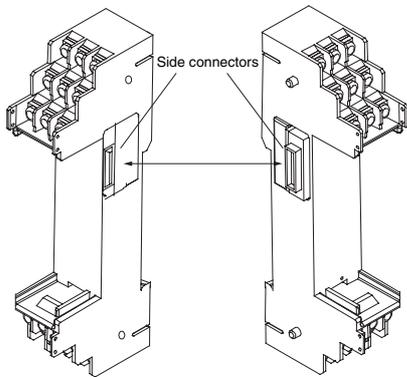
Side connectors

Attach a connector cover to the Terminal Unit on the right end.

Connector cover
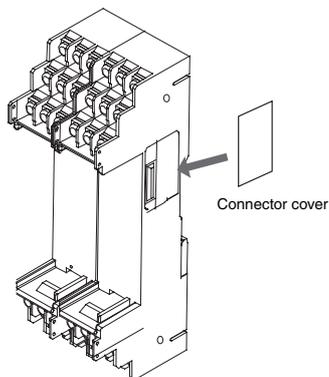
Mounting to the DIN Track

Mounting

Catch the hook located on the top of the Controller onto the DIN Track and press the Controller until it locks into place.

(2) Catch the upper hook onto the DIN Track.

(3) Press in on the Controller.

(1) Lower the hooks.

(4) Make sure the Controller is locked into place.
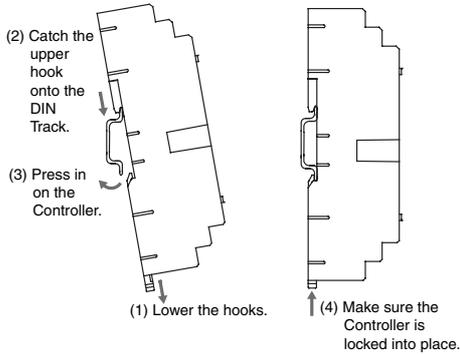
Removing the Controller

Pull down on the hooks with a flat-blade screwdriver and lift up on the Controller.

Flat-blade screwdriver
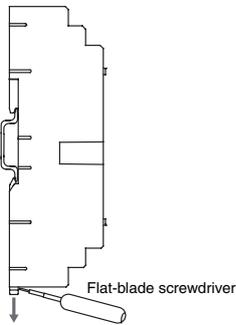
Mounting the End Plate

Always attach End Plates on both ends of the Controller.

Mounting one Controller   Side-by-side Mounting

(2)

(1)
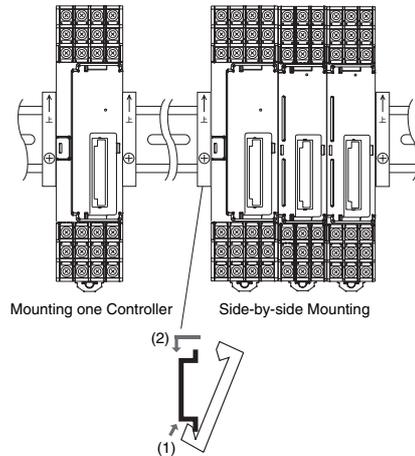
Mounting Bracket

Mount the E5ZN on a DIN Track. Mount the DIN Track using screws in at least three places in the control panel.

• DIN Track   PFP-50N (50 cm)
                    PFP-100N (100 cm)
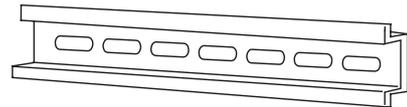
Install the DIN Track vertically to the ground.

Vertical
Correct

Horizontal
Incorrect
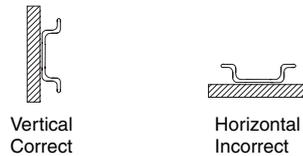
Mounting the Controller

Mounting Procedure

Firmly insert the Controller following the guides on the Controller and Terminal Unit.

Push in the Controller following the guides until it clicks into place.

Removing the Controller

(1) Pull out the Controller while pushing the hook on the end of the Controller.

(2)

(1)
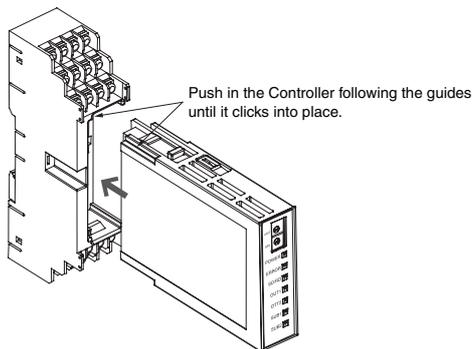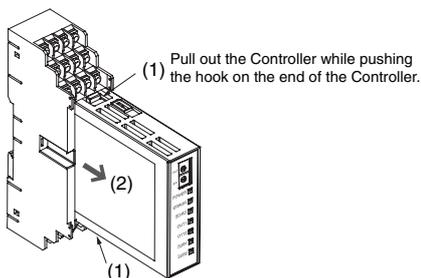
Setup Guidance

The sensor input type, alarm type, control cycle, and other initial hardware settings that were made using DIP switches on previous models are now made using the setup display on the E5ZN-SDL. Change the setup display by pressing the **LEVEL** and **MODE** Keys. The amount of time the keys are pressed determines what parameter is entered.

Interpreting Typical Examples

Changing Parameters
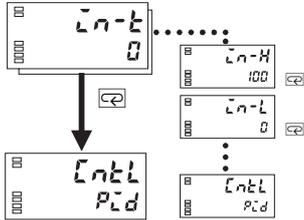
This symbol means that there are further parameters. Keep pressing the **MODE** Key until the system switches to the intended parameter.

Changing Values
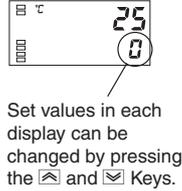
Set values in each display can be changed by pressing the ⊼ and ⊻ Keys.

Typical Example 1

Input type:	0 K thermocouple −200 to 1300°C	Set point:	100°C
Control method:	ON/OFF control	E5ZN unit number:	3
Alarm type:	2 upper limit	Channel number:	1
Alarm value 1:	20°C (Set the deviation in		

Setup Procedure

Power ON → Set the unit number. → Set the channel number. → Initial Setting Level → Set input specifications. → Set the control method. → Set the alarm type. → Operation Level → Set alarm values. → Start operation.

Power ON

Operation Level — Process value/set point

Set the unit number and channel by pressing the UNIT and CH Keys.

Press the ▱ Key for at least three seconds.

Control stops.

Initial Setting Level

Check the input type. — Input type 0

Select ON/OFF control by using the ⊼ and ⊻ Keys. — For ON/OFF control: ănăF / For PID control: Pᴵd

Check the alarm type. — Alarm 1 type 2

Press the ▱ Key for at least one second.

Operation Level

Press the ⊼ and ⊻ Keys to set the set point to 100°C. — Process value/set point 100

Press the ⊼ and ⊻ Keys to set the alarm value to 20°C. — Alarm value 1 20

Select "Run" using the ⊼ and ⊻ Keys. — To operate: rŭn / To stop: 5tăP

Operation Level

Typical Example 2

Input type:	4 T thermocouple −200 to 400°C	Alarm value 1:	30°C
Control method:	PID control Calculate PID constants using AT (auto-tuning).	Set point:	150°C
		E5ZN unit number:	1
Alarm type:	2 upper limit	Channel number:	2

Setup Procedure

Power ON

→ Set the unit number.
→ Set the channel number.

Initial Setting Level
→ Set input specifications.
→ Set the control method.
→ Set the alarm type.

Operation Level
→ Check the alarm type.

Adjustment Level
→ AT execution (for PID control)

→ Start operation

Power ON

Operation Level
25 / 01 0 — Process value/set point

Set the unit number using the **UNIT** Key.

25 / 11 0

Set the channel number using the **CH** Key.

25 / 12 0

Press the ⬜ Key for at least 3 s.
Control stops.

Initial Setting Level

Use the ⌃ and ⌄ Keys to set the input type to 4.
In-t / 12 4 — Input type 4

Use the ⌃ and ⌄ Keys to check that the control is PID.
Cntl / 12 Pid — For ON/OFF control onoF / For PID control Pid

Set to Pid when PID control is used.

Check the control period.
CP / 12 2 — Control period (OUT1) (unit: seconds) 2

Recommended settings: 20 s for a relay output and 2 s for a voltage/SSR output.

Check the alarm type.
ALt1 / 12 2 — Alarm 1 type 2

Press the ⬜ Key for at least one second.

Operation level

Press the ⌃ and ⌄ Keys to set the set point to 150°C.
25 / 12 150 — Process value/set point 150

Press the ⌃ and ⌄ Keys to set the alarm value to 30°C.
AL-1 / 12 30 — Alarm value 1 30

Select "Run" using the ⌃ and ⌄ Keys.
r-S / 12 rUn — To operate rUn / To stop StoP

Press the ⬜ Key for less than one second.

Adjustment Level

Execute AT.
At / 12 oFF — To execute AT on / To stop AT oFF

Set to on to execute AT and to oFF to stop AT.

Press the ⬜ Key (for less than 1 s).

AT ends and operation starts.

PV/SP
After AT execution.
25 / 100

During AT execution.
25 / -100
SP will flash while AT is being executed.

After AT execution.
At / oFF

During AT execution.
At / on

Using Copy Mode

This function can be used only when control is stopped. When copying settings, first finish making settings for the Temperature Controller in the normal mode, then upload and download in Copy Mode.

Upload (Temperature Controller to Setting Display Unit)
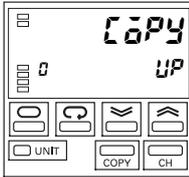
Step 1

Press the **COPY** Key for at least 1 s to enter Copy Mode.

Step 2

Use the **UP** and **DOWN** Keys to select *UP* on Display No. 2. Press the **UNIT** Key to select the unit number for the upload.
Any unit number from *0* to *F* or "-" (all units) can be selected.

Step 3

Press the **LEVEL** Key for at least 1 s to start the upload.

Note: 1. *UP* will flash on Display No. 2 during the upload.

 2. The mode will return automatically to the Operation Level when the upload has been completed.

Download (Setting Display Unit to Temperature Controller)
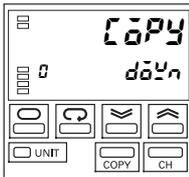
Step 1

Press the **COPY** Key for at least 1 s to enter the copy mode.

Step 2

Use the **UP** and **DOWN** Keys to select *doΨn*.
The possible selections are *UP* and *doΨn*.

Step 3

Press the **UNIT** Key to select the unit number for which data has been uploaded. Any unit number from *0* to *F* can be selected (for each Unit). The unit number for any Controllers without uploaded data, however, will not be displayed. Also, selection will not be possible if the uploaded information in the display was uploaded from all Controllers. The UNIT display will be "-".

Note: For example, to download setting data from unit number 1 to unit number 2, change the unit number from 2 to 1, and change the number of unit number 1 to another unit number or disconnect the socket connected to unit number 1. Be sure that there is only one Controller with the same unit number on the network at any one time.

Step 4

Press the **LEVEL** Key for at least 1 s to start the download.

Note: 1. *doΨn* will flash on Display No. 2 during the download.

 2. The mode will return automatically to the Operation Level when the download has been completed.

Supplementary Explanation

To download to all Temperature Controllers, use the same configuration as when the data was uploaded. Downloading is not possible in the following circumstances. If downloading is not possible, *doΨn* will flash and then the upload display will be shown.

- An E5ZN has been added or deleted since the upload.
- The same number of Controllers are connected as when the upload was executed, but when the unit numbers are different.
- The resistance thermometer/thermocouple type configuration is different.

Copying Parameters from an E5ZN Master to Other E5ZNs

This section describes how to copy parameters from Unit 1, used as the master, to Units 2 and 3, as shown in the following diagram.

System Configuration
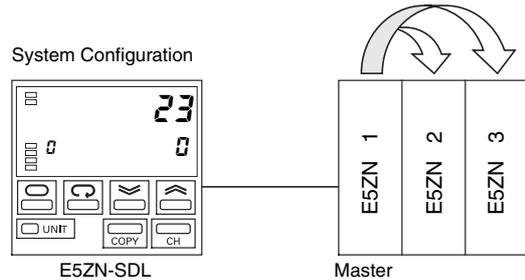
E5ZN-SDL   Master

Data uploaded to the E5ZN-SDL can be downloaded only to a Controller whose unit number has been uploaded. Therefore, after copying the Master parameters, change the unit number of the Controller where the data is to be downloaded to the unit number from which data was uploaded (i.e., the master's unit number), and then download the parameter data.

Step 1
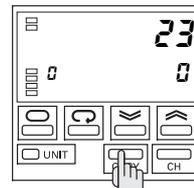
Select Copy Mode.
Press the **COPY** Key for at least 1 s to enter Copy Mode.

Step 2
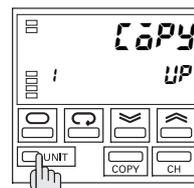
Press the **UNIT** Key to select the unit number of the master. In this example, the master is unit number 1, so select 1.

Step 3
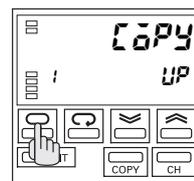
Upload all the parameters from the Master.
In this example, all the parameters from unit number 1 will be uploaded to the E5ZN-SDL. Press the **LEVEL** Key for at least one second to start the upload. *UP* will flash on the display during the upload.
The mode will return automatically to Run Mode when the upload has been completed.

Step 4

Change the unit number of the Controller to which the data is to be downloaded to the unit number of the Controller from which the data was uploaded. When uploading has been completed, turn OFF the power and disconnect the uploaded Controller (unit number 1) from the socket or change the unit number to avoid using the same unit number twice during the download.

In this example, change the unit number of the master from 1 to 5, and change the unit number of the Controller to which the data is to be downloaded from number 2 to number 1. The system configuration will change to the configuration shown in the following diagram.

Master Copy
destination
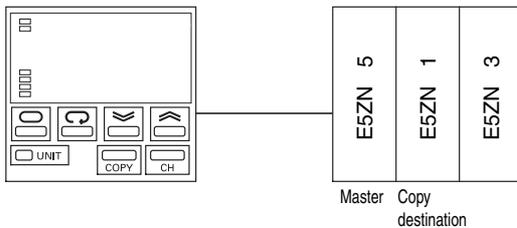
Step 5
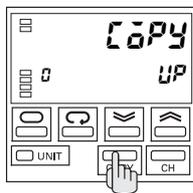
Select Copy Mode.
Turn ON the power and press the **COPY** Key for at least 1 s to enter the Copy Mode.

Step 6

Set the download mode and the copy destination.
Use the **DOWN** Key to select *down* on Display No. 2. Press the **UNIT** Key to select unit number 1. (The lowest unit number that is being uploaded will be displayed in the download unit number display. At initialization, there is no upload data, so the unit number display is blank.)

Step 7
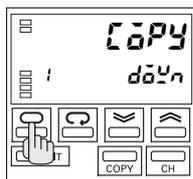
Press the **UNIT** Key for at least 1 s to start the download.
down will flash on the display during the download.
The mode will return automatically to Run Mode when the download has been completed.

Step 8

Copying to Other Controllers

Repeat steps 4 to 7 to continue copying the data.
The following example shows copying data to unit number 3.
Turn OFF the power and change unit number 1 back to unit number 2.
Change unit number 3, where the data is to be downloaded, to unit number 1. The system configuration is shown in the following diagram. Turn ON the power and follow steps 4 to 7 to copy data to unit number 3.

Master   Copy   Copy
          source   destination
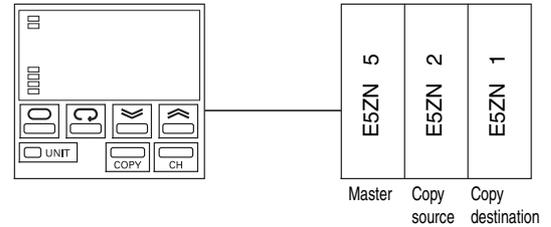
Step 9

Changing back to the original unit number.
After copying has been completed, turn OFF the power and change back to the original the unit numbers.
In this example, turn OFF the power and change unit number 5 to unit number 1, and change unit number 1 to unit number 3.

Operating Procedure Overview

Parameters are divided into groups called levels. Each of the items that is set in any of the levels is called a parameter.
The parameters on the E5ZN are divided into the following seven levels:
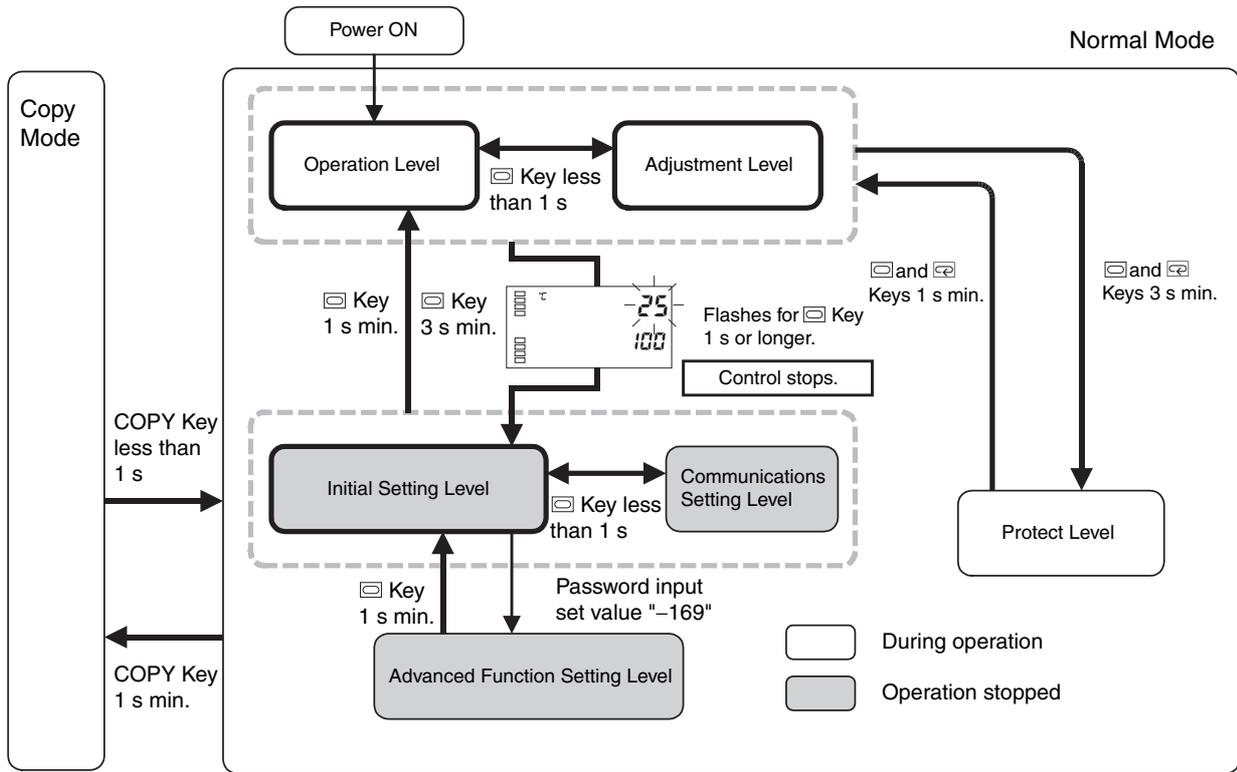
Mode/Level		During operation	Operation stopped
Normal mode	**Protect Level**	❍	---
	Operation Level	❍	---
	Adjustment Level	❍	---
	Initial Setting Level	---	❍
	Advanced Function Setting Level	---	❍
	Communications Setting Level	---	❍
Copy mode		---	❍

❍: Indicates items that can be set.

Note: To move to the Advanced Function Setting Level, set the Initial Setting/Communications Protection parameter in the Protect Level to 0.

Of these levels in normal mode, the Initial Setting Level, Communications Setting Level, and Advanced Function Setting Level can be used only when operation is stopped. Operation stops when any of these four levels are selected.

It is possible to enter Copy Mode while control is being performed, but copy operations (e.g., upload and download) can be used only when control has stopped.

Description of Modes

Protect Level

• To enter the Protect Level, simultaneously press the ⬜ and ⬜ Keys for at least 3 s in the Operation Level or Adjustment Level. The Protect Level is for preventing unwanted or accidental modification of parameters. Protected levels will not be displayed, and so the parameters in that level cannot be modified.

Operation Level

• This level is displayed first when you turn ON the power to the E5ZN. You can move to the Protect Level, Initial Setting Level, or Adjustment Level from this level.

• During operation, the PV, SP, and MV can be monitored, and the SP, alarm value, upper limit alarm and lower limit alarm can be monitored and modified.

Adjustment Level

• To enter the Adjustment Level, press the ⬜ Key for less than 1 s.

• This level is for entering set values and offset values for control. The level contains parameters for setting the auto-tuning, communications writing ON/OFF, hysteresis, multi-SP, input correction values, heater burnout alarm (HBA) settings, PID constants, etc. You can move to the top parameter of the Initial Setting Level and Operation Level from here.

Initial Setting Level

• To enter the Initial Setting Level, press the ⬜ Key for at least 3 s in the Operation Level or Adjustment Level. The first display flashes after 1 s. The Initial Setting Level is for specifying the input type, selecting the control method, setting the control period, setting direct/reverse operation, and selecting the alarm type. You can move to the Advanced Function Setting Level or Communications Setting Level from this level. To return to the Operation Level, press the ⬜ Key for at least 1 s. To move to the Communications Setup Level, press the ⬜ Key for less than 1 s.
(The display will be blank ("‐ ‐ ‐ ‐") when you move from the Initial Setting Level to the Operation Level.)

Advanced Function Setting Level

• To enter the Advanced Function Setting Level, you must enter 0 for the Initial Setting/Communications Protection parameter in Protect Level, and then enter the password (−169) in the Initial Setting Level.

• You can move only to the Initial Setting Level from the Advanced Function Setting Level.

• The Advanced Function Setting Level sets the MV limits, event input assignments, standby sequences, alarm hysteresis, and other parameters.

Communications Setting Level

• To enter the Communications Setting Level, press the ⬜ Key for less than 1 s in the Initial Setting Level. When the communications settings are to be used, set the communications conditions in this level. Communications with a host device (e.g., computer) enables SPs to be read and written, and MVs to be monitored.

Operation

The setting data that can be set from the E5ZN-SDL Setting Display Unit is shown below.
Depending on the protection settings and other factors, some settings may not be displayed.
A password is required to move to the advanced function setting level.

Communications setting level

`LEn` `7`	Communications data length
`SbiE` `2`	Communications stop bit
`PrEY` `EuEn`	Communications parity
`SduE` `20`	Communications response wait time

The display below indicates that there is setting data for ch1 or ch2.

Press the CH Button to switch between the screens for ch1 and ch2.

`in-H` `01 100` → ch2: `in-H` `02 100` ↔ ch1: `in-H` `01 100`

P : This symbol indicates setting data that is displayed only for models with pulse output.
("Models with pulse output" is used here to indicate models with voltage output or transistor output.)

A : This symbol indicates setting data that is displayed only for models with analog output.

□ Key 1 s max.

□ Key 1 s min.

□ Key

□ Key

Advanced function setting level

`iniE` `oFF`	Parameter initialize
`Eu-n` `1`	Number of multi-SP used
`Eu` `nonE`	Event input allocation
`mSPU` `oFF`	Multi-SP used
`SPrE` `0`	SP ramp set value
`rESE` `A`	Standby sequence reset
`AL 1n` `n-o`	Alarm 1 open in alarm
`ALH1` `02`	Alarm 1 hysteresis
`AL2n` `n-o`	Alarm 2 open in alarm
`ALH2` `02`	Alarm 2 hysteresis
`AL3n` `n-o`	Alarm 3 open in alarm
`ALH3` `02`	Alarm 3 hysteresis
`HbU` `on` P	HBA used
`HbL` `oFF` P	Heater Burnout Latch
`HbH` `0.1` P	Heater burnout hysteresis

Move to the advanced function setting level by entering the password "–169".

`oE-2` `0` A	Voltage output type
`SEdU` `3`	Sensor error indicator used
`Amou` `0`	Move to advanced function setting level

Top of initial setting level

`ALFA` `065`	α
`oL-H` `1050`	MV upper limit
`oL-L` `50`	MV lower limit
`inF` `00`	Input digital filter
`PuAd` `oFF`	Additional PV display
`iSdP` `oFF`	Additional temperature input shift value display
`iStP` `0`	Temperature input shift type
`A1LE` `oFF`	Alarm 1 latch
`A2LE` `oFF`	Alarm 2 latch
`A3LE` `oFF`	Alarm 3 latch
`SEro` `oFF`	Input error output
`CJC` `on`	Cold junction compensating method

Top of advanced function setting level

`oUE2` `5`	Control output 2 allocation
`SUb1` `2`	Auxiliary output 1 allocation
`SUb2` `7`	Auxiliary output 2 allocation
`SUb3` `12` A	Auxiliary output 3 allocation
`SUb4` `17` A	Auxiliary output 4 allocation
`ConE` `no`	Operation after power ON
`tr 1H` `1300` A	OUT1 transfer output upper limit
`tr 1L` `-200` A	OUT1 transfer output lower limit
`tr2H` `1300` A	OUT2 transfer output upper limit
`tr2L` `-200` A	OUT2 transfer output lower limit
`tr3H` `1300` A	SUB3 transfer output upper limit
`tr3L` `-200` A	SUB3 transfer output lower limit
`tr4H` `1300` A	SUB4 transfer output upper limit
`tr4L` `-200` A	SUB4 transfer output lower limit
`oE-1` `0` A	Current output type

Initial setting value

`in-E` `0`	Input type
`in-H` `01 100`	Scaling upper limit
`in-L` `01 0`	Scaling lower limit
`dP` `01 0`	Decimal point
`d-U` `C`	Temperature unit
`SL-H` `01 1300`	SP upper limit
`SL-L` `01- 200`	SP lower limit
`CnEL` `01 onoF`	PID control and ON/OFF control switching
`CP` `01 2`	Control period (heat)
`C-CP` `01 2`	Control period (cool)
`orEu` `01 or-r`	Direct/reverse operation
`ALE1` `01 2`	Alarm 1 type
`ALE2` `01 2`	Alarm 2 type
`ALE3` `01 2`	Alarm 3 type
`oUE1` `0`	Control output 1 allocation

OMRON

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During control

Control stopped

Copy mode

Protect level

Returns automatically or when the COPY Key is pressed for 1 s max.

COPY Key 1 s min.

☐ and ⟲ Keys 1 s min.

☐ and ⟲ Keys 3 s min.

ōRPŁ   0   Operation/adjustment protection

ꞮꞦPŁ   0   Initial setting/communications protection

ꞮŁPŁ   ōFF   Setting change protection

Power ON

1 s min.

3 s min.

Operation level

☐ Key, 1 s min.

☐ Key, 1 s min.

Adjustment level

Operation level

25   PV

25 / 0   PV/SP

ñ-SP   0   Multi-SP

SP-ñ   0   SP ramp monitor

ꞮŁ   00   Heater current value monitor Ⓟ

r-S   StōP   Run/stop

RL-1   0   Alarm value 1

RL 1H   0   Upper-limit alarm value 1

RL 1L   0   Lower-limit alarm value 1

RL-2   0   Alarm value 2

RL2H   0   Upper-limit alarm value 2

RL2L   0   Lower-limit alarm value 2

RL-3   0   Alarm value 3

ō   00   MV monitor for heating

Ꞓ-ō   00   MV monitor for cooling

Top of operation level

Adjustment (middle)

Ꞓ-Sꞓ   100   Cooling coefficient

Ꞓ-db   00   Dead band

ōF-r   500   Manual reset value

HYS   10   Heating hysteresis

ꞒHYS   10   Cooling hysteresis

Top of adjustment level

Adjustment level

RŁ   ōFF   Cancel AT execution.

ꞒñꞀŁ   ōn   Allow/prohibit communications writing

ꞒŁ   00   Heater current value monitor Ⓟ

Hb   00   Heater burnout detection Ⓟ

SP-0   0   SP 0

SP-1   0   SP 1

ꞮnS   00   Temperature input shift

ꞮnSH   00   Upper-limit temperature input shift value

ꞮnSL   00   Lower-limit temperature input shift value

P   80   Proportional band

ꞮꞮ   233   Integral time

d   40   Derivative time

Input Type

Set the input type corresponding to the sensor used. The E5ZN supports two types of inputs: resistance thermometers and thermocouples. The setting is different for each input type. Refer to the following tables and set the correct value for the temperature range and the sensor used. The same input type is used by channel 1 and channel 2.

Resistance Thermometer Input

Input Type	Name	Set Value	Input SP Range
Resistance thermometer	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

Input Type	Name	Set Value	Input SP Range
Thermo-couple	K	0	−200 to 1300 (°C)/ −300 to 2300 (°F)
		1	−20.0 to 500.0 (°C)/ 0.0 to 900.0 (°F)
	J	2	−100 to 850 (°C)/ −100 to 1500 (°F)
		3	−20.0 to 400.0 (°C)/ 0.0 to 750.0 (°F)
	T	4	−200 to 400 (°C)/ −300 to 700 (°F)
		17	−199.9 to 400.0 (°C)/ −199.9 to 700.0 (°F)
	E	5	0 to 600 (°C)/ 0 to 1100 (°F)
	L	6	−100 to 850 (°C)/ −100 to 1500 (°F)
	U	7	−200 to 400 (°C)/ −300 to 700 (°F)
		18	−199.9 to 400.0 (°C)/ −199.9 to 700.0 (°F)
	N	8	−200 to 1300 (°C)/ −300 to 2300 (°F)
	R	9	0 to 1700 (°C)/ 0 to 3000 (°F)
	S	10	0 to 1700 (°C)/ 0 to 3000 (°F)
	B	11	100 to 1800 (°C)/ 300 to 3200 (°F)
ES1A Infrared Temperature Sensor	K10 to 70°C	12	0 to 90 (°C)/ 0 to 190 (°F)
	K60 to 120°C	13	0 to 120 (°C)/ 0 to 240 (°F)
	K115 to 165°C	14	0 to 165 (°C)/ 0 to 320 (°F)
	K160 to 260°C	15	0 to 260 (°C)/ 0 to 500 (°F)
Analog input	0 to 50 mV	16	One of following ranges depending on the scaling: −1999 to 9999, −199.9 to 999.9

Note: The default settings are 0.

Output Assignments

• The following table shows the default functions assigned to each output terminal.

Name	Terminal number	Setting
OUT1 (control output 1)	7, 8	Channel 1 control output (heating)
OUT2 (control output 2)	1, 2	Channel 2 control output (heating)
SUB1 (auxiliary output 1)	13, 15	Channel 1 Alarm 1 and HB alarm OR output
SUB2 (auxiliary output 2)	14, 15	Channel 2 Alarm 1 and HB alarm OR output
SUB3 (auxiliary output 3)	16, 17	Channel 1 Transfer output: PV (See note 1.)
SUB4 (auxiliary output 4)	16, 18	Channel 2 Transfer output: PV (See note 1.)

Note 1. Only for models with analog output.

The functions can be changed as desired by setting output assignments. Refer to the following table for functions that can be allocated. Different outputs can be allocated to the same function.

Set value	Function
0	Channel 1 Control output (heating)
1	Channel 1 Control output (cooling)
2	Channel 1 Alarm 1 and HB alarm OR output
3	Channel 1 Alarm 2 output
4	Channel 1 Alarm 3 output
5	Channel 2 Control output (heating)
6	Channel 2 Control output (cooling)
7	Channel 2 Alarm 1 and HB alarm OR output
8	Channel 2 Alarm 2 output
9	Channel 2 Alarm 3 output
10	Channel 1 Transfer output: Present SP (See note 2.)
11	Channel 1 Transfer output: Ramp SP (See note 2.)
12	Channel 1 Transfer output: PV (See note 2.)
13	Channel 1 Transfer output: MV (heating) (See note 2.)
14	Channel 1 Transfer output: MV (cooling) (See note 2.)
15	Channel 2 Transfer output: Present SP (See note 2.)
16	Channel 2 Transfer output: Ramp SP (See note 2.)
17	Channel 2 Transfer output: PV (See note 2.)
18	Channel 2 Transfer output: MV (heating) (See note 2.)
19	Channel 2 Transfer output: MV (cooling) (See note 2.)

Note 2. Assignment is not possible for SUB1 or SUB2.

• If Control Output (Cooling) is assigned to an output for channel 1, heating/cooling control will be performed for channel 1. If Control Output (Cooling) is assigned to an output for channel 2, heating/cooling control will be performed for channel 2.

Allocating an Alarm 2 Output to the SUB2 Auxiliary Output 2 for Channel 1

Use host communications or the E5ZN-SDL Setting Display Unit to set 3 as assignment for auxiliary output 2.

Alarm Type

Alarms 1 and 2

Set value	Alarm type	Alarm output	
		When alarm value X is positive	When alarm value X is negative
0	No alarm	Output OFF	
1	Upper and lower limits (See note 1.)	ON / OFF — L H — SP	(See note 2.)
2	Upper limit	ON / OFF — X — SP	ON / OFF — X — SP
3	Lower limit	ON / OFF — X — SP	ON / OFF — X — SP
4	Upper and lower limits of range (See note 1.)	ON / OFF — L H — SP	(See note 3.)
5	Upper- and lower-limit alarm with standby sequence (See notes 1 and 6.)	ON / OFF — L H — SP (See note 5.)	(See note 4.)
6	Upper-limit alarm with standby sequence (See note 6.)	ON / OFF — X — SP	ON / OFF — X — SP
7	Lower-limit alarm with standby sequence	ON / OFF — X — SP	ON / OFF — X — SP
8	Absolute-value upper limit	ON / OFF ← X → 0	ON / OFF ← X → 0
9	Absolute-value lower limit	ON / OFF ← X → 0	ON / OFF ← X → 0
10	Absolute-value upper limit with standby sequence (See note 6.)	ON / OFF ← X → 0	ON / OFF ← X → 0
11	Absolute-value lower limit with standby sequence (See note 6.)	ON / OFF ← X → 0	ON / OFF ← X → 0

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."

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

Case 1: L H SP — H < 0, L > 0, |H| < |L|
Case 2: SP L H — H > 0, L < 0, |H| > |L|
Case 3 (Always ON): H SP L — H < 0, L < 0
H L SP — H < 0, L > 0, |H| ≥ |L|
SPLH — H > 0, L < 0, |H| ≤ |L|
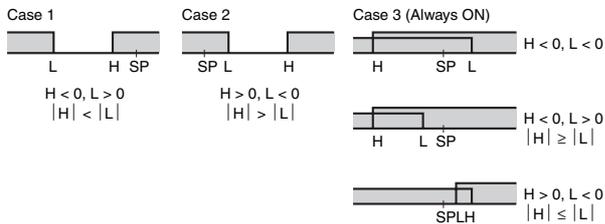
3. Set value: 4, Upper- and lower-limit range

Case 1: L H SP — H < 0, L > 0
Case 2: SP L H — H > 0, L < 0
Case 3 (Always ON): H SP L — H < 0, L < 0
H L SP — H < 0, L > 0, |H| ≥ |L|
SP H L — H > 0, L < 0, |H| ≤ |L|
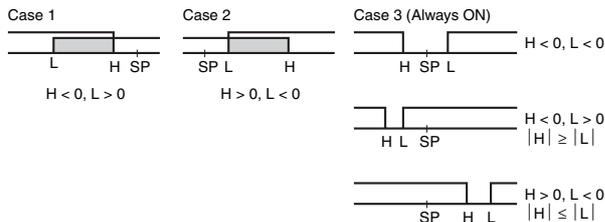
4. Set value: 5, Upper- and lower-limit with standby sequence For upper- and lower-limit alarms in the above diagrams, the alarm is always OFF in cases 1 and 2 if the hysteresis for the upper and lower limits overlaps, and the alarm is always OFF for case 3.

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

6. Refer to *Alarm Hysteresis* for information on standby sequences.

Alarm 3

Set value	Alarm type	Alarm output	
		When alarm value X is positive	When alarm value X is negative
0	No alarm	Output OFF	
1	Upper and lower limits	ON / OFF — X X — SP	Always ON
2	Upper limit	ON / OFF — X — SP	ON / OFF — X — SP
3	Lower limit	ON / OFF — X — SP	ON / OFF — X — SP
4	Upper and lower limits of range	ON / OFF — X X — SP	Always OFF
5	Upper- and lower-limit alarm with standby sequence	ON / OFF — X X — SP	Always OFF
6	Upper-limit alarm with standby sequence	ON / OFF — X — SP	ON / OFF — X — SP
7	Lower-limit alarm with standby sequence	ON / OFF — X — SP	ON / OFF — X — SP
8	Absolute-value upper limit	ON / OFF ← X → 0	ON / OFF ← X → 0
9	Absolute-value lower limit	ON / OFF ← X → 0	ON / OFF ← X → 0
10	Absolute-value upper limit with standby sequence	ON / OFF ← X → 0	ON / OFF ← X → 0
11	Absolute-value lower limit with standby sequence	ON / OFF ← X → 0	ON / OFF ← X → 0

Note: If the alarm type is set to value from 1 to 7, set the alarm value as the deviation from the SP.

Use host communications or the E5ZN-SDL Setting Display Unit to set the alarm type separately for each alarm for alarms 1 to 3. The default settings are for an upper-limit alarm (set value: 2). Set the alarms separately for each channel.

Error Displays

If an error occurs, an error message will be displayed on the E5ZN-SDL Setting Display Unit.
Use the error message to check the type of error and correct the error accordingly.

PV display	Error	Meaning	Action	Operation

5.Err	Input error	The input value has exceeded the control range∗.
		
		∗Control Range
		  Resistance thermometer or thermocouple input:
		    SP lower limit −20°C to SP upper limit 20°C
		    (SP lower limit −40°F to SP upper limit 40°F)
		  ES1A input:
		    Same as input indication range
		  Analog input:
		    −5% to 105% of scaling range
			Check the wiring of inputs for mistakes in wiring, disconnections, short-circuits, and the input type. If no abnormality is found in the wiring and input type, turn the power OFF then back ON again. If the display remains the same, the E5ZN must be repaired. If the display is restored, then electrical noise may be affecting the control system. Check for electrical noise.	After the error occurs, the error is displayed, and control outputs turn OFF.
				
				Alarm outputs operate as if the upper limit has been exceeded.
				
				This error message is displayed when the PV or PV/SP is displayed.

cccc ɔɔɔɔ	Display Range Over	This message does not indicate an error. It is displayed if the PV exceeds the display range and the control range is larger than the display range (−1999 (−199.9) to 9999 (999.9)). • Less than -1999 (−199.9): cccc • More than 9999 (999.9): ɔɔɔɔ	---	Control continues and operation is normal. This message is displayed when the PV or PV/SP is displayed.
E111	Memory Error	There is an error in the internal memory operation for the E5ZN-SDL Setting Display Unit.	First, turn the power OFF then back ON again. If the display remains the same, the E5ZN must be replaced. If the display is restored, then electrical noise may be affecting the control system. Check for electrical noise.	Key operations are not possible.
FFFF	Current Value Exceeded	This error is displayed when the heater current value exceeds 55.0 A.	---	Control continues and operation is normal. This error message is displayed when the heater current value monitor is displayed.
- - - -	Disabled Status	This error is displayed when one of the following errors has occurred in the connection with the E5ZN. • The connecting cable is disconnected. • The power supply to the E5ZN-SDL has been turned OFF while in Copy Mode. • A memory error has occurred in the E5ZN. The control output and alarm outputs will be OFF for the E5ZN generating the error.	---	Controllers that do not show this disabled status will continue operation and will operate normally. The selected Controller and the channel status will be displayed.

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