

数字式温度控制器

CHN 使用说明书

感谢您购买欧姆龙E5EZ数字温度控制器。为了您更好的使用这一产品，该手册描述了其功能、特性以及应用方法。

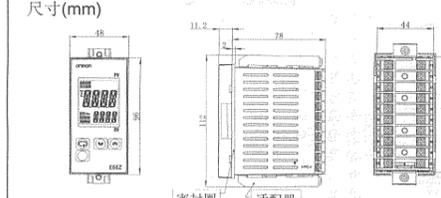
欧姆龙公司 ©All Rights Reserved 详细的操作指令请参考E5CZ/AZ/EZ用户手册(Cat.No.H207).

安全警告

警告符号的要点 表示潜在的危險情况，如不加以防止，很可能导致轻度或中度的人身伤害，或财产损坏。

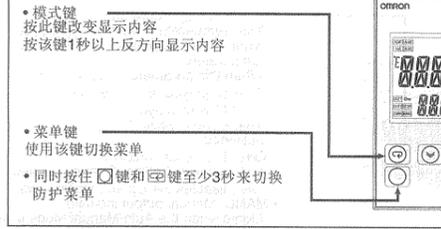
配线

尺寸规格



1. 无需断开端子接线，可以把主单元拆下来维修。 2. 产品下部配有设定工具接口，当使用设定工具时，请使用此接口连接电脑和该产品。

前面板的名称



操作菜单

输入类型

Table with columns for Input Type, Input, Setting, and Setting Range. Includes options for Pt100, K, J, T, E, L, U, N, R, S, B, ES1B, and Analog Input.

Table for Input Type and Range, showing settings for current and voltage inputs.

报警

Table for Alarm Settings, detailing alarm types (e.g., deviation, absolute limit) and their corresponding outputs.

错误显示 (故障诊断)

Table for Error Display, listing error codes (S.ERR, E.111, H.ERR) and their meanings and actions.

联系方式

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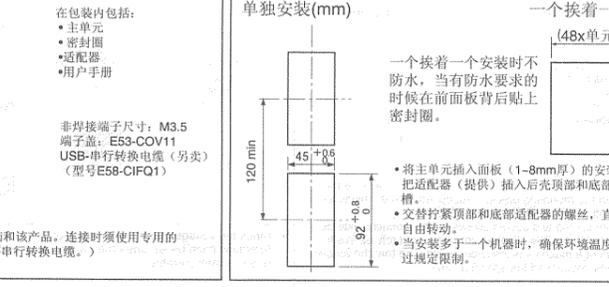
警告符号

当电源带电时，不要接触端子。这样做可能会导致电击或导致轻度伤害。 不允许金属碎片、导线线头或者安装时产生的细小的金属屑进入设备。

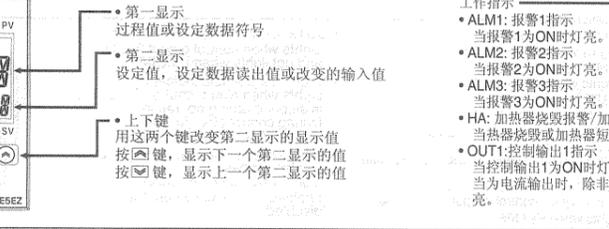
使用的适用性

欧姆龙不负责遵守任何使用该产品进行集成的用户产品的标准、章程或规则。 采取一切必要的步骤来决定该产品对采用该产品的系统、机器和设备的适用性。

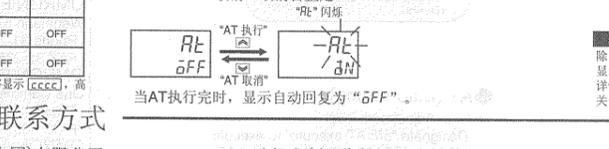
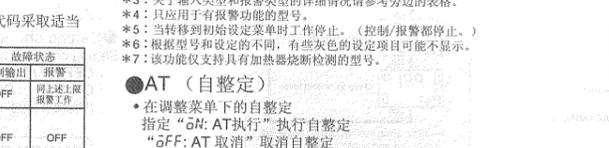
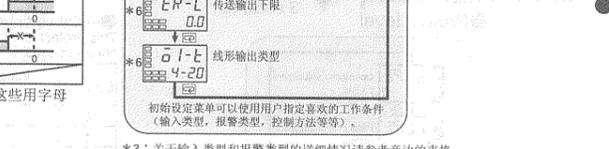
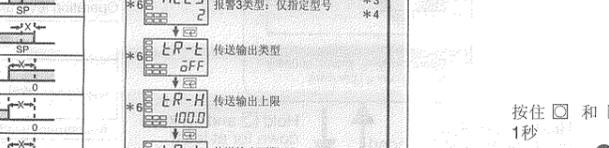
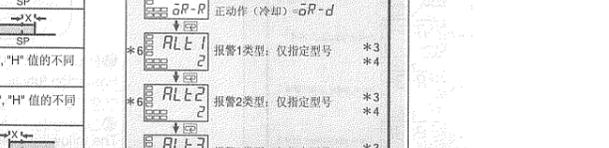
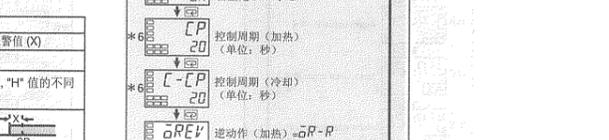
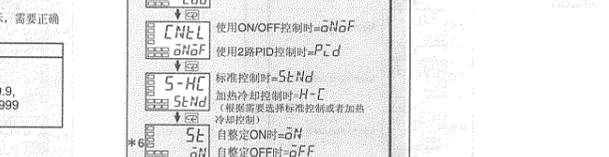
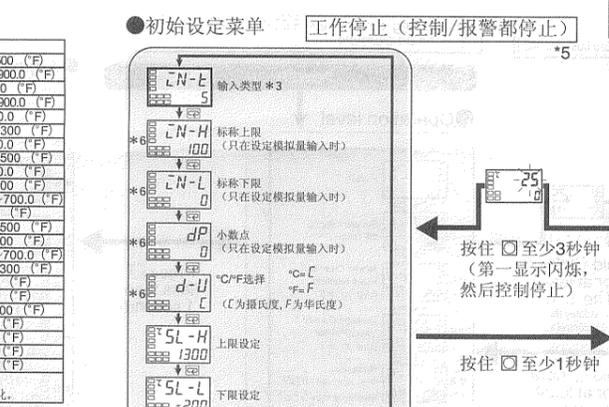
安装



连接



调整菜单

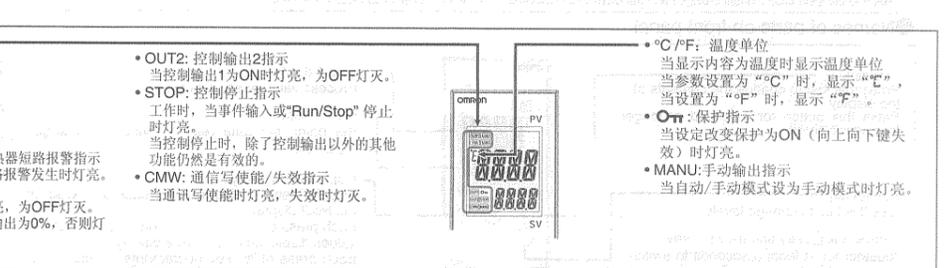


安全使用注意事项

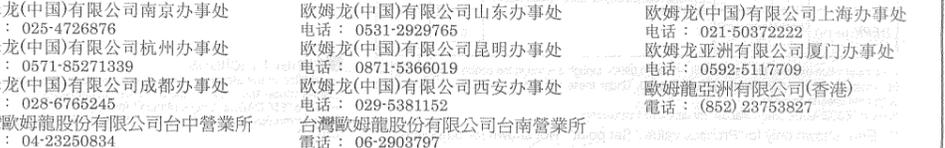
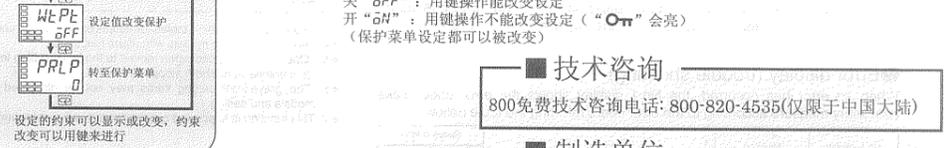
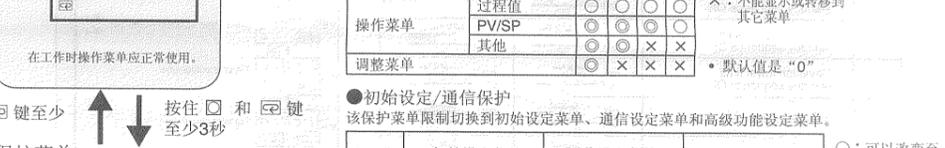
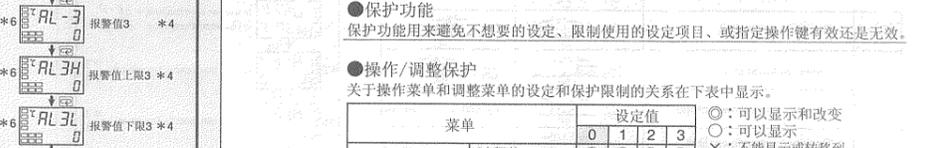
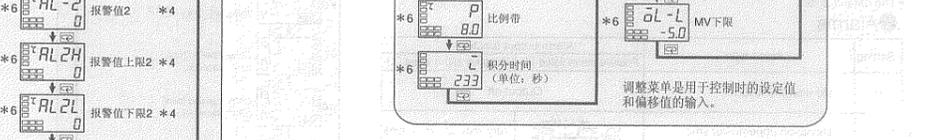
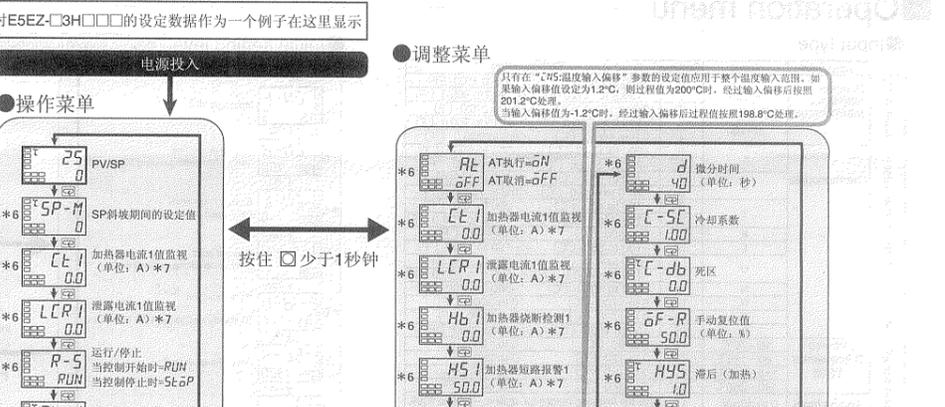
- 了解以下警告以避免操作失误、误动作或产品特性、功能的相反效果。 1) 该产品只被设计为室内使用。 2) 在额定温度和湿度范围内使用/存储该设备。

Specifications

Specifications table listing power supply, working voltage range, accuracy, and other technical details.



操作菜单



EN INSTRUCTION MANUAL

Thank you for purchasing the OMRON E5EZ Digital Temperature Controller. This manual describes the functions, performance, and application methods needed for optimum use of the product.
Please observe the following items when using the product.
• This product is designed for use by qualified personnel with a knowledge of electrical systems.
• Before using the product, thoroughly read and understand this manual to ensure correct use.
• Keep this manual in a safe location so that it is available for reference whenever required.

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For detailed operating instructions, please refer to the E5CZ/AZ/EZ User's Manual (Cat. No.H207). Significance of WARNINGS and CAUTIONS

Safety Precautions

Key to Warning Symbols

CAUTION Indicates a potentially hazardous situation which, if not avoided, is likely to result in minor or moderate injury or property damage. Read this manual carefully before using the product.

CAUTION

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

Do not allow pieces of metal, wire clippings, or fine metallic shavings or filings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.

Do not use the product where subject to flammable or explosive gas. Otherwise, minor injury from explosion may occasionally occur.

Never disassemble, modify, or repair the product or touch any of the internal parts. Minor electric shock, fire, or malfunction may occasionally occur.

CAUTION - Risk of Fire and Electric Shock

a) This product is UL recognized as Open Type Process Control Equipment. It must be mounted in an enclosure that does not allow fire to escape externally.

b) More than one disconnect switch may be required to de-energize the equipment before servicing.

c) Signal inputs are SELV, limited energy.

d) Caution: To reduce the risk of fire or electric shock, do not interconnect the outputs of different Class 2 circuits.

If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions.

Tighten the terminal screws to between 0.74 and 0.90 Nm. Loose screws may occasionally result in fire.

Set the parameters of the product so that they are suitable for the system being controlled. If they are not suitable, unexpected operation may occasionally result in property damage or accidents.

A malfunction in the Temperature Controller may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage. To maintain safety in the event of malfunction of the Temperature Controller, take appropriate safety measures, such as installing a monitoring device on a separate line.

Suitability for Use

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product. Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product. NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also Product catalog for Warranty and Limitation of Liability.

Precautions for safety use

Be sure to observe the following precautions to prevent operation failure, malfunction, or adverse effects on the performance and functions of the product. Do not do so may occasionally result in unexpected events.

- The product is designed for indoor use only. Do not use the product outdoors or in any of the following locations:
 - Places directly subject to heat radiated from heating equipment.
 - Places subject to splashing liquid or oil atmosphere.
 - Places subject to direct sunlight.
 - Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
 - Places subject to intense temperature change.
 - Places subject to icing and condensation.
 - Places subject to vibration and large shocks.
- Use/store within the rated temperature and humidity ranges. Provide forced-cooling if required.
- To allow heat to escape, do not block the area around the product. Do not block the ventilation holes on the product.
- Be sure to wire properly with correct polarity of terminals.
- Use the specified size (M3.5, width 7.2 mm or less) crimped terminals for wiring. To connect bare wires to the terminal block, use copper braided or solid wires with a gage of AWG24 to AWG14 (equal to a cross-sectional area of 0.205 to 2.081 mm²). (The stripping length is 5 to 6 mm.) Up to two wires of same size and type or two crimp terminals can be inserted into a single terminal.
- Do not wire the terminals which are not used.
- Allow as much space as possible between the controller and devices that generate a powerful high-frequency or surge. Separate the high-voltage or large-current power lines from other lines, and avoid parallel or common wiring with the power lines when you are wiring to the terminals.
- Use this product within the rated load and power supply.
- Make sure that the rated voltage is attained within 2 seconds of turning ON the power by using a switch or relay contact. If the voltage is applied gradually, the power may not be reset or output malfunctions may occur.
- Make sure that the Temperature Controller has 30 minutes or more to warm up after turning ON the power before starting actual control operations to ensure the correct temperature display.
- When executing self-tuning, turn the load and the unit ON simultaneously, or turn the load ON before you turn the controller ON.
- A switch or circuit breaker should be provided close to this unit. The switch or circuit breaker should be within easy reach of the operator, and must be marked as a disconnecting means for this unit.
- Always turn OFF the power supply before pulling out the interior of the product, and never touch nor apply shock to the terminals or electronic components. When inserting the interior of the product, do not allow the electronic components to touch the case.
- Do not use paint thinner or similar chemical to clean with. Use standard grade alcohol.
- Design system (control panel, etc.) considering the 2 seconds of delay that the controller's output to be set after power ON.
- The output may turn OFF when shifting to certain levels. Take this into consideration when performing control.
- The number of EEPROM write operations is limited. Therefore, use RAM write mode when frequently overwriting data during communications or other operations.
- Refer to the instruction sheet for installing Option unit (E53-AZB/E53-AZ01/E53-AZ03).

Specifications

| | |
|---|---|
| Power supply voltage | 100 to 240VAC, 50/60Hz or 24VAC, 50/60Hz or 24VDC |
| Operating voltage range | 85 to 110% of the rated voltage |
| Power consumption | Approx. 8.5VA (AC100 to 240V) Approx. 6VA (AC24V) Approx. 4W (DC24V) |
| Indication accuracy (Ambient temperature: 23°C) | Thermocouple, platinum resistance thermometer: (±0.5% of indication value or ±1°C, which is greater) ±1 digit max. Analog input: ±0.5% FS ±1 digit max. Output current: approx. 7 mA per contact. |
| Event input | ON: 1 kΩ max., OFF: 100 kΩ min. ON: residual voltage 1.5 V max., OFF: leakage current 0.1 mA max. |
| Contact input | Relay output: SPST-NO, 250 VAC, 5A (resistive load) Voltage output (for driving SSR): 12 VDC, 40 mA |
| No-contact input | Current output: 4 to 20 mA DC, 0 to 20 mA DC load: 600 Ω max. Electrical life of relay: 100,000 operations |
| Control output | ON/OFF or 2-PID control Relay output: SPST-NO, 250 VAC, 2 A (resistive load), electrical life: 100,000 operations -10 to 55°C (Avoid freezing or condensation) RH 25 to 85% -25 to 65°C (Avoid freezing or condensation) Max. 2,000m T2A, 250V AC, time-lag, low-breaking capacity Approx. 250g (main unit only) Front panel: IP66 (Indoor use) Rear case: IP20, Terminal section: IP00 Installation category II, pollution degree 2 (as per IEC61010-1) EEPROM (non-volatile memory) (Number of write operations: 1,000,000) |
| Ambient temperature | |
| Ambient humidity | |
| Storage temperature | |
| Altitude | |
| Recommended fuse | |
| Weight | |
| Degree of protection | |
| Installation environment | |
| Memory protection | |

Wiring

Dimensions

Dimensions (mm)

In the pack:
• Main unit
• Waterproofing packing
• Adapter
• Instruction manual

Solderless terminal size: M3.5
Terminal cover: E53-COV11
USB-Serial Conversion Cable (Sold Separately)
(E58-CIFQ1)

1. The internal mechanisms can be drawn out for maintenance without removing terminal wiring.
2. A Setup Tool port is provided on the bottom of the product. Use this port to connect a personal computer to the product when using the Setup Tool. E58-CIFQ1 USB-Serial Conversion Cable is required to connect the personal computer to the product. (Do not use the product with the USB-Serial Conversion Cable left permanently connected.) Refer to the instruction manual provided with the USB-Serial Conversion Cable for details on connection methods.

Installation

Individual mounting (mm)

Waterproofing is impossible with side-by-side installation. When waterproofing is required, fit waterproofing packing on the backside of front panel.

• Insert the main unit through the mounting hole in the panel (1.8 mm thickness). Insert the mounting brackets (supplied) into the fixing slots located on the top and bottom of the rear case.
• Alternately tighten the top and bottom screws on the mounting fixtures applying equal pressure a little at a time until the ratchet rotates freely.
• When more than one machine is installed, make sure that the ambient temperature does not exceed the specified limit.

Connections (The applicability of the electric terminals varies with the type of machine.)

• 100 to 240 VAC
• 24 VAC/DC (no polarity)

• Relay output 250 VAC, 5 A (Resistive load)
• Current output 4 to 20 mA DC or 0 to 20 mA DC Load 600 Ω max.
• Voltage output (for driving SSR) 12 VDC, 40 mA

Since the voltage output (control output 1) is not electrically insulated from the internal wiring, one or freezing of the control output terminals must be left unearthened when using an earthed thermocouple thermometer. (Connection makes measurements unreliable due to sneak currents.)

Names of parts on front panel

• **Mode key**
Press this key to change the contents of the display.
Press this button for 1 second or longer for reverse scroll.

• **Level key**
Use this key to change levels:
Press the \square key and the \square key together for at least 3 seconds to switch to protect level.

• **No.1 display**
Process value or set data symbol

• **No.2 display**
Set point, set data read-out value or changed input value

• **Up and Down keys**
Use the keys to change the values displayed on the No.2 display. Each press of \uparrow key increments or advances the values displayed on the No.2 display. Each press of \downarrow key decrements or returns the values displayed on the No.2 display.

Operation indicators

• **ALM1: Alarm 1 indicator**
Lights when alarm 1 is ON.

• **ALM2: Alarm 2 indicator**
Lights when alarm 2 is ON.

• **ALM3: Alarm 3 indicator**
Lights when alarm 3 is ON.

• **HA: Heater burnout alarm/Heater short alarm indicator**
Lights when a heater burnout or HS alarm has occurred.

• **OUT1: Control output 1 indicator**
Lights when control output 1 is ON and not lights when it's OFF.

• **OUT2: Control output 2 indicator**
Lights when control output 2 is ON and not lights when it's OFF.

• **STOP: control stop indicator**
Lights when event input or "Run/Stop" is stopped during operation. During control stop, functions other than control output are valid.

• **CMW: communications writing enable/disable indicator**
Lights when communications writing is "enabled" and is off when it is "disabled".

• **MANU: Manual output indicator**
Lights when the Auto/Manual Mode is set to Manual Mode.

Operation menu

Input type

| Input type | Input | Setting | Setting range |
|---|-------|--|---|
| Platinum resistance thermometer (universal input) | Pt100 | 0 | -200 to 850 (°C) / -300 to 1500 (°F) |
| | | 1 | -199.9 to 500.0 (°C) / -199.9 to 900.0 (°F) |
| | | 2 | 0.0 to 100.0 (°C) / 0.0 to 210.0 (°F) |
| | | 3 | -199.9 to 500.0 (°C) / -199.9 to 900.0 (°F) |
| Thermocouple | J | 4 | 0.0 to 100.0 (°C) / 0.0 to 210.0 (°F) |
| | | 5 | -200 to 1300 (°C) / -300 to 2300 (°F) |
| | K | 6 | -20.0 to 500.0 (°C) / 0.0 to 900.0 (°F) |
| | | 7 | -100 to 850 (°C) / -100 to 1500 (°F) |
| | J | 8 | -20.0 to 400.0 (°C) / 0.0 to 750.0 (°F) |
| | | 9 | -200 to 400 (°C) / -300 to 700 (°F) |
| | T | 10 | -199.9 to 400.0 (°C) / -199.9 to 900.0 (°F) |
| | E | 11 | 0 to 600 (°C) / 0 to 1100 (°F) |
| | L | 12 | -100 to 850 (°C) / -100 to 1500 (°F) |
| | U | 13 | -20.0 to 400 (°C) / -300 to 700 (°F) |
| | N | 14 | -199.9 to 400.0 (°C) / -199.9 to 900.0 (°F) |
| | R | 15 | -200 to 1300 (°C) / -300 to 2300 (°F) |
| S | 16 | 0 to 1700 (°C) / 0 to 3000 (°F) | |
| | 17 | 0 to 1700 (°C) / 0 to 3000 (°F) | |
| Infrared Thermosensor | ES1B | 18 | 100 to 1800 (°C) / 300 to 3200 (°F) |
| | | 19 | 0 to 90 (°C) / 0 to 190 (°F) |
| | | 20 | 0 to 120 (°C) / 0 to 240 (°F) |
| Analog input | | 21 | 0 to 165 (°C) / 0 to 320 (°F) |
| | | 22 | 0 to 260 (°C) / 0 to 500 (°F) |
| | 23 | Use the following ranges for scaling: -1999 to 9999, -199.9 to 999.9, Vary Depending on "L", "H" value | |

• The default is "5".
• SEPR will be display when a platinum resistance thermometer is mistakenly connected while input type is not set for it. To clear the SEPR display, correct the wiring and cycle the power supply.

Analog input type

| Input type | Input | Setting | Setting range |
|---------------|-------|---------|---|
| Current input | | 0 | Use the following ranges for scaling: -1999 to 9999, -199.9 to 999.9, -199.9 to 99.99 |
| | | 1 | -1.999 to 9.999 |
| Voltage input | | 2 | Use the following ranges for scaling: -1999 to 9999, -199.9 to 999.9, -199.9 to 99.99 |
| | | 3 | -1.999 to 9.999 |

• The default is "0".

Alarms

| Setting | Alarm type | Alarm output function |
|---------|---|----------------------------------|
| 0 | No alarm function | Output off |
| *1 | Deviation upper/lower limit | ON: \uparrow L, \downarrow H |
| | | OFF: SP |
| 2 | Deviation upper limit | ON: \uparrow X OFF: SP |
| 3 | Deviation lower limit | ON: \downarrow X OFF: SP |
| *1 | Deviation upper/lower range | ON: \uparrow L, \downarrow H |
| | | OFF: SP |
| *1 | Deviation upper/lower limit standby sequence ON | ON: \uparrow L, \downarrow H |
| | | OFF: SP |
| 6 | Deviation upper limit standby sequence ON | ON: \uparrow X OFF: SP |
| 7 | Deviation lower limit standby sequence ON | ON: \downarrow X OFF: SP |
| 9 | Absolute value upper limit | ON: \uparrow X OFF: 0 |
| 10 | Absolute value lower limit | ON: \downarrow X OFF: 0 |
| 11 | Absolute value upper limit standby sequence ON | ON: \uparrow X OFF: 0 |
| 12 | LBA (only for alarm 1) | ON: \uparrow X OFF: 0 |

*1: Upper and lower limits can be set for parameters 1, 4 and 5 to provide for different types of alarm. These are indicated by the letter "L" and "H".
• The default is "2".

Initial setting level (Operation stopped, (control/alarm are both stopped).)

Initial setting level enables users to specify their preferred operating conditions (input type, alarm type, control method, etc.)

*3: Refer to the adjoining tables for details of input types and alarm types.
*4: Applicable only to models with alarm functions.
*5: Operation is stopped when moved to the initial setting level. (control/alarm are both stopped).
*6: The grayed-out setting items may not be displayed according to the models and setting.
*7: This function is supported only by models with heater burnout detection.

Adjustment level

Adjustment level is for entering set values and shift values for control.

Error display (trouble shooting)

When an error has occurred, the No.1 display shows the error code. Take necessary measure according to the error code, referring the table below.

| No.1 display | Meaning | Action | Status at error |
|--------------|---------------------------|---|--|
| SEPR (S.Err) | Input error *2 | Check the wiring of inputs, disconnections, shorts and input type. | Control output: OFF Alarm: Operates as above the upper limit. |
| | A/D converter error *2 | After the correction of input error, turn the power OFF then back ON again. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise. | Control output: OFF Alarm: OFF |
| E111 (E111) | Memory error | Turn the power OFF then back ON again. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise. | Control output: OFF Alarm: OFF |
| HEPR (H.Err) | Internal circuit error *2 | | Control output: OFF Alarm: OFF |

If the input value exceeds the display limit (-1999 to 9999), though it is within the control range, [SEPR] will be displayed under -1999 and [HEPR] above 9999. Under these conditions, control output and alarm output will operate normally.
Refer to "E5CZ/AZ/EZ User's Manual" for details of control range.
*2: Error shown only for "Process value / Set point". Not shown for other status.

Other functions

In addition to the aforementioned, there are alarm hysteresis, automatic return of display mode and others in the advanced setting level. Refer to "E5CZ/AZ/EZ User's Manual" for details.
For communications details, please refer to "E5CZ/AZ/EZ communications User's Manual".

Protection level

Restricts which settings can be displayed or changed, and restricts change by key operation.

AT (auto-tuning)

• **AT in Adjustment level**
Designate "ON": AT execute" to execute AT and "OFF": AT cancel" to cancel AT. "RL" flashes.

Also when AT execution ends, the display automatically returns to "OFF".

Protection function

Protection function, to prevent unwanted settings, restricts the setting items to be used or designates if operation of the key is valid or invalid.

| Level | Set value |
|------------------|-----------|
| 0 | 0 1 2 3 |
| Process value | ○ ○ ○ ○ |
| Operation level | ○ ○ ○ ○ |
| Others | ○ ○ ○ ○ |
| Adjustment level | ○ ○ ○ ○ |

○ : Can be displayed and changed
○ : Can be displayed
X : Display or shifting to another level is not possible.
• The default is "0".

Operation / Adjustment protection

The following table shows the relationship between settings and protect limits related to Operation level and Adjustment level.

| Level | Initial setting level | Communications setting level | Advanced function setting level |
|-------|-----------------------|------------------------------|---------------------------------|
| 0 | ○ | ○ | ○ |
| 1 | ○ | ○ | X |
| 2 | X | X | X |

○ : Change to other levels possible
X : Change to other levels not possible
• The default is "1".

Setting change protection

Setting changes by key operation are restricted.
OFF "OFF": Setting can be changed by key operation
ON "ON": Setting cannot be changed by key operation ("ON" will light.) (Protect level settings can all be changed.)

Initial setting/Communications protection

This protect level restricts movement to the initial setting level, communications setting level and advanced function setting level.

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