

E5AN-H Digital Controller



Warning Symbols

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**
 - This product is UL listed as Open Type Process Control Equipment. It must be mounted in an enclosure that does not allow fire to escape externally.
 - More than one disconnect switch may be required to de-energize the equipment before servicing.
 - Signal inputs are SELV, limited energy.
- 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 torques of 0.74 and 0.90 N·m. 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 Digital 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 Digital 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.

INSTRUCTION MANUAL

Thank you for purchasing the OMRON E5AN-H Digital 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 E5CN-H/E5AN-H/E5EN-H Digital Controllers User's Manual Advanced Type (Cat. No. H157). Significance of WARNINGS and CAUTIONS

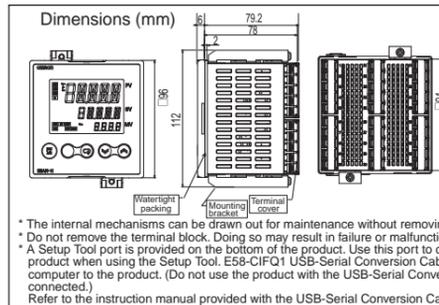
Safety Precautions

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.

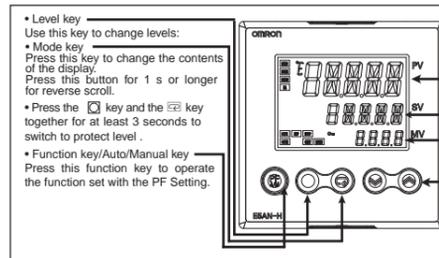
Wiring

Dimensions



The internal mechanisms can be drawn out for maintenance without removing terminal wiring. Do not remove the terminal block. Doing so may result in failure or malfunction. 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.

Names of parts on front panel



Operation menu

Input Type

Input type	Input	Setting	Input Setting range		
Platinum resistance thermometer	Pt100	0	-200.0 to 850.0(°C) / -300.0 to 1500.0(°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)		
Thermocouple	J	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)		
		5	-200.0 to 1300.0(°C) / -300.0 to 2300.0(°F)		
		6	-20.0 to 500.0(°C) / 0.0 to 900.0(°F)		
		7	-100.0 to 850.0(°C) / -100.0 to 1500.0(°F)		
		8	-20.0 to 400.0(°C) / -30.0 to 700.0(°F)		
		9	-200.0 to 400.0(°C) / -199.9 to 700.0(°F)		
		10	-199.9 to 400.0(°C) / -199.9 to 700.0(°F)		
		11	-200.0 to 600.0(°C) / -300.0 to 1100.0(°F)		
		12	-100.0 to 850.0(°C) / -100.0 to 1500.0(°F)		
		13	-200.0 to 400.0(°C) / -300.0 to 700.0(°F)		
		14	-199.9 to 400.0(°C) / -199.9 to 700.0(°F)		
		Current input	I	15	-200.0 to 1300.0(°C) / -300.0 to 2300.0(°F)
16	-20.0 to 1700.0(°C) / 0.0 to 3000.0(°F)				
17	0.0 to 1700.0(°C) / 0.0 to 3000.0(°F)				
18	100.0 to 1800.0(°C) / 300.0 to 3200.0(°F)				
19	0.0 to 2300.0(°C) / 0.0 to 3200.0(°F)				
20	0.0 to 1300.0(°C) / 0.0 to 2300.0(°F)				
21	-50.00 to 200.00(°C) / -50.00 to 200.00(°F)				
22	-50.00 to 200.00(°C) / -50.00 to 200.00(°F)				
23	-50.00 to 200.00(°C) / -50.00 to 200.00(°F)				
24	-50.00 to 200.00(°C) / -50.00 to 200.00(°F)				
Voltage input	V			25	One of the following ranges is used depending on scaling.
				26	-1999.9 to 3240.0
				27	-199.9 to 324.0
28	-199.9 to 32.4				
29	-19.999 to 3.240				

*The default is "5".
*SEPR will be displayed 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.

Alarms

Setting	Alarm type	Alarm output function	
		Positive alarm value (X)	Negative alarm value (X)
0	No alarm function	Output off	
*1	Deviation upper/lower limit	ON	Vary with "L", "H" values
		OFF	
		SP	
2	Deviation upper limit	ON	Vary with "L", "H" values
3	Deviation lower limit	ON	Vary with "L", "H" values
*1	Deviation upper/lower range	ON	Vary with "L", "H" values
		OFF	
		SP	
*1	Deviation upper/lower limit standby sequence ON	ON	Vary with "L", "H" values
		OFF	
		SP	
6	Deviation upper limit standby sequence ON	ON	Vary with "L", "H" values
7	Deviation lower limit standby sequence ON	ON	Vary with "L", "H" values
8	Absolute value upper limit	ON	Vary with "L", "H" values
9	Absolute value lower limit	ON	Vary with "L", "H" values
10	Absolute value upper limit standby sequence ON	ON	Vary with "L", "H" values
11	Absolute value lower limit standby sequence ON	ON	Vary with "L", "H" values
12	LBA (only for alarm 1)	ON	Vary with "L", "H" values
13	PV change rate alarm	ON	Vary with "L", "H" values
14	RSP absolute value upper limit	ON	Vary with "L", "H" values
15	RSP absolute value lower limit	ON	Vary with "L", "H" values

*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".

Error display (troubleshooting)

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	Check the setting of the input type parameter, check the input wiring, and check for broken or shorts in the temperature sensor.	Control OFF / Alarm ON
E333 (E333)	A/D converter error	After the correction of A/D converter 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 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 OFF / Alarm OFF

If the input value exceeds the display limit (-1999.9 to 3240.0), though it is within the control range, [SEPR] will be displayed under -1999.9 and [E333] above 3240.0. Under these conditions, control output and alarm output will operate normally. Refer to E5CN-H/E5AN-H/E5EN-H User's Manual Advanced Type (Cat. No. H157) for details of control range.
*2: Error shown only for "Process value / Set point". Not shown for other status.

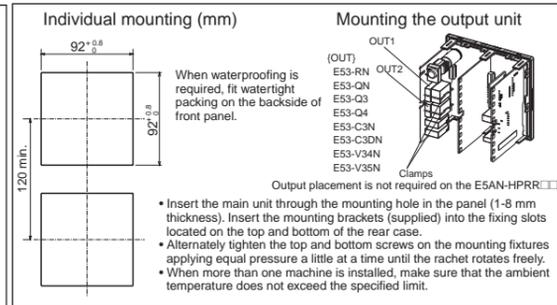
Precautions for Safe Use

- 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. Use the product within specifications.
- The product is designed for indoor use only. Do not use the product outdoors. Do not use or store the product 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 specified size (M3.5, with 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 crimped 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 two seconds of turning ON the power 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 Digital 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 second 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.
 - Use of non-volatile memory 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-AKB/E53-ENO1/E53-EN03).
 - Read the information provided in the catalog and manual and be sure you understand it before attaching a Control Output Unit.
 - When disassembling the Temperature Controller for disposal, use suitable tools.
 - Do not use the Temperature Controller if the front sheet is peeling or torn.

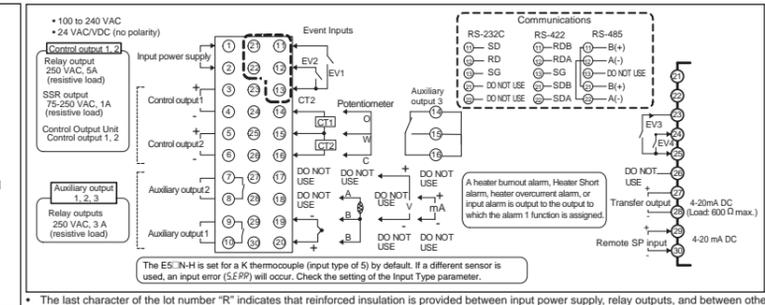
Specifications

Power supply voltage	100 to 240 VAC, 50/60 Hz or 24 VDC, 50/60 Hz / 24 VDC
Operating voltage range	85 to 110% of the rated voltage
Power consumption	Approx. 12 VA (100 to 240 VAC) / Approx. 8.5 VA (24 VDC)/5.5 W (24 VDC)
Indication accuracy (Ambient temperature: 23°C)	Thermocouple: (±0.1% of indication value or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer: (±0.1% of indication value or ±0.5°C, whichever is greater) ±1 digit max. Analog input: ±0.1% FS ±1 digit max. Output current: approx. 7 mA per contact. ON: 1 kΩ max., OFF: 100 kΩ min. ON-residual voltage: 1.5 V max., OFF: leakage current 0.1 mA max. Relay output: SPST-NO, 250 VAC, 5 A (resistive load). Electrical life of relay: 100,000 operations SSR output: 75-250 VAC, 1A (resistive load)
Event input	Control input / No-contact input
Control output 1,2	Control Output Unit / Relay outputs: SPST-NO, 250 VAC, 3 A (resistive load). On/Off or 2-PID control
Control method	Relay outputs: SPST-NO, 250 VAC, 3 A (resistive load). On/Off or 2-PID control
Auxiliary outputs	Relay outputs: SPST-NO, 250 VAC, 3 A (resistive load). On/Off or 2-PID control
Ambient temperature	-10 to 55°C (Avoid freezing or condensation) RH25 to 85%
Ambient humidity	-25 to 65°C (Avoid freezing or condensation) Max. 2,000 m
Storage temperature	Electrical life of relay: 100,000 operations
Altitude	2,000 m
Recommended fuse	T2A, 250 VAC, time-lag, low-breaking capacity
Weight	Approx. 310 g (main unit only)
Degree of protection	Front panel: IP20
Installation environment	Rear case: IP20, Terminal section: IP00
Memory protection	Installation category II, pollution degree 2 (as per IEC61010-1)
Input	Non-volatile memory (Number of write operations: 1,000,000)
Transfer output	Position proportional potentiometer input, Remote SP input 4 to 20 mA DC, Load: 600 Ω max.

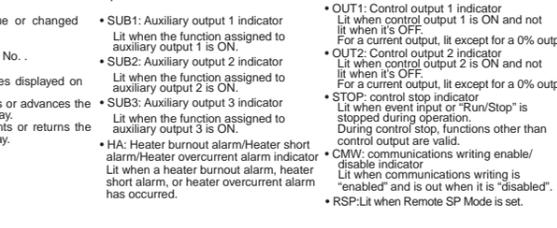
Installation



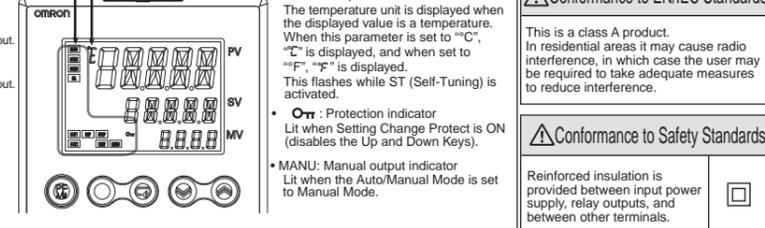
Connections (The applicability of the electric terminals varies with the type of machine.)



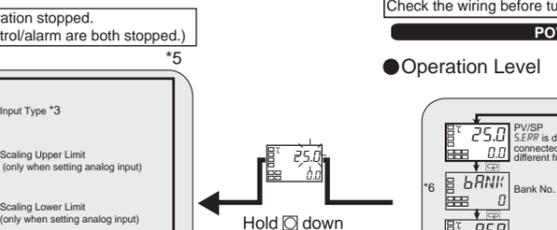
Operation Level



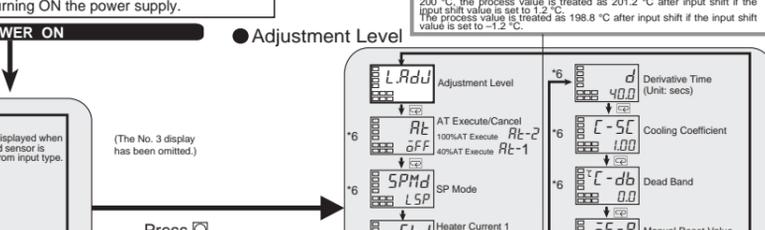
Adjustment Level



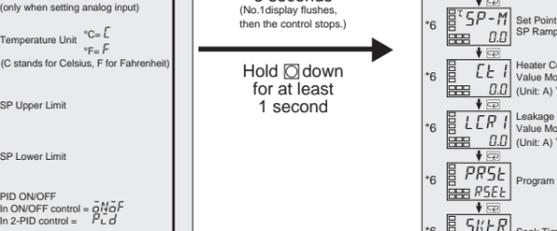
Advanced Function Setting Level



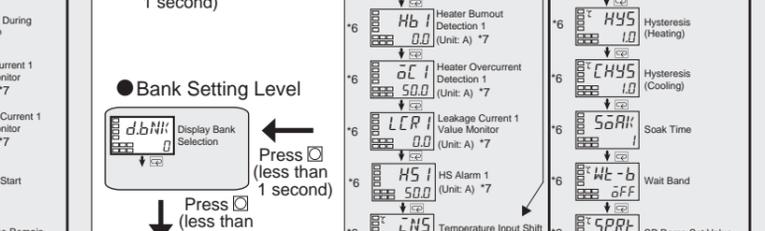
Protect Level



Bank Setting Level



PID Setting Level



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.

Operation / Adjustment protection

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

Level	Process value	0	1	2	3
Operation level	PV/SP	○	○	○	○
Adjustment level	Others	○	○	○	○

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	○	○	○
2	x	x	x

Setting change protection

Setting changes by key operation are restricted.

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

PF key protection

PF key operation can be enabled or disabled.
OFF "GF": PF Key enabled.
ON "GM": PF Key disabled.

Other functions

For details about advanced function setting level, bank setting level, pid setting level, monitor/setting item level, or manual control level, refer to E5CN-H/E5AN-H/E5EN-H Digital Controllers Communications Manual Advanced Type (Cat. No. H159).

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