



**EN INSTRUCTION MANUAL**

Thank you for purchasing the OMRON E5EC 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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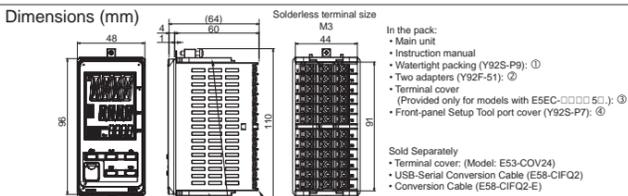
Refer to the *E5EC Digital Controllers User's Manual* (Cat. No. H174) for detailed application procedures.

**Safety Precautions**

**Key to Warning Symbols**

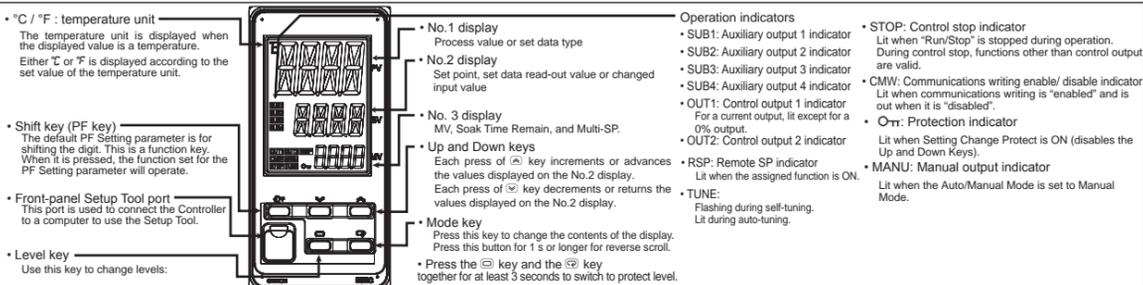
**CAUTION** Indicates a potentially hazardous situation which, if not avoided, is likely to result in minor or moderate injury or property damage. Read this manual carefully before using the product.

**Wiring** **Dimensions**



- Do not remove the terminal block. Doing so may result in failure or malfunction.
- Setup Tool ports are provided on the top and front of the Digital Controller. Use these ports to connect a personal computer to the Digital Controller when using the Setup Tool. The E58-CIFQ2 USB-Serial Conversion Cable is required to connect to the top-panel port. The E58-CIFQ2 USB-Serial Conversion Cable is required to connect to the front-panel port. (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.
- If the front-panel port cover is lost or damaged, order it separately. The Waterproof Packing should be periodically replaced because it may deteriorate, shrink, or harden depending on the operating environment.

**Names of Parts on Front Panel**



**Operation Menu**

Input type	Input	Setting	Setting range	°C	°F
Platinum resistance thermometer	Pt100	0	-200 to 850	-300 to 1500	
		1	-199.9 to 500.0	-199.9 to 900.0	
	JPt100	2	0.0 to 100.0	0.0 to 210.0	
		3	-199.9 to 500.0	-199.9 to 900.0	
Thermocouple	K	4	0.0 to 100.0	0.0 to 210.0	
		5	-200 to 1300	-300 to 2300	
	J	6	-20.0 to 500.0	0.0 to 900.0	
		7	-100 to 850	-100 to 1500	
	E	8	-20.0 to 400.0	0.0 to 750.0	
		9	-200 to 400	-300 to 700	
	T	10	-199.9 to 400.0	-199.9 to 700.0	
		11	-200 to 600	-300 to 1100	
	L	12	-100 to 850	-100 to 1500	
		13	-200 to 400	-300 to 700	
	U	14	-100 to 850	-100 to 1500	
		15	-200 to 1300	-300 to 2300	
	R	16	0 to 1700	0 to 3000	
17		0 to 1700	0 to 3000		
B	18	100 to 1800	300 to 3200		
	19	0 to 2300	0 to 3200		
PI	20	0 to 1300	0 to 2300		
	21	0 to 90	0 to 190		
Infrared Thermosensor ES18	22	0 to 120	0 to 240		
	23	0 to 165	0 to 320		
Current input	24	0 to 260	0 to 500		
	25	4 to 20 mA	Use the following ranges for scaling: -1999 to 9999, -199.9 to 999.9, -19.99 to 99.99, -1.999 to 9.999		
Voltage input	26	1 to 5 V			
	27	0 to 5 V			
	28	0 to 10 V			

\*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
0	No alarm function	Output off
1	Deviation upper/lower limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
2	Deviation upper limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
3	Deviation lower limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
4	Deviation upper/lower range	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
5	Deviation upper/lower limit standby sequence ON	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
6	Deviation upper limit standby sequence ON	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
7	Deviation lower limit standby sequence ON	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
8	Absolute value upper limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
9	Absolute value lower limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
10	Absolute value upper limit standby sequence ON	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
11	Absolute value lower limit standby sequence ON	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
12	LBA (only for alarm 1)	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
13	PV Change Rate Alarm	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
14	SP absolute value upper limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
15	SP absolute value lower limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
16	MV absolute value upper limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
17	MV absolute value lower limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
18	RSP absolute value upper limit	ON: Vary with "L", "H" values
		OFF: Vary with "L", "H" values
19	RSP absolute value lower limit	ON: Vary with "L", "H" values
		OFF: 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".  
\*The default alarm type is "2".

**Warning Symbols**

**CAUTION**

Minor injury due to electric shock may occasionally occur. Do not touch the terminals while power is being supplied.

Electric shock, fire, or malfunction may occasionally occur. Do not allow metal objects, conductors, cuttings from installation work, or moisture to enter the Digital Controller, the Setup Tool ports, or between the pins on the connectors on the Setup Tool cable. Attach the cover to the front-panel Setup Tool port whenever you are not using it to prevent foreign objects from entering the port.

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 is the product UL listed 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.

Loose screws may occasionally result in fire. Tighten the terminal screws to the specified torque of 0.43 to 0.58 N·m.

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 Digital Controller, take appropriate safety measures, such as installing a monitoring device on a separate line.

**Suitability for Use**

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product.

At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

**NEVER USE THE PRODUCT 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(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.**

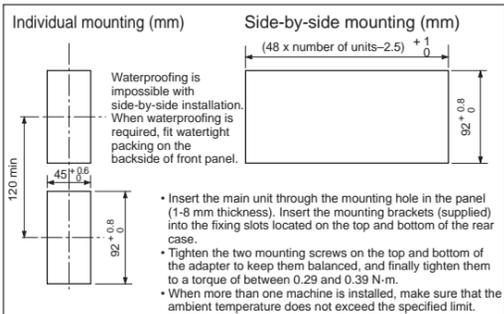
**Precautions for Safe Use**

- Be sure to observe the following precautions to prevent operation failure, malfunction, or adverse effects on the performance and functions of the product. Not doing 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 areas subject to the following conditions:
    - Placed directly subject to heat radiated from heating equipment.
    - Placed subject to splashing liquid or oil atmosphere.
    - Placed subject to direct sunlight.
    - Placed subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
    - Placed subject to intense temperature change.
    - Placed subject to liquid and condensation.
  - 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 use properly with correct polarity of terminals.
    - Use the specified size of crimped terminals (M3, width 5.8 mm or less) for wiring. To connect bare wires to the terminal block, use copper braid or solid wires with a gage of AWG24 to AWG18 (equal to a cross-sectional area of 0.205 to 0.8231 mm<sup>2</sup>). (The stripping length is 6 to 8 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.
  - Wipe off any dirt from the Digital Controller with a soft dry cloth. Never use thinners, benzene, alcohol, or any cleaners that contain these or other organic solvents. Deformation or discoloration may occur.
  - Design system (control panel, etc.) considering the 2 second of delay that the controller's output to be set after performing control.
  - The number of non-volatile memory write operations is limited. Therefore, use RAM write mode when frequently overwriting data during communications or other operations.
  - When disassembling the Digital Controller for disposal, use suitable tools.
  - Do not connect cables to both the front-panel Setup Tool port and the top-panel Setup Tool port at the same time. The Digital Controller may be damaged or may malfunction.
  - Do not exceed the communication distance that is given in the specifications and use the specified communications cable. Refer to the *E5EC Digital Controllers User's Manual* (Cat. No. H174) for the communications distance and cable specifications.
  - Do not turn the power supply to the Digital Controller ON or OFF while the USB-Serial Conversion Cable is connected to the controller.
  - The maximum terminal temperature is 75°C. Use wires with heat resistance of 75°C min to wire the terminals.

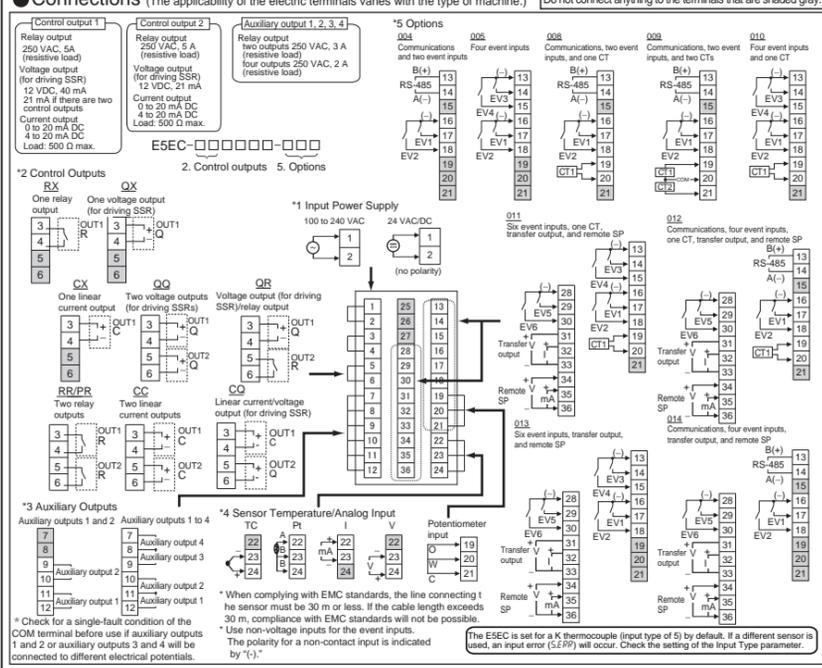
**Specifications**

Power supply voltage	100 to 240 VAC, 50/60 Hz or 24 VDC, 500 mA / 24 VDC
Operating voltage range	85 to 110% of the rated voltage
Power consumption	6.6 VA max. (100 to 240 VAC)
Operation 000	4.1 VA max. (24 VDC)/2.3 W max. (24 VDC)
All other specifications:	8.3 VA max. (100 to 240 VAC)
	5.5 VA max. (24 VDC)/3.2 W max. (24 VDC)
Indication accuracy	(±0.3% of indication value or ±1°C, whichever is greater) ±1 digit max.
(Ambient temperature: 23°C)	(±0.2% of indication value or ±0.8°C, whichever is greater) ±1 digit max.
Event input	Analog input: ±0.2 to 5 FS ±1 digit max.
Contact input	Output current: approx. 7 mA per contact.
Non-contact input	ON: 1 kΩ max., OFF: 100 kΩ min.
Remote SP input	ON: 100 mA max., OFF: 10 mA max.
Potentiometer input	0 to 5 V DC or 1 to 5 V DC or 0 to 10 V DC
Control output 1	Relay output: SPST-NO, 250 VAC, 5 A (resistive load)
Control output 2	Relay output: SPST-NO, 250 VAC, 5 A (resistive load)
Control method	Relay output: SPST-NO, 250 VAC, 5 A (resistive load)
Auxiliary outputs	Electrical life of relay: 100,000 operations
Transfer output	Voltage output (for driving SSR): 12 VDC, 21 mA
Ambient temperature	Current output: 4 to 20 mA DC, 0 to 20 mA DC
Ambient humidity	Load: 5000 mA
Storage temperature	Relay output: SPST-NO, 250 VAC, 5 A (resistive load)
Altitude	Electrical life of relay: 100,000 operations
Recommended use	Voltage output (for driving SSR): 12 VDC, 21 mA
Weight	Analog input: ±0.2 to 5 FS ±1 digit max.
Degree of protection	Current output: 4 to 20 mA DC, 0 to 20 mA DC
Installation environment	Load: 5000 mA
Memory protection	Relay output: SPST-NO, 250 VAC, 5 A (resistive load)
Temporary overvoltage	Electrical life of relay: 100,000 operations

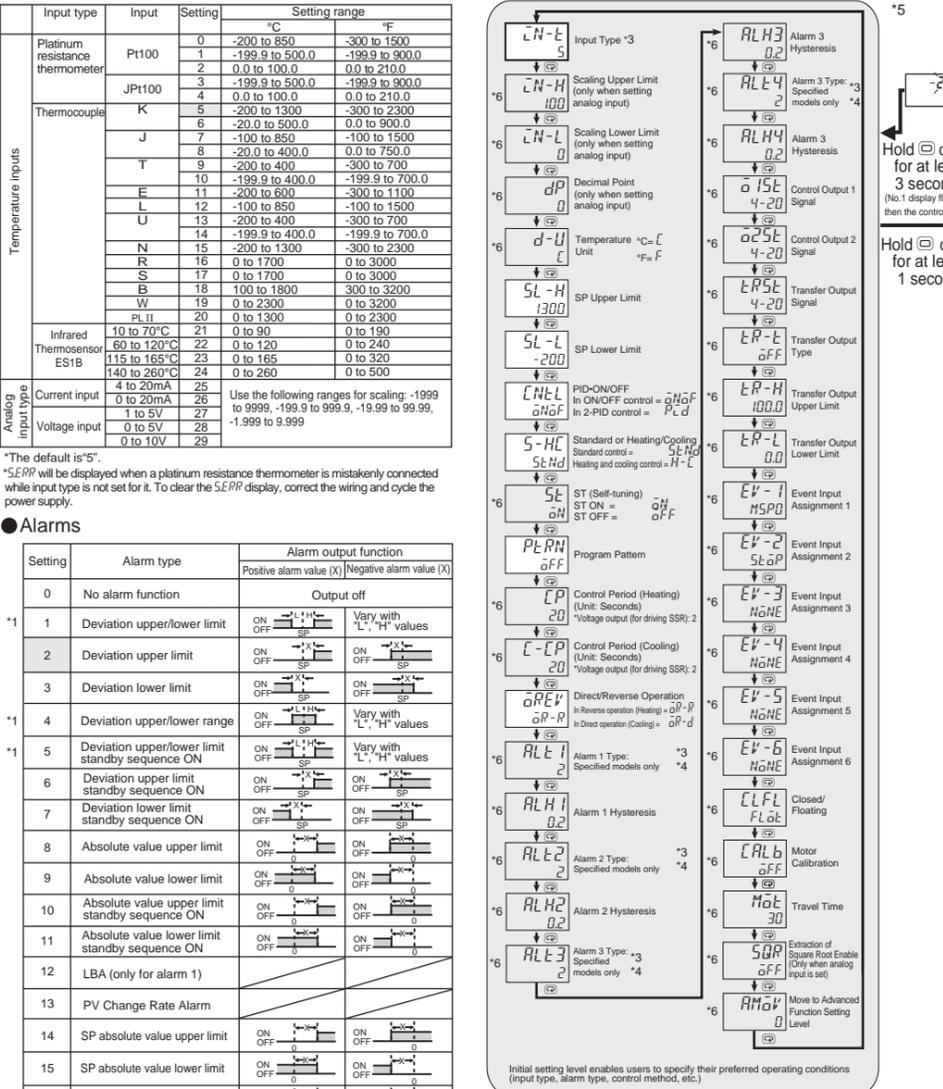
**Installation**



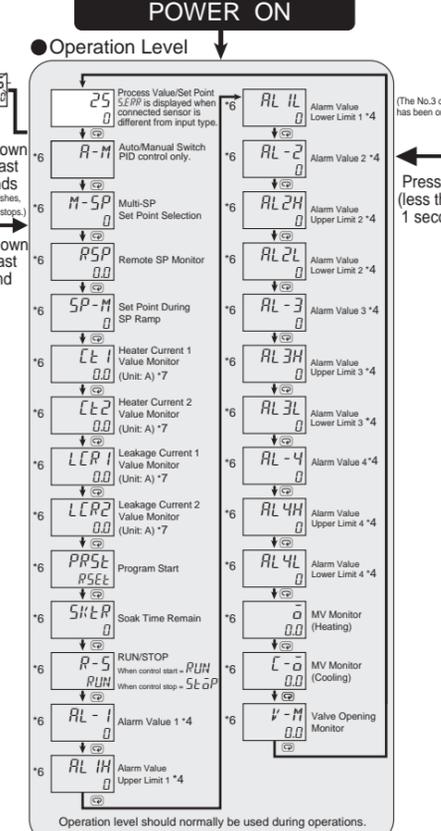
**Connections** (The applicability of the electric terminals varies with the type of machine.)



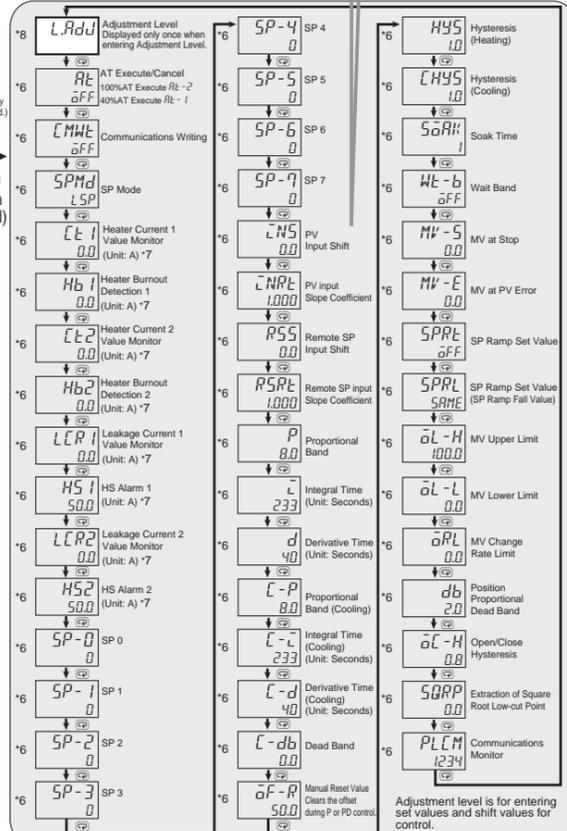
**Initial Setting Level**



**Operation Level**



**Adjustment Level**



**Conformance to EN/IEC Standards**

This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

A 급 기기 (업무용 방송통신기자재) 이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 위하여, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

**Conformance to Safety Standard**

Reinforced insulation is provided between input power supply, relay outputs, and between other terminals.

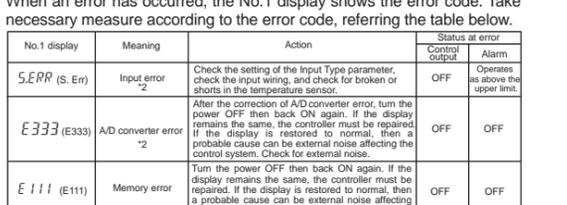
Due to UL listing requirements, use the E54-CT1L or E54-CT3L current transformer with the factory wiring (internal wiring). Use a UL category X0BA or X0BAT current transformer that is UL Listed for field wiring (external wiring) and not the factory wiring (internal wiring).

**Error Display (troubleshooting)**

No.1 display	Meaning	Action	Status at alarm
SEPR (S Err)	Input error *2	Check the setting of the Input Type parameter, check the input wiring, and check for broken or shorts in the temperature sensor.	Control output OFF
E333 (E333)	A/D converter error *2	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.	OFF 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.	OFF OFF

\*2: Error shown only for "Process value / Set point". Not shown for other status.

**Protect Level**



**Other functions**

Refer to the *E5EC Digital Controllers User's Manual* (Cat. No. H174) for information on the Advanced Function Setting Level, Monitor/Setting Item Level, Manual Control Level, and other functions. Refer to the *E5EC Digital Controllers Communications Manual* (Cat. No. H175) for information on communications.

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