

E5CC-U

Digital Controller

OMRON

INSTRUCTION MANUAL

- Thank you for purchasing the OMRON E5CC-U 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 *E5□□ Digital Controllers User's Manual* (Man. No. H174) for detailed application procedures.

Safety Precautions

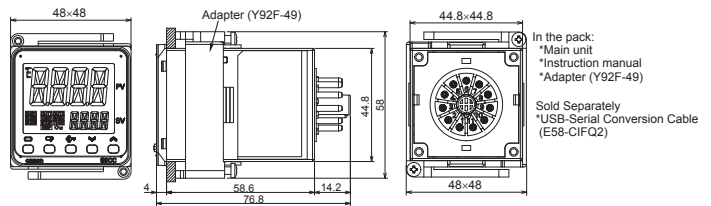
Key to Warning Symbols

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

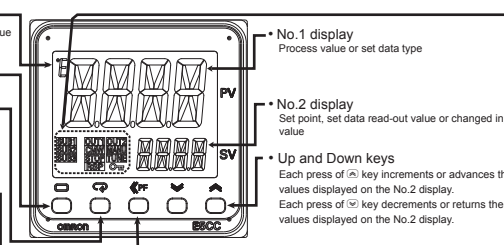
Dimensions (mm)



* A Setup Tool port is provided on the upper of the product. Use this port to connect a personal computer to the product when using the Setup Tool. E58-CIFQ2 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

- **C / F** : temperature unit
The temperature unit is displayed when the displayed value is a temperature. Either "C" or "F" is displayed according to the set value of the temperature unit.
- **Level key**
Use this key to change levels:
- **Mode key**
Press this key to change the contents of the display. Press this button for 1 s or longer for reverse scroll.
- **Press the key and the key together for at least 3 seconds to switch** : to protect level.
- **Shift key (PF key)**
The default PF Setting parameter is for shifting the digit. This is a function key. When it is pressed, the function set for the PF Setting parameter will operate.



- **No.1 display**
Process value or set data type
- **No.2 display**
Set point, set data read-out value or changed input value
- **Up and Down keys**
Each press of the key increments or advances the values displayed on the No.2 display. Each press of the key decrements or returns the values displayed on the No.2 display.
- **Operation indicators**
 - SUB1: Auxiliary output 1 indicator
 - SUB2: Auxiliary output 2 indicator
 - OUT1: Control output 1 indicator
- **TUNE**:
Flashing during ST (self-tuning).
Lit during AT (auto-tuning).
- **STOP**:
Lit when "Run/Stop" is stopped during operation. During control stop, functions other than control output are valid.
- **Ctrl**:
Lit when Setting Change Protect is ON (disables the Up and Down Keys).
- **MANU**:
Lit during Manual Mode.

Operation Menu

Input Type

Input type	Input	Setting	Setting range
Temperature inputs	Platinum resistance thermometer	Pt100	0 -200 to 850 -300 to 1500
			1 -199.9 to 500.0 -199.9 to 900.0
		JPt100	3 -199.9 to 100.0 0.0 to 210.0
			4 0.0 to 100.0 0.0 to 210.0
	Thermocouple	K	5 -200 to 1300 -300 to 2300
			6 -20.0 to 500.0 0.0 to 900.0
		J	7 -100 to 850 -100 to 1500
			8 -20.0 to 400.0 0.0 to 750.0
		T	9 -200 to 400 -300 to 700
			10 -199.9 to 400.0 -199.9 to 700.0
		E	11 -200 to 600 -300 to 1100
		L	12 -100 to 850 -100 to 1500
		U	13 -200 to 400 -300 to 700
			14 -199.9 to 400.0 -199.9 to 700.0
Infrared Thermosensor ES1B		N	15 -200 to 1300 -300 to 2300
			16 0 to 1700 0 to 3000
		S	17 0 to 1700 0 to 3000
		B	18 100 to 1800 300 to 3200
		W	19 0 to 2300 0 to 3200
		PL II	20 0 to 1300 0 to 2300
			21 0 to 90 0 to 190
			22 0 to 120 0 to 240
			23 0 to 165 0 to 320
			24 0 to 260 0 to 500
Analog input type	Current input		25 4 to 20mA
			26 0 to 20mA
			27 1 to 5V
			28 0 to 5V
			29 0 to 10V
			30 0 to 50mV
			Use the following ranges for scaling: -1999 to 9999, -199.9 to 999.9, -19.99 to 99.99, -1.999 to 9.999

*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	1 Deviation upper/lower limit	ON OFF SP Vary with "L", "H" values
	2 Deviation upper limit	ON OFF SP Vary with "L", "H" values
	3 Deviation lower limit	ON OFF SP Vary with "L", "H" values
*1	4 Deviation upper/lower range	ON OFF SP Vary with "L", "H" values
	5 Deviation upper/lower limit standby sequence ON	ON OFF SP Vary with "L", "H" values
	6 Deviation upper limit standby sequence ON	ON OFF SP Vary with "L", "H" values
*1	7 Deviation lower limit standby sequence ON	ON OFF SP Vary with "L", "H" values
	8 Absolute value upper limit	ON OFF SP Vary with "L", "H" values
	9 Absolute value lower limit	ON OFF SP Vary with "L", "H" values
*1	10 Absolute value upper limit standby sequence ON	ON OFF SP Vary with "L", "H" values
	11 Absolute value lower limit standby sequence ON	ON OFF SP Vary with "L", "H" values
	12 LBA (only for alarm 1)	ON OFF SP Vary with "L", "H" values
*1	13 PV Change Rate Alarm	ON OFF SP Vary with "L", "H" values
	14 SP absolute value upper limit	ON OFF SP Vary with "L", "H" values
	15 SP absolute value lower limit	ON OFF SP Vary with "L", "H" values
*1	16 MV absolute value upper limit	ON OFF SP Vary with "L", "H" values
	17 MV absolute value lower limit	ON OFF SP 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.

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 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 0.5 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 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.

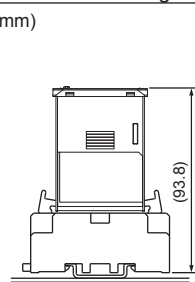
Suitability for Use

Omron 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.

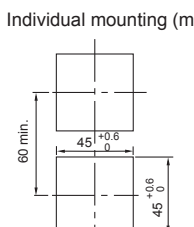
NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Surface mounting



E5CC-U + P2CF-11

Installation



- Insert the main unit through the mounting hole in the panel (1 to 5 mm thickness). Insert the mounting brackets (supplied) into the fixing slots located on the top and bottom of the rear case.
- Tighten the two mounting screws on the top and bottom of the adapter to keep them balanced, and finally tighten them to a torque of 0.29 and 0.39 N·m.
- When more than one machine is installed, make sure that the ambient temperature does not exceed the specified limit.

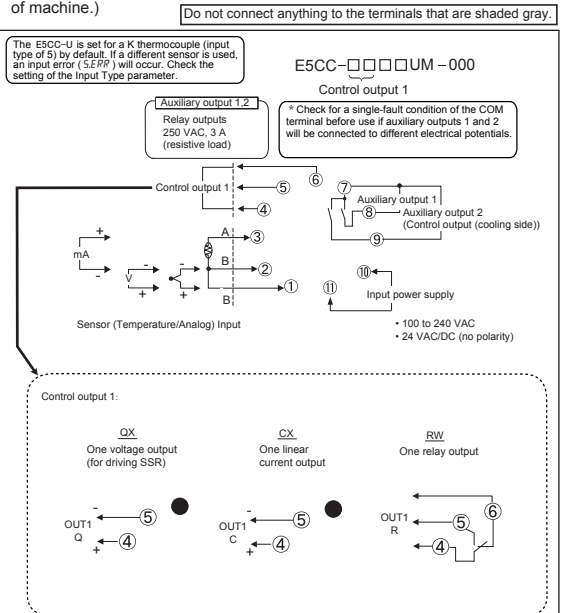
Precautions for Safe Use

- Be sure to observe the following precautions to prevent operation failure, malfunction, or adverse effects on the performance or function of the product. Do not do so may occasionally result in unexpected events.
- Use the product within specifications.
- (1) 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 vibration and condensation.
 - Places subject to icing and large shocks.
 - (2) Use the specified size of crimped terminals (M3.5, width 7.2 mm or less) 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 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.
 - (3) Do not wire the terminals which are not used.
 - (4) 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.
 - (5) Use this product within the rated load and power supply.
 - (6) 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.
 - (7) 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.
 - (8) When executing self-tuning, turn the load and the unit ON simultaneously, or turn the load ON before you turn the controller ON.
 - (9) 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.
 - (10) 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.
 - (11) Design system (control panel, etc) considering the 2 second of delay that the controller's output to be set after power ON.
 - (12) The output will turn OFF when you move to the Initial Setting Level. Take this into consideration when performing control.
 - (13) The number of non-volatile memory write operations is limited. Therefore, use RAM write mode when frequently overwriting data during communications or other operations.
 - (14) When disassembling the Temperature Controller for disposal, use suitable tools.
 - (15) Do not turn the power supply to the Digital Controller ON or OFF while the USB-Serial Conversion Cable is connected. The Digital Controller may malfunction.
 - (16) The terminals can reach temperature of up to 65°C. Use wires with heat resistance of 65°C min to wire the terminals.

Specifications

Power supply voltage	100 to 240 VAC, 50/60 Hz or 24 VAC, 50/60 Hz / 24 VDC
Operating voltage range	85 to 110% of the rated voltage
Power consumption	5.2 VA max. (100 to 240 VAC) 3.1 VA max. (24 VAC) 1.6 W max. (24 VDC)
Indication accuracy (Ambient temperature: 23°C)	Thermocouple: (±1.0 % of indication value or ±2°C, whichever is greater) ±1 digit max. Platinum resistance thermometer: (±0.2 % of indication value or ±0.8°C, whichever is greater) ±1 digit max. Analog input: ±0.2 % FS ±1 digit max.
Control output 1	Relay output: SPDT, 250 VAC, 3 A (resistive load) Electrical life of relay: 100,000 operations Voltage output (for driving SSR): 12 VDC ±20%, 21 mA Linear current output: 4 to 20 mA DC, 0 to 20 mA DC Load: 500 Ω max.
Control method	ON/OFF or 2-PID control
Auxiliary outputs	Relay outputs: SPST-NO, 250 VAC, 3 A (resistive load) Electrical life of relay: 100,000 operations -10 to 55°C (Avoid freezing or condensation) 25% to 85% (Avoid freezing or condensation) -25 to 65°C (Avoid freezing or condensation) Max. 2,000 mA T2A, 250 VAC, time-lag, low-breaking capacity Approx. 100 g (Digital Controller only) Front panel: IP50 Rear case: IP20 Terminal section: IP00 Installation category II, pollution degree 2 (as per IEC 61010-1) Non-volatile memory (Number of write operations: 1,000,000) Long-term: 250V+(Power supply voltage) Short-term: 1200V+(Power supply voltage)
Ambient temperature	
Ambient humidity	
Storage temperature	
Altitude	
Recommended fuse	
Weight	
Degree of protection	
Installation environment	
Memory protection	
Temporary overvoltage	

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

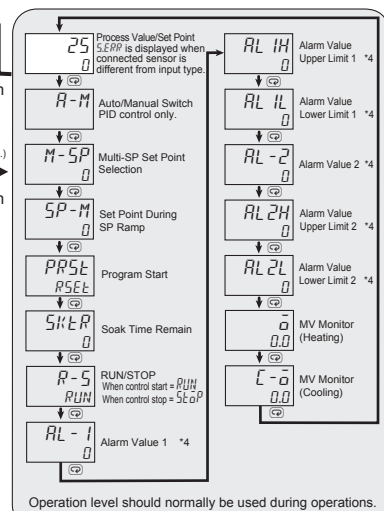


* When complying with EMC standards, the line connecting the sensor must be 30 m or less. If the cable length exceeds 30 m, compliance with EMC standards will not be possible.

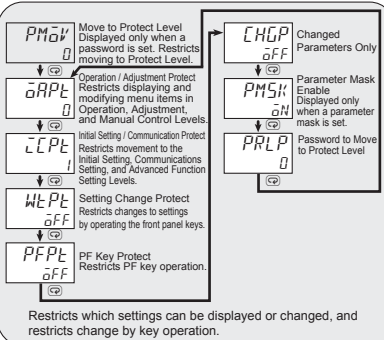
Check the wiring before turning ON the power supply.

POWER ON

Operation Level



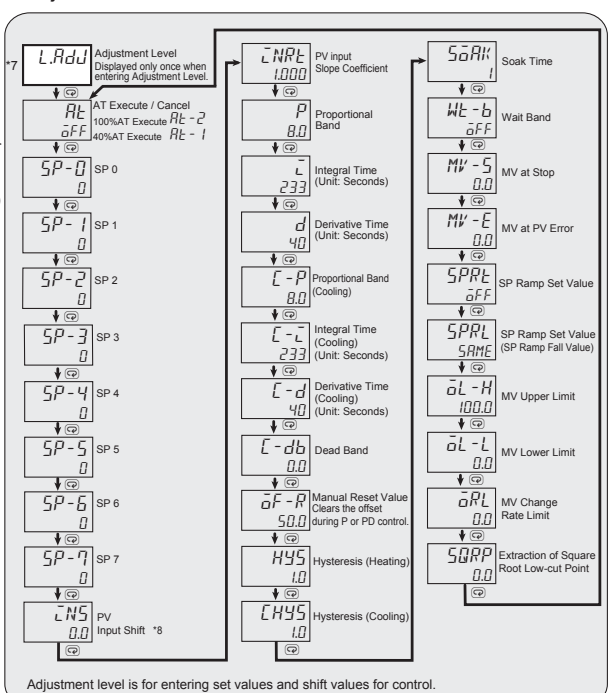
Protect Level



Other functions

Refer to the *E5□□ Digital Controllers User's Manual* (Man. No. H174) for information on the Advanced Function Setting Level, Manual Control Level, and other functions.

Adjustment Level



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	Alarm
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.	OFF	Operates as above the upper limit.
E333 (E333)	A/D converter error	After the check 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.	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

If the input value exceeds the display limit (-1999 to 9999), though it is within the control range, [ECCC] will be displayed under -1999 and [3333] above 9999. Under these conditions, control output and alarm output will operate normally. Refer to the *E5□□ Digital Controllers User's Manual* (Man. No. H174) for the controllable ranges.

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

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