

# E5CC-T Digital Controller

EN INSTRUCTION MANUAL

Thank you for purchasing the OMRON E5CC-T 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.

OMRON Corporation ©All Rights Reserved

Refer to the E5CC-T Digital Controllers User's Manual (Cat. No. H185) for detailed application procedures.

## Safety Precautions

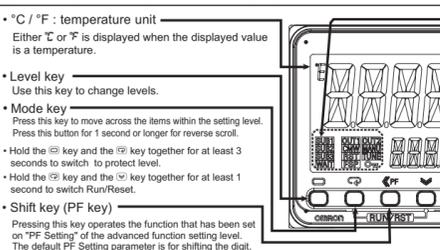
### Key to Warning Symbols

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

Dimensions (mm)



\* Do not remove the terminal block. Doing so may result in failure or malfunction.

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

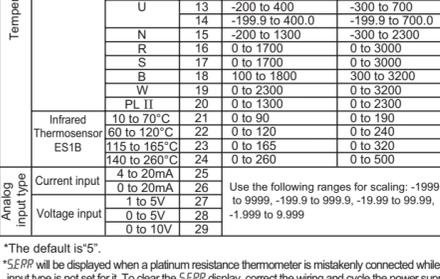
\* Hold the key and the key together for at least 3 seconds to switch to protect level.

\* Hold the key and the key together for at least 1 second to switch Run/Reset.

\* Shift key (PF key) Pressing this key operates the function that has been set on "PF Setting" of the advanced function setting level.

The default PF Setting parameter is for shifting the digit.

### Names of Parts on Front Panel



• °C / °F : temperature unit

Either °C or °F is displayed when the displayed value is a temperature.

• Level key Use this key to change levels.

• Mode key Press this key to move across the items within the setting level.

• Hold the key and the key together for at least 3 seconds to switch to protect level.

• Hold the key and the key together for at least 1 second to switch Run/Reset.

• Shift key (PF key) Pressing this key operates the function that has been set on "PF Setting" of the advanced function setting level.

The default PF Setting parameter is for shifting the digit.

## Operation Menu

### Input Type

Table with columns: Input type, Input, Setting, Setting range (°C, °F). Rows include Platinum resistance thermometer, Thermocouple, Infrared Thermosensor, Current input, Voltage input.

\*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

Table with columns: Setting, Alarm type, Alarm output function. Rows include Deviation upper/lower limit, Deviation upper/lower range, Absolute value upper/lower limit, PV Change Rate Alarm, SP absolute value upper/lower limit, MV absolute value upper/lower limit.

• The default alarm type is "2".

\*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".

\*2: Refer to the tables above for details of input types and alarm types.

## 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.

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 0.43 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 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

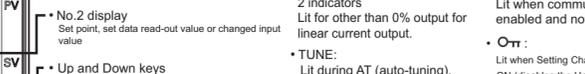
Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and 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.

## Installation

### Individual mounting (mm)



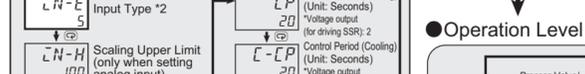
Waterproofing is impossible with side-by-side installation. When waterproofing is required, fit watertight packing on the backside of front panel.

• 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 between 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.

### Side-by-side mounting (mm)



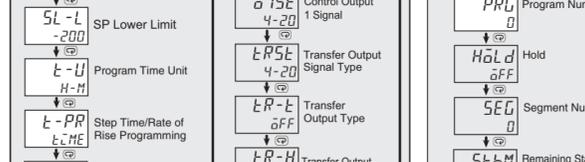
Do not connect anything to the terminals that are shaded gray.

The E5CC-T is set for a K thermocouple (input type of 5) by default. If a different sensor is used, an input error (SEPR) will occur. Check the setting of the Input Type parameter.

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

## Connections

The applicability of the electric terminals varies with the type of machine.



Relay 250 VAC, 3 A (resistive load) 12 VDC, 21 mA

Linear current (for driving SSR) 0 to 20 mA DC 4 to 20 mA DC Load: 500 Ω max.

Voltage (for driving SSR) 12 VDC, 21 mA

Relay 250 VAC, 2 A (resistive load)

Linear current/voltage (for driving SSR)

Auxiliary outputs 1, 2, and 3

Auxiliary output 3

Auxiliary output 2

Auxiliary output 1

Input Power Supply 100 to 240 VAC 24 VAC/DC (no polarity)

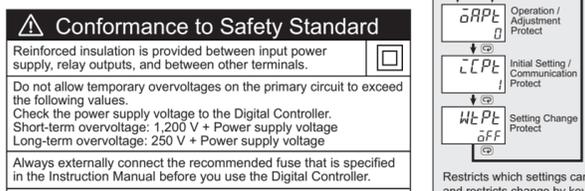
Options: 001 Event inputs 1 and 2, CT1; 002 Communications (RS-485) and CT1; 003 Communications (RS-485), CT1, and CT2; 004 Communications (RS-485) and event inputs 3 and 4; 005 Event inputs 1 to 4; 006 Event inputs 1 and 2, and transfer output.

## Program Setting Level

Check the wiring before turning ON the power supply.

### POWER ON

### Operation Level



Operation level should normally be used during operations.

### PID Setting Level

Display PID Selection

For other information, refer to the E5CC-T Digital Controllers User's Manual (Cat. No. H185).

### Adjustment Level



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

### 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.

Table with columns: No.1 display, Meaning, Action, Status at error. Rows include SEPR (S.Err), E333 (E333), E111 (E111).

If the input value exceeds the display limit (-1999 to 9999), though it is within the control range, [E333] will be displayed under -1999 and [E333] above 9999. Under these conditions, control output and alarm output will operate normally. Refer to the E5CC-T Digital Controllers User's Manual (Cat. No. H185) for the controllable ranges.

\* Error shown only for "Process Value / Set point". Not shown for other status.

## Protect Level



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

## Conformance to Safety Standard

Reinforced insulation is provided between input power supply, relay outputs, and between other terminals. Do not allow temporary overvoltages on the primary circuit to exceed the following values.

Check the power supply voltage to the Digital Controller. Short-term overvoltage: 1.200 V + Power supply voltage Long-term overvoltage: 250 V + Power supply voltage

Always externally connect the recommended fuse that is specified in the Instruction Manual before you use the Digital Controller.

Analog Input • If you input an analog voltage or current, set the Input Type parameter to the correct input type.

• Do not use the Digital Controller to measure a circuit with Measurement Category II, III, or IV.

• Do not use the Digital Controller to measure an energized circuit with a voltage that exceeds 30 Vrms or 60 VDC is applied.

The protection provided by the Digital Controller may be impaired if the Digital Controller is used in a manner that is not specified by the manufacturer.

## Other functions

Refer to the E5CC-T Digital Controllers User's Manual (Cat. No. H185) for information on the Advanced Function Setting Level, Manual Control Level, and other functions.

Refer to the E5CC-T Digital Controllers Communications Manual (Cat. No. H186) for information on communications.

## 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.

(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 icing and condensation.

• Places subject to vibration and large shocks.

(2) Use the product within the rated temperature and humidity ranges. Provide forced-cooling if required.

(3) To allow heat to escape, do not block the area around the product.

(4) Do not block the ventilation holes on the product.

(5) Be sure to wire properly with correct polarity of terminals.

(6) 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 braided or solid wires with a gage of AWG24 to AWG18 (equal to 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.

(7) Do not wire the terminals which are not used.

(8) 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.

(9) Use this product within the rated load and power supply.

(10) 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 other malfunctions may occur.

(11) 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.

(12) 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.

(13) 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.

(14) Design system (control, etc.) considering the 2 second of delay that the controller's output to be set after power ON.

(15) The output will turn OFF when you move to the Initial Setting Level. Take this into consideration when performing control.

(16) The number of non-volatile memory write operations is limited. Therefore, use RAM write mode when frequently overwriting data during communications or other operations.

(17) When disassembling the Temperature Controller for disposal, use suitable tools.

(18) Do not exceed the communications and use the specified communications cable. Refer to the E5CC-T Digital Controllers User's Manual (Cat. No. H185) for the communications distance and cable specifications.

(19) 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.

(20) The terminals can reach temperatures of up to 75°C.

## 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 7.5 VA max. (100 to 240 VAC) 4.1 VA max. (24 VAC) 2.3 W max. (24 VDC)

Power consumption

Indication accuracy (Ambient temperature: 23°C) ±0.3% of indication value or ±1°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.

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 250VAC, 3A(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.

Voltage output (for driving SSR): 12 VDC, 21 mA ON/OFF or 2-PID control Relay outputs: SPST-NO, 250 VAC, 2 A (resistive load).

Electrical life of relay: 100,000 operations 4 to 20 mA DC with load of 500 Ω max. 1 to 5 VDC with load of 1 kΩ min. -10 to 55°C (avoid freezing or condensation) 25 to 85°C (avoid freezing or condensation) Max. 2,000m

Altitude T2A, 250 VAC, time-lag, low-breaking capacity Approx. 120 g (Digital Controller only) Front panel: IP66

Rear case: IP20, Terminal section: IP00 Installation category II, pollution degree 2 (see IEC61010-1)

Non-volatile memory (Number of write operations: 1,000,000) Short term: 1200 V+ power supply voltage Long term: 250 V+ power supply voltage

Event input Contact input No-contact input

Control output 1 Control output 2

Auxiliary outputs

Transfer output

Ambient temperature Altitude Recommended fuse Weight Degree of protection

Installation environment Memory protection

Temporary overvoltage

OMRON EUROPE B.V. Wegalaan 67-69, NL-2132 JD Hoofddorp The Netherlands

Phone 31-2356-81-300 FAX 31-2356-81-388

OMRON ELECTRONICS LLC One Commerce Drive Schaumburg, IL 60173-5302 U.S.A

Phone 1-847-843-7900 FAX 1-847-843-7787

OMRON ASIA PACIFIC PTE. LTD. One 438A Alexandra Road # 05-05/08 (Lobby 2),

Alexandra Technopark, Singapore 119967 Phone 65-6835-3011

FAX 65-6835-2711

OMRON Corporation Shiokoji Horikawa, Shimogyo-ku, Kyoto 600-8530 JAPAN

