OMRON

Temperature controller

ΕN

Instruction Manual

Thank you for purchasing the OMRON Product. To ensure the safe application of the Product, only a professional with an understanding of electricity and electric devices must handle it. Read this manual carefully before using the Product and always keep it close at hand when the Product is in use.

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For detailed operating instructions, please refer to the *EJ1 Modular Temperature Controller User's Manual* (Cat. No. H142).

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 CAUTION carefully before using the product.

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.

Use a power supply that complies with the reinforced insulation specified in IEC 60664 for the EJ1 external power supply or the power supply connected to the EJ1. If non-compliant power supplies are used ectric shock may occasionally result in minor injury.

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 occasior

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

(Screw-Less Clamp Terminals)

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Provide safety measures in external circuits (i.e., not in the Temperature Controller) to ensure safety in the system if an abnormality occurs due to malfunction or due to external factors. Not doing so may result in serious accidents due to incorrect operation • Emergency stop circuits, interlock circuits, interlock circuits, interlock circuits, amid circuits. Provide measures must be provided in external control circuits. • Provide measures in the communications system and programming to ensure safet in the overall system even if errors or malfunctions occur in serial communications.

in the overall system even it errors or malfunctions occur in serial communications, remote I/O communications, or other communications.

• You must take fail-safe measures to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causess.

nalfunction in the product may occasionally make control operations impossit vent alarm outputs, resulting in property damage. To maintain safety in the e malfunction of the product, take appropriate safety measures, such as installi monitoring device on a separate line Always consider the application conditions and use the product within the rated load If the product is used past its life expectancy, burning may occasionally occur.

Tighten the terminal screws to between 0.5 and 0.6 N·m. Loose screws may

asionally result in fire.

CAUTION - Risk of Fire and Electric Shook
a) This is the product UL Recognition 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

before servicing:

2) Signal inputs are SELV, limited energy.

3) Gaution: To reduce the risk of fire or electric shock, do not interconnect the outputs of different Class 2 circuits. 1

11 A class 2 circuit is one tested and certified by UL as having the current and voltage of the secondary output restricted to specific levels.

⚠ Conformance to UL/CSA

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Do not allow temporary overvoltage on the primary circuit to exceed the following values. Check the power supply voltage to the Temperature Controller. Short-term overvoltage: 1,200 V + (Power supply voltage) Long-term overvoltage: 250 V + (Power supply voltage)

The power supply terminals must be supplied from a SELV, limited-current source. A SELV (safety extra-low voltage) source is a power supply having double or reinforced insulation between the primary and the secondary circuits and having an output voltage of 30 V r.m.s. max. and 42.4 V peak max. or 60 V DC max.

Functional insulation is provided between the power supply, input, output, and communications erminals. If reinforced or double insulation is required, use a power supply that complies with the einforced or double insulation standards specified in ELG 60664 for the EJ1 external power supply and for the power supply connected to the EJ1.

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

Analog Input

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

On not use the Temperature Controller to measure a circuit with Measurement Category II, III, or IV. Do not use the Temperature Controller to measure a circuit with Measurement Category II. 1 Do not use the Temperature Controller to measure an energized circuit to which a voltage exceeds 30 V r.m.s. or 60 V DC is applied.

The protection provided by the Temperature Controller may be impaired if the Temperature Controller is used in a manner that is not specified by the manufacturer. Due to UL Listing requirements, use the E54-CT1L or E54-CT3L current transformer with the factory wiring (internal wiring). Use a UL category XOBA or XOBA7 current transformer that is UL Listed for field wiring (external wiring) and not the factory wiring (internal wiring).

[EJ1C-EDU: End Unit]

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

Precautions for Safe Use

- The product is designed for indoor use only. Do not use the product outdoors or in any of the

- The product is designed for indoor use only. Do not use the product outdoors on the airy of actional colorwing locations.

 Places directly subject to heat radiated from heating equipment.

 Places subject to glashing liquid or oil atmosphere.

 Places subject to direct sunlight.

 Places subject to direct sunlight.

 Places subject to intense temperature change.

 Places subject to intense temperature change.

 Places subject to ivbration or strong shocks.

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

 Do not block the ventilation holes on the product. Internal temperature rise may result in a shorter product service life.

 Be sure to wire properly with correct polarity of terminals.

 Use the wire sizes and stripping lengths given in the following table to prevent smoking and firing of the wiring material.

Terminal type	Recommended wires	Stripping length	
Screw Terminals *1	Basic Unit AWG24 to AWG18 (equal to cross-sectional area of 0.205 to 0.823 mm²) End Unit AWG24 to AWG16 (equal to cross-sectional area of 0.205 to 1.309 mm²)	6 to 8 mm	
Screw-Less Clamp Terminals *2	AWG24 to AWG16 (0.25 to 1.5 mm²) Copper stranded or solid wires	8 mm	
Screw Connector Terminals *3	AWG24 to AWG14 (equal to cross-sectional area of 0.205 to 2.081 mm²)	-	
*1 You can connect up to two wires of the same size and type, or two crimped terminals using M3			

*1 You can connect up to two wires of the same size and type, or two crimped terr width 5.8 mm or less to a single terminal.
*2 You can connect only one wire to each terminal.
*3 You can connect up to two wires of the same size and type to a single terminal.

To a can connect up to two wires of the same size and type to a single terminal.
Do not connect anything to unused terminals.
To reduce inductive noise, keep the wiring for the product's terminal block away from power cables carrying high voltages or large currents. Also, do not wire power lines together with or parallel to product wiring. Using shielded cables and using separate ononduits or ducks is recommended.
Attach a surge suppressor or noise filter to peripheral devices that generate noise (in particular, motors, transformers, solenoids, magnetic coils or other equipment that have an inductance component).

inductance component).

Allow as much space as possible between the product and devices that generate powerful high frequencies (high-frequency welders, high-frequency sewing machines, etc.) or surge. Allow as much space as possible between the Temperature Controller and devices that generate powerful high frequencies (high-frequency welders, high-frequency sewing machines, etc.) or surge.

Use the product within the rated load and power supply.

use are product writin 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 outbut malifications may occur.

output malfunctions may occur.

Make sure that the product 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 ON power for the load (e.g., heater) at the same time as or before supplying power to the Temperature Controller. I power is turned ON for the Temperature Controller before turning ON power for the load, self-tuning will not be performed properly and optimum control will not be achieved.

The switch or circuit breaker must be within easy reach of the operator, and must be marked as a disconnecting means for this unit.

Do not use paint thinner or similar chemical to clean with. Use standard grade alcohol.

Do not use paint thinner or similar chemical to clean with. Use standard grade alcohol. Design the system (e.g., the control panel) allowing leeway for the delay required before product outputs are valid after turning ON power to the product. The number of non-volatile memory write operations is limited. Therefore, use RAM write mode when frequently overwriting data, e.g., through communications. Never touch the electronic components, connectors, or patterns on product boards with your bare hands. Always hold the product by the case. Inappropriately handling the product may occassionally damage internal components due to static electricity. Use suitable tools when taking the Temperature Controller apart for disposal. Sharp parts inside the Digital Controller may cause injury. Do not exceed the communications distance that is given in the specifications and use the specified communications cable.

specified communications cable.

Do not furn the power supply to the Temperature Controller ON or OFF while the USB-Serial Conversion Cable is connected. The Temperature Controller may malfunction.

Do not bend the wiring cables past their natural bending radius. Do not pull on the wiring cables. Mount the product to a DIN Rail mounted vertically to the ground.

Names of Parts on Front Panel

Operation

COM1

COM₂

сомз

ndicators PWR 1 RUN 2

ERR 3

ALM 4

Display

SW1

SW2

Specifications

Power supply voltage

Control output

Auxiliary output

Inrush current (POWER) Weight(V2.0)

Degree of protection

Installation enviro

Event inputs

Indication accuracy(V2.0) The

Operation Indicators

	Operation indicator	PIN 6 OF SW 2 = OFF	PIN 6 OF SW 2 = ON	
	PWR/1 (green)	Lit when power is supplied.	Lit when output 1 is ON	
	RUN/2 (green)	Lit during operation.	Lit when output 2 is ON	
	ERR/3 (red)	Flashes or lights when an error occurs.	Lit when output 3 is ON	
Ī	ALM/4 (red)	Lights when an alarm occurs.	Lit when output 4 is ON	
	COM1 (orange) Flashes during communications on End Unit port A. COM2 (orange) Flashes during communications on End Unit port B.			
	COM3 (orange)	Flashes during communications with the G3ZA.		

25) Use a switch, relay, or other device with contacts to turn OFF the power supply quickly. Gradually lowering the voltage of the power supply may result in incorrect outputs or memory errors.

26) Do not touch the electronic components with your hands or subject them to shock when removing the terminal block.

27) Connect only the specified number of products in only a specified configuration.

28) Always turn OFF the power supply before wiring the product, replacing the product configuration.

29) Attach the enclosed cover seal to the connector opening on the left end product during installation.

Do not use port B on the End Units when using port C on Advanced Units.

30) Io not use port B on the End Units when using port C on Advanced Units.
 Be sure to use the external fuse with the appropriate fusing characteristics, and the breaker with the appropriate tripping characteristics to ensure that the fuse does not me and the breaker is not activated due to the innush current. Be particularly careful when I units are linked together, the inrush current will be equal to N times that for one unit.
 Do not use the port A connector and port A terminal of the End Unit at the same time.
 Do not connect or disconnect the Conversion Cable or USB-Serial Conversion Cable while communications are in progress. the product faults or malfunction may occur.
 Make sure that the metal components of the product are not touching the external power terminals.

34) Make Sure that the riselation of the USB-Serial Conversion Cable connected power terminals.
35) Do not leave the Conversion Cable or the USB-Serial Conversion Cable or USB-Serial Conversion Cable, possibly causing equipment malfunctions.
36) Observe the following precautions when you wire the product models with screwless clamp terminal blocks.

Solution to the control of the cont

u) Basic Unit 1 C4: 3 W max. (at max. Dc load)
TC2: 2.5 W max. (at max. Dc load)
) Thermocouple Input: (±0.3% of Indication value or ±1°C, which is greater) ± 1 digit max.
Platinum Resistance Thermometer Input: (±0.2% of Indication value or ±0.4°C, which is greater) ± 1 digit max.
Analog Input: (±0.2% F/S) ± 1 digit max.
C7 Input: (±5% F/S) ± 1 digit max.
Voltage output: 42 V DC, 21 mA max.
Voltage output: 42 V DC, 21 mA max.
Current output: 30 V DC, 100 mA max.
Transistor output: 30 V DC, 50 mA max.
Transistor output: 30 V DC, 50 mA max.
ON/OFF or advanced PID
Operating: -10 to 55°C
Storage: -25 to 55°K
Storage: 25% to 55%
Individual Unit: 15 A max.
End Unit: 76 g
Rear case, End Unit case: IP20
Rear case, End Unit case: IP20

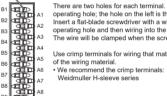
Rear case, End Unit case: IP20 Terminal section: IP00 Overvoltage category II, pollution degree 2 (as per IEC 61010-1) 2,000 m max.

2,000 m max. Output current: Approx. 4 mA Contact input ON: 1 k Ω max., OFF: 100 k Ω min. No-contact input ON: Residual voltage of 1.5 V max., OFF: Leakage current of 0.1 mA max. Single-phase, 100 A (AC) Non-volatile memory Number of writes: 100,000 T4A 125V time-lag low-braking capacity

ower supply voltage 24 V DC 5A (at max. DC load) perating voltage range 85% to 110% of the rated voltage ower consumption(V2.0) Basic Unit TC4: 3 W max. (at max. DC load) TC2: 2.5 W max. (at max. DC load)

• Wiring Procedure for Screw-Less Clamp Terminals





Use crimp terminals for wiring that match the cross-sectional area

Connecting to the G3ZA (EJ1□-TC□□-□□□□)

G3ZA

Connections

■ Wiring

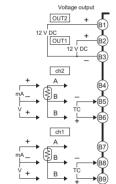
(Screw Terminals)

Dimensions (mm)

onent: Basic Unit, Instruction Manual)

[EJ1□-TC: Basic Unit]

• EJ1□-TC4□-QQ



OUT4 OUT3 12 V D ch4 **■** B ch3

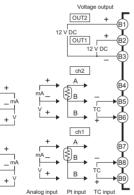
• EJ1□-TC2□-QNHB OUT2

С

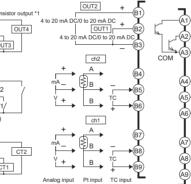
Screw Terminals: 109 Screw-Less Clamp Terminals: 104.85

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888



OUT4 A5 + EV1/



• EJ1 □-TC2 □-CNB

ent: End Unit, Instruction Manual, End Plate, Cover Seal)

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OUT4 A2 OUT3 A5 + EV1/A6 + (A7) (A8) (A9) (A9)

THE STATE OF

Port A (Connector) Both of these ports cannot be used at the Port A **▼** A(−) COM 24 V DC

• EJ1C-EDUA-FLK

24 V DC

SUB2 СОМ

CN1 Connect the G3ZA harness to the CN1 bottom of the Unit.

Set SW 2 to (57.6 kbps). Set SW 2 to 3 Connect the black line with a white stripe to terminal 7 on the G3ZA and the black line with no stripe to terminal 8.

EJ1C-CBLA050 (sold separately) Length of cable: 5 m

Refer to the G3ZA Instruction Manual for wiring methods.

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

Installation

Connecting Units

Align the connector and connect the Units to each other. Connect and End Unit to the Unit on the right end. (Up to 16 Units can be connected side by:



2. Slide the yellow sliders on the tops and bottoms of the Units until they click into place

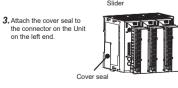
• Mounting to the DIN Rail

<Mounting>
Insert the hooks on

press the EJ1 until

the hooks lock into

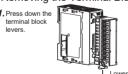
the top of the EJ1 into the DIN Rail and



2. Insert the upper hooks

into the DIN Rail

Removing the Terminal Block



Precautions for Correct Use Do not connect an End Unit directly to an Advanced

- Always connect an End Unit to the right side of a Basic Unit
- the Unit, make sure that the new Unit matches the original Unit.

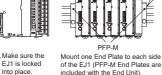
You cannot use an EJ1 Controller as a CJ-series When removing the terminal block and replacing

· Removing the Terminal Block







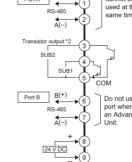


To mount an End Plate, hook the bottom of the End Plate on the bottom of the DIN Rail (5,), place the top of the End Plate on the DIN Rail (6,), and then pull down on the End Plate

OFF ON 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 ON ON 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63



olicable DIN Rail (sold separately) 2-100N (100 cm) PFP-50N (50 cm)



• EJ1C-EDUC-□FLK

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*2 Max. operating voltage: 30 V DC, Max. load current: 50 mA

• Terminals A10 and B10 of the screw-less clamp terminals are not used. Port A (Connector) is used only to connect the Temperature Controller to a computer when using the Setup Tool. E58-CIFQ1 USB-Serial Conversion Cable is required for the connection. (Do not use the product with the Cable left permanently connected.) Refer to the Instruction Manual provided with the USB-Serial Conversion Cable for details on connection methods.

When wiring a voltage input, be sure to connect the correct terminals. Incorrect wiring may cause EJ1 failure.
 Use non-voltage inputs for the event inputs. The polarity for a non-contact input is indicated by "(-)."

Check that the EJ1 is turned OFF before operating theswitches.

Settings are valid only when power is supplied.

• Set the switches with a small flat-blade screwdriver. Do not set the switches midway between settings.

Setting the Unit Number SW 1 and SW 2 can be used together to set the unit number to between 00 and 63. The factory setting is unit number 01.

■Specification Settings

*1 Max. operating voltage: 30 V DC, Max. load current: 100 mA

Switch Operation

SW 1 is set to 1 and SW 2 pins are all set to OFF in the default

SW1
0 1 2 3 4 5 6 7 8 9 A B C D E F OFF OF 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 ON OFF 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

\$450 000 000 000 000 000 000 000 000 000				
SW1	•			
↓ □ □ ≤1 2	3 4 5	6 7	8	
SW2				

사용자안내문 이 기기는 업무용 환경에서 사용할 목적으로적합성평가를 받은 기기로서

가정용 환경에서사용하는 경우 전파간섭의 우려가 있습니다

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.

responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES 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.

SW2 Set to ON when using the Modbus communications protocol for port B.

Setting SW 2

	Pin 3	OFF: The setting for port B communications protocol is used. ON: Modbus is used.
	Pins 4 and 5	Set the baud rate for port B. 4 = OFF, 5= OFF: Use port B baud rate setting (default: 9.6 kbps). 4 = ON, 5= OFF: 19.2 kbps 4 = OFF, 5= ON: 38.4 kbps 4 = ON, 5= ON: 115.2 kbps
	Pin 6	Set to ON to display the output status on the operation indicators. OFF: The operation status is displayed (PWR, RUN, ERR, and ALM). ON: The output status is displayed (outputs 1, 2, 3, and 4). Note: Normally keep this pin set to OFF so that the operation status can be checked
	Pin 7	Set to ON when using the G3ZA.
	Pin 8	Used when using an Advanced Unit and distributed installation. (Refer to the User's Manual for details.)

Description

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Note: Specifications subject to change without notice