

OMRON

NEW

Ver.1.2

Modular  
Temperature  
Controllers

EJ1

Radically Increase the Performance  
of Multipoint Temperature Control  
with the EJ1.



realizing

# Achieve Optimum Temperature Control for a Device.

The EJ1 is a new type of Modular Controller that increases device performance from design and installation through maintenance. Additional functions required for multipoint temperature control have been added to the EJ1 to reduce even further the amount of work required for setup and communications. It enables building systems that meet customer needs.

The area for programless communications with PLCs has been expanded to 1,200 parameters.

Bit specifications for operation commands reduces the amount of work required for ladder programming.

NP-series PT screen templates for the EJ1 reduce the amount of work required to create screens.

**Reduced Design Work**

CX-Thermo Support Software supports multi-node settings.

A switch can be set to enable monitoring the output status on operation indicators.

A switch can be set to use Modbus as the port B communications protocol.

**Easy Installation and Setup**

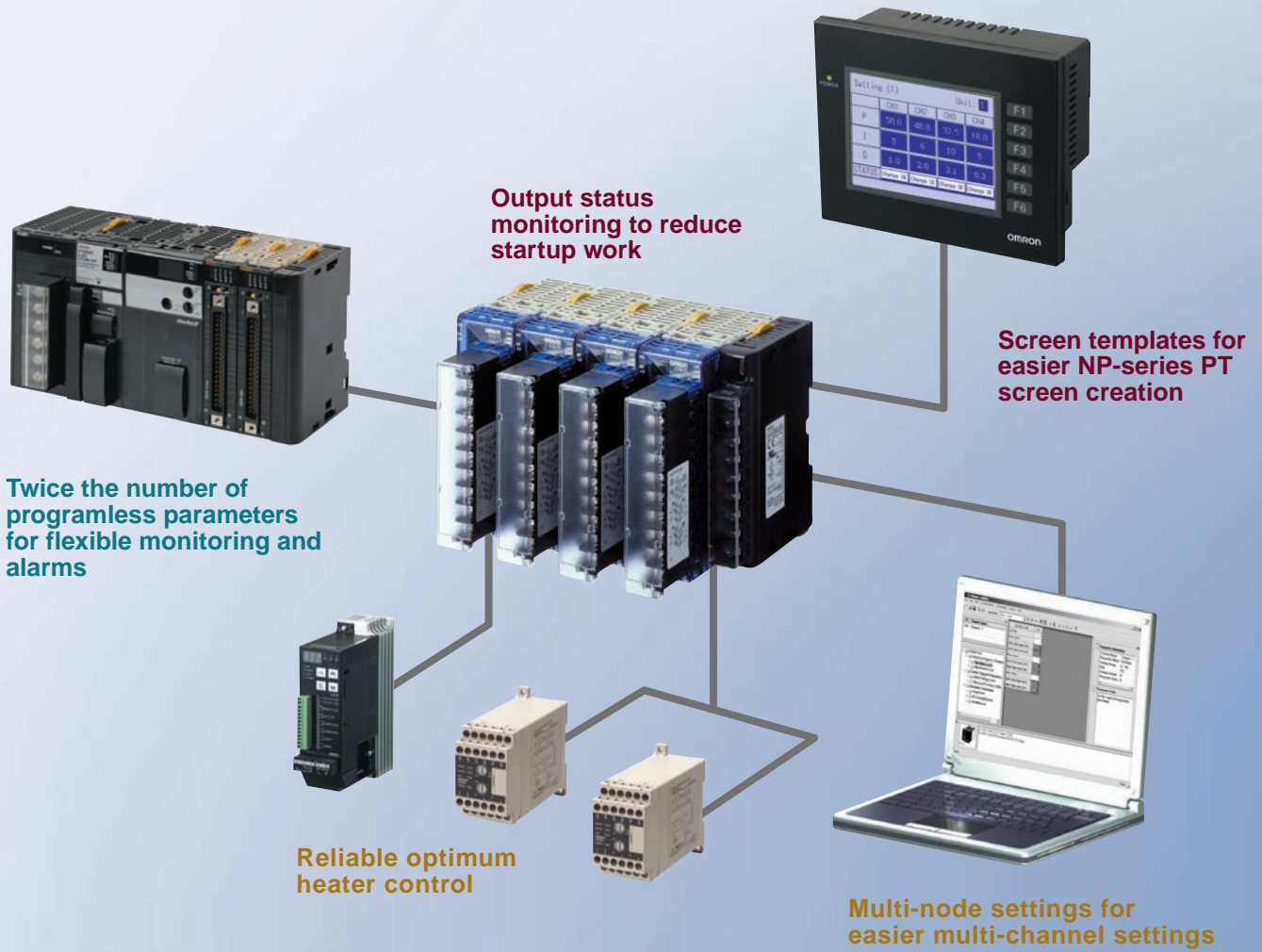
Independent heating/cooling PID control and autotuning (AT) for heating and cooling.

Self-tuning (ST).

Optimum cycle control with the G3ZA and phase control with the G3PW.

**Flexible Control and Adjustment**

**Smart Concept**



**Version Upgrade:  
The Ultimate in User-friendly  
Design to Directly Improve  
Device Performance.  
Even Better Functions for  
Multipoint Temperature  
Control.**

Ver.1.2

Modular  
Temperature  
Controllers **EJ1**



# New Functions

## Incredible User-friendly Design with Advance F

### Reduced Design Work

**HFU**  
Ver.UP

The capacity of the area for programless communications with PLCs has been increased from 600 (version 1.1) to 1,200 parameters. You can now use more parameters for each loop or to support multipoint control.

Programless communications enables exchanging data simply by setting PLC flag operation and the EJ1 parameters. There is no need for creating a communications program. This results in a significant reduction in design work.

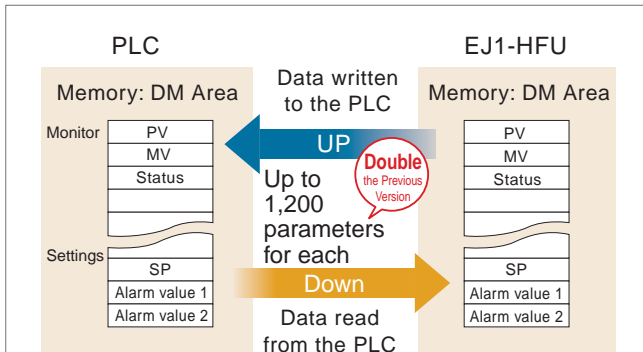


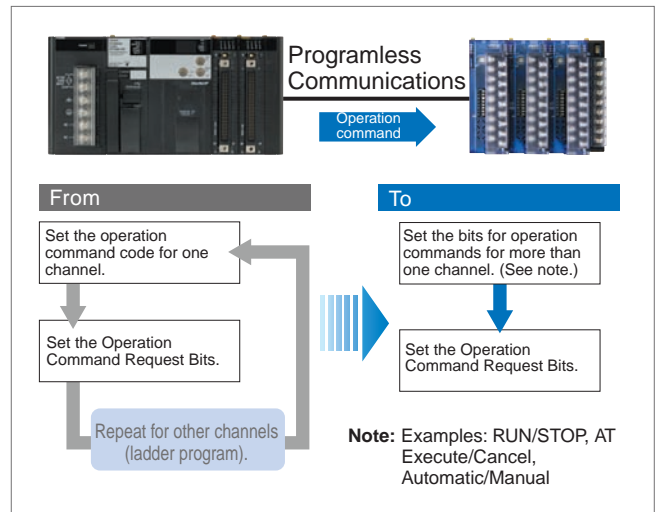
Illustration of Connection to OMRON PLC

The HFU automatically performs communications with the PLC.

**Note:** In addition to OMRON PLCs (SYSMAC CS/CJ/CP Series), you can also use Mitsubishi PLCs (MELSEC-Q/QnA/QnAS/An/AnS/FX3UC Series). However, only some models can be used when multiple HFUs are connected.

**HFU**  
Ver.UP

Operation commands that were previously executed for each channel can now be executed using bit specifications, reducing the amount of work required to create ladder programs.



**Connectivity and Compatibility**

Screen templates for the EJ1 are a standard feature in the NP-series PTs. There is no need to create basic screens, such as for monitoring the process value, the set point, or the manipulated variable.



Setting (1)		Unit: [ ]			
	CH1	CH2	CH3	CH4	
P	50.0	48.0	32.5	18.0	
I	5	6	10	5	
D	1.0	2.0	3.1	0.3	
STATUS	Change [X]	Change [X]	Change [X]	Change [X]	

#### Examples of Standard Screens

- Monitoring the Process Value (PV), Set Point (SP), or Manipulated Variable (MV)
- Displaying the status during RUN, STOP, Manual Mode, or AT operation
- Displaying the status of the two alarms using lamps
- RUN/STOP and AT Execute/Cancel operations for each channel

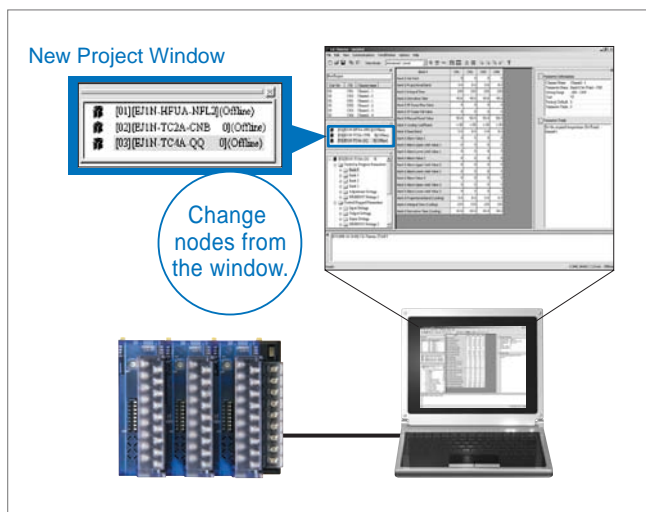
**Note:** Refer to the NP Series Programmable Terminal (Cat. No. V101) for details.

# Functionality, Connectivity, and Compatibility

## Easy Installation and Setup

CX-Thermo Ver.UP

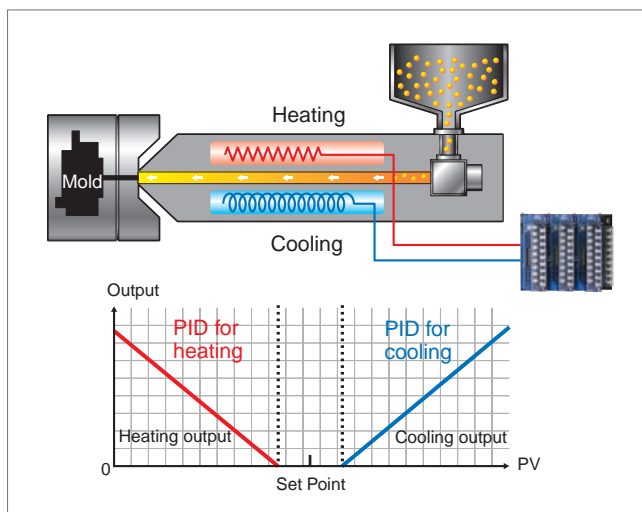
The CX-Thermo Support Software (version 4.1) supports multi-node settings to eliminate the need to change cable connections. It can be easily connected to any EJ1 Controller in a multi-node network.



## Flexible Control and Adjustments

TC Ver.UP

Independent heating/cooling PID control (see note) and autotuning (AT) for heating/cooling are provided for devices such as extruders.



**Note:** This control method allows independently setting PID control for heating and cooling.

TC Ver.UP

A switch can be set to enable monitoring the output status on the operation indicators. The output status when a device is starting can be checked without using any special software. The communications baud rate settings and protocol changes for Modbus can also be set on a DIP switch.

Operating

Operation Indicator	Operation Indicator
PWR/1 Lit green while power is ON.	PWR/1 Lit green while OUT1 is ON.
RUN/2 Lit green during operation.	RUN/2 Lit green while OUT2 is ON.
ERR/3 Flashes or lights red when an error occurs.	ERR/3 Lit red while OUT3 is ON.
ALM/4 Lights red when an alarm occurs.	ALM/4 Lit red while OUT4 is ON.

Monitoring Output Status (New Function)

Operation Indicator	Operation Indicator
PWR/1 Lit green while power is ON.	PWR/1 Lit green while OUT1 is ON.
RUN/2 Lit green during operation.	RUN/2 Lit green while OUT2 is ON.
ERR/3 Flashes or lights red when an error occurs.	ERR/3 Lit red while OUT3 is ON.
ALM/4 Lights red when an alarm occurs.	ALM/4 Lit red while OUT4 is ON.

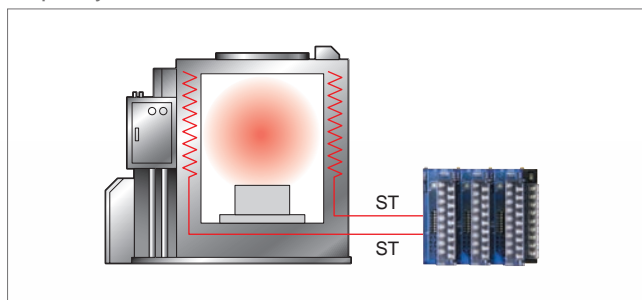
Pin 6 of Switch 2: OFF

Pin 6 of Switch 2: ON

**Note:** Pin 6 of switch 2 can be turned ON or OFF while the power is ON. Normally keep this pin set to OFF so that operation status can be checked.

TC Ver.UP

Self-tuning (ST) (see note) can be used when AT is difficult to use to control devices with a large heating capacity.



**Note:** Self-tuning (ST) finds the PID constants by using step response tuning (SRT) when the EJ1 is operating or the set point is changed.

EJ1 Ver.1.2

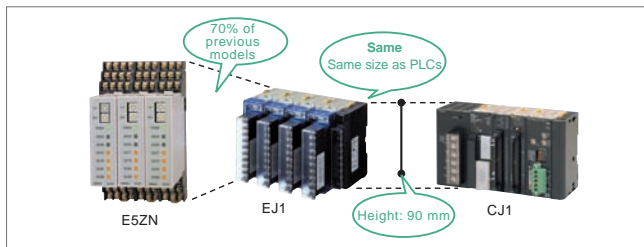
# Basic Functions

## Flexibility Build Advanced Temperature Control Systems

### Basic Functions

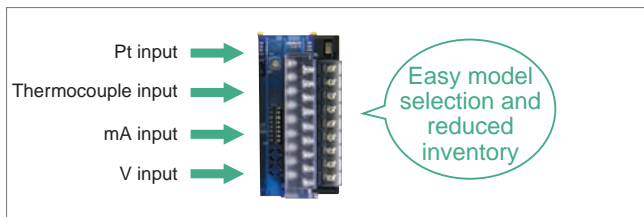
#### Smaller Control Panels

The EJ1 is the same size as PLCs to eliminate dead space.



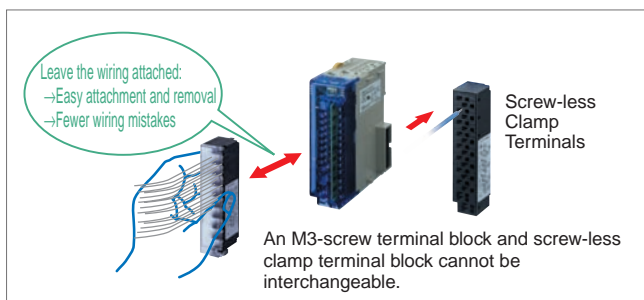
#### Reduces Customer Inventory

Fully universal inputs for all input points to reduce inventory.



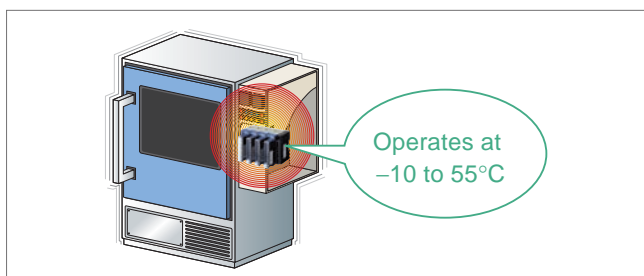
#### Easy Installation and Wiring

Easy operation with one-touch terminal block attachment and removal and screw-less clamp terminals.



#### Reliable Basic Functions and Quality

Operates at ambient temperature up to 55°C! UL, CE, and RoHS compliant.



### System Configuration

#### System with High Function Unit (HFU)

Build systems with programless connection to a PLC using programless communications.

RS-232C/RS-485

Distributed placement with programless communications or DeviceNet communications.

DeviceNet or RS-232C/485

RS-485

Build systems with DeviceNet communications.

DeviceNet

#### Programless Communications for 1,024-channel Systems

Up to 8 HFUs (see note) can be connected to a PLC.  
Up to 32 Basic Units can be connected to each HFU. (See note.)

RS-485

**TC4**  
4 channels per Unit x 32 Units x 8 HFUs = 1,024 channels

**TC2**  
2 channels per Unit x 32 Units x 8 HFU = 512 channels

For each End Unit, up to 16 Units can be connected side by side, including HFUs.

**Note:** EJ1N-HFU□-NFL□

#### Build 200-channel Systems with DeviceNet Communications

Up to 63 HFUs (see note) can be connected to a PLC.  
Up to 16 Basic Units can be connected to each HFU. (See note.)

Device Net

When data is allocated by the user with the Configurator, up to 1,000 channels can be used for inputs and outputs for a DeviceNet Master. Therefore, if you allocate 5 inputs/outputs per channel, you can use up to 200 channels.

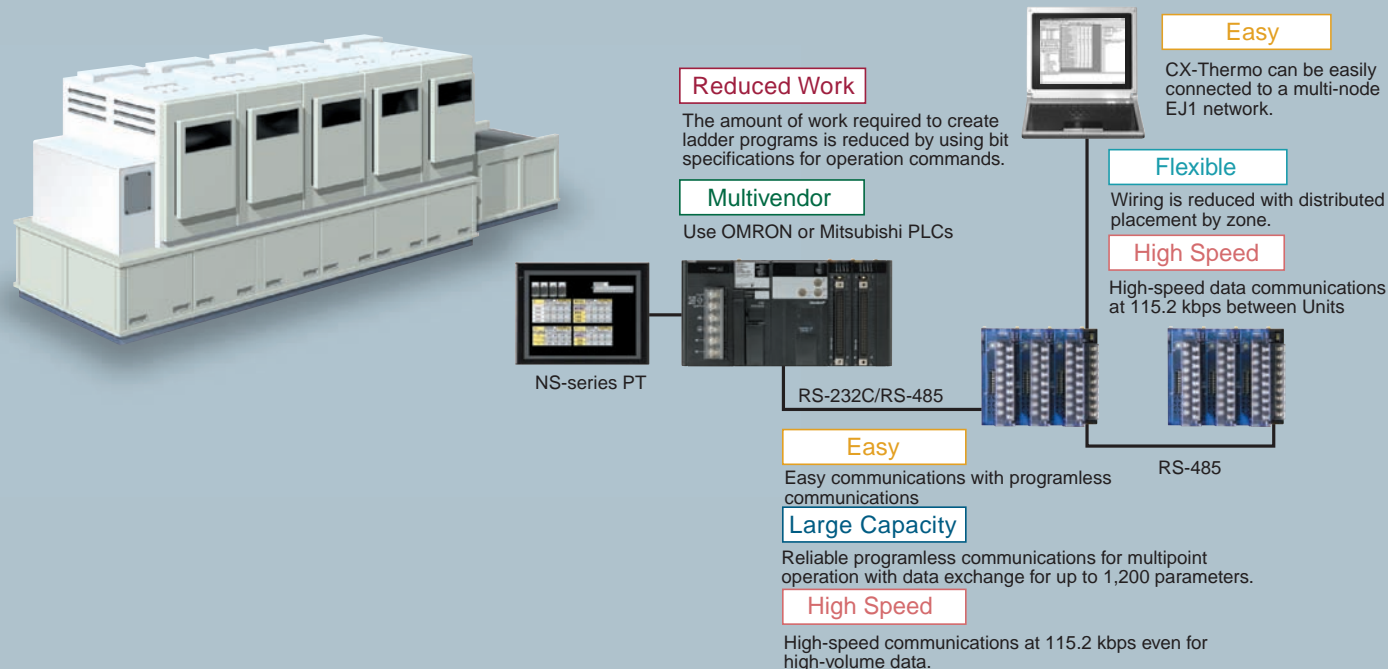
For each End Unit, up to 16 Units can be connected side by side, including HFUs.

**Note:** EJ1N-HFUB-DRT

Applications

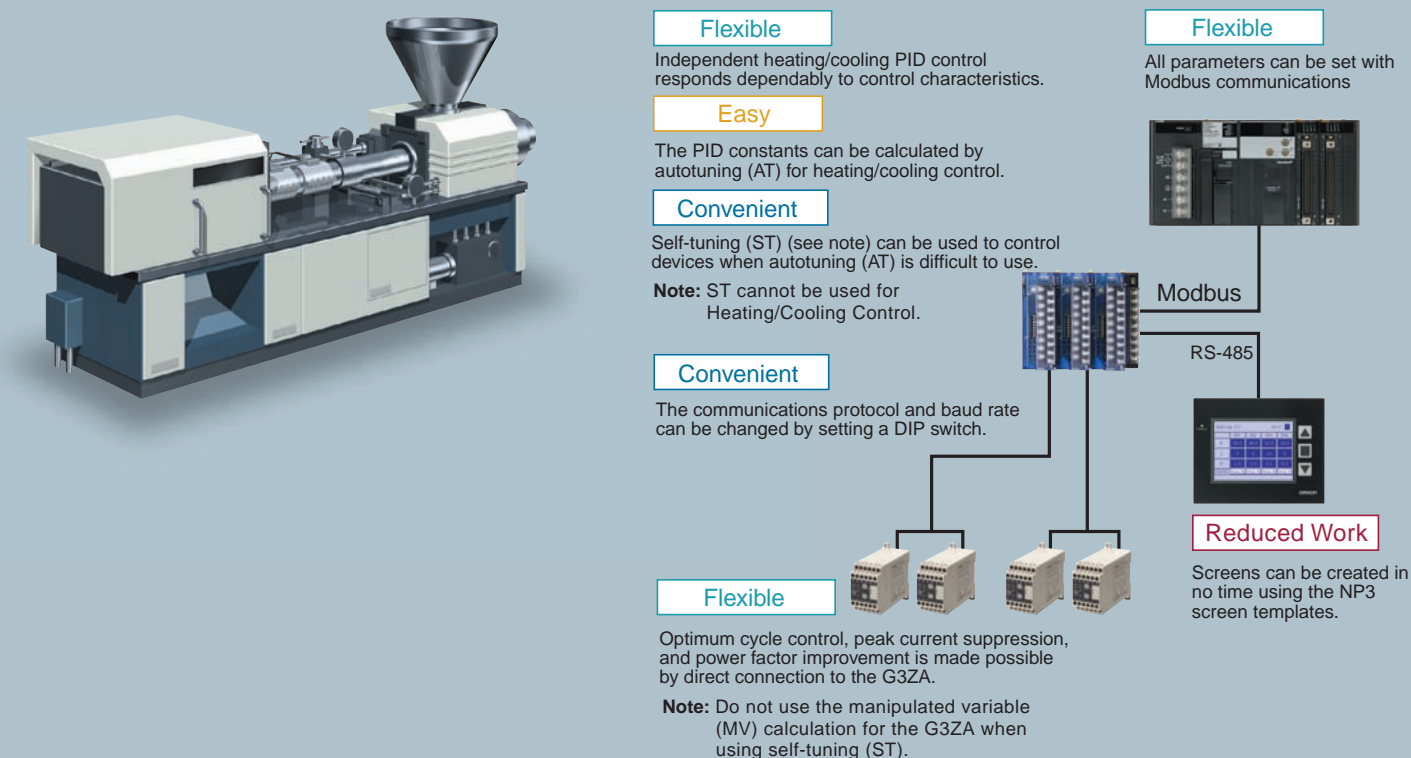
# Electric Component Furnaces

The EJ1 can control up to 1,024 channels with programless communications. Monitoring of multipoint heater temperatures and integrated processing with high-precision controls are easy for continuous furnaces to create a system without waste.



# Molding Machines

Independently set heating/cooling PID control improves control of molding machines. OMRON's unique optimum cycle control improves the power factor and reduces energy consumption.



The above application examples are provided for reference only. Always confirm devices, equipment functions, and safety before using the EJ1 in any specific application. When using the EJ1 in applications requiring special attention to safety, be sure there is sufficient margin in ratings and performance and take suitable safety measures, such as installing failsafe measures. Also, consult with your OMRON representative and confirm specifications and other related documents.

# Ordering Information

## Temperature Controller

### Standard Control Models

Name	Power supply voltage	No. of control points	Control outputs 1 and 2	Control outputs 3 and 4	Auxiliary outputs	Functions		Communications functions	Input type	Terminal	Model
						Heater burnout alarm	Event inputs				
Basic Unit (temperature control) (See note 1.) Ver.1.2	24 VDC supplied from the End Unit	2	Voltage output: 2 points (for SSR drive) (See note 2.)	Transistor output: 2 points (sinking)	None	2 (See note 3.)	2	G3ZA connection port: RS-485 From End Unit: Port A or port B: RS-485	Thermocouple, platinum resistance thermometer, analog voltage, and analog current selectable for each channel.	M3 terminal	EJ1N-TC2A-QNHB
		4	Voltage output: 2 points (for SSR drive) (See note 2.)	Voltage output: 2 points (for SSR drive) (See note 2.)		None	None			Screw-less clamp	EJ1N-TC2B-QNHB
		2	Current output: 2 points	Transistor output: 2 points (sinking)		2	M3 terminal			EJ1N-TC4A-QQ	
HFU with Programless Communications (See note 1.) Ver.1.2	None	None	None	None	Transistor output: 4 points (sinking)	None	4	Port C: RS-485 or RS-232C selectable. From End Unit: Port A: RS-485 Port C: RS-422 From End Unit: Port A: RS-485	No input	Screw-less clamp	EJ1N-TC4B-QQ
										M3 terminal	EJ1N-TC2A-CNB
HFU with DeviceNet Communications (See note 1.)	24 VDC	None	None	None	None	None	None	DeviceNet communications	No input	Screw-less clamp	EJ1N-TC2B-CNB
End Unit (See note 1.)										Transistor output: 2 points (sinking)	None
										Screw-less clamp	EJ1N-HFUB-NFLK
										M3 terminal	EJ1N-HFUA-NFL2
										Screw-less clamp	EJ1N-HFUB-NFL2
										Screw-less clamp	EJ1N-HFUB-DRT
										M3 terminal	EJ1C-EDUA-NFLK
										Detachable connector	EJ1C-EDUC-NFLK

**Note 1:** An End Unit is always required for connection to a Basic Unit or an HFU. An HFU cannot operate without a Basic Unit. External communications cannot be performed when using a Basic Unit only.

**Note 2:** For heating/cooling control applications, control outputs 3 and 4 on the 2-point models are used for the cooling or heating control outputs. On the 4-point models, heating/cooling control is performed for the two input points.

**Note 3:** When using the heater burnout alarm, purchase a Current Transformer (E54-CT1 or E54-CT3) separately.

### Accessories (Order Separately)

#### Current Transformer (CT)

Diameter	Model
5.8 dia.	E54-CT1
12.0 dia.	E54-CT3

#### CX-Thermo Support Software Ver. 4.1

Model
EST2-2C-MV4

#### G3ZA Connecting Cable

Cable length	Model
5 m	EJ1C-CBLA050

#### USB-Serial Conversion Cable

Model
E58-CIFQ1

#### Rail Mounting Equipment

Name	Model
Mounting Rail	PPF-100N
	PPF-50N

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Cat. No. H146-E1-03

Printed in Japan  
0908