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

Achieve Optimum Temperature Control for a Device.

- 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.
- NB-series PT screen templates for the EJ1 reduce the amount of work required to create screens and allow parameter values to be viewed and updated without the need to reconnect the unit to CX-Thermo.
- 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.
- Available with screw terminals or screw-less clamp terminals.
- 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.
- Up to 256 loops per system for large-area control; allows easy expansion.

- Output status monitoring to reduce startup work
- Screen templates for easier NB-series PT screen creation
- Twice the number of programless parameters for flexible monitoring and alarms
- Reliable optimum heater control
- Multi-node settings for easier multi-channel settings
EJ1 Modular Temperature Controllers
Ver.1.2

New Functions
Incredible User-friendly Design with Advance

Reduced Design Work

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.

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.

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

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 NB Series Programmable Terminal (Cat. No. V106-E1-11) for details.
**New Functions**

**Functionality, Connectivity, and Compatibility**

### Easy Installation and Setup

The CX-Thermo Support Software 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

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

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.

**Pin 6 of Switch 2:**
- **OFF:**
  - Lit green while power is ON.
  - Lit green during operation.
  - Flash or lights red when an error occurs.
  - Lights red when an alarm occurs.
- **ON:**
  - Lit green while OUT1 is ON.
  - Lit green while OUT2 is ON.
  - Lit red while OUT3 is ON.
  - Lit red while OUT4 is ON.

**Operation Indicator**

- **PWR/1:** Lit green while power is ON.
- **RUN/2:** Lit green during operation.
- **ERR/3:** Flash or lights red when an error occurs.
- **ALM/4:** Lights red when an alarm occurs.

**Operation Indicator**

- **PWR/1:** Lit green while OUT1 is ON.
- **RUN/2:** Lit green while OUT2 is ON.
- **ERR/3:** Lit red while OUT3 is ON.
- **ALM/4:** Lit red while OUT4 is ON.

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

**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.

**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.
Basic Functions

Flexibility Build Advanced Temperature Control Systems

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.

Pt input
Thermocouple input
mA input
V input

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

Screw-less Clamp Terminals
An M3-screw terminal block and screw-less clamp terminal block cannot be interchangeable.

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

Operates at -10 to 55°C
EJ1 Modular Temperature Controllers

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Power supply voltage</th>
<th>No. of control points</th>
<th>Control outputs 1 and 2</th>
<th>Control outputs 3 and 4</th>
<th>Auxiliary outputs</th>
<th>Heaters/burnout alarm</th>
<th>Event inputs</th>
<th>Communications functions</th>
<th>Input type</th>
<th>Terminal</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Unit (temperature control) (See note 1.)</td>
<td>24 VDC supplied from the End Unit</td>
<td>2</td>
<td>Voltage output: 2 points (for SSR drive) (See note 2.)</td>
<td>Transistor output: 2 points (sinking)</td>
<td>None</td>
<td>2 (See note 3.)</td>
<td>2</td>
<td>G3ZA connection port: RS-485 or RS-232C selectable. From End Unit: Port A or port B: RS-485</td>
<td>M3 terminal</td>
<td>EJ1N-TC2A-QNHB</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>4</td>
<td>None</td>
<td>None</td>
<td>Transistor output: 4 points (sinking)</td>
<td>4</td>
<td>Port C: RS-485 or RS-232C selectable. From End Unit: Port A: RS-485</td>
<td>M3 terminal</td>
<td>EJ1N-HFUB-NFLK</td>
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<td></td>
<td>Port A or B: RS-485 Connector: Port A</td>
<td>M3 terminal</td>
<td>EJ1N-TC2B-CN</td>
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<td>DeviceNet communications</td>
<td>M3 terminal</td>
<td>EJ1N-HFUB-DRT</td>
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<td>Screw-less clamp</td>
<td>EJ1N-HFUB-NFL</td>
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<tr>
<td>HFU with Programless Communications (See note 1.) (Ver.1.2)</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td>M3 terminal</td>
<td>EJ1N-HFUA-NFLK</td>
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<tr>
<td>End Unit (See note 1.)</td>
<td>24 VDC</td>
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<td></td>
<td></td>
<td></td>
<td>M3 terminal</td>
<td>EJ1N-TC2A-CN</td>
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</tbody>
</table>

#### Accessories (Order Separately)

**Current Transformer (CT)**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>5.8 dia.</td>
<td>E54-CT1</td>
</tr>
<tr>
<td>12.0 dia.</td>
<td>E54-CT3</td>
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**G3ZA Connecting Cable**

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>5 m</td>
<td>EJ1C-CBLA050</td>
</tr>
</tbody>
</table>

**USB-Serial Conversion Cable**

<table>
<thead>
<tr>
<th>Model</th>
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<tbody>
<tr>
<td>E58-CIFQ1</td>
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</table>

**Rail Mounting Equipment**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
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<tbody>
<tr>
<td>Mounting Rail</td>
<td>PFP-100N, PFP-50N</td>
</tr>
</tbody>
</table>

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.

### CX-Thermo Support Software Ver. 4.1

**Model**

<table>
<thead>
<tr>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>EST2-2C-MV4</td>
</tr>
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</table>

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