

# DeviceNet Communications Unit E5ZN-DRT

## Streamlined Communications from Temperature Controller to PLC

- The E5ZN Modular Temperature Controller is connected to the DeviceNet network.
- The I/O link function allows setting and monitoring (e.g., of present values) for the E5ZN Modular Temperature Controller to be performed without communications programming.
- Up to 16 E5ZN Modular Temperature Controllers can be connected to one Unit.
- All the parameters for the E5ZN can be uploaded or downloaded in one operation using DeviceNet Configurator.

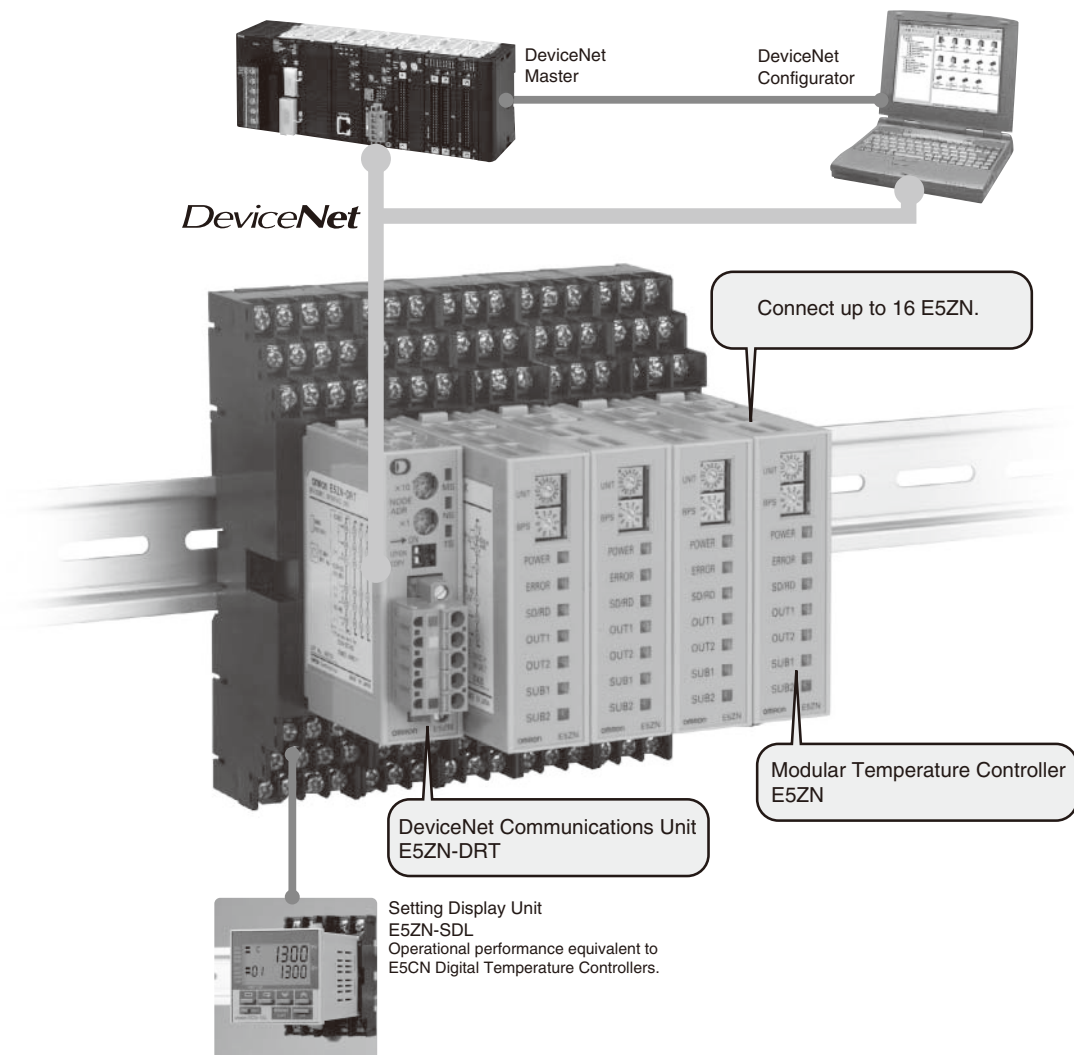


Refer to *Safety Precautions for All Temperature Controllers*.



## Features

### DeviceNet Communications Unit Enables Program-free Communications with Temperature Controllers

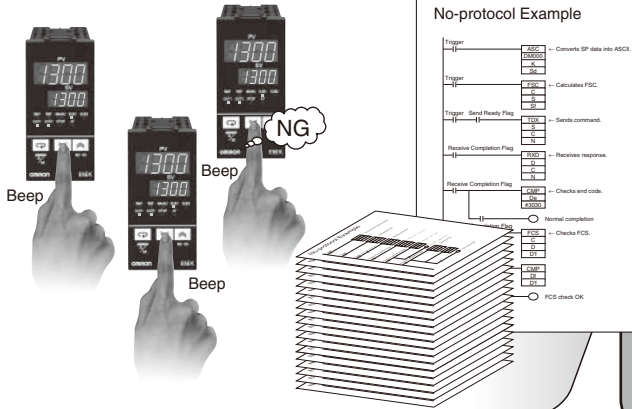


# Features

## Startup Time Is Six Times Faster and No Communications Programs Are Needed

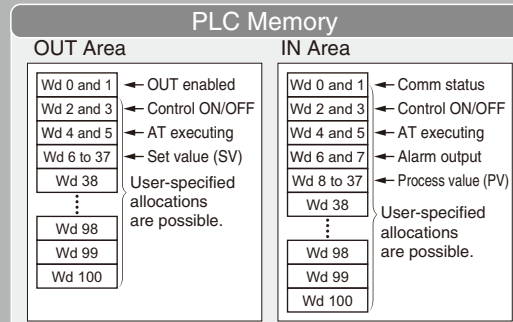
Previously, a time-consuming process of creating communications programs, debugging, and checking operations was required for the Temperature Controller to communicate with the PLC.

- For example, setting 10 Units required 60 minutes.
- Incorrect inputs were a concern.
- Separate debugging for each Unit was needed.



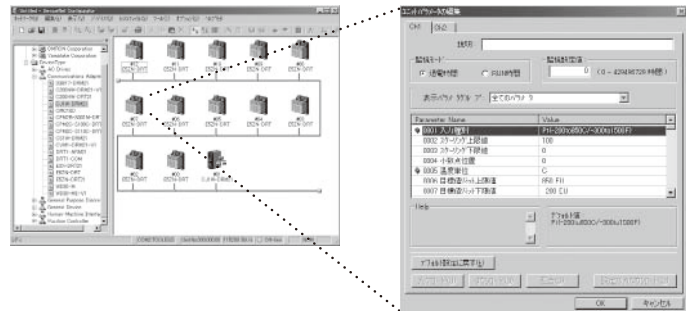
DeviceNet Communications Units enable high-speed data communications by allocating settings and monitoring parameters in the PLCs I/O Memory Area, contributing to greater reductions in the time required for communications program development.

- For example, set 10 Units in 10 minutes.
- Batch download using the personal computer.
- Debugging is easy using the personal computer.



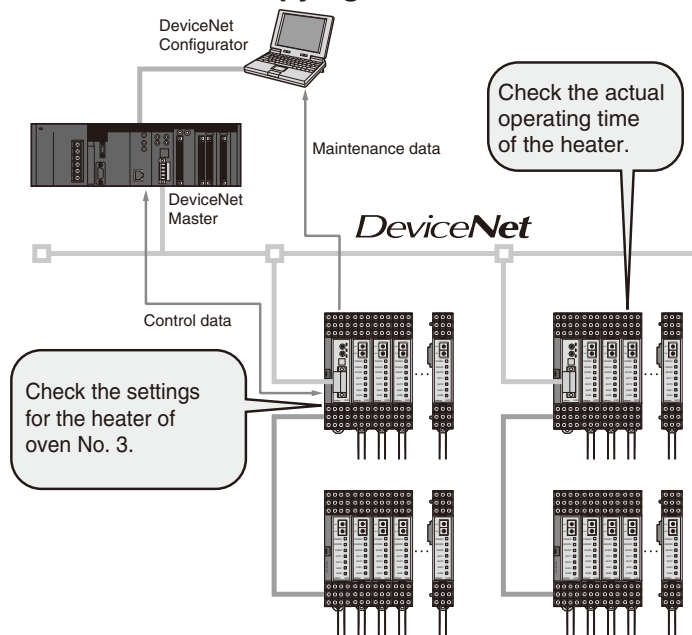
## Manage All E5ZN Together from the DeviceNet Configurator

Use the DeviceNet Configurator for E5ZN initial settings and temperature control wiring to enable immediate execution.



## Improved Maintenance with Monitoring, Comment, and Copying Functions

- Measure the heater control time (RUN time monitor) to manage heater life expectancy.
- Monitor supply voltages, such as those for Temperature Controller and Communications Unit power supplies, and network power supplies.
- User-specified names can be set for each heater and Communications Unit, enabling the location of errors to be checked quickly.
- Upload/download Temperature Controller parameters to the Communications Unit. This shortens the time required to replace Temperature Controllers.



## Model Number Structure

### ■ Model Number Legend

**E5ZN-DRT**  
 1. DRT: DeviceNet communications

## Ordering Information

### ■ List of Models

Name	External input power supply voltage	Applicable Temperature Controller	Model
DeviceNet Communications Unit	24 VDC	E5ZN	E5ZN-DRT
Terminal Unit			E5ZN-SCT24S

**Note:** A DeviceNet Communications Unit and Terminal Unit are required to connect to DeviceNet. Two End Plates are provided with E5ZN-SCT24S Terminal Units. When mounting to a DIN track, be sure to mount End Plates on both sides.

## Specifications

### ■ Ratings

<b>Power supply voltage</b>	<b>DeviceNet</b>	24 VDC (for internal circuits)
	<b>External input power supply</b>	24 VDC (for RS-485 communications circuits and Temperature Controllers)
<b>Allowable voltage range</b>	<b>DeviceNet</b>	11 to 25 VDC
	<b>External input power supply</b>	20.4 to 26.4 VDC
<b>Power consumption</b> (See note 2.)	<b>DeviceNet</b>	Approx. 1.1 W (for a current of 45 mA at 24 VDC)
	<b>External input power supply</b>	Approx. 0.5 W (for a current of 20 mA at 24 VDC)
<b>Connectable Temperature Controllers</b>		E5ZN Series
<b>Maximum number of connectable Temperature Controllers</b>		16
<b>Ambient operating temperature</b>		-10 to 55°C (with no icing or condensation)
<b>Ambient operating humidity</b>		25% to 85%
<b>Ambient storage temperature</b>		-25 to 65°C (with no icing or condensation)

**Note:** 1. Do not use an inverter output as the power supply. (Refer to *Safety Precautions for All Temperature Controllers*.)

2. The power consumption for the Temperature Controllers is not included.

## ■ Characteristics

<b>Insulation resistance</b>	20 MΩ min. (at 100 VDC)	
<b>Dielectric strength</b>	500 VAC, 50/60 Hz for 1 min between the DIN track and all DeviceNet connector terminals and between the DIN track and all terminal socket terminals	
<b>Vibration resistance</b>	10 to 55 Hz, 10 m/s <sup>2</sup> for 2 hrs each in ±X, ±Y, and ±Z directions	
<b>Shock resistance</b>	150 m/s <sup>2</sup> , 3 times each in ±X, ±Y, and ±Z directions	
<b>Weight</b>	100 g max.	
<b>Safety standards</b>	cULus508	
	EMS:	Electrostatic Discharge (ESD) EN61006-2, EN61000-4-2 (4 kV/contact, 8 kV/air) Radiated Electromagnetic Fields EN61006-2, EN61000-4-3 (10 V/m) Electrical Fast transients/BURST EN61006-2, EN61000-4-4 (2 kV/DC power-line, 1 kV/Signal-line) Surge Transients EN61006-2, EN61000-4-5 (line to ground : 1 kV/DC power-line : 2 kV/Signal-line line to line : 0.5 kV/DC power-line)
	EMI:	Conducted Disturbances EN61006-2, EN61000-4-6 (10 V) Radiated Emissions (electric field) EN50081-2 Class A

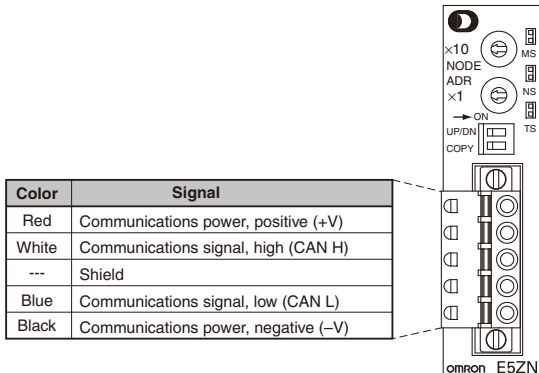
## ■ Communications (for Temperature Controller Expansion)

<b>Transmission line connection method</b>	RS-485 multipoint
<b>Communications method</b>	RS-485 (2-wire, half-duplex)
<b>Synchronization method</b>	Start-stop synchronization
<b>Baud rate</b>	38,400 bps
<b>Transmission code</b>	ASCII
<b>Data bit length</b>	7 bits
<b>Stop bit length</b>	2 bits
<b>Error detection</b>	Vertical parity (even) BCC (block check character)
<b>Flow control</b>	None
<b>Number of Units that can be connected in parallel</b>	16 Units max. (32 channels)

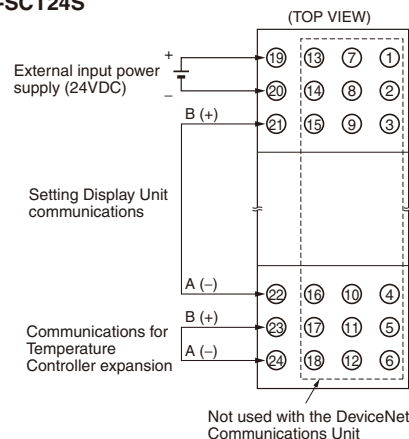
## Connections

### ■ Terminal Arrangement

E5ZN-DRT

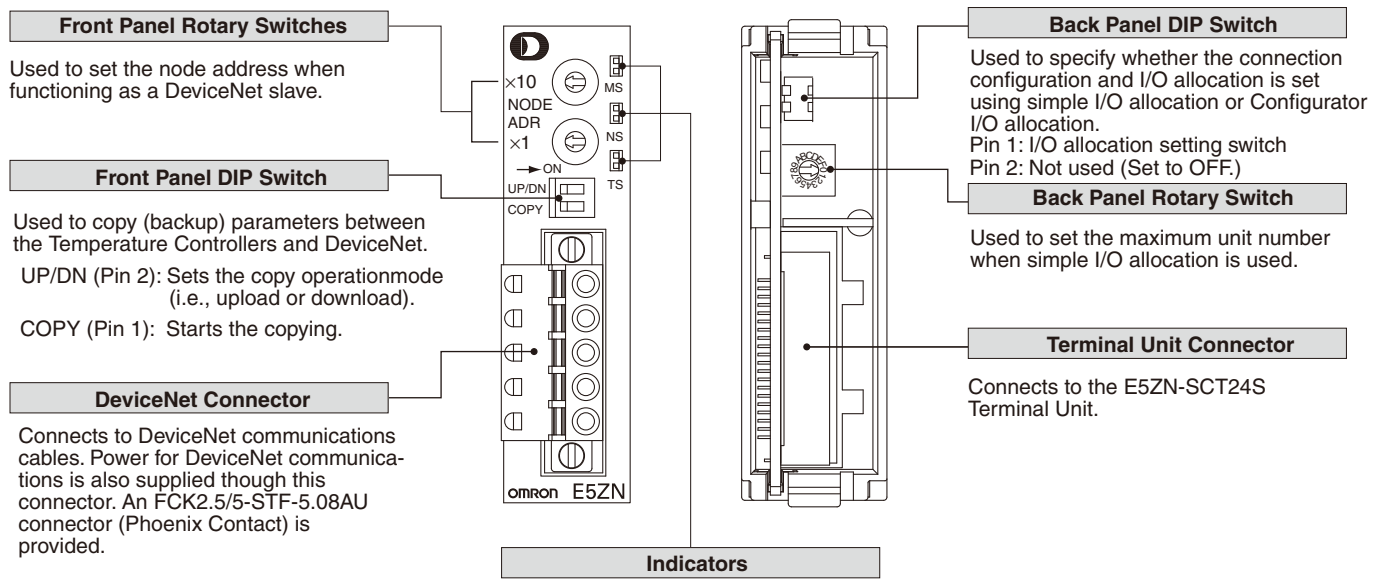


E5ZN-SCT24S



# Nomenclature

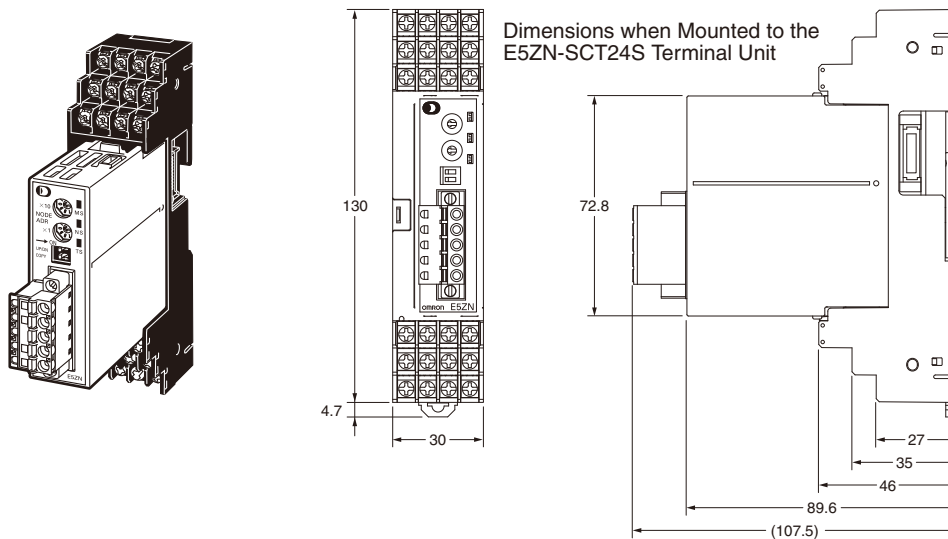
## E5ZN-DRT



# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

## E5ZN-DRT



**Note:** Be sure to read the precautions for correct use and other precautions in the following user's manuals before using the Communications Unit.  
E5ZN-DRT DeviceNet Communications Unit Operation Manual (Cat. No. H119)  
DeviceNet Operation Manual (Cat. No. W267)

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.  
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

# Safety Precautions for All Temperature Controllers

Refer to the precautions of individual product for more specific details.

## Warning

The following products contain lithium batteries. Do not disassemble, deform under pressure, heat to over 100°C, or incinerate these products. The lithium battery may ignite or explode. Applicable models: E5ZE, E5LD, and E5LC.



## Caution

Do not touch any of the terminals while the power is being supplied. Doing so may result in electric shock.



Do not allow pieces of metal or wire cuttings to get inside the Temperature Controller. Doing so may result in electric shock, fire, or malfunction.



Do not attempt to disassemble, repair, or modify the Temperature Controller. Any attempt to do so may result in electric shock, fire, or malfunction.



Do not use the Temperature Controller in locations subject to flammable or explosive gases. Doing so may result in an explosion.



The switching capacity and switching conditions will significantly affect the longevity of the output relays. Use the Temperature Controller within the rated load, and do not use the Temperature Controller beyond the number of operations specified under electrical life. Using the Temperature Controller beyond its electrical life may result in contact welding or burning.



Use Temperature Controller settings that are appropriate for the controlled system. Failure to do so may cause unexpected operation resulting in damage to equipment or personal injury.



Prepare a circuit with an overheating prevention alarm and implement other safety measures to ensure safe operation in the event of a malfunction. Loss of operational control due to malfunction may result in a serious accident.



Tighten the terminal screws to the following torque:

- M3.5 screws: 0.74 to 0.90 N·m
- M3 screws: 0.40 to 0.56 N·m
- E5GN: Terminals 1 to 6: 0.23 to 0.25 N·m
- Terminals 7 to 9: 0.12 to 0.14 N·m



Failure to tighten terminal screws to the correct torque may result in fire or malfunction.

Make sure there will be no adverse affects from the device connected to the Temperature Controller before using the hardware test mode. Devices connected to the Temperature Controller may reach a dangerous state during the test.



## Operating Environment Precautions

1. Do not use the Temperature Controller in the following locations:
  - Locations exposed to radiated heat from heating devices
  - Locations subject to exposure to water or oil
  - Locations subject to direct sunlight
  - Locations subject to dust or corrosive gases (in particular, sulfide gas and ammonia gas)
  - Locations subject to severe changes in temperature
  - Locations subject to icing or condensation
  - Locations subject to excessive shock or vibration
2. Use and store the Temperature Controller within the rated temperature or humidity range specified for each model. When two or more Temperature Controllers are mounted horizontally close to each other or vertically next to one another, the internal temperature will increase due to the heat they radiate and the service life of the products will decrease. In such cases, forced cooling by fans or other means of air ventilation will be required to cool down the Temperature Controllers.
3. Allow enough space around the Temperature Controller to ensure proper heat dissipation. Do not block the ventilating holes.
4. Be sure to wire properly with correct polarity of terminals.
5. To wire the E5AN, E5EN, or E5CN using crimp terminals, use crimp terminals designed for M3.5 screws and with a width of 7.2 mm max.



6. When wiring the E5GN, use a cable gauge of AWG24 (0.205 mm<sup>2</sup>) to AWG14 (2.081 mm<sup>2</sup>) for terminals 1 to 6, and use a cable gauge of AWG28 (0.081 mm<sup>2</sup>) to AWG22 (0.326 mm<sup>2</sup>) for terminals 7 to 9. The exposed current-carrying part to be inserted into terminals must be 5 to 6 mm.
7. After wiring is completed, do not pull on or bend a terminal block lead wire with a force of 30 N or higher.
8. Do not connect anything to unused terminals.
9. Make sure that the power supply voltages and loads are within specification and rating ranges before using the Temperature Controller.
10. To avoid inductive noise, keep the wiring for the Temperature Controller's terminal board away from power cables carrying high voltages or large currents. Also, do not wire power lines together with or parallel to Temperature Controller wiring. Using shielded cables to separate pipes and ducts is recommended. Attach surge absorbers or noise filters to peripheral devices that generate noise (e.g., motors, transformers, solenoids, magnetic coils, or other equipment that has an inductance element). If using a noise filter with the power supply, be sure to confirm the voltage and the current, and then mount the power supply as near as possible to the Temperature Controller. Set up the Temperature Controller, along with its power supply, as far away as possible from devices that generate strong, high-frequency waves, such as high-frequency welders and high-frequency machines, and from devices that generate surges.
11. Make sure that the rated voltage is attained within two seconds of turning the power ON.
12. Allow at least 30 seconds for the Temperature Controller to warm up.
13. When using self-tuning, turn ON power for the load (e.g., heater) at the same time as or before supplying power to the Temperature Controller. If 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.

## Precautions for Correct Use

14. In order that power can be turned OFF in an emergency by the person operating the Temperature Controller, install the appropriate switches and circuit breakers, and label them accordingly.
15. Turn OFF the power before drawing out the Temperature Controller body. Do not touch or apply excessive force to the terminals or electronic parts. When inserting the body, make sure that electronic parts do not come in contact with the case.
16. When the terminal block for the E5GN is detached, do not touch or apply excessive force to any electronic parts.
17. Use alcohol to clean the Temperature Controller. Do not use thinner or other solvent-based substances.
18. Inverters with an output frequency of 50/60 Hz are available, but they may cause the internal temperature of Temperature Controller to rise, possibly resulting in smoke or burning. Do not use an inverter output to supply power to a Temperature Controller.

### ● Service Life

1. Use the Temperature Controller within the specified temperature and humidity ranges. If the product is installed inside a control panel, the temperature around the Temperature Controller and not the temperature around the control panel must be kept within the specified temperature range.
2. The service life of electronic devices such as Temperature Controllers is determined not only by the number of switching operations performed by the relay, but also by the service life of the internal electronic components. The service life of these components depends on the ambient temperature: it will be shorter if the ambient temperature is high and longer if the ambient temperature is low. For this reason, the service life of the product can be extended by keeping the internal temperature of the Temperature Controller low.
3. If several Temperature Controllers are mounted side-by-side or are arranged vertically, the heat generated by them may cause the internal temperature of the products to rise, thus reducing their service life. To prevent this, take steps to ensure that the Temperature Controllers are cooled, such as installing fans. When providing forced cooling, however, be careful not to cool down the terminal sections alone to avoid measurement errors.

### ● Measurement Accuracy

1. When extending the lead wires for thermocouples, use a compensating conductor appropriate for the type of thermocouple use.
2. When extending the lead wires for platinum resistance thermometers, use lead wires with low resistance, and make the resistance in the 3 lead wires equal.
3. The type of Temperature Sensor and the input type for the Temperature Controller must be set the same.
4. There are two types of platinum resistance thermometers: Pt and JPt. Accurate measurement will not be possible if the input type for the Temperature Sensor is not set correctly.
5. Mount the Temperature Controller horizontally.
6. If significant errors occur, check to see if the input shift has been set correctly.

### ● Waterproofing

Sections without any specification on their degree of protection or those with IP□0 specifications are not waterproof.

### ● EN/IEC Compliance

Installing the following fuse in the power supply terminal block is recommended if the Temperature Controller is used in applications requiring EN/IEC compliance.

Recommended fuse: A T2A, 250-VAC, time lag fuse with low breaking capacity

### ● Operating Precautions

1. It takes approximately five seconds for the outputs to turn ON from the moment the power is turned ON. Due consideration must be given to this time when incorporating Temperature Controllers in a sequence circuit.
2. When using the self-tuning capability of the E5□N, E5□K, or E5□J, supply power to the load (e.g., heater) at the same time as or before supplying power to the Temperature Controller. If 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. When starting operation after the Temperature Controller has warmed up, turn OFF the power and then turn it ON again at the same time as turning ON power for the load. (Instead of turning the Temperature Controller OFF and ON again, switching from STOP mode to RUN mode can also be used in this case.)
3. The reception of the Temperature Controller may be affected if it is used close to radios, television sets or wireless devices.

## Parameter Displays

The following displays are used to represent the characters for parameter names on the Temperature Controller.

● Seven-segment Digital Display

A	b	C	d	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

● Eleven-segment Digital Display

A	b	C	d	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

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