

# SECTION 1

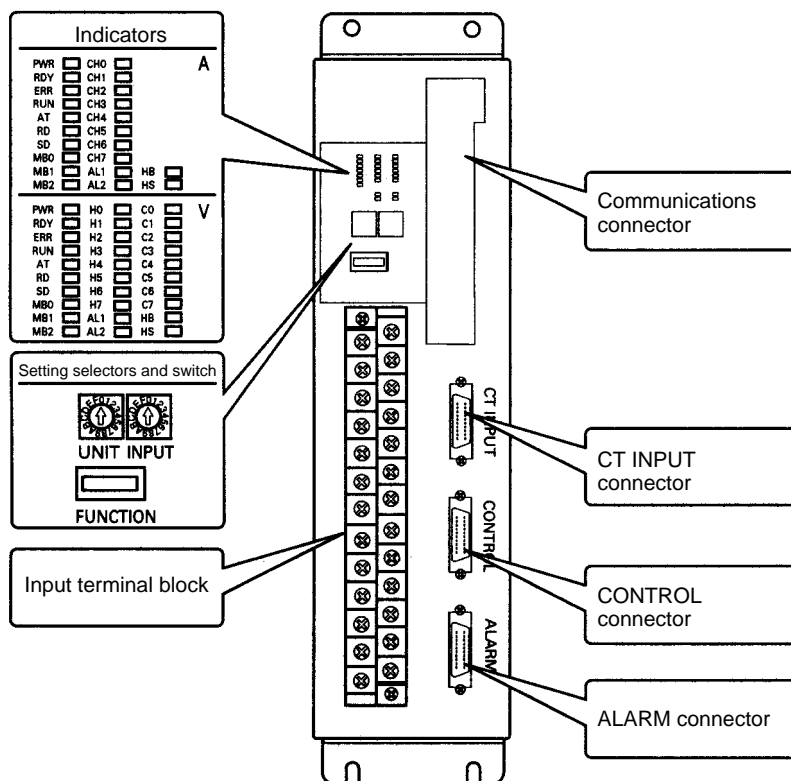
## Introduction

This section describes the components, a standard system configuration, and the functions of the E5ZE. Refer to *Section 2 Preparations* and later sections for details on functions and their applications.

- 1-1 Component Names and Functions .....
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## 1-1 Component Names and Functions

The component names and their functions are provided here. The positions of components on the E5ZE-8□□□□-E (without casing) are the same as in the following.



Indicators

A: E5ZE-8A□□□□B (Standard Models with casing)

V: E5ZE-8V□□□□B (Heating and Cooling Control Models with casing)

### Indicators

The indicators show the operating status of the E5ZE, as follows:

**PWR:** Lit when power is ON.

**RDY:** Lit when the E5ZE is ready to operate.

**ERR:** Lit when an error occurs in the E5ZE.

**RUN:** Lit when the E5ZE is operating.

**AT:** Lit when auto-tuning is being executed.

**RD:** Lit when the E5ZE is receiving command data.

**SD:** Lit when the E5ZE is sending response data.

#### CH0 to CH7:

Lit for the control points for which the corresponding control outputs are ON.  
(Not lit for Current Output Models.)

#### H0 to H7:

Lit for the control points for which the corresponding heating outputs are ON.  
(Not lit for Current Output Models.)

#### C0 to C7:

Lit for the control points for which the corresponding cooling outputs are ON.

**AL1:** Lit when alarm 1 is ON.

**AL2:** Lit when alarm 2 is ON.

**HB:** Lit when the HB (heater burnout) alarm is ON.

**HS:** Lit when the HS alarm (SSR short circuit) is ON.

**MB0 to MB2:**

Lit when the memory bank designation inputs (bits 2<sup>0</sup> to 2<sup>2</sup>) are turned ON with external contacts.

**Setting Selectors and Switch**

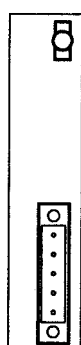
The setting selectors and switch are used to select the temperature sensor type, the unit number, and the functions to be used with the E5ZE. Refer to 2-3 *Setting Selectors and Switch* for details on setting methods.

**Input Terminal Block**

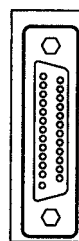
The input terminal block is connected to a DC power supply, temperature sensor, and ground wire. Refer to 2-5 *Power Supply and Input Wiring* for details on wiring procedures.

**Communications Connector**

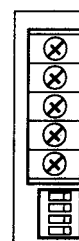
The communications connector is connected to the communications cable. Refer to the *E5ZE Multipoint Temperature Controller Communications Manual (H77)* or the *E5ZE-8 Multipoint Temperature Controller CompoBus/D Communications Manual (H104)* for details on communications functions and their applications.



E5ZE-8□□□D1□B  
(for CompoBus/D communications)



E53-E01  
(for RS-232C Communications Unit)



E53-E04  
(for RS-422/485 Communications Unit)

**CT INPUT Connector**

The CT INPUT connector is connected to the Current Transformer (CT) to detect heater burnout or SSR failure. Use E5ZE-CBL□□□ Connecting Cables to connect to the Connector Terminal Conversion Unit (XW2B-20G5 for M3.5 terminal screws or XW2B-20G4 for M2.4 terminal screws). Refer to 2-6 *Wiring CT Inputs and Control/Alarm Outputs* for details on wiring procedures.

**CONTROL Connector**

The CONTROL connector is used to connect the control output and memory bank designation input contacts. Use E5ZE-CBL□□□ Connecting Cables to connect to the Connector Terminal Conversion Unit (XW2B-20G5 for M3.5 terminal screws or XW2B-20G4 for M2.4 terminal screws). Refer to 2-6 *Wiring CT Inputs and Control/Alarm Outputs* for details on wiring procedures.

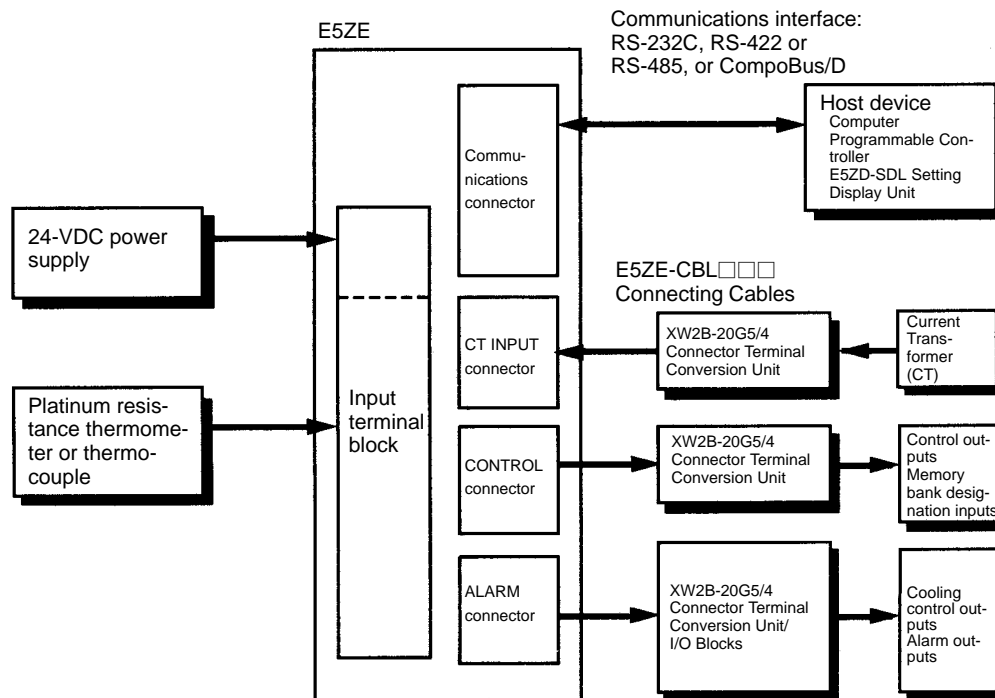
**ALARM Connector**

The ALARM connector for the E5ZE-8A□□□□□ Standard Models is used for an alarm output and that for the E5ZE-8V□□□□□ Heating and Cooling Control Models is used for cooling control output and alarm output. Use E5ZE-CBL-□□□ Connecting Cables to connect to the following devices.

| Device                              | Model     | Specifications                       |
|-------------------------------------|-----------|--------------------------------------|
| Connector Terminal Conversion Units | XW2B-20G4 | M2.4 terminal screws                 |
|                                     | XW2B-20G5 | M3.5 terminal screws                 |
| I/O Blocks                          | G7TC-OC08 | 8 relay outputs (no cooling outputs) |
|                                     | G7TC-OC16 | 16 relay outputs                     |
|                                     | G7VC-OC16 | 16 relay outputs                     |
|                                     | G7VC-OA16 | 16 SSR AC outputs                    |
|                                     | G7VC-OD16 | 16 SSR DC outputs                    |

## 1-2 System Configuration

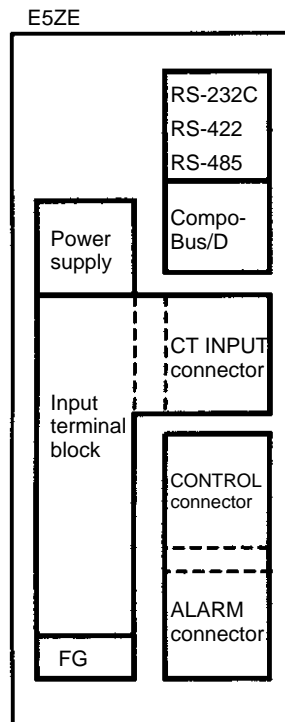
The following diagram shows the system configuration of the E5ZE.



Use the specified cables and wiring devices to prevent malfunctions or accidents caused by incorrect wiring.

- The connection between the communications connector and the host device differs according to the communications interface used. Refer to the *E5ZE Multipoint Temperature Controller Communications Manual (H77)* or the *E5ZE-8 Multipoint Temperature Controller CompoBus/D Communications Manual (H104)* for details.
- There are restrictions on the items that can be set or displayed from the E5ZD-SDL Setting Display Unit. Refer to the *E5ZD-SDL Setting Display Unit Data-sheet (H61)* for details.

## Isolation



The components of the E5ZE contained within bold lines in the above diagram are electrically isolated.

**Note** The covers of the CT INPUT, CONTROL, and ALARM connectors are connected to the frame ground (FG).

For the E5ZE-8□□□□TC□ (Thermocouple Input Models), the thermocouple inputs of the control points are insulated from each other.

## 1-3 Main Functions

### Input Type

The E5ZE is connected to platinum resistance thermometers or thermocouples, depending on the model used. The type of temperature sensor is specified using the INPUT selector on the front panel of the Unit. The input values can be adjusted using the input adjustment function.

### CONTROL Outputs

The control outputs can be either voltage output or current output, depending on the model. The control period and direct/reverse operation can be specified using the set values.

### ALARM Outputs

A maximum of 2 alarm outputs are possible. There are 12 alarm modes that can be set for each alarm output according to set values. The outputs are comprehensive output for all control points.

### Output Limitations

The output values are limited by the following 2 limiters:

- Output limiter
- Output change rate limiter

If an output value is outside the upper or lower limit for the output, the output will be limited to the preset upper or lower limit. The output change rate limiter limits the rate at which output values change per unit time.

### Ramp

The ramp function is used to limit the control temperature (set point) from changing rapidly. If the set point changes quicker than the preset rate, the rate of temperature change will be limited to the preset rate, and the temperature will gradually change until it reaches the new temperature. The ramp can be set by the user.

|   |   |
|---|---|
| <b>Control Adjustment</b>                       | PID and fuzzy constants can be set by executing auto-tuning (AT). If an offset occurs during P or PD control, manual adjustment is possible using the manual reset function. Temperature turbulence caused by external disturbances can be suppressed and controlled using the fuzzy function.  |
| <b>Heater Burnout and SSR Failure Detection</b> | Output short circuits caused by heater burnout or SSR failure can be detected.  |
| <b>Control Method Selection</b>                 | Control can be switched between ON/OFF control and the normal 2-PID control (with 2 degrees of freedom). Manual operation is also possible.   |
| <b>Memory Banks</b>                             | The memory banks store different sets of set values for the control points. There are 8 memory banks for each control point. Memory banks allow the set values for a control point to be changed as a group rather than resetting them individually. Use the external contact inputs or communications to designate the required memory bank. |

## 1-4 E5ZE without Casing

If an E5ZE-8□□□□□-E Temperature Controller (without casing) is being used, static electricity may be generated. Observe the following precautions when handling the E5ZE-8□□□□□.

- Unpack the Unit on a grounded conductive mat.
- Wrap the Unit in the anti-static mat provided when transporting or storing it.
- Handle the Unit's printed circuit board only by the edges.
- Do not touch the electrical components or printed pattern of the printed circuit board.
- Wrap the Unit in the anti-static mat when not using it.
- Use only the anti-static mat provided to wrap the Unit. Do not use other materials, such as vinyl or polyethylene.