

Appendix E

Hardware Test

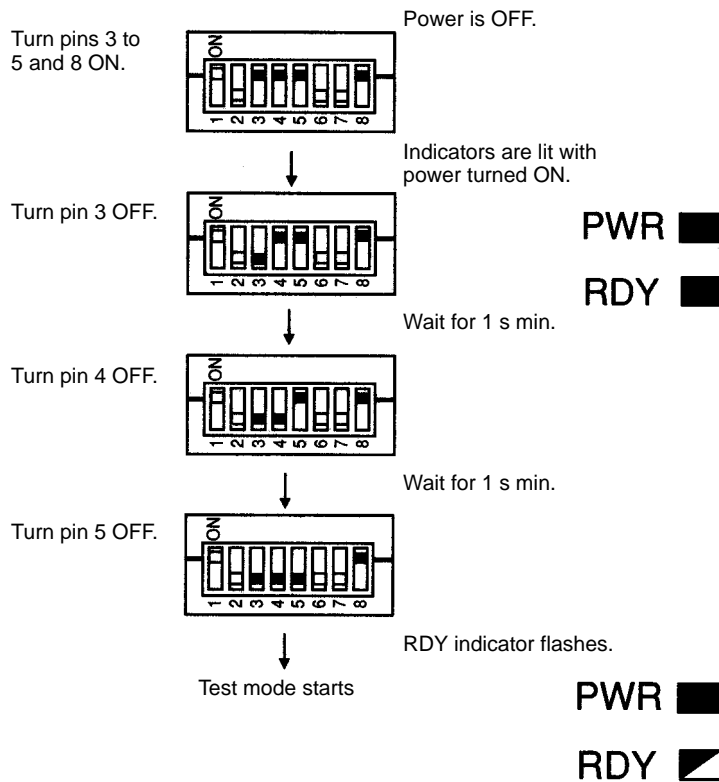
If Peripheral Devices are connected to an E5ZE in a system without a host device connection, the hardware test function of the E5ZE makes it possible to check whether the Peripheral Devices are connected properly.

The following tests can be performed with the hardware test function.

- E5ZE self-communications test (loop-back test)
- Memory bank designation input (MB0 to MB2) test
- Control output test and alarm output test
- Temperature sensor input test
- Current Transformer (CT) input test

Hardware Test Mode

Set the FUNCTION switch pins according to the following diagram, so that the E5ZE will be in hardware test mode.



Test Item Selection

After the E5ZE is in hardware test mode, select the tests to be performed using the FUNCTION switch, as shown in the following table.

Test	FUNCTION switch				Test check- ing indica- tor	Commu- nications path
	Pin 3	Pin 4	Pin 5	Pin 8		
Commu- nications test	OFF	OFF	OFF	ON	None	Connected
Memory bank desig- nation input	OFF	OFF	OFF	ON		Not connected
Control out- put and alarm output	ON	OFF	OFF	ON	MB0 lit	
Temperature sensor input	OFF	ON	OFF	ON	MB1 lit	
CT input	OFF	OFF	ON	ON	MB2 lit	

Temperature Sensor Input Test

- In this test, if a temperature sensor is correctly connected to a control point, the control output indicator (CH0 to CH7 or H0 to H7) corresponding to the control point will be lit.
- If the control indicator is not lit, recheck the wiring connecting the E5ZE to the temperature sensor. The cause of the indicator not lighting may be as follows:

Thermocouple:

A lead of the temperature sensor is disconnected or incorrectly wired.

Platinum resistance thermometer:

A lead of the temperature sensor is disconnected or incorrectly wired or the A and B terminals of the temperature sensor are short-circuited.

Procedure

- 1, 2, 3...** 1. While in hardware test mode, set pins 4 and 8 of the FUNCTION switch to OFF.
2. Make sure that the MB0 indicator is lit.
3. Set the INPUT selector according to the temperature sensor connected to the control point.
4. Make sure that the control output indicators corresponding to each of the control points are lit.

Memory Bank Designation Input Test

If a contact connecting a memory bank designation input is ON, the MB designation input indicator (MB0 to MB2) corresponding to the contact will be lit. If the MB designation input indicator is not lit, check that the input is wired correctly.

Procedure

- 1, 2, 3...** 1. While in hardware test mode, set pin 8 of the FUNCTION switch to ON.
2. Turn ON or OFF the contact corresponding to the memory bank designation input.
3. Make sure that the MB designation input indicator corresponding to the contact that is ON is lit.

Control Output and Alarm Output Test

In this test, a control output or alarm output is turned ON (100% output) and the indicator for the output will light. Depending on the wiring, an output may be unintentionally produced for the wrong control point. Make sure that any output that is ON will not affect the object being controlled when performing this test.

Procedure

- 1, 2, 3... 1. While in hardware test mode, set the UNIT or INPUT selector of the E5ZE so that the control output or alarm output will be ON. The relationship between the selectors and the outputs is shown in the following tables.

UNIT Selector

Set value	Output to be turned ON
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	Alarm 1
9	Alarm 2
A	HB alarm
B	HS alarm
C	Temperature controller error
D	None
E	
F	

} Control points

INPUT Selector

Set value	Output to be turned ON
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	None
9	
A	
B	
C	
D	
E	
F	

} Cooling control points (See note.)

Note Outputs will not turn ON if an E5ZE-8□□□□ Standard Model is being used.

2. Set pins 3 and 8 of the FUNCTION switch to ON.

3. Check if the output is ON, the MB0 indicator is lit, and the indicator corresponding to the output is lit. (The control output indicator is lit even if the E5ZE is a Current Output Model.)
4. To change the output to be turned ON, set with the UNIT or INPUT selector after setting pins 3 and 8 of the FUNCTION switch to OFF.

Current Transformer (CT) Input Test

The CT input test can be performed when a model with heater burnout detection and SSR failure detection is being used.

The carry current and leakage current of a control point that is measured using CT input are displayed as bar graphs by using the E5ZE indicators.

The carry current is the CT input measurement when the control output is turned ON. The leakage current is the CT input measurement when the control output is turned OFF.

If the leakage current bar graph is displayed, and the current bar graph indicates a value very different from the heater’s rated value, check the selector, switch settings and the wiring.

Procedure

- 1, 2, 3...
1. While in hardware test mode, set the control point to be measured and the type of current with the UNIT selector.

UNIT Selector

Set value	Control point to be measured
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	0
9	1
A	2
B	3
C	4
D	5
E	6
F	7

Carry current measurement

Leakage current measurement

2. Set pins 5 and 8 of the FUNCTION switch to ON.
3. Check that the MB2 indicator is lit.
- The CT input measurement value of the selected control point will be displayed as a bar graph using the indicators, as follows:

PWR

RDY

MB2

45 A min.

40 A min.

35 A min.

30 A min.

25 A min.

20 A min.

15 A min.

10 A min.

5 A min.

1 A min.

The second row of indicators will be lit for the bar graph display.

Lit

Flashing

4. To change the control point to be measured, set pins 5 and 8 of the FUNCTION switch to OFF and reset the UNIT selector.

Communications Test

The communications test can be performed when an RS-232C Communications Model or RS-422/RS-485 Communications Model is being used.

The E5ZE can transmit and receive data to check its communications circuit by self-diagnosis (loop-back test). The E5ZE transmits the following character string repeatedly for the communications test. “_” represents a space and “[CR]” represents a carriage return.

E5ZE_Copyright_1995_OMRON_Corporation[CR]

Procedure

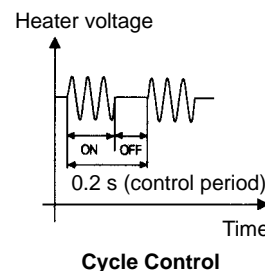
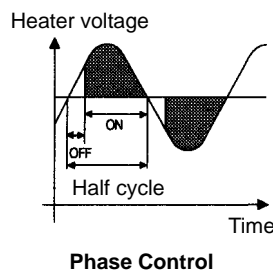
- 1, 2, 3... 1. While in hardware test mode, set pin 8 of the FUNCTION switch to ON.
2. Short-circuit the send data and receive data at the E5ZE when RS-232C or RS-422 communications are being used, as follows:

Communications interface	RS-232C	RS-422
Short-circuit locations	Communications connector: Pins 2 and 3	Communications terminal block: Terminals 5 and 2 Terminals 1 and 4

3. Make sure that the SD or RD indicator is lit. The following indicate a communications error:
 - The SD and RD indicators are not lit.
 - The ERR indicator is lit.
 If MB0, MB1, or MB2 is lit, this does not indicate an error.

Current Output

The E5ZE Current Output Model can be connected to a Power Controller or a Cycle Control Unit to enable more accurate temperature control.



Phase Control

Phase control is possible when a Current Control Model is used in combination with the G3PX Power Controller. Phase control will enable highly-precise temperature control and prolongs the life of the heaters connected to the E5ZE.

Cycle Control

Cycle control is possible when a Current Control Model is used in combination with the G32A-EA Cycle Control Unit and a G3PA or G3NH SSR.

Cycle control will enable high-speed response with minimal noise generation.

The relationship between the output values and current output values of the Current Output Model are as follows:

Control Output

Output value: 0% to 100%

Current output value: $4^{+0}_{-0.6}$ to 20^{+2}_{-0} mA

Output with Control Interrupted

Output value: 0%

Current output value: $4^{+0}_{-0.6}$ mA

Output with Control Interrupted by Error

Output with Temperature Controller error

Output value: -16%

Current output value: 1 ± 0.5 mA