

# Chapter 8

## Troubleshooting

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This chapter explains equipment trouble and how to remedy it. When trouble is detected by one of the self-check features, the trouble is displayed on the instrumentation panel display and a trouble buzzer is sounded. For trouble undetected in self-checks and misoperation which can be easily mistaken as trouble, see "8.2 Before You Call for Service".

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## 8.1 Alarm and Action

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 **DANGER**

- **ELECTRIC SHOCK! Before working on the power circuits on the primary side of the main power switch (leakage breaker), shut OFF primary power supply and check the line is dead. Also, take measures to prevent accidental charging.**

Working with primary power supply ON runs the risk of electric shock.

- **Shut OFF power from the main power switch BEFORE detaching the electric parts compartment door.**

The Compact Ultra Low Temperature Chamber is equipped with a buzzer that sounds when detects trouble as well as self-check features which display the trouble on the instrumentation panel display. Displayed alarm codes and their content are given in the alarm table on the following pages. Remedy trouble as described therein.

For trouble which is undetected in self-checks, see "8.2 Before You Call for Service". If the trouble cannot be remedied after taking the prescribed action, contact the place of purchase or ESPEC CORP.

### 1st and 2nd Degree Alarms

Detectable trouble is manifested either as 1st or 2nd degree alarms. They are defined as follows.

1st degree alarm: Even after the cause of the trouble has been eliminated, control is NOT automatically restored. The trouble state must be cleared in accordance with the displayed alarm code and the system restarted.

2nd degree alarm: As soon as the cause of the trouble has been eliminated, control is automatically restored. However, the alarm code will be displayed indefinitely until one of the keys is pressed.

## Clearing Alarms

This section explains how to deal with trouble that trips one of the chamber's self-checks. The buzzer can be silenced by pressing any of the keys, but follow the below procedure as best possible.

### ■ When a 1st Degree Alarm Occurs

- Procedure**
1. Press either the  or  keys to silence the buzzer.
  2. Check the alarm code (AL × ×) on the display.
  3. If the chamber is running, press the **OPER./STOP** key to stop the chamber.
  4. If control power is ON, press the **POWER** key to shut OFF power to the instrumentation.
  5. Set the main power switch in the OFF position.
  6. Remedy the trouble as explained in the Alarm Tables on the following pages.
  7. To resume operation, set the main power switch in the ON position, press the **POWER** key and then press the **OPER./STOP** key in that order.

### ■ When a 2nd Degree Alarm Occurs

- Procedure** When the cause of the trouble persists
1. Check the alarm code (AL × ×) on the display.
  2. Press either the  or  keys to silence the buzzer.
  3. Remedy the trouble as explained in the Alarm Tables on the following pages. When the cause of the trouble has been cleared, normal control is automatically restored. The alarm code is cleared.

When the cause of the trouble has been eliminated

1. Check the alarm code (AL × ×) on the display.
2. Press either the  or  keys to silence the buzzer. The alarm code is cleared.

## Alarm Table

Table 8.1 Alarm table

Type	Displayed alarm code/channel code (option)	Trouble	Cause	Remedial action
1st	AL00 [CH0] [0]	The room temperature compensation input to the temperature controller was disconnected. The chamber has been stopped.	The sensor is loosely connected to the RTD terminal on the ES102C temperature controller board or there is an open circuit on the ES102C board.	Turn control power OFF from the <b>POWER</b> key and resume testing. If the same alarm occurs again, call for service.
1st	AL00 [CH1] [0]	The dry-bulb input to the temperature controller was disconnected. The chamber has been stopped.	The sensor is loosely connected to the CH1 terminal on the ES102C temperature controller board or there is an open circuit in the connected thermocouple.	Turn control power OFF from the <b>POWER</b> key and resume testing. If the same alarm occurs again, call for service.
2nd	AL01 [1]	The temperature inside the chamber has risen above the upper deviation limit. The heater has been stopped until temperature returns within range.	Either specimens inside the chamber are generating heat or the upper deviation limit is set too low.	Remove the heat-generating specimens and/or set the upper deviation limit about 10°C higher than the target temperature. When temperature returns within range, normal control is restored automatically. The alarm can be cleared by pressing the  or  key.
1st	AL02 [2]	The temperature inside the chamber has risen above the absolute high limit. The chamber has been stopped.	Either specimens inside the chamber are generating heat or the absolute high limit is set too low.	Turn control power OFF from the <b>POWER</b> key. Then, remove the heat-generating specimens and/or set the absolute high limit about 15°C higher than the target temperature. Resume testing. If the same alarm occurs again, call for service.

Cont.

Type	Displayed alarm code/channel code (option)	Trouble	Cause	Remedial action
1st	AL03 (3)	The temperature inside the chamber has dropped below the absolute low limit. The chamber has been stopped.	Possible causes include infiltrating of outside air, excessive cooling, the effects of cooling sources inside the chamber, and the absolute low limit being set too high.	Turn control power OFF from the <b>POWER</b> key and check the chamber door and cable port. Reset the refrigerator control setting. If cooling sources are overcooling the chamber, reduce their number. Also, correct the absolute low limit setting as necessary. Then, resume testing. If the same alarm occurs again, call for service.
1st	AL06 (6)	The temperature inside the chamber has risen above the overheat protector setting (instrumentation panel). The chamber has been stopped.	Either specimens inside the chamber are generating heat or the overheat protector is set too low.	Turn control power OFF from the <b>POWER</b> key. Remove the heat-generating specimens and/or correct the overheat protector setting. Resume testing. If the same alarm occurs again, it is possible that the thermal fuse has blown. Call for service.
1st	AL07 (7)	The built-in temperature switch of the air circulator motor (electric parts compartment) tripped because the motor is abnormally hot. The chamber has been stopped.	The air circulator motor is overloaded.	Leave the chamber OFF until the air circulator cools down. Then, turn control power ON from the <b>POWER</b> key and resume testing.
1st	AL08 (8)	The thermal relay tripped because refrigerator operating current was high. The chamber has been stopped.	Refrigerator operating current is over the specified level.	Turn control power OFF from the <b>POWER</b> key. Check if the condenser is clogged and reset the thermal relay manually. Resume testing. If the same alarm occurs again, call for service.
		The compressor temperature switch tripped because refrigerator surface temperature was high. The chamber has been stopped.	Refrigerator surface temperature is over the specified level.	Turn control power OFF from the <b>POWER</b> key. Check if the condenser is clogged. Correct as necessary and resume testing. If the same alarm occurs again, call for service.
		The thermal relay of the condenser fan motor tripped because fan operating current was high. The chamber has been stopped.	Condenser fan motor current is over the specified level.	Turn control power OFF from the <b>POWER</b> key. Check if the condenser is clogged and reset the thermal relay manually. Resume testing. If the same alarm occurs again, call for service.

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Type	Displayed alarm code/channel code (option)	Trouble	Cause	Remedial action
1st	AL 19 [19]	A reverse or open phase was detected in the 3 $\phi$ primary power supply connection. The chamber has been stopped.	Primary power supply is not correctly connected to the chamber.	An incorrect power supply can seriously affect chamber components. Set the main power switch (leakage breaker) in the OFF position, and check/correct primary power supply phase alignment and connections. Then, reactivate the system from the main power switch followed by the <b>POWER</b> key, and resume testing. If the same alarm occurs again, call for service.
1st	AL 99 [99]	The instrumentation detected system trouble in the display board. The chamber has been stopped.	Display board error (i.e.: internal memory, etc.)	Reactivate the system from the main power switch (leakage breaker) and resume testing. If the same alarm occurs again, call for service.
		The instrumentation detected system trouble in the CPU board. The chamber has been stopped.	Sequence task error on CPU board	Reactivate the system from the main power switch (leakage breaker) and resume testing. If the same alarm occurs again, call for service.
		The instrumentation detected system trouble in the CPU board. The chamber has been stopped.	Refrigeration task error on CPU board	Reactivate the system from the main power switch (leakage breaker) and resume testing. If the same alarm occurs again, call for service.
		The instrumentation detected system trouble in the CPU board. The chamber has been stopped.	Temperature control task error on CPU board	Reactivate the system from the main power switch (leakage breaker) and resume testing. If the same alarm occurs again, call for service.