

# Chapter 6 Troubleshooting

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 "6.2 Before You Call for Service".

## 6.1 Alarm and Action

### 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.**

Temperature (and humidity) chambers are 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 "6.2 Before You Call for Service ". If the trouble cannot be remedied after taking the prescribed action, contact the place of purchase or ESPEC CORP. (Call for service.)

### 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 ( $FL \times \times$ ) 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**
1. When the cause of the trouble persists
  2. Check the alarm code ( $FL \times \times$ ) on the display.
  3. Press either the  or  keys to silence the buzzer.
  4. 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 ( $AL \times \times$ ) on the display.
2. Press either the  $\triangle$  or  $\nabla$  keys to silence the buzzer. The alarm code is cleared.

## Alarm Table









Table 6.1 Alarm table

Type	Displayed alarm code/channel code (option)	Trouble	Cause	Remedial action
1st	AL00 [CH00] (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 [CH01] (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.
1st	AL00 [CH02] (0) (Not applicable to LU chambers)	The wet-bulb input to the temperature controller was disconnected. The chamber has been stopped.	The sensor is loosely connected to the CH2 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 $\triangle$ or $\nabla$ key.

Cont.

Type	Displayed alarm code/channel code (option)	Trouble	Cause	Remedial action
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.
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 (water circuit [heat exhaust] compartment) tripped because the motor was 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 high pressure switch of the refrigerator (mechanical parts compartment) tripped because of abnormal pressure. The chamber has been stopped.	Surrounding temperature is too high. Or, power supply voltage may have dropped.	Leave the chamber OFF until the refrigerator cools down. Check power supply voltage, then turn control power ON from the <b>POWER</b> key to resume testing. If the same alarm occurs again, call for service.
1st	AL21 (21)	Humidifier surface temperature rose and tripped the boil-dry protector. The chamber has been stopped.	Humidifier surface temperature rose above the trip temperature.	Turn control power OFF from the <b>POWER</b> key and check water level in the humidifying tray water level regulator. Reposition the regulator as necessary and wait till the humidifier cools. Then, 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
2nd	AL22 {22}	The humidity inside the chamber has risen above the absolute high limit. Humidity control has been stopped until humidity returns within range.	The absolute high limit is set lower than the target humidity.	Set the absolute high limit about 10%rh higher than the target humidity. When humidity returns within range, normal control is restored automatically. The alarm can be cleared by pressing the  or  keys.
2nd	AL23 {23}	The humidity inside the chamber has dropped below the absolute low limit. The heater has been stopped and refrigerator capacity decreased to the minimum (turned OFF in some cases) until humidity returns within range.	The absolute low limit is set higher than the target humidity.	Set the absolute low limit about 10%rh lower than the target humidity. When humidity returns within range, normal control is restored automatically. The alarm can be cleared by pressing the  or  keys.
2nd	AL26 {26}	During humidity testing, the wet-bulb (measures relative humidity) rose above the specified temperature. *This alarm can be triggered during operation at low temperature and high humidity or when the target humidity is changed. There is nothing wrong with the equipment. Silence the buzzer and continue testing.	Humidity control will continue as is, but humidity control might destabilize and trigger a humidity alarm. The wet-bulb wick (gauze) inside the chamber may be dry.	Stop the chamber and replace the wick. After wet-bulb temperature returns within the specified range, the alarm can be cleared by pressing the  or  keys.
		The water tank is empty. Humidity control will continue, but it will eventually stop unless water is replenished.	The water tank is empty.	Refill the portable (option) water tank and resume testing. After water has been sufficiently supplied to the main water tank, the alarm can be cleared by pressing the  or  keys. If the same alarm occurs again, call for service.
1st	AL99 {99}	The instrumentation detected communication trouble between the CPU board and display board. The chamber has been stopped.	Communication error between the CPU board and display 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 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.

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Type	Displayed alarm code/channel code (option)	Trouble	Cause	Remedial action
1st	AL99 [99]	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.