Chapter 8

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 "8.2 Before You Call for Service". This chapter also includes trouble information for options.

8.1 Alarm and Action

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⚠ DANGER

- **Before working on the primary side of the main power switch (leakage breaker), shut OFF the primary supply and make sure the line is not charged. Also, take all necessary measures to prevent accidental charging.**
  Working with primary power supply ON runs the risk of electric shock.

- **Before opening the mechanical parts compartment on the chamber top, shut OFF power at the main power switch.**

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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 "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(RL ××)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(RL ××)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 CH00 [0]	The room temperature compensation input to the temperature (humidity) indicator-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 POWER key and resume testing. If the same alarm occurs again, call for service.
1st	AL00 CH01 [0]	The dry-bulb temperature input to the temperature (humidity) indicator-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 POWER key and resume testing. If the same alarm occurs again, call for service.
1st	AL00 CH02 [0] (SH chambers only)	The wet-bulb temperature input to the temperature (humidity) indicator-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 POWER 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.

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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 POWER 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 POWER key and check the test area door and cable port are closed. If caused by excessive cooling sources inside the test area, reduce their number. Resume testing. If the same alarm occurs again, call for service.
1st	AL08 [8]	The overload relay in the refrigerator (mechanical parts compartment) tripped because of abnormally high heat. The chamber has been stopped.	Possible causes include the room being too hot and a power supply voltage drop.	Leave the chamber off for a while to cool the refrigerator. Check power supply voltage and then reactivate power from the POWER key. Resume testing. If the same alarm occurs again, call for service.
		The high pressure switch in the refrigerator (mechanical parts compartment) tripped because of abnormally high pressure. The chamber has been stopped.		
1st	AL 12 [12]	Test area temperature exceeds the overheat and overcool protector setting (instrumentation panel). Or, the temperature switch in the air circulator (mechanical parts compartment) tripped because of abnormally high heat. The chamber has been stopped. (All digits of setting device display are flashing.)	Temperature was driven up by heat generated from specimens or the overheat and overcool protector is set too low.	Turn control power OFF from the POWER key, remove heat sources from the test area and set the overheat and overcool protector higher. If the same alarm occurs again, call for service.
			Possible causes include infiltrating of outside air, excessive cooling, the effects of cooling sources inside the chamber, and the overheat and overcool protector being set too high.	Turn control power OFF from the POWER key and check the test area door and cable port are closed. If caused by excessive cooling sources inside the test area, reduce their number. Resume testing. If the same alarm occurs again, call for service.
			The air circulator motor is overloaded.	Leave the chamber off for a while to cool the air circulator. Then, turn control power ON from the POWER key 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	AL 12 [12]	Trouble in the overheat and overcool protector temperature sensor ("---" burnout indication appears on setting device display.)	The sensor is loosely connected to the overheat and overcool protector or there is an open circuit in the connected thermocouple.	Turn control power OFF from the POWER key and resume testing. If the same alarm occurs again, call for service.
2nd	AL 13 [13]	During operation, the test area door was detected open longer than the set time. The chamber has been stopped temporarily. However, refrigerator capacity is dropped to a minimum and even shut OFF entirely in some cases.	The test area door is open or not shut properly.	Testing is resumed automatically when the door is closed. Once testing resumes, clear the alarm with the △ or ▽ keys.
1st	AL 21 [21]	The humidifier's boil-dry protector tripped because of high surface temperature. Humidity control shut down, but temperature operations continue.	Humidifier surface temperature rose above the trip temperature.	Turn control power OFF from the POWER key and check water level in the humidifying tray water level regulator. Leave the chamber off for a while to cool the humidifier. Resume testing. If the same alarm occurs again, call for service.
2nd	AL 22 [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	AL 23 [23]	Test area humidity dropped below the absolute low limit. The refrigerator is running at low capacity (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.

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Type	Displayed alarm code/channel code (option)	Trouble	Cause	Remedial action
2nd /1st	AL 26 [26]	The water tank is empty. Humidity control will continue, but it will eventually stop unless water is replenished.	The water tank is empty.	Add water to the water tank. Once filled, clear the alarm with the △ or ▽ keys.
		The water tank is empty. Humidity control will continue as long as the humidifying tray has water, but it will eventually stop unless replenished.	The water tank is empty.	Add water to the water tank. Once filled, clear the alarm with the △ or ▽ keys
		During humidity operations, the humidifying tray did not fill within the specified time. Humidity control shut down, but temperature operations continue.	The humidifying water circuit (filter, etc.) is clogged or leaking, or supply pressure is too low.	Stop the chamber and check the humidifying water circuit. Restore water supply and resume testing. If the same alarm occurs again, call for service.
1st	AL 99 [99]	The instrumentation detected a disconnection between the CPU and display boards. The chamber has been stopped.	The CPU and display boards are not properly connected.	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.
2nd	SuErr	The temperature (and humidity) setting value(s) in the operating data was detected outside of the allowable operating ranges. The program has been stopped.	Temperature (and humidity) setting value(s) in the operating data is outside of the allowable operating ranges.	Recheck the operating data. The alarm can be cleared by pressing the ⌷CLR⌷ button on the ALARM screen. Resume testing. If the same alarm occurs again, call for service.

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