



# Steri-Cult

## Model 3307 and 3310 Series CO<sub>2</sub> Incubator Controlled RH with Sterilization Cycle

Operating and Maintenance Manual 7023307 Rev. 28

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Model	Size	Voltage
3307, 3307E, 3307CTS	Medium	115
3308, 3308E, 3308CTS	Medium	230
3310, 3310E, 3310CTS	Large	115
3311, 3311E, 3311CTS	Large	230

**MANUAL NUMBER 7023307**

28	ECNM-000976	02/22/21	Corrected 191682 to 192080 in page 11-1. Added New part number 400218 to the Parts List in page 11-2. Added EMC statements in preface page iv.	TFI
27	ECNM-001260	01/07/21	Added Auto-Lock power inlet cord to the Parts List in page 11-2.	TFI
26	ECNM-001092	12/08/2020	Added new part number Plug Filter Assembly (Smart-Vue) in page 11-2.	TFI
25	ECNM-001141	09/29/2020	Added tubing inspection details to preventive maintenance section in page 6-2.	TFI
24	ECNM-001073	07/24/2020	Added Bullseye and Cell Therapy model numbers in page preface i and Electropolished information. Updated Configuration Chart in page 4-2 and removed Assembly and Electrical Schematic Drawings.	TFI
23	41883	4/11/18	Intended use statement added	TFI
22	41633	1/11/18	New Release: Uaisala HMP251 CO <sub>2</sub> IR sensor	bpg
21	40087/IN-4743	7/26/16	Changed label in remote alarm artwork to note - pg 9-1	ccs
20	40639	4/22/16	Added risk assessment information	ccs
19	40270/IN-4660	7/20/15	Change remote alarm connector, update schematics	ccs
18	31343/IN-4592	10/22/14	New magnetic door switch (exploded drawing, electrical schematics) RoHS	ccs
17	29174/IN-4469	3/21/14	Updated solenoid - pgs 11-8 through 11-12	ccs
16	--	10/21/13	Replaced the typo - pan with bottle on pgs 1-10 through 1-11	ccs
15	28727	6/18/12	Clarified nebulizer flush instructions - pg 7-4 & 7-5	ccs
14	28408	5/18/12	Chg'd 95% non-condensing in Specifications to 90%	ccs
13	27891	10/27/11	Clarified Water Empty alarm language on pg 5-3	ccs
12	27292/IN-4073	9/28/11	400119 to 400201 switcher kit - pg 11-1	ccs
11	27162/IN-4071	3/24/11	Added pilasters and shelf channels to Parts List	ccs
--	--	11/24/10	Corrected typo in chart above: 3308/3310, medium/large	ccs
10	25128/IN-3882	4/7/10	Missed correction from water bottle change (pgs 1-10, 7-3 & 7-4)	ccs
9	25480/SI-10033	11/4/09	Common shelf channel (pg 1-7 & 1-8 artwork and 11-1 parts list)	ccs



**Important** Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

**Warning** All internal adjustments and maintenance must be performed by qualified service personnel. ▲



- Use this product only in the way described in the product literature and in this manual. Before using it, verify that this product is suitable for the intended use.
- Do not modify system components, especially the controller. Use OEM exact replacement equipment or parts. Before use, confirm that the product has not been altered in any way.
- Disconnect the unit from all power sources before cleaning, troubleshooting, or performing other maintenance on the product or its controls. To disconnect power supply to the incubator, unplug the supply cord at the back of the incubator. Note that turning the key switch on the front control panel to the Off position is not sufficient to disconnect power.

**Warning** The user is responsible for carrying out appropriate decontamination procedures when hazardous materials are spilled on or inside the incubator. ▲

**Caution** If the incubator is not used in the manner specified in this operating manual, the protection provided by the equipment design may be impaired. ▲

**Intended Use:** The Thermo Scientific Steri-Cult CO<sub>2</sub> Incubators are intended to maintain an optimal environment for the incubation of cells and tissues for scientific research and clinical applications. These models maintain temperature and carbon dioxide (CO<sub>2</sub>) levels are set by the operator with increased relative humidity.

**Non-Intended Use:** The Thermo Scientific Steri-Cult CO<sub>2</sub> Incubators are not intended for use where electrical or physical contact with the patient is established. Not intended for use by the general public. Not intended for use within the patient environment. Not to be used outdoors. Not intended to be operated in potentially explosive environments or for use with flammable materials.

Material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising out of or related to the use of this manual.

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Important operating and/or maintenance instructions. Read the accompanying text carefully.



Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.



Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.



Asphyxiation Hazard Warning. High concentrations of CO<sub>2</sub> can displace oxygen and cause asphyxiation!



Lifting Hazard Warning. The incubator weighs more than 200 lbs (91 kgs). Take adequate safety measures when moving this device.



4-Person Lift. The incubator weighs more than 200 lbs (91 kgs). It is recommended that four persons lift this device together to move it.



**WEEE Compliance:** Thermo Fisher Scientific has contracted with companies for recycling/disposal in each EU Member State. For further information, send an email to [weee.recycle@thermofisher.com](mailto:weee.recycle@thermofisher.com).

- ✓ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✓ Always dissipate extreme cold or heat and wear protective clothing.
- ✓ Always follow good hygiene practices.
- ✓ Each individual is responsible for his or her own safety.

## **EMC**

This equipment has been tested and found to comply with the limits for a Class A digital device. Class A covers devices for usage in all establishments other than domestic and that are not directly connected to a low voltage power supply network, which supplies domestic environment.

**Consideration for Korea.** EMC Registration is done on this equipment for business use only. It may cause interference when the product would be used in home.

사용자 안내문 이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다 .

## **Consideration for Korea**

This product is intended for use at locations where product is being supplied by separate power network, in most cases supplied from a high or medium voltage transformer, dedicated only for manufacturing plants or similar plants.

## **FCC Statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## **Canada Statement:**

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada.

## Do You Need Information or Assistance on Thermo Scientific Products?

If you do, please contact us 8:00 a.m. to 6:00 p.m. (Eastern Time) at:

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1-877-213-8051	FAX
<a href="http://www.thermofisher.com">http://www.thermofisher.com</a>	Internet Worldwide Web Home Page
<a href="mailto:service.led.marietta@thermofisher.com">service.led.marietta@thermofisher.com</a>	Tech Support Email Address
<a href="http://www.unitylabservices.com">www.unitylabservices.com</a>	Certified Service Web Page

Our **Sales Support** staff can provide information on pricing and give you quotations. We can take your order and provide delivery information on major equipment items or make arrangements to have your local sales representative contact you. Our products are listed on the Internet and we can be contacted through our Internet home page.

Our **Service Support** staff can supply technical information about proper setup, operation or troubleshooting of your equipment. We can fill your needs for spare or replacement parts or provide you with on-site service. We can also provide you with a quotation on our Extended Warranty for your Thermo Scientific products.

Whatever Thermo Scientific products you need or use, we will be happy to discuss your applications. If you are experiencing technical problems, working together, we will help you locate the problem and, chances are, correct it yourself...over the telephone without a service call.

When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

Thermo Fisher Scientific (Asheville) LLC  
401 Millcreek Road, Box 649  
Marietta, OH 45750

International customers, please contact your local Thermo Scientific distributor.

## Warranty Notes

### **Information You Should Know Before Requesting Warranty Service**

- **Locate the model and serial numbers.** A serial tag is located on the unit itself.
- For equipment service or maintenance, or with technical or special application inquiries, contact Technical Services at 1-800-438-4851 or 1-740-373-4763 (USA and Canada). Outside the USA, contact your local distributor.

### **Repairs NOT Covered Under Warranty**

- **Calibration of control parameters.** Nominal calibrations are performed at the factory; typically  $\pm 1^{\circ}\text{C}$  for temperature,  $\pm 1\%$  for gases, and  $\pm 5\%$  for humidity. Our service personnel can provide precise calibrations as a billable service at your location. Calibration after a warranty repair is covered under the warranty.
- **Damage resulting from use of improper quality water, chemicals or cleaning agents detrimental to equipment materials.**
- **Service calls for improper installation or operating instructions.** Corrections to any of the following are billable services:
  - 1) electrical service connection
  - 2) tubing connections
  - 3) gas regulators
  - 4) gas tanks
  - 5) unit leveling
  - 6) room ventilation
  - 7) adverse ambient temperature fluctuations
  - 8) any repair external to the unit
- **Damage resulting from accident, alteration, misuse, abuse, fire, flood, acts of God, or improper installation.**
- **Repairs to parts or systems resulting from unauthorized unit modifications.**
- **Any labor costs other than that specified during the parts and labor warranty period, which may include additional warranty on CO<sub>2</sub> sensors, blower motors, water jackets, etc.**

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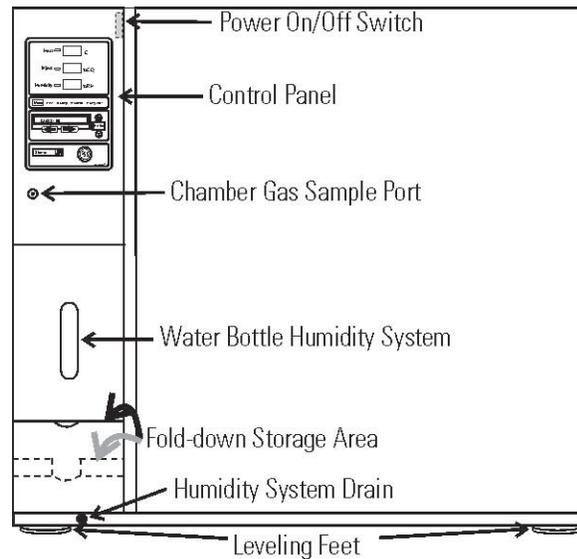
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# Section 1 Installation and Start-Up



**Figure 1-1.** Steri-Cult Components

The incubator's major components are described below:

- Chamber Gas Sample Port - Used for sampling chamber CO<sub>2</sub> content for calibration purposes (Section 2).
- Power On/Off Switch - Mains disconnect
- Control Panel - Keypad, Displays & Indicators (Figure 1-3)
- Fold-down Storage Area - Store manuals, markers etc.
- Leveling Feet - Used to level the unit

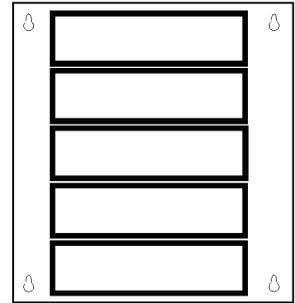
**Note** The incubators are stackable. Information follows in this section.

# Inventory Management System

Included in the parts bag shipped with each unit is an inventory management system. This system consists of:

- A steel plate
- Five different colored magnets
- Five heat-resistant shelf labels
- Dry-Erase marker

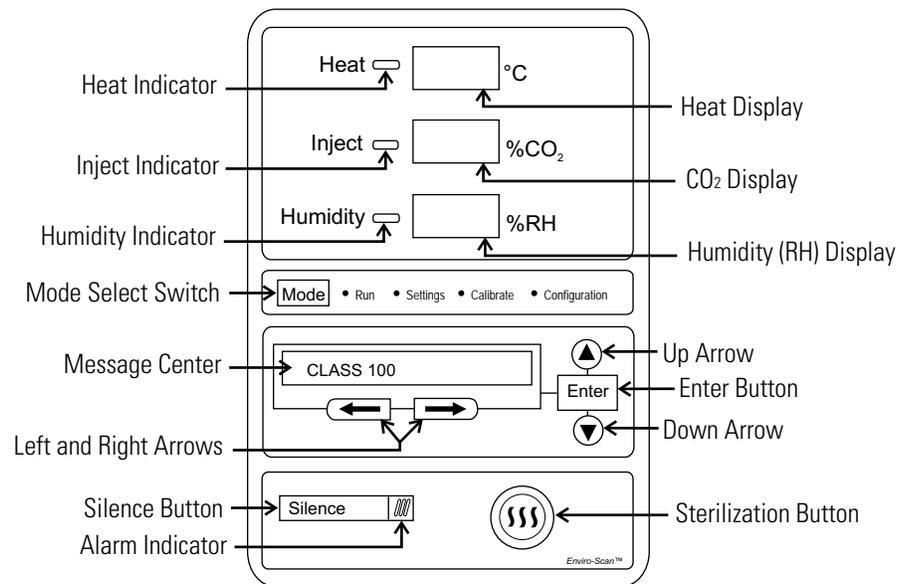
Hang the plate on the inside of the outer door, using the keyholes and hardware already installed on the door. Attach a colored shelf label to the front edge of each shelf. The magnets may be aligned on the plate, in order according to shelf label color. Use the marker to record information about the product on corresponding shelves. The magnets can be erased as needed and rewritten.



**Figure 1-2.** Inventory System

**Caution** The inventory management system magnet plate will not withstand the heat of the sterilization cycle. Simply unhook the whole plate from the outer door and set aside before initiating the cycle, then reinstall afterward. ▲

# Control Panels Keys, Displays & Indicators



**Figure 1-3.** Control Panel Components

## **Control Panel (continued)**

**Heat indicator** - Lights when power is applied to the heaters.

**Heat display** - Displays temperature (°C).

**Inject indicator** - Lights when CO<sub>2</sub> is being injected into the incubator chamber.

**CO<sub>2</sub> display** - Displays CO<sub>2</sub> (%).

**Humidity indicator** - Lights when humidity is required.

**RH display** - Displays humidity (%).

**Mode select switch** - Used to select Run, Setpoints, Calibration and System Configuration Modes.

**Mode select indicators** -

Run: Run Menu

Settings: Set Points Menu

Calibrate: Calibration Menu

Configuration: Configuration Menu

**Message center** - Displays system status.

**Enter** - Stores any changed values into memory.

**Up / down arrows** - Increments number values, toggles between parameter values.

**Left and right arrows** - Steps the operator through the parameters of Run, Settings, Calibrate and Configure Modes. The right arrow goes to the next parameter, the left arrow returns to the previous parameter.

**Silence** - Mutes the audible alarm. See Section 5 for ringback times.

**Alarm indicator** - Light pulses on/off during an alarm condition in the cabinet.

**Sterilization button** - Starts Sterilization Cycle

## **Operation of the Keypad**

The Steri-Cult incubator has four basic modes which allow incubator setup: Run, Settings, Calibrate and System Configuration.

**Run** is the default mode which the incubator will normally be in during operation.

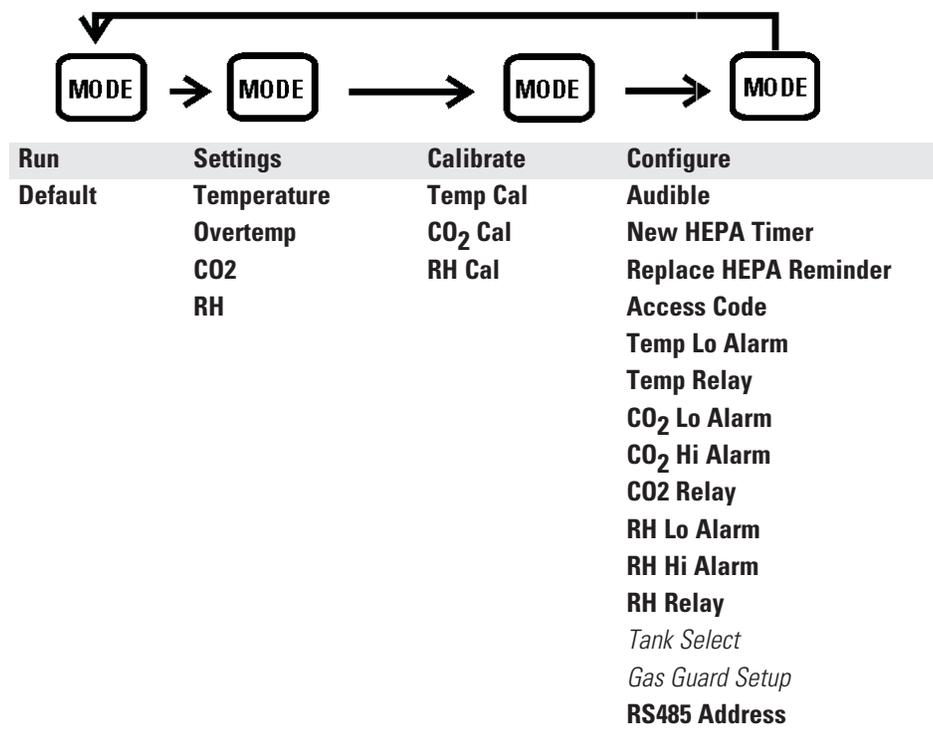
**Settings** is used to enter system setpoints for incubator operation.

**Calibrate** is used to calibrate various system parameters.

**Configuration** allows for custom setup of various options.

## Keypad (continued)

The chart below shows the selections under each of the Modes. **Base Unit Displays** are in bold type and *Option Displays* are in italics.



## Displays

**Message Center:** Displays the system status (Mode) at all times. Displays CLASS 100, SYSTEM OK or RH WAITS ON TEMP (see Setting the RH Setpoint for further details) during normal operation. Alarm messages display if the system detects an alarm condition. See Section 5, Alarms. The display message CLASS 100 is a timing mechanism indicating that, under normal operating conditions with the HEPA filter installed, the air inside the chamber meets the Class 100 air cleanliness standard for particulates of 0.5 micron size or larger per cubic foot of air.

**3 Upper Displays:** The first upper display shows the temperature. The second display shows the percentage of CO<sub>2</sub>. The third display shows the humidity percentage.

## Installing the Incubator

**Caution** Single and stacked units must be installed against a wall or similar structure. ▲

1. Maintain a three-inch clearance behind the incubator for electrical and gas hook-ups. In addition, a three-inch ventilation space is needed on each side of the unit.
2. Locate the unit on a firm level surface capable of supporting the unit's weight (340 lbs.-Models 3307 & 3308, 410 lbs.-Models 3310 & 3311), plus estimated total sample and user equipment weight. This would be doubled if units are to be stacked.
3. Locate the incubator away from exterior doors and windows as changes in outdoor temperatures and contact with direct sunlight can affect the anti-condensation functions of the unit.
4. Position the door opening away from forced air heating and cooling ducts as these can carry dust, dirt, and other contaminants into the incubator chamber, as well as negatively affect the door opening recovery time.

**Caution** Have sufficient personnel available to lift the unit into place using proper lifting techniques according to local EHS policies. Lift from both sides of the unit (left and right, not front and back) holding it from the bottom. Do not lift the incubator by the outer door as this could damage the hinges and/or the outer door may come loose. Note that the outer door can be removed to reduce weight and make it easier to lift the unit by its corners. Do not push or pull the incubator along the floor as this could damage the leveling feet. ▲

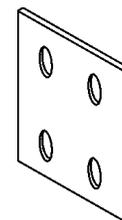
## Stacking the Incubators

**Warning** With incubators in a stacked configuration, do not leave both exterior doors open at the same time. ▲

**Warning** If the units have been in operation, turn them both off and disconnect the power before beginning any service work. ▲

Four stacking brackets (one shown at right) are included in the parts bag shipped with each incubator.

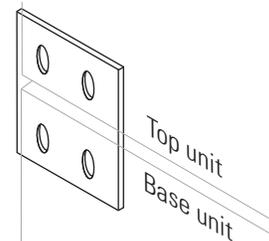
1. Unscrew and remove the 4 leveling feet from the unit to be stacked on top and lift it onto the base unit. Align all sides.



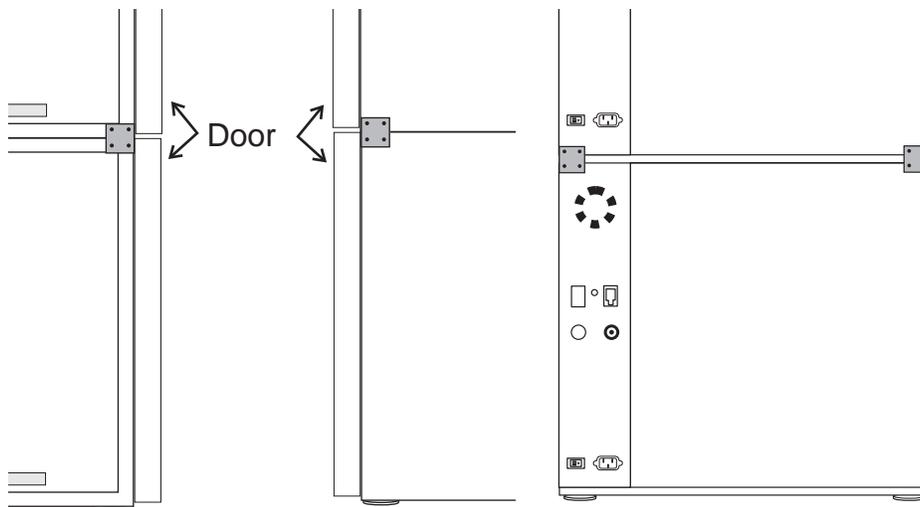
**Figure 1-4.**  
Stacking Bracket

## Stacking the Incubators (continued)

2. Remove the hole plugs from the stacking bracket holes (Figure 1-6).
3. Align the holes in the brackets with the mounting holes on the sides of the top and bottom incubator. Secure the two brackets with the stainless steel screws and washers provided in the parts bag. See Figure 1-5.



**Figure 1-5.** Stacking Brackets Installed



**Figure 1-6.** Sides and Back of Stacked Units

## Preliminary Cleaning

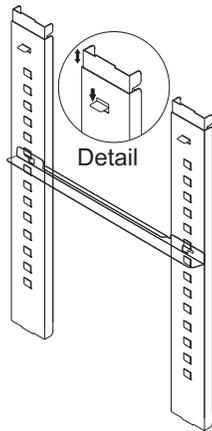
**Caution** Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment. ▲

Using a suitable laboratory disinfectant such as quaternary ammonium, thoroughly clean all interior surfaces to remove any residues which may remain from production of the incubator.

## Installing the Shelves

1. Install the pilasters, two on each side, with the tab facing into the center of the chamber with their slots up. Press downward on the top section of each pilaster to locate, then release when in position (Figure 1-9). Fit each pilaster securely into the indentations at each side of the ceiling and the floor of the chamber. Figure 1-7 shows the diffuser pan, pilasters, and shelf channels.
2. Install the diffuser pan in the bottom of the unit with the flanges down.

## Installing the Shelves (continued)

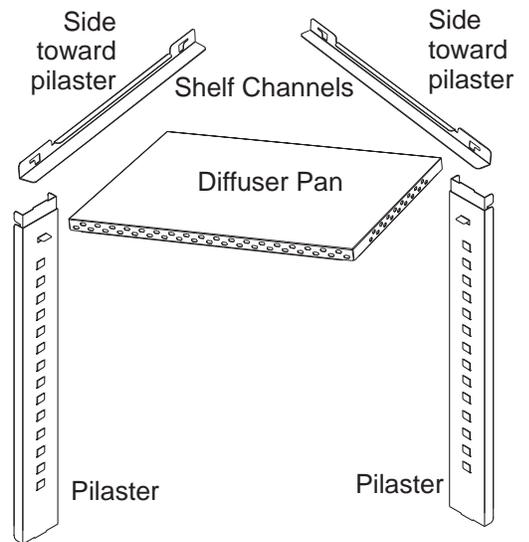


**Figure 1-9.** Installed Shelf Channel

3. Install the shelf channels by placing the channel's rear slot over the appropriate rear tab on the pilaster. Pull the shelf channel forward and engage the channel's front slot into the pilaster's appropriate forward tab. Refer to Figure 1-8.

4. Figure 1-9 shows a shelf channel installed on pilasters on the right side of the chamber.

5. Slide the shelves in, side flanges upward, along the channels into the chamber.



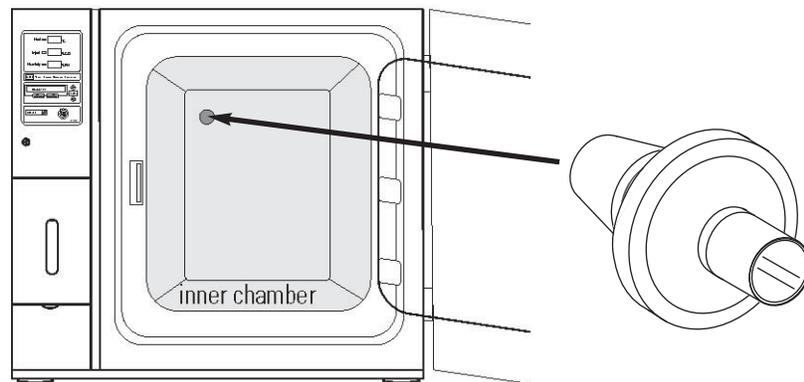
**Figure 1-7.** Shelf Installation



**Figure 1-8.** Slots and Tabs

## Installing the Access Port Filter

1. Locate the opening in the top left corner on the inside of the chamber. Remove the tape covering the opening on the outside of the unit.
2. Install the the filter/stopper assembly into the opening inside the chamber. See Figure 1-10.



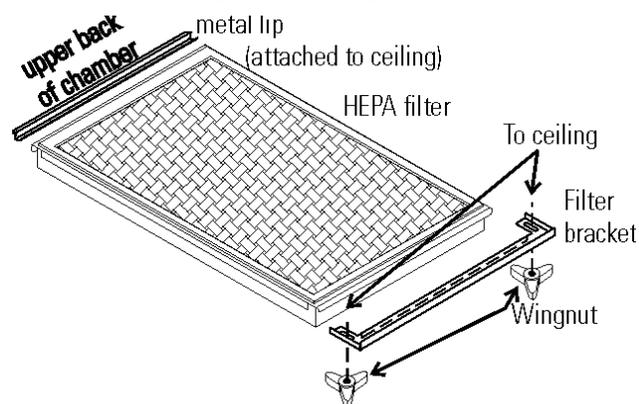
**Figure 1-10.** Access Port Filter Installation

**Caution** Filter **MUST** be installed inside the chamber or it will become plugged with condensation and inhibit the recovery of the RH system. Do not replace this filter with a solid cover of any kind. ▲

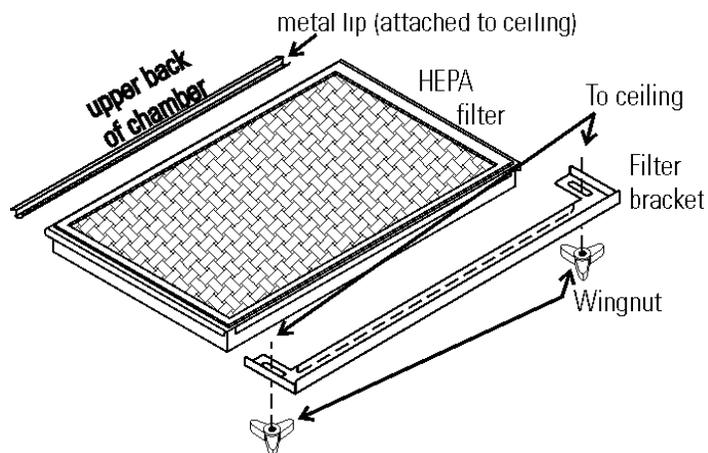
## Installing the HEPA Filter

**Caution** Handle the HEPA filter very carefully as the filter media can be easily damaged. Do not touch the filter media during installation. To avoid damage to the incubator, do not operate the unit without the HEPA filter in place. If higher RH are needed and CLASS 100 air quality conditions are not required, then use the restrictor plate instead of the HEPA filter in order to maintain proper air flow. ▲

1. Remove the filter from the shipping box.
2. Remove the plastic covering from the filter and inspect the filter for any visible signs of damage.



**Figure 1-11.** HEPA Orientation for Model 3307/3308



**Figure 1-12.** HEPA Orientation for Model 3310/3311

3. Loosen black wingnuts in front corners of the chamber ceiling (Figure 1-11 or 1-12).
4. Locate the metal lip at the upper back of the chamber. Hook the HEPA filter carefully over the back edge of the metal lip.
5. Lift the front of the filter to the ceiling of the chamber. Push filter bracket back over the filter frame. Tighten the wingnuts.
6. Refer to Section 6 for HEPA filter maintenance.

## Leveling the Unit

Check for level by placing a bubble-style level on one of the shelves. Turn the hex nut on the leveling feet counterclockwise to lengthen the leg or clockwise to shorten it. Level the unit front-to-back and left-to-right.

## Connecting the Unit to Electrical Power

See the serial tag on the side of the unit for electrical specifications or refer to the electrical schematics in this manual.

**Caution** Serial tag amp rating is based on the amperage draw during the sterilization cycle. Normal operating amperage is much less. Ensure that the electrical circuit will handle the amp draw of the sterilization cycle. ▲

**Warning** Connect the incubator to a grounded, dedicated circuit. The power cord connector is the mains disconnect device for the incubator. Position the incubator to allow unobstructed access to the power cord so the unit can be easily disconnected in case of an emergency. ▲

Plug the provided power cord into the power inlet connector on the back of the cabinet (See Figure 1-14), then into the grounded, dedicated, electrical circuit.

## Filling the Humidity Water Bottle

1. Open the outer chamber door.
2. Open the access door located on the front of the unit, below the control board. See Figure 1-13.
3. Remove the lid of the humidity bottle and fill with sterile distilled water. Install the lid and close the door, being careful not to pinch the tubing.

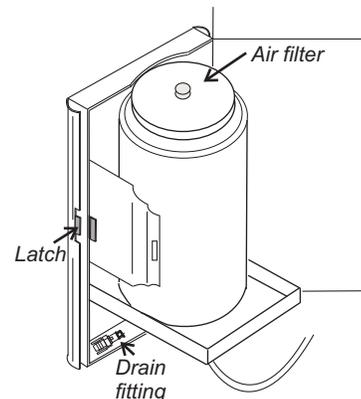


Figure 1-13. Water Bottle

Condensation will increase water consumption. Under normal conditions of 37°C, 90% RH, 5% CO<sub>2</sub>, five door openings per day, the water bottle should last 1-1.5 weeks.

For best operation of the incubator, sterilized distilled, demineralized or de-ionized water should be used in the humidity bottle. Water purity should be in the resistance range of 50 K to 1 M Ohm/cm, or a conductivity range of 20.0 to 1.0 uS/cm. Refer to ASTM Standard D5391-93 or D4195-88 for measuring water purity.

Distillation systems, as well as some types of reverse osmosis water purity systems, can produce water in the quality range specified. Tap water is not recommended as it may contain chlorine, which can deteriorate the stainless steel. Tap water may also have a high mineral content, which would produce a build-up of scale in the pan.

## Filling the Humidity Water Bottle (continued)

High purity or ultra pure water is not recommended as it is an extremely aggressive solvent and will deteriorate the stainless steel. High purity water has a resistance of above 1 M to 18 M Ohm. Even high purity water can contain bacteria and organic contaminants. Water should always be sterilized or treated with a decontaminant, such as a 2% solution of quaternary ammonium, prior to being introduced into the humidity bottle.

## Connecting the CO<sub>2</sub> Gas Supply

**Warning** High concentrations of CO<sub>2</sub> gas can cause asphyxiation! Refer to local EHS policies regarding employee exposure to CO<sub>2</sub>. Carbon dioxide monitors are recommended for confined areas where concentrations of carbon dioxide gas can accumulate. ▲

**Warning** This incubator is designed to be operated with CO<sub>2</sub> gas only. Connecting a flammable or toxic gas can result in a hazardous condition. Gases other than CO<sub>2</sub> should not be connected to this equipment. CO<sub>2</sub> gas cylinders have a UN1013 label on the cylinder and are equipped with a CGA 320 outlet valve. Check the gas cylinder for the proper identification labels. The CO<sub>2</sub> gas supply being connected to the incubator should be industrial grade, 99.5% pure (nominal). Do not use CO<sub>2</sub> gas cylinders equipped with siphon tubes. A siphon tube is used to extract liquid CO<sub>2</sub> from the cylinder which can damage the pressure regulator. Consult with your gas supplier to ensure that the CO<sub>2</sub> cylinder does not contain a siphon tube. Gas cylinders should also be secured to a wall or other stationary object to prevent them from tipping.

A two-stage CO<sub>2</sub> pressure regulator is required to be installed on the outlet valve of the gas cylinder. Input pressure to the incubator must be maintained at 15 psig (103.4 kPa), ±5 psig, for proper performance of the CO<sub>2</sub> control system. A single stage CO<sub>2</sub> pressure regulator will not maintain 15 psig (103.4 kPa) to the incubator as the pressure in the CO<sub>2</sub> cylinder decreases; therefore, a two stage regulator is recommended. ▲

**Warning** If higher purity CO<sub>2</sub> is desired inside the incubator (greater than 99.5% pure nominal), the pressure regulator should be constructed with a stainless steel diaphragm, along with specifying the purity of the CO<sub>2</sub> from the gas supplier. Follow the manufacturer's instructions to ensure proper and safe installation of the pressure regulator on the gas cylinder. Consult a facility safety officer to ensure that the equipment is installed in accordance with codes and regulations applicable in your area. ▲

**Note** For customer convenience, 12 feet of 1/4" I.D. vinyl tubing with two 3/8" hose clamps are included in the shipping materials for connecting the unit to the gas supply.

## Connecting the CO<sub>2</sub> Gas Supply (continued)

The incubator has 1/4" barbed fittings on the back of the cabinet to connect the gas supply. Refer to Figure 1-14. The fitting is labeled CO<sub>2</sub> Inlet #1. Install 3/8" hose clamps to secure the 1/4" I.D. tubing to the barbed fitting on the regulator and the rear of the electronics area.

**Warning** Check for leaks at all connections. ▲

For units having the CO<sub>2</sub> Gas Guard option, refer to Section 9.

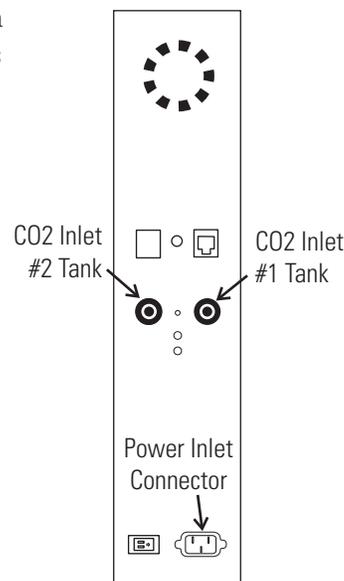


Figure 1-14. Connection Locations

## Humidity and Loading the Chamber

With the chamber loaded with liquid product and the RH setpoint at less than 90%, some evaporation of product will occur. If the actual RH reaches 2% above setpoint, the incubator microprocessor turns on dehumidification. This process pulls outside air in through the nebulizer and exhausts air through the access port. Humidity decreases. However, in the process, CO<sub>2</sub> consumption increases. Ensure your tank and product are monitored.

## **Section 1**

### Installation and Start-Up

## Section 2 Incubator Settings

With the incubator properly installed and connected to power, the humidity water bottle filled, and the unit connected to gas supplies, system setpoints can be entered. The following setpoints can be entered in Settings mode: Temperature, Overtemp, CO<sub>2</sub> and RH. To enter Settings mode, press the Mode key until the Settings indicator lights. Press the right and/or left arrow keys until the proper parameter appears in the message center. See Chart 2-1 for more detail.

**Caution** It is the responsibility of the user to validate the proper operation of each incubator in their specific application(s) with respect to unit location, operating environment, and settings. ▲

### Setting the Temperature Setpoint

The temperature setpoint range is 10°C to 50°C, settable to within 0.1°C. The lowest temperature the incubator can control is +5°C above the ambient temperature in the incubator's location. The incubator is shipped from the factory with a temperature setpoint of 10°C. At this setting, temperature control and alarms are turned off. To change the temperature setpoint:

1. Press the Mode key until the Settings indicator lights.
2. Press the right arrow until "Temp XX.XC" is displayed in the message center.
3. Press the up/down arrow key until the desired temperature setpoint is displayed.
4. Press Enter to save the setpoint.
5. Press the Mode key until the Run indicator lights for Run mode or press the right/left arrow keys to go to next/previous parameter.

## Setting the Overtemp Setpoint

**Caution** In the event that the heaters are locked on as a result of a failure in the main temperature control, the independent overtemp system is designed as a safety to protect the incubator only. It is not intended to protect or limit the maximum temperature of the cell cultures or customer's equipment inside the incubator if an overtemp condition occurs. ▲

The incubator is equipped with an independent circuit that monitors the air temperature in the cabinet. Should the main temperature control fail, the overtemp circuit will disconnect power to all heaters when the chamber temperature reaches the Overtemp setpoint. When the chamber temperature falls below the Overtemp setpoint, the overtemp circuit will reconnect power to all heaters. An incubator operating in the overtemp condition will maintain the chamber temperature approximately 1°C around the Overtemp setpoint.

The overtemperature is set by the factory (default) at 40°C. However, the overtemp can be set up to 55°C in 0.1°C increments.

If the incubator's operating temperature setpoint is set above the overtemp setpoint, the overtemp setpoint will automatically update to 1°C above the temperature setpoint.

It is recommended that the overtemp setpoint be maintained at 1°C over the operating temperature setpoint.

To change the Overtemp setpoint:

1. Press the Mode key until the Settings indicator lights.
2. Press the right arrow until OVERTEMP XX.XC is displayed in the message center.
3. Press the up or down arrow key until the desired Overtemp setpoint is displayed.
4. Press Enter to save the setting.
5. Press the Mode key until the Run indicator lights or press the right or left arrow to go to the next or previous parameter.

## Setting the CO<sub>2</sub> Setpoint

The CO<sub>2</sub> setpoint range is 0.0% to 20.0%, settable to within 0.1% CO<sub>2</sub>. The incubator is shipped from the factory with a CO<sub>2</sub> setpoint of 0.0%. At this setting, all CO<sub>2</sub> control and alarms are turned off. To change the CO<sub>2</sub> setpoint:

1. Press the Mode key until the Settings indicator lights.
2. Press the right arrow until “CO<sub>2</sub> XX.X%” is displayed in the message center.
3. Press the up/down arrows until the desired CO<sub>2</sub> setpoint is displayed.
4. Press Enter to save the setpoint.
5. Press the Mode key until the Run indicator lights to go to Run mode or press the right/left arrow keys to go to next/previous parameter.

## Setting the Relative Humidity (RH) Setpoint

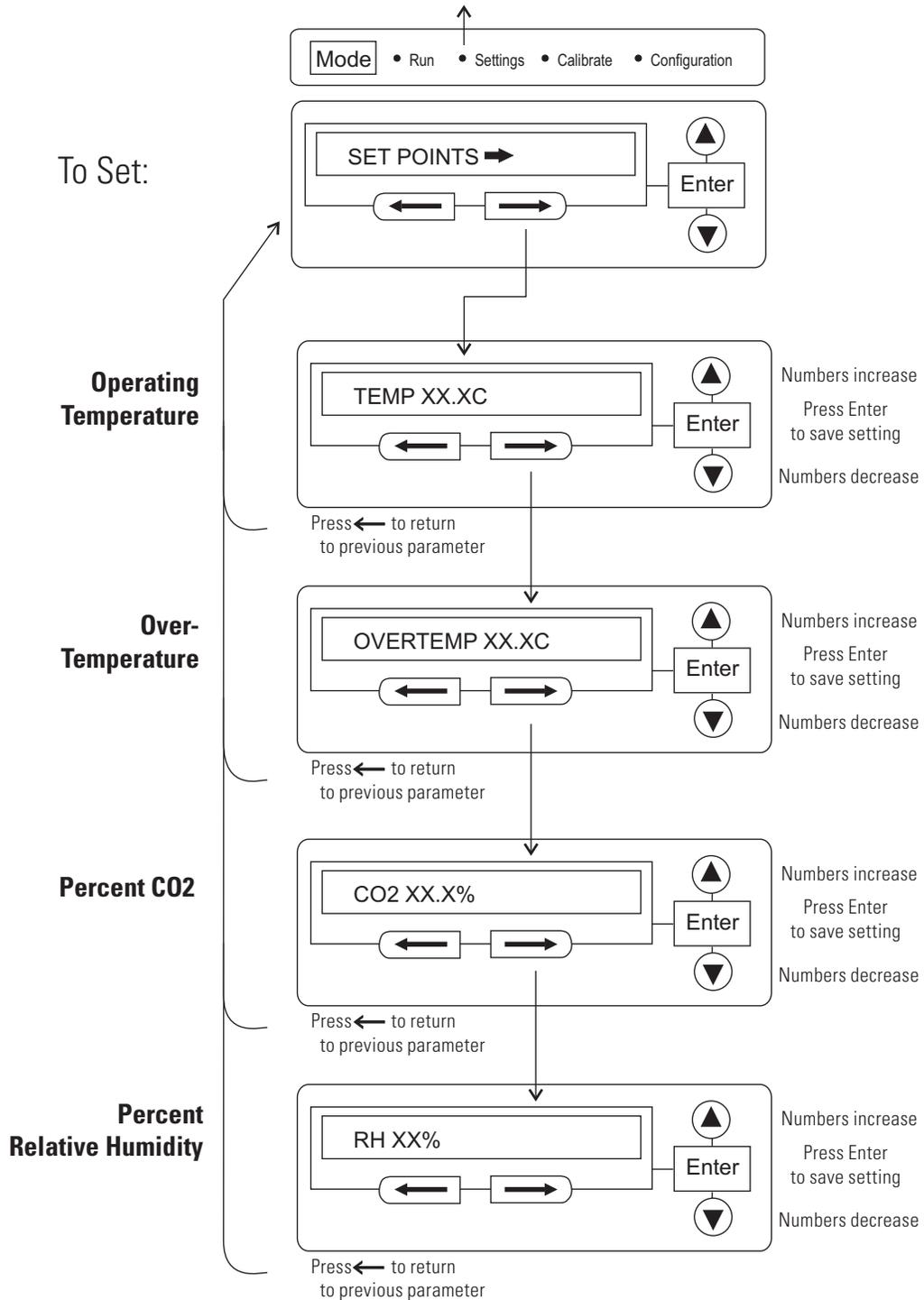
The RH setpoint range is 0% to 95%, settable to within 1% RH (Settings above 90% may cause some condensation to occur in the chamber). The incubator is shipped from the factory with an RH setpoint of 0%. At this setting, all RH control, water level control and alarms are turned off. To change the RH setpoint:

1. Press the Mode key until the Settings indicator lights.
2. Press the right arrow until “RH XX%” is displayed in the message center.
3. Press the up/down arrows until the desired RH setpoint is displayed.
4. Press Enter to save the setpoint.
5. Press the Mode key until the Run indicator lights to go to Run mode or press the right/left arrow keys to go to next/previous parameter.

On power-up or a temperature setpoint change, RH is delayed until the temperature is within 0.5°C of the setpoint. RH WAITS ON TEMP is displayed until this temperature is reached.

# Set Mode

Press MODE to light Settings



## Section 3 Calibration

After the unit has stabilized, several different systems can be calibrated. In Calibration mode, the air temperature, CO<sub>2</sub> and RH levels can be calibrated to reference instruments. To access Calibration mode, press the Mode key until the Calibrate indicator lights. Press the right and/or left arrow until the appropriate parameter appears in the message center. See Chart 3-1 at the end of this section for more detail.

Calibration frequency is dependent on use, ambient conditions and accuracy required. A good laboratory practice would require at least an annual calibration check. On new installations, all parameters should be checked after the stabilization period.

Prior to calibration, the user should be aware of the following system functions. While the unit is in Calibration mode, all system control functions are disabled so the unit remains stable. Readout of the system being calibrated will appear on the message center. If no keys are pressed for approximately five minutes while in Calibration mode, the system will reset to Run mode so control functions are reactivated.

**Caution** Before making any calibration or adjustments to the unit, it is imperative that all reference instruments be properly calibrated. It is the responsibility of the user to understand the interactive effects of temperature, CO<sub>2</sub>% and RH% on each other and the independent reference instruments, especially a Fyrite<sup>®</sup> sensor. Read and understand all reference instrument operating manuals before use. Double-check all values entered into the incubator for accuracy before completing calibration and returning unit to service. ▲

### Calibrating the Temperature

Before calibration, allow the cabinet temperature to stabilize. Place the calibrated instrument in the center of the chamber. The instrument should be in the airflow, not against the shelf.

#### Temperature Stabilization Periods

**Startup** - Allow 12 hours for the temperature in the cabinet to stabilize before proceeding.

**Presently Operating** - Allow at least 2 hours after the display reaches setpoint for temperature to stabilize before proceeding.

## Temperature (continued)

1. Press the Mode key until Calibrate indicator lights.
2. Press the right arrow until “TEMP CAL XX.XC” appears in the message center.
3. Press up/down arrow to match display to calibrated instrument.
4. Press Enter to store calibration.
5. Press the Mode key to return to Run or the right/left arrow to go to next/previous parameter.

## Calibrating the Infrared CO<sub>2</sub> System

All models of the Steri-Cult incubator have an infra-red (IR) CO<sub>2</sub> sensor. Infrared CO<sub>2</sub> sensors are not affected by chamber atmosphere temperature or humidity.

### CO<sub>2</sub> Sensor Stabilization Times

**Start-Up-** Allow the CO<sub>2</sub> of the cabinet to stabilize at least 12 hours before proceeding.

**Presently Operating** - Allow CO<sub>2</sub> to stabilize at least 2 hours at setpoint before proceeding.

1. Measure the CO<sub>2</sub> concentration in the chamber through the gas sample port with an independent instrument. Take several readings to ensure accuracy.
2. Press the Mode key until the Calibrate indicator lights.
3. Press the right arrow until “CO<sub>2</sub> CAL XX.X%” appears in the message center.
4. Press the up/down arrow to adjust the display to match the independent instrument reading.
5. Press Enter to store the calibration.
6. Press the Mode key to return to Run mode.

## **Calibrating Relative Humidity (RH)**

Place a calibrated independent instrument in the airflow in the center of the chamber. Before calibration, allow the cabinet temperature to stabilize. Most RH measuring devices are least accurate above 90%. It is recommended that when calibrating above 90%, the incubator should be adjusted to the lower edge of the instrument accuracy range. For example; with the incubator set at 95%, the independent instrument with accuracy of  $\pm 5\%$  reads 94%. Calibrate the incubator display to 99%. (This prevents condensation issues caused by actual RH levels above 95%).

### **Relative Humidity Stabilization Times**

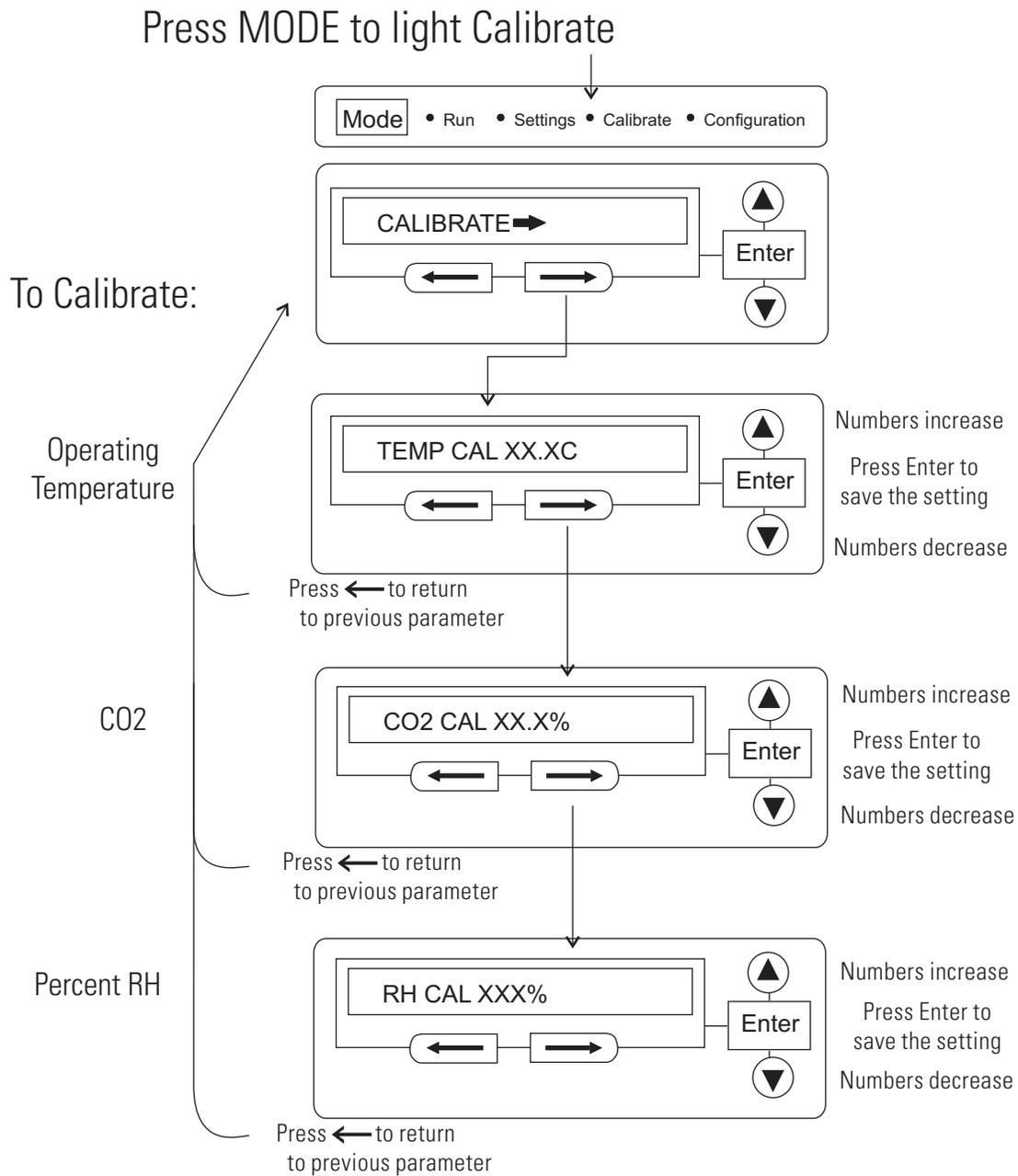
**Start-Up** - Allow 12 hours for the relative humidity and temperature in the chamber to stabilize before proceeding.

**Presently Operating** - Allow at least 2 hours after temperature display reaches setpoint for relative humidity to stabilize before proceeding.

1. Press the Mode key until the Calibrate indicator lights.
2. Press the right arrow key until "RH CAL XXX%" appears in the message center.
3. Press the up/down arrow to match the display to the independent instrument.
4. Press Enter to store the calibration.
5. Press the Mode key to return to Run mode.

Chart 3-1

# Calibrate Mode



## Section 4 Configuration

Several features available in the Configuration Mode allow custom setup of the incubator. These features are listed and described below. All features may not be necessary in all applications, but are available if needed. To enter Configuration mode, press the Mode key until the Configuration indicator lights. Press the right and/or left arrow until the appropriate parameter appears in the message center. See Chart 4-1 for more detail.

### Turning the Audible Alarm ON/OFF

The audible alarm can be turned on or off. The factory setting is ON.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until AUDIBLE ON/OFF is displayed in the message center.
3. Press up/down arrow to toggle ON or OFF.
4. Press Enter to save the setting.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

### New HEPA Filter

When the REPLACE HEPA reminder is displayed and the visual alarm flashes, the specified time has elapsed and the HEPA filter should be replaced by following the HEPA Filter Maintenance procedures of Section 7. The factory setting is 182 days (calculated from REPL HEPA XX setting of 6 months).

After replacing the HEPA filter with a new one, clear the display and reset the timer by following the steps below.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until NEW HEPA XXX is displayed in the message center.

## New HEPA Filter (continued)

**Note** Do not press Enter if only viewing remaining days before specified filter replacement time runs out because this will restart the timer to start value as though the HEPA filter had just been replaced.

3. Press Enter to restart the timer and clear the REPLACE HEPA alarm. This new number is the remaining days before the specified filter replacement time runs out. For example, if 12 months was chosen in the REPL HEPA XX message screen, the NEW HEPA number would be 365 days.
4. Press the Mode key to return to Run mode.

## Setting the REPLACE HEPA Filter Reminder

A HEPA filter replacement timer can be set for a specific amount of time, from 1 to 12 months of actual unit running time. Time will not accrue when the unit is turned off. When the allotted time has run out, REPLACE HEPA appears in the display and the visual alarm flashes. The factory setting is 6 months.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until REPLACE HEPA XX is displayed.
3. Press the up/down arrow to choose the number of months desired.
4. Press Enter to save the number.
5. Press the Mode key to return to Run Mode or right/left to go to next/previous parameter.

**Note** After the reminder has been set, check the allotted time remaining by going to Configuration mode, then pressing the right arrow until NEW HEPA XXX displays. This number is the remaining days before the specified filter replacement time runs out. For example, if 12 months was chosen in the REPLACE HEPA XX message screen, the NEW HEPA number would be 365 days. ▲

## Setting an Access Code

A 3-digit Access Code can be entered to avoid unauthorized personnel from changing the setpoints, calibration, or configuration. A setting of 000 disables the access code function. The factory setting is 000.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until ACCESS CODE XXX is displayed in the message center.
3. Press up/down arrow to change the access code.
4. Press Enter to save the access code.
5. Press the Mode key to return to the Run mode or right/left to go to next/previous parameter.

## Setting a Low Temp Alarm Limit

The low temperature alarm limit (tracking alarm) is the deviation from the temperature setpoint which causes a low temp alarm. The low temp alarm is variable from one-half degree to five degrees below setpoint. The factory setting is 1° below setpoint. A minus sign (-) in the display indicates that the alarm setting is below the setpoint.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until TEMP LO LMT -X.X is displayed in the message center.
3. Press up/down arrow to change the low temp alarm limit.
4. Press Enter to save the low temp alarm limit.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

## Enabling Temp Alarms to Trip Contacts

The high and low temperature alarms can be programmed to trip the remote alarm contacts. A setting of ON activates this ability. A setting of OFF will not allow the temp alarms to trip the contacts. The factory setting is ON.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until TEMP RELAY ON/OFF is displayed.

## Enabling Temp Alarms to Trip Contacts (cont.)

3. Press the up/down key to toggle the setting ON/OFF.
4. Press Enter to save the setting.
5. Press the Mode key to return to Run or the right/left arrow key to go to next/previous parameter.

## Setting a Low CO<sub>2</sub> Alarm Limit

The low CO<sub>2</sub> alarm limit (tracking alarm) is the deviation from the CO<sub>2</sub> setpoint which will cause a low CO<sub>2</sub> alarm. The setpoint is variable from 0.5% to 5.0% CO<sub>2</sub> below setpoint. The factory setting is 1.0% CO<sub>2</sub> below setpoint. A minus sign (-) in the display indicates that the alarm setting is below the setpoint.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until CO<sub>2</sub> LO LMT -X.X is displayed in the message center.
3. Press up/down arrow to change the low CO<sub>2</sub> alarm limit.
4. Press Enter to save the low CO<sub>2</sub> alarm limit.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

## Setting a High CO<sub>2</sub> Alarm Limit

The high CO<sub>2</sub> alarm limit (tracking alarm) is the deviation from the CO<sub>2</sub> setpoint which will cause a high CO<sub>2</sub> alarm. The setpoint is variable from 0.5% to 5.0% CO<sub>2</sub> above setpoint. The factory setting is 1.0% CO<sub>2</sub> above setpoint. When activated, the CO<sub>2</sub> valve is disabled.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until CO<sub>2</sub> HI LMT X.X is displayed in the message center.
3. Press up/down arrow to change the high CO<sub>2</sub> alarm limit.
4. Press Enter to save the high CO<sub>2</sub> alarm limit.
5. Press the Mode key to return to run mode or right/left to go to next/previous parameter.

## **Enabling CO<sub>2</sub> Alarms to Trip Contacts**

High and Low CO<sub>2</sub> alarms can be programmed to trip the remote alarm contacts. A setting of ON activates this ability. A setting of OFF will not allow CO<sub>2</sub> alarms to trip the contacts. The factory setting is ON.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until CO<sub>2</sub> RELAY ON/OFF is displayed in the message center.
3. Press up/down arrow to toggle the setting ON or OFF.
4. Press Enter to save the setting.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

## **Setting a Low RH Alarm Limit**

The low RH alarm limit (tracking alarm) is the deviation from the humidity setpoint which causes a low RH alarm. The setpoint is variable from -5 to -20% RH. The factory setting is -10% RH.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until RH LO LMT -XX is displayed in the message center.
3. Press up/down arrow to change the RH low alarm limit.
4. Press Enter to save the RH low alarm limit.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

## Setting a High RH Alarm Limit

The high RH alarm limit (tracking alarm) is the deviation from the humidity setpoint which causes a high RH alarm. The setpoint is variable from 5 to 20% RH. The factory setting is 10% RH. When the alarm is activated, the humidity system is disabled.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until RH HI LMT XX is displayed in the message center.
3. Press up/down arrow to change the RH high alarm limit.
4. Press Enter to save the RH high alarm limit.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

## Enabling RH Alarms to Trip Contacts

The high and low RH alarms can be programmed to trip the remote alarm contacts. A setting of ON activates this ability. A setting of OFF will not allow the RH alarm to trip the contacts. The factory setting is ON.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until RH RELAY ON/OFF is displayed in the message center.
3. Press up/down arrow to toggle the setting ON or OFF.
4. Press Enter to save the setting.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

## Selecting a Primary Tank

On units equipped with the Gas Guard option, a primary tank can be selected. The primary tank will be either Tank 1 or 2. The factory setting is Tank1.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until TANK SELECT X is displayed in the message center.
3. Press up/down arrow to toggle setting between 1 and 2 .
4. Press Enter to save the setting.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

## Disabling the Gas Guard System

On units equipped with the Gas Guard option, the Gas Guard system may be turned ON, or OFF if it is not in use. The factory setting is ON.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until GAS GUARD ON/OFF is displayed in the message center.
3. Press up/down arrow to toggle the setting ON or OFF.
4. Press Enter to save the setting.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

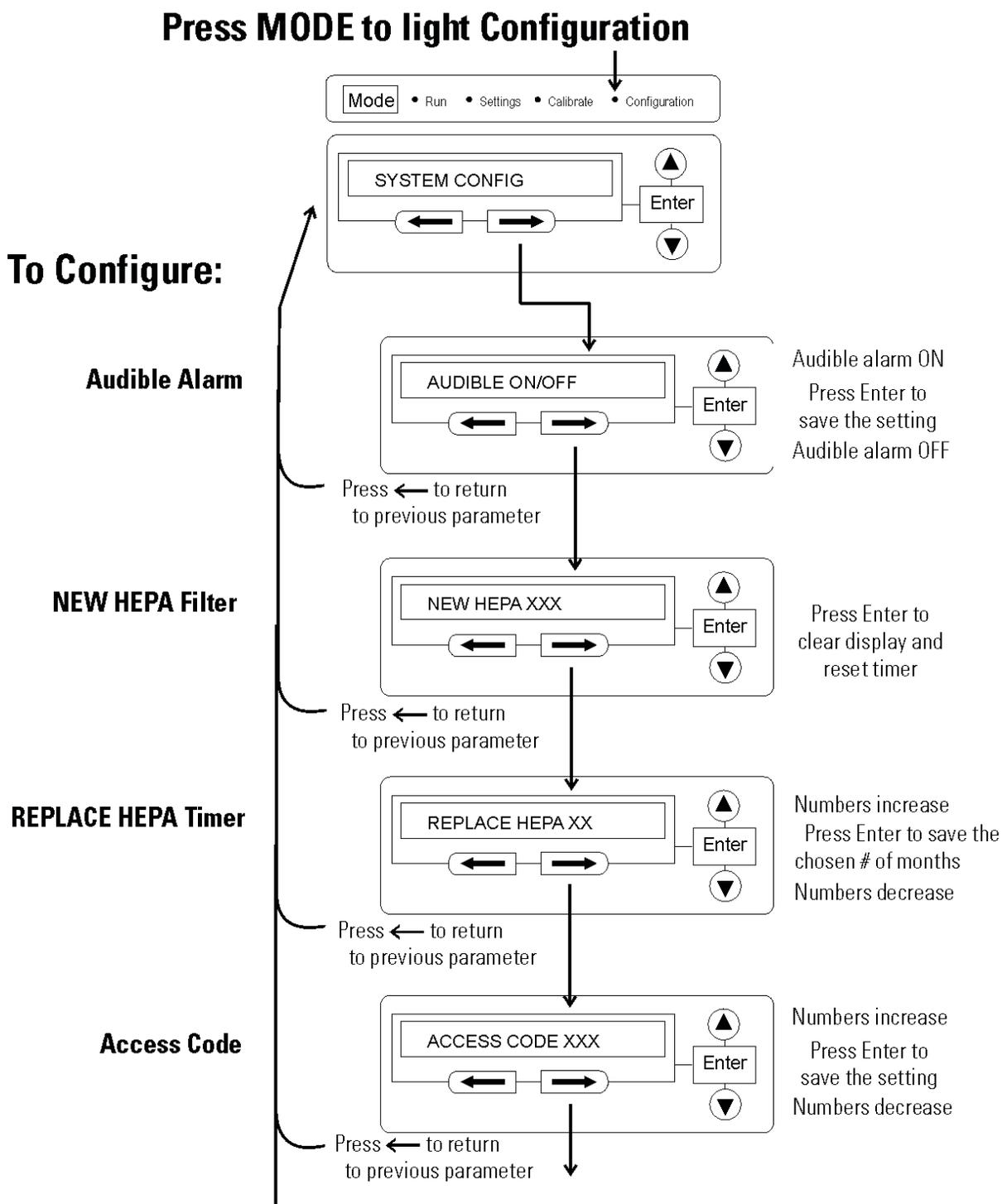
## Setting a RS485 Communications Address

On units that have the RS485 option, direct communication with the Model 1535 alarm system can be established. Each piece of equipment connected to the Model 1535 must have a unique address. An address of 0-24 can be entered for the incubator. A setting of 0 is an invalid address that the 1535 will ignore. The factory setting for the RS485 address is 0.

1. Press the Mode key until the Configuration indicator lights.
2. Press the right arrow until 485 ADDRESS XX is displayed in the message center.
3. Press up/down arrow to change the RS485 address.
4. Press Enter to save the RS485 address.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

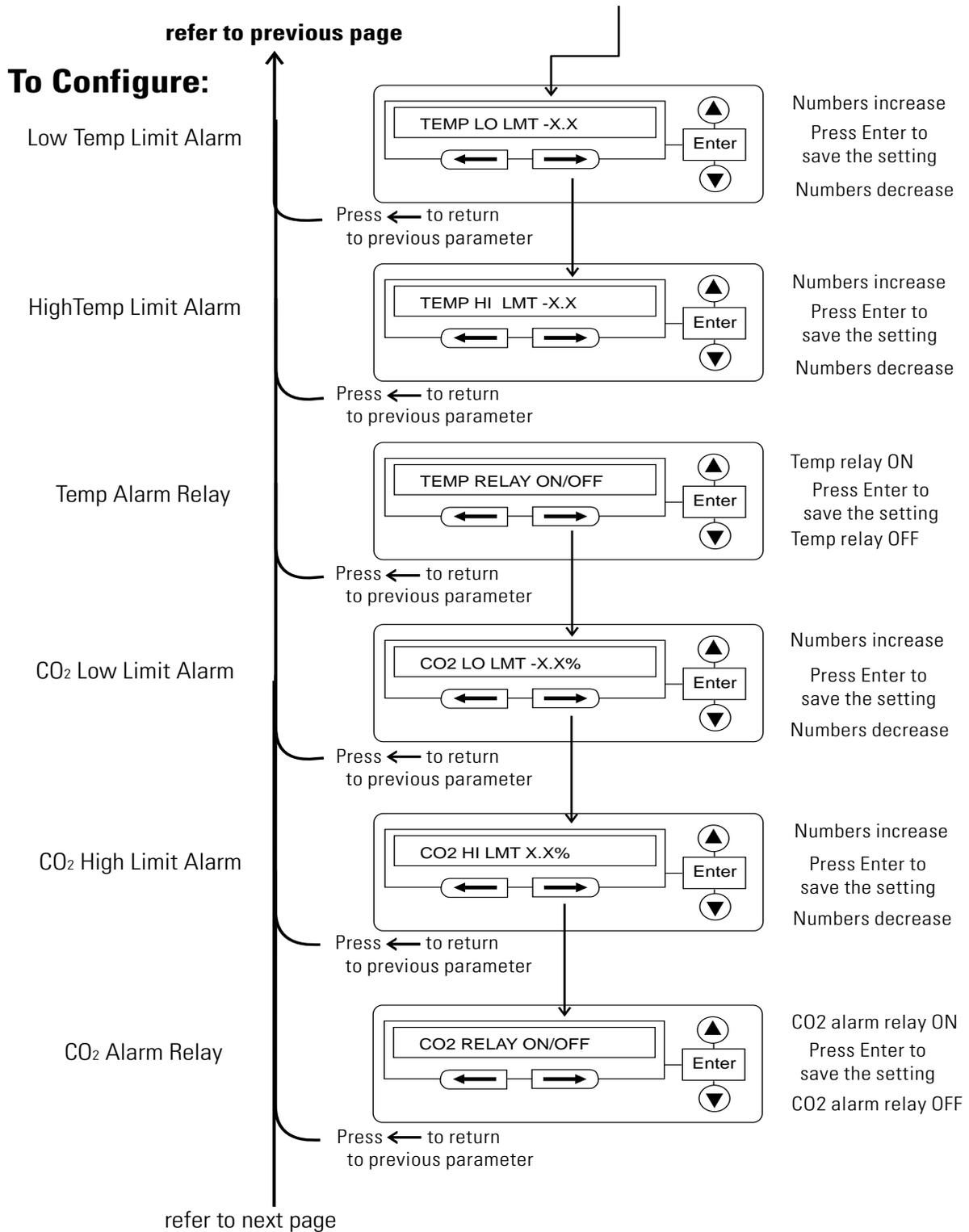
# Chart 4-1

## Configuration Mode

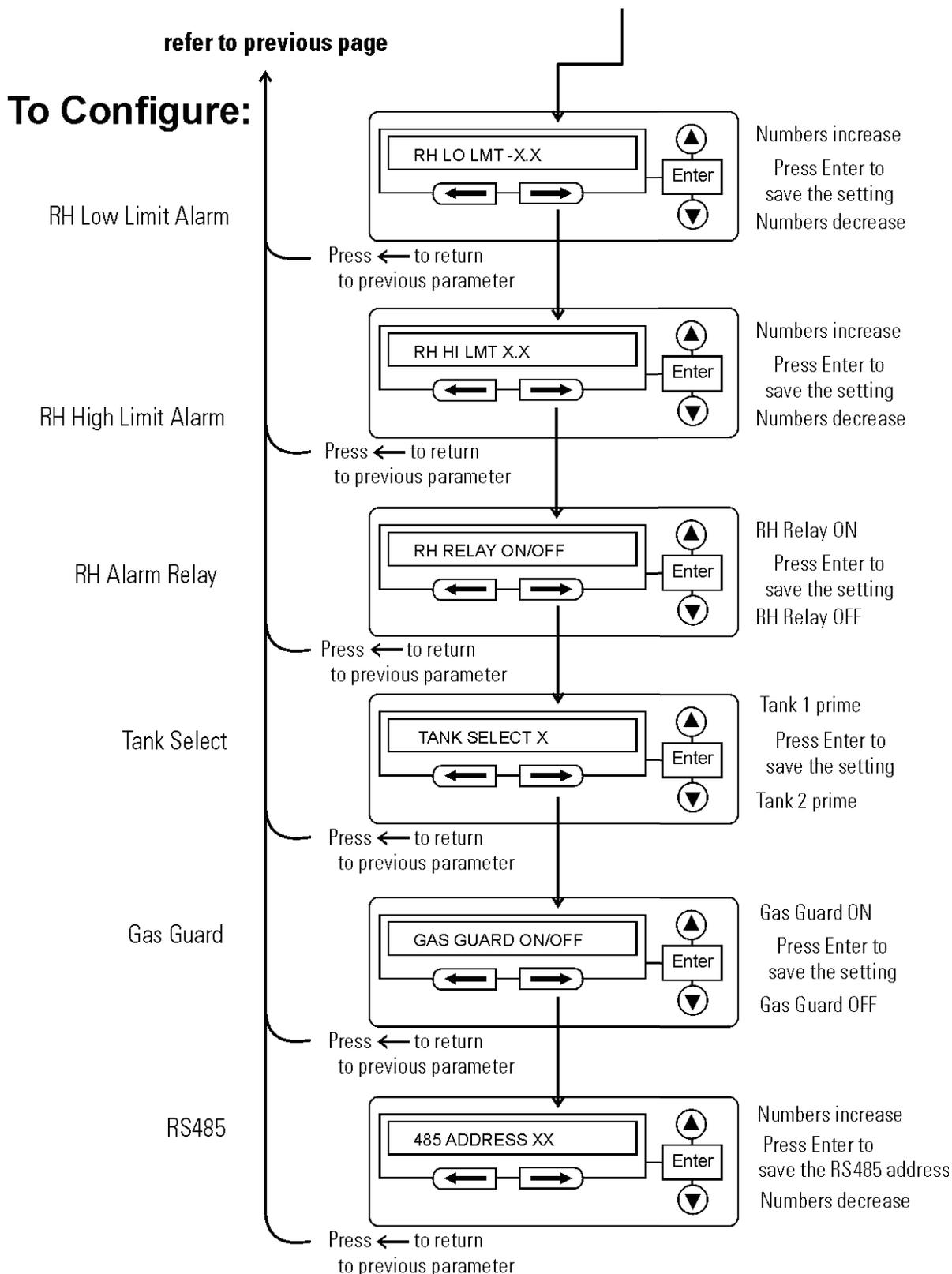


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## Configuration Mode, Chart 4-1, Page 2 of 3



## Configuration Mode, Chart 4-1, Page 3 of 3



**Section 4**  
Configuration

## Section 5 Alarms

The Steri-Cult incubator alarm system is shown in the table below. When an alarm is active, the message appears in the LED message center. Pressing Silence disables the audible alarm for the ringback period. However, the visual alarm continues until the incubator returns to a normal condition. The alarms are momentary alarms only. When an alarm condition occurs and then returns to normal, the incubator automatically clears the alarm condition and the message center.

**Table 5-1.** Alarms and Descriptions

Description	Message	Delay	Ringback	Relay
No alarm condition exists	SYSTEM OK, CLASS 100 or RH WAITS ON TEMP	-----	-----	-----
Temp > OVERTEMP Setpoint	SYSTEM IN OTEMP	0 min.	15 min.	Yes
Temperature Controller Failure	TEMP CNTRL ERROR	0 min.	15 min.	Yes
Air Temp Sensor Fault	AIR SENSOR ERROR	0 min.	15 min.	No
CO <sub>2</sub> Sensor Fault	CO <sub>2</sub> SENSOR ERROR	0 min.	15 min.	No
RH Conditioner Sensor Fault	RH COND SNSR ERR	0 min.	15 min.	No
Water Bottle Empty	WATER EMPTY	5 min.	15 min.	No
Inner Door is Open	DOOR IS OPEN	15 min.	15 min.	No
CO <sub>2</sub> > CO <sub>2</sub> High Tracking Alarm	CO <sub>2</sub> IS HIGH	0 min.	15 min.	Prog.
CO <sub>2</sub> < CO <sub>2</sub> Low Tracking Alarm	CO <sub>2</sub> IS LOW	15 min.	15 min.	Prog.
No water flow through the water valve	NO WATER FLOW	5 min.	15 min.	No
TEMP < TEMP Low Tracking Alarm	TEMP IS LOW	15 min.	15 min.	Prog.
RH < RH Low Limit Alarm	RH IS LOW	30 min.	15 min.	Prog.
RH > RH High Limit Alarm	RH IS HIGH	0 min.	15 min.	Prog.
RH System Fault	CHECK RH SYSTEM	60 min.	15 min.	No
Change HEPA filter reminder-set time expired*	CHANGE HEPA SOON	0 min.	-----	No
RH Conditioner Failure	RH COND HEAT ERR	60 min.	15 min.	No
Tank 1 is low, switch to tank 2 (Gas Guard only)	TANK 1 LOW	0 min.	N/A	No
Tank 2 is low, switch to tank 1 (Gas Guard only)	TANK 2 LOW	0 min.	N/A	No
Tank 1 and 2 are low (Gas Guard Only)	TANK 1&2 LOW	0 min.	15 min.	No
Water Bottle is Low*	WATER LOW	0 min.	N/A	No

\* *Visual only, no audible alarm* -All alarm delays and ringback times are ±30 seconds-

When multiple alarm conditions occur, active messages display in the message center one at a time, updating at 5 second intervals. Pressing Silence during multiple alarms causes all active alarms to be silenced and ringback in 15 minutes.

The temperature alarms are disabled when the temperature setpoint is 10°C. The CO<sub>2</sub> alarms are disabled when the CO<sub>2</sub> set point is 0.0%. RH alarms are disabled when the setpoint is 0%.

## Temp Controller Failure TEMP CNTRL ERROR

In addition to other safety features designed into Steri-Cult incubators, a thermostat is provided to monitor the cabinet temperature. In the event of a temperature control failure, the thermostat will turn off all heaters at a cabinet temperature of 160°C ( $\pm 5\%$ ). This is intended to be a safety feature to protect the incubator, and is not intended to protect the cell cultures or the equipment inside the chamber should a temperature control failure occur. Should such a failure occur, contact the Technical Services Department or your local distributor.

## RH System Fault

This alarm occurs if the humidifier has been detected as being on for an abnormal length of time. Possible causes are:

1. RH calibrated too low.
2. Humidifier tubing pinched or disconnected.
3. Access port is plugged.
4. Ultrasonic humidifier has heavy build-up. See Section 6, Cleaning the Humidity System.
5. If none of the above, contact the Technical Services department.

## Sensor Fault Alarms

The microprocessor in Steri-Cult incubators continually scans all available sensors to ensure that they are operating properly. Should an error be detected, the incubator sounds an alarm and displays the appropriate message. Contact the Technical Services Department or your local distributor.

## Gas Guard Alarms

If the Gas Guard option is installed, the choice of tank is available in Configuration mode. If the tank in use goes low, the unit automatically switches to the other tank. However, an audible alarm and warning light activate indicating the low tank condition. Pressing Silence clears the alarm condition and does not ringback. The warning light on the display remains activated until the tank is replaced and both tanks are normal.

If the tank not in use goes low, the warning light is activated.  
If both tanks go low, the audible alarm and warning light are activated.

## Water Level Alarms

When the water level in the bottle falls to approximately 3 inches (7.6 cm), a visual alarm with display message “WATER LOW” occurs. Pressing Silence clears the alarm condition and does not ringback. The blue backlight on the water bottle flashes until the bottle is filled.

If the water bottle fill switch is empty/low and the humidity reservoir fill switch is empty/low, an audible alarm with display message “WATER EMPTY” occurs. Pressing Silence mutes the audible alarm but it rings back in 15 minutes. The blue backlight on the water bottle flashes until the bottle is filled.

If the water level inside the humidification system is not as required, yet the water level in the bottle is not low, then an audible alarm with display message “NO WATER FLOW” occurs. Pressing Silence mutes the audible alarm but it rings back in 15 minutes until the condition is resolved.

## Door Open Alarm

When the door is opened on the Steri-Cult incubator, heat and CO<sub>2</sub> injection are disabled. The door must be securely latched for heat and CO<sub>2</sub> injection to resume after a door opening.

If the door is latched, yet the display still shows “Door Ajar”, the door switch could be faulty. Call Technical Services.

**Section 5**  
Alarms

## Section 6 Troubleshooting

Certain conditions can occur in usage of this incubator which can be resolved by checking the troubleshooting chart below. If the issue is not listed or cannot be resolved, contact the Services department.

**Table 6-1.** Troubleshooting Guide

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Poor temperature recovery and/or temperature overshoot	HEPA filter is dirty	If the HEPA filter is older than six months, replace with new.
	Temperature probe not reinstalled correctly.	Ensure temperature probe holder bottoms-out in hole.
Poor CO <sub>2</sub> recovery and/or actual higher than display	CO <sub>2</sub> sensor not reinstalled correctly.	Ensure CO <sub>2</sub> sensor bottoms-out in hole.
Poor RH recovery	Access port is plugged.	Install access port filter assembly. If it is older than six months, replace with new.
	Humidifier tubing pinched or disconnected.	Check to ensure tubing is not pinched or disconnected.
	Humidifier has heavy build-up.	Clean the humidifier; see Section 6.
	RH sensor not reinstalled correctly.	Ensure RH sensor bottoms out in hole.
Condensation on cabinet face	Removable gasket not reinstalled properly.	Ensure there are not gaps between the gasket and the glass door.
Condensation on cabinet interior	RH out of calibration.	Calibrate the RH, see Section 3.
	RH sensor not reinstalled correctly.	Ensure RH sensor bottoms-out in hole.

# PREVENTIVE MAINTENANCE

## Incubators

Your equipment has been thoroughly tested before shipment. Regular preventive maintenance is important to keep your unit functioning properly. The operator should perform routine cleaning and maintenance on a regular basis. For maximum performance and efficiency, it is recommended the unit be checked and calibrated periodically by a qualified service technician.

The following is a condensed list of preventive maintenance requirements. See the specified section of the instruction manual for further details.

We have qualified service technicians, using NIST traceable instruments, available in many areas. For more information on Preventive Maintenance or Extended Warranties, please contact us at the number listed below.

Cleaning and calibration adjustment intervals are dependent upon use, environmental conditions and accuracy required.

### Tips for all incubators:

- Do NOT use bleach or any disinfectant that has high chlorine content.
- Use water with characteristics as described in Filling the Water Bottle.
- Avoid spraying cleaner on the CO<sub>2</sub> sensor.
- Do not use powdered gloves for tissue cultures.

### Preventive Maintenance for Steri-Cult Incubators

Refer to Manual Section	Action	Daily	Weekly	Monthly	6 Months	Yearly
--	Check CO <sub>2</sub> tank levels (tanks w/o an optional gas guard monitor.	✓				
--	Perform preventive maintenance per instruction sheet 7270102 using PM kit #2270102					✓
2	* Verify and document CO <sub>2</sub> , humidity and temperature calibration, as applicable.					✓
6	Disinfect the interior of the incubator.				✓	
7	Perform Sterilization Cycle as needed.					
--	Inspect the inner and outer door latches and hinges for proper operation and excessive mechanical wear; inspect the line cord insulation and inner door silicone gasket for chips and cracks. Replace as required.					✓
--	Tubing Maintenance and Inspection: Inspect all tubing and connections & Replace any tubing that shows signs of degradation or damage.				✓	

## Section 7 Routine Maintenance

### Cleaning the Incubator Interior

**Caution** Before using any cleaning method except those recommended by the manufacturer, users must check with the manufacturer that the proposed method will not damage the equipment. ▲

**Warning** It is the responsibility of the user to immediately clean up after all accidental spills of hazardous materials. Be certain to follow local EHS policies with regards to personal protective equipment, cleaning and disposal. ▲

Use an appropriate disinfectant, such as quaternary ammonium. All articles and surfaces must be thoroughly cleaned, rinsed with sterile water, and rough-dried.

**Warning** Alcohol, even a 70% solution, is volatile and flammable. Use it only in a well ventilated area that is free from open flame. If any component is cleaned with alcohol, do not expose the component to open flame or other possible hazard. ▲

**Caution** Do not use strong alkaline or caustic agents. Stainless steel is corrosion resistant, not corrosion-proof. Do not use solutions of sodium hypochlorite (bleach) as they may also cause pitting and rusting. ▲

A HEPA filter replacement kit (see parts list section) should be on hand prior to cleaning the interior of the incubator.

**Warning** If the unit has been in service, disconnect the power cord from both the unit and the power source, turn off all gas regulators, and allow the unit to cool before disinfecting. ▲

1. Remove the shelves, access port filter assembly, HEPA filter and the left and right pilasters. Discard the HEPA filter and the access port filter assembly.
2. Wash the shelves and pilasters with disinfectant, then rinse with sterile water. **Optional:** The shelves and pilasters may be autoclaved.
3. Wash the inner door gasket with disinfectant. This gasket may be removed to be cleaned, or replaced.

## Cleaning the Interior (continued)

4. Wash the cabinet interior with disinfectant, starting at the top and working down. Refer to the disinfectant label for instruction on the length of time needed before rinsing. Wash the inner door(s) both inside and out. The cabinet and door must be rinsed with sterile water until the disinfectant has been removed. After the cabinet has been rinsed, spray with 70% alcohol.

**Some precautions in the cleaning and care of the incubator glass doors:** Moisture leaches alkaline materials (sodium, Na) from the surface of the glass. Evaporation of the moisture concentrates the alkaline and may produce a white staining or clouding of the glass surface. Cleaning chemicals with a PH above 9 and heat (autoclaving) accelerate the corrosion process. Therefore, it is very important to rinse and dry the glass doors after cleaning. Autoclaving the glass doors should be avoided. There is no simple method for repairing corroded glass. In most cases, the glass must be replaced.

**Caution** Do not spray or wipe sensors. ▲

5. Install the left and right pilasters, inner door gasket and access port filter assembly, spraying each with 70% alcohol.
6. Install a new HEPA filter.
7. Install the shelves and spray with 70% alcohol.

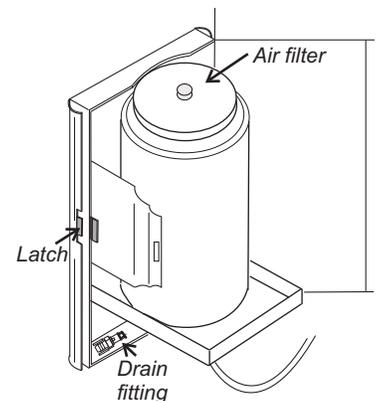
## Cleaning the Cabinet Exterior

Clean the incubator exterior with a damp sponge or soft, well-wrung cloth and mild detergent dissolved in water. Dry with a soft cloth.

## Cleaning the Humidity System

Make sure power is on and the RH setpoint has been changed from factory default.

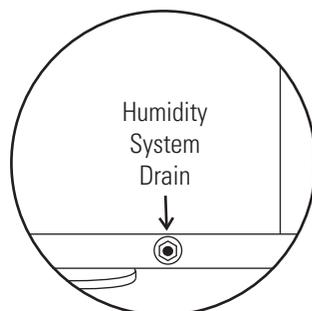
1. Open outer chamber door.
2. Open the access door located on the front of the unit, below the control panel.
3. Locate the humidity system drain fitting attached to the bottom of this door. See Figure 7-1.
4. Install the hose barb end of this fitting to the supplied tubing and route to a drain or suitable 0.5 gallon (3.8 liter) container.



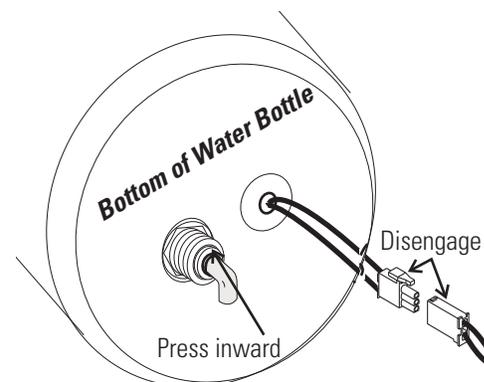
**Figure 7-1.** Water Bottle

## Cleaning the Humidity System (continued)

- Connect the other end of the fitting to the quick-connect drain located below the fold-down storage door. See Figure 7-2. Allow water to drain. This may take several minutes.



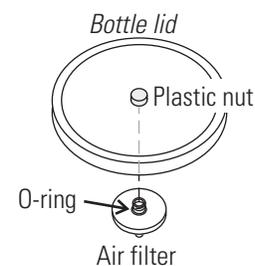
**Figure 7-2.** RH Drain



**Figure 7-3.** Drain Water Bottle

- Turn power off.
- Attached to the bottom of the water bottle is a length of tubing and low voltage wiring (Figure 7-3). Disconnect the tubing by pressing inward on the collar where the tubing connects to the bottle. Pull the tubing free. Disengage the wiring at the connector.
- Lift the water bottle from the bottle platform. Empty any water out of the bottle.

- Replace the filter in the lid by first unscrewing the clear plastic nut on the outside of the lid. Catch the filter as it loosens from the inside of the lid. Remove the small black o-ring from the filter and discard the filter. Assemble this o-ring onto the new filter and install as previously. Tighten the plastic nut only finger-tight to prevent stripping.

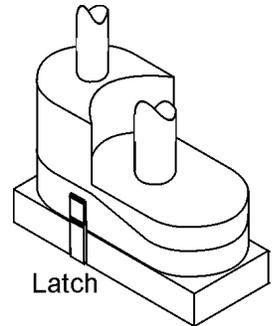


**Figure 7-4.** Filter Assembly

- Clean the humidity bottle and lid with soap and water and a general-use laboratory disinfectant. Rinse with sterile water and spray with 70% alcohol.
- Also behind the access door is the humidifier. See Figure 7-5. Lift the latches on both sides of this small unit.
- Separate the top and bottom sections. Carefully clean the inside of both sections and spray with 70% alcohol.

## Cleaning the Humidity System (continued)

**Caution** Do not touch the metal disk in the bottom of the humidifier with bare fingers as any fingerprints or other residue can affect humidity recovery. ▲



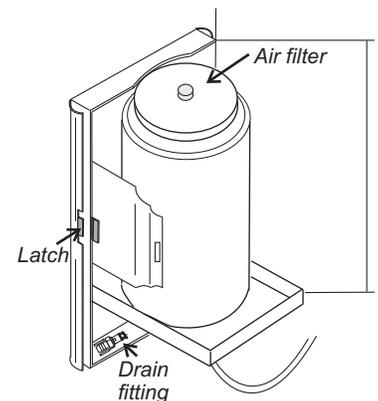
**Figure 7-5.** Humidifier

13. Reinstall the top section of the humidifier. Fasten the latches on each side.
14. Reconnect the tubing and wiring to the water bottle as previously.

## Flushing the Humidity System

1. Locate the humidity system drain fitting attached to the inside of the water bottle access door. See Figure 7-6.
2. Install the hose barb end of this fitting to the supplied tubing and route to a drain or suitable 0.5 gallon (3.8 liter) container.

3. Connect the other end of the fitting to the quick-connect drain located below the fold-down storage door (Figure 7-2). With the incubator turned On, allow the entire humidity system to drain. This could take several minutes.



**Figure 7-6.** Water Bottle

4. Prepare 0.5 gallon (3.8 liters) of decontamination solution per the instructions on the container. Sudsy ammonia works well to kill waterborne contaminants, such as pseudomonas.
5. Disconnect the drain fitting.
6. Fill the incubator water bottle with the decontamination solution. Change the incubator humidity system setpoint to 95% (Section 2).
7. Open both doors to the incubator. Tape down the door switch (Figure 7-7) on the face of the unit. This ensures the humidity nebulizer operates in a 8 seconds on, 2 seconds off continuous cycle.
8. Allow the incubator to run approximately 30 minutes to fill and agitate the solution in the humidity system.
9. Reconnect the drain fitting and drain the system again.

## Flushing the Humidity System (continued)

10. Disconnect the drain fitting and fill the incubator water bottle with distilled water. Allow the incubator to run for 15 minutes.
11. Connect the drain fitting and allow the system to drain.
12. Repeat the Steps 9 and 10 until all decontaminant is rinsed from the incubator humidity system.
13. Remove the tape from the door switch. Fill the humidity system per the instructions in Section 1 and return the unit to service.



**Figure 7-7.** Door Switch

Replace the HEPA filter when the REPLACE HEPA reminder is displayed, or after a Sterilization cycle.

**Caution** The HEPA filter must be removed before the Sterilization cycle. The filtering material cannot withstand the 140°C heat. It will melt onto the shelves and be difficult to remove. ▲

## HEPA Filter Maintenance

The REPLACE HEPA reminder can be set to alarm after a specified time from 1 to 12 months. The reminder default is the factory recommended setting of 6 months. For details on setting the reminder, see Section 4.

Replace the HEPA filter (Figures 7-8a and 7-8b) using the steps below.

1. Locate and loosen the two large wingnuts in the top of the inner chamber. Slide the filter bracket toward the chamber opening until the filter swings down.
2. Lift the back edge of the HEPA filter until it unhooks from the metal lip in the back of the chamber. Discard the filter.

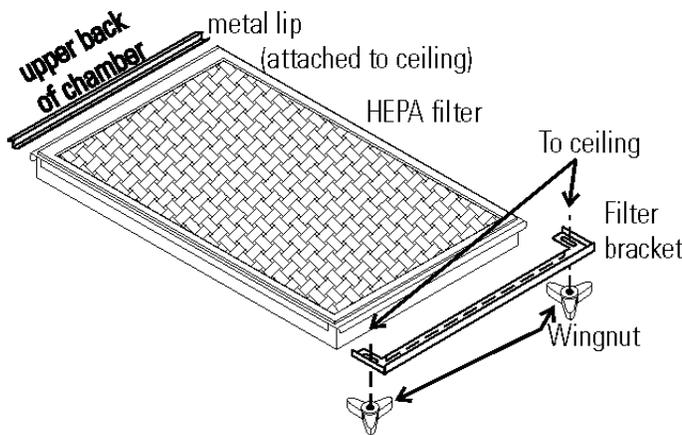


Figure 7-8a. HEPA Orientation for 3307/3308

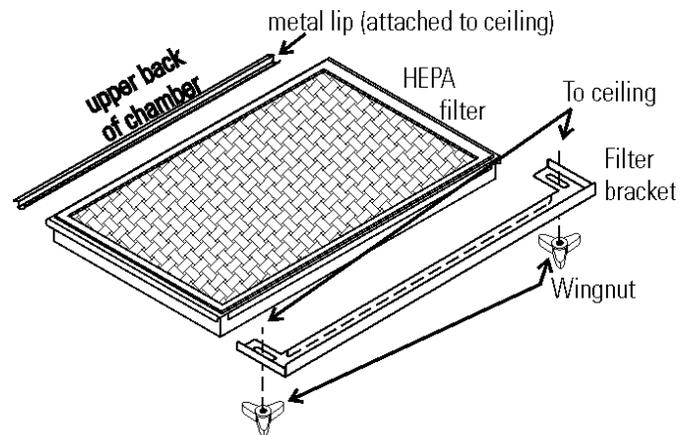


Figure 7-8b. HEPA Orientation for 3310/3311

3. Install a new HEPA by first hooking the back edge of the filter as previously.
4. After the back edge is hooked, lift the front of the HEPA to the top of the chamber. Slide the filter bracket over the HEPA frame to secure it. Tighten the two wingnuts.

## Section 8 Sterilization Cycle

### Sterilization Cycle

#### Information You Need to Know Before Starting a Cycle

- If the Sterilization Cycle is to be performed on initial start-up with new unused filters, do not install the access port or HEPA filters until AFTER the Sterilization Cycle. If the unit has been in service, the HEPA must be removed BEFORE the Sterilization cycle. The filtering material cannot withstand the 140° heat. It will melt onto the shelves and be difficult to remove.
- The Sterilization Cycle requires approximately 14 hours - heat-up (2.5-5 hours), sterilize (2 hours), and cool down (8-10 hours). Additional time is needed to verify the calibration of temperature and CO<sub>2</sub> after the cycle is complete.
- During the Sterilization Cycle, the incubator updates the temperature to the analog output board and the 1535, however CO<sub>2</sub> and RH will be fixed at setpoint.
- A HEPA filter replacement kit (see the spare parts list) should be on hand prior to initiating the Sterilization Cycle.

#### Information About the Cycle

- Pre-cleaning may be required. In order to avoid odors, stains on the interior, baked-on material, etc., wipe off all visible signs of spills.
- Odor may occur during the Sterilization Cycle and is considered normal.
- The Sterilization Cycle is not intended to sterilize other items; instruments, etc., from the lab.
- During the cycle, the unit chamber becomes hot enough to melt samples, instruments, dishes, etc., left inside the unit. The RH and CO<sub>2</sub> sensors also need to be removed.
- During the Sterilization Cycle, discoloration of some materials may occur. For example, stainless steel turns a straw color after a period of exposure to high temperatures. This is normal.

**Section 8**  
Sterilization Cycle

**Table 8-1.** Checkpoints

What if?	Then
Cycle does not initiate or terminates in mid-cycle	Check for alarms: TEMP IS HIGH, AIR SENSOR ERROR, TEMP CNTRL ERROR
Units are stacked	A Sterilization Cycle performed on either unit affects performance on second unit. Do not use second unit during Sterilization Cycle. The Sterilization Cycle may be performed on both units simultaneously, with proper electrical connection.
No action is taken within 10 minutes, following REMOVE HEPAs display prompt	Unit returns to normal operation, SYSTEM OK
No action is taken within 5 minutes, following REMOVE SENSORS display prompt	Unit returns to normal operation, SYSTEM OK
Need to cancel cycle in progress	Hold down Sterilization Cycle initiation button for 3 seconds
Sensor hole plugs are not installed	The cycle will not continue. REMOVE SENSORS shows in the display. If not installed within 5 minutes, unit returns to normal operation, SYSTEM OK.
The outer door is opened during the Heat or Sterilization phases	An outer door alarm occurs: CLOSE DOOR in the display, plus an audible (cannot be silenced) and visual alarm.
The outer door is open longer than 20 seconds during phases listed above	Cycle is cancelled, unit goes to CANCELLED COOL PHASE*
The outer door is open during the Cool Down phase when the temp is 60°C or greater	An outer door alarm occurs (cannot be silenced)
Power interruption during the HEAT PHASE	HEAT PHASE resumes if the chamber temperature was less than 90°C when power was interrupted  HEAT PHASE resumes if the chamber temperature was greater than 90°C when power was interrupted, and the temperature dropped less than 1°C  CANCELED COOL PHASE* starts if the chamber temp drop is more than 1°C
Power interruption during the STERILIZATION PHASE	HEAT PHASE begins if the chamber temperature has not dropped below 139°C  STERILIZATION PHASE starts again when the chamber temperature reaches 140°C  CANCELED COOL PHASE* starts if the chamber temp dropped below 139°C
Sensor hole plugs are not removed at the end of the cycle.	INSTALL SENSORS is displayed until the sensor hole plugs are removed. All control is delayed for 1 minute to allow time to reinstall the sensors.
Sensor hole plugs are removed, but sensors are not reinstalled correctly.	RH level in chamber reaches saturation and CO <sub>2</sub> level becomes dangerously high.

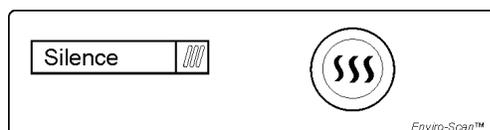
\* CANCELED COOL PHASE - The display toggles between "CYCLE CANCELLED" and "COOL PHASE"

When the temperature cools down to the original set operating temperature or 30°C, whichever is higher, the display toggles between "CYCLE CANCELLED", "REPLACE HEPAs", "REPLACE SENSORS", and "PRESS ENTER". The green LED is lighted but no longer flashes. After the unit is powered back on with the CO<sub>2</sub> sensor reinstalled, the display returns to "SYSTEM OK".

## Sterilization Cycle

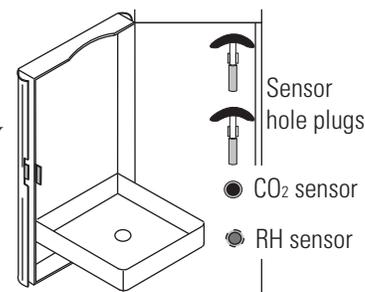
**Warning** The Sterilization Cycle will heat the incubator interior surfaces to 140°C. Contact with any surface inside the outer door during this cycle may result in burns. ▲

1. Remove any samples, instruments, dishes, etc. from the chamber. Set the inventory system magnet plate aside, if used.
2. Press and hold the Sterilization Cycle initiation button on the control panel (Figure 8-1) for approximately 3 seconds until it lights.



**Figure 8-1.** Sterilization Cycle Initiation Button

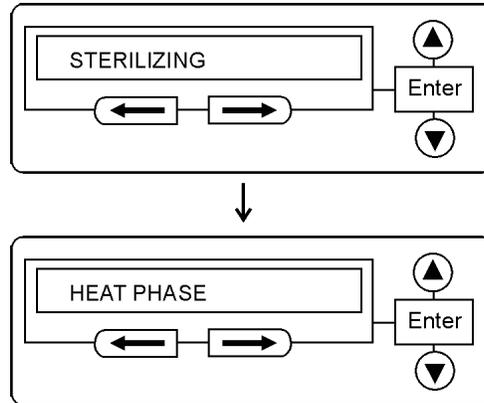
3. Enter the access code, if applicable. An access code is recommended to prevent accidental cycle initiation.
4. Pre Sterilization - The display toggles between “REMOVE HEPAs” and “PRESS ENTER”. If no response within 10 minutes, the display returns to “SYSTEM OK”. If the filter is removed (refer to Section 7, HEPA Filter Maintenance) and Enter is pressed within 10 minutes, the display begins to toggle between “OPEN ACCESS DOOR”, “REMOVE SENSORS” and “PRESS ENTER”. If no response within 5 minutes, the display returns to “SYSTEM OK”.
5. Remove the RH and CO<sub>2</sub> sensors. To access the sensors, open the access door containing the humidity system water bottle. (The illustration shows the bottle removed for clarity). Locate the RH and CO<sub>2</sub> sensors (Figure 8-2).



**Figure 8-2.** Hole Plugs and Sensors

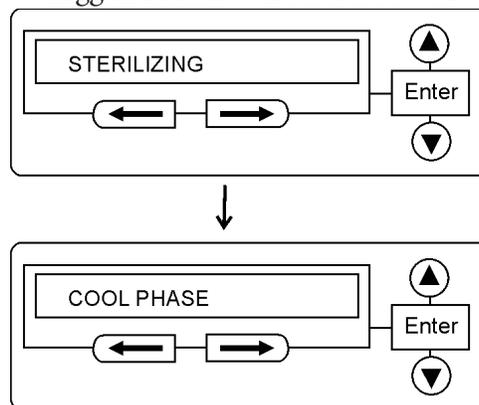
6. Pull the sensors outward carefully. Allow them to hang. See Step 12 for the sensor disinfecting procedure.
7. Secured in the same area are sensor hole plugs. Install a plug into each sensor location. Close the access door.
8. After ENTER is pressed with the sensor hole plugs installed, the Heat Phase initiates. The cycle initiation button flashes and the display toggles between “STERILIZING” and “HEAT PHASE”. During this period, the HEAT light will be on and the cabinet heats to sterilization temperature.

## Sterilization Cycle (continued)



**Figure 8-3.** Heat Phase in Sterilization Cycle

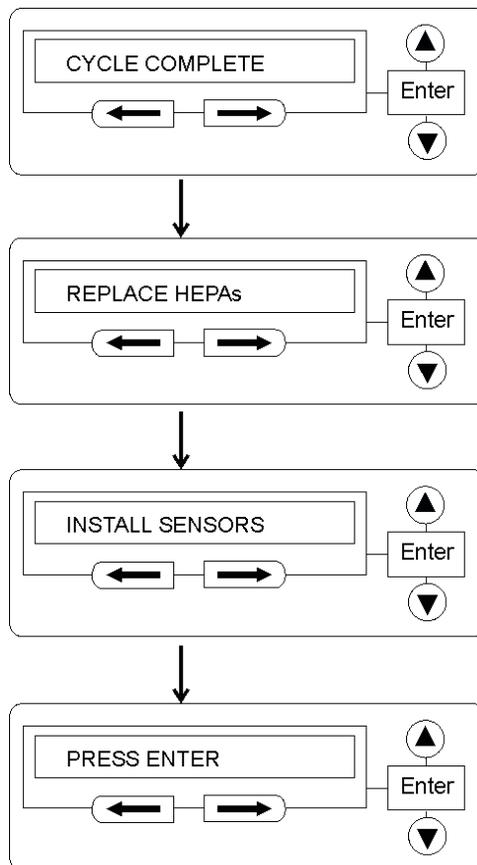
9. When the air temperature in the unit reaches 140.0°C, the Sterilization Phase begins and the display shows "STERILIZING". Heat  °C
10. After approximately 2 hours, a 5-second audible tone sounds, signaling that sterilization is complete. The Cool Phase begins. The display toggles between "STERILIZING" and "COOL PHASE".



**Figure 8-4.** Cool Phase in Sterilization Cycle

## Sterilization Cycle (continued)

- Completed Sterilization Cycle - When the temperature cools down to the original set operating temperature or 30°C, whichever is higher, the display toggles between “CYCLE COMPLETE”, “REPLACE HEPAs”, “INSTALL SENSORS” and “PRESS ENTER”. The cycle initiation button is lighted but no longer flashes.



**Figure 8-5.** Cycle Complete

- Disinfect the RH and CO<sub>2</sub> sensors with either isopropanol or Lysol No-Rinse Sanitizer. Spray cleaner on a clean, soft cloth and wipe each sensor.

**Caution** Do not saturate the sensors or immerse the sensors in a cleaner. ▲

- Open the side panel, and replace the sensor hole plugs into their clips. Install the cleaned RH and CO<sub>2</sub> sensors in their respective holes. Be sure the sensors reach the hole limit.

**Caution** RH and CO<sub>2</sub> sensors must be reinstalled correctly for systems to properly sense chamber conditions! If not, RH and CO<sub>2</sub> levels may be uncontrolled. ▲

## Sterilization Cycle (continued)

14. Open the chamber and replace the present HEPA with a new one. For instructions to install, see Section 1.
15. Install the new access port filter assembly into the upper left corner of the back of the chamber (Section 1). Press ENTER.
16. When ENTER is pressed, the cycle initiation button goes out, the display returns to “SYSTEM OK” and the HEPA filter replacement timer is reset.
17. Reinstall the inventory system magnet plate, if used.
18. Allow to stabilize for at least 2 hours at the required temperature and CO<sub>2</sub> level.
19. Verify the calibration of the sensors. See Section 3, CO<sub>2</sub> or RH.

**Note** The sterilization process can cause the inner door knob to become difficult to turn. A small amount of mineral oil, vegetable oil or similar oil applied to the knob should remedy this.

## Section 9 Factory Installed Options

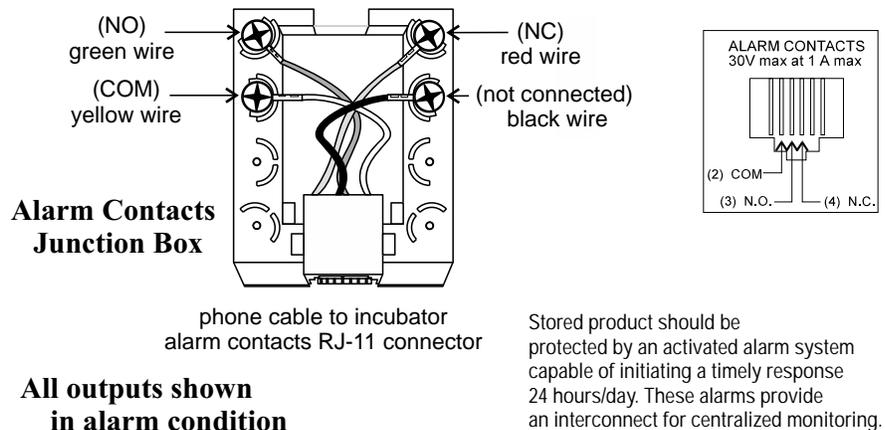
Information about connecting to external equipment follows.

### Remote Alarm Contacts

A set of relay contacts is provided to monitor alarms through an RJ11 telephone style connector on the back of the cabinet. Refer to Figure 9-2 for the location of the alarm connector. The 12-foot telephone cord (P/N 190388) and RJ11-to-screw terminal conversion box (P/N 190392) are available through our Services department.

The remote alarm provides a NO (normally open) output, an NC (normally closed) output and COM (common). Refer to Figure 9-1.

The contacts will trip on a power outage or a temperature controller failure. The contacts may also be programmed to trip or not trip on temperature alarms, CO<sub>2</sub> alarms and RH alarm. See Section 4, Configuration.



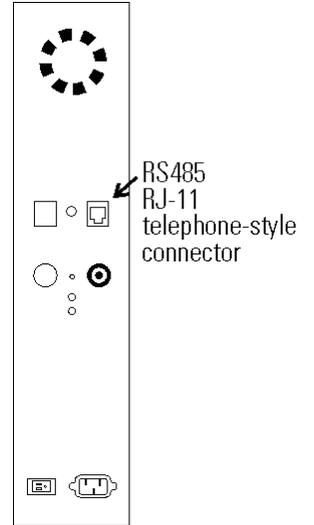
**Figure 9-1.** Remote Alarm Outputs

**Note** After connecting the incubator to the external alarm system, verify proper alarm operation by simply placing the incubator power switch to its off position to simulate a power outage condition.

## RS485 Interface

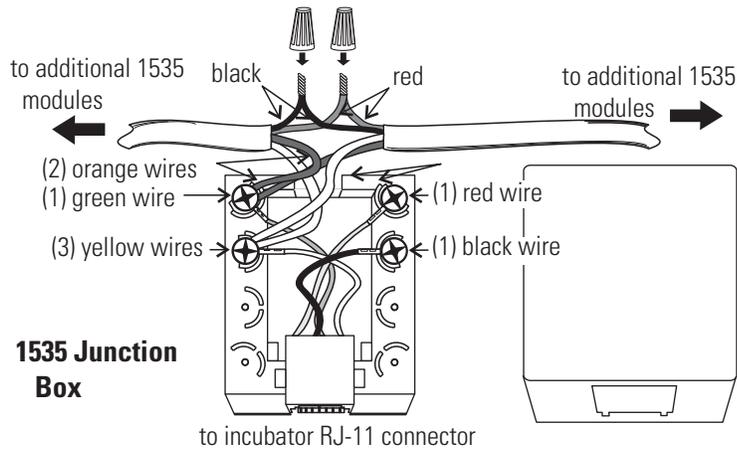
All Steri-Cult incubator models can be purchased with the RS485 communications option (P/N 1900152). This option allows the incubator to be directly connected to a Model 1535 alarm system without the use of a communications module. A junction box is provided with each RS485 option. See Figure 9-3 for wiring details. Figure 9-2 shows the location of the RS485 connector on the back of the incubator cabinet.

To allow the incubator and the 1535 to communicate, an address must be allocated on the 1535. Refer to the 1535 operating manual. The same address number must be assigned to the incubator. Refer to Section 4 of this manual.



**Figure 9-2.** RS485 Connector location

**Note** After connecting the Model 1535 Alarm System to the incubator, verify that there are no RS485 communication errors per the Model 1535 operating manual. Simulate incubator failures of each module to verify proper Model 1535 operation.



**Figure 9-3.** RS485 Wiring



## Connecting the Analog Output Boards



The analog output board (P/N 191761, 191762, 191763) is an option that allows the incubator to output analog signals representing the air temperature of the cabinet, CO<sub>2</sub> content and relative humidity, depending upon which systems are in the incubator. There are three different analog output board options available : 0-1 V, 0-5 V, or 4-20 mA signals. Negative display readings will output 0 V. Refer to Table 9-1 for output specifications of the three boards.

For the 0-1 V and 0-5 V boards, the recording device must supply a load > 1000 ohm. For the 4-20 mA board, the recorder must supply a load of < 100 ohm.

To wire in the analog output board, use a shielded 22 gauge, 3-conductor shielded cable (P/N 73041), maximum length 50 ft (15.2 m).

**Warning** The electronics area contains hazardous voltages. Accessing and wiring in an analog board should be performed by qualified personnel only. If the unit has been in service, disconnect the power cord from both the unit and the power source, turn off all gas regulators, and disconnect all tubing and any other connections from the rear of the electronics drawer. ▲

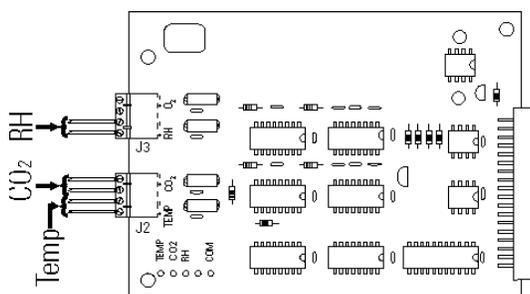
**Table 9-1.** Analog Output Board Specifications

	<b>191761 4-20 mA Output Scaling 4-20 mA Equals</b>	<b>191763 0-1 V Output Scaling 0-1 V Equals</b>	<b>191762 0-5 V Output Scaling 0-5 V Equals</b>
<b>Temperature</b>	12.5-162.5°C	0.0-150.0°C	0.0-150.0°C
<b>RH</b>	0-100 %RH	0-100 %RH	0-100 %RH
<b>CO<sub>2</sub></b>	0.0-100.0 %CO <sub>2</sub>	0-100.0 %CO <sub>2</sub>	0-100.0 %CO <sub>2</sub>

## Connecting Analog Boards (continued)

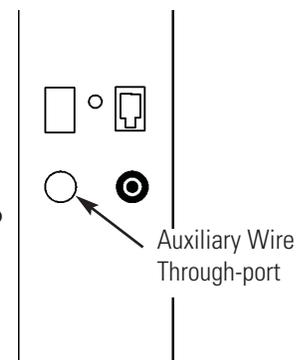
To install the analog board:

1. Turn the incubator Off and disconnect it from the power source.
2. Remove the two screws from the bottom of the left side panel to access the electronics area. Using the handle provided, lift the side panel up and out.
3. On the left side of the opening is the electronics area. Locate the Analog Output board.
4. Each system monitored (Temp, CO<sub>2</sub>, RH) requires two conductors (Refer to Figure 9-4).



**Figure 9-4.** Conductors on Analog Output Board

5. Feed the wires through the auxiliary wire through-port (Figure 9-5) on the back panel. This port is a circular fitting adjacent to the remote alarm and RS485 connectors.
6. Strip the ends of each conductor and wire it to the appropriate terminals of connectors J2 and/or J3 on the analog board. Refer to Figure 9-4.
7. When wiring is completed, install the side panel and secure with the screws.



**Figure 9-5.** Through-port

**NOTE** Accuracy of the analog outputs measured at the circuit board terminal strip with respect to the incubator display is  $\pm 1$  unit. There is no calibration of the analog outputs by the incubator, so the instrument(s) connected to the analog outputs must be calibrated to match the incubator display before returning to service.

## CO<sub>2</sub> Gas Guard

The Steri-Cult incubators can be equipped with a built-in Gas Guard system (P/N 1900153) that will operate with a CO<sub>2</sub> gas supply. The Gas Guard uses two pressure switches to continuously monitor the pressures of two independent CO<sub>2</sub> supplies and automatically switches from one supply to the other when the supply pressure drops below 10 psig (68.94 kPa). The Gas Guard's design does not facilitate use by multiple incubators.

The CO<sub>2</sub> gas supplies must be equipped with two-stage pressure regulators with gauges. The high pressure gauge at the tank should have a 0-2000 psig range and the low pressure gauge should have a 0-30 psig range. The gas supply to the incubator must be maintained at 15 psig (103.4 kPa) maximum. Gas pressures below 15 psig may cause nuisance alarms to occur on incubators equipped with the built-in Gas Guard.

### Connecting the CO<sub>2</sub> Gas Supplies

The CO<sub>2</sub> inlets for the Gas Guard are located on the back of the cabinet. Using 1/4" ID tubing, connect one of the CO<sub>2</sub> supply tanks to the fitting labeled CO<sub>2</sub> Inlet #1. Connect the second CO<sub>2</sub> supply tank to the fitting labeled CO<sub>2</sub> Inlet #2. Install 3/8" hose clamps to secure the 1/4" ID tubing to the barbed fittings on the cabinet back. Refer to Figure 9-6. Check for leaks at all connections.

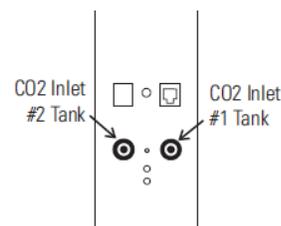


Figure 9-6. Inlet Connections

### De-activating the Gas Guard

The built-in Gas Guard is turned ON when shipped from the factory. In addition, the Tank Select for the Gas Guard is specified as Tank 1 when shipped. Refer to Section 4, Configuration, to de-activate the Gas Guard, or change the Tank Select from #1 to #2. If the Gas Guard system is de-activated, the incubator functions normally by supplying CO<sub>2</sub> from the supply tank connected to Inlet #1.

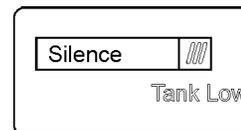
### Operation of the CO<sub>2</sub> Gas Guard

With the Gas Guard in operation, the incubator uses the gas supplied by the tank connected to Inlet #1 until the pressure drops below 10 psig (68.94 kPa). At this time, the Gas Guard automatically switches to the gas supplied through CO<sub>2</sub> Inlet #2.

In addition, the incubator automatically changes the Tank Select in Configuration mode from 1 to 2 to indicate that the incubator is now using gas supplied through Inlet # 2. If the gas supply to Inlet #1 is replenished, the incubator will continue to operate using the gas supplied through Inlet #2 unless the operator changes the Tank Select from #2 to #1 through Configuration mode. Refer to Section 4, Configuration.

## Operation of the CO<sub>2</sub> Gas Guard (continued)

Audible and visual alarms occur on the control panel when the gas guard switches from one supply to the other. The audible alarm sounds until the operator presses the Silence key on the control panel. The visual alarm in the Message Center reads “Tank 1 Low” while the audible alarm is sounding, but the message is removed when the operator presses the Silence key. However, the ‘Tank Low’ indicator on the control panel stays lighted until the condition is resolved. The unit operates normally.



**Figure 9-7.** Tank Low Indicator

Both the audible and visual alarms described above do not ring back after the Silence key is pressed. If the Gas Guard system does not detect an adequate gas supply at CO<sub>2</sub> Inlet #1 or Inlet #2, a visual and audible alarm again occurs on the control panel. The visual alarm in the Message Center reads “Tank 1&2 Low”. The audible alarm continues to ring until the Silence key is pressed. The audible alarm rings back every 15 minutes after the alarm is silenced if the Gas Guard continues to detect that both gas supply pressures are below 10 psig (68.94 kPa).

## Section 10 Specifications\*

### Temperature

Control . . . . .	±0.1°C @ 37.0°C
Setpoint . . . . .	Digital touch pad, 0.1°C resolution
Range . . . . .	5°C over ambient to 50°C, factory default 10.0°C (disabled)
Uniformity . . . . .	±0.2°C@+37°C, in a 23°C ambient @ nominal line voltage
Display . . . . .	Digital, LED, 0.1°C increments
Sensor . . . . .	Thermistor

### Over Temperature Protection

Setpoint . . . . .	Fixed @ 160°C, ±5.6°C
Sensor . . . . .	Thermostat, manual reset
Action . . . . .	removes voltage from heaters to disable heat control

### Relative Humidity

Control . . . . .	±2.0%
Range . . . . .	Ambient level to 90%**
Controller . . . . .	Microprocessor
Humidity system . . . . .	95% RH at 37°C
Setpoint . . . . .	Digital touch pad, 1% resolution
Display . . . . .	Digital LED, 1% resolution

### CO<sub>2</sub>

Control . . . . .	±0.1% @ 5.0%
Sensor . . . . .	Infrared
Setpoint . . . . .	Digital touch pad, 0.1% resolution
Range . . . . .	0 to 20%, factory default 0% (disabled)
Inlet Pressure . . . . .	15 PSIG, ±5 PSIG
Controller . . . . .	Microprocessor
Display . . . . .	Digital LED, 0.1% increments

*\*Specifications are based on nominal voltages of 115 V or 230 V in ambients of 22°C to 25°C.*

*\*\*Humidity greater than or equal to 90% may lead to condensation depending on environmental conditions in the work area.*

### Shelves

Standard . . . . .	5
Maximum . . . . .	22
Construction . . . . .	Stainless steel, perforated
Clearance . . . . .	Adjustable on 1.160" centers
Dimensions (3307/3308) . .	17.7" x 19.9" (45.2 cm x 50.5 cm)
Surface area . . . . .	2.4 sq. ft. per shelf
Dimensions (3310/3311) . . .	25.7" x 19.9" (65.5 cm x 50.5 cm)
Surface area . . . . .	3.6 sq. ft. per shelf
Loading . . . . .	50 lbs. (22.7 kg) stationary

### Sterilization Cycle

Setpoint . . . . .	140°C
Cycle time . .	Approximately 14 hours @ 23°C, nominal line voltage
Activation . . . . .	Digital touch pad

### Construction

Interior volume	
3307/3308 . . . . .	8.2 cu. ft. (232.2 liters)
3310/3311 . . . . .	11.4 cu. ft. (322.8 liters)
Interior. . .	Type 304 stainless steel mirror finish, coved corners
Exterior . . . . .	18 gauge cold rolled steel, powder-coated
Outer door gasket . . . . .	Four-sided, molded, magnetic vinyl
Inner door gasket . . . . .	Silicone feather
Insulation. . . . .	Mineral wool

### Fittings

Access port . . . . .	1.4" (3.6 cm) with removable silicone plug
CO <sub>2</sub> inlet . . . . .	1/4" (0.64 cm) hose barbed
Drain port . . . . .	3/8" (0.95 cm) barbed fitting with shutoff

### Electrical

115 VAC, 50/60 Hz, 1 PH (Operating range 90 - 125 VAC),  
Model 3307 10.5 FLA, Model 3310 11.5 FLA

Circuit breaker power switch . . . 15 A, 2 Pole (Model 3307/3310)

230 VAC, 50/60 Hz, 1 PH (Operating Range 180-250 VAC)  
Model 3308 5.4 FLA, Model 3311 5.9 FLA

Circuit breaker power switch . . . 10 A, 2 Pole (Model 3308/3311)

Power interconnect . . . . . IEC 320, male

Power inlet cord . . . 8' (2.4 m) cord with IEC 320 female plug and  
country specific plug

Accessory outlet . . Standard, 115 V/220 V export, 75 watts max.  
(one per chamber)

Alarm contacts . . .Deviation of temperature, CO<sub>2</sub>, RH, power failure.  
N/O and N/C

### Dimensions

Exterior . . (3307/3308)35.0" W x 39.4" H x 27.0" F-B (88.9 cm x  
100.1 cm x 68.6 cm)

(3310/3311)43.0" W x 39.4" H x 27.0" F-B (109.2 cm x  
100.1 cm x 68.6 cm)

### Weight

Net weight . . . . . Model 3307/3308 - 330 lbs. (149.7 kg), . .  
Model 3310/3311 - 410 lbs. (186.0 kg)

Shipping (motor). . . Model 3307/3308 - 400 lbs. (181.4 kg),  
Model 3310/3311 - 480 lbs. (217.7 kg)

### Certifications

Declarations of Conformity available on request

### Safety Specifications

Indoor Use Only

Altitude . . . . . Up to 2,000 meters

Temperature . . . . . 5°C to 40°C

Humidity . . . Maximum 80% RH for temperatures up to 31°C,  
decreasing linearly to 50% RH at 40°C

Mains Supply Fluctuations . . Mains supply voltage fluctuations not to  
exceed  $\pm 10\%$  of the nominal voltage

Installation Category II <sup>1</sup>

Pollution Degree 2 <sup>2</sup>

Class of Equipment I

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<sup>1</sup> Installation Category (overvoltage category) defines the level of transient overvoltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II which is the category used for instruments in installations supplied from a supply comparable to public mains such as hospital and research laboratories and most industrial laboratories, the expected transient overvoltage is 2500 V for a 230 V supply and 1500 V for a 120 V supply.

<sup>2</sup> Pollution Degree describes the amount of conductive pollution present in the operating environment. Pollution Degree 2 assumes that normally only non-conductive pollution such as dust occurs with the exception of occasional conductivity caused by condensation.

## Section 11 Servicing

### Parts List

Part Number	Description
2270102	Preventive maintenance kit (door gasket, HEPA filter, CO <sub>2</sub> air filter, RH bacterial filter, access port filter, water bottle air filter)
3310902	Pilaster, single
3310903	Shelf channel, right or left
1900446	Pilaster, 4 pack
1900462	Electropolished Pilaster, 4 pack
1900447	Shelf channel, 10 pack
192099	Electropolished Shelf channel, 10 pack
3310904	Diffuser pan, large (3310/3311)
192101	Electropolished Diffuser pan, large (3310(E/CTS) / 3311(E/CTS))
3307904	Diffuser pan, small (3307/3308)
192100	Electropolished Diffuser pan, small (3307(E/CTS) / 3308(E/CTS))
192080	Microboard, main control
230201	Fuse, 750 mA, TD, 5 x 20 mm (humidity system, 250 V)
230135	Fuse, 1 A, TD, 5 x 20 mm (accessory outlet, 115 V)
230120	Fuse, 0.5 A, TD, 5 x 20 mm (accessory outlet , 230 V)
156125	Motor, hot air, 115 VAC, 50/60 Hz
191681	Display board
290185	Probe, 2252 Ohm/25°C, 0.156 x 2
1900160	HEPA filter kit (includes 760207 & 1900185)
224310	Stainless steel shelf, large
192103	Electropolished Shelf, large (3310(E/CTS) / 3311(E/CTS))
224307	Stainless steel shelf, small
192102	Electropolished Shelf, small (3307(E/CTS) / 3308(E/CTS))
231238	Infrared type CO <sub>2</sub> sensor
250087	CO <sub>2</sub> valve kit with assorted fittings
290174	RH sensor assembly, 1ft.
230180	12 A, DPDT circuit breaker switch (power)
400201	Switcher kit, 40 W
360213	Pressure switch (Gas Guard option)
250121	Solenoid gas valve (12 VDC Gas Guard option)

## Parts List (continued)

Part Number	Description
113008	Leveling foot
1900161	VOC HEPA filter kit (includes 760208 & 1900185)
250049	12 V valve (water fill)
250128	12 V valve (RH air valve)
360251	Door switch, outer
360263	Door switch, inner
280096	Blue LED light source
100119	3.5 x 1.5 CCW blower wheel
139033	Humidifier, humidity system
360171	Liquid level switch (float)
360255	Liquid level switch (protection float)
900140	1.6" sq. 12 VDC fan x CFM
130625	Tubeaxial fan 31 CFM 115 V Fan
105070	Inner glass door
247013	Humidity system drain fitting
760208	HEPA/VOC filter only
1900199	Complete blower assembly (includes motor, wheel, scroll, mounting materials)
1900200	Complete humidifier assembly (includes nebulizer and housing)
1900201	RH conditioner assembly, 115 V
1900202	RH conditioner assembly, 230 V
1900233	Temperature sensor assembly (290185 sensor)
50109579	Water cleaning cell (for water reservoirs, pans, and bottles)
130101	Water cleaning cell (quantity of 6)
5300613	Filter/Stopper Assy (SMART-VUE)
430108A	Auto-Lock power inlet cord with IEC320 female plug
400218	12 VDC Single Output Power Supply

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## Replacing the Fuses

**Note** See Wiring Diagram 3307-71, page 1 of 2, Fuse Holder Detail 2. ▲

**Warning** The following procedure requires accessing the electronics area. Qualified personnel only should perform this procedure. Wearing a electrostatic discharge wrist band or other grounding device is recommended. ▲

To access the only replaceable fuse in the incubator, follow the steps below.

1. Turn off the incubator's power switch and disconnect the power cord.
2. Remove the four screws from the left side panel. Set the panel aside.
3. On the left side of the opening is the electronics area. Locate the fuse. See Table 11-1 below for replacement fuse specifications. Replace the blown fuse with a new one.
4. Install the panel and secure with the screws.
5. Return the unit to service. If the fuse blows after restoring power to the incubator, contact the Technical Services Department.

**Table 11-1.** Fuse Specifications

Fuse Voltage	Manufacturers Part #	Amperage Rating	Rupture Speed	IEC Letter Code
115 VAC ACC	BUSS GMC-1.0 A	1.0 Amp	Time-Lag	T
250 VAC ACC	BUSS GMC-740 mA	750 mA	Time-Lag	T
230 VAC ACC	BUSS GMC-500 mA	0.5 Amp	Time-Lag	T

## Replacing the CO<sub>2</sub> and RH Air Filters

**Warning** The following procedure requires accessing the electronics area. Qualified personnel only should perform this procedure, using preventive maintenance kit # 2270102. Wearing a electrostatic discharge wrist band or other grounding device is recommended. ▲

The CO<sub>2</sub> and RH air filters are recommended to be replaced annually. Follow the steps below to replace the filters.

1. Turn off the incubator's power switch and disconnect the power cord.
2. Remove the four screws from the left side panel. Set the panel aside.



## **THERMO FISHER SCIENTIFIC STERI CULT INCUBATOR WARRANTY USA \***

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the first year warranty period.

During the first year, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, including labor. In addition, after the initial warranty period of one year, the CO<sub>2</sub> sensor (IR) will be warranted for a second year, parts only. The blower motor will be warranted for three years, total, parts only. Installation and calibration are not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of components parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any components or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo postage paid and replacement parts are shipped FOB destination.

**THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY.** Thermo Fisher Scientific shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation and preventative maintenance.

If equipment service is required, please call your Technical Services Department at 1-800-438-4851 (USA and Canada) or 1-740-373-4763. We're ready to answer your questions on equipment warranty, operation, maintenance, service and special applications. Outside the USA, contact your local distributor for warranty information.



Rev. 3 4/09

## THERMO FISHER SCIENTIFIC INTERNATIONAL STERI CULT INCUBATOR WARRANTY\*

The Warranty Period starts two months from the date your equipment is shipped from our facility. This allows shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the first year warranty period.

During the first year component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, excepting labor. In addition, after the initial warranty period of one year, the CO<sub>2</sub> sensor (IR) will be warranted for a second year, parts only. The blower motor will be warranted for three years, total, parts only. Installation and calibration is not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of components parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any components or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo postage paid and replacement parts are shipped FOB destination.

**THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY.** Thermo shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

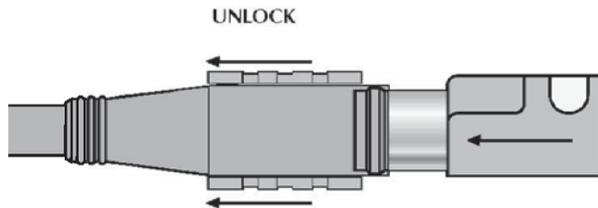
Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation and preventive maintenance.

If equipment service is required, please call your Technical Services Department at 1-800-438-4851 (USA and Canada) or 1-740-373-4763. We're ready to answer your questions on equipment warranty, operation, maintenance, service and special application. Outside the USA, contact your local distributor for warranty information.



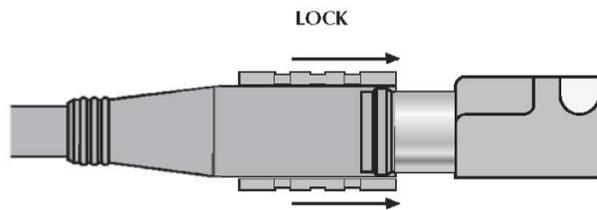
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## *picofast* "Snap Lock" Connector Instructions



With TURCK's patented Locking Sleeve pulled back, any *picofast* sensor slides on without any difficulty.

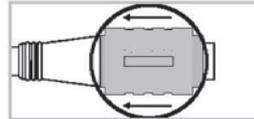
After sensor is connected, push Locking Sleeve forward to create a watertight connection. It's a snap!



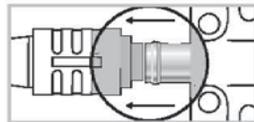
## Installation Instructions

### To Attach:

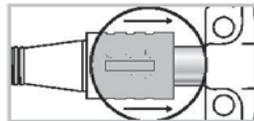
1. Be sure black locking sleeve is pulled back.



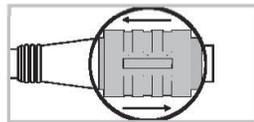
2. Line up pins and push connector onto plug. You will feel a "snap." Do not twist.



3. Push locking sleeve forward on connector until it is flush with the front of the connector.



4. If sleeve is difficult to slide on a new connector, "exercise" it a few times. Do not use tools.

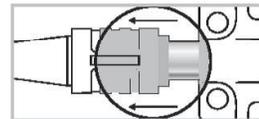


### To Detach:

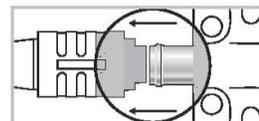
1. Do not twist.



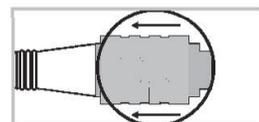
2. Pull locking sleeve back to "unlocked" position.



3. Pull connector straight off.



4. Leave locking sleeve in unlocked position.



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**Thermo Fisher Scientific (Asheville) LLC**

401 Millcreek Road  
Marietta, Ohio 45750

United States

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