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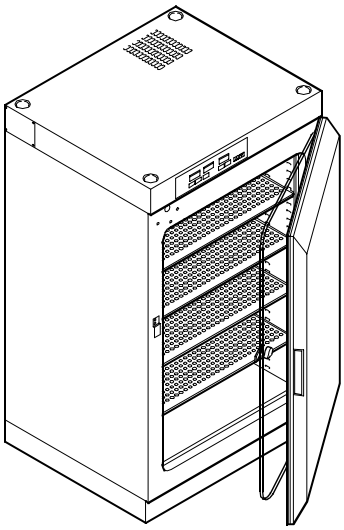
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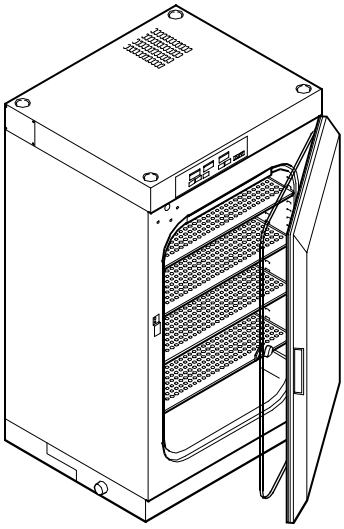
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Find the *Thermo / Revco RCO3000T-7-ABB* at our website: *Click HERE*

1 Introduction



Welded Wall



Seamless Wall

1.1 Features and Benefits

These incubators are designed to create a stable, reliable environment for cell culture applications. They operate at temperatures ranging from 5°C above ambient temperature to +60°C, accurate to ±0.2°C. The gas system controls within ±0.1% of measurable setpoint.

- Thermal conductivity Sensor. Provides stable, automatic injection of CO_2.
- Optional Tank Interchange System:
  - Allows the interconnection of multiple gas supply cylinders for extended operation.
  - Control panel warning system signals when one of the gas supply cylinders is empty.
  - Automatically switches from the empty cylinder to the full cylinder.
- Convenience Outlet. A receptacle rated at 115 VAC, 75 watts maximum, is located at the rear of the incubator. The outlet is ideal for electronic recorders or other small loads. Do not exceed the electrical capacity of this outlet.
- Automatic Gas Shutoff. Incubator controls shut off the gas supply when the inner glass door is opened to prevent wasting the control gas.
- Alarms:
  - High and low level CO_2 setpoint alarms, fixed at ±1%.
  - High and low temperature alarms. The high alarm can be set by the user.
- Chamber Drain. Seamless tank models are provided with a chamber drain fitting at the bottom left side of the cabinet.
- Humidity Diffuser. For models with humidity pans, a pan cover diffuses evaporation, optimizing the humidity level.
- Optional HEPA filter. Available for all models, HEPA filters remove airborne particulates from the chamber.

1.2 Requirements

- A high quality two-stage, low pressure 15 psig (1.056 kg/cm^2) pressure regulator is required for proper operation of the CO_2 gas supply.
- In-line gas supply filters must be used on the CO_2 supply to prevent damage to the solenoid valve(s):
  - Type: Microbiological
  - Specification: 0.3 micron
  - Location: rear of unit
- CO_2 used in the incubator must be at least 99.9% pure.
- Each chamber contains approximately 12 gallons of jacket water when filled (water-jacketed models only). The water takes six to eight hours to heat from 20° to 37°C. This time must be allowed for the interior temperature to stabilize before any adjustments or permanent calibrations are made.

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1.3 Specifications

Gas	**Control Type**	Thermal Conductivity.
	Control Sensor	Matched Thermistors.
	Control Setpoint	Direct digital, 0 to 20% range.
	Control Accuracy	±0.1% of setpoint.
	Recovery	Automatic, actuated by inner door opening.
	Recovery Time	Less than eight minutes at 5% setpoint.
	Filter	Disposable, autoclavable for each input.
	Hi/Lo CO_2 Alarms	Audio and visual at ±1.0% setpoint deviation. Low alarm has 15 minute delay after inner door opening.
	Alarm Silence	Touchpad on control panel, 15 minute ringback.
	Minimum grade CO_2	99.9% purity
Temperature Control System	**Range**	5°C above ambient to +60°C.
	Accuracy	±0.1°C
	Safety Alarms	Monitor the chamber temperature, independently adjustable within 0.3°C of setpoint. Audible and visual warnings. Alarm silence has a 15 minute ringback.
	Display	LED, digital, 0.1°C resolution, independent probe.
Humidification	**Range**	When humidity pan cover is in place and water reservoir is properly maintained, humidity is approximately 96% at 37°C.
Construction	**Welded Tank Models**	Stainless steel interior, baked-on powder coated exterior.
	Seamless Tank Models	Stainless steel or copper lined interior, baked-on powder coated exterior.
	Walls	Triple Construction for water-jacketed models only. Additional insulation around water jacket provides protection against large ambient temperature fluctuations. Double Construction for dry wall models only.
	Inner Door	Contamination resistant silicone rubber gasket seals against tempered glass. Positive latch.
	Outer Door	Flush mounted with heater on inner surface to provide radiant heat to inner glass door to minimize condensation.
	Leveling Feet	Adjustable, non-skid design. Placement of feet allows mounting on 24 in. (61 cm) deep laboratory bench.
Utilities	**CO_2 Connections**	Automatic tank switching (optional): two 3/16 in. D (4.76 mm) tubing connections. One tank units: one 3/16 in. D (4.76 mm) tubing connection.
	CO_2 Input Pressure	10 to 15 psig (0.7 to 1.06 kg/cm^2) required. One two-stage, 15 psig pressure regulator for each cylinder.
	Electrical Requirements[a]	Single Units: • Domestic 115 VAC, 50/60 Hz, one-phase, 4.0 amps and 220 VAC, 60 Hz, one-phase. 15 amp dedicated circuit recommended. • Export 220 VAC, 50/60 Hz, one-phase, 2.0 amps and 115 VAC, 60 Hz, one-phase. 10 amp dedicated circuit recommended.
		Dual Units: • Domestic 115 VAC, 50/60 Hz, one-phase, 7.4 amps and 220 VAC, 60 Hz, one-phase. 15 amp dedicated circuit recommended. • Export 220 VAC, 50/60 Hz, one-phase, 3.7 amps and 115 VAC, 60 Hz, one-phase. 10 amp dedicated circuit recommended.
	Water Jacket Fill and Drain	Fill: Top of chamber, plastic, snap-on cover. Drain: Snap-on locking fitting (seamless tank models only).

[a] Both domestic and export units utilize 115/1/60 or 220/1/50 or 60.

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Shelves	**Construction**	Stainless steel, perforated, precision flat, with adjustable shelf brackets to prevent tipping. Shelves, brackets, and supports are removable without tools for cleaning, chamber decontamination, and maintenance.
	Capacity	Welded Tank: • 24 maximum quantity (four included with unit) • Area is 47.5 ft^2 (4.41 m^2) • Clearance is 3/4 in. (19 mm)
		Seamless Tank: • 20 maximum quantity (five included with unit) • Area is 40.8 ft^2 (3.8 m^2) • Clearance is 3/4 in. (19 mm)
Dimensions	**Welded Tank**	Single Unit: 25.4 in. (64.5 cm) wide 40.7 in. (103.4 cm) high 23.5 in. (59.7 cm) deep
		Dual Unit, Stacked: 25.4 in. (64.5 cm) wide 79.4 in. (191.7 cm) high 23.5 in. (59.7 cm) deep
		Working Interior: 20 in. (50.8 cm) wide 28 in. (71.1 cm) high 18 in. (45.7 cm) deep
		Shelf: 17.5 in. x 18.5 in.
	Seamless Tank	Single Unit: 25.4 in. (64.5 cm) wide 40.7 in. (103.4 cm) high 23.5 in. (59.7 cm) deep
		Dual Unit, Stacked: 25.4 in. (64.5 cm) wide 79.4 in. (191.7 cm) high 23.5 in. (59.7 cm) deep
		Working Interior: 20 in. (50.8 cm) wide 28 in. (71.1 cm) high 18 in. (45.7 cm) deep
		Shelf: 17.5 in. x 18.5 in.

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2 Safety Precautions

In this manual and on labels attached to this product, the words WARNING and CAUTION mean the following:

- WARNING: a potentially hazardous situation which, if not avoided, could result in serious injury or death.
- CAUTION: a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the equipment.

Before installing, using or maintaining this product, please be sure to read this manual and product warning labels carefully. Failure to follow these instructions may cause this product to malfunction, which could result in injury or damage.

Below are important safety precautions that apply to this product:

- 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 its 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.
- Your unit must be properly grounded in conformity with national and local electrical codes. Never connect the unit to overloaded power sources.
- Disconnect the unit from all power sources before cleaning, troubleshooting, or performing other maintenance on the product or its controls.

3 Pre-Installation

3.1 Unpacking

At delivery, examine the exterior for physical damage while the carrier's representative is present. If exterior damage is present, carefully unpack and inspect the unit and all accessories for damage.

If there is no exterior damage, unpack and inspect the equipment within five days of delivery. If you find any damage, keep the packing materials and immediately report the damage to the carrier. **Do not return goods to the manufacturer without written authorization.** ***When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.***

Do not exceed the electrical and temperature ratings printed on the dataplate located on the lower left side of the unit.

CAUTION! Improper operation of the equipment could result in dangerous conditions. To preclude hazard and minimize risk, follow all instructions and operate within the design limits noted on the dataplate.

3.1.1 Included Parts

The following items are packaged and shipped inside the incubator cabinet:

- This manual
- Shelves and shelf brackets
- 3/16 in. ID clear tubing
- 0.3 micron gas filter, replacement Blower Wheel, CO_2 Sensor gasket, and Injection Port Assembly gasket
- Drip trough
- Black tubing, funnel, and bottle of water conditioning crystals (water-jacketed models only)
- Humidity pan with cover (optional on some models)

3.1.2 Set-up

Remove all parts from the inside of the incubator and clean the incubator (refer to Section 7.1 on page 13). The shelves and brackets can be autoclaved at this time.

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3.2 Location

Install the unit in a level area free from vibration with a minimum of three inches of space on the sides and rear and 12 inches at the top.

The floor must be able to support 40 PSI (single chamber incubator) or 75 PSI (double chamber incubator).

Do not position the equipment in direct sunlight or near any HVAC duct/diffusers. The ambient temperature range at the location must be 59 to 90°F (15 to 32°C).

For water-jacketed models only, have a water source or 12 gallons of water available to fill the water jacket.

3.3 CO_2 Gas Supply

Verify that the incubator gas supply is available near the installation area. The required gas supply pressure is 10 to 15 PSI, controlled by a high-quality, two-stage regulator suitable for the connected input gas (part # 6317, refer to Section 10 on page 21).

If the incubator contains a tank interchange system, each supply requires a supply cylinder and pressure regulator. Both supplies must be set to the same outlet pressure.

3.4 Wiring

CAUTION! Connect the equipment to the correct power source. Incorrect voltage can result in severe damage to the equipment. Always connect the unit to a dedicated (separate) circuit.

WARNING! For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect the unit to overloaded power lines.

Always connect the unit to a dedicated (separate) circuit. Electrical codes require fuse or circuit breaker protection for branch circuit conductors. Use time delay fuses for #12 AWG circuits.

4 Installation and Start-up

Complete the following sections in order to ensure dependable installation of your incubator.

Tools required for installation:

- Sharp knife suitable for cutting plastic tubing.
- Thin, 1/2 in. open-end wrench
- Bubble level (9 in. or longer)

CAUTION! Do not turn on the gas during this initial start-up until the Auto Zero procedure (Section 4.10 on page 9) is complete.

4.1 Initial Set-Up

1. Position the incubator close to the final location. Refer to Section 3.2 on page 5 for location specifications.
2. Open the incubator door and remove the contents, including shelves and supports.

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4.2 CO_2 Gas Connections

CO_2 Gas Connection(s) are located at the rear of the unit.

Note: *The required gas supply pressure is 10 to 20 PSI. Make sure the supply is available in the installation area.*

To install the CO_2 connections, complete the following steps:

1. Be sure that you have the right size tubing (3/16 in. interior diameter).
2. Cut a small length (approximately 6 in.) from the supplied roll of 3/16 in. ID tubing.
3. Pull the cap off the gas connection port at the rear of the incubator and attach one end of the tubing to the gas connection port.
4. Connect the opposite end of the tubing to a high-quality input gas filter (0.3 micron supplied). Note that the side of the filter marked "IN" faces the incoming gas connection, *not* the back of the incubator (refer to Figure 1).

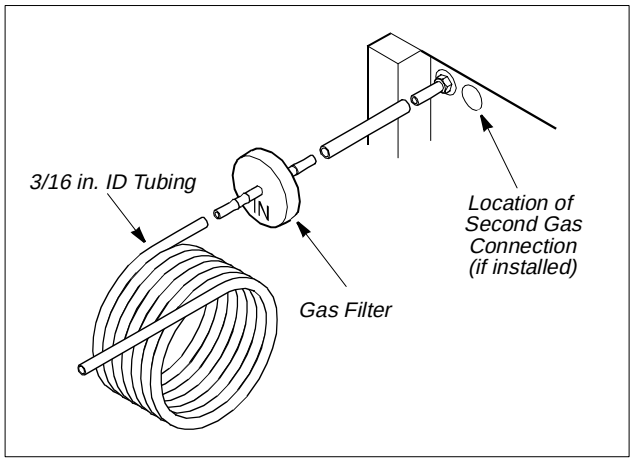


Figure 1. CO_2 Gas Connections

5. Use the remaining 3/16 in. ID tubing to connect the input gas to the gas filter. Keep the tubing length as short as possible to minimize the pressure drop.

⚠ **CAUTION!** DO NOT turn on the gas supply at this time.

Note: *If a dual gas system is factory installed, there will be a second gas connection port on the incubator (refer to Figure 1). Gas connection to the second port is the same as the procedure for a single port.*

4.3 Level and Position

It is very important to level the unit both left to right and front to back.

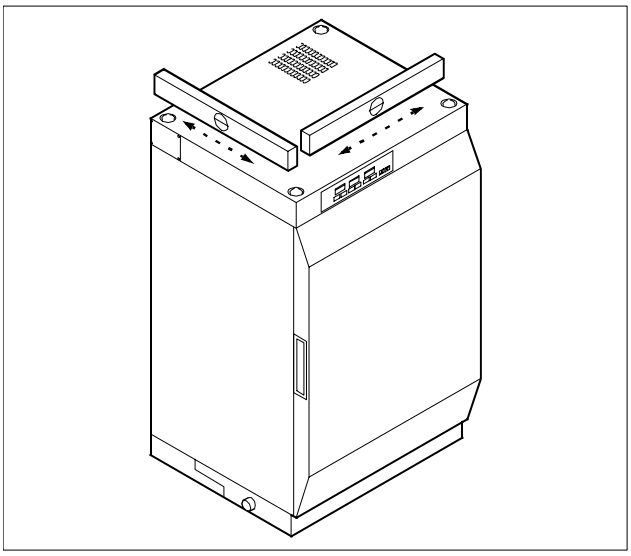


Figure 2. Leveling

1. Place a bubble level on the top of the incubator.
2. Use a thin, 1/2 in. open-end wrench to adjust the leveling feet located at the base of the incubator.
3. Make sure that the power switch located at the rear of the control is in the OFF position and connect the incubator to a power source (refer to Section 3.4 on page 5).
4. Slide the incubator into place.

For water-jacketed models only, after the water jacket is filled, the incubator must be re-leveled left to right and front to back.

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4.4 Water Jacket Fill (Water-jacketed Models Only)

Skip this section if you have a dry-wall incubator.

Before starting to fill the water jacket, have a water source or 12 gallons of water available near the incubator.

For double (stacked) units, *always* fill the bottom unit first.

WARNING! Over-filling the water jacket may result in damage to electronic components and can become hazardous. Avoid filling beyond the weep hole located near the upper left corner of the glass door.

To fill the water jacket, complete the following steps:

1. Locate the plastic bottle of water conditioning crystals, funnel, and length of black tubing supplied with the incubator.
2. Connect one end of the black tubing to the funnel.

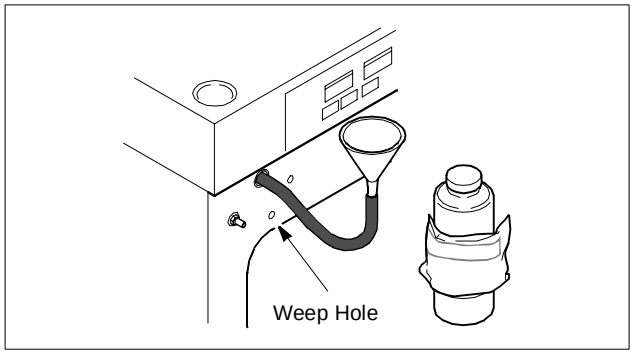


Figure 3. Water Jacket Fill

3. Fill the plastic bottle of water conditioning crystals with luke-warm water, replace the cap, and shake the bottle until the crystals are dissolved.

Note: *It is important that all the crystals are used to properly treat the water in the water jacket. The solution is a concentrate and should be mixed with water inside the plastic bottle before adding it to the water jacket.*

4. Open the outer door of the incubator and remove the fill port cap located in the upper left corner (labeled FILL).
5. Slide the tubing into the fill opening, leaving the funnel and approximately six inches of tubing exposed.
6. Carefully pour all of the conditioning crystal solution into the funnel.

Note: *Mix the crystal solution before you pour it into the funnel. Refer to Step 3 above.*

7. Turn the incubator power switch to ON.

Note: *The status window will indicate LOW WATER at this time. The incubator alarm will sound. You can press the Mute button on the control panel to silence the alarm.*

8. Using *cool* tap water, continue to fill the water jacket until the low water indication in the status window goes out (approximately 12 gallons). Replace the fill port cap.
   - Always use cool tap water to fill the water jacket. If you use hot water to fill the water jacket, temperature correlation will be impossible for days.
   - If the water jacket is too full, water will come out of the weep hole (refer to Figure 3). If that happens, remove any excess water from the water jacket.
9. Close the incubator door and once again level the incubator left to right and front to back (refer to Section 4.3 on page 6). Attach the drip trough to the mounting pins on the kick panel, below the incubator door.

4.5 Door Seal

To check the door seal, complete the following steps:

1. Open the door.
2. Insert a strip of paper (a couple of inches wide) between the door gasket and the cabinet flange and close the door.
3. Slowly pull the paper strip from the outside. You should feel some resistance.
4. Repeat this test at 4 inch intervals around the door. If the door does not seal properly, the gasket must be replaced.

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4.6 Temperature Operating Parameters

4.6.1 Control Panel Features

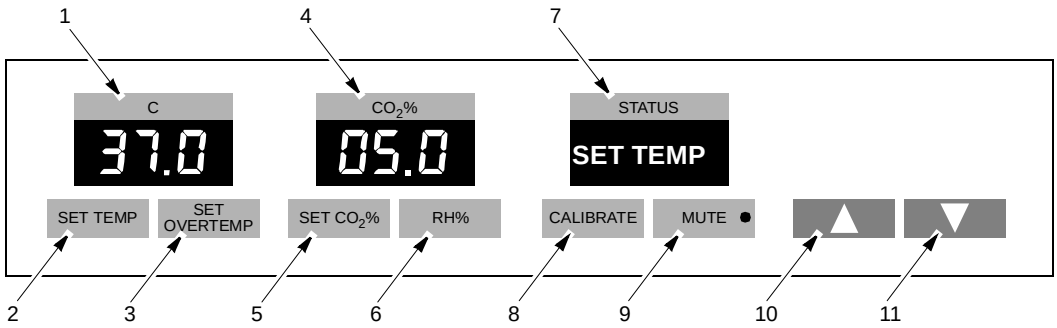


Figure 4. Control Panel

Before the setting the temperature operating parameters, take some time to become familiar with the controls on your incubator. Figure 4 illustrates the control panel.

1. Temperature Display Window. Displays the incubator temperature.
2. Set Temp key. Press this key to set the incubator operating temperature (refer to Section 4.6.2).
3. Set Overtemp key. Press this key to set the overtemperature limit (refer to Section 4.6.3).
4. CO_2% Display Window. Displays the CO_2%.
5. Set CO_2% key. Press this key to set the Operating CO_2% (refer to Section 4.6.4).
6. RH% key (Optional on some models). Press this key to display the Relative Humidity value.
7. Status Display Window. Alpha-numeric display for error and operating messages. Refer to Section 8.1 on page 16 for a description of the messages.
8. Calibrate key. Press this key to perform the Auto Zero function (refer to Section 4.10 on page 9) and to correlate temperature (refer to Section 4.11.2 on page 11), CO_2 (refer to Section 4.11.1 on page 10), and humidity (refer to Section 4.11.3 on page 11).
9. Mute key. Press this key to silence the alarm.
10. Increment key (△). Press this key to increase values.
11. Decrement key (▽). Press this key to decrease values.

4.6.2 Set Operating Temperature

1. Press the Set Temp key and either the △ or the ▽ key simultaneously.
2. Hold both keys until the desired operating temperature appears in the Temperature Display Window.
3. Release both keys.

4.6.3 Set Overtemperature Limit

Note: *To avoid nuisance alarms, set the overtemperature limit one degree above the operating temperature setpoint during the warm-up period.*

1. Press the Set Overtemp key and either the △ or the ▽ key simultaneously.
2. Hold both keys until the desired overtemperature temperature appears in the Temperature Display Window.
3. Release both keys.

4.6.4 Set Operating CO_2%

CAUTION! Do not turn on the gas at this point. Complete the Auto Zero procedure (Section 4.10 on page 9) before turning on the gas.

1. Press the Set CO_2% key and either the △ or the ▽ key simultaneously.
2. Hold both keys until the desired CO_2% appears in the CO_2% Display Window.
3. Release both keys.

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4.7 Humidity Pan

Note: *Skip this section if you do not have a humidity pan installed on your incubator.*

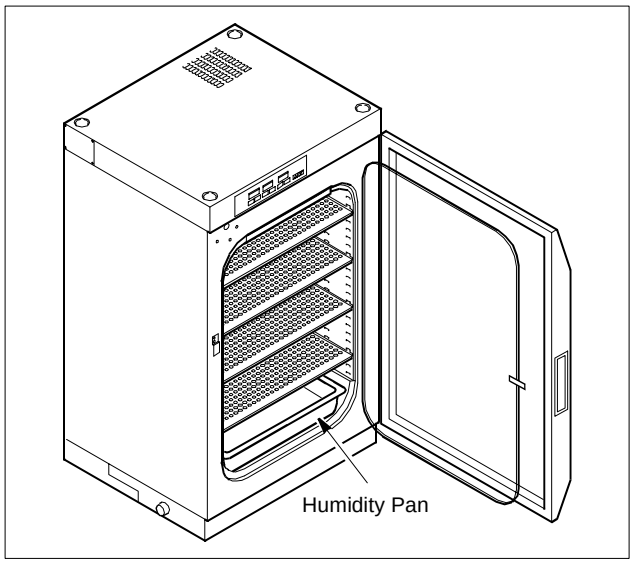


Figure 5. RH Option

Fill the humidity pan one-half full with distilled water and set the pan aside to stabilize at room temperature during the initial warm-up period. This reduces the possibility of moisture collecting on the interior surfaces of the incubator.

Note: *To retard micro-organism growth, you can use 0.25 ml of Roccal II (1:15,000 ratio) in the humidity pan. Do not use the water conditioning crystals. Test the Roccal II for effects on cell growth prior to applying to the humidity pan.*

4.8 Shelves

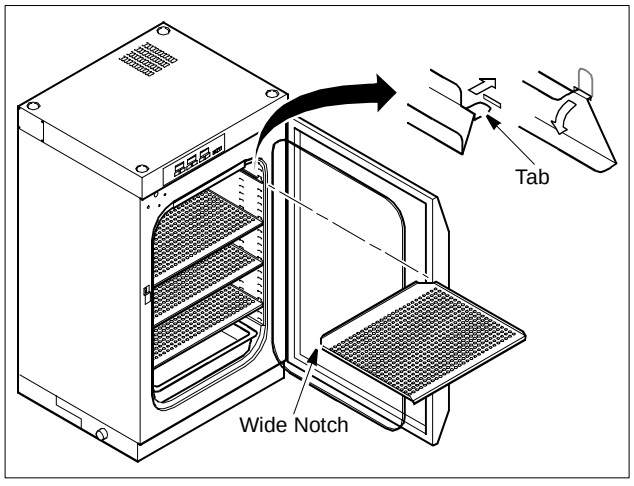


Figure 6. Shelving Detail

The incubator shelves are fully adjustable. Determine the location you want for each shelf and install the shelf brackets.

Note: *Always install the front of the shelf brackets in the slots nearest the door.*

1. Hold a shelf bracket perpendicular to the incubator wall and slide the tabs on the bracket into the slots on the wall, then let the bracket fall down against the incubator wall.
2. Install another shelf bracket in the same location on the opposite wall of the incubator.
3. Slide a shelf into the clips with the wide notches on the shelf toward the back of the incubator and the shelf lip down in the front.

4.9 Stabilize

Allow the incubator to stabilize for a minimum of eight hours; overnight is best (dry wall incubators stabilize in approximately three hours).

If you have a humidity pan, place it in the chamber after the stabilization period, place the cover on top of the pan, and allow two hours for the humidity level to stabilize. The pan cover diffuses evaporation, optimizing the humidity level.

4.10 Auto Zero

You should always perform an auto zero before initial use of the incubator. This procedure ensures consistency between the gas control system and the sensor circuitry. Auto Zero takes at least an hour to perform.

After temperature (and RH%) stabilization is complete, perform an Auto Zero by completing the following steps:

1. Make sure that both doors have been closed for at least two hours before beginning the Auto Zero procedure.
2. Hold the glass door open and press the Calibrate key. The status window alternates between AUTO ZERO and DOOR OPEN. The CO_2 display goes blank.
3. After approximately one minute, the display indicates CLOSE DOOR.

Note: *If the door is closed before the CLOSE DOOR message appears or if the door is closed for approximately five seconds and then opened while the Auto Zero is in progress, the message ZERO ERROR appears in the status window and Auto Zero is aborted. To clear the error message and restart Auto Zero, leave the door open and press the Calibrate key.*

4. Close the glass door and the outer door (Auto Zero will not complete properly unless both doors are closed.). The CO_2 display stays blank and the status window displays AUTO ZERO. The control is adjusting for the surrounding conditions.
5. When the Auto Zero procedure is complete (about an hour), the CO_2 display lights to indicate the current CO_2%.
6. Turn on the gas supply (make sure the supply is regulated between 10 to 20 PSI).

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7. Adjust the CO_2 operating parameter to the desired level:
   a. Press the Set CO_2% key and either the △ or the ▽ key simultaneously.
   b. Hold both keys until the desired CO_2% appears in the CO_2% Display Window.
   c. Release the keys.
8. Allow the incubator to stabilize 10 to 15 minutes until the display shows the CO_2 level you set in step 7. Then wait another 15 minutes before taking any concentration measurements. If calibration is desired, refer to Section 4.11.1.
9. If all parameters are satisfactory, you can operate the incubator at this time.

Note: *The overtemperature limit can be set closer to the operating temperature now. Do not set the limit closer than 0.3°C above the operating temperature.*

4.11 Calibration (Optional)

4.11.1 CO_2 Measurement and Calibration

This method uses an instrument, such as the Fyrite, to read the actual CO_2% in the chamber. The display can be changed to agree with the measured reading. The factory standard method, using traceable gas standards, assures an accuracy of ±0.2%. The Fyrite instrument obtains ±0.5% accuracy.

To use the Fyrite for CO_2 concentration measurement, complete the following steps:

1. Wait at least 15 minutes after the CO_2 level arrives at setpoint before attempting any concentration measurement.
2. Make sure that the wick in the sample tube is moist and make sure that the tubing is in good condition (no cracks or cuts).
3. Hold the Fyrite upright and away from your face. Depress the plunger valve briefly to vent the Fyrite and release the valve.

⚠ **WARNING!** Never depress the plunger valve when the Fyrite is in the inverted position. Doing so causes fluid, which is corrosive and contains poisonous elements, to spill. Refer to the MSDS sheet contained in the Fyrite instruction packet for additional information.

4. Invert the Fyrite, holding it at a slight angle to drain the fluid into the top reservoir.
5. Turn the Fyrite up to a 45 degree angle momentarily to allow fluid droplet drainage into the bottom reservoir.
6. Hold the Fyrite completely upright and away from your face. Depress the plunger valve briefly and release the valve.
7. Loosen the locknut at the rear of the scale. Slide the scale until the top of the fluid column lines up with zero on the scale. Tighten the locknut.

Note: *When setting zero, hold the Fyrite vertically and level with your eyes while sighting across the scale to the top of the fluid column. Use this same procedure for adjusting zero and reading percent CO_2.*

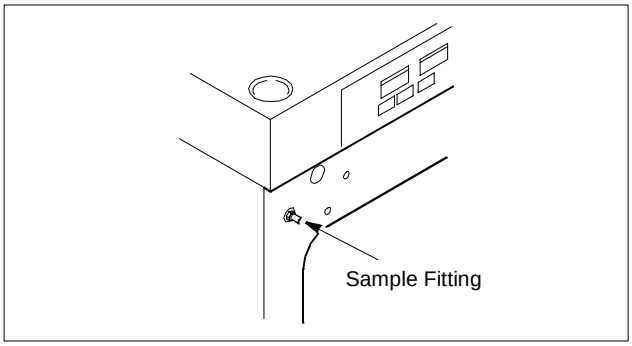


Figure 7. Sample Fitting

8. Slide the open end of the sample tubing over the sample fitting on the front of the incubator. Holding the Fyrite in the upright position, place the sampling rubber connector tip over the plunger valve on the Fyrite. Purge the sample line by squeezing the aspirator bulb twice, then depress the plunger valve firmly with the connector tip. Squeeze and release the aspirator bulb *18* times. During the 18th squeeze and with bulb held deflated, release the connector tip and the plunger valve.

Note: *Always hold the Fyrite by the fins only to prevent warming of the Fyrite fluid during analysis.*

9. Invert the Fyrite until the fluid drains into the top reservoir, then turn the Fyrite upright to drain the fluid into the bottom reservoir. Repeat this step once.
10. Briefly hold the Fyrite at a 45 degree angle to allow the fluid to drain into the bottom reservoir.
11. Hold the Fyrite completely upright and immediately read the CO_2 percent on the scale at the point corresponding to the top of the fluid column.
12. Repeat the entire procedure (steps 3 through 11) once to confirm the reading.

Refer to Section 4.11.2 on page 11 for the temperature correlation procedure.

To offset the CO_2% level, complete the following steps:

1. Press the Calibrate key twice.
2. The CO_2% display starts flashing.
3. Press either the △ or the ▽ key to change the displayed CO_2 value to match the instrument reading. After a few seconds, the display stops flashing and normal operation resumes.

The CO_2% is now permanently changed.

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4.11.2 Temperature Correlation

The factory standard method of temperature calibration uses instruments with an accuracy of ±0.1°C or better. To place an offset on the displayed reading to match any other reliable temperature measuring instrument:

1. Press the Calibrate key once.
2. The temperature display starts flashing and the message CALIB TEMP appears in the status display window.
3. Press either the △ or the ▽ key to change the displayed temperature value to match the instrument reading. After a few seconds, the display stops flashing and normal operation resumes. The temperature is now permanently changed.

4.11.3 Humidity Compensation (Optional RH% on Some Models)

The factory standard correlation of the relative humidity reading uses instruments with an accuracy of ±1.0%. To place an offset on the displayed reading to match any other reliable instrument:

1. Press the Calibrate key three times.
2. The RH reading appears in the CO_2 display window and flashes. The message CALIB RH appears in the status display window.
3. Press either the △ or the ▽ key to change the displayed RH to match the instrument reading. After a few seconds, the display stops flashing and normal operation resumes. The RH% is now permanently changed.

4.12 HEPA Filter (Optional on All Models)

In any incubator model, you can use a HEPA filter to remove airborne particulates from the chamber environment. The filter provided is 99.97% efficient with a 0.3 micron rating.

To install the filter, place it in the hole in the top duct and twist, as shown in Figure 8.

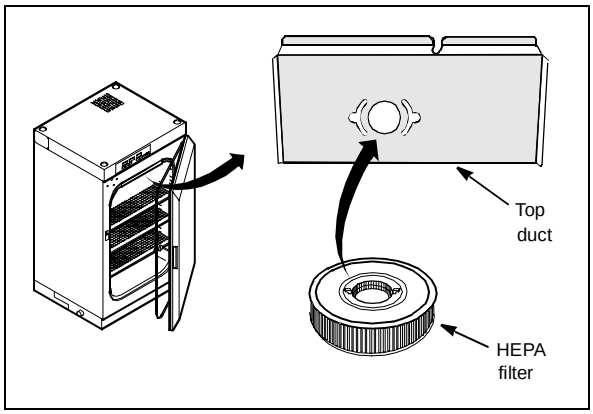


Figure 8. HEPA Filter Placement

5 Optional Connections

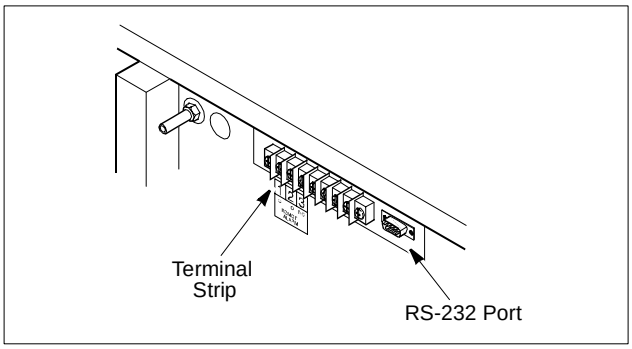


Figure 9. Option Locations

5.1 RS-232 Communication Port (Optional on Welded Chamber Models)

The RS-232 communication port is located on the back of the control (refer to Figure 9). The minimum user requirements for this option are:

- IBM or compatible XT, AT, 386, 486, etc. computer with a free RS-232 communications port.
- RS-232 Interface cable.

A diskette which provides the software link between the incubator and the computer is provided. The diskette also provides instructions for incubator data acquisition.

Place the diskette in drive A or B. At the DOS prompt, type:

A:README.BAT or

B:README.BAT

A user's guide document can be printed from a file on this diskette.

5.2 Remote Alarm Contacts

Terminal strips for remote alarms are located on the back of the control (refer to Figure 9). The contacts are not powered from internal circuits. These terminals provide normally open or normally closed contacts for switching remotely powered alarms.

5.3 Recorder Outputs (4 to 20 mA)

Outputs for electronic chart recorders covering both temperature and CO_2 levels are available on terminal strips at the rear of the incubator (refer to Figure 9).

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6 Control Systems Theory

6.1 Temperature Control System

Laboratory CO_2 Incubators have a “jacket” between the incubator chamber and the exterior wall of the unit. In water-jacketed incubators, the jacket is filled with water; in dry wall incubators, the jacket contains air. The temperature control system operates in the same manner for both types of incubators.

Interior chamber temperature control is maintained by two sensors. One sensor is located in the jacket (either in water or in air) and the other sensor is located in the chamber air. Both sensors constantly signal the electronic circuitry. The chamber air provides a reference point while the jacket is being controlled. This circuitry recognizes that jacket temperature is very slow to react to any change in either ambient or chamber temperature but the chamber temperature can change very rapidly due to door opening.

For example:

The chamber inner door is opened. The chamber air sensor immediately signals a large drop in temperature but the control recognizes that, unless there is a corresponding (smaller) drop in jacket temperature, there is no need to increase the heat. The system does nothing until sufficient time passes to measure how fast the chamber air temperature is rising to meet the jacket temperature after the door is closed. Heat is applied to the jacket in short bursts. The rate of heat application changes as the circuit monitors the two sensors. This control scheme is extremely accurate and stable, with the ability to control within ±0.1°C of the setpoint.

6.2 Overtemperature Monitoring System

This system is activated anytime the chamber air sensor detects a temperature above the overtemperature setpoint, which should be set no closer than 0.3°C above the chamber temperature. When the system is activated, the jacket heater is turned off and both audio and visual alarms are activated. Control is now effectively switched to the overtemperature monitoring system. The overtemperature sensor is the chamber air sensor which also provides the signal for the digital display on the control panel.

6.3 Door Heat System

Heating the inner surface of the outer door with a low wattage, large area heater provides enough radiant heat to the glass door to control condensation. The micro-processor control operates the door heater.

6.4 CO_2 Control System

This system uses a sensor assembly consisting of a pair of matched, thermistor sensors in a housing. One of the sensors is sealed in a nitrogen filled housing and provides the 0 to 1 VDC reference signal for the gas control board. The other sensor continually samples filtered chamber air. The main control board compares these signals with the input from the control panel CO_2 setpoint. If the difference exceeds 0.5% below setpoint, the CO_2 solenoid remains open 100% of the time. If the difference is less than 0.5%, the CO_2 solenoid cycles until setpoint is reached.

6.5 CO_2 Recovery (After Door Opening)

When the chamber inner door is opened, the door switch shuts off all gas flow into the chamber. When the door is closed, gas again flows into the chamber under the control of the TC gas concentration sensor. At this time the gas solenoid is open 100% of the time and remains open until the CO_2 level has recovered to within 5% of the setpoint. The solenoid then reverts to cycling.

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7 Maintenance

WARNING! Maintenance procedures involve working with high voltages which can cause injury or death. Maintenance should only be performed by trained personnel.

7.1 Cleaning

The incubator can be easily cleaned and disinfected in about 30 minutes.

Be sure to use an appropriate disinfectant solution: Roccal II; its Lysol equivalent, 5 milliliters per liter; or O-Syl in a one percent solution. ***You should always dilute disinfectants with sterile, distilled water.***

CAUTION! Do not use strong alkaline or caustic agents, which can cause corrosion, rust and pitting of stainless steel surfaces. Stainless steel is corrosion-resistant but not corrosion-proof.

CAUTION! Do not use sodium hypochlorite solutions such as Purex and Clorox. These can also cause corrosion and pitting of stainless steel.

When cleaning stainless steel, use the mildest cleaning procedure that will do the job effectively. To avoid marring the surface, always rub in the direction of the finish polish lines.

Do not use aromatic solvents to clean the cabinet interior: residues could cause contamination of the cabinet environment.

To clean and disinfect your incubator:

1. Remove the shelves, support walls and pans.
2. Clean all interior surfaces with the disinfectant solution using a clean sponge.
3. Rinse the interior surfaces at least twice with sterile distilled water.
4. Clean the inner door gasket thoroughly.
5. Clean the inside of the glass door with the disinfectant solution, then rinse twice with sterile distilled water.
6. Clean the shelves, support walls and pans with disinfectant and rinse thoroughly with sterile distilled water.
7. Wipe down all disinfected surfaces with an alcohol solution.

CAUTION! Alcohol is volatile and flammable. Use only in a well-ventilated area removed from open flames and other heat sources. Allow sufficient time for fumes to dissipate before using cleaned components.

7.2 CO_2 Filter Replacement

To replace the CO_2 Filter:

1. Turn the main power switch to OFF.
2. Turn the gas supply (or supplies) to OFF.
3. Remove the tubing from both ends of the gas filter.
4. Note the flow direction on the filter. The side marked IN points to the gas supply. Install the new filter onto the tubing connected to the incubator and the tubing connected to the gas supply (refer to Section 3.3 on page 5 and Figure 1 on page 6).
5. Turn the gas supply (or supplies) to ON.
6. Turn the main power switch to ON.

7.3 HEPA Filter Replacement

If you use a HEPA filter, be sure to replace it regularly. In high humidity environments the filter can trap some moisture in addition to particulates. The filter should be replaced every six to twelve weeks, depending on the incubator application.

For an illustration of HEPA filter placement, see Figure 8 on page 11.

7.4 Draining the Water Jacket (Water-jacketed Models only)

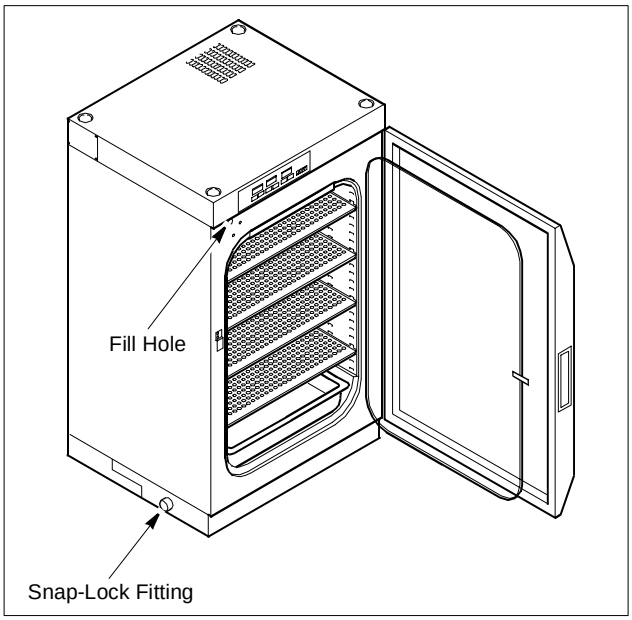


Figure 10. Water Drain Locations

7.4.1 Units without Drain Fitting

To drain the water jacket in incubators without a drain fitting:

1. Turn the main power switch to OFF.
2. Run a flexible plastic drain line to the nearest floor drain or a large container.

Note: *The jacket holds approximately 12 gallons of water. Make sure that the floor drain or container can accommodate that amount of water.*

CAUTION! Water will rush out of the incubator rapidly. Make sure that one end of the drain line is located in a floor drain or large container before inserting the other end of the drain line in the water jacket.

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3. Remove the fill port cap, located below and to the left of the control panel. Insert the drain line into the fill port and all the way to the bottom of the water jacket.
4. Install a tubing clamp at floor level, pull the tube out of the jacket, and fill the tube with water from the tubing clamp to the top of the tube. This provides a water leg to start a siphon.
5. Reinsert the tube to the bottom of the water jacket, loosen the tubing clamp at the floor, and allow the jacket to drain until the siphon action stops.

7.4.2 Units with Drain Fitting

Some incubators have a snap-lock drain fitting located on the side of the unit. To drain the water jacket:

1. Turn the main power switch to OFF.
2. Run a flexible plastic drain line to the nearest floor drain or a large container.

Note: *The jacket holds approximately 12 gallons of water. Make sure that the floor drain or container can accommodate that amount of water.*

⚠ **CAUTION!** Water will rush out of the incubator rapidly. Make sure that one end of the drain line is located in a floor drain or large container before connecting the other end of the drain line to the drain fitting.

3. Attach the drain line to the water drain fitting on the side of the incubator.

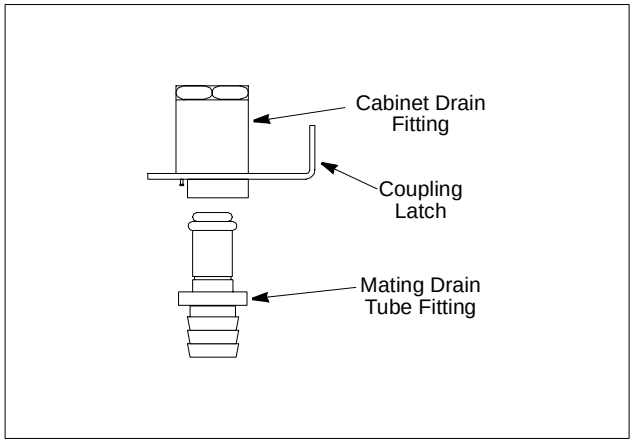


Figure 11. Snap-Lock Drain Detail

4. Open the fitting and allow the jacket to drain.

7.5 Battery Back-up Replacement (Dry Wall Units Only)

The battery back-up provides a maximum of 140 Watts and is not recommended for use with any other equipment. During a power failure, with the incubator door closed, a setpoint of 37°C, 25°C ambient, and 5% CO_2, the batteries will provide up to five hours of back-up power.

Be sure to replace the batteries every two years (even if not used).

To replace the batteries:

1. Turn the main power switch to OFF.
2. Turn the battery back-up power switch off and disconnect the power cord.
3. Remove the eight thumbnuts (four on each side) holding the battery back-up cover to the incubator.
4. Remove the cover.
5. Disconnect the battery wires from each battery (one black and one red per battery).
6. Remove and replace both batteries.
7. Replace the cover and connect the power cord.
8. Turn the battery back-up power switch on.

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7.6 Blower Wheel and Gaskets

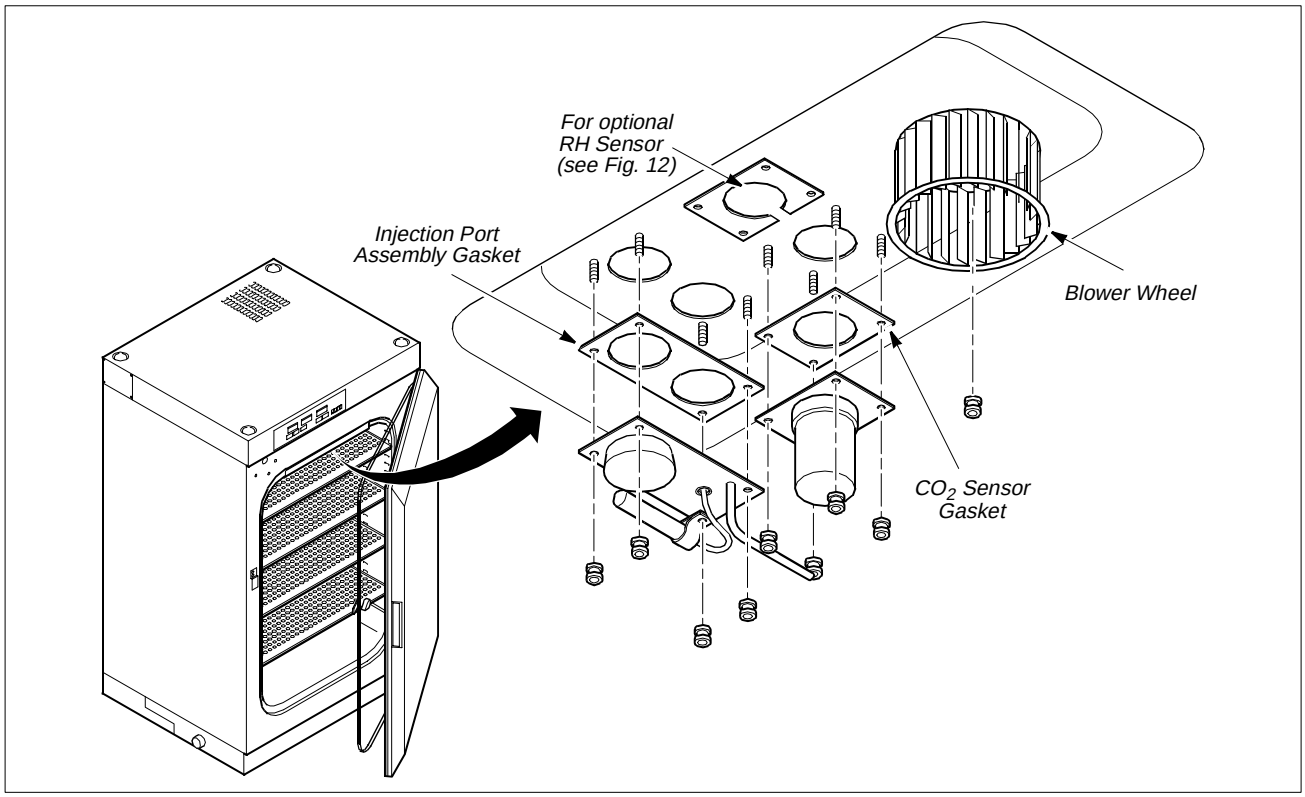


Figure 12. Blower Wheel and Gasket Detail

The CO_2 Sensor gasket, Injection Port Assembly gasket, and Blower Wheel can be removed for replacement or cleaning.

1. Turn the main power switch to OFF.
2. Turn the gas supply (or supplies) to OFF.
3. Remove the shelves and shelf brackets.
4. Welded units:
   a. Tilt one duct wall toward the center of the incubator until it disengages from the top duct.

CAUTION! The top duct will drop down when the side wall is disengaged.

   b. Remove the duct wall, the top duct, and the other duct wall.
   c. Refer to Figure 12 to remove the CO_2 Sensor Gasket, Injection Port Assembly gasket, or Blower Wheel for replacement or cleaning.
5. Seamless units:
   a. Pull the top duct out of the incubator.
   b. Remove both side ducts and the bottom duct.
   c. Refer to Figure 12 to remove the CO_2 Sensor Gasket, Injection Port Assembly gasket, or Blower Wheel for replacement or cleaning.

The gasket for the optional humidity sensor can also be removed as shown below in Figure 13.

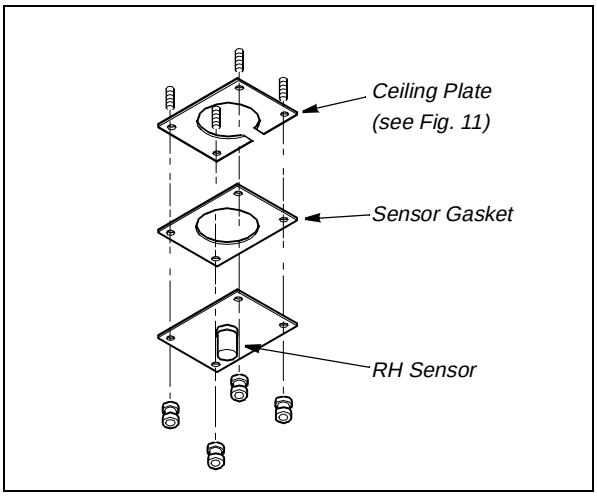


Figure 13. Optional RH Sensor Detail

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8 Troubleshooting

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

8.1 Alphanumeric Display

The standard array for the alphanumeric display is ten characters, but some displays have an eight-character display. Refer to Table 1 for a list of display messages and an explanation of each message.

Table 1. Alphanumeric Display Messages

10 Character Display	8 Character Display	Message Meaning
ADD WATER	ADD WATR	Water is Low
TANK 1 OUT	TK1 OUT	CO_2 Tank No. 1 is empty
TANK 2 OUT	TK2 OUT	CO_2 Tank No. 2 is empty
SYSTEM ERR	SYS ERR	Call for service
CALIB TEMP	CAL TEMP	Temperature calibration mode
CALIB CO2	CAL CO2	CO_2 calibration mode
CALIB WATER	CAL WATR	Jacket water low
CALIB RH	CAL RH	RH calibration mode
AUTO ZERO	AUTOZERO	CO_2 automatic zero mode
HIGH CO2	HIGH CO2	Excess CO_2 alarm
LOW CO2	LOW CO2	Deficient CO_2 alarm
HIGH TEMP	HI TEMP	Overtemperature warning
LOW TEMP	LOW TEMP	Undertemperature warning
DOOR OPEN	DR OPEN	Glass door is open
PROBE1 ERR	PRB1 ERR	Chamber temperature probe has failed
PROBE2 ERR	PROB2 ERR	Water temperature probe has failed
CO2 SENSOR	CO2 SNSR	CO_2 sensor has failed
CLOSE DOOR	SHUT DR	Action to start auto zero
ZERO ERROR	ZERO ERR	Auto zero was aborted
SET TEMP	SET TEMP	Set the operating temperature
SET OVTEM	SET OV T	Set the overtemperature alarm
VIEW T OFS	TEMP OFS	Look at the temperature offset
VIEW W OFS	WATR OFS	Look at the water temperature offset
SET CO2	SET CO2	Set CO_2% operating level
VIEW C OFS	CO2 OFS	Look at the CO_2 offset
VIEW RH	VIEW RH	Read the RH level
VIEW H OFS	RH OFS	Look at the RH offset

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8.2 Troubleshooting Procedures

8.2.1 Viewing Correlation Offsets

Viewing offsets is required for troubleshooting. Since the available range of offsets is limited, it may be impossible to change an offset if the limit is exceeded.

To view offsets:

- CO_2 Offset: press the Set CO_2 key and the Set Temp key simultaneously.
- Temp Offset: press the Set Overtemp key and the Set CO_2 key simultaneously.
- RH Offset (Optional on some models): press Set Temp key and RH% key simultaneously.

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

Table 2. Troubleshooting Procedures

Symptom	Solution
General	
No display on control panel.	No power: • The service cord is loose in the outlet. • Check the outlet for power. • Check the circuit breaker in the power panel. Make sure the circuit serving the incubator is a dedicated circuit. Reset the circuit breaker. • Check that the main power switch on the incubator is turned on.
Water leaking from the cabinet (water-jacketed models only).	Water jacket is overfilled: • Remove the fill plug and visually check the water level. Refer to Section 4.4 on page 7. • Siphon some water from the water jacket.
Temperature display disagrees with setpoint.	• Check the jacket water level (water-jacketed models only). The water must be up to the fill port. • Allow sufficient time for stabilization. Refer to Section 4.9 on page 9. • Make sure door was not recently opened. If door was opened, allow stabilization time. • Make sure power did not fail recently. If power failed, allow stabilization time after power is restored.
Error message showing on alphanumeric display.	• Refer to Table 1 on page 16 for explanations of the messages. • If PROBE 1 ERR, SYSTEM ERR, PROBE 2 ERR, or CO2 SENSOR messages are displayed, call for service.
Overtemperature indicator is illuminated and the alarm is sounding.	• Check that the overtemperature setpoint is not closer than 0.3°C above the operating temperature. Refer to Section 4.6 on page 8. • Check the incubator location. Refer to Section 3.2 on page 5. • Do not open the door more frequently than at five minute intervals. Set the operating temperature setpoint at least 5°C above the maximum ambient temperature. Refer to Section 4.6 on page 8.
Oxidation forming on interior surfaces.	• Do not wipe surfaces with a Clorox solution greater than 10%. • Always wipe surfaces with a mild detergent and water to remove Clorox residue. • Never use a Brillo pad on interior surfaces. Use a non-metallic pad (e.g., Scotch-brite). • Corrosive culture medias can cause oxidation.
Add-Water indicator is illuminated and alarm is sounding (water-jacketed models only).	• Do not fill the incubator with de-ionized water. Use tap or distilled water. • Check the floor for evidence of a leak. • Make sure the incubator is level. Refer to Section 4.3 on page 6. • Check that water is visible at the weep hole. If not, add water (refer to Section 4.4 on page 7).
Condensation	
Humidity is too low.	• Close the glass door for at least 30 minutes. • Make sure that the humidity pan is stainless steel, has at least 150 square inches of water surface area, and more than one inch of water depth. • Check the water level in the humidity pan. Refer to Section 4.7 on page 9. • Check the jacket water level. Refer to Section 4.4 on page 7. • Make sure the glass door seals properly. Use the outer door seal procedure to check the inner door seal (Section 4.5 on page 7).
Too much condensation on glass door.	• Outer door gasket is not sealing properly or is damaged. Refer to Section 4.5 on page 7. • Make sure that the humidity pan cover is in place. Refer to Section 4.9 on page 9.
Condensation on inside of outer door.	• Door seal is not tight. Refer to Section 4.5 on page 7.

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Symptom	Solution
Condensation on interior walls/ceiling.	• Check the water level (water-jacketed models only). Refer to Section 4.4 on page 7. • Make sure the incubator is level. Refer to Section 4.3 on page 6. • Check the incubator location. Refer to Section 3.2 on page 5. • Make sure the glass door seals properly. Use the outer door seal procedure to check the inner door seal (Section 4.5 on page 7). • Make sure that the humidity pan cover is in place. Refer to Section 4.9 on page 9.
Door Ajar Warning	
Door ajar indicator is illuminated.	• Check that the glass door is closed and properly latched. • Make sure the door latch is not loose in its mounting.
Temperature Control	
Temperature display is drifting.	• Check the incubator location. Refer to Section 3.2 on page 5.
Inside temperature is not equal to the display temperature.	• Verify the calibration procedure. Refer to Section 4.11.2 on page 11. • Check the incubator location. Refer to Section 3.2 on page 5.
Temperature not controlling at setpoint.	• Close the doors for a minimum of 30 to 40 minutes. • Check the setpoint. Refer to Section 4.6 on page 8.
Temperature is over-shooting during the day.	• Do not open the door more frequently than at five minute intervals. • Check the incubator location. Refer to Section 3.2 on page 5.
CO_2 Gas Control	
CO_2 display indicates more than 0.2 above setpoint (Automatics, 300/3000 Series).	• Check the setpoint. Refer to Section 4.6 on page 8. • Perform Auto Zero after adding humidity. Refer to Section 4.7 on page 9 and Section 4.10 on page 9. • Check the incubator location. Refer to Section 3.2 on page 5.
CO_2 display indicates more than 0.2 below setpoint (Automatics, 300/3000 Series).	• Check the setpoint. Refer to Section 4.6 on page 8. • Check the CO_2 gas supply. Refer to Section 4.2 on page 6. • Replace the gas input filter. Refer to Section 4.2 on page 6. • Check the gas tubing for dirt and replace if necessary.
CO_2 recovery takes too long (Automatics, 300/3000 Series).	• Make sure a gas supply filter is installed. Refer to Section 4.2 on page 6. • Replace the gas input filter. Refer to Section 4.2 on page 6. • Check the gas tubing for dirt and replace if necessary.
CO_2 display is drifting (Automatics, 300/3000 Series).	• Close the glass door for at least ten minutes. • Check the CO_2 gas supply. Refer to Section 4.2 on page 6.
CO_2 concentration measurement does not equal the display (Automatics, 300/3000 Series).	• Check the setpoint. Refer to Section 4.6 on page 8. • Verify Fyrite analyzer operation. Refer to Section 4.11.1 on page 10. • Perform Auto Zero after adding humidity. Refer to Section 4.7 on page 9 and Section 4.10 on page 9.
CO_2 concentration (as measured by a gas analyzer) is less than the setpoint.	• The gas pressure regulator is set too low. • The door seal is not tight. Refer to Section 4.5 on page 7. • The gas setpoint is incorrect. Refer to Section 4.6 on page 8. • CO_2 concentration measured too soon after door closing. • Make sure power did not fail recently. If power failed, allow stabilization time after power is restored.
CO_2 concentration (as measured by a gas analyzer) is greater than the setpoint.	• The gas percentage is incorrectly set. • The CO_2 injection solenoid is stuck open.
CO_2 setpoint and display agree. Fyrite analyzer reads lower.	• Fyrite not zeroed. Check the Fyrite Operation manual, also refer to Section 4.11.1 on page 10. • Wool filter in Fyrite is dry. • Fluid in Fyrite needs to be changed. • Chamber absolute humidity has decreased. • CO_2 control is incorrectly zeroed. Refer to Section 4.10 on page 9.
CO_2 setpoint and display agree. Fyrite analyzer reads higher.	• Fyrite not zeroed. Check the Fyrite Operation manual, also refer to Section 4.11.1 on page 10. • Chamber absolute humidity has increased. • CO_2 control is incorrectly zeroed. Refer to Section 4.10 on page 9.
CO_2 alarm and light are activated. Can be silenced. If reset, the alarm activates again.	• CO_2 level has deviated more than one percent from setpoint. • CO_2 supply has been interrupted.
Digital CO_2 display and Fyrite read more than one percent different from setpoint. CO_2 alarm is not activated.	• Defective alarm. • Defective alarm circuit. • Defective CO_2 sensor or control.
Digital CO_2 display and Fyrite read 0% CO_2. Setpoint is okay. CO_2 alarm and light are activated. CO_2 inject light is on.	• Loss of CO_2 supply. • Defective CO_2 solenoid. • Blocked CO_2 inline filter.

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Symptom	Solution
Digital CO_2 display locks up. Shows some random number or a decimal point.	• Defective display board. • Defective output to display board. • Faulty interconnect wiring.
Digital CO_2 display will not go to zero no matter how long the inner door is left open.	• Improper Auto Zero procedure. Close door and allow the temperature and humidity to stabilize (six to eight hours). • Defective CO_2 sensor. • Defective CO_2 control.
Display flickers badly or counts up or down three or four tenths of a percent.	• Defective display board. • Excessive RFI or EMI near cabinet.
CO_2 setpoint cannot be changed.	• Defective setpoint potentiometer. • Defective CO_2 control. • Defective CO_2 sensor.
Unit cannot be zeroed.	• Defective CO_2 zero potentiometer. • Defective CO_2 sensor.
CO_2 overshoots badly.	• Defective air circulator. • CO_2 control defective. • CO_2 inlet pressure is too high. • CO_2 solenoid valve is stuck.
CO_2 recovers extremely slowly.	• Plugged orifice in CO_2 solenoid valve. • Inline CO_2 filter is partially blocked. • Leak around the sensor gasket. • Leak around the port cover gasket. • CO_2 inlet pressure is too low. • Blockage in the CO_2 injection line.
Actual CO_2 is higher than the setpoint and display. Re-zeroing helps, but the symptom returns.	• Defective CO_2 sensor. • Incorrect calibration of CO_2 control.
CO_2 alarm sounds while CO_2 level is controlling at setpoint.	• Excessive EFI or EMI near cabinet. • Faulty grounding circuit. • Defective CO_2 control.
CO_2 setpoint changes by itself.	• Defective setpoint potentiometer. • Defective CO_2 control. • EMI or RFI.

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9 Replacement Parts

Part Number	Description	UM	Quantity
21487H01	Motor, Fan 110/120V 50/60Hz	ea	1
22006H01	Motor, Fan 220/240V 50/60Hz		
23051I01	Valve, Inject Assembly	ea	1
23053I01	Control, Door Heat Assembly 120V	ea	1
29127H01	Gasket, Outer Door	ea	1
29218H01	Glass, Inner Door, Seamless	ea	1
29323H01	Gasket, Inject/Sensor Plate	ea	1
29860H03	Board, TC Gas w/o RH	ea	1
300120H01	Humidity Pan Cover	ea	1
31310G01	Hinge, Glass Door Paint Assembly	ea	1
31390G01	Outer Door Assembly, DOM	ea	1
31390G02	Outer Door Assembly, EXP	ea	1
31664H01	Board, Micro, Water Jacket	ea	1
31664H05	Board, Micro, Dry Wall	ea	1
31665H01	Board, Display	ea	1
31666H01	Board, Power	ea	1
31727G01	Rust Inhibitor Water Conditioner	ea	1
31853G01	T/C Gas Sensor Assembly, MTC	ea	1
32300H01	Knob, Infinite Heat Control	ea	1
32540H01	Thermistor Sensor with Cable - Water jacket	ea	1
32540H02	Thermistor Sensor with Cable - Display	ea	1
38747H01	Foot, Leveling	ea	4
86738H01	Board, Control PC 500	ea	1
86742H01	Switch, Rocker Power DPST 4A 250VAC	ea	1
86764G02	Latch Assembly, Glass Door, Seamless	ea	1
86766H01	Latch Arm	ea	1
86790H01	Heater, Door 120V 25W 50Hz/60Hz	ea	1
86832H01	Wheel, Blower #250X125C181C1	ea	1
86836H01	Gasket, Sensor CO_2 Inc	ea	1
86855H01	Switch, MOM Push Button SPST	ea	1
86865H01	Breaker, Circuit 5A MP# 1600-114-050-32	ea	1
86886H01	Receptacle	ea	1
86887H01	Receptacle	ea	1
86961H01	Receptacle, Snap-in 125V Eagle #49BK	ea	1
87333H01	3/16 in. ID and 5/16 in. OD Clear Tubing	ft	as req'd
87599H01	Blade, Fan	ea	1
88653H01	Washer, Lock Ext Tooth #6 SS	ea	0
88673H03	Gasket, Continuous Inner Door	ft	8
89819G01	Shield, Motor Assembly	ea	1

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10 Accessories

Description				Part No.
Cleaning, Sanitizing Agents				
Roccal II, 3.5 liter bottle				**6314**
Amphyl Spray, disinfecting agent, 12 cans/case				**6315**
O-Syl, 3.5 liter bottle				**6316**
Multi-Clean Disinfectant, 1 gallon container				**6505**
General				
Remote Alarm				**5612**
Caster Dolly Assembly, for 300/3000 Series				**6720**
Cooling Coil for Constant Flow				**6555-1**
Cooling Coil for Automatic Flow				**6555-2**
Decontamination Kit, for 300/3000 Series				**6324-1**
Gas Filter, in-line, disposable bacteriological filter.				**6320**
HEPA Filter (package of four replacement filters)				**6951**
Humidity Pan, stainless steel for water-jacketed units only				**6322**
Water Conditioning Crystals, for one water-jacketed chamber				**6326**
Gas Analyzers, including aspirator and case				
Fyrite CO_2/O_2				**6309**
Fyrite CO_2				**6310**
Replacement Fluid, CO_2, one bottle				**6312**
Gas Regulators				
CO_2 Gas Regulator, two-stage, CGA fitting 320				**6317**
Recorders				
Type	**Width (in.)**	**Pens**	**Drive**	
Temperature, hydraulic (Forced Draft only)	6	1	7-day	**6300**
Temperature, hydraulic (Forced Draft only)	6	2	7-day	**6301**
Temperature, electronic	6	1	7-day	**6302**[a]
CO_2, electronic	6	1	7-day	
Replacement Recorder Paper				
For hydraulic-type recorders (6300 and 6301), 0° to 60°C, 50/box				**6306**
For electronic-type temperature recorders, (6302), 50/box				**6307**
For electronic-type CO_2 recorders, (6302), 50/box				**6308**
RS-232 Data Port				
Available for automatic CO_2 incubators only. For remote data logging, includes software.				**6689**
Shelves, stainless steel with channel brackets				
Shelf, perforated, ultra-flat				**6305**
Tank Interchange System				
Free-standing. Automatically switches from empty cylinders to standby cylinder when CO_2 is exhausted. For use with automatic CO_2 incubators only (300/3000 Series and forced draft units).				**6281**

[a] Specify temperature or CO_2 when ordering.

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Important

For your future reference and when contacting the factory, please have the following information readily available:

Model Number: _____

Serial Number: _____

Date Purchased: _____

The above information can be found on the dataplate attached to the equipment. If available, please provide the date purchased, the source of purchase (specific agent/rep organization), and purchase order number.

IF YOU NEED ASSISTANCE:

LABORATORY PARTS and SERVICE

Phone:	800/438-4851
FAX:	828/658-2576

TECHNICAL SUPPORT

Phone:	800/438-4851
Toll Free (U.S.):	828/658-2576

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