CARON

Caron Scientific

OPERATIONS MANUAL

INCUBATOR SHAKER

Models: 7406-25/7406-33

PO BOX 715.MARIETTA.OH 45750 / PHONE 740 373 6809 & 800 648 3042 / FAX 740 374 3760 / CARONSCIENTIFIC.COM

Dear Valued Customer:

Thank you for purchasing CARON Products & Services equipment. We appreciate your business and look forward to being your preferred supplier of controlled environment equipment products in the future.

At CARON, we are committed to continuous quality improvement. Our goal is to supply our customers with highly reliable equipment at a fair price. In order to openly monitor our performance, we would appreciate your feedback on our products and services.

If you have questions, or any suggestions for improvement based on the installation or operation of the equipment you have purchased, please contact our service department at www.caronscientific.com or 740-373-6809.

Thanks again for your business!

Revision Log

Version	Date	Description
Rev A	8-25-24	Initial Release
Rev B	3-31-25	Revised Accessories & populated shaker RPM table
Rev C	4-14-25	Revised Humidity to be standard not an option, Moved primary and secondary door latch information to Operation section, Deleted GASG302 references, Switched OUTP303, OUTP304 to OUTP307, OUTP308 and revised instructions, Revised Spare Replacement Parts
Rev D	5-1-25	Revised Spare Replacement Parts – changed CO2-103KIT ASY to CO2103KIT ASY, CTR-141 moved to CO_2 Related, HTR-166 changed to 7000KIT HTR 003

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WARRANTY INFORMATION

CO_2 INCUBATOR LIMITED WARRANTY

Please review this section before requesting warranty service. At CARON, one of our primary goals is to provide customers with high levels of personal service and top-quality products, delivered on time, backed by technical service and supported for the life of the product.

Before contacting us for warranty service, please be aware that there are repairs that are not covered under warranty.

WARRANTY DEFINED

Caron Products & Services, Inc. (herein after CARON) hereby warrants that equipment manufactured by CARON is free from defects in materials and workmanship when the equipment is used under normal operating conditions in accordance with the instructions provided by CARON.

COVERED:

- Parts and labor for a period of two (2) years from date of shipment.
- Any part found defective will be either repaired or replaced at CARON's discretion, free of charge, by CARON in Marietta, OH. Parts that are replaced will become the property of CARON.
- If CARON factory service personnel determine that the customer's unit requires further service, dependent of the model involved, CARON may, at its sole discretion, provide a service technician to correct the problem, or require the return of the equipment to the factory or authorized service depot.
- CARON will have the right to inspect the equipment and determine the repairs or replacement parts necessary. The customer will be notified, within a reasonable time after inspection, of any costs incurred that are not covered by this warranty prior to initiation of any such repairs.

NOT COVERED:

- Calibration of control parameters.
- Improper installation; including electrical service, gas and water supply tubing, gas supplies, room ventilation, unit leveling, facility structural inadequacies or ambient conditions that are out of specification.
- Cost of express shipment of equipment or parts.
- Any customer modifications of this equipment, or any repairs undertaken without the prior written consent of CARON, will render this limited warranty void.
- CARON is not responsible for consequential, incidental or special damages; whether shipping damage or damages that may occur during transfer to the customer’s point of use. When the equipment is signed for at the customer’s site, ownership is transferred to the customer. Any damage claims against the shipping company become the responsibility of the customer.
- Repairs necessary because of the equipment being used under other than normal operating conditions or for other than its intended use.
- Repair due to the customer's failure to follow normal maintenance instructions.
- Parts considered consumable; including: light bulbs, filters, gases, etc.
- Damage from use of improper water quality.
- Damage from chemicals or cleaning agents detrimental to equipment materials.
- Force Majeure or Acts of God.

This writing is a final and complete integration of the agreement between CARON and the customer. CARON makes no other warranties, express or implied, of merchantability, fitness for a particular purpose or otherwise, with respect to the goods sold under this agreement. This warranty cannot be altered unless CARON agrees to an alteration in writing and expressly stated herein shall be recognized to vary or modify this contract.

Ohio Law governs this warranty.

EQUIPMENT INTERNATIONAL LIMITED WARRANTY

Please review this section before requesting warranty service. At CARON, one of our primary goals is to provide customers with high levels of personal service and top-quality products, delivered on time, backed by technical service and supported for the life of the product.

Before contacting your distributor for warranty service, please be aware that there are repairs that are not covered under warranty.

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COVERED:

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- If CARON or their authorized representatives determine that the customer's unit requires further service, CARON or the representative may, at its sole discretion, provide a service technician to correct the problem, or require the return of the equipment to the an authorized service depot.
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PO Box 715 · Marietta, OH 45750
740-373-6809

INTERNATIONAL SYMBOLS AND DEFINITIONS

Help

Information

Warning of hazardous area

Warning of hot surface

Warning of dangerous electric voltage

Warning of risk of fire

Earth (ground) protective conductor

WARNINGS

Local government may require proper disposal

TO LOCATE REFRIGERANT TYPE AND PRESSURES, SEE SERIAL LABEL LOCATED ON THE OUTSIDE OF THE UNIT

FOR HYDROCARBON (R290 PROPANE) REFRIGERANT UNITS

R290 is highly flammable and must be treated with proper care.

Do not damage the refrigeration circuit. Do not store explosive substances in the unit. Component parts shall be replaced with like components and servicing shall be done by authorized personnel to reduce the risk of possible ignition.

DANGER – Flammable Refrigerant Used. Risk of fire or explosion.

- Do not puncture refrigerant tubing
- Do not use mechanical devices to defrost refrigeration equipment
- Unit to be repaired only by trained service personnel

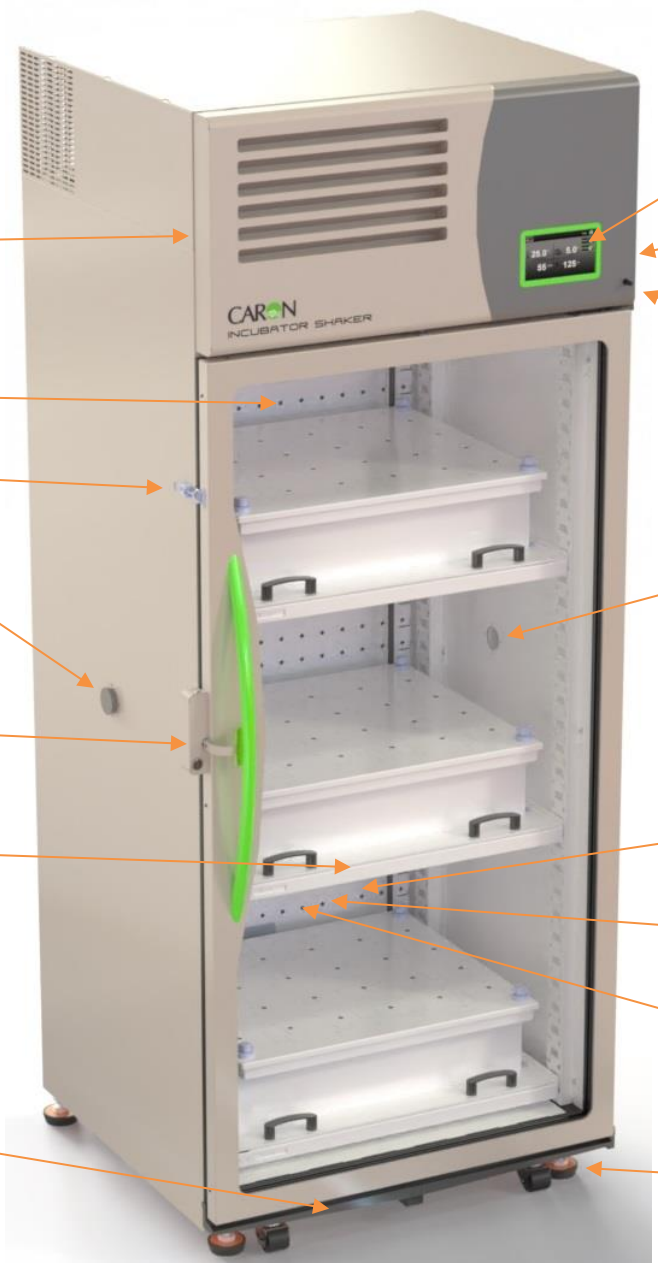
CAUTION – Flammable Refrigerant Used. Risk of fire or explosion.

- Consult repair manual, owners guide before attempting to service this product. All safety instructions must be followed.
- Dispose of properly in accordance with federal or local regulations.

CAUTION – Do not use any electrical appliance within the Environmental Chamber, other than those recommended by the manufacturer.

EQUIPMENT OVERVIEW

Congratulations! You have just purchased the latest technology in CO_2 incubator shakers. Before using the equipment, familiarize yourself with key components of the product and thoroughly read this manual.



7" Full Color HMI

Power Switch Right side

CO_2 Sample Port

Replaceable air intake filter

Heated Triple Pane Outer Glass Door

Secondary Door Latch

Left Side Access Port

Right Side Access Port

Primary Door Latch

Adjustable Shaker Height

RTD Temperature Sensor

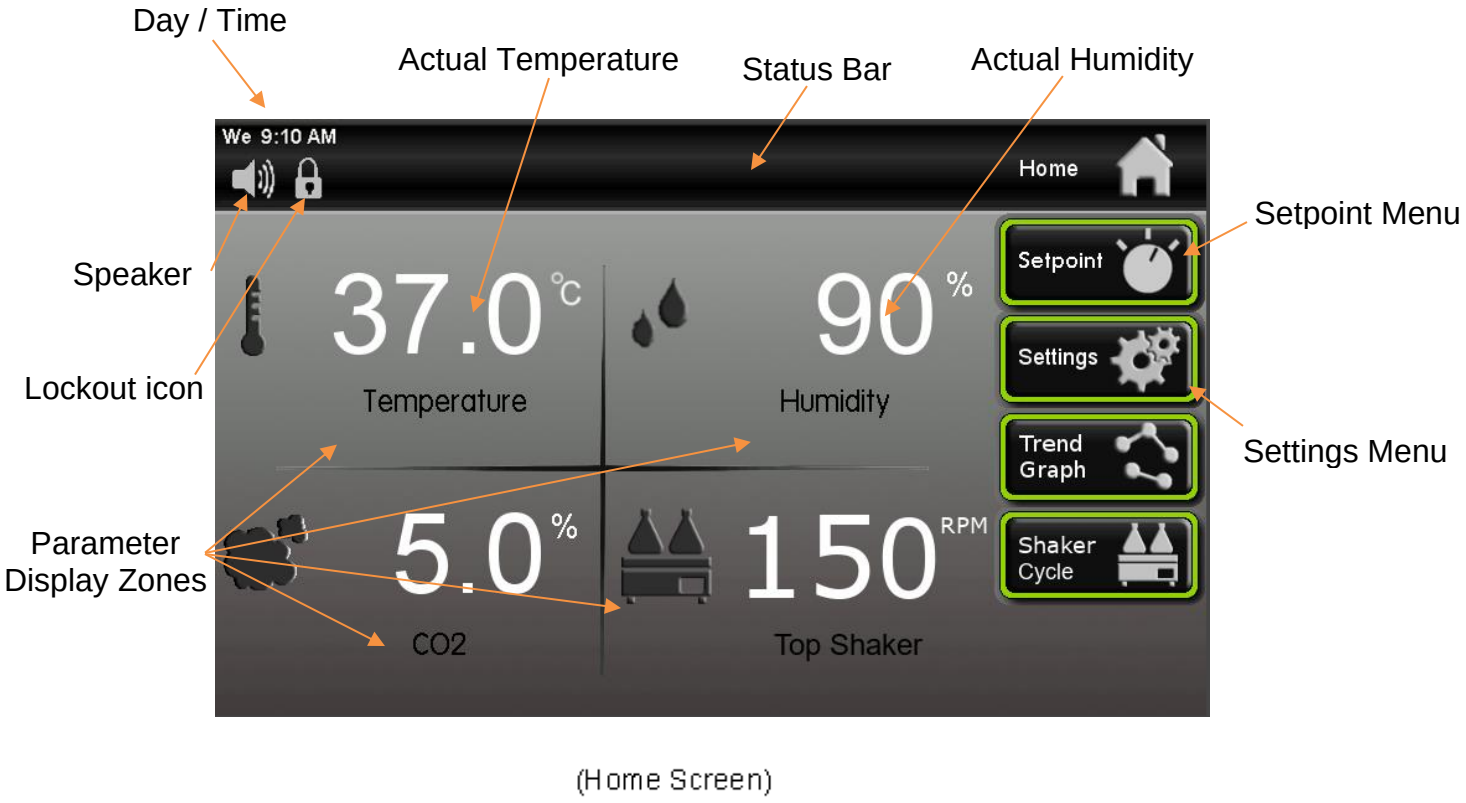
Infrared CO_2 Sensor

Humidity Sensor

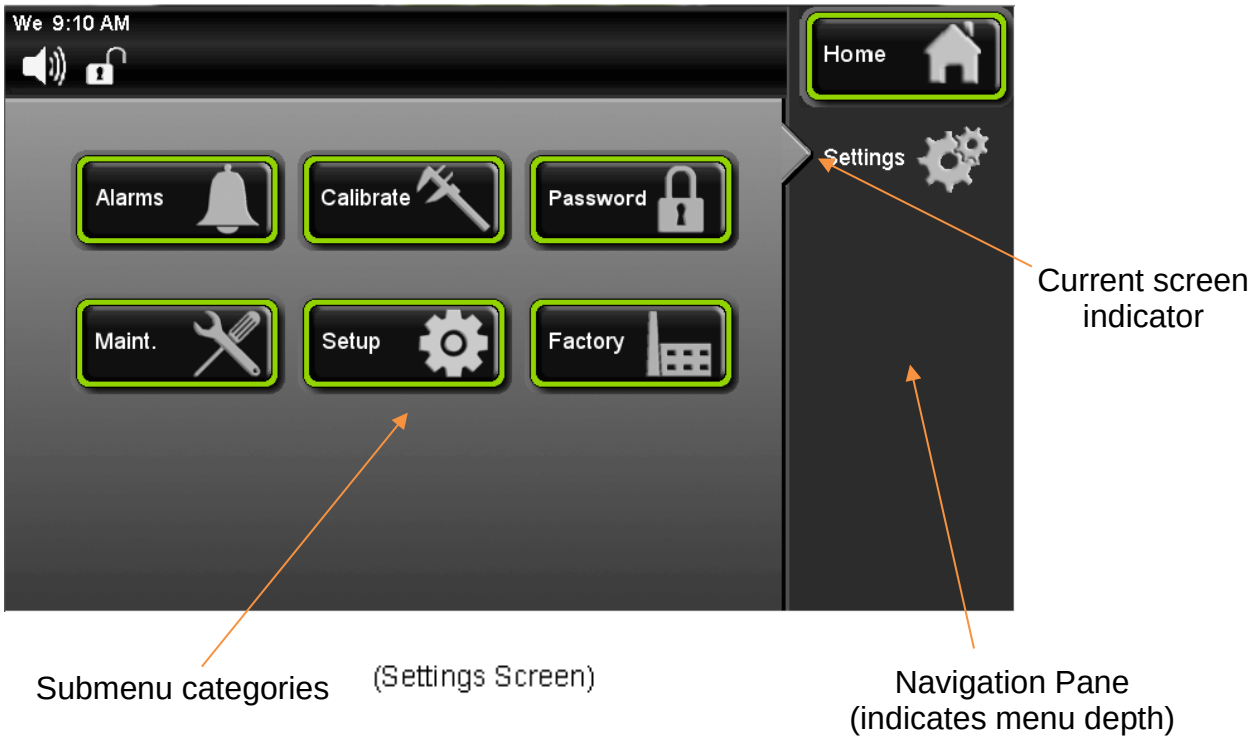
Outer Door Drip Trough

Vibration Dampening Leveling Feet

Model 7406-33



(Home Screen)



(Settings Screen)

INSTALLATION

Unpacking

Your new unit has been thoroughly packaged to avoid shipping damage. However, the unit should be fully inspected upon arrival before signing for receipt. If the package has visual damage, notes should be made on the freight bill and signed by the delivery company. In the event of concealed damage after the unit is uncrated, keep the carton and packaging material. Call the shipping company within 7 days of receipt, request inspection and retain a copy of the inspection report.

For prolonged periods of inactivity leave the unit unplugged and securely stored.

Caron provides full on-site installation services for all models. Our installation services guarantees the proper set-up and startup of all equipment. Please contact the Service Department at 740-373-6809 or www.caronscientific.com for details.

Choosing a Location

This product weighs in excess of 800 pounds. Ensure that sufficient resources are available to safely move the product.

To ensure proper operation, the unit must be located on a firm level surface, capable of supporting approximately 1200 pounds (500 kg). The unit should be located in an 18°C – 25°C ambient area and where there is no direct airflow from heating and cooling ducts as well as out of direct sunlight. Allow four inches of clearance on all sides of the product to allow for connections and airflow. The unit is designed to be used under the following conditions.

- Indoor use only
- Altitude up to 2000m.
- Maximum relative humidity: non-condensing
- Mains supply voltage fluctuations up to +/- 10% of the nominal voltage; damage may occur if voltage varies more than 10%
- Transient over voltages up to the levels of overvoltage category II
- Temporary over voltage occurring on the mains power supply
- Pollution degree: 2
- Ingress protection: IPXO
- Not near vibration sensitive equipment

The unit requires a dedicated electrical connection. Depending on the options purchased with unit a floor drain may be required. Choose a location where these facilities are or can be made available. Contact CARON customer service for information on the product: www.caronscientific.com

Preliminary Cleaning

Your new environmental chamber was thoroughly cleaned prior to leaving the factory. It is recommended, however, to clean all interior surfaces with a general purpose laboratory cleaning agent to remove any shipping dust or dirt prior to using the product. Contact Caron if there is any doubt of the compatibility of the cleaning agent being used with the chamber. After cleaning, dry all interior components with a sterile cloth as necessary.

Installing the Port Stoppers

The unit has an access port built into each side of the cabinet. The ports are designed to allow customer access for equipment validation or for installation of other equipment inside the chamber. These ports should be sealed with the provided rubber stoppers to allow the incubator to function properly. Install the stoppers provided in the port on each side of the unit.

R290 REFRIGERANT UNITS

DANGER – Flammable Refrigerant Used. Risk of fire or explosion.

- No equipment that uses an open flame should be placed inside the unit.
- Do not use instrumentation or equipment that incorporates potential ignition sources, e.g. open contact switching, brushed DC and AC motors, etc.
- Do not use electrical appliances within the unit, other than those recommended by the manufacturer.

7406-25

7406-33

The incubator shaker has integrated orbital shakers. Each shaker runs independent of the other(s). Additionally, each shaker can be set up for different orbit diameters, including 0.75” (19mm), 1.0” (25mm), 1.5” (38mm), and 2.0” (51mm). The shakers are set to the 1.0” (25mm) orbit diameter from the factory. See Page 40 for instructions on how to change the orbit.

Shaker weight capacity: each shaker platform is capable of supporting a uniformly distributed maximum load of 65 lbs (29.5kgs). Maximum chamber capacity is 500 pounds (227kgs) stationary.

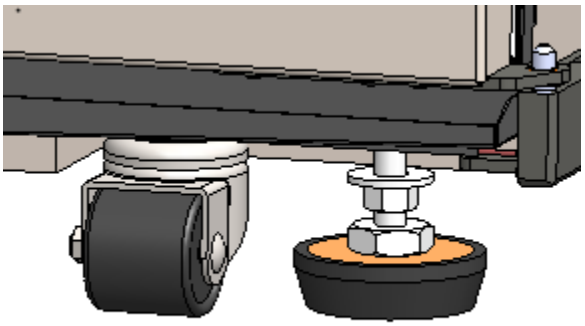
Shaker speed range:
Min: 20 RPM (loaded or unloaded)
Max: 425 RPM (unloaded)

Chamber should be empty when being moved to different location.

Leveling the Unit

Place a level on the top shaker platform 7406-25. Middle shaker platform on the 7406-33 incubator.

Adjust the leveling feet until the unit sits level left to right and front to back. Even if the unit is level without adjustment, the leveling feet must still be lowered below the casters to avoid the incubator moving while the unit is in operation.



Connecting the Drain

When using a pressurized water source, failure to connect the unit to a drain could result in facility flooding.

The chamber drain connection is located in the bottom middle of the back of the chamber. A 3/8” tube fitting, tubing and wire ties are supplied in the unit parts kit. Insert the tube fitting into the tubing, secure tubing to fitting with provided wire tie. Insert fitting into drain connection.

Pull on the tubing after installation to make sure it is secure. Route the drain tubing to a local floor drain. Duplicate fitting installation on other end of tubing if necessary.

The drain line relies on gravity to remove water from the chamber. The drain line must remain below the chamber to drain properly. Kinks or elevations in the drain line above the cabinet drain will not allow the chamber to drain.

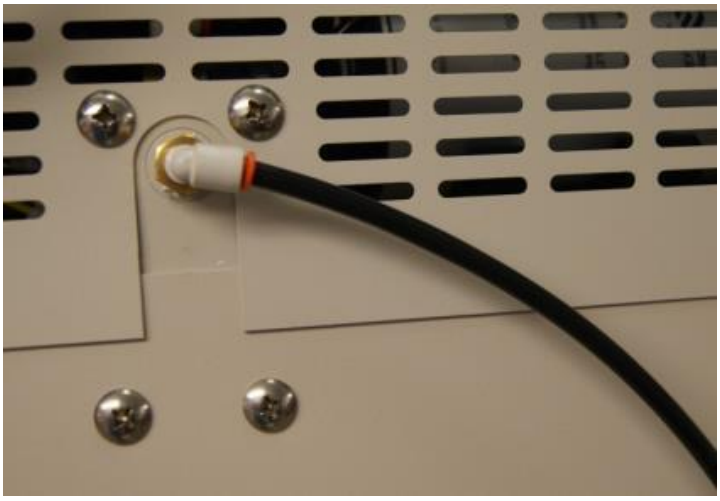
If a local floor drain is not available, a variety of accessories are available through CARON customer service. These accessories can also be viewed at www.caronscientific.com

Connecting the Water Supply

To ensure proper operation, distilled or deionized water is required as a supply on units that have humidity control. If these water sources are not available contact CARON customer service.

Use only distilled or deionized water with a resistivity between 50KΩ-CM and 1MΩ-CM and a pH of greater than 6.5. Using water outside this range will void your warranty.

Do not use water that contains chloramines. Chloramines can damage internal rubber gaskets resulting in leaks.



A water inlet fitting on the back of the unit and ¼" black tubing are provided to connect the water supply to the chamber. Connect an appropriate water supply to the fitting. Incoming line pressure should be regulated to not exceed 80 psi.

CRSY103 or BOTL301 are optional accessories that can be used as water supplies.

Connecting a CO_2 supply

High concentrations of carbon dioxide can cause asphyxiation. The use of CO_2 monitors and alarms is recommended for areas where CO_2 can collect.

The CO_2 gas supply should be 99% pure and should not contain a siphon tube. Gas pressure to the unit must be regulated to 20-25 PSIG. Failure to do so could cause tubing to burst.

The CO_2 supply should be 99% and not have siphon tubes. CO_2 pressure should be regulated to 20-25 PSIG. CO_2 tank regulators REGL101 can be purchased through CARON customer service. Once the cylinder regulator is installed, connect the outlet of the regulator to the hose barb fitting using the tubing and clamps provided.

An inline filter is provided to remove any contaminants in the CO_2 gas supply. Check the connections closely for leaks.

Connecting Electrical Power

Connect each incubator to a grounded circuit. Failure to do so could result in electrical shock.

The unit requires a dedicated electrical outlet. See table below for model specific power required and connection.

Model #	Power Requirements	Plug Connection
7406-1	115V, 60Hz, 16A FLA	NEMA 5-20
7406-2	230V, 60Hz, 10A FLA	NEMA 6-15
7406-3	230V, 50Hz, 10A FLA	CEE 7/7

When the required electrical connection is available, plug the provided power cord into the unit and the electrical outlet.

The mains power supply cord must meet the requirements listed above. The use of an inadequate mains power supply cord could result in equipment failure or personal harm to the user.

In the event of a power outage the unit will automatically restart when the power is restored.

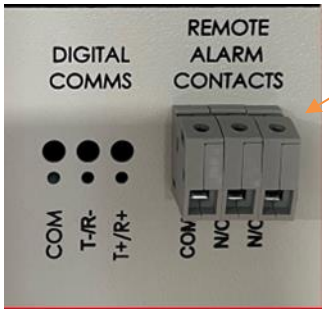
OPTIONAL ACCESSORY INSTALLATION

Connecting Alarm Contacts (ALRM302)

With the purchase of ALRM302, a set of terminals on the rear of the unit is provided to monitor temperature and humidity alarms.

With the alarm contacts, the terminals provided allow for a NO (normally open) output, a NC (normally closed) and COM (common) connection. In the event of an alarm condition or power failure, the NO contact will close, and the NC contact will open. Once the alarm is cleared, the contacts return to their normal conditions. Insert the appropriate wire into the terminal and tighten down the screw terminal on top of the connector.

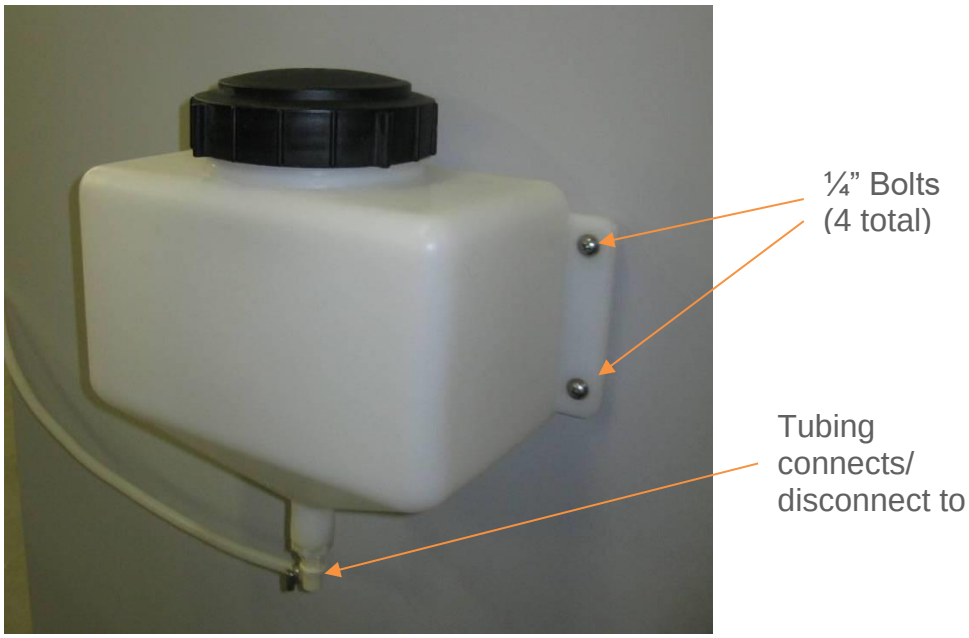
Terminal Connection	Unit off	Normal	Alarm
N/O to C	Closed	Open	Closed
N/C to C	Open	Close	Open



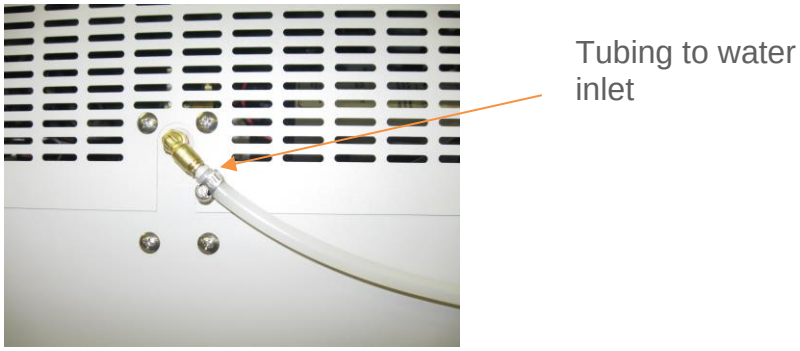
Alarm Contact Connections

Installing Carboy water system (BOTL301)

Incubators can be purchased with an optional 2.5-gallon carboy water system. The carboy system is preassembled and shipped inside the chamber. The four ¼" bolts required to mount the carboy to the unit will be mounted in the left hand side of the chamber. Remove the carboy assembly from inside the chamber and attach it to the chamber using the ¼" bolts.



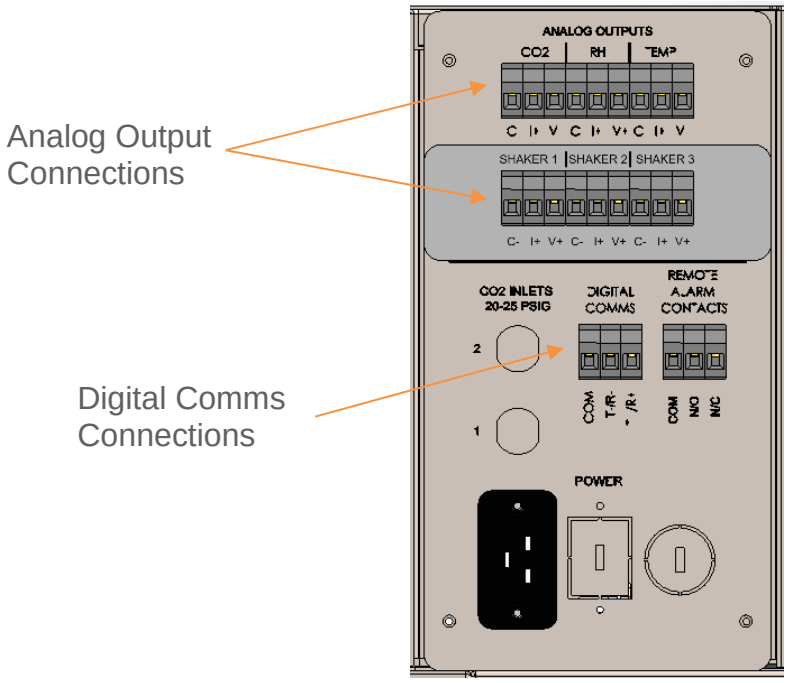
Attach the preassembled tubing provided with the carboy to the water inlet on the rear of the chamber.



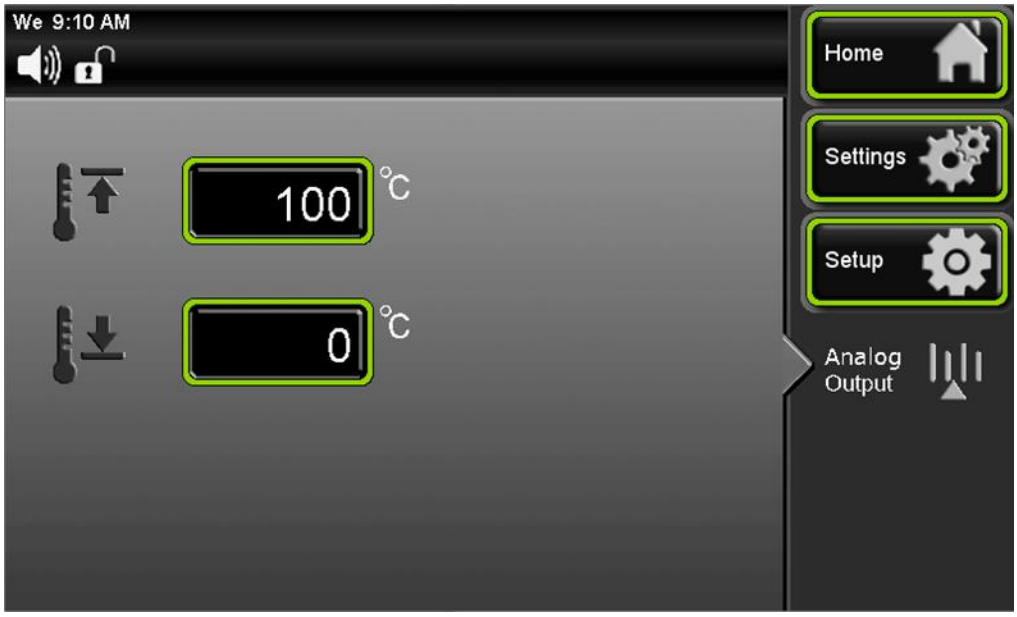
Fill the carboy with water as described in the "Using the Carboy Water System" section of the manual.

Connecting Analog Outputs (OUTP307, OUTP308)

With the purchase of OUTP307, the controls are equipped with analog outputs. OUTP307 provides 5 connections for monitoring temperature, humidity, CO_2, and 2 tiers shaker speed. OUTP308 provides 6 connections for monitoring temperature, humidity, CO_2, and 3 tiers shaker speed.



Analog outputs provide either a milliamp (4-20mA) or voltage (0-5V) signal output to represent each of the displayed Temperature, Humidity, CO_2, Shaker speed. These options can be used for connection to in-house data acquisition, recorder, or alarm system. The temperature parameter (only) is adjustable in its scaling and is accessible at the Analog Output screen.

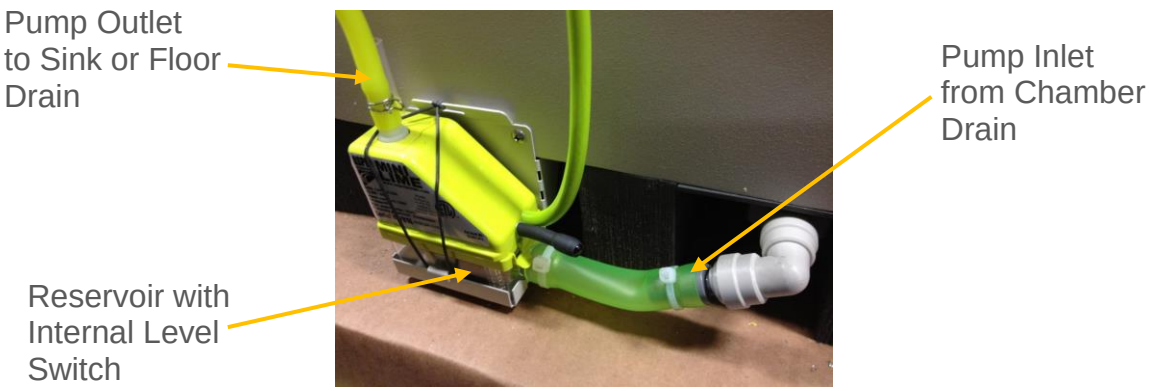


Parameter	Analog Output	Current	Corresponding Value
Temperature	0 – 5 V	4-20 mA	-50 – 100 °C (adjustable)
Humidity	0 – 5 V	4-20 mA	0 – 100 %rh
CO_2	0 – 5 V	4-20 mA	0 – 20 %CO_2
Shakers	0 – 5 V	4-20 mA	0-425 RPM

*Default range is -50C to +100C. Temperature scale low range is adjustable from -50C to 0C. Temperature scale high range is adjustable from 1C to 100C.

Connect shielded wires to the appropriate signal terminals: I(+) for current (mA) *or* V(+) for voltage (DC). For both current and voltage outputs, COM(-) is common terminal.

Installing Drain Water Pump (PUMP301)



In applications where a floor drain is not available and a CARON water recycling system is not being used, a drain pump can be purchased to pump any excess condensate from the chamber to a local sink or drain. The pump is located near the middle of the back of the chamber. Connect the supplied tubing from the pump to the sink / drain. The tubing may be run vertically into a ceiling but should not exceed 15 feet height. The pump is equipped with a small reservoir on the bottom of the pump with an internal level switch that will automatically turn the pump *ON* when it is full to drain the water out of the reservoir and into a floor or sink drain.

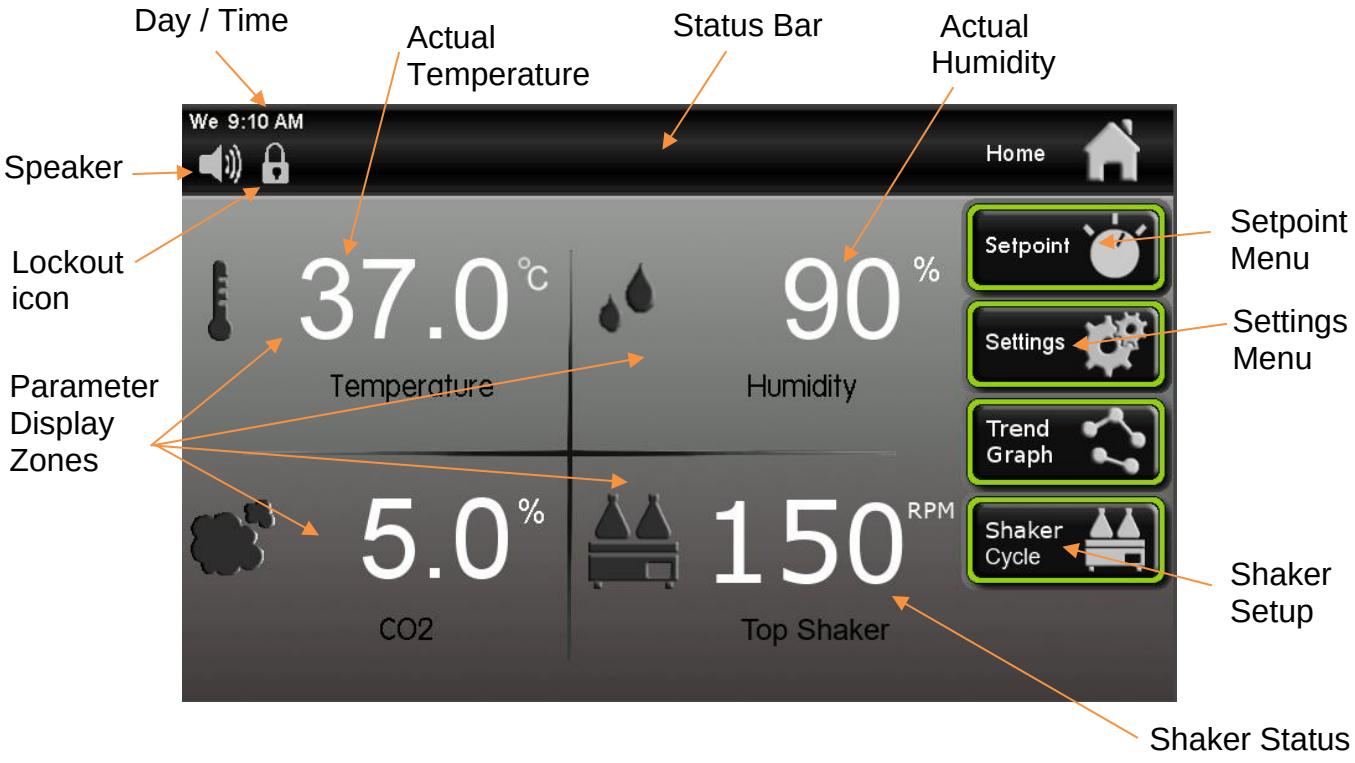
OPERATION

Before the incubator can be commissioned for use, make sure that the following steps have been completed:

- Chamber is properly installed and level.
- The appropriate utilities connected to the chamber.

With the above mentioned steps complete, the power switch located on the right side, near the top of the unit exterior, can be turned on.

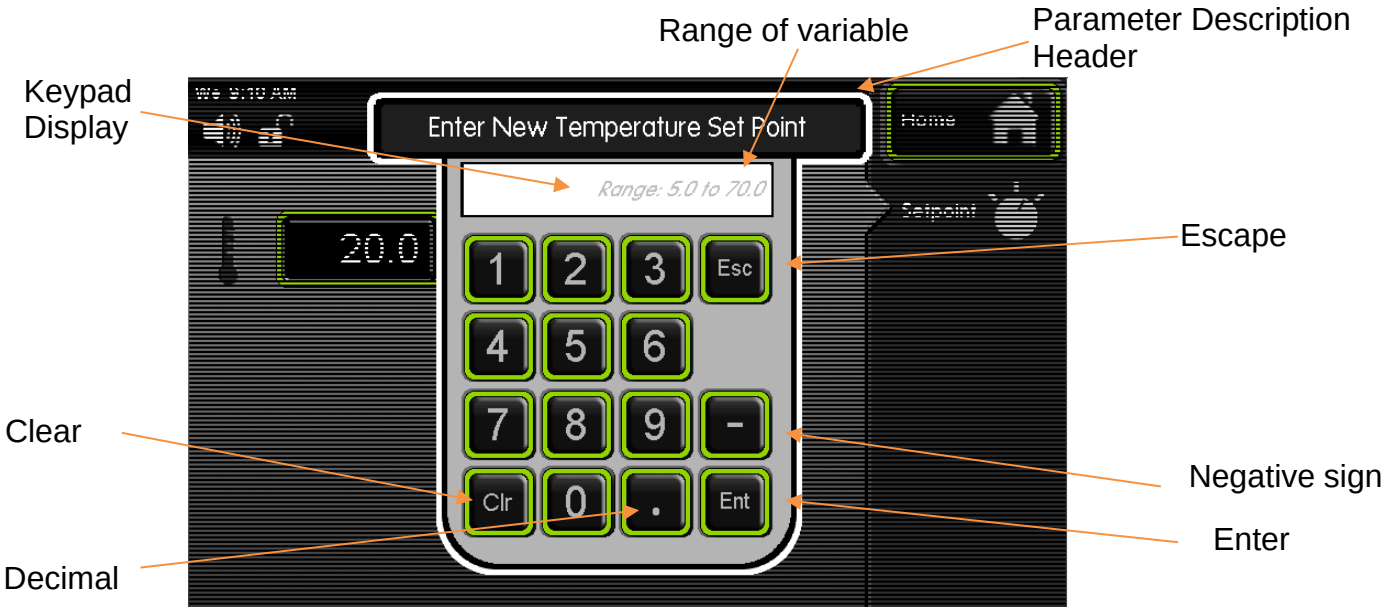
Within a few minutes, the temperature and humidity will begin to approach setpoints. Here is an overview of the home screen.



Model 7406 Main screen with HUMD307

Using the Keypad

This control system uses a numeric keypad to enter all parameter values. Similar to a calculator, this allows quick and precise entry of values. When any numeric value button is pressed, the keypad display will pop up over the current display.



The Parameter Description Header tells what parameter is being changed.
The Keypad Display shows allowable values of the parameter being changed (initially) and displays the entered value (when a button is pressed).

The Escape “Esc” button aborts the entry and returns to the previous screen without changing the value. The Clear “Clr” button erases the value that you have entered. After you have entered the value that you want, pressing the Enter “Ent” button and the new value will take effect. This also closes the keypad window. Other keypad buttons include a decimal point button and negative button.

If an invalid numeric button is pressed such that it would create an entry above the parameter’s range, the entered number will not display. For example, if the temperature setpoint range is 5.0 to 70.0, pressing ‘8’ followed by an ‘0’, only the ‘8’ will display.

If an invalid entry is made with an entry below the range (such as a ‘4’ followed by the ‘Ent’ button), then the entry will clear and the range will be re-displayed.

Learning the Touchscreen

To save power and ensure long product life, the touchscreen display has a few features that can be changed to reduce screen brightness and initiate a Screen Saver mode.

High / Low button 

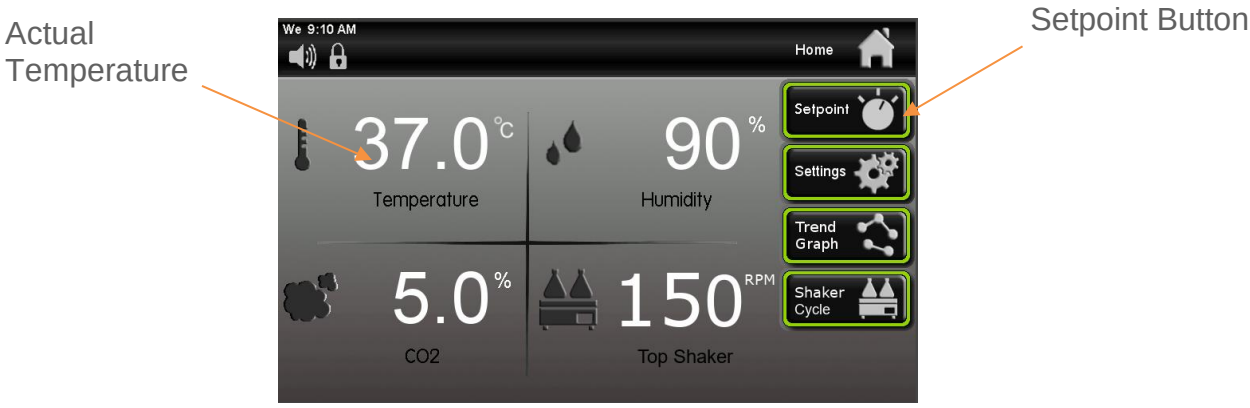
: high or low screen brightness, preset values.

Screen Saver 

: By pressing the Screen Saver button “on” this will automatically enter screen saver mode after 15 minutes. At this time, the screen will be completely blank (i.e. black). The illuminated Caron logo (see Equipment Overview section) shows that the unit is powered on and functioning. To wake-up the touchscreen, simply press anywhere on the touchscreen and the main screen will display. If the unit has an alarm condition, the touchscreen will not go into screen saver mode. If an alarm condition occurs while in screen saver mode, the display will automatically wake up and display the alarm.

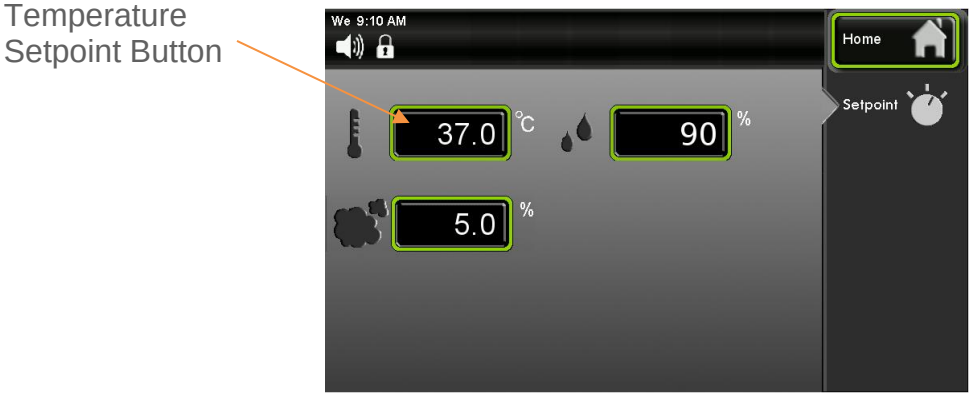
Changing the Temperature Setpoint

The steps below walk through an example of changing the temperature setpoint from 37.0 °C to 20.0 °C. Here is the display of the home screen.



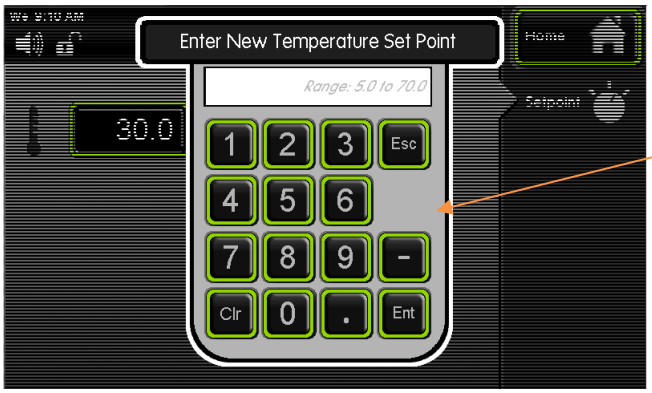
To set the temperature setpoint, press the 

(Setpoint) button on the right side of the screen.



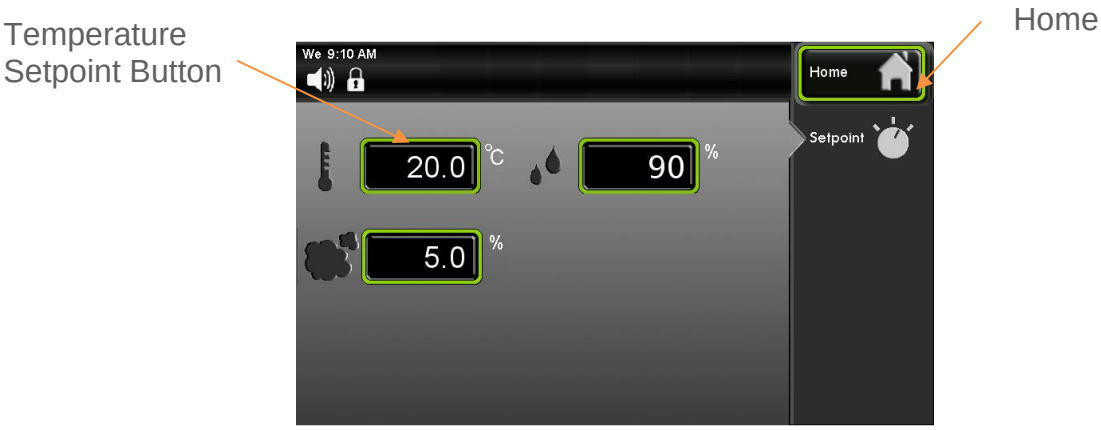
Once the Setpoint screen appears, press the 

(Temperature Setpoint) button. (In this example the temperature setpoint initially has a value of ’37.0’; this will vary with different initial setpoint values.)



A temperature setpoint window will appear. Enter the temperature setpoint by using the keypad. For a setpoint of 20, press 2 (‘2’), then 0 (‘0’), followed by the Ent (Enter) key. Correct any mistakes with the Clr (Clear button) and reenter the value.

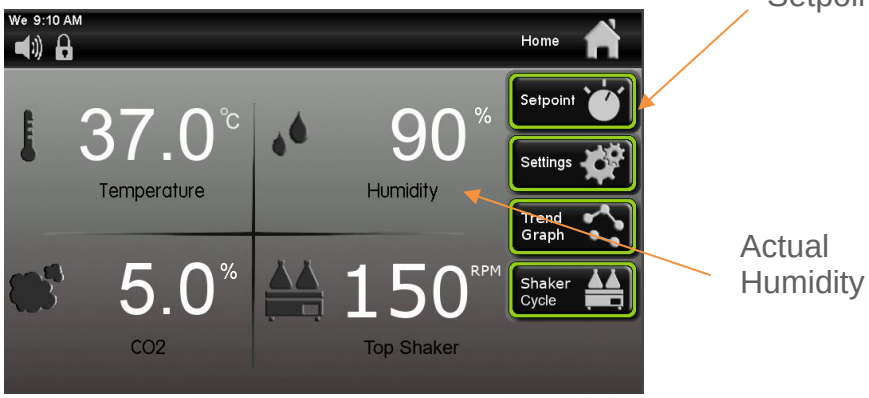
Once the Enter key has been pressed, the pop-up keypad disappears and the screen returns to the Setpoint display with the new value of 20.0 in the temperature setpoint button.



Press the Home (Home) button to return to the main screen.

Changing the Humidity Setpoint

The steps below walk through an example of changing the humidity setpoint. Here is the display of the home screen.

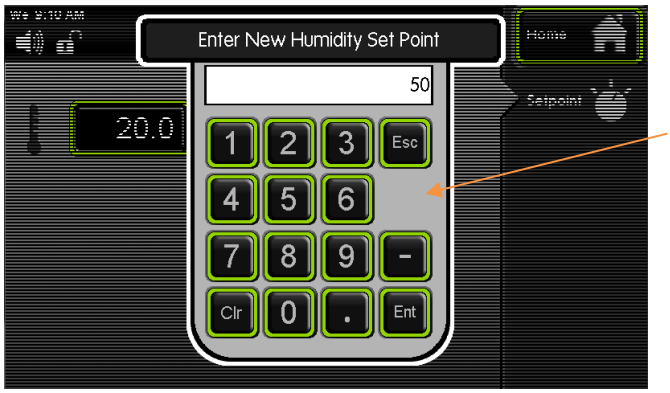


To set the humidity setpoint, press the 

(Setpoint) button on the right side of the screen

Once the setpoint screen appears, press the 

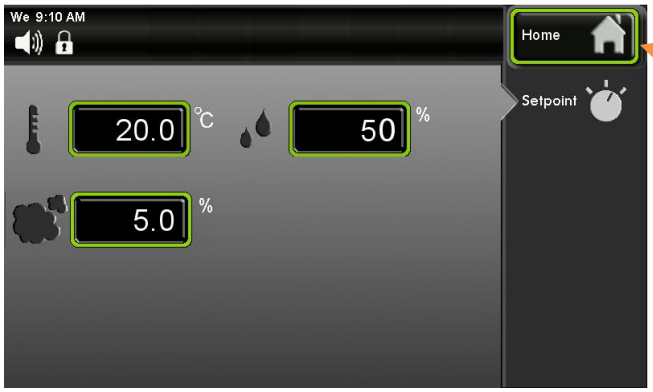
(Humidity Setpoint) button.



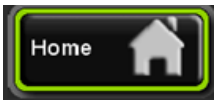
Keypad

Enter the new humidity setpoint on the keypad as desired and press 

(Enter) when complete.



Home Button

Press the 

(Home) button to return to the main screen.

Changing the CO_2 Setpoint

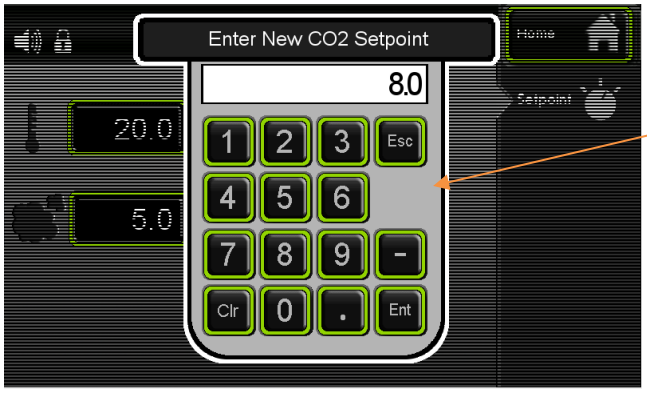
If an alternative CO_2 setpoint is required, the following steps can be taken:

To set the CO_2 setpoint, press the 

(Setpoint) button on the right side of the screen

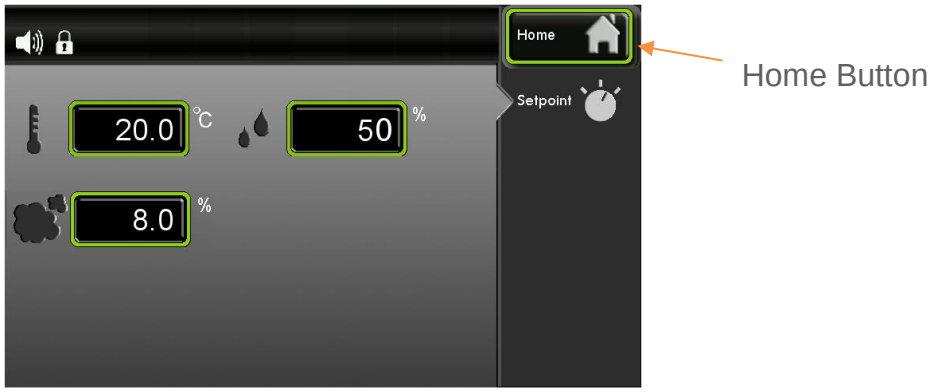
Once the setpoint screen appears, press the 

(CO_2 Setpoint) button.



Enter the new CO_2 setpoint on the keypad as desired and press 

(Enter) when complete.



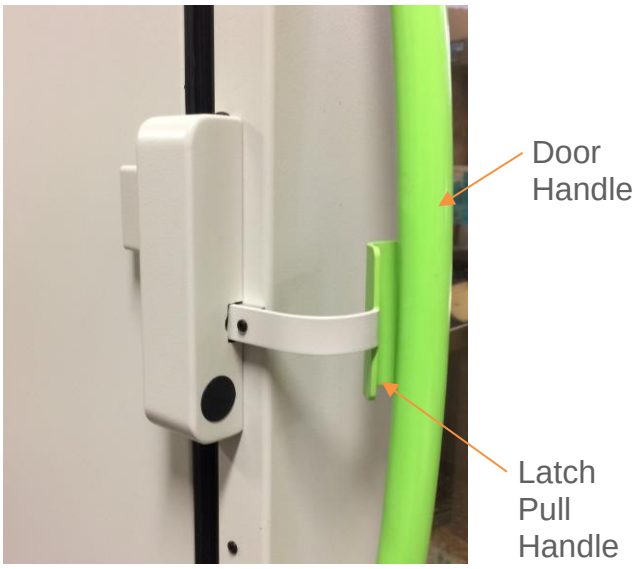
Home Button

Press the 

(Home) button to return to the main screen.

Operation of the Door Latch

The door latch is shipped installed on the incubator from the factory and requires no installation.

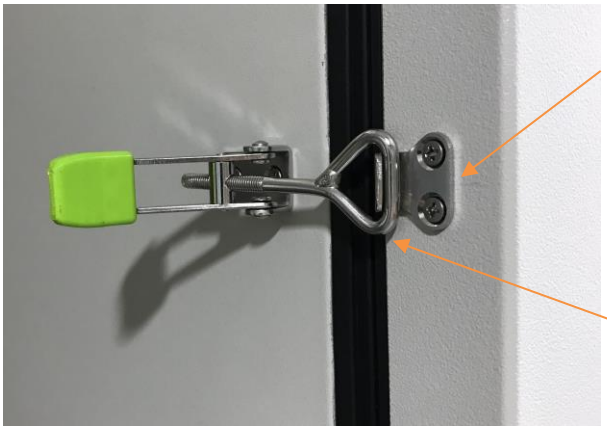


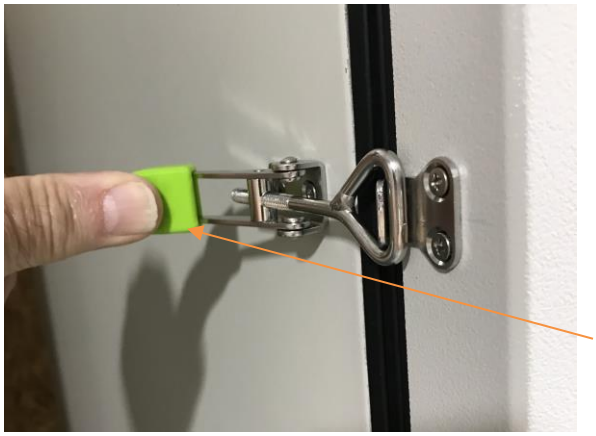
To operate the latch, grasp the pull handle and squeeze it toward the main door handle. The latch will disengage. Continue pulling on the handle to open the door. Closing the door fully will automatically re-engage the latch as long as the latch pull handle is not squeezed.

Latch cannot be disengaged from inside the incubator

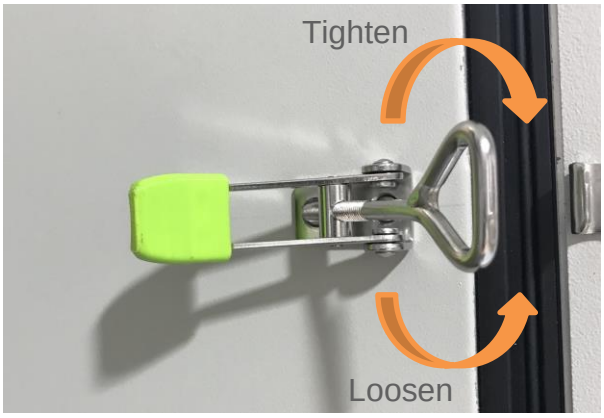
Operation of the Secondary Door Latch

The 7406 incubators are equipped with a secondary door latch to hold the door more securely during shaking. To engage the secondary latch, close the incubator door and hook the triangular shaped bolt of the latch over the keeper on the door. Then push the green knob toward the side of the cabinet until it stops.





When the latch is adjusted properly, it should compress the gasket on the door tightly against the cabinet. If the compression is too little, shorten the triangular bolt by turning it in the clockwise direction, when the latch is not engaged. If the compression is so much that the latch is too difficult to engage, turn the bolt in the counterclockwise direction to reduce the compression.
To release the latch, pull the green knob out away from the cabinet and unhook the bolt from the keeper.

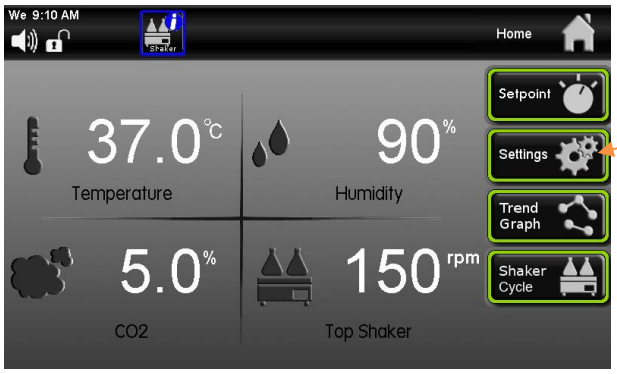


SETTING UP THE SHAKERS

Setting the incubator Door Open Mode

As a safety feature, while shaking is taking place, the incubator is designed to either slow the shaking motion to a very low rpm, or stop the shaking completely when the incubator door is opened. The preference of slowing or stopping the shaking can be set while the shakers are orbiting or stopped, as follows:

Select the “Settings” button from the home screen



Settings Button

Select “Setup” from the Settings menu

Setup Button

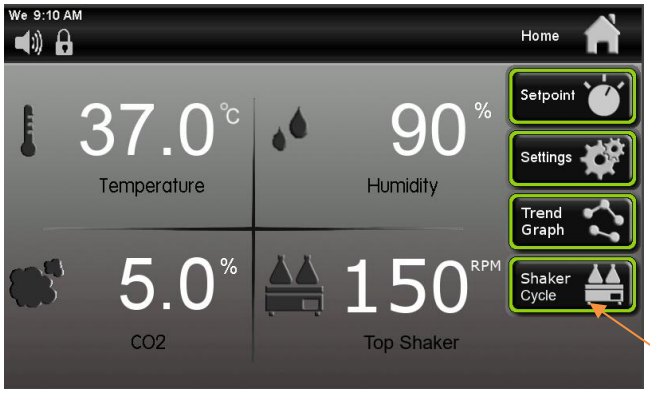
Select “Shaker Options” from the Setup menu

Shaker Options Button

After selecting “Shaker Options” the screen below will appear. The word “Slow” or “Stop” will be displayed on the right side of the button. Pressing the button toggles between “Slow” and “Stop”. When the desired mode is set, press the “Home” button to return to the Home screen.

CAUTION: When the incubator door is opened, there is a slight delay until the shakers slow down or stop completely. Wait a few seconds before reaching into the incubator after opening door

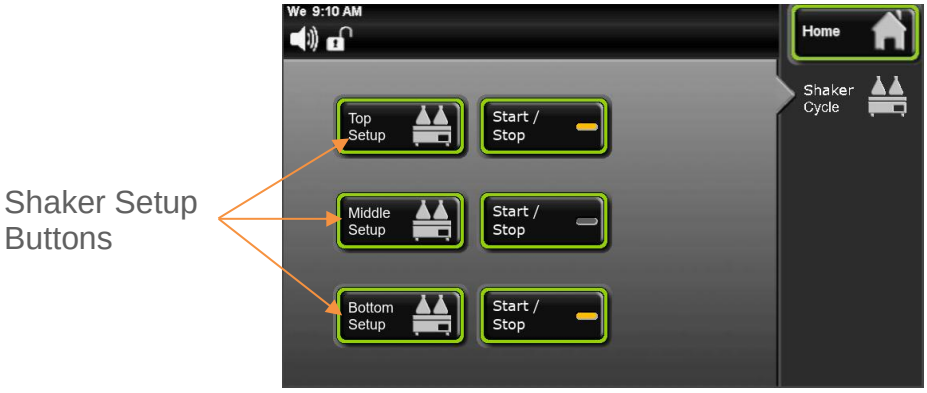
Setting the Shaker Functionality



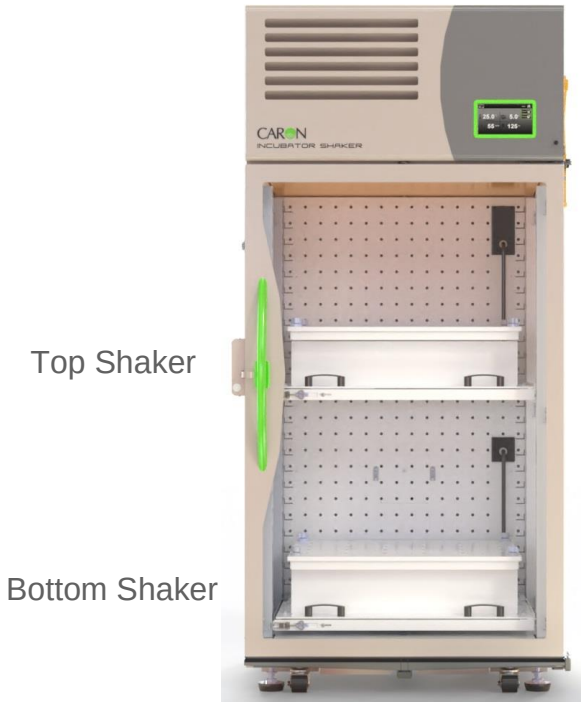
Shaker Cycle Button

To setup the desired operation of each shaker, press the 

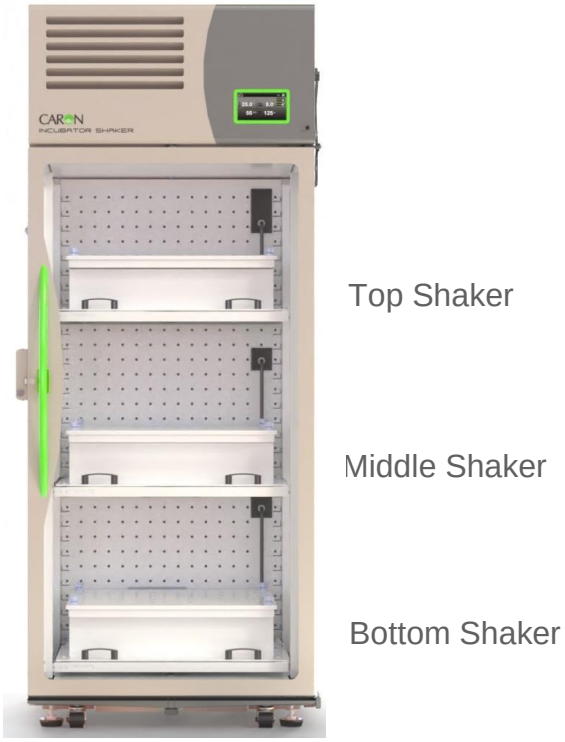
(Shaker Cycle) button on the right side of the screen



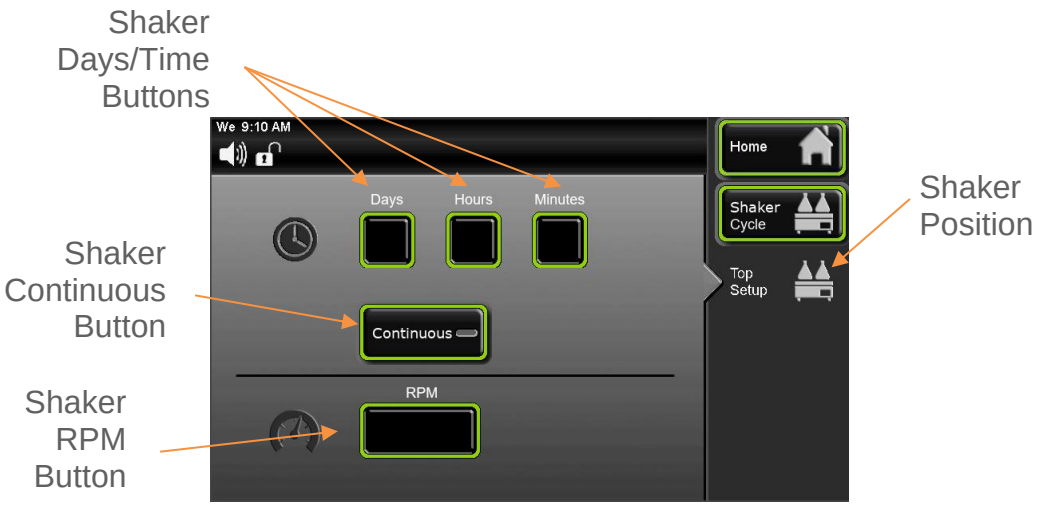
The shaker button positions Top, Middle, Bottom refer to the position of the shaker in the chamber. Model 7406-33 has 3 shakers, and model 7406-25 has 2 shakers (Top & Bottom).



7406-25



7406-33

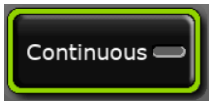


Once the Shaker Setup button is selected, the next screen will give you options for Days, Hours, Minutes or Continuous and RPM settings.

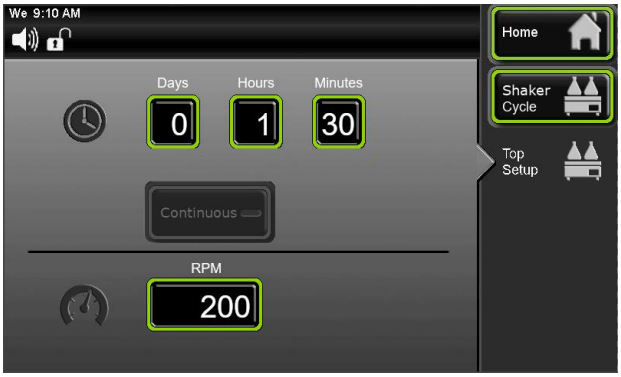
Enter values for Days, Hours, Minutes, RPM.

Minimum/Maximum values for each category

Category	Min values	Max values
Days	0	31
Hours	0	23
Minutes	0	59
RPM	20	425

If the 

(Continuous) button is selected, the shaker will over-ride any time values that have been entered for the shaker. Same rule applies if the time is setup, then Continuous button cannot be selected.
The RPM values are independent of the Time settings for each shaker.



Once the values are entered then press the 

(Shaker Cycle) button to return to the Shaker Cycle screen.

Shaker Start/Stop Button(s)

Press the 

(Start/Stop) button to activate the shaker.

Each shaker can be configured with 4 different choices of orbit diameters: 0.75", 1", 1.5", and 2". (see orbit changing instructions, starting on Page 42)
This allows flexibility to meet the need of the desired mixing to be achieved. Below is a table of maximum RPM for various flask sizes at each of the four RPM settings, with a 35% flask volume fill percentage (35% is the maximum fill recommended):

Flask Size	Max Number of Flasks per Shaker	Max Number of Flasks per Incubator	Max RPM for .75" Orbit	Max RPM for 1" Orbit	Max RPM for 1.5" Orbit	Max RPM for 2" Orbit
125ml	59	177	425	255	240	200
250ml	38	114	425	245	235	190
500ml	24	72	305	235	220	185
1 Liter	16	48	280	225	210	170
2 Liter	9	27	250	225	200	170
5 Liter	6	18	215	180	175	140

Preparing shaker for use

Depending on the flask height that is going to be placed on the shaker, the shaker position inside of the cabinet may need to change in height on the inside structure of the chamber (to be performed by the Caron Service Team only).

Once flask size is determined, remove the shaker platform by twisting the (4) shaker platform fasteners counterclockwise until they spring up. Then lift the shaker platform from the shaker.
To re-install the platform, align the platform fasteners, push down, and turn clockwise. There is an audible “click” sound when fastener is secure.

Shaker platform fastener locked position

Shaker platform fastener unlocked position

Vessels can be secured to the shaker platform by 2 different means: attaching clamps and bottle holders with mechanical fasteners or by using sticky pads to secure flasks, bottles etc.

Attach desired flask clamp(s) or sticky pad(s) to shaker platform, re-install shaker platform, and lock fasteners to secure

IMPORTANT! Sticky pads can only be used in applications where the shaker is operating below 250 RPM for .75” and 1.0” orbits, and below 200 RPM for 1.5” and 2” orbits

SHAKER POSITIONING FOR TALLER FLASKS

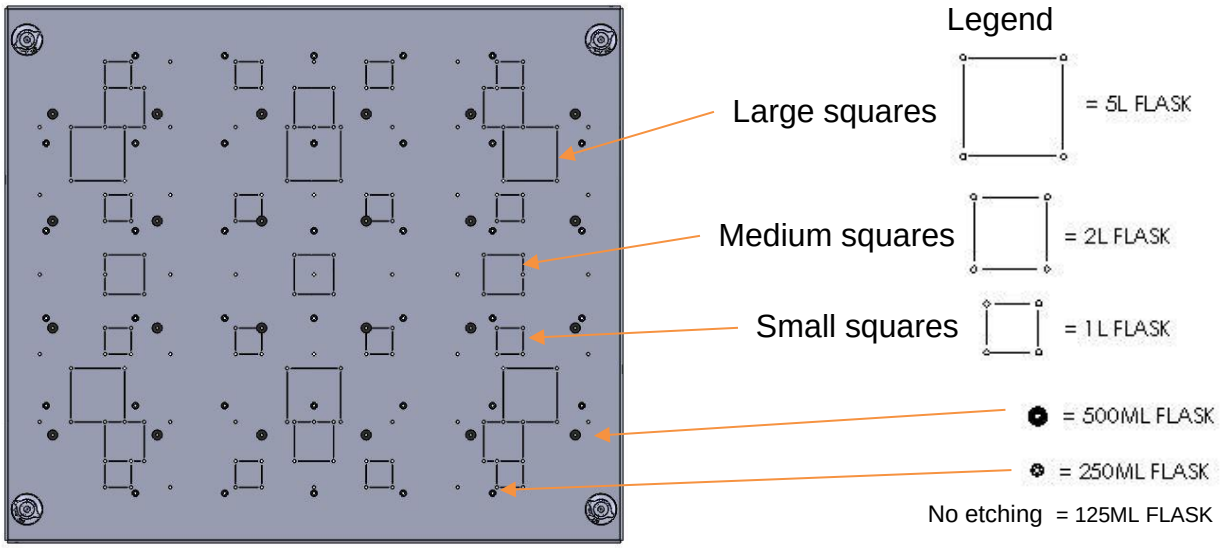
The images below show the shakers in the factory-installed positions for both the 7406-25 and 7406-33. The height position of each individual shaker is adjustable in 2” increments, allowing for more (or less) space between each shaker. This gives the user the flexibility to use a combination of shorter and taller flasks if desired.
The process of changing a shaker’s height position must be performed by a Caron Service Technician.

7406-25

7406-33

LOADING SHAKER PLATFORM

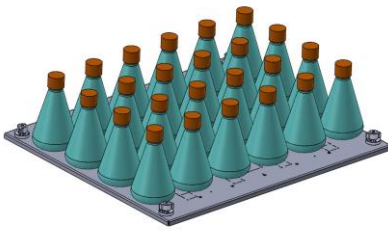
The shaker platform has been uniquely designed to accommodate the maximum number of flask clamps of each size that are recommended by Caron. Lines and circles are etched in the platform to serve as a guide for mounting the clamps. See the image and legend below for optimal placement of each flask by size. If less than a full platform of flasks is desired, positioning the clamps to produce a balanced load will result in smoother operation of the incubator.



See the diagrams below for the maximum number of flasks of each size that can be loaded on the shaker platform.

125ml Size – 59 flasks

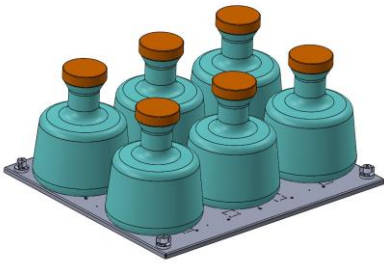
250ml Size – 38 flasks



500ml Size – 24 flasks

1L Size – 16 flasks

2L Size – 9 flasks



5L Size – 6 flasks

WARNINGS:

- Do not load shaker with weight exceeding specifications. This could cause shaker to not run at desired RPM setting, or could cause possible damage to shaker.
- Make sure that flasks, bottles, trays are secure when shaker is running at any RPM rate, particularly with high RPMs.
- Do not try to remove flask, bottle, trays while shaker platform is in motion. As a built-in safety feature, when the incubator door is opened while the shakers are orbiting, the RPM of the shakers will automatically slow down to the minimum RPM, or stop, if desired, until the door is closed again
- Do not load shaker platform with unbalanced load, Keep flask, bottle, and tray loads evenly distributed on shaker platform for smooth orbiting motion.
- Make sure the incubator door is closed tightly and both the primary and secondary door latches are engaged before starting the shaking motion.

NOTE: In the event of excessive incubator vibration due to higher than recommended weight or RPM, the 7406 Incubators are equipped with a safety alarm that will activate and slow the shaker RPM to a safe level. If this occurs, turn the shakers off, adjust RPM to a safe level, reset the alarm, and restart the shakers

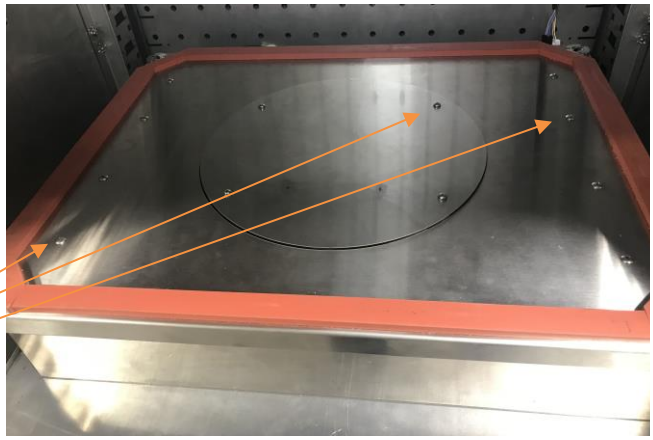
CHANGING SHAKER ORBIT DIAMETER

The integral shakers of the 7406-25 & 7406-33 have the capability of shaking at 4 different orbit diameters (0.75”, 1”, 1.5”, and 2”). Changing these orbits to one different from the factory set orbit diameter of 1” requires accessing the counterbalance weights located under the shaker top platform. Follow these steps to change the orbit diameter:

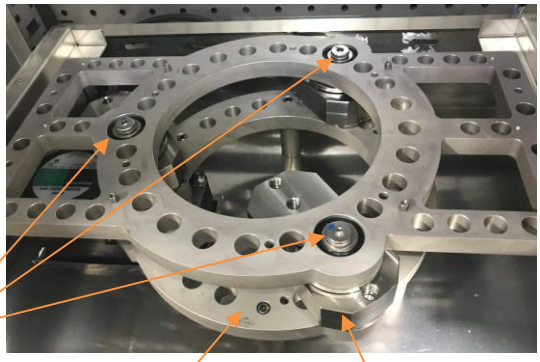
1. Turn shaker off and remove any loaded flasks or bottles from the shaker platform

2. Remove the top platform from the shaker by turning the 4 corner locking knobs (see page 39) and lifting off the platform, exposing the steel plates underneath

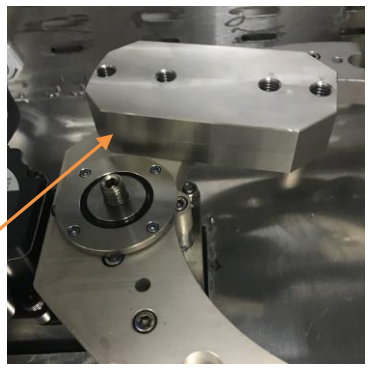
3. Remove the 8 screws that fasten the rectangular plate and 4 screws that fasten the circular plate. Remove both plates and set the plates and screws aside



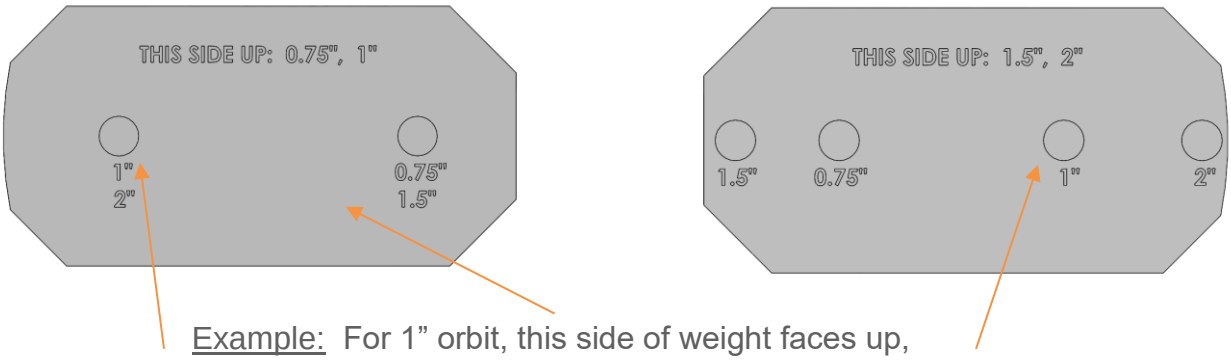
4. Using a ¼" hex wrench, **evenly** loosen the 3 bolts that fasten the upper ladder assembly to the counterbalance weights. After all 3 bolts are completely unthreaded from the weights, lift off the upper ladder assembly and set aside



5. Insert a medium length screwdriver in the cross hole in the head of the bolt at the motor, that the counterbalance weight is threaded onto. Push or tap the weight with a rubber hammer in the counterclockwise direction, loosening the weight. Continue to unscrew the weight and remove it



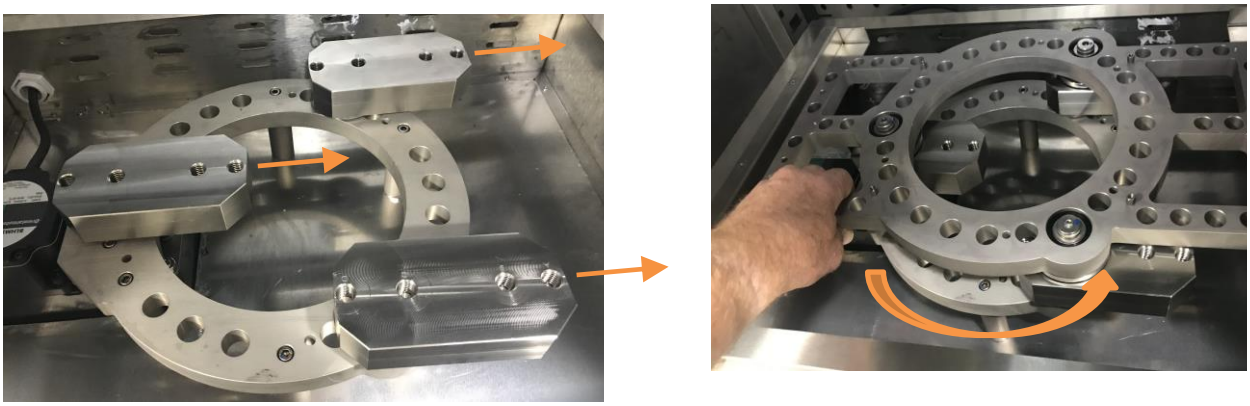
6. Re-attach the weight, using the correct threaded hole and weight orientation for the desired new orbit. Refer to the diagram below. It is very important to use the correct holes with correct sides of the weights facing up for the shaker to operate. The threaded holes are labeled for use with the desired orbit.



Example: For 1" orbit, this side of weight faces up,
this hole is used on upper ladder; this hole is used on lower ladder

7. Repeat the removal and replacement of the second and third counterbalance weights, taking care that all three weights have the same side facing up, and the same attachment holes are used. Tighten the weights to the bolts on the lower ladder assembly.

8. After all three weights are re-attached, rotate each weight so they are all facing the same direction. Then place the upper ladder assembly back onto the weights, aligning the three bolts in the ladder assembly with the corresponding desired orbit holes in the weights. Evenly tighten the bolts to secure the upper ladder assembly. Ensure that the ladder assembly is attached correctly by orbiting the upper ladder assembly counterclockwise by hand a few turns. It should orbit smoothy.



9. Re-attach the rectangular and circular plates removed in Step 3 and tighten all 12 screws. Replace the top platform and lock the four fastening knobs. This completes the changing of the orbit diameter.

OPTIONAL ACCESSORY OPERATION

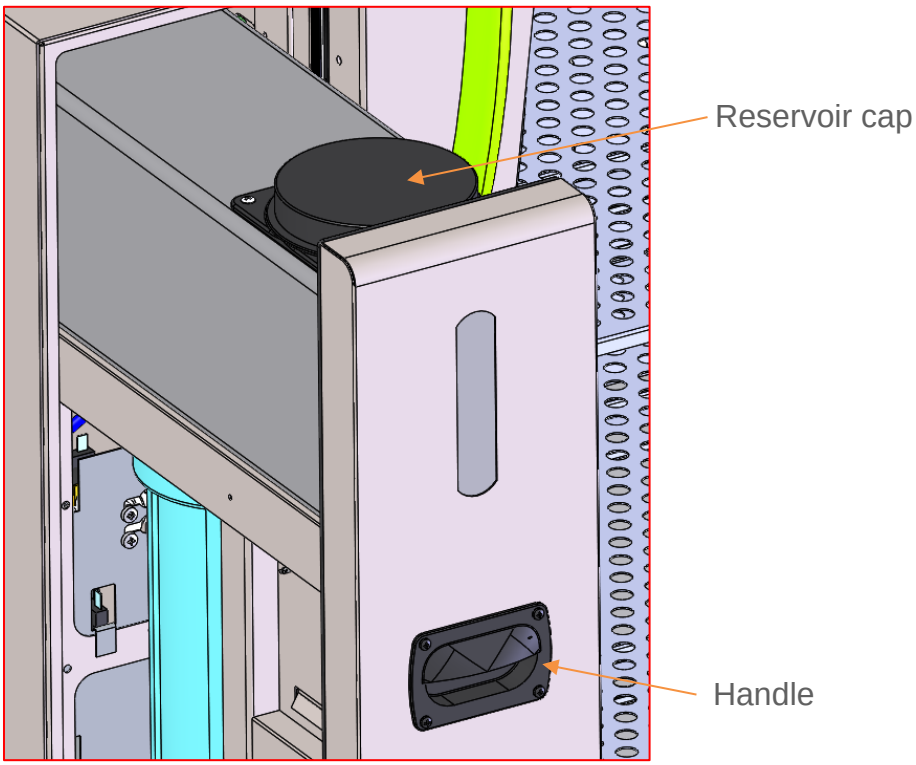
Condensate Recirculator System (CRSY103) Startup

Be sure recirculator outlet is connected before unit is turned on. As soon as the recirculator is turned on, water will begin flowing from the outlet.

When adding water to the reservoir, do not spill onto recirculator.

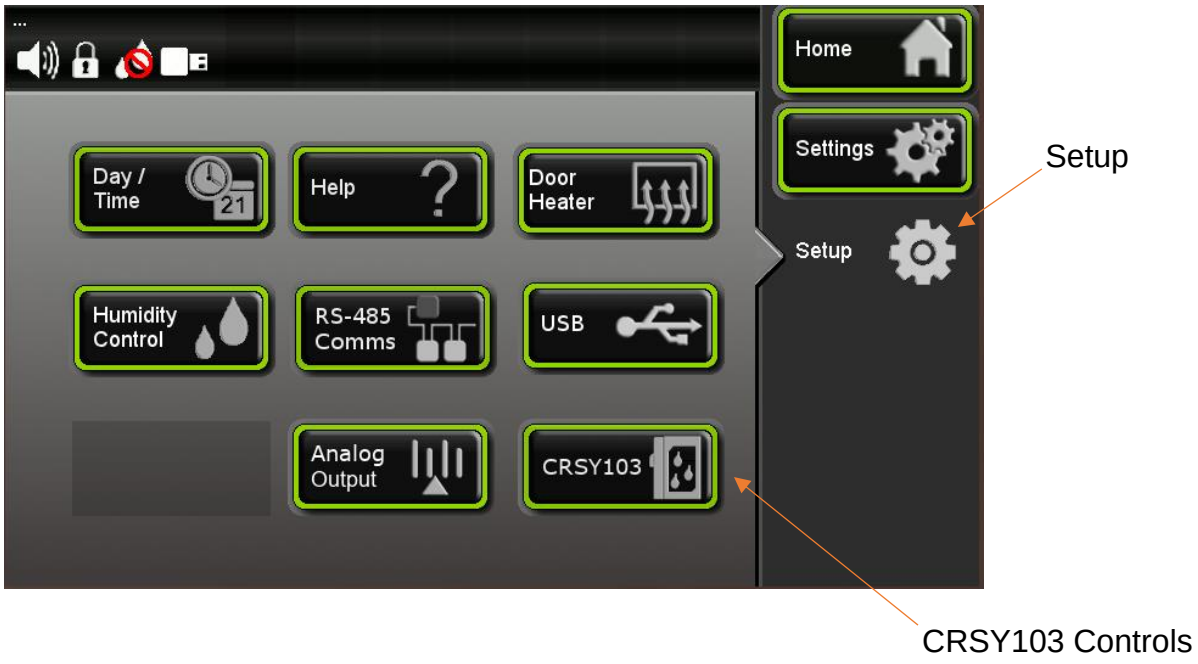
Filling Reservoir

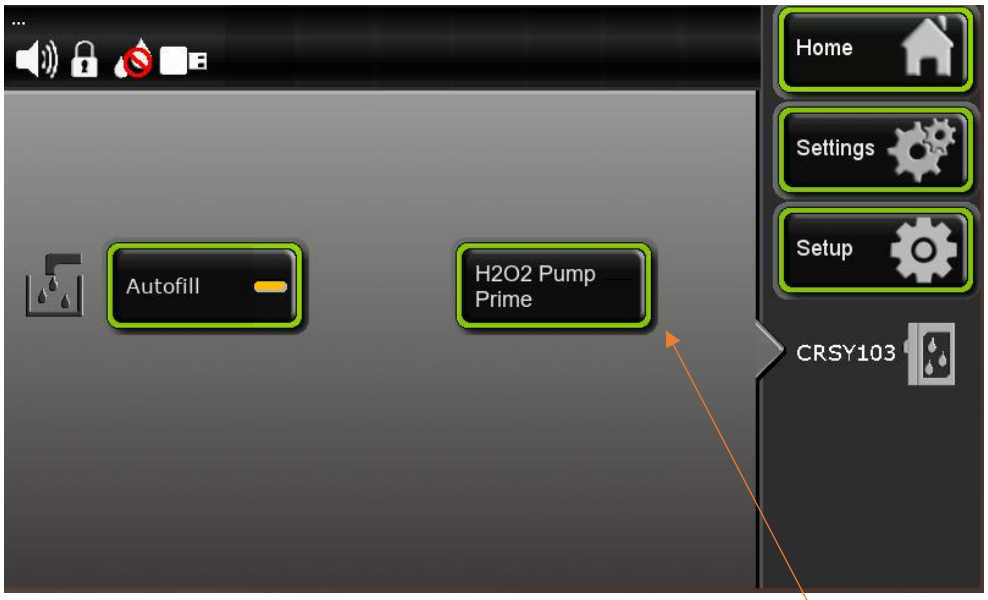
1. Pull black handle to open drawer.
2. Unscrew reservoir cap.
3. Fill reservoir with water. Reservoir holds 3 gallons (11.4 liters).
4. Screw reservoir cap back in place.
5. Close drawer.



Starting Recirculator

1. Turn chamber power switch on
   - Recirculator outlet will become pressurized
   - Internal water purification cycle will initiate (as necessary)
2. Purge air from chamber water supply line (recirculator outlet) by setting the chamber to high temperature and high humidity set points
3. Wait a few minutes as water fills the tubing in the chamber
4. Verify the humidity level has increased inside the chamber
5. Set temperature and humidity set points on chamber to desired settings
6. Prime the H_2O_2 pump
   - On the touchscreen, select “Setup”
   - Then, select “CRSY103”





- Select the "H_2O_2 Pump Prime"

Condensate Recirculator System Maintenance

Refilling Reservoir

The reservoir water level can be monitored through the front viewing window. Additionally, the low water indicator light will illuminate when the reservoir needs refilled. Water can be added to the reservoir while the recirculator is on.

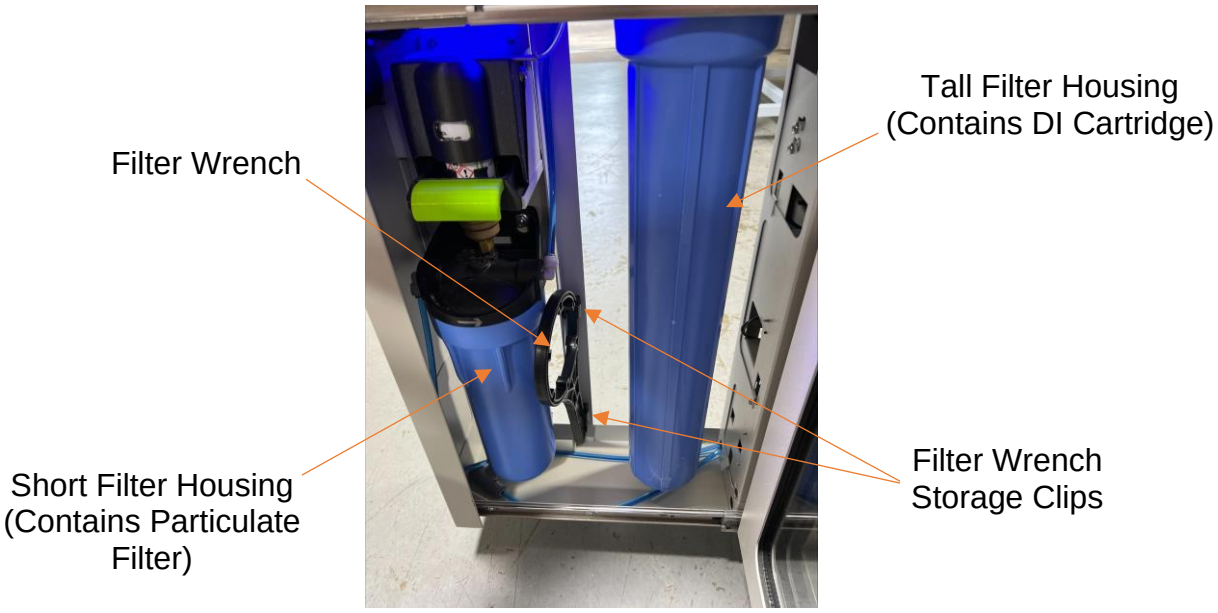
⚠	When adding water to the reservoir, do not spill onto recirculator.
⚠	If reservoir water level is too low, it will not supply water to the chamber and proper chamber humidity level may not be maintained.

Replacing Filters

1. It is recommended to turn off the entire chamber and unplug power cord.

> If the filters are changed while the chamber is still running, water leakage may occur.

2. Pull black handle to open drawer.
3. Remove the filter wrench (pull out of clips).



4. Using the filter wrench, unscrew the tall filter housing.

> Orientation of the DI cartridge is critical. Orient per instructions on DI cartridge container.

5. Discard used DI cartridge and insert new DI cartridge into tall filter housing.

6. Apply silicone grease to the O-ring.
7. Using the filter wrench, screw tall filter housing back in place until tight (tighten 1/8 turn after hand tight).
8. Using the filter wrench, unscrew the short filter housing.
9. Discard used particulate filter & insert new particulate filter into short filter housing.

Be sure O-ring inside of the filter housing is properly seated.

10. Apply silicone grease to the O-ring.
11. Using the filter wrench, screw short filter housing back in place until tight. (Tighten 1/8 turn after hand tight).
12. Snap filter wrench back into the storage clip.
13. Close drawer.
14. Plug power cord in and turn chamber on.

Replacing Filter on Chamber

1. It is recommended to turn off the entire chamber and unplug power cord.

If the filters are changed while the chamber is still running, water leakage may occur.

2. Using the filter wrench, unscrew the two short filter housing located on the back of the chamber.
3. Discard used carbon filters & insert new carbon filters into short filter housings.
4. Apply silicone grease to the O-rings.
5. Using the filter wrench, screw short filter housings back in place until tight. (Tighten 1/8 turn after hand tight).
6. Snap filter wrench back into the storage clip.
7. Close drawer.
8. Plug power cord in and turn chamber on.

Replacing H_2O_2 Canister

1. Pull black handle to open drawer.
2. Pull green handle on the H_2O_2 module.
3. Remove used canister.
4. Remove cap from new canister and place canister in position.
5. Close H_2O_2 module.
6. Close drawer

Draining Reservoir

1. Turn off the chamber and unplug power cord.
2. Pull black handle to open drawer.
3. Locate ball valve.
4. Direct ball valve flow into an empty container and open valve. Because this uses gravity to drain the reservoir, the ball valve must be located below the reservoir.
5. After reservoir is drained, close ball valve and place back inside recirculator.
6. Close drawer.

Using the Carboy Water System (BOTL301)

To fill the carboy while attached to the incubator, unscrew the cap. Fill carboy with distilled or deionized water (see Connecting the Water Supply section for details). The carboy holds 2.5 liters.

If the carboy must be removed in order to fill it up, first disconnect the tubing between the carboy and incubator by pressing the metal lever at the tubing connects / disconnects at the bottom of the carboy. Then unscrew the four mounting screws and remove the carboy. After re-attaching the carboy, connect the tubing by simply pressing the plastic fittings into each other.

Cleanroom Wipe Down (CLEN305, CLEN306)

Caron offers upgrades to the base incubator model for applications where aggressive chemicals are used to clean the incubator exterior. Bleach or chlorine containing solutions should never be used to clean the incubator. The customer is responsible to verify the chemicals used are compatible with the incubators. See Caron's Disinfectants Technical Bulletin for more details.

Incubators configured for aggressive cleaning chemicals (CLEN305/306) have type 316 stainless steel exteriors as well as type 316 stainless steel hardware, hinges, and coated door strips. Additionally, the touchscreen uses capacitive technology, providing additional ingress protection.

Model 7406-25
CLEN305 Option

Model 7406-33
CLEN306 Option

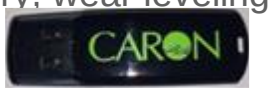
Operation of the Data Logger (DLOG301)

The DLOG301 option provides the customer with a means of logging data electronically for viewing at a later date. Logged variables are Temperature, Humidity, CO_2 and Shaker RPMs. All data is time-stamped with year, month, day of the month, hour, minute, 24 hour time (ISO 8601 format). This data is stored internally in the chamber in non-volatile memory.

Note: The date and time are logged within the actual file name. The file's "Date modified" field is not maintained and therefore may not reflect the actual date and time the file was created.

Data is logged every 5 minutes (provided the chamber is on); more than 10 years of data can be stored in memory. If the internal memory fills up, new data overwrites the oldest data.

Continuous writing to the flash drive necessitates a high quality industrial grade device. Use only the flash drive provided by Caron (or equivalent: single level cell memory, wear leveling algorithms, error correcting code).



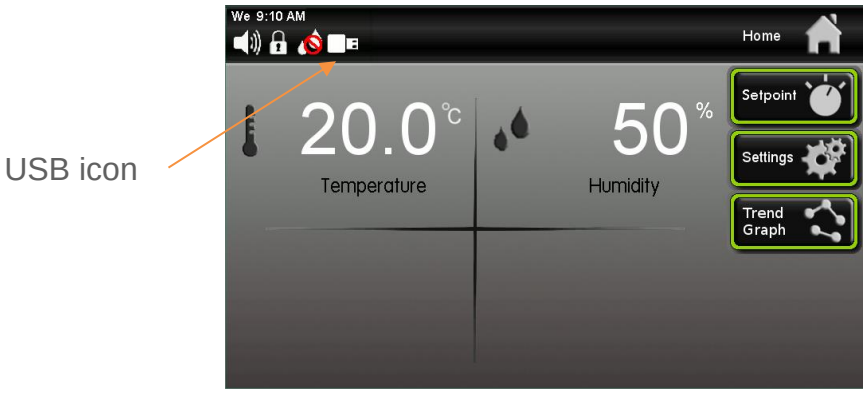
File name format is “DATE START YYYY-MM-DDTHH-MM_.csv” (hours in 24 hour time)

When the chamber is on, the chamber’s history data is being stored even when a flash drive is ***not*** inserted in the USB port. This data may be retrieved anytime using the provided USB flash drive.

Here are the methods for retrieving data:

Continuous logging of data

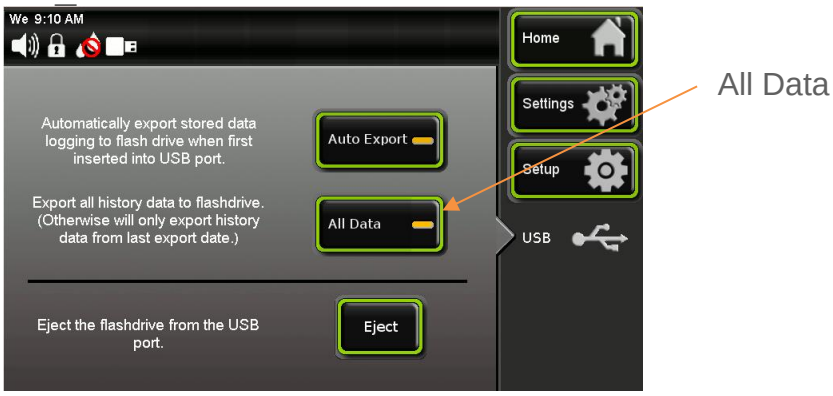
Insert the flash drive into the chamber’s USB port. When first inserted, it creates a .csv file called ‘DATA START’ with the current date and time in the file name. At 5 min intervals, the chamber’s process values are appended to the file.
(The file will get as large as the flash drive, permitting several years of uninterrupted data storage.)



USB icon appears in in Status bar indicating that data is being written to flash drive.
To retrieve the data, press the ‘Eject’ button, then insert the flash drive into a computer to upload the data.
Upon re-insertion of the flash drive, a new .csv file is created, even if the old file is still present. File name nomenclature is “DATE START YYYY-MM-DDTHH-MM_.csv”.

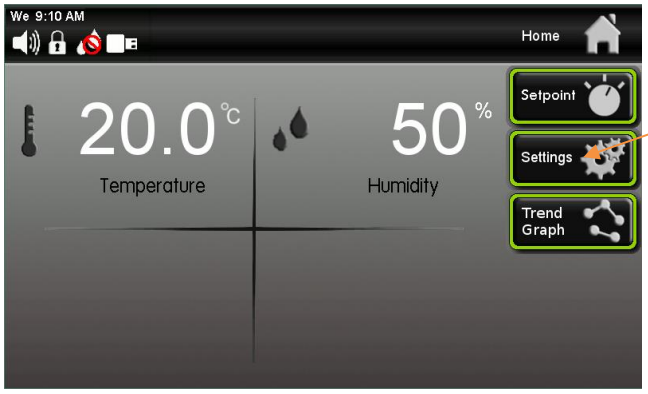
History Retrieval

Select the ‘Auto Export’ feature on the USB menu screen. Insert the flash drive into the chamber’s USB port. A new .csv file is automatically created on the flash drive with all the stored history data. The file name nomenclature is “DATE END YYYY-MM-DDTHH-MM_.csv”.

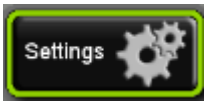


There is also an ‘All Data’ feature to indicate if the upload should include all data (since the unit has been used) or just the history data since a flash drive was last inserted. An ‘Info’ button will appear in the status bar warning the user not to remove the flash drive while the data is being uploaded. The length of time to upload the file will depend on the file size. When the ‘Info’ button disappears from the status bar, press the ‘Eject’ button to safely remove the flash drive. Now the data can be uploaded to a computer for viewing.

When using the Continuous Logging of Data method, nothing on the touchscreen has to be setup. However, using the History Retrieval method will require going into the USB screen to select either the ‘Auto Export’ or ‘All Data’ buttons before inserting flash drive into USB port.
To select the ‘Auto Export’ and ‘All Data’ buttons.



Settings Button

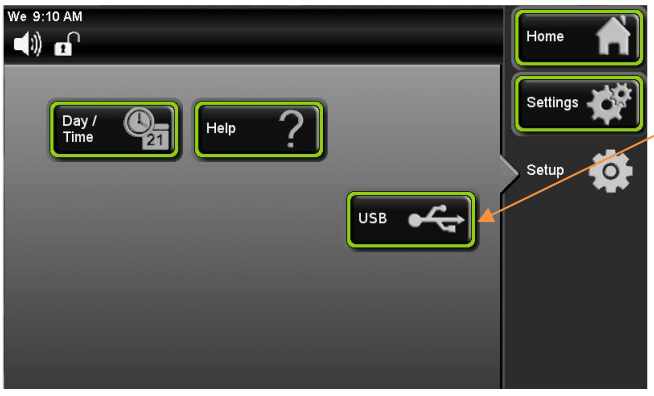
Press the 

(Settings) button.

Setup Button

Press the 

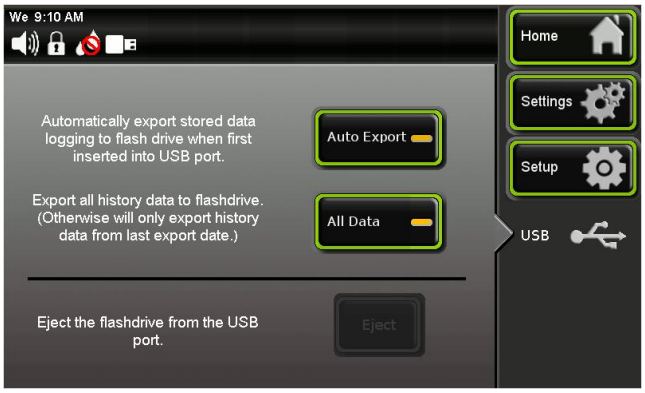
(Setup) button.



USB Button

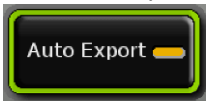
Press the 

(USB) button.

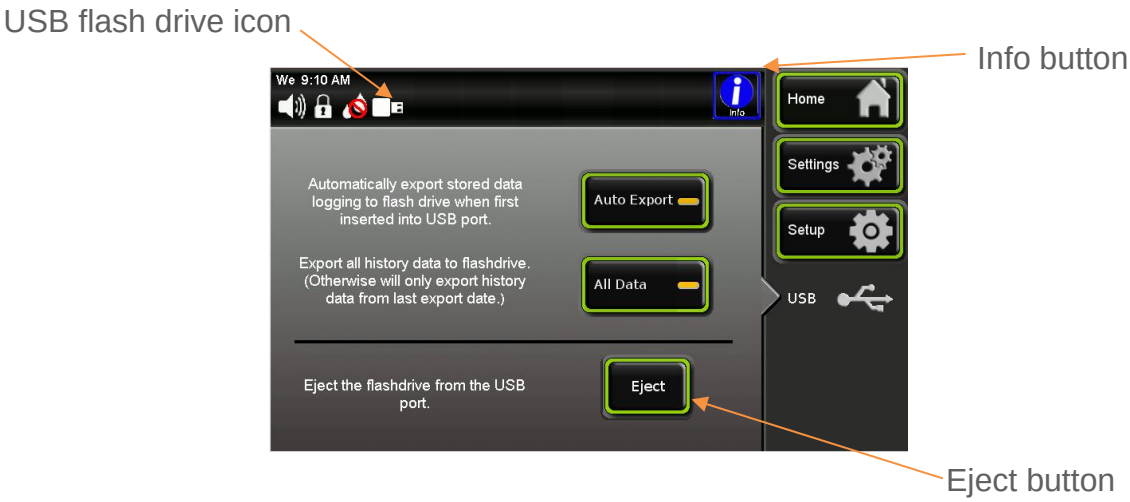


When the ‘Auto Export’ 

button is selected this will retrieve the data starting at the point of the last download, and continuing to the present time.

When the ‘Auto Export’ 

button is selected this will retrieve the data starting at the point of the last download, and continuing to the present time.



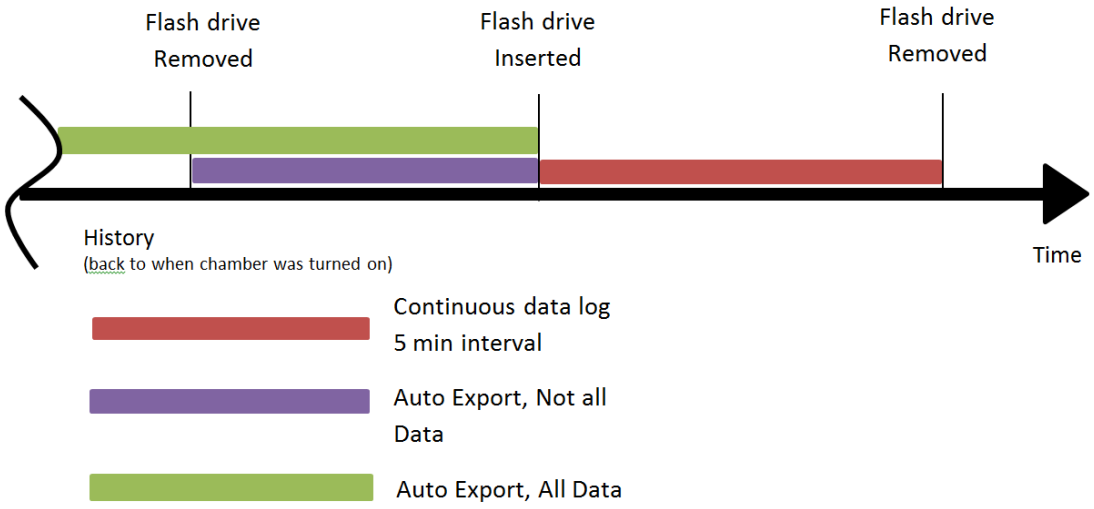
When flash drive is inserted into the USB port a ‘USB flash drive’ icon and flashing ‘Info’ button appears in the status bar indicating that the data is being downloaded to the flash drive. Once ‘Info’ icon stops flashing select the ‘Eject’ 

button.

Wait until the USB icon disappears to safely remove the flash drive from the USB port.

Note: Press the Eject button before removing the flash drive from the chamber, otherwise there could be the risk of corrupt data.

Here is a graphic to illustrate how the data retrieval works.



Ultraviolet Germicidal Lamp (LGHT602)

Before removing access panel(s), disconnect electrical power.

Avoid exposure to direct or reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.

Replacing UV Light (optional accessory)

1. Turn off chamber and unplug power cord.
2. Remove the incubator top access panel. The housing is located in the back of the incubator.
3. Unclip green wire with ground clip from UV light housing.

4. Pull UV light housing cap from UV light housing. Connected UV lamp will come out with it.

See separate ultraviolet light owner's manual for specific warnings and instructions.

Follow local regulations for disposing lamps.

5. Discard used UV lamp
6. Insert new UV lamp into lamp connector socket.
7. Install UV light housing cap (with attached new UV lamp) into UV light housing.
8. Re-attach ground clip.

Ground clip must be securely attached to UV light housing to reduce risk of electrical shock.

9. Install left access panel.
10. Plug power cord in and turn chamber on.

R290 REFRIGERANT UNITS

DANGER – Flammable Refrigerant Used. Risk of fire or explosion.

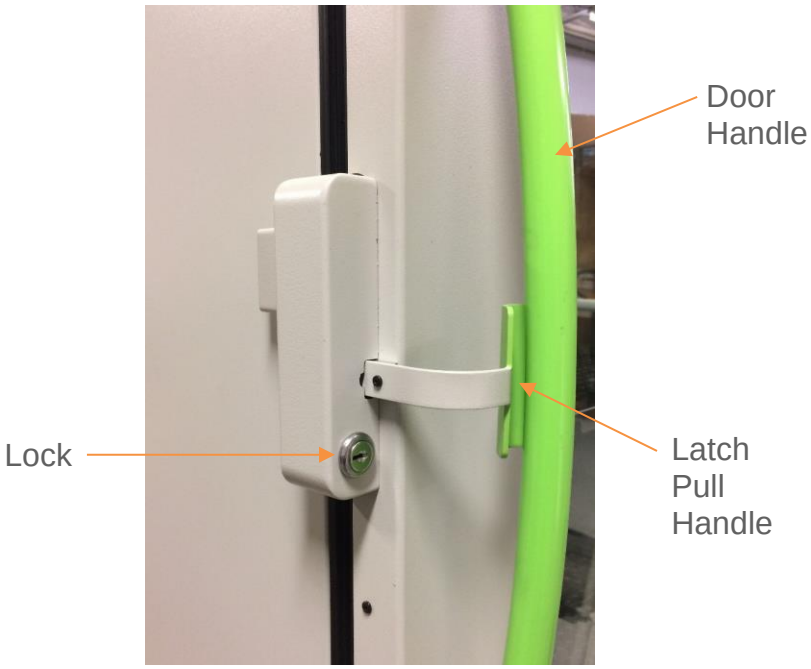
- No equipment that uses an open flame should be placed inside the refrigerator.
- Do not use instrumentation or equipment that incorporates potential ignition sources, e.g. open contact switching, brushed DC and AC motors, etc.

Operation of H2O2 Sterilization cycle (STER305)

The 7406 incubators are equipped with STER305, meaning they are ready for the use of Caron's STER301 sterilization module (not included). STER305 includes an internal wiring connection for the sterilization module as well as door safety interlock. See separate STER301 User's Manual for details. Abide by all warnings.

Operation of the Primary Door Latch with Lock (LTCH302)

The door latch is shipped installed on the incubator from the factory and requires no installation. LTCH302 is the latch assembly with an integral lock.



LTCH302

To operate the latch, grasp the pull handle and squeeze it toward the main door handle. The latch will disengage. Continue pulling on the handle to open the door. Closing the door fully will automatically re-engage the latch as long as the latch pull handle is not squeezed. Inserting and turning the key when the door is closed will engage the lock, prohibiting the pull handle from being squeezed enough to disengage the latch.

Latch cannot be disengaged from inside the incubator

CALIBRATION

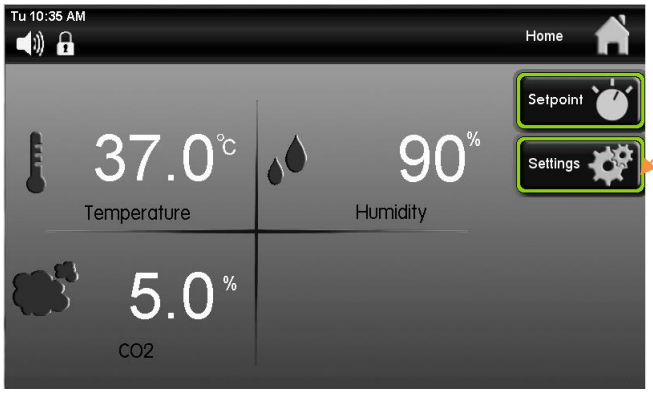
The temperature and humidity systems can all be calibrated as necessary. CARON recommends an annual calibration check of each system. Before making a calibration adjustment, allow the cabinet to stabilize a minimum of 12 hours from a power off condition. If the unit has been in operation, allow a minimum of 3 hours of stable operation at all setpoints.

If you do not have the appropriate reference instruments to perform calibration, contact CARON's service department for on-site calibration at www.caronscientific.com Caron also provides validation services which ensure that the unit is functioning properly according to IQ, OQ and PQ protocols which satisfy FDA guidelines for qualification verification of equipment.

Be sure that all reference instruments are calibrated to an appropriate standard.

The Calibration Screen

To get to the calibration screen from the home page:

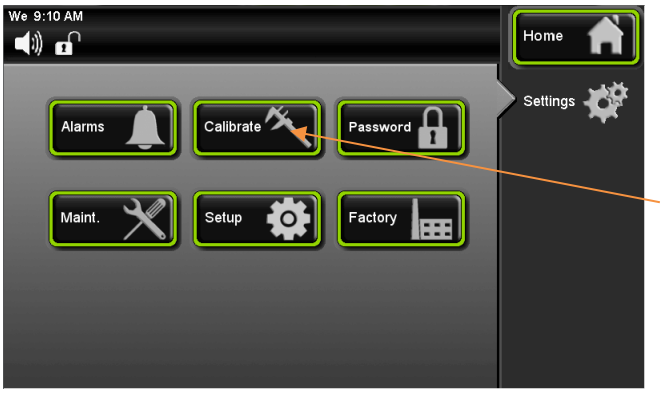


Settings Button

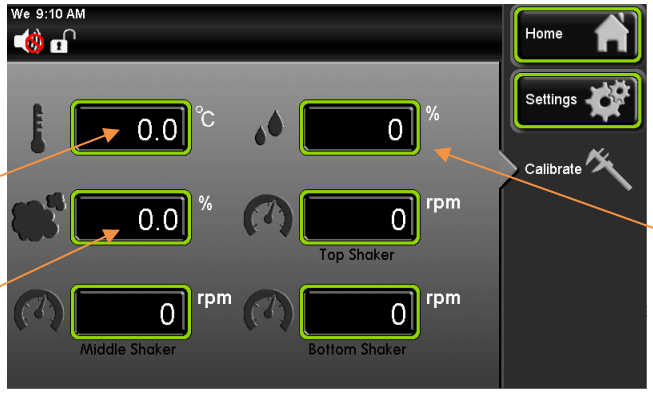
Main screen with HUMD307 (Standard on 7406)

Press the 

(Settings) button.



Press the  (Calibrate) button.



If optional features such as CO2 are purchased, a calibration button will also appear for those options.

Calibrating Temperature

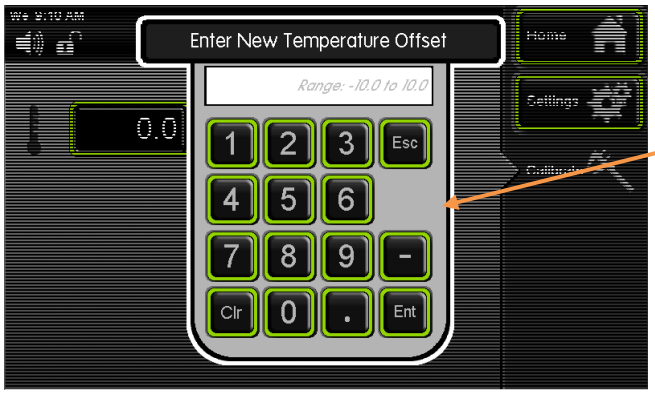
If temperature calibration is needed, the following steps can be taken:

Locate the reference instrument's temperature sensor in close proximity to the cabinet's geometric center. Be sure that the stabilization times described earlier have been satisfied prior to performing calibration.

Temperature
Calibrate Button

At the calibrate screen, press the 

(Temperature Calibrate) button.



Keypad

Enter the temperature offset by using the keypad and pressing 

(Enter) when complete.

A positive value will move the temperature ‘up’ and a negative value ‘down’. Press the ‘home’ button and verify the proper temperature is displayed.

Temperature calibration (example)

If the chamber temperature display reads 40.0°C and the calibrated independent sensor shows 40.3°C, set the temperature offset value to 0.3°C. If the calibrated independent sensor shows 39.6°C, then the entered offset should be negative. In this example the required offset to temperature would be -0.4°C.

Calibrating Humidity

If humidity calibration is needed, the following steps can be taken:
Locate the reference instrument's humidity sensor in close proximity to the cabinet's geometric center. Be sure that the stabilization times described earlier have been satisfied prior to performing this calibration.

A positive value will move the humidity 'up' and a negative value 'down'. Press the 'home' button and verify the proper humidity is displayed.

Humidity calibration (example)

If the chamber humidity display reads 80% and the calibrated independent sensor shows 83%, set the humidity offset value to 3.0%. If the calibrated independent sensor shows 74%, then the entered offset should be negative. In this example the required offset to humidity would be -6.0%.

Calibrating CO_2

If CO_2 calibration is needed, the following steps can be taken:
Locate the reference instrument's CO_2 sensor in close proximity to the cabinet's geometric center. Be sure that the stabilization times described earlier have been satisfied prior to performing this calibration.

A positive value will move the humidity 'up' and a negative value 'down'. Press the 'home' button and verify the proper humidity is displayed.

Calibrating Shaker RPMs

The RPM will be accurate unless something is broken mechanically or a motor/drive fails. However, the RPM can be calibrated if desired to match a reference instrument.

A positive value will move the speed 'up' and a negative value 'down'. Press the 'home' button and verify the proper RPM is displayed.

ALARMS

Alarm System Overview

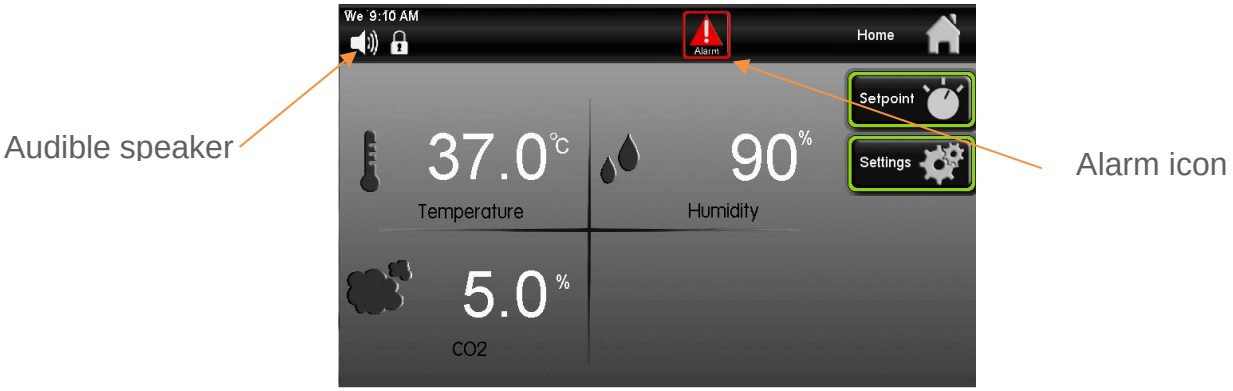
The incubator control system is equipped with an alarm system that constantly monitors temperature, CO_2 and humidity to ensure the user is notified if the cabinet goes into an alarm condition. Notification occurs via an alarm pop-up window and a buzzer. Each alarm condition has been factory programmed to minimize nuisance alarms while maximizing warning time. There is a 2 hour time delay after start-up and setpoint changes. To avoid nuisance alarms after a routine door opening, an alarm condition must be present for 15 minutes* (45 minutes for humidity) before the operator is alerted. If the optional remote alarm contacts are present, in an alarm condition, the dry contacts will change state.

*Alarm delays are adjustable, see “Changing Alarm Setpoints and Delay” for details.

The following alarm messages may be displayed:

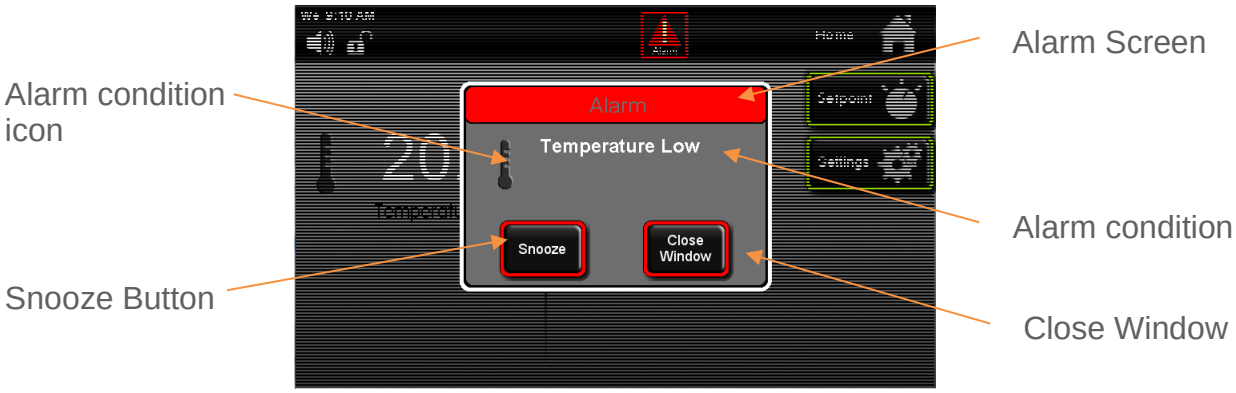
- Chamber temperature is higher than setpoint temperature
- Chamber temperature is lower than setpoint temperature
- Chamber CO_2 is higher than setpoint CO_2
- Chamber CO_2 is lower than setpoint CO_2
- Door Open
- Temperature sensor error
- Shaker Fault (Top, Middle, Bottom)
    - A Shaker Fault alarm may occur if the shaker is overloaded or the load is unbalanced. Turn the unit off and check the load.
- Out-of-Balance
    - An Out-of-Balance alarm may occur if the unit experiences excessive vibration. This may occur if the RPM is set too high. During this alarm, all shakers will be limited to around 30 RPMs. Check the table on page 42 and adjust the RPM as needed. The Out-of-Balance alarm popup includes a reset button in place of the Snooze button. Press this button to reset the alarm.
- Check CO2
    - A Check CO2 alarm may occur if the CO2 supply is depleted. Check the CO2 supply.
    - The alarm may also occur if there is a CO2 sensor error. This may occur if the sensor is exposed to a high concentration of CO2 i.e., >20% due to a stuck valve. Verify the actual CO2 percentage with an independent instrument. This may also occur if the sensor has failed. Contact service for a replacement.

In the event an alarm occurs, the alarm indicator will appear on the status bar and an audible alarm pop-up window will automatically appear.



The flashing 

(Alarm) icon will appear on the status bar.



Audible Alarm Snooze Function:

When in an alarm condition, the Audible Alarm can be temporarily silenced to avoid being a nuisance to those nearby. The Audible Alarm will repeat after 1 hour has passed, if the condition has not been corrected. (The audible alarm will not sound if the alarm is muted, see Audible Alarm Mute)

Press the 

(Snooze) button, the audible alarm is silenced for a period of 60 minutes.

When the alarm condition is corrected the alarm indicator and the audible alarm will automatically turn off (unless there is another alarm condition).

To check what the alarm condition is, press the 

(Alarm) button on the status bar.

and the alarm window will be displayed. If the 

(Snooze) button has already been pushed and 60 minutes have not passed the Snooze button will be “greyed” out.

If you press the 

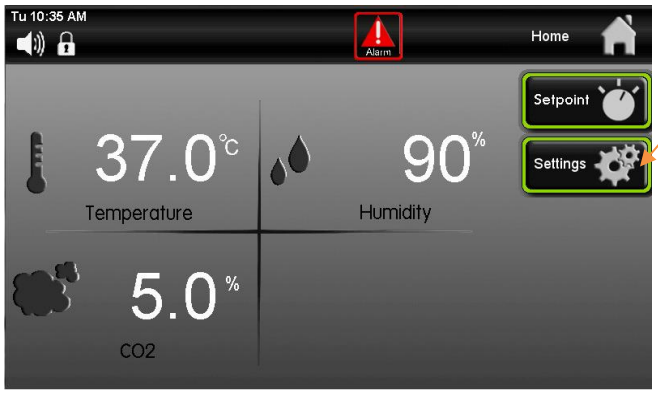
(Close Window) button, the Alarm Window will close, but the alarm will still be present as a flashing alarm icon on the status bar for the remainder of the 1 hour of time. It will not reset the 1 hour alarm countdown time if the alarm condition is viewed on the pop up window.

After the 1 hour time has passed for an alarm condition, the counter will reset itself to 1 hour and repeat the countdown process again until the alarm has been resolved.

Audible Alarm Mute:

By factory default, when an alarm condition is present, the speaker will sound. This speaker can be muted in an 'on/off' fashion eliminating all audible sounds. (Muting the speaker will silence it until manually 'un-muted'. This is different than 'snooze' in the fact that snooze can only be enabled when an alarm condition is present and only lasts for 1 hour.) When the speaker is muted, the alarm icon continues to flash and the remote alarm contacts (optional) remain in the 'alarm' state.

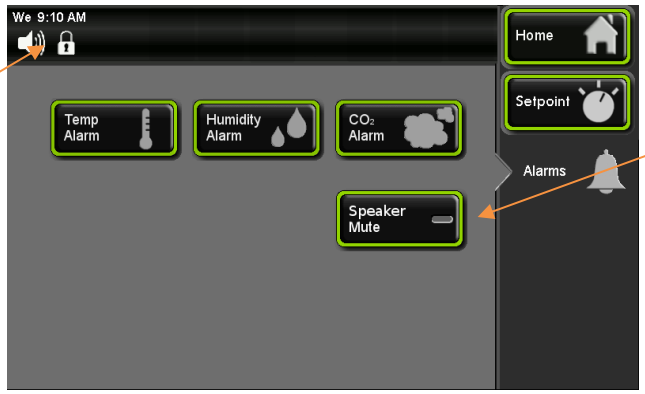
To mute the audible alarm:



Settings Button

Press the 

(Settings) button.

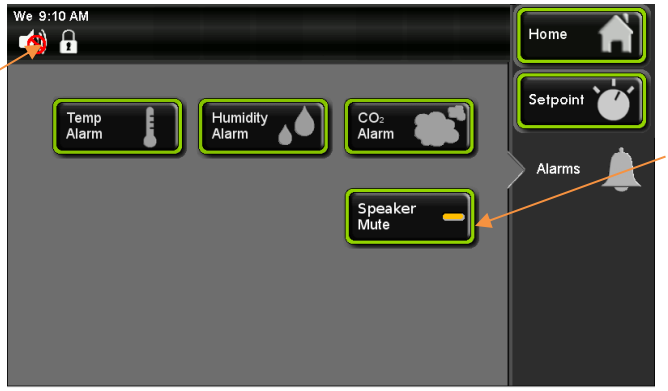


Speaker icon

Speaker Mute button

Press the 

(Speaker Mute) button.

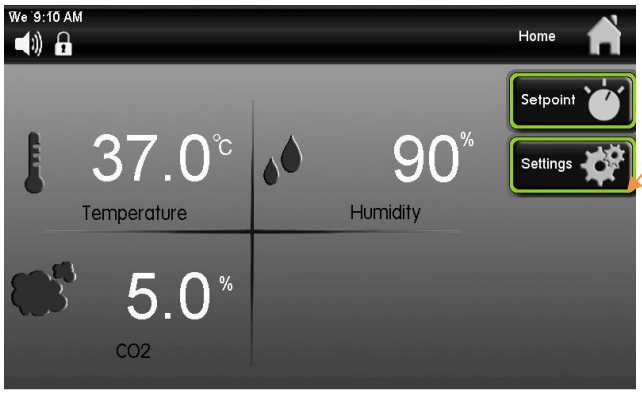


The Speaker Mute button toggles to the "on" position 

, and the speaker icon changes to  "Speaker Muted" icon.

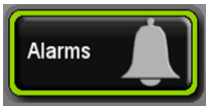
Changing Alarm Setpoints and Delay

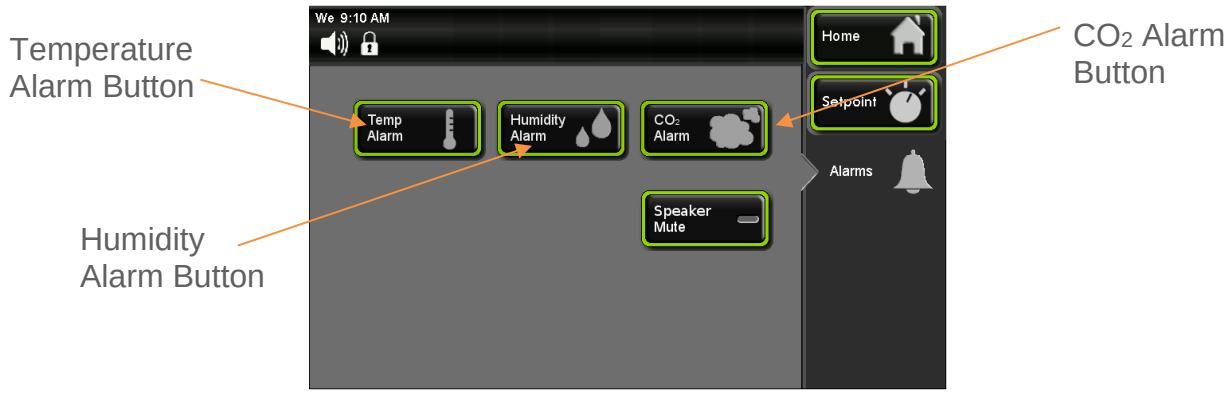
All alarm setpoints were pre-set at the factory to minimize nuisance alarms that could be created as a result of door openings. Alarm setpoints can be changed based on individual user requirements. Alarm values are deviations from the setpoint and are not actual setpoint values.
To change the alarm setpoints and delay:



Press the 

(Settings) button.

Press the  (Alarms) button.

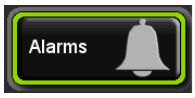


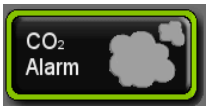
Press the  (Temp Alarm) button.

Once the alarm screen appears, press the  (Temp High Limit) button.

Keypad screen will appear. Enter the High Temp Alarm value; press 

(Enter) when complete.

To change the CO_2 Alarm, press the 

(Alarms) button on the navigation menu to go back to the Alarms screen. Press the 

(CO_2 Alarm) and 

(Humidity Alarm) buttons and repeat the same steps for CO_2 and humidity.

To change the alarm delay, press the alarm delay button 

and enter the delay in minutes.

ALERTS

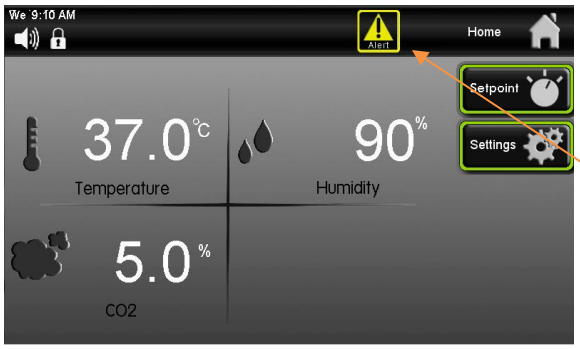
Alert System Overview

The chamber control system is equipped with an Alert system that constantly monitors features of the chamber and notify the user if the cabinet needs any type of service to ensure good running performance of the chamber. Alerts draw user attention to regular maintenance needs, and minimize the risk of a future alarm condition.

When an Alert notification occurs, contact www.caronscientific.com with the serial number of the chamber to order preventative maintenance kit(s).

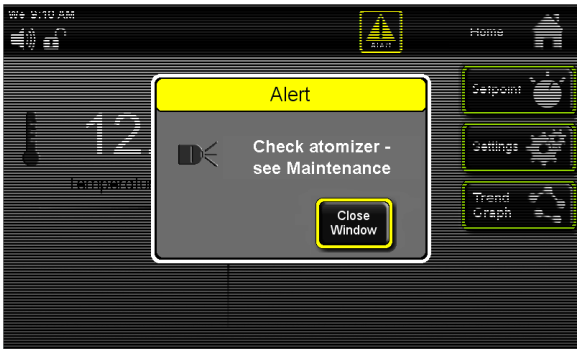
Some of the Alert features are: Check the Atomizers (humidified units only), Replace the Air Filter, and Check Equipment Calibration is Due.

Notification occurs via an Alert icon on the status bar. When the Alert icon is pressed, a pop up window will display the alert condition(s). Each alert condition parameter is factory pre-set; no adjustment is necessary.



Alert icon

Press the Alert (Alert icon).

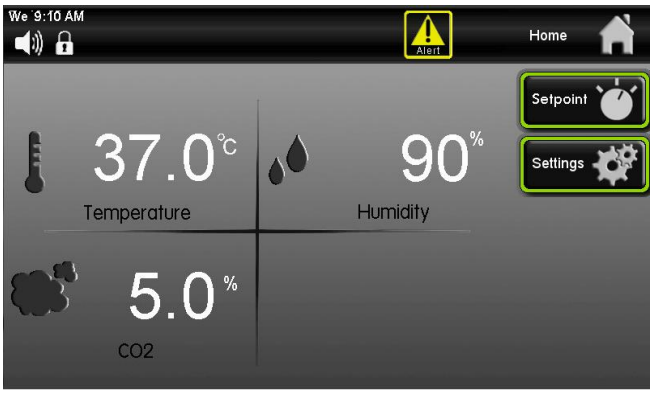


The Alert pop up window will appear displaying the alert message.

Press Close Window (Close Window) button to make the pop up window disappear.

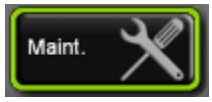
Resetting Maintenance Alerts

Maintenance Menu Screen lets users check to see how much time is remaining on an item that may need routine service or calibration. This is very convenient to inform the user that a particular item will need to have service performed soon. After service has been completed, the item needs reset and the alert will disappear.

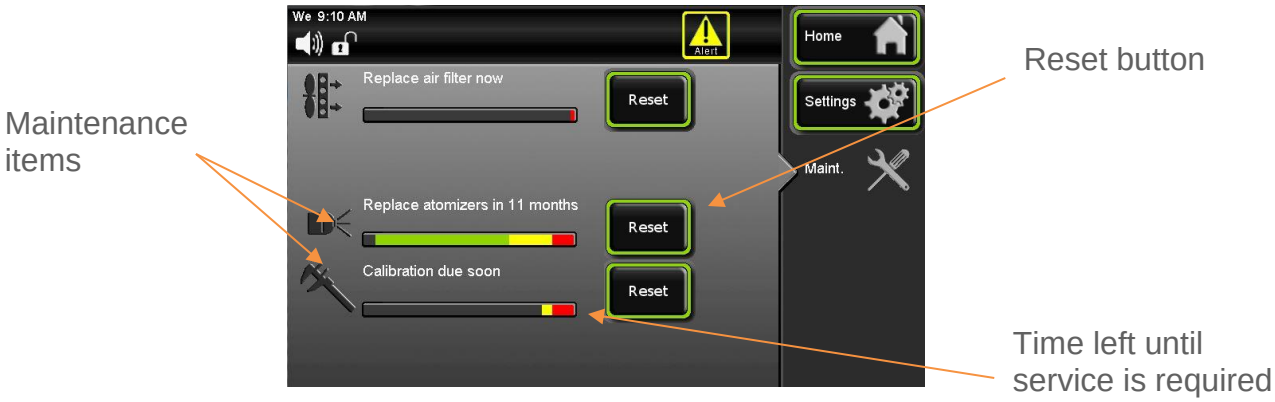


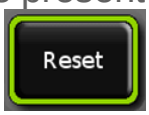
Press the 

(Settings) button.

Once the Settings screen appears, press the 

(Maintenance) button.



Once a Maintenance item is displayed on the Alert screen, it will continue to be present as an icon in the Status Bar until the Maintenance item is corrected and the 

(Reset) button is pressed resetting the replacement time to “new” status.

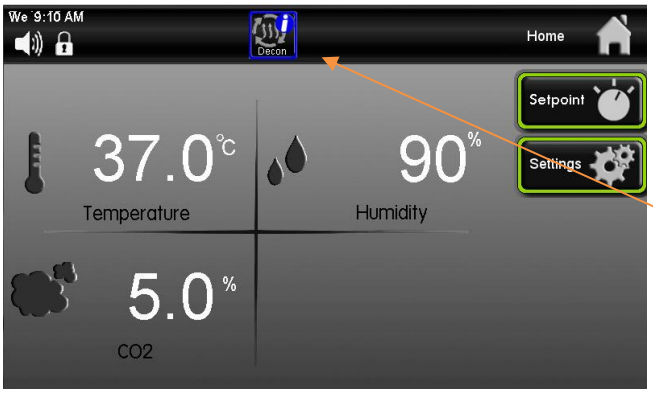
Press the 

(Home) button to return to the main screen.

INFO

Info System Overview

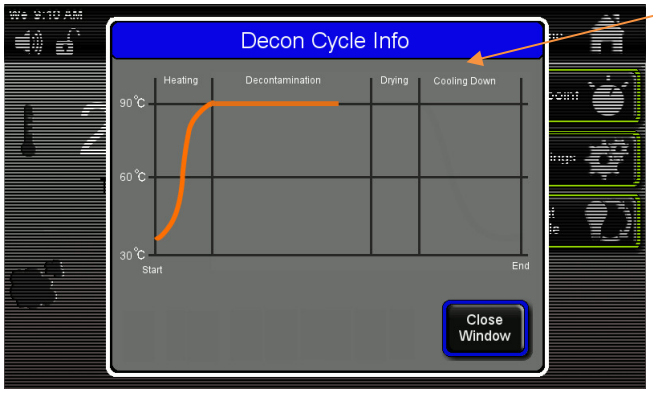
The incubator control system is equipped with an Information system that constantly monitors the incubator and to notify the user when an automatic condition is occurring. This applies to conditions such as Decon Cycle or others that cannot be switched on and off by the user but is controlled automatically by the software of the control system. This notification cannot be disabled, it only lets the user know the incubator's current status.
Notification occurs via an Info pop-up icon on the status bar. When the Info icon is pressed a pop up window will display the Info condition(s).



Info Button

The 

(Info) icon will appear on the status bar.



Info Screen

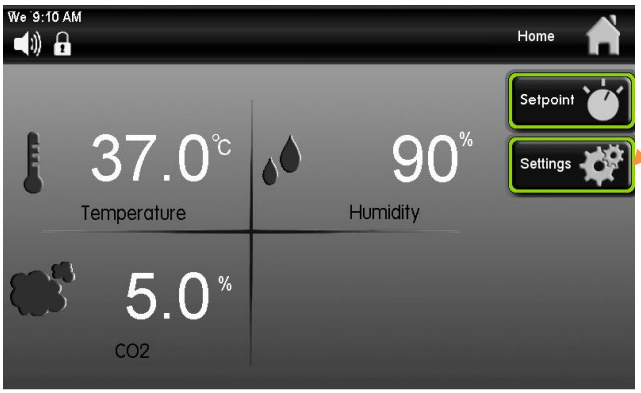
Press the 

(Close Window) button to return to the main screen.

ADVANCED FEATURES

Setting the Time & Day

The chamber has an internal real-time clock that keeps track of the day and time. It is set at the factory to Eastern Standard Time and may need to be adjusted for your time zone. To keep the clock accurate, it will need to be adjusted manually for daylight savings time changes. To set the day & time:



Settings Button

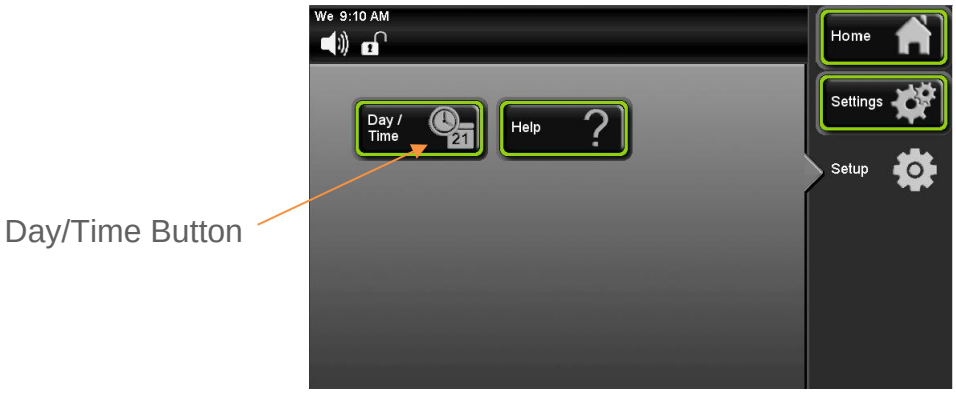
Press the 

(Settings) button.

Setup Button

Press the 

(Setup) button.



Press the 

(Day / Time) button.

Press the 

(Hour) button.

The Enter New Time in Hours window will appear. Enter the hour by using the keypad and pressing 

(Enter) when complete.

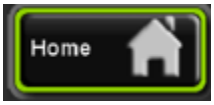
Follow same procedure for setting up minutes.

To setup AM/ PM, Press 

(AM /PM) button and the words for AM and PM will toggle back and forth.

To set the Day of the Week, press the 

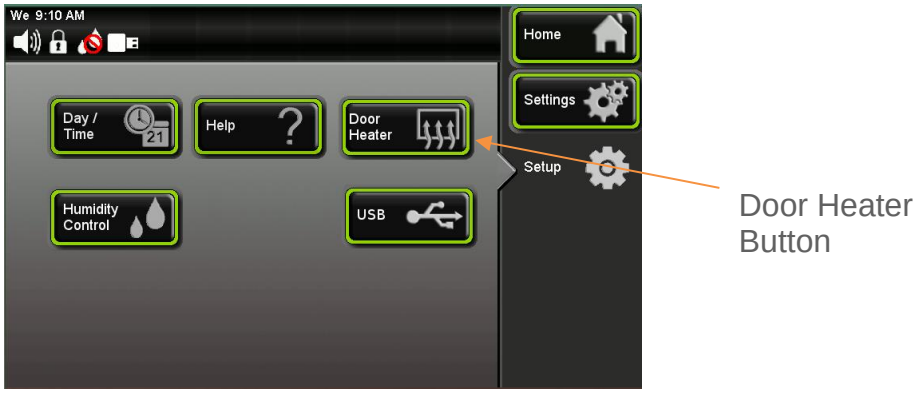
(Day of the Week) button. This button will scroll through the days of the week, press until the abbreviated letters correspond to the actual day of the week.

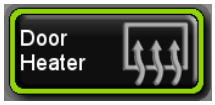
Press the 

(Home) button to return to the main screen.

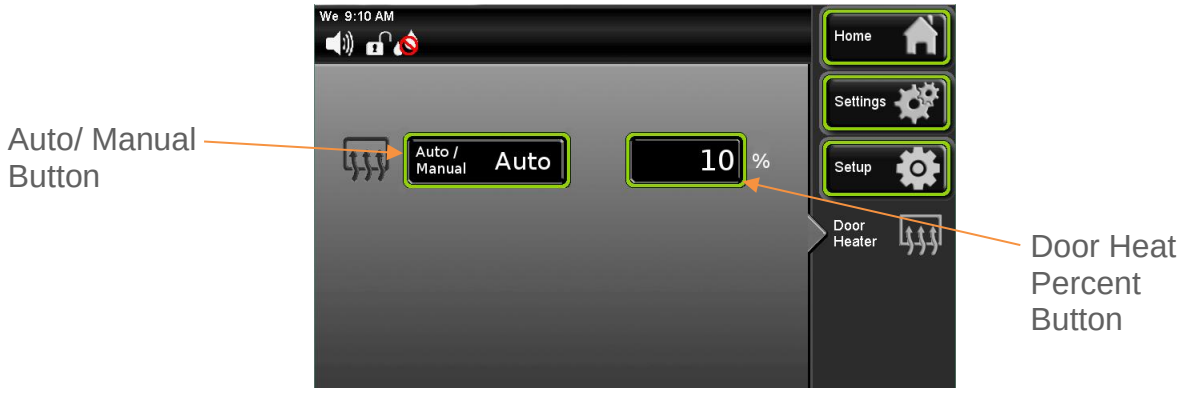
Door Heat

Some Caron units are equipped with an integral door heater to keep internal condensation off of the glass viewing area. In extreme ambient or running conditions, the factory default settings may need adjusted to maintain a clear viewing area. Increasing the door heater percentage will increase the amount of heat applied to prevent condensation. The door heater can run in either automatic or manual mode. For the Incubator Shaker, the default setting is Manual mode at 10%.



From the Setup screen press the 

(Door Heater) button



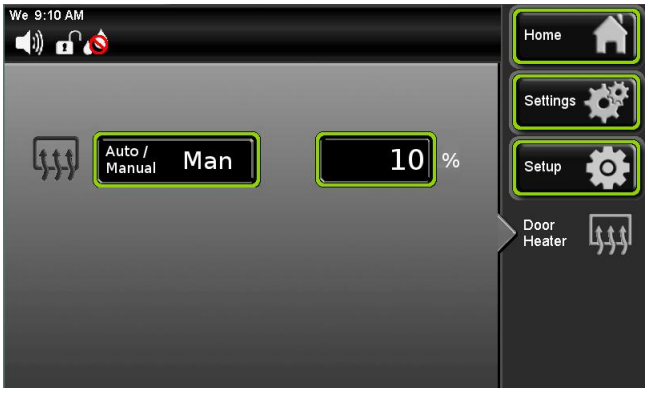
In Automatic mode, the door heater works in conjunction with the internal heaters to maintain the temperature set point. In the event that the temperature is above set point, the door heater will automatically throttle back.

In this mode, the output percent is a scale factor of the overall heat output percentage. If condensation is present on the glass door under stable condition, then increase the door heater percentage value. The factory default value is 10%.

To change the output percent value, Press the 

(Door Heat Percent) button.

Enter the hour by using the keypad, press the enter button when complete.



In Manual mode, the door heater is a fixed output value regardless of temperature set point. This setting should only be used in units that have active cooling with temperature set points well above the low-end range.

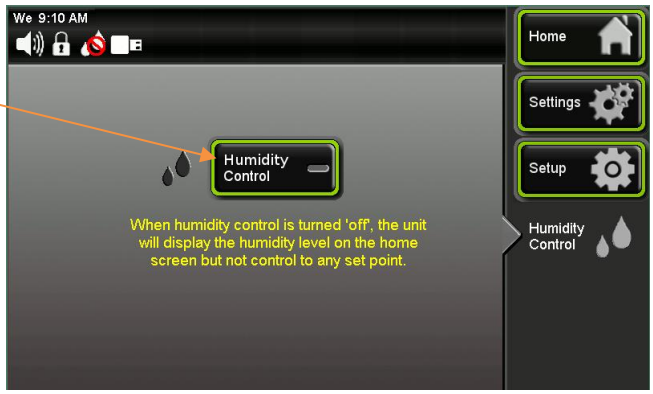
The door heater mode may need changed from Manual to Automatic if the temperature of the incubator continually exceeds the temperature set point.

Humidity Control

This feature allows the Humidity to be controlled by a setpoint determined by the user, which will be displayed on the home screen. If this feature is disabled, the humidity value on the home screen will be in a “read only” condition. An icon in the status bar will indicate whether the Humidity Control is enabled or disabled

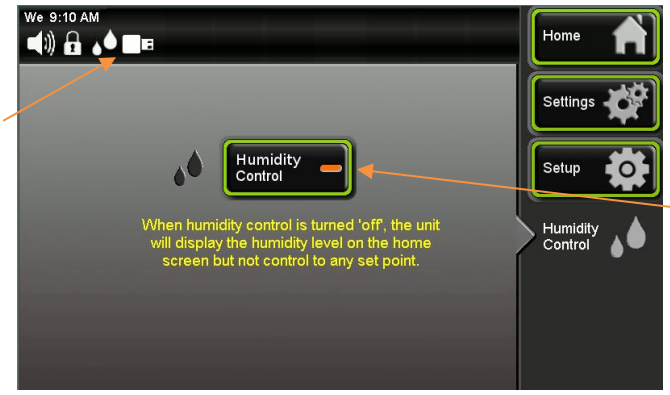
Humidity Control Button

From the Setup screen press the  (Humidity Control) button



Humidity Control disabled icon

When the humidity control is disabled the toggle button indicator is off and the humidity control icon in the status bar has a red circle around it.



Humidity Control enabled icon

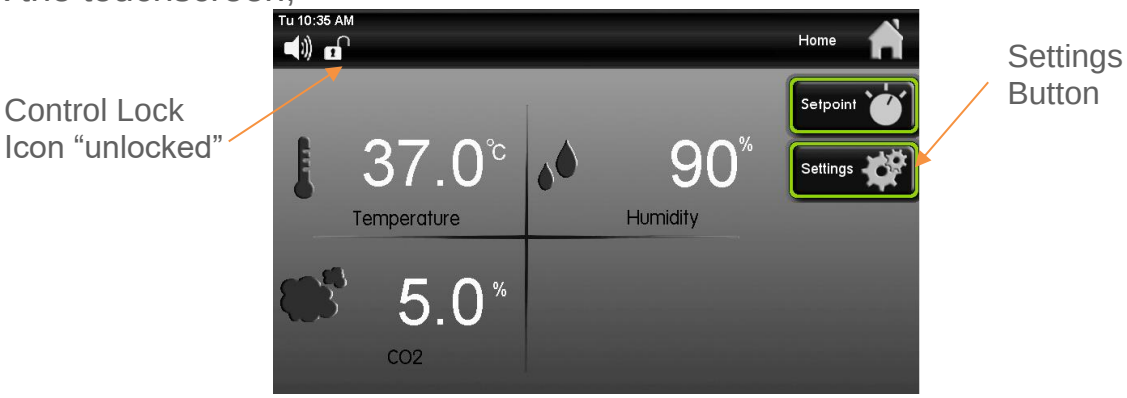
Humidity Control enabled indicator

When the humidity control is enabled the toggle button indicator is on and the humidity control icon in the status bar has the red circle removed. Once the selection has been made the status of the Humidity control will be visible on the home screen.

Locking the Controls

To prevent unauthorized and accidental setpoint changes, the touchscreen can be locked-out. The passcode is required to lock-out the controls and the same passcode is used to unlock it. The factory default passcode is '1234'. This passcode can be changed by the user to create a unique 4-digit passcode. There is also a feature that will let you change the passcode from the factory default to a user defined passcode. The factory default for the screen lock is "unlocked"

To lock the touchscreen,

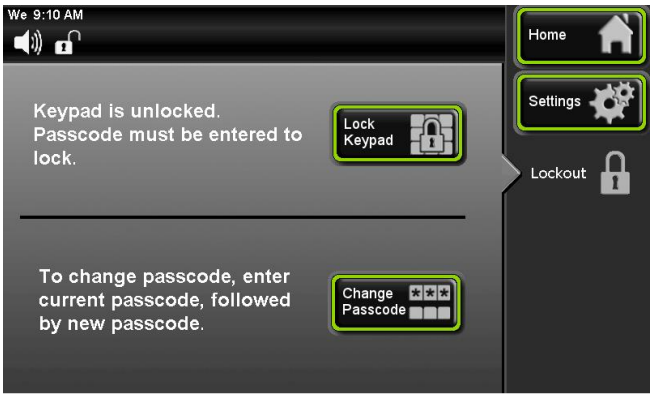


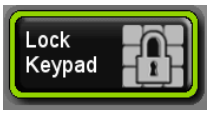
Press the 

(Settings) button.

Press the 

(Password) button.



Press the 

(Lock Keypad) button.

The Enter the Current Passcode Keypad screen will appear.

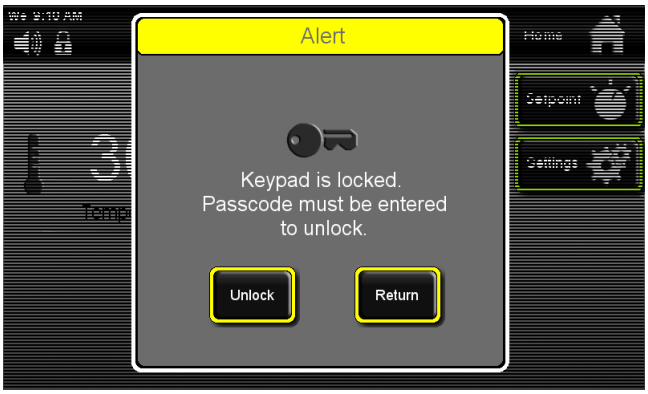
Enter digits “1 2 3 4”; press 

(Enter) when complete.

The screen will change back to the Home Screen and the Control Lock icon will change to the “locked” position.

Control Lock
Icon “locked”

When any button is pressed on the home screen the following pop-up window will appear. If the Return button is pressed, the screen will change back to the Home Screen.

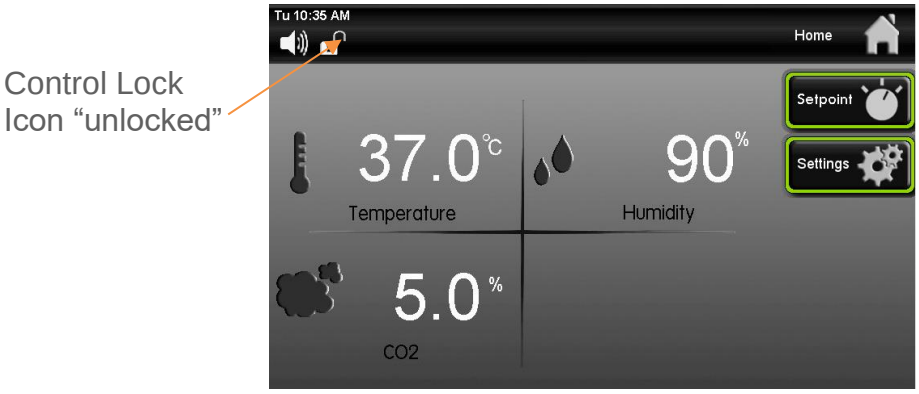


To unlock the touchscreen,

From the previous Alert “Keypad is Locked” pop up screen, press the Unlock (Unlock) button. The Enter New Passcode window will pop up.

Enter the digits “1 2 3 4”; press 

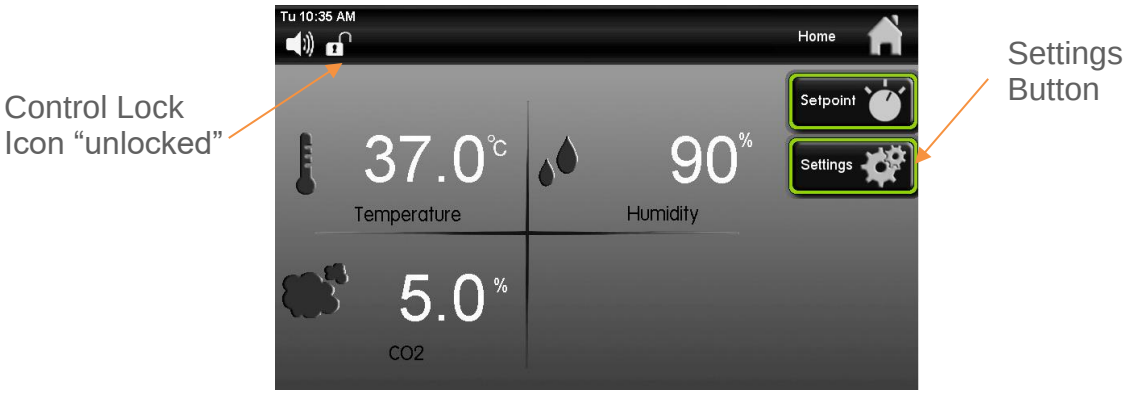
(Enter) when complete. The Control Lock Icon will change back to the “unlocked” position.



Changing Passcode

To prevent unauthorized and accidental changes being made to the chamber, the touchscreen can be locked-out. The passcode is required to lock-out the controls and the same passcode is used to unlock it. The factory default passcode is ‘1234’. This passcode can be changed by the user to create a unique 4-digit passcode. The current passcode is required to change the passcode.

To lock the touchscreen,



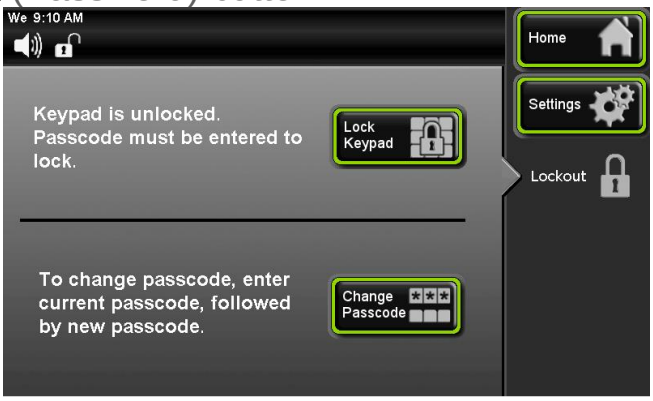
Press the 

(Settings) button.

Password Button

Press the 

(Password) button.



Press the 

(Change Passcode) button.

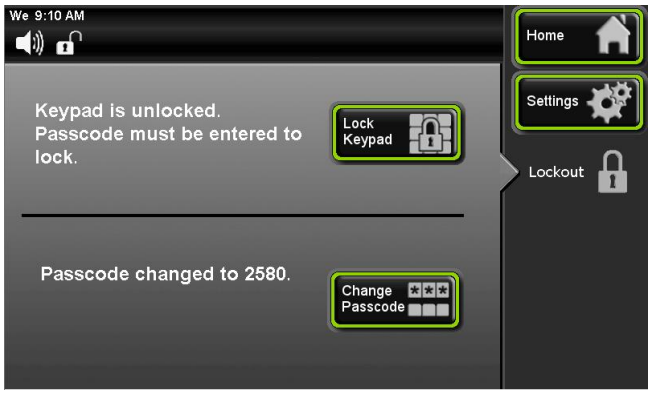
The Enter Current Passcode Keypad screen will appear.

Enter digits “1 2 3 4”; press  (Enter) when complete.

The Enter New Passcode Keypad screen will appear.

Enter any new four-digit passcode (example: “2 5 8 0”). Then press 

(Enter) when complete.



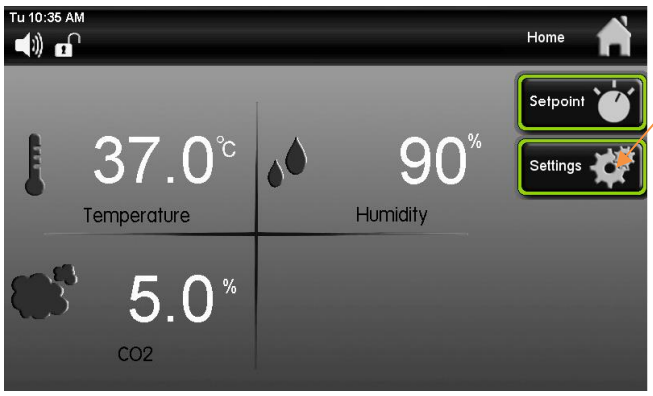
The Lockout screen will tell you that the Passcode has been changed to a new value. *This is only time that the Passcode will be displayed on the Lockout screen.*

Factory Menu & Troubleshooting

The chamber control system is equipped with advanced diagnostics features which allow the user to manually turn ‘on’ & ‘off’ each electronically controlled system. The factory menu can be used to

- View the current chamber configuration
- See the percent output of the control system
- Manually and individually toggle any output

To access the Factory Menu,



Settings Button

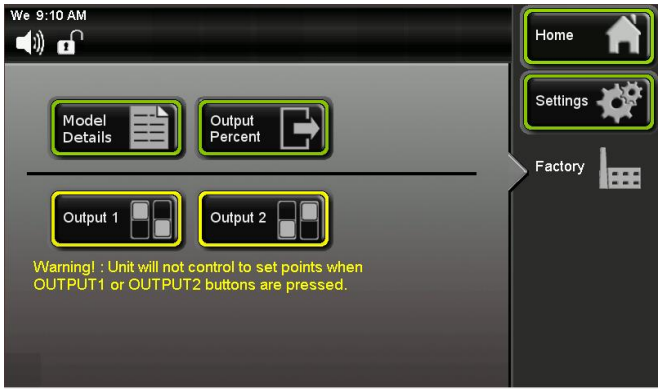
Press the 

(Settings) button.

Factory Button

Press the 

(Factory) button.

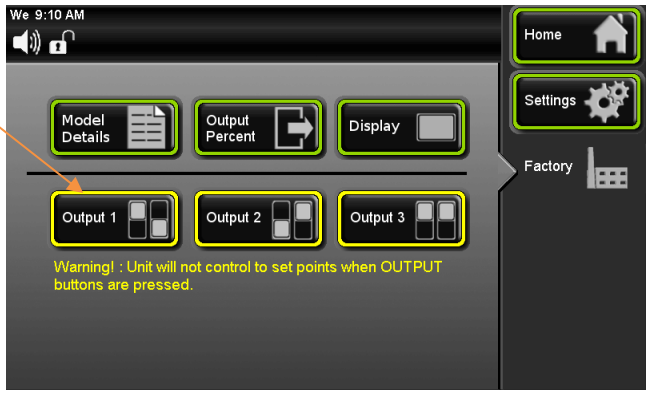


From the factory menu, four items can be selected. Press the 

(Model Details) button to view the chamber's configuration

From the Factory screen, press the 

(Output Percent) button to view the current percent output level of each control parameter.



Navigating to the Output screens in the factory page will temporarily halt chamber control & functionality.

To individually and manual control each output variable, from the factory screen press the 

(Output 1) button. Note: Based on the chamber model number and options, not all functions will be present.

Each item can be turned on to check the condition of that device or parameter to aid in diagnosing a problem.

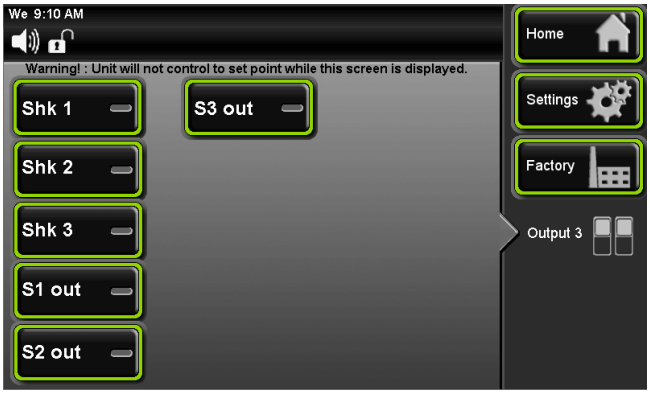
Press the 

(Output 2) button for other parameter buttons.

Press the 

(Output 3) button for other parameter buttons.

- Shk 1 – turns shaker 1 (top) on at approximately 30 RPM
- Shk 2 – turns shaker 2 (middle) on at approximately 30 RPM
- Shk 3 – turns shaker 3 (bottom) on at approximately 30 RPM
- S1 out – turns shaker 1 (top) analog output on at 50% scale
- S2 out – turns shaker 2 (middle) analog output on at 50% scale
- S3 out – turns shaker 3 (bottom) analog output on at 50% scale



Chamber control & functionality is restored as soon as the screen is exited (Home, Settings, or Factory buttons). When finished with diagnosis in Output 1, 2 or 3 screen, press the 

(Factory) button to return to that screen. Once you go back to the Factory screen all parameters that were selected in Output 1, 2 or 3 screens will reset to the “off” position.

Press the 

(Home) button to return to the main screen.

PREVENTATIVE MAINTENANCE

Your CARON incubator has been robustly designed to minimize performance problems. However, regular maintenance is very important for continuous trouble free operation.

As a general rule, CARON recommends an annual calibration check of the temperature, humidity, CO_2 systems. CARON offers a full range of on-site calibration and validation services. We also offer preventative maintenance contracts on our equipment. Contact our service department for details at 740-373-6809 or visit us on the web at www.caronscientific.com.

Recommended Daily Maintenance Checks

- Check the Temperature, Humidity, and CO_2 displays versus setpoints.
- Check for and correct any alarm condition.

Recommended Monthly Maintenance Checks

- Check to ensure the drain in the bottom of the unit is draining properly.
- Check front air intake filter. If the filter is dirty replace it with Caron Preventative Maintenance PM Kit. Washing the filter will result in poor performance.

Recommended Annual Maintenance Checks

- Replace atomizer nozzle (Replacement Parts section)
- Disinfect all interior surfaces with a general purpose laboratory cleaning agent.
- Perform a complete calibration of the temperature, humidity, and CO_2 systems.
- A full validation is recommended for GMP facilities each time a unit is installed, moved or undergoes significant repair. Contact CARON's service department to schedule on-site validation.
- Replace UV lamp and clean quartz sleeve (feature optional)

CONDENSATE RECIRCULATOR SYSTEM (CRSY103) PREVENTATIVE MAINTENANCE

Before accessing any electrical components, disconnect electrical power from the chamber.

Electrical components are located in the back of the drawer. To access this section, push the white stopper away from the cabinet and the catch. For additional service support, contact your local distributor or CARON service department at www.caronscientific.com.

If recirculator is not powered on for more than three days or if it will be subjected to temperatures below freezing, the water should be drained.

Routine chamber maintenance is necessary to keep the recirculator working properly.

Recommended Weekly Maintenance Checks

- Check internal fittings for water leaks
- Check large reservoir for debris & algae. Clean if necessary.
- Check small reservoir for debris & algae. Clean if necessary.
- Check chamber drain (recirculator inlet) for blockage, kinks or other restrictions
- Remove standing or splashed water from all surfaces

Recommended Monthly Maintenance Checks

- Replace H_2O_2 canister

Recommended Semi-Annual Maintenance Checks

- Replace DI cartridge
- Replace carbon filter
- Replace charcoal filter
- Replace H_2O_2 canister

Whenever the DI cartridge, particulate filter, or charcoal filter is replaced, it is recommended that they all be replaced at the same time.

Shaker Maintenance

- Wipe exposed surfaces with isopropyl alcohol as needed.
- When spills occur wipe up the spill immediately. Spills can penetrate the shaker platform and be contained under the shaker platform.
- Check the line cord for any fraying or cuts that could cause the unit not to work properly or could cause personal injury.

Here is a list of PM Kits that are available for models and accessories covered in this manual.

Model	PM Kit
7406-25	PM-7406-25
7406-33	PM-7406-33

Accessory	PM Kit
BOTL301	PM-BOTL301
CRSY103	PM-CRSY103
LGHT602	[1]PM-LGHT602
STER301	PM-STER301

[1]only if LGHT602 is installed

SPECIFICATIONS

MODEL	7406-25	7406-33
Temperature Range	5°C to 60°C	
Temperature Control	± 0.1°C	
Temperature Uniformity	± 0.3°C	
Temperature Sensor	RTD	
Humidity Range	Ambient to 90% RH	
Humidity Control	± 3% RH	
Humidity Sensor	Capacitive	
CO_2 Range	0-20% CO_2	
CO_2 Control	± 0.1% CO_2	
CO_2 Sensor	Infrared	
Interior Construction	Type 304, 2B Finish, Solid Stainless Steel	
Exterior Dimensions	35.5" W x 33.3" D* x 77.1" H (90.2cm x 84.6cm x 195.8cm)	35.5" W x 33.3" D* x 90" H (90.2cm x 84.6cm x 229cm)
Exterior Construction	Cold Rolled Steel, Powder Coated	
Work Space	25 Cu. Ft. (708 Liters)	33 Cu. Ft. (934 Liters)
# of Shakers	Two (2)	Three (3)
Shaker Platform Dimensions	26.5" W x 23" D (67.3cm x 58.4cm)	

Electrical

MODEL	7406-25	7406-33
-1	115V, 60Hz, 16A	
-2	230V, 60Hz, 12A	
-3	230V, 50Hz, 10A	

Weight (with shakers installed)

MODEL	7406-25	7406-33
-1	958 lbs (435 kg)	1093 lbs (496 kg)
-2		
-3**	1258 lbs (571 kg)	1393 lbs (632 kg)

Specifications are subject to change without notice.
Environmental Conditions: Temperature 15ºC to 25ºC, Humidity non-condensing
**Add 2.75 inches for handle*
***Includes export shipping crate*

7406-25 Series units have forced internal air flow of 350 cfm (9,900 LPM)
7406-33 Series units have forced internal air flow of 450 cfm (13,000 LPM)

Condensate Recirculator System Specifications

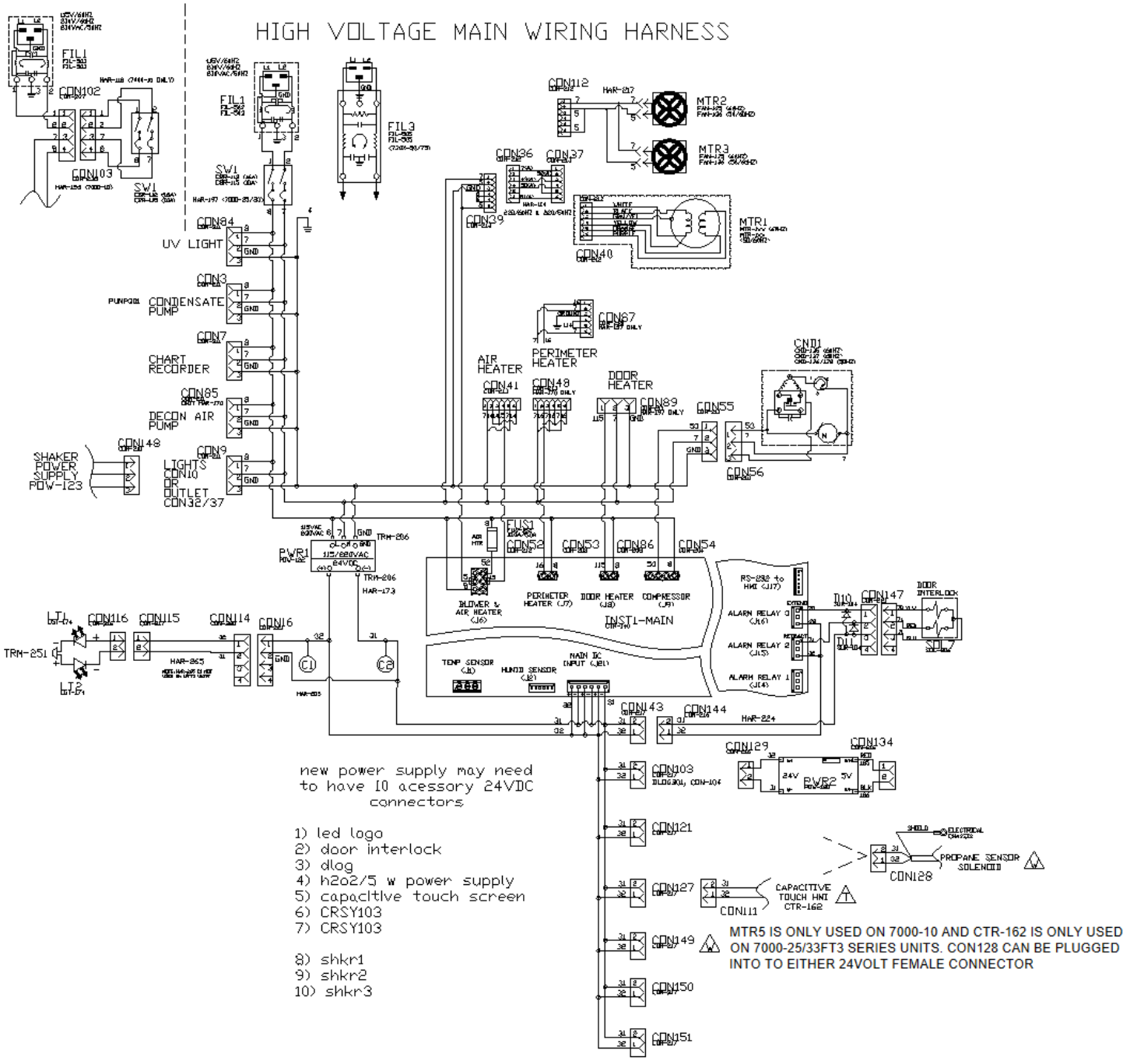
Model	CRSY103
Water Purity*	100 to 125 kΩ-cm
Water Reservoir	3 gallons (11.4 L)
Exterior Dimensions	6.2” W x 28.8” D x 30.9” H (15.7cm W x 78.6cm D x 73.1cm H)
Exterior Construction	Cold Rolled Steel, Powder Coated
Shipping Weight	100 lbs (45.36 kg)

* Water purity measured internally

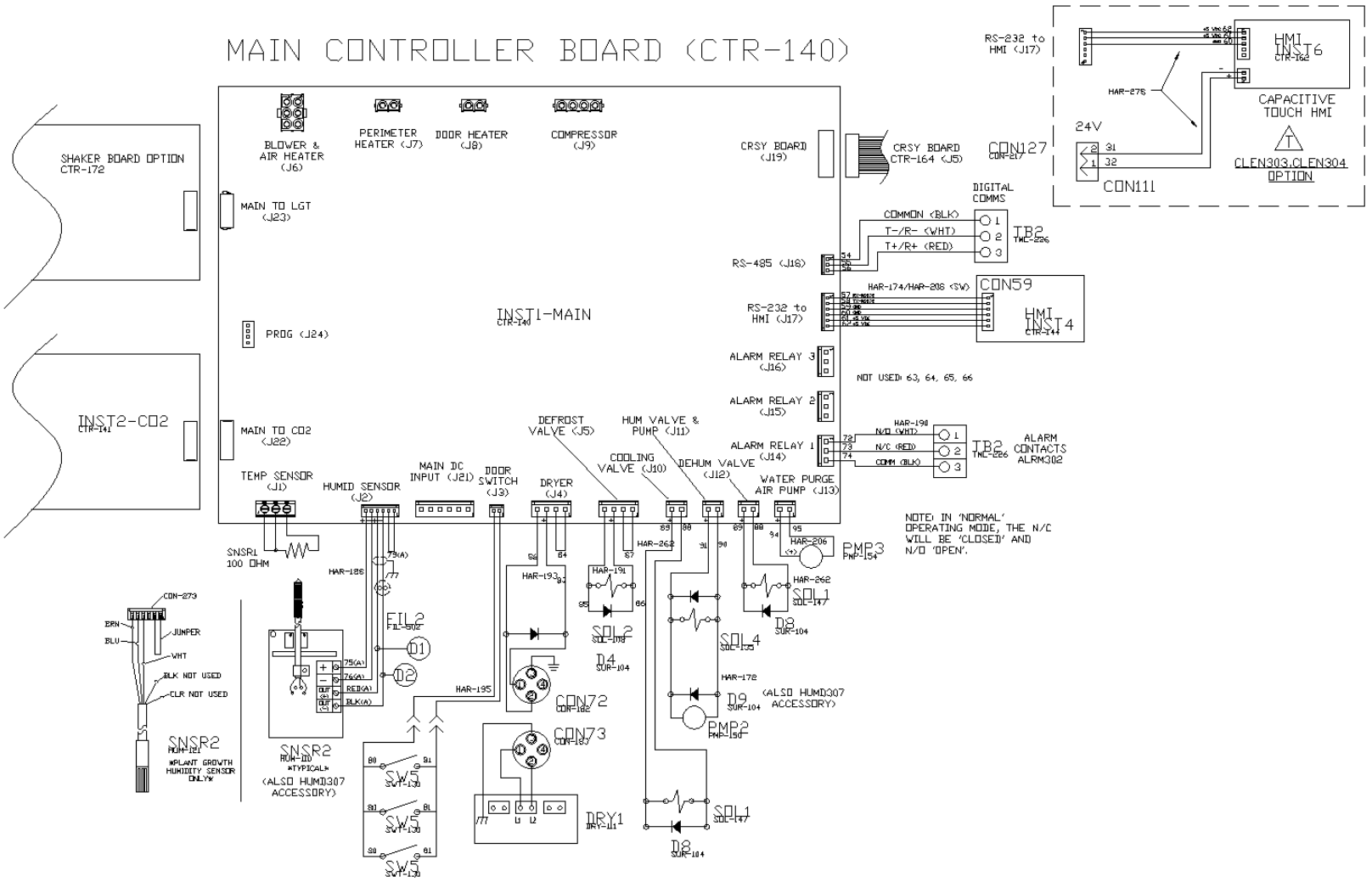
Specifications are subject to change without notice.

ELECTRICAL SCHEMATICS

7000 SERIES ELECTRICAL SCHEMATIC (PAGE 1 OF 12)



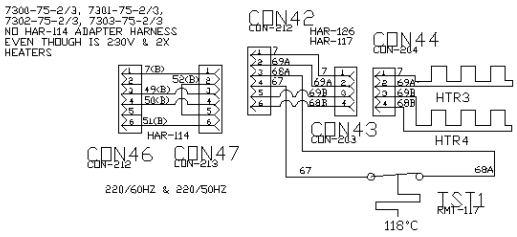
7000 SERIES ELECTRICAL SCHEMATIC (PAGE 5 OF 12)



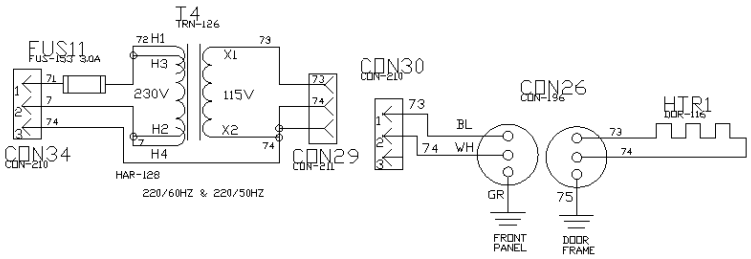
7000 SERIES ELECTRICAL SCHEMATIC (PAGE 9 OF 12)

7000 SERIES ELECTRICAL SCHEMATIC (PAGE 2 OF 12)

AIR HEATERS



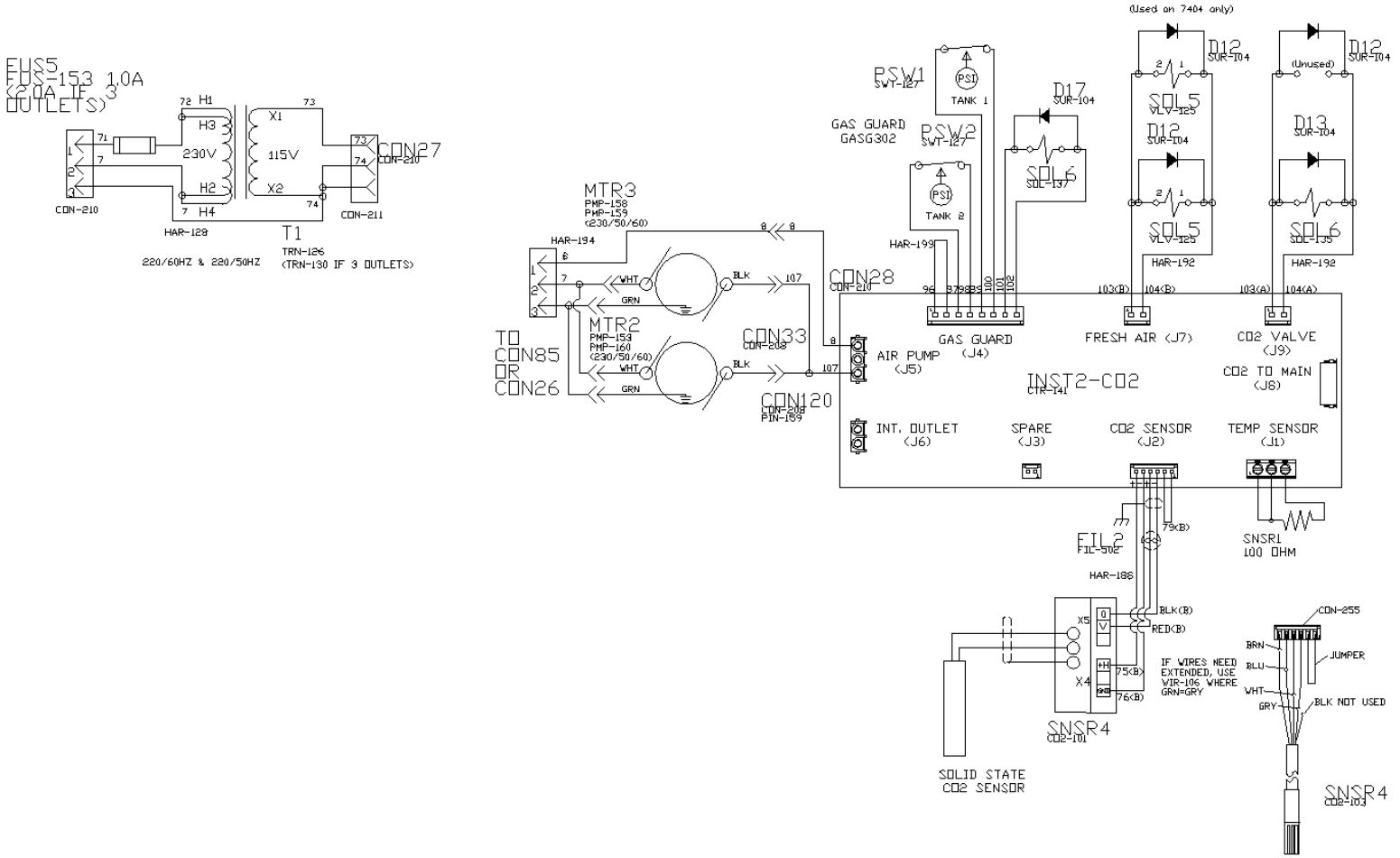
DOOR HEATER



7406-25-,33 SERIES

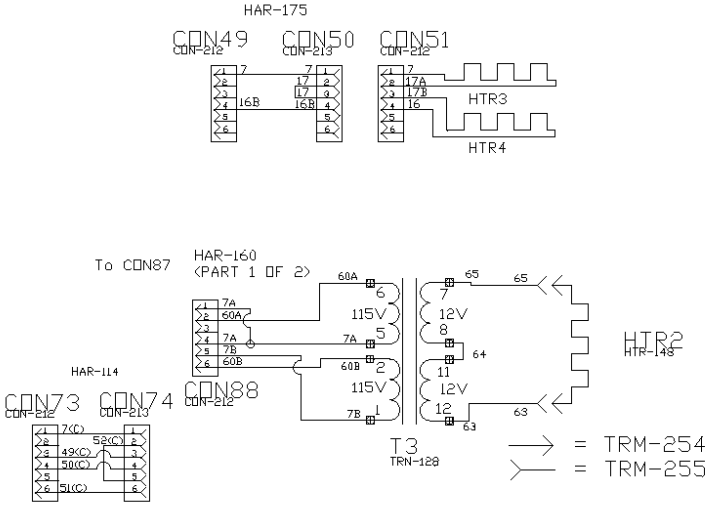
7000 SERIES ELECTRICAL SCHEMATIC (PAGE 6 OF 12)

CO2 CONTROLLER BOARD (CTR-141)



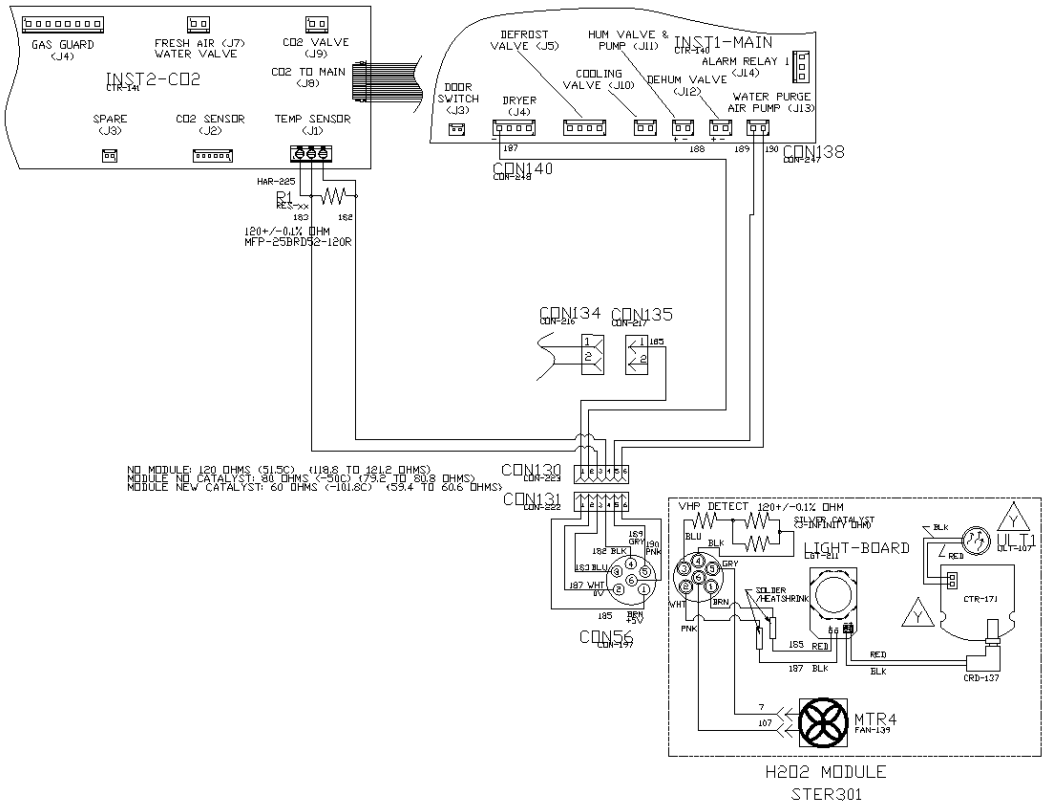
7000 SERIES ELECTRICAL SCHEMATIC (PAGE 10 OF 12)

PERIMETER HEATERS



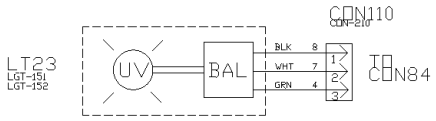
7000 SERIES ELECTRICAL SCHEMATIC (PAGE 3 OF 12)

VHP MODULE

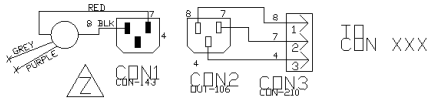


7000 SERIES ELECTRICAL SCHEMATIC (PAGE 7 OF 12)

UV LIGHT



CONDENSATE PUMP



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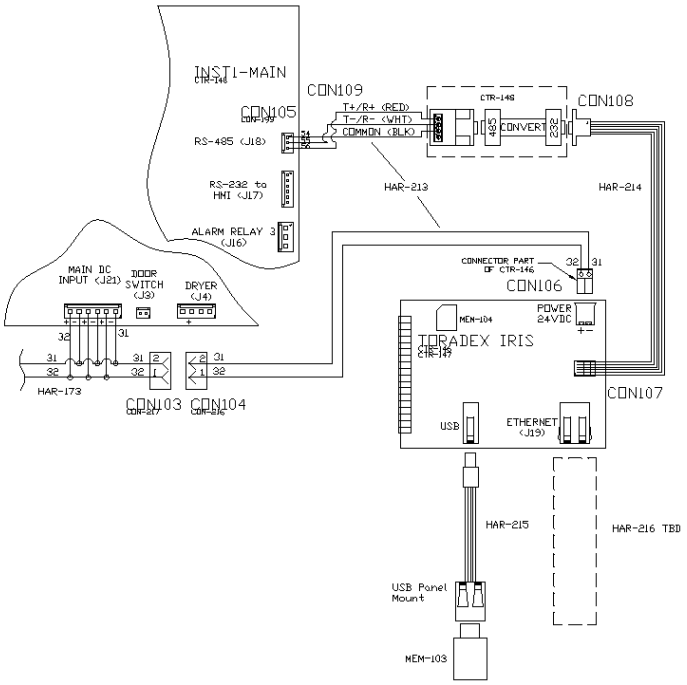
COMMUNICATION OPTION (DLOG301)



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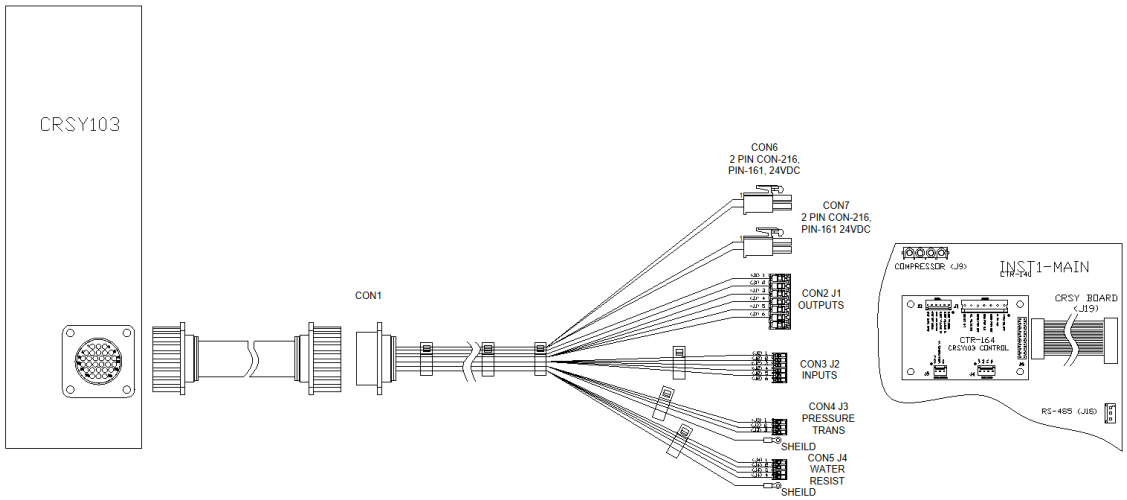

TROUBLESHOOTING

Problem -- Unit will not turn on

- Is the unit connected to a dedicated electrical circuit as defined in the installation section of the manual?
- Is there power at the electric outlet the unit is plugged into?
- Is the unit's power switch turned on?

Problem -- Unit temperature is above / below temperature setpoint

- Has the unit's temperature setpoint been recently lowered / raised and if so has the unit been allowed 12 hours stabilize at the new setpoint?
- Are the access port stoppers installed in the cabinet?
- Is the door closed?
- Is the condenser filter on the front of the cabinet clean?

Unit humidity level is above / below humidity setpoint

- Is the unit connected to a water source as specified in the installation section of the manual?
- Has the unit been leveled to ensure the cabinet drain works correctly?
- The cabinet's drain line uses gravity to remove water. Does the drain line have any rises in it above the cabinet's drain level that could be trapping water?
- Has the unit's humidity setpoint been recently lowered / raised and if so has the unit been allowed time to stabilize at the new setpoint?
- Are the access port stoppers installed in the cabinet?
- Is the door closed?
- Is the condenser filter on the front of the cabinet clean?

Unit CO_2 level is above / below the CO_2 setpoint / Check CO2 alarm

- Is the unit connected to a pressure regulated CO_2 source as specified in the installation section of the manual?
- Has the unit's CO_2 setpoint been recently lowered / raised and if so has the unit been allowed time to stabilize at the new setpoint?
- Is the door closed?
- Are the access port stoppers installed in the cabinet?
- CO2 Sensor Error – contact Caron Service

Shaker Fault / Out-of-Balance Alarm

- Is shaker overloaded or unbalanced?
- RPMs set too high?

CONDENSATE RECIRCULATOR SYSTEM (CRSY103)
BRIEF TROUBLESHOOTING

Water is leaking from unit

- Is the chamber turned on?
- Has a power failure recently occurred?
- Are the filter housings tight?
- Is the O-ring in the filter housing properly seated?
- Is the internal reservoir drain valve open?
- Is the recirculator water outlet connected properly to the chamber?

Water is not draining properly from the chamber to the recirculator

- Is the return reservoir connected to the chamber drain?
- Is the chamber drain line (recirculator inlet) kinked? Plugged? Have a rise?
- Is the recirculator off?

It is part of the normal operation for

- Water to flow into the reservoir producing a splashing and stirring motion

SPARE REPLACEMENT PARTS

CAUTION: Before servicing the unit, the mains power supply cord must be unplugged to avoid risk of shock. Any area of the unit that requires a tool to access shall only be serviced by trained personnel approved by Caron Products.

R290 REFRIGERANT UNITS
Do not damage the refrigeration circuit. Component parts shall be replaced with like components and servicing shall be done by authorized personnel to reduce the risk of possible ignition.

General

Part Number	Description
MTR-130	Blower Motor
BLW-112	Blower Wheel
7000KIT BRD 001	Main Control Board with Battery
CTR-144	7” Touchscreen, HMI
POW-115	24V DC Power Supply
CRD-113	Power Line Cord
STP-101	2” Rubber Port Stopper

The main power supply cord must be replaced by the corresponding CRD part number above. The use of an inadequate main power supply cord could result in equipment failure or personal harm to the user.

Temperature Related

Part Number	Description
7000KIT HTR 003	Heater Assembly
RMT-117	107C Air Heater Thermostat
RTD-101	Temp Sensor -- RTD 100 Ohm Platinum
CMP-125	115V / 60Hz Compressor
SOL-108	Refrigeration Cooling Solenoid

Humidity Related

Part Number	Description
HUM-110	RH Sensor
PMP-150	24VDC RH Pressure Pump
NOZ-110	Precision RH Spray Nozzle
SOL-108	Dehumidification Solenoid
SOL-135	Humidification Solenoid
TUB-168-S	Drain Tubing, 3/8”
TUB-132-S	Water Supply Tubing, ¼”

CO_2 Related

Part Number	Description
CO2103KIT ASY	Carbon Dioxide Sensor with Pre-Wired Connector
CTR-141	CO_2 Controller Board
SOL-135	CO_2 Injection Solenoid

Fuse Related

ID	Description	115V	230V
SW1	Main circuit breaker switch	CBR-112 (16A)	CBR-115 (10A)
FUS1	Heater fuse	FUS-103 (10A)	FUS-104 (5A)
FUS3*	Internal outlet fuse (single duplex)	FUS-151 (2A)	FUS-151 (2A)
FUS3*	Internal outlet fuse (double duplex)	-	FUS-163 (4A)
FUS5	Internal outlet transformer fuse	-	FUS-164 (3A)

* Fuse size varies depending upon whether the chamber has a single internal duplex outlet or two internal duplex outlets

Options Related

Part Number	Description	Option
MEM-103	USB Flash Drive	DLOG301
TUB-174	1/2” I.D. silicone tubing	PUMP301
WIR-102	20/3 conductor shielded wire	ALRM302
CRSYKIT	Tubing & fitting kit for connection to chamber	CRSY103
TUB-132-S	1/4” tubing	CRSY103
TUB-168-S	3/8” tubing	CRSY103
GAS-114	Filter O-ring	CRSY103
WRN-102	Filter wrench	CRSY103

To order replacement parts, contact CARON’s service department at 740-373-6809 or www.caronscientific.com.