



6 CUFT BENCHTOP
CO₂ INCUBATOR
OPERATIONS MANUAL

FOR MODELS
6400-1 and 6400-4
6404-1 and 6404-4



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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 service@caronproducts.com or 740-373-6809.

Thanks again for your business!

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SECTION 1- WARRANTY INFORMATION

CO2 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.

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 for a period of two (2) years from date of shipment.
- Any part found defective will be either repaired or replaced at CARON's or their authorized representative's discretion. Parts that are replaced will become the property of CARON.
- 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.
- CARON or their authorized representative 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.
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INTERNATIONAL SYMBOLS AND DEFINITIONS



Help



Information



Warning of hazardous area



Warning of hot surface



Warning of dangerous electric voltage



Earth (ground) protective conductor

WARNINGS



Local government may require proper disposal

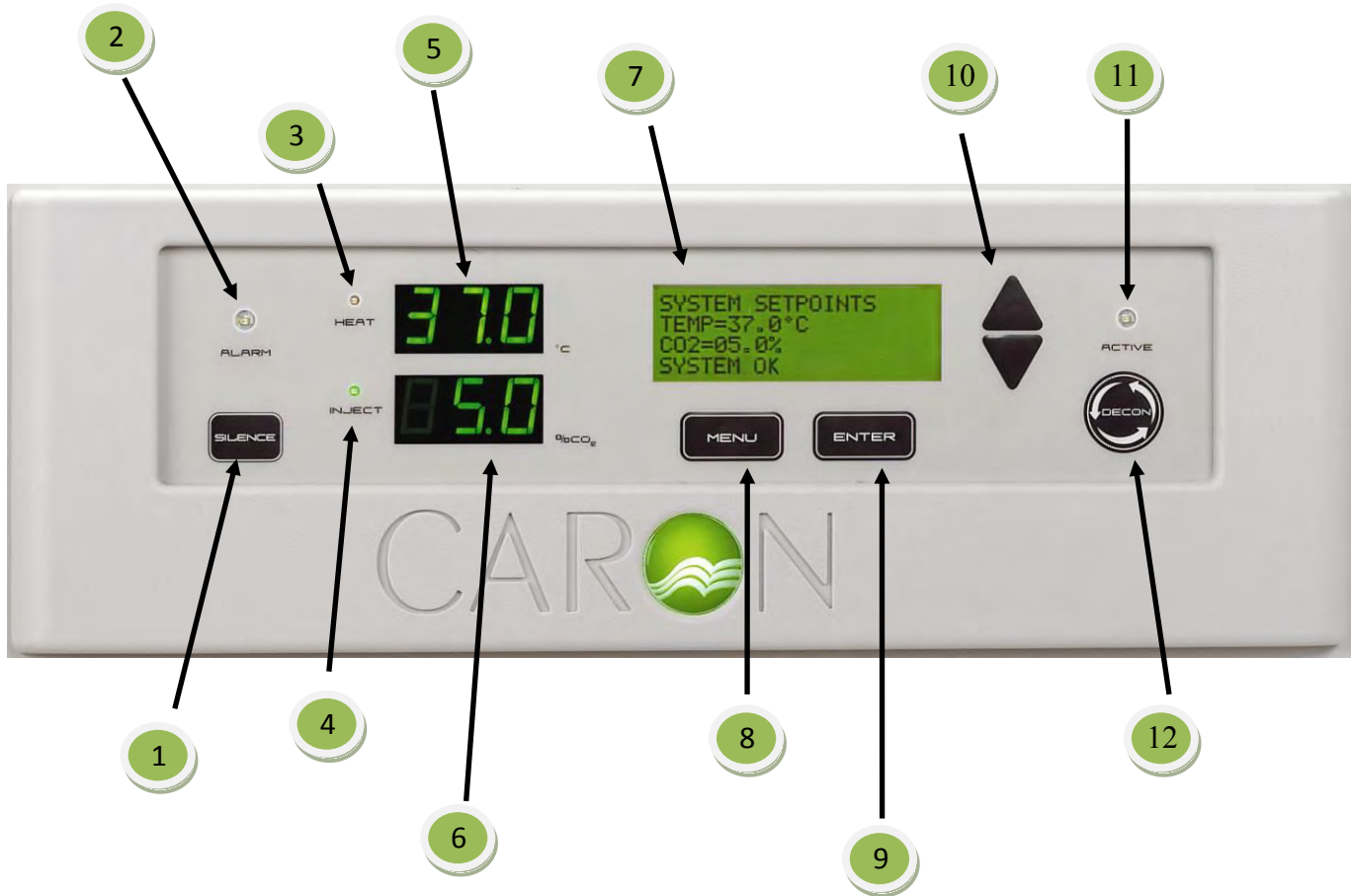
SECTION 2 – EQUIPMENT OVERVIEW

Congratulations! You have just purchased the latest technology in CO₂ incubators. Before using the equipment, familiarize yourself with key components of the product and thoroughly read this manual.



SECTION 2 – EQUIPMENT OVERVIEW – CONTINUED

INCUBATOR CONTROL PANEL



- 1 Silence Key – Press to Silence audible alarm
- 2 Alarm Indicator – Illuminates on and off during an alarm condition
- 3 Heat Indicator – Illuminates when any system heater is on
- 4 Inject Indicator – Illuminates when gas is being injected
- 5 Temperature / Humidity Display
- 6 CO₂ / O₂ Display

- 7 Message Center – Displays incubator setpoints and any alarm conditions
- 8 Menu Select – Allows user to select programming menu
- 9 Enter – Allows user to enter any adjusted system variable
- 10 Allows user to adjust system variables up and down
- 11 Active Indicator – Illuminates when incubator is in Decon Cycle
- 12 Decon – Press to initiate decon cycle

SECTION 3 – EQUIPMENT 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, make notes accordingly on the freight bill and have it 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 added convenience, your incubator was shipped with shelving and internal components installed. Remove all foam protective pieces from both outside and inside the incubator. Remove any tape holding components in position during shipping.

A boxed shipping kit is also included inside the incubator. The shipping kit includes a user's manual, electrical cord, gas connection tubing with filters, stacking adaptors with hardware, and spare incubator hardware.

Choosing a Location



This product weighs approx. 250 pounds. Ensure that sufficient resources are available to safely move the product.



When moving your incubator, do not lift the unit by the door handle or the outer door as structural damage could occur.

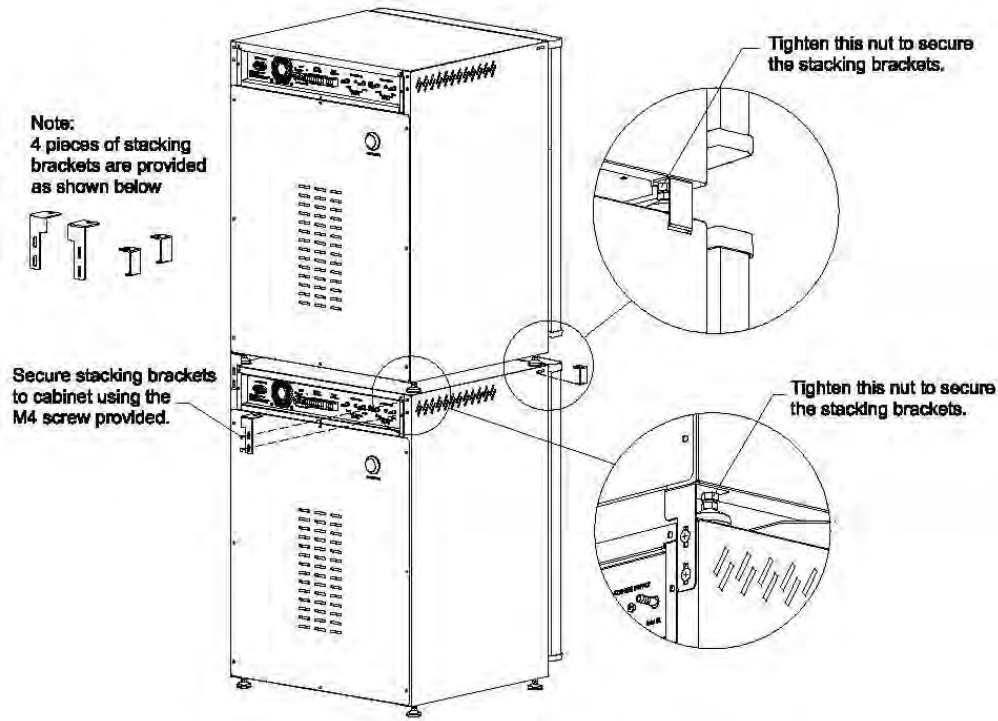
To ensure proper operation, you must locate the unit on a firm level surface, capable of supporting approximately 250 pounds (500 pounds if stacked). The unit should be located in an 18°C – 25°C ambient area and where there is no direct airflow from heating and cooling ducts as well as out of direct sunlight. Allow four to six inches of clearance on all sides of the product to allow for connections and airflow.

The unit requires a dedicated electrical connection and a regulated pressurized CO₂ supply. Choose a location where these facilities are or can be made available.

Your incubators are designed to stack on top of each other to optimize floor space. Stacking brackets are provided with each incubator to secure them together.



Failure to properly install the provided stacking brackets could result in unit tipping.



The incubator specifications were developed by testing the product in controlled environment conditions of 72°F to 77°F degrees with a voltage fluctuation of +/-10%. Operating the incubator outside of these specifications will affect the incubator's performance.

Preliminary Cleaning

Your new incubator was thoroughly cleaned prior to leaving the factory. It is recommended however, to disinfect all interior surfaces with a general purpose laboratory cleaning agent prior to using the product. After cleaning, dry all interior components with a sterile cloth as necessary.



Chloride containing cleaners can attack and corrode stainless steel. Cleaners with strong acids can damage plastic components.



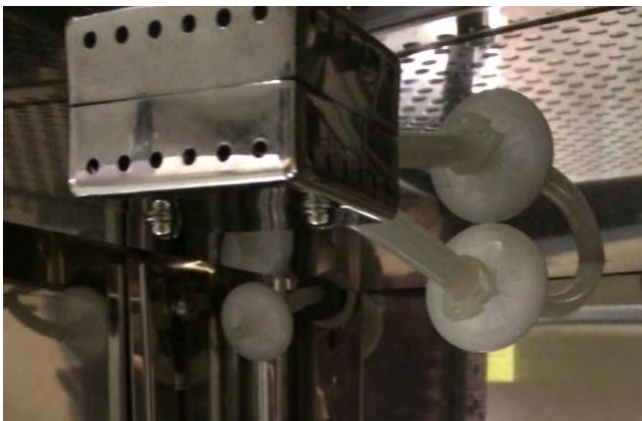
Before relocating an incubator remove the water in the humidity pan and transfer any product to another incubator.

Leveling the Unit

Place a level on the middle shelf of the incubator. The cabinet has built in adjustable leveling feet designed to level the unit. Adjust the feet appropriately until the unit sits level left to right and front to back.

Installing Filtered Air Exchange Port Stopper

The Oasis incubator is designed with a filtered air exchange that allows a small amount of ambient air to be drawn into the incubator to slightly reduce the relative humidity to approximately 90% and just below saturation. The recirculating fan pulls HEPA filtered ambient air into the incubator and exhausts the air through a HEPA filtered stopper. The silicone port stopper HEPA assembly that is supplied in the accessory kit will need to be installed in the rear access port located on the top left side of the back wall as seen in the picture below.



If higher humidity levels higher than 90% are required, install the brass plug that is supplied in the accessory kit into the rear panel of the cabinet labeled Control Leak. This will disable the filtered air exchange. With the filtered air exchange disabled, the humidity level may increase above saturation resulting in some condensation developing on incubator surfaces.

Filling the Humidity Pan



Use only distilled or deionized water with a resistivity between 50K Ω -CM and 1M Ω -CM and a neutral pH. Using water outside this range will void your warranty.

To ensure proper operation, distilled or deionized water is required in the humidity pan. Fill the humidity pan approximately half full of water. Place the pan directly under the hinged airflow duct sitting on the bottom floor of the incubator to insure optimum temperature and humidity response. The hinged airduct has “stops” designed into it to ensure the pan is located in the ideal position. Slide the humidity pan back under the duct until it hits the “stops”.

Connecting a CO₂ supply



High concentrations of carbon dioxide can cause asphyxiation. The use of CO₂ monitors and alarms is recommended for areas where CO₂ can collect.



The CO₂ gas supply should be 99.5% pure and should not contain a siphon tube. Install a 2 stage gas pressure regulator with a maximum adjustment of 25 psi. Inlet pressure must be regulated to 15 psi.

The CO₂ supply should be 99.5% and not have siphon tubes. Regulate CO₂ pressure to 15 psi. CO₂ tank regulators are available to purchase 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 HEPA filter is provided to remove any contaminants in the CO₂ gas supply. Check the connections closely for leaks.

If the unit is equipped with an optional built in gas guard system, there will be 2 gas inlets. Each of the inlets should be connected to an individual gas tank as described above.

Connecting a N₂ supply (for suppressed O₂ 6404 models)



Low levels of oxygen can cause suffocation. The use of O₂ monitors and alarms is recommended for areas where N₂ is used to suppress oxygen



The N₂ gas supply should be 99.5% pure and should not contain a siphon tube. Install a 2 stage gas pressure regulator with a maximum adjustment of 25 psi. Inlet pressure must be regulated to 15 psi.

The N₂ supply should be 99.5% and not have siphon tubes. Regulate N₂ pressure to 15 psi. N₂ tank regulators are available to purchase 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 HEPA filter is provided to remove any contaminants in the N₂ gas supply. Check the connections closely for leaks.

If the unit is equipped with an optional built in gas guard system, there will be 2 gas inlets. Each of the inlets should be connected to an individual gas tank as described above.

Connecting Electrical Power



Connect each incubator to a dedicated grounded circuit. Failure to do so could result in electrical shock. Ensure that there is unobstructed access to the main power plug disconnect.

Model 6400-1 requires a 100-130 VAC, 50/60Hz 15A power connection. The power cord connection is a NEMA 5-15P plug.

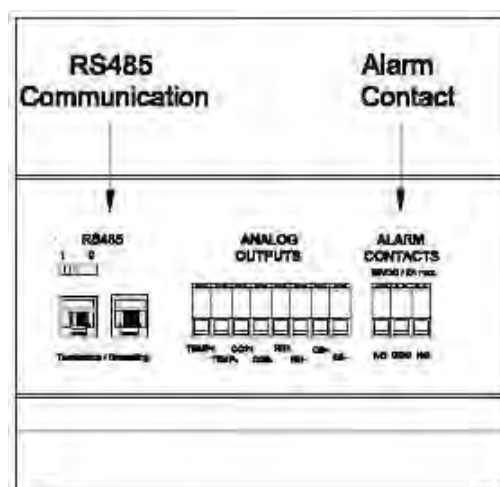
Model 6400-4 requires a 220 – 240 VAC, 50/60Hz, 16A power connection. The power cord connection is a CEE 7/7 plug.

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

Connecting Alarm Contacts

A set of dry relay alarm contacts are provided standard with each incubator. They are located on the back of the incubator. The terminals on the relay contact 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 will return to their normal position.



SECTION 4 – OPTIONAL ACCESSORY INSTALLATION

Installing the units on a Roller Base or Floor Stand



This product weighs approx. 250 pounds. Ensure that sufficient resources are available to safely move the product.

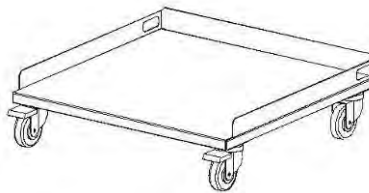


When moving your incubator, do not lift the unit by the door handle or the outer door as structural damage could occur.

Caron offers three different configurations of roller bases and floor stands. The units are designed to both add mobility to the incubators and to lift them up off the floor to simplify cleaning underneath them.

Accessory RLBS401 in the figure below provides swivel casters for added mobility to either single or stacked incubators. The two front casters have brakes which can be securely locked once the unit is rolled to its final location.

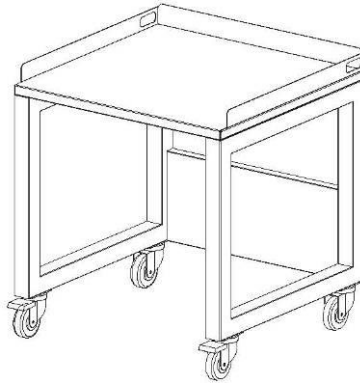
When placing stacked units on any roller base or floor stand, lock the roller base brakes by pressing down on them; lift a single unit onto the base first, next lift the second unit onto the first unit. Then attach the stacking brackets as shown in the equipment installation section of the manual.



Accessory FLST401 in the figure below provides adjustable leveling feet for increasing the height of the incubator by approximately 8 to 10”.



Accessory FLST402 in the figure below provides swivel casters for added mobility to either single or stacked incubators. The two front casters have brakes which can be locked once the unit is rolled to its final location. The unit is designed for a single incubator and elevates it from the floor by approximately 25”.



Connecting the CO2 or N2 Gas Guard

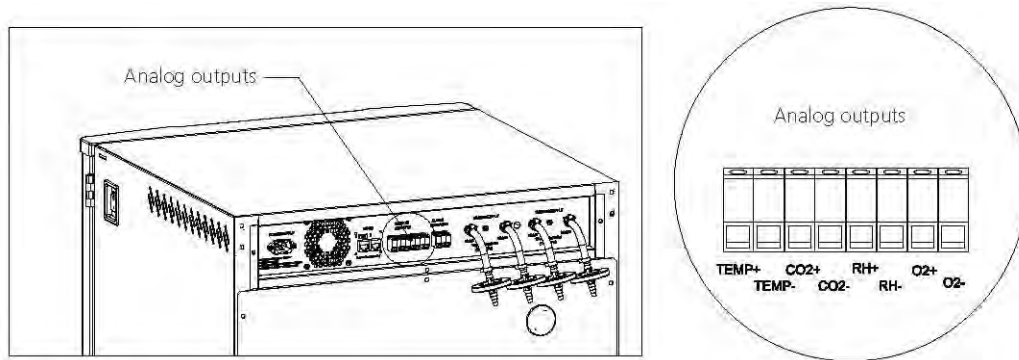
Accessory GASG401 CO2 backup system and GASG403 N2 backup system provide an optional built in system to allow two regulated CO2 or N2 supplies to connect to an incubator.

Refer to the equipment installation section, connecting a CO2 or N2 gas supply.

The gas guard is designed to automatically switch from the primary tank to the secondary tank when low gas pressure is detected on the primary tank. This allows for a temporary uninterrupted supply of CO2 or N2 to the incubator should the primary tank go empty.

Connecting Analog Outputs

Accessory OUTP401 provides terminals at the rear of the incubator to output analog signals, representing the temperature, CO₂, and optional relative humidity levels inside the incubator. Connections can be made to in house data acquisition systems to monitor incubator performance. The accessory can be configured at the factory to supply either 4-20mA or 0-5V signals that represent the parameters.



The table below represents the range of parameter values

	Controller Value	Output 0-5V	Output 4-20mA
Temperature Low	0 degrees C	0.0 VDC	4 mA
Temperature High	100 degrees C	5.0 VDC	20 mA
CO ₂ Low	0.0% CO ₂	0.0 VDC	4 mA
CO ₂ High	20.0% CO ₂	5.0 VDC	20 mA
Humidity Low	0% rH	0.0 VDC	4 mA
Humidity High	100% rH	5.0 VDC	20 mA
O ₂ Low	0.0% O ₂	0.0 VDC	4 mA
O ₂ High	20.7% O ₂	5.0 VDC	20 mA

SECTION 5 – EQUIPMENT OPERATION

Once the incubator is properly installed with the humidity pan filled and CO₂ source connected, turn on the power switch on the front upper right side of the incubator. When power is applied, the incubator will proceed through a series of startup diagnostics. After this is complete, the incubator will begin to cycle heat and inject CO₂. The displays will begin to move toward their setpoints.



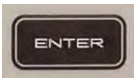
An inner door switch is located on the front of the unit. When the outer door is opened the blower and gas inject are disabled. Do not manually override the switch.

The incubator keypad is designed to produce a simple, easy to understand user interface that is intuitive and user friendly. With just a few presses of the keys, the logic behind the user interface is very easy to learn and remember.

There are four basic keys to setup or change any incubator parameter to be setup or changed.



Enter into a submenu when at Main Menu or Exit submenu to return to Main











Saves any adjusted parameter.



Scroll Up/Down inside a menu or adjust a selected parameter









Changing the Temperature Set-point

The incubator has an operating temperature range of 20.0°C to 60.0°C. The lowest temperature set-point that the incubator will control temperature is 5°C above ambient. A setting of 20.0°C will disable the temperature control and all heaters and alarms will be disabled. To change the operating temperature setpoint:

- 1) Press the  key from the main menu
- 2) Press the  to select settings
- 3) Press the  key to enter Settings
- 4) Press the  to select Set Temp
- 5) Press the  key to enter Set Temp
- 6) Press the  to increase / decrease temperature setpoint (hold for scroll)
- 7) Press the  key to save the setpoint
- 8) Press the  key twice to return to the main menu









Changing the CO2 Set-point

The incubator has an operating CO2 range of 0.0% CO2 to 20.0% CO2. A setting of 0.0% CO2 will disable the CO2 control and all CO2 control and alarms. To change the operating CO2 setpoint:

- 1) Press the  key from the main menu
- 2) Press the  to select settings
- 3) Press the  key to enter Settings
- 4) Press the  to select Set CO2
- 5) Press the  key to enter Set CO2
- 6) Press the  to increase / decrease CO2 setpoint (hold for scroll)
- 7) Press the  key to save the setpoint
- 8) Press the  key twice to return to the main menu

Changing the O2 Set-point

The incubator has an operating O2 range of 20.6% O2 to 1.0% O2. A setting of either 20.7% or 1.0% O2 will disable the O2 control and all O2 control and alarms. To change the operating O2 setpoint:

- 1) Press the  key from the main menu
- 2) Press the  to select settings
- 3) Press the  key to enter Settings
- 4) Press the  to select Set O2
- 5) Press the  key to enter Set O2
- 6) Press the  to increase / decrease O2 setpoint (hold for scroll)
- 7) Press the  key to save the setpoint
- 8) Press the  key twice to return to the main menu









SECTION 6 – CALIBRATION

After the incubator has stabilized at the user selected setpoints, the control systems can be calibrated. When in calibration mode, the temperature display, CO2 display, and rh display (optional) can all be adjusted to match a reference standard.

Before any system is calibrated it is critical that the incubator has been allowed to stabilize properly. In the instructions below, each individual system has a recommended stabilization time that is required before calibration.









Calibrating the Temperature Display

Place the temperature reference device in the center of the chamber. If the incubator has just been installed and started up, allow 8-12 hours for the incubator to stabilize before making a calibration adjustment. If the unit has been in operation, allow a full hour after the display reaches the temperature setpoint before making any calibration adjustments.

- 1) Press the  key from the main menu
- 2) Press the  to select Calibration
- 3) Press the  key to enter Calibration
- 4) Press the  to select Temp Sensor
- 5) Press the  key to enter Temp Sensor
- 6) Press the  to increase / decrease the Temp Sensor value (hold for scroll)
- 7) Press the  key to save the Temp Sensor calibration value
- 8) Press the  key twice to return to the main menu









Calibrating the CO2 Display

A port is available in the center of the inner glass door to allow an air sample to be drawn from the incubator. If the incubator has just been installed and started up, allow 8-12 hours for the incubator to stabilize before making a calibration adjustment. If the unit has been in operation, allow a full hour after the display reaches the CO2 setpoint before making any calibration adjustments. After stabilization, open the outer door; insert the calibration device's sample tube into the port to take a sample.

- 1) Press the  key from the main menu
- 2) Press the  to select Calibration
- 3) Press the  key to enter Calibration
- 4) Press the  to select CO2 Sensor
- 5) Press the  key to enter CO2 Sensor
- 6) Press the  to increase / decrease the CO2 Sensor value (hold for scroll)
- 7) Press the  key to save the CO2 Sensor calibration value
- 8) Press the  key twice to return to the main menu

Calibrating the Relative Humidity Display









If your incubator is equipped with an optional humidity sensor and display, the humidity system can be calibrated. If the humidity option was not purchased, the calibration menus will not be displayed in the calibration mode. Place the relative humidity reference device to which the incubator temperature will be calibrated to in the center of the chamber. If the incubator has just been installed and started up, allow 8-12 hours for the incubator to stabilize before making a calibration adjustment. If the unit has been in operation, allow a full hour after the temperature display reaches the temperature setpoint before making any calibration adjustments.

- 1) Press the  key from the main menu
- 2) Press the  to select Calibration
- 3) Press the  key to enter Calibration
- 4) Press the  to select Rh Sensor
- 5) Press the  key to enter Rh Sensor
- 6) Press the  to increase / decrease the Rh Sensor value (hold for scroll)
- 7) Press the  key to save the Rh Sensor calibration value
- 8) Press the  key twice to return to the main menu

Calibrating the O2 Display













Independent device calibration

A port is available in the center of the inner glass door to allow an air sample to be drawn from the incubator. If the incubator has just been installed and started up, allow 8-12 hours for the incubator to stabilize before making a calibration adjustment. If the unit has been in operation, allow a full hour after the display reaches the O2 setpoint before making any calibration adjustments. After stabilization, open the outer door; insert the calibration device's sample tube into the port to take a sample.

- 1) Press the  key from the main menu
- 2) Press the  to select Calibration
- 3) Press the  key to enter Calibration
- 4) Press the  to select O2 Sensor
- 5) Press the  key to enter O2 Sensor
- 6) Press the  to increase / decrease the O2 Sensor value (hold for scroll)
- 7) Press the  key to save the O2 Sensor calibration value
- 8) Press the  key twice to return to the main menu

Ambient reference calibration

The O2 sensor may be calibrated by using the ambient air as a reference. This process involves filling the incubator with ambient air and then setting the O2 calibration reading to the expected O2 level.









- 1) Press the sequence    to access the factory configuration setup menu
- 2) Use the  and  to program '0 3 9 7' as the PIN number
- 3) Press the  to select O2 control
- 4) Press the  key to enter O2 control
- 5) Press the  to select 'Install'
- 6) Press the  key to install O2 control
- 7) Press the  key to skip the 100mV and 4.5V DC calibration prompts
- 8) Open both the outer solid and inner glass doors
- 9) Press and hold the door switch while the calibration counts down for 60 seconds
- 10) Let go of door switch once the display shows 'Calibrating XX.X'
- 11) Wait until the display reads 'Calibrating 20.7'
- 12) Press  to acknowledge the 'Sensor is Ready'
- 13) Press  to exit to the main display

SECTION 7 – ADMIN MODE

Many incubator settings are set to common defaults to minimize initial setup of the incubator. However, these settings are also adjustable to allow a user to customize the incubator. These adjustments are all available in ADMIN Mode.









Setting Over/Low Temperature Alarm Level

The incubator has both an over and low programmable temperature alarm. The factory default for the over temperature alarm is 1.0°C above setpoint. The factory default for the low temperature alarm is 1.0°C below setpoint. To change either alarm level:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Over Temp Alarm / Low Temp Alarm
- 5) Press the  key to enter Over Temp Alarm / Low Temp Alarm
- 6) Press the  to change alarm level
- 7) Press the  key to save the alarm level
- 8) Press the  key twice to return to the main menu









Setting High/Low CO2 Alarm Level

The incubator has both a high and low programmable CO2 alarm. The factory default for the high CO2 alarm is 1.0% above CO2 setpoint. The factory default for the low CO2 alarm is 1.0% below CO2 setpoint. To change either alarm level:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select High CO2 Alarm / Low CO2 Alarm
- 5) Press the  key to enter High CO2 Alarm / Low CO2 Alarm
- 6) Press the  to change alarm level
- 7) Press the  key to save the alarm level
- 8) Press the  key twice to return to the main menu









Setting New CO2 Tank (for unit without the optional gas backup switch system)

The CO2 tank depletion reminder automatically calculates how much CO2 gas is left in the tank. It alerts the user approximately one week before the gas is depleted which gives the user some buffer time to order new tanks. To change CO2 tank net weight and to set new CO2 tank:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select New CO2 Tank
- 5) Press the  key to enter New CO2 Tank
- 6) Press the  to change CO2 tank net weight
- 7) Press the  key to set new CO2 tank
- 8) Press the  key twice to return to the main menu









Setting High/Low O2 Alarm Level (suppressed O2 model 6404s only)

The incubator has both a high and low programmable O2 alarm. The factory default for the high O2 alarm is 1.0% above O2 setpoint. The factory default for the low O2 alarm is 1.0% below O2 setpoint. To change either alarm level:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select High O2 Alarm / Low O2 Alarm
- 5) Press the  key to enter High O2 Alarm / Low O2 Alarm
- 6) Press the  to change alarm level
- 7) Press the  key to save the alarm level
- 8) Press the  key twice to return to the main menu









Setting Low RH Alarm Level (for unit with optional RH display)

The incubator will display/sound the alarm when the RH level goes below the low %RH alarm value. The default low %RH alarm is 75%. To change the alarm level:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Low RH Alarm
- 5) Press the  key to enter Low RH Alarm
- 6) Press the  to change alarm level
- 7) Press the  key to save the alarm level
- 8) Press the  key twice to return to the main menu









Setting a System Password (PIN)

It is optional to setup a system password to limit access to the control panel functions. If the control panel is protected by a password, you cannot go into the menus until the PIN is entered. The factory default is 0000 which does not limit access to these menus. To setup a system password:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select New Pin
- 5) Press the  key to enter New Pin
- 6) Press the  to toggle set Pin number
- 7) Press the  key to save the Pin number value
- 8) Press the  key twice to return to the main menu









Enabling / Disabling Audible Alarm

The incubator is equipped with an audible and visual alarm. The audible alarm can be silenced if an alarm condition occurs by pressing the silence key. However, the alarm will ring back if the alarm condition is not corrected or a new alarm condition occurs (see Alarm, Section 11 for more details). To enable/disable the audible alarm setting:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Audible Alarm
- 5) Press the  key to enter Audible Alarm
- 6) Press the  to toggle between Disable / Enable
- 7) Press the  key to save the Audible Alarm setting
- 8) Press the  key twice to return to the main menu









Setting the Alarm Ring Back Time

The incubator is equipped with an audible alarm ring back timer. The ring back timer will begin when an alarm is silenced using the silence key on the control panel. When the ring back timer hits the programmed value, the audible alarm will sound again, reminding the user that the alarm condition needs addressed. The factory default for the alarm ring back timer is 15 minutes. To change the alarm ring back timer:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Alarm Ring Back
- 5) Press the  key to enter Alarm Ring Back
- 6) Press the  to adjust the Alarm Ring Back Setting
- 7) Press the  key to save the Alarm Ring Back setting
- 8) Press the  key twice to return to the main menu









Setting the Door Alarm Delay

The incubator has a programmable door alarm delay that can be set between 1 to 15 minutes. The factory default is 15 minutes. To change the door alarm delay time:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Door Alarm Delay
- 5) Press the  key to enter Door Alarm Delay
- 6) Press the  to adjust the door alarm delay time
- 7) Press the  key to save the door alarm delay time
- 8) Press the  key twice to return to the main menu









Configuring the Temp / CO2 / RH / O2 Alarm Relay

The incubator is equipped a set of dry alarm contacts. Rating of the relay contacts is a maximum of 30V DC, 2A. A set of NO (normally open) and NC (normally closed) contacts are available on the back of the incubator. The software can configure the relay so it changes state during a temperature or CO2 alarm. To enable/disable a temp / CO2 / RH / O2 alarm from changing the state of the relay:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select the desired alarm relay configuration
- 5) Press the  key to modify the desired alarm relay configuration
- 6) Press the  to toggle between Disable / Enable
- 7) Press the  key to save the alarm relay configuration
- 8) Press the  key twice to return to the main menu







Selecting Language

A user may select one of two languages for the control panel display including English, and Spanish. The default language is English. To change the language setting:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Set Language
- 5) Press the  key to enter Set Language
- 6) Press the  to toggle between the selections
- 7) Press the  key to save the Set Language value
- 8) Press the  key twice to return to the main menu



Setting System Date / Time

The incubator is equipped with a real time clock that keeps track of date and time even when power is off. Accurate date and time stamping are necessary for the data logging feature. The 24 hour clock is factory set to US Eastern Standard Time. To change the date and time:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Set Date / Time
- 5) Press the  key to enter Set Date / Time
- 6) Press the  to change the Date / Time.








Date is entered in YYYY MM DD format, one digit at a time

Time is entered in HH MM SS format, one digit at a time.

- 7) Press the  key to save each Digit of the Date / Time value
- 8) Press the  key twice to return to the main menu

Resetting Factory Defaults









A user can reset factory defaults for temperature and CO2 setpoints and alarm conditions by selecting Reset Defaults. To reset defaults:

- 1) Press the  key from the main menu
- 2) Press the  to select Admin
- 3) Press the  key to enter Admin
- 4) Press the  to select Reset Defaults
- 5) Press the  key to enter Reset Defaults
- 6) Press the  key to again to Reset Defaults
- 7) Press the  key twice to return to the main menu

SECTION 8 – DATA LOGGING








The incubator is equipped with a built in data logging system. The data logger records time stamped records of temperature, CO₂, and humidity/O₂ (if equipped) that can be viewed on screen. The information is valuable in determining performance of the incubator.

Setting the Data Log Time Period

- 1) Press the  key from the main menu
- 2) Press the  to select Data Logging
- 3) Press the  key to enter Data Logging
- 4) Press the  to select Data Log Period
- 5) Press the  key to enter Data Log Period
- 6) Press the  to change the Data Log Period
- 7) Press the  key to save the Data Log Period
- 8) Press the  key twice to return to the main menu

Reviewing Data Logs

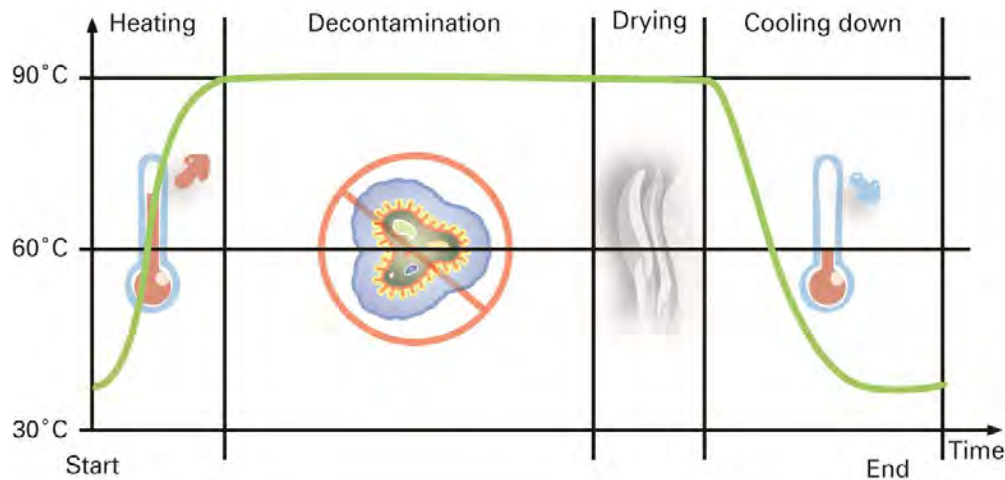
Time stamped data log information can be viewed on screen and the history scrolled through. To review the data logs of a particular parameter:

- 1) Press the  key from the main menu
- 2) Press the  to select Data Logging
- 3) Press the  key to enter Data Logging
- 4) Press the  to select Parameter that you want to view
- 5) Press the  key to enter view the data logs
- 6) Press the  to view the scroll through data logs.
- 7) Press the  key twice to return to the main menu

SECTION 9 – USING THE AUTOMATIC DECON CYCLE

The incubator is equipped with a built-in automatic 90°C moist heat decontamination cycle. The cycle is designed to decontaminate the entire interior workspace including all installed components. Moist heat at 90°C is proven to effectively kill common organisms known to contaminate incubators.

The decon cycle consists of a heating phase in which the temperature and humidity rise to approximately 90°C and 60% relative humidity. After reaching these temperatures the unit soaks for several hours before entering a drying phase. During the drying phase the heaters maintain 90°C while a built in pump pulls in HEPA filtered clean air. Next, the unit cools down to the setpoint from which the decon cycle was initiated. The total cycle time is approximately 15 hours. The graph below represents the various cycles of the decon cycle:



To initiate the decon cycle press the DECON button on the control panel and follow the on screen prompts.

The first step of the cycle is to replace the water in the pan with 400 mL of water. This is the amount of water required to effectively create the moist heat decontamination environment.



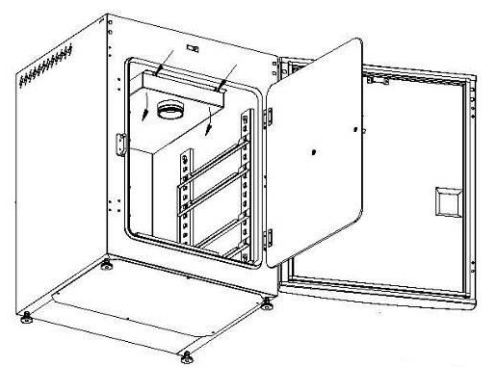
Use only distilled or deionized water with a resistivity between 50K Ω -CM and 1M Ω -CM and neutral pH. Using water outside this range will void your warranty.

You are then prompted to remove the IR CO2 sensor. Follow the instructions below to remove the IR sensor.

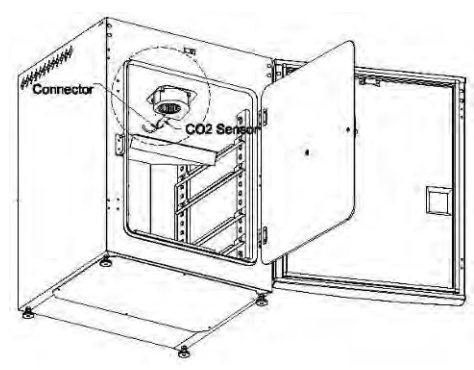


Failure to remove the IR sensor or O2 sensor (if equipped) during the moist heat decontamination cycle will damage the sensor(s).

Remove the two thumbscrews and lower the top air duct from inside the incubator as shown below:



Disconnect the cable from the CO2 sensor by rotating the connector counter clockwise and store the sensor in a safe place until it can be replaced following the decon cycle.



If the incubator is equipped with an O2 sensor, remove the four screws that hold the O2 sensor in place. Replace the sensor plate with the blank sensor plate provided with the incubator.

Replace the top air duct, close the inner and outer doors, and press ENTER on the control panel.

The decon cycle is now initiated. Do not open the outer door during the decontamination process. The message center on the display will notify you how much time remains to complete the cycle and when the cycle is complete.

The total time to complete the decon cycle will vary slightly depending upon ambient conditions and line voltage to the incubator. The overall time to complete the cycle is approximately 15 hours. Heat up time is approximately 2 hours followed by 9 hours of soak time at elevated temperature and humidity. The drying cycle lasts 30 minutes, followed by a cool down time of approximately 3 hours.

Upon completion of the decon cycle, fill the humidity pan as instructed in the installation instructions. Replace the IR sensor reversing the process followed to remove it. Replace the O2 sensor reversing the process followed to remove it. Press ENTER for the incubator to return to normal operation mode.

SECTION 10 – ALARMS

A sophisticated alarm system monitors all system parameters for any fault condition. At the same time, built in alarm delays protect the user from nuisance alarms created by routine use such as door openings. A list of alarm descriptions, the conditions they look for, and how they are delayed and displayed are in the table below:

Alarm Description	Condition Detected	Delay*	Audible / Visual or Both	Alarm Rings Back	Other Notes
TEMP SENSOR ERROR	Faulty Temp Sensor Detected	No Delay	Both	Yes	Display shows "---"; Heating will be disabled
CO2 SENSOR ERROR	Faulty CO2 Sensor Detected	No Delay	Both	Yes	Display shows "---"; CO2 will be disabled
RH SENSOR ERROR	Faulty Humidity Sensor Detected	No Delay	Both	Yes	Display shows "---";
OVER TEMPERATURE	Temperature reading greater than Overtemp Alarm	No Delay	Both	Yes	Heating is disabled, Display continues to show Temp reading
HIGH CO2 LEVEL	CO2 reading greater than Overtemp Alarm	15 Minute Delay of Continuous High Reading	Both	Yes	CO2 injection is disabled, display continues to show CO2 reading
DOOR OPEN	Outer Door Open	Programmable 1-15 minutes	Both	Yes	CO2 injection is disabled, internal fan shuts down
LOW % RH (optional)	Humidity reading Lower than Low %RH Alarm	Startup Delay** & 30 Minute Delay of Continuous Low Reading	Both	Yes	Display continues to show Rh reading
LOW TEMPERATURE	Temperature reading lower than Low Temp Alarm	Startup Delay** & 15 Minute Delay of Continuous Low Reading	Both	Yes	Display continues to show Temp reading
LOW CO2 LEVEL	CO2 reading lower than Low CO2 Alarm	Startup Delay** & 15 Minute Delay of Continuous Low Reading	Both	Yes	Display continues to show CO2 reading
HIGH O2 LEVEL	O2 reading greater than High O2 alarm	Startup Delay** & 15 Minute Delay of Continuous High Reading	Both	Yes	Display continues to show O2 reading
LOW O2 LEVEL	O2 reading lower than Low O2 Alarm	15 Minute Delay of Continuous Low Reading	Both	Yes	N2 injection is disabled, display continues to show O2 reading
ALL CO2 TANKS LOW (optional)	Optional Gas Guard indicates both CO2 tanks are low	No Delay	Both	No	Display continues to show CO2 reading
CO2 TANK 1 LOW (optional)	Optional Gas Guard indicates tank 1 has low pressure	15 Minute Delay of Continuous Low Reading	Both	No	Solenoid switches to tank 2 inlet. Display continues to show CO2 reading
CO2 TANK 2 LOW (optional)	Optional Gas Guard indicates tank 2 has low pressure	15 Minute Delay of Continuous Low Reading	Both	No	Solenoid switches to tank 1 inlet. Display continues to show CO2 reading
ALL N2 TANKS LOW (optional)	Optional Gas Guard indicates both N2 tanks are low	No Delay	Both	No	Display continues to show O2 reading
N2 TANK 1 LOW (optional)	Optional Gas Guard indicates N2 tank 1 has low pressure	15 Minute Delay of Continuous Low Reading	Both	No	Solenoid switches to tank 2 inlet. Display continues to show O2 reading
N2 TANK 2 LOW (optional)	Optional Gas Guard indicates N2 tank 2 has low pressure	15 Minute Delay of Continuous Low Reading	Both	No	Solenoid switches to tank 1 inlet. Display continues to show O2 reading

* Status message is shown in the message center status menu immediately; unless in startup delay.

** To avoid nuisance alarms on startup, alarm is delayed until parameter reaches alarm limit the first time.

SECTION 11 – SERVICE MODE

Your CARON incubator has a built in read only Service / Diagnostics mode that can provide information regarding operation of the incubator for troubleshooting purposes. There are no adjustments available or necessary in this mode. The screens available in this mode allow a service technician to quickly troubleshoot any system level problems that occur with the incubator.

SECTION 12 – PREVENTATIVE MAINTENANCE

Your CARON incubator is 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 (optional), and CO2 systems. CARON offers a full range of on-site calibration and validation services. We also offer preventative maintenance contracts on our equipment. Contact our customer service department for details or visit us on the web at www.caronproducts.com.

Recommended Daily Maintenance Checks

- Check the Temperature and CO2 displays versus set-points.
- Check for and correct any alarm condition.
- Check the CO2 and N2 gas tank levels
- Check the water level in the humidity pan

Recommended Annual Maintenance Checks

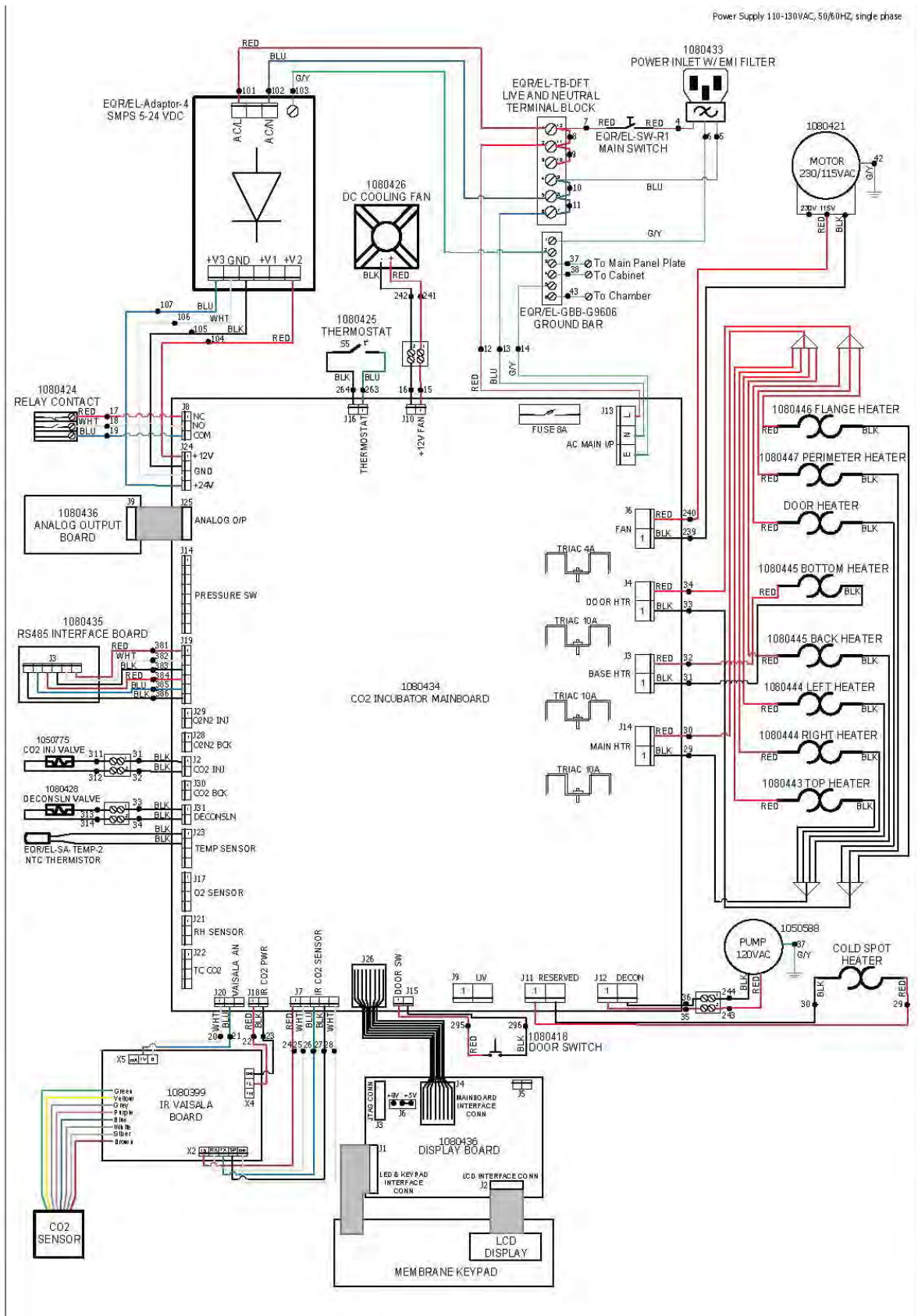
- Replace inline HEPA filters on both CO2 and N2 gas supplies
- Replace O2 sensor
- Check tightness of hinge screws on inner and outer door moving parts
- Disinfect all interior surfaces with a general purpose laboratory cleaning agent.
- Perform a complete calibration of the temperature, humidity, and CO2, and O2 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.

SECTION 13 – SPECIFICATIONS

Model	6400-1	6400-4
Temperature Range	5°C above ambient to 60°C	
Temperature Control	±0.1°C at 37°C	
Temperature Uniformity	±0.3°C at 37°C	
Temperature Sensor	Precision Thermistor	
Humidity Range	Elevated up to 95% @ 37°C	
CO ₂ Range	0-20% CO ₂	
CO ₂ Control	±0.1% CO ₂	
CO ₂ Sensor	Infrared CO ₂ Sensor	
O ₂ Range	20-1% O ₂	
O ₂ Control	±0.1% O ₂	
O ₂ Sensor	Fuel Cell	
Interior Dimensions	20"W x 21"D x 25"H (50.8 cm x 53.3 cm x 63.5 cm)	
Interior Construction	Polished Stainless Steel	
Exterior Dimensions	26"W x 26"D* x 36"H (66 cm x 66 cm x 91.4 cm)	
Exterior Construction	Powder Coated Cold Rolled Steel	
Work Space	6 cu. ft. (170 liters)	
# of Shelves	4 Standard; 13 Maximum	
Shelf Construction	Perforated Stainless Steel	
Shelf Dimensions	18.5" x 18.3" (47 cm x 46.5 cm)	
Electrical	110-130 VAC, 50/60 HZ, Single Phase, 840 Watts	220-240 VAC, 50/60 HZ, Single Phase, 785 Watts
Shipping Weight	264 lbs. (120 kg.)	
Specifications are subject to change without notice. *Add 2.75" for handle.		

SECTION 14 – ELECTRICAL SCHEMATICS

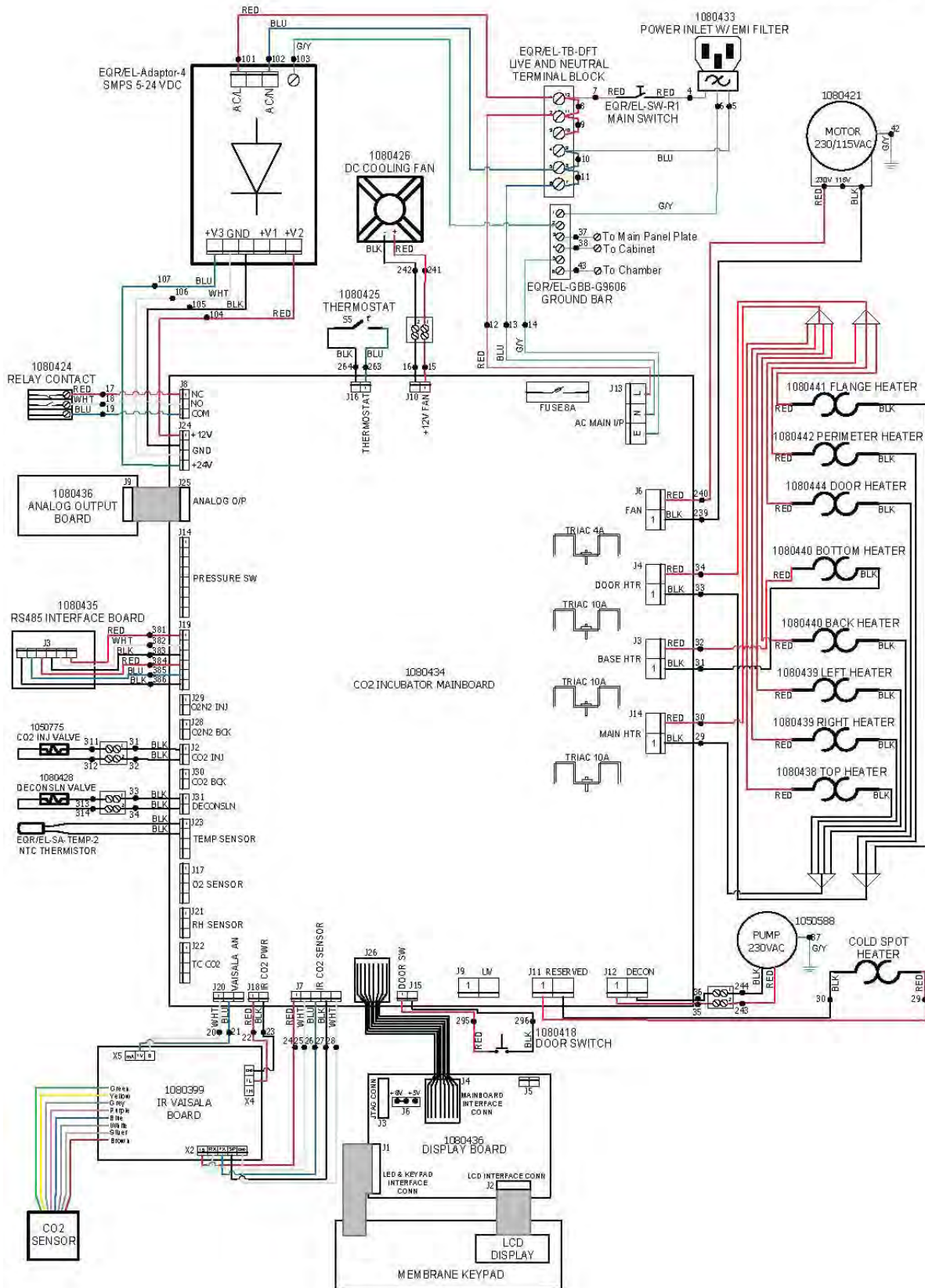
6400-1 110-130V 50/60 HZ, SINGLE PHASE, 7.0 AMPS, 840 WATTS



SECTION 14 – ELECTRICAL SCHEMATICS

6400-4 220-240 VAC, 50/60 HZ, SINGLE PHASE, 3.4 A, 785 WATTS

Power Supply 220-240VAC, 50/60HZ, single phase





DECLARATION OF CONFORMITY

In accordance with EN 45014:1998

We, based at:

Caron Products and Services, Inc.
27640 State Route 7
Marietta, OH 45750 USA



Declare that the product:

Equipment: Forced Convection CO2 Incubator
Model: 6400 Oasis CO2 Incubator

In accordance with the following directives

- 2006/95/EEC: The Low Voltage Directive and its amending directives
- 89/336/EEC: The Electromagnetic Compatibility Directive and its amending directives

Has been designed to comply with the requirements of the following Harmonized Standard:

- Low Voltage: EN 61010 (2001)
- EMC: 61626-1 (2006) Class B

By: Dave Figel
Engineering/Production Manager
CARON Products & Services, Inc.