CARON

Caron Products & Services

OPERATIONS MANUAL

CO_2/O_2 INCUBATOR / OASIS

Models: 6400-6 / 6404-6

PO Box 715, Marietta OH 45750 / **PHONE** 740 373 6809 & 800 648 3042 / **FAX** 740 374 3760 / caronproducts.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.caronproducts.com or 740-373-6809.

Thanks again for your business!

Revision Log

Version	Date	Description
H	01-05-16	N_2 Sparger info added
J	08-01-17	Updated consistency between all manuals
K	07-23-18	Added O2 removal procedure

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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.

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.
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Caron Products & Services, Inc.
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

Earth (ground) protective conductor

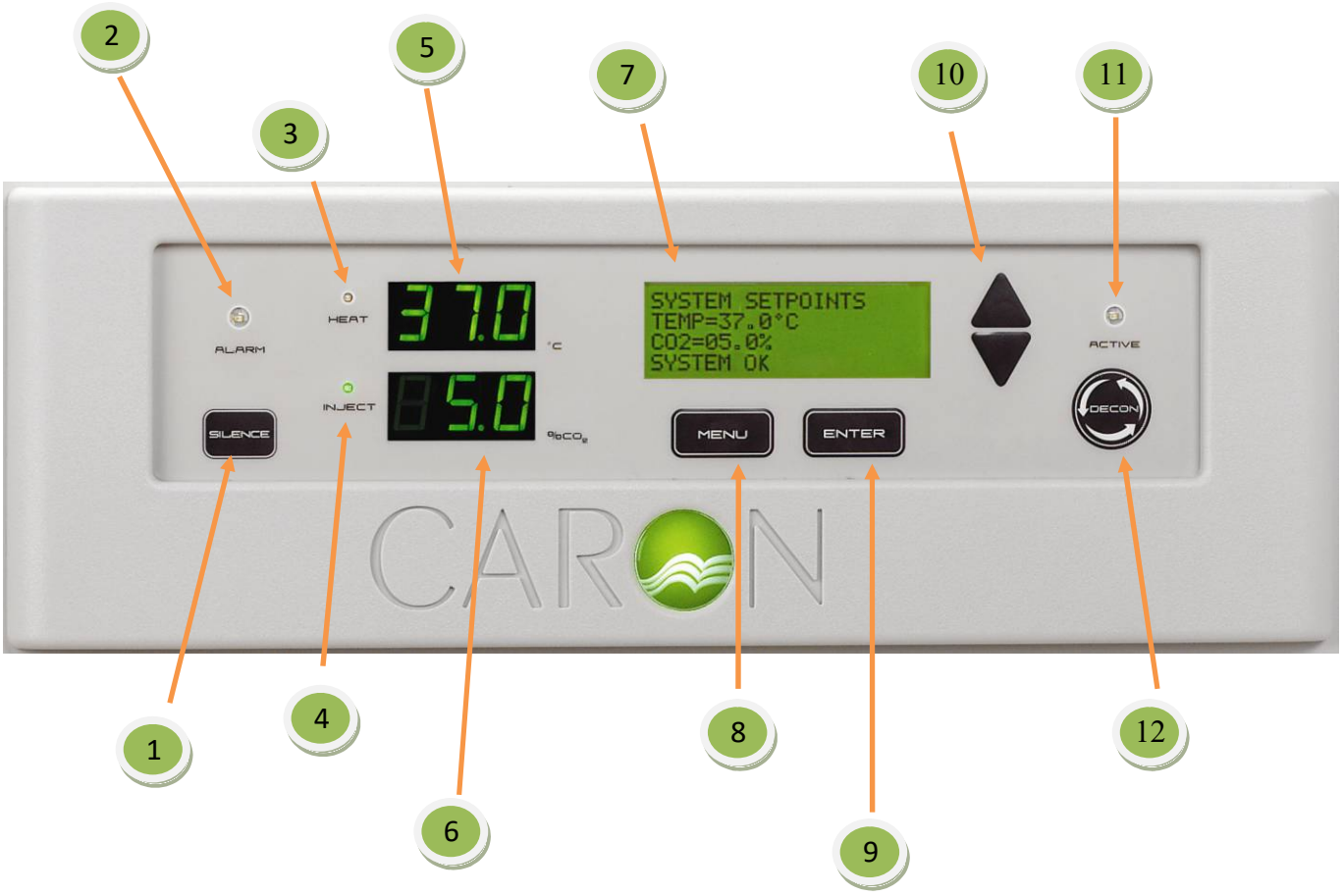
WARNINGS

Local government may require proper disposal

EQUIPMENT OVERVIEW

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

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. CO_2 / O_2 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

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.

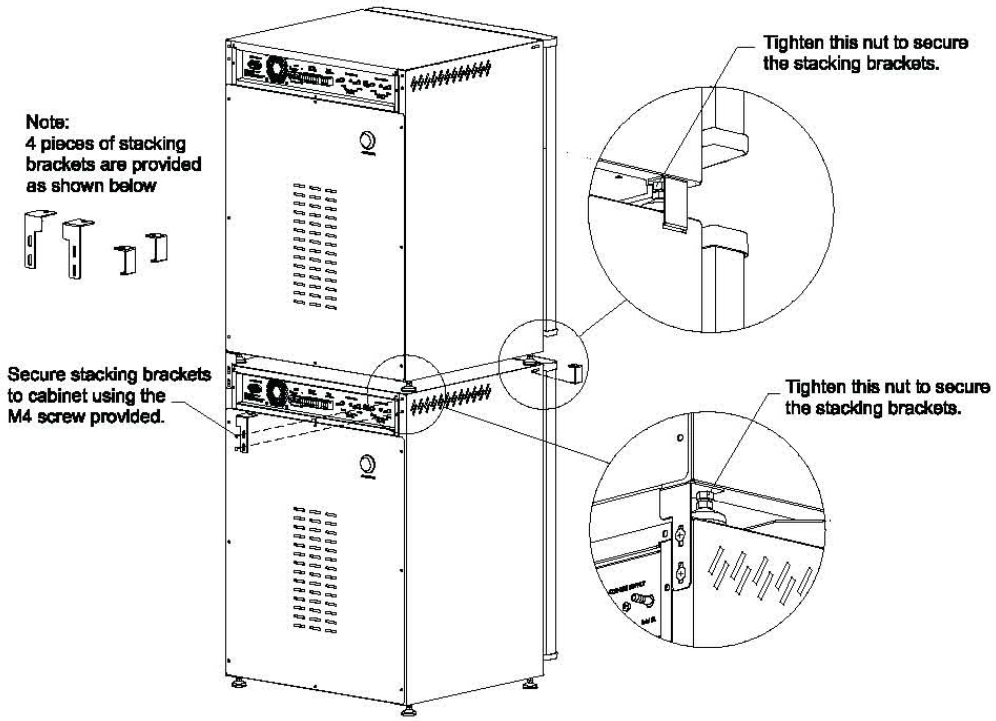
When moving your incubator, do not lift the unit by the door handle or the outer door as structural damage could occur.

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 CO_2 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 clean all interior surfaces with a general purpose laboratory cleaning agent to remove any shipping dust or dirt 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.

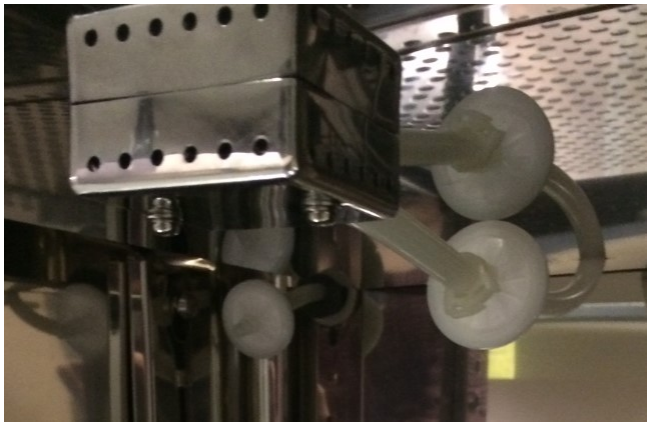
Before relocating an incubator remove the water in the humidity pan and transfer any product to another incubator.

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 50KΩ-CM and 1MΩ-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 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 99.5% 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 CO_2 supply should be 99.5% and not have siphon tubes. Regulate CO_2 pressure to 15 psi. CO_2 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 CO_2 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 N_2 supply (for suppressed O_2 6404 models)

⚠	Low levels of oxygen can cause suffocation. The use of O_2 monitors and alarms is recommended for areas where N_2 is used to suppress oxygen
⚠	The N_2 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 N_2 supply should be 99.5% and not have siphon tubes. Regulate N_2 pressure to 15 psi. N_2 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 N_2 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. On the inside of the 6404 chambers ONLY, the N_2 sparger will need to be connected into the water pan as shown below.

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.

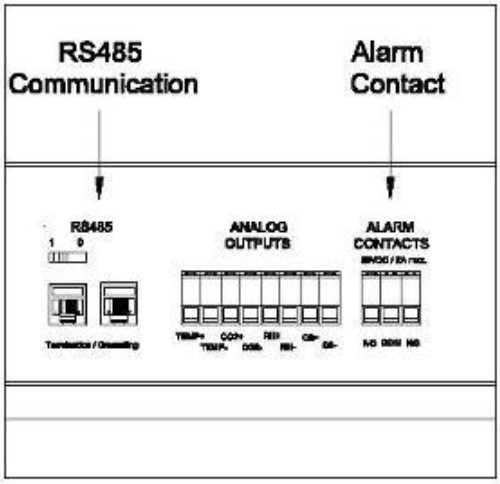
Model 6400-4 requires a 220 – 240 VAC, 50/60Hz, 16A power connection. The power cord connection is a CEE 7/7 plug.

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.



OPTIONAL ACCESSORY INSTALLATION

Installing the units on a Roller Base or Floor Stand

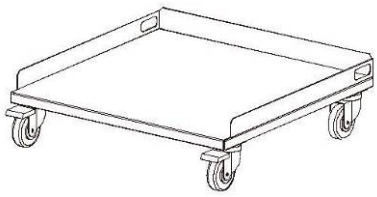
This product weighs approx. 250 pounds. Ensure that sufficient resources are available to safely move the product.

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

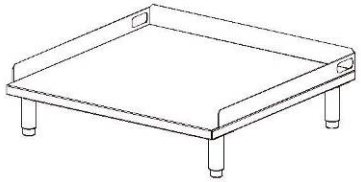
Caron offers three different configurations of roller bases and floor stands. The units are designed to both add mobility to the incubators and to lift them up off the floor to simplify cleaning underneath them.

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.

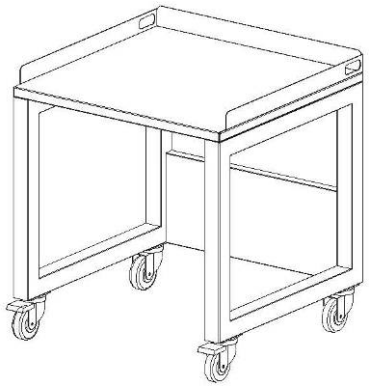
When placing stacked units on any roller base or floor stand, lock the roller base brakes by pressing down on them; lift a single unit onto the base first, next lift the second unit onto the first unit. Then attach the stacking brackets as shown in the equipment installation section of the manual.



Accessory FLST401 in the figure below provides adjustable leveling feel 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”.



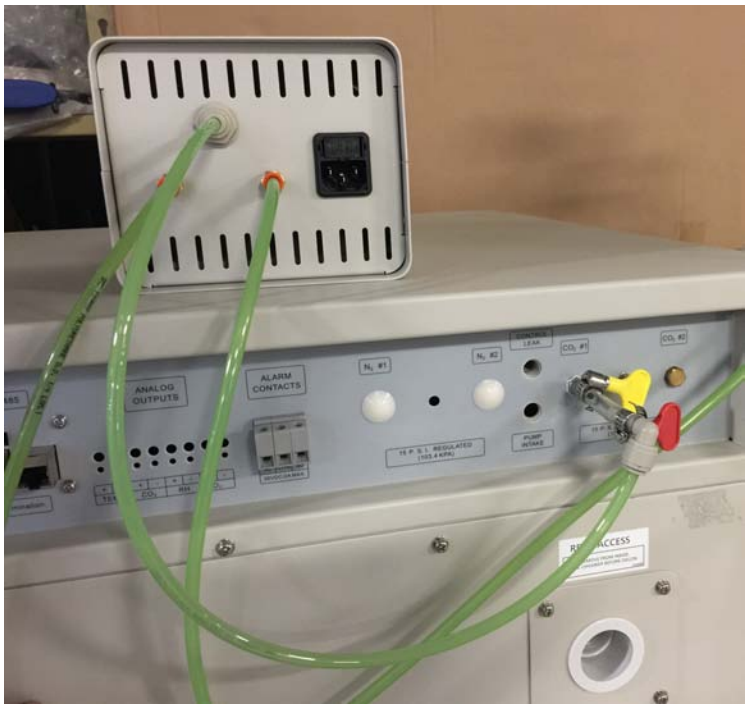
Connecting the CO_2 or N_2 Gas Guard

Accessory GASG401 CO_2 backup system and GASG403 N_2 backup system provide an optional built in system to allow two regulated CO_2 or N_2 supplies to connect to an incubator. Each of the inlets should be connected to an individual gas tank as described above in the Connecting a CO_2 Supply section.

Connecting the Stand Alone Gas Guard

Accessory GASG201 Stand Alone Gas Guard from CARON is designed to allow two tanks of either CO_2 or N_2 to be connected to an incubator requiring approximately 15 psig of gas pressure. With the provided hardware, assemble the configuration as shown for each cylinder regulator.

Once the provided tubing is attached to the cylinder regulators, insert the tubing into both Tank 1 and Tank 2 inlets.

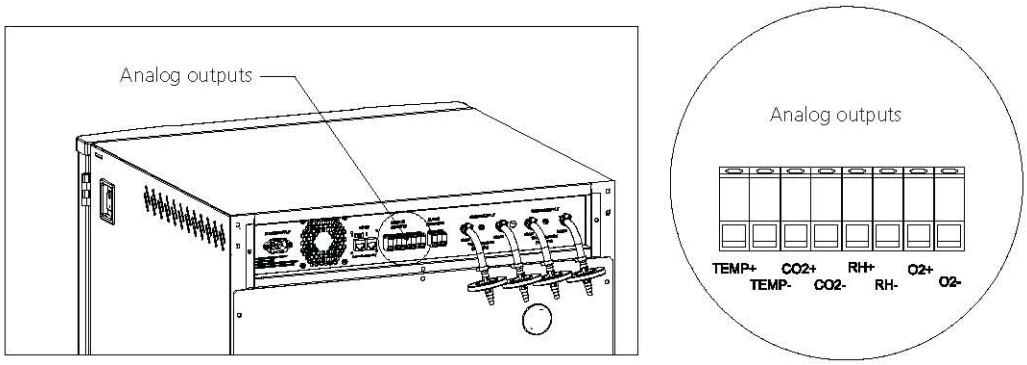


Next, connect the tubing from the outlet of the Gas Guard to the inlet on the back of the chamber as shown in the previous picture. If one or more Gas Guards are supplying separate chambers, the line configuration should be assembled as shown for in the picture below.

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 CO_2 or N_2 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, CO_2, 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

EQUIPMENT OPERATION

Once the incubator is properly installed with the humidity pan filled and CO_2 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 CO_2. 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 CO_2 Set-point

The incubator has an operating CO_2 range of 0.0% CO_2 to 20.0% CO_2. A setting of 0.0% CO_2 will disable the CO_2 control and all CO_2 control and alarms. To change the operating CO_2 setpoint:

1) Press the MENU key from the main menu
2) Press the ▲▼ to select settings
3) Press the ENTER key to enter Settings
4) Press the ▲▼ to select Set CO_2
5) Press the ENTER key to enter Set CO_2
6) Press the ▲▼ to increase / decrease CO_2 setpoint (hold for scroll)
7) Press the ENTER key to save the setpoint
8) Press the MENU key twice to return to the main menu

Changing the O_2 Set-point

The incubator has an operating O_2 range of 20.6% O_2 to 1.0% O_2. A setting of either 20.7% or 1.0% O_2 will disable the O_2 control and all O_2 control and alarms. To change the operating O_2 setpoint:

1) Press the MENU key from the main menu
2) Press the ▲▼ to select settings
3) Press the ENTER key to enter Settings
4) Press the ▲▼ to select Set O_2
5) Press the ENTER key to enter Set O_2
6) Press the ▲▼ to increase / decrease O_2 setpoint (hold for scroll)
7) Press the ENTER key to save the setpoint
8) Press the MENU key twice to return to the main menu

CALIBRATION

After the incubator has stabilized at the user selected setpoints, the control systems can be calibrated. When in calibration mode, the temperature display, CO_2 display, and rh display (optional) can all be adjusted to match a reference standard.

Before making a calibration adjustment, allow the cabinet to stabilize a minimum of 12 hours from the most recent power off condition. If the unit has been in operation, allow a minimum of 3 hours of stable operation at all set-points. If you do not have the appropriate reference instruments to perform calibration, contact CARON's service department for on-site calibration at www.caronproducts.com. Caron also provides validation services to ensure that the unit is functioning properly according to IQ, OQ and PQ protocols, which satisfy FDA guidelines for qualification verification of equipment.

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 MENU key from the main menu
2) Press the ▲▼ to select Calibration
3) Press the ENTER key to enter Calibration
4) Press the ▲▼ to select Temp Sensor
5) Press the ENTER key to enter Temp Sensor
6) Press the ▲▼ to increase / decrease the Temp Sensor value (hold for scroll)
7) Press the ENTER key to save the Temp Sensor calibration value
8) Press the MENU 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 CO_2 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 MENU key from the main menu
2) Press the ▲▼ to select Calibration
3) Press the ENTER key to enter Calibration
4) Press the ▲▼ to select CO_2 Sensor
5) Press the ENTER key to enter CO_2 Sensor
6) Press the ▲▼ to increase / decrease the CO_2 Sensor value (hold for scroll)
7) Press the ENTER key to save the CO_2 Sensor calibration value
8) Press the MENU 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 MENU key from the main menu
2) Press the ▲▼ to select Calibration
3) Press the ENTER key to enter Calibration
4) Press the ▲▼ to select Rh Sensor
5) Press the ENTER key to enter Rh Sensor
6) Press the ▲▼ to increase / decrease the Rh Sensor value (hold for scroll)
7) Press the ENTER key to save the Rh Sensor calibration value
8) Press the MENU key twice to return to the main menu

Calibrating the O_2 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 O_2 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 MENU key from the main menu
2) Press the ▲▼ to select Calibration
3) Press the ENTER key to enter Calibration
4) Press the ▲▼ to select O_2 Sensor
5) Press the ENTER key to enter O_2 Sensor
6) Open both the outer solid and inner glass doors
7) Press and hold the door switch while the calibration counts down for 60 seconds
8) Let go of door switch once the display shows 'Calibrating XX.X'
9) Wait until the display reads 'Calibrating 20.7'
10) Press ENTER to acknowledge the 'Sensor is Ready'
11) Press the MENU key twice to return to the main menu

Ambient reference calibration

The O_2 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 O_2 calibration reading to the expected O_2 level.

1) Press the sequence ▼ ▼ ENTER to access the factory configuration setup menu
2) Use the ▲▼ and ENTER to program ‘ 0 3 9 7 ‘ as the PIN number
3) Press the ▲▼ to select O_2 control
4) Press the ENTER key to enter O_2 control
5) Press the ▲▼ to select ‘Install’
6) Press the ENTER key to install O_2 control
7) Press the MENU 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 ENTER to acknowledge the ‘Sensor is Ready’
13) Press MENU to exit to the main display

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 CO_2 Alarm Level

The incubator has both a high and low programmable CO_2 alarm. The factory default for the high CO_2 alarm is 1.0% above CO_2 setpoint. The factory default for the low Temperature alarm is 1.0% below CO_2 setpoint. To change either alarm level:

1) Press the MENU key from the main menu
2) Press the ▲▼ to select Admin
3) Press the ENTER key to enter Admin
4) Press the ▲▼ to select High CO_2 Alarm / Low CO_2 Alarm
5) Press the ENTER key to enter High CO_2 Alarm / Low CO_2 Alarm
6) Press the ▲▼ to change alarm level
7) Press the ENTER key to save the alarm level
8) Press the MENU key twice to return to the main menu

Setting New CO_2 Tank (for unit without the optional gas backup switch system)

The CO_2 tank depletion reminder automatically calculates how much CO_2 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 CO_2 tank net weight and to set new CO_2 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 CO_2 Tank
5) Press the 

key to enter New CO_2 Tank
6) Press the  to change CO_2 tank net weight
7) Press the 

key to set new CO_2 tank
8) Press the 

key twice to return to the main menu

Setting High/Low O_2 Alarm Level (suppressed O_2 model 6404s only)

The incubator has both a high and low programmable O_2 alarm. The factory default for the high O_2 alarm is 1.0% above O_2 setpoint. The factory default for the low Temperature alarm is 1.0% below O_2 setpoint. To change either alarm level:

1) Press the MENU key from the main menu
2) Press the ▲▼ to select Admin
3) Press the ENTER key to enter Admin
4) Press the ▲▼ to select High O_2 Alarm / Low O_2 Alarm
5) Press the ENTER key to enter High O_2 Alarm / Low O_2 Alarm
6) Press the ▲▼ to change alarm level
7) Press the ENTER key to save the alarm level
8) Press the MENU 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 MENU key from the main menu
2) Press the ▲▼ to select Admin
3) Press the ENTER key to enter Admin
4) Press the ▲▼ to select Audible Alarm
5) Press the ENTER key to enter Audible Alarm
6) Press the ▲▼ to toggle between Disable / Enable
7) Press the ENTER key to save the Audible Alarm setting
8) Press the MENU 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 MENU key from the main menu
2) Press the ▲▼ to select Admin
3) Press the ENTER key to enter Admin
4) Press the ▲▼ to select Alarm Ring Back
5) Press the ENTER key to enter Alarm Ring Back
6) Press the ▲▼ to adjust the Alarm Ring Back Setting
7) Press the ENTER key to save the Alarm Ring Back setting
8) Press the MENU 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 / CO_2 / RH / O_2 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 CO_2 alarm. To enable/disable a temp / CO_2 / RH / O_2 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 CO_2 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

DATA LOGGING

The incubator is equipped with a built in data logging system. The data logger records time stamped records of temperature, CO_2, and humidity/O_2 (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 MENU key from the main menu
2) Press the ▲▼ to select Data Logging
3) Press the ENTER key to enter Data Logging
4) Press the ▲▼ to select Data Log Period
5) Press the ENTER key to enter Data Log Period
6) Press the ▲▼ to change the Data Log Period
7) Press the ENTER key to save the Data Log Period
8) Press the MENU key twice to return to the main menu

Reviewing Data Logs

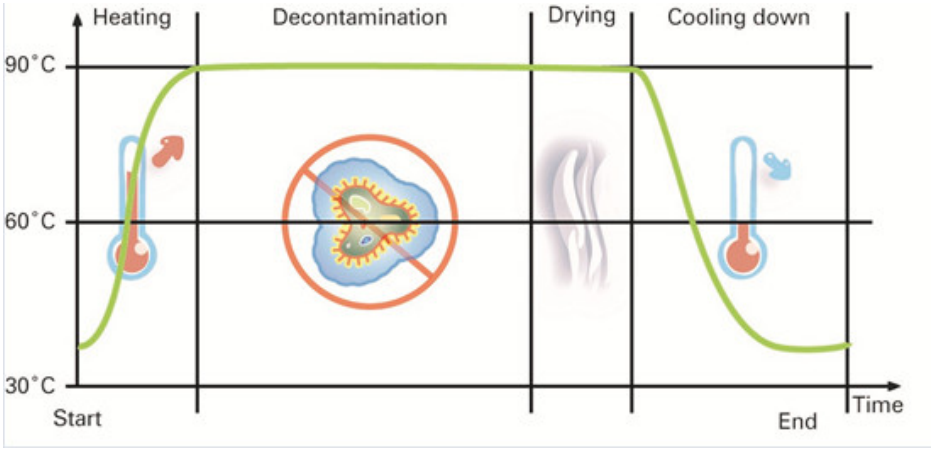
Time stamped data log information can be viewed on screen and the history scrolled through. To review the data logs of a particular parameter:

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

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:



<u>Before preparing unit for Decon Cycle turn power switch off. Removing sensors if power switch is not off, could result in sensor failure.</u>

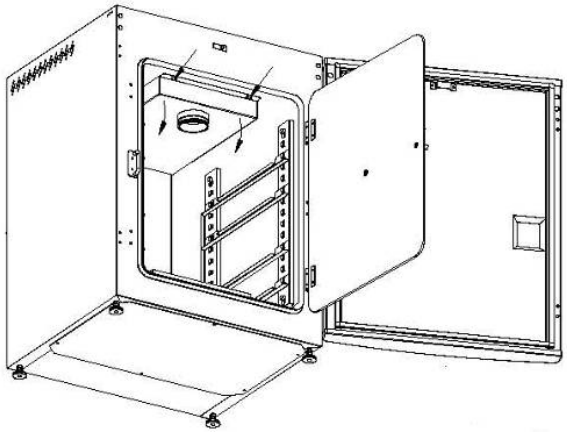
Failure to remove the IR CO_2 sensor or O_2 sensor (if equipped, Model 6404) during the moist heat decontamination cycle will damage the sensor(s).

<u>Remove all of the shelves from the unit.</u>

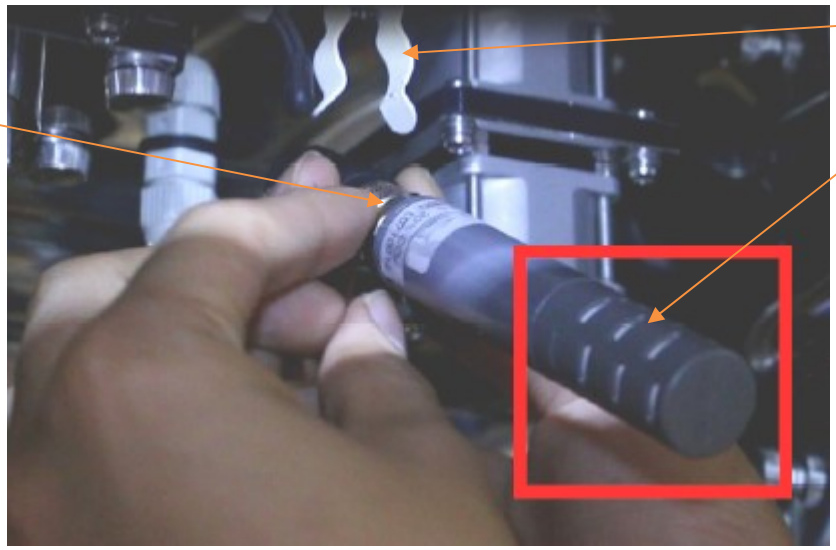
The first step of the cycle is to replace the water in the pan with 400 mL of water. This is the amount of water required to effectively create the moist heat decontamination environment.

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

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

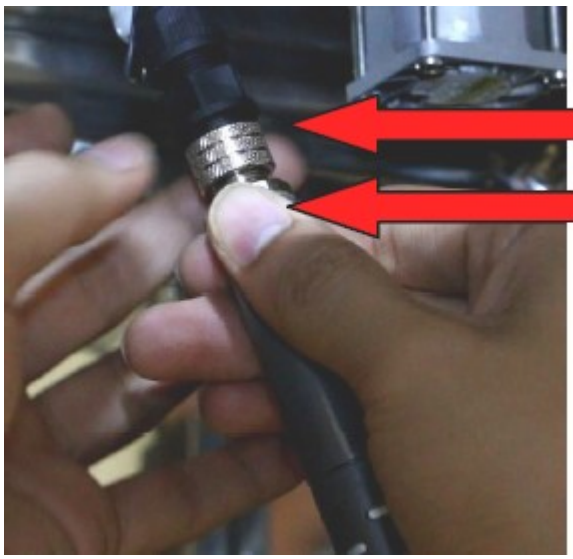


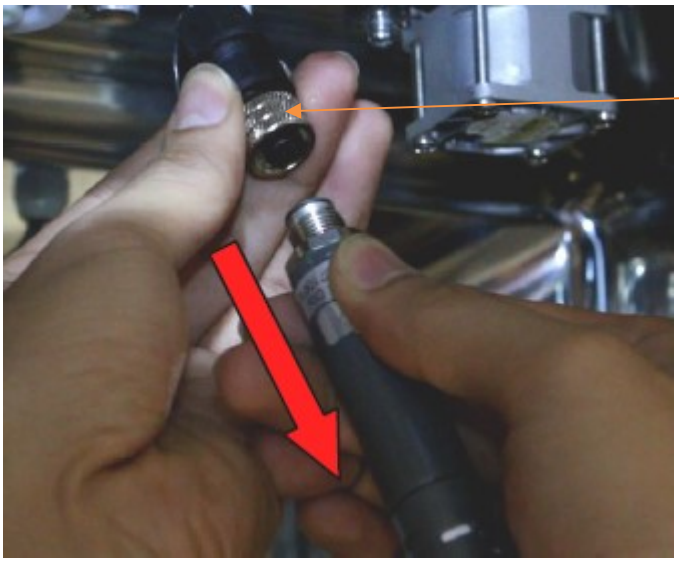
Remove IR CO_2 sensor assembly, grab the silver, knurled holder attached to the grey sensor and pull from retainer clip. Do not touch sensor tip area.



Do not touch the sensing area end of the CO_2 sensor, this could result in inaccurate readings or failure of the sensor.

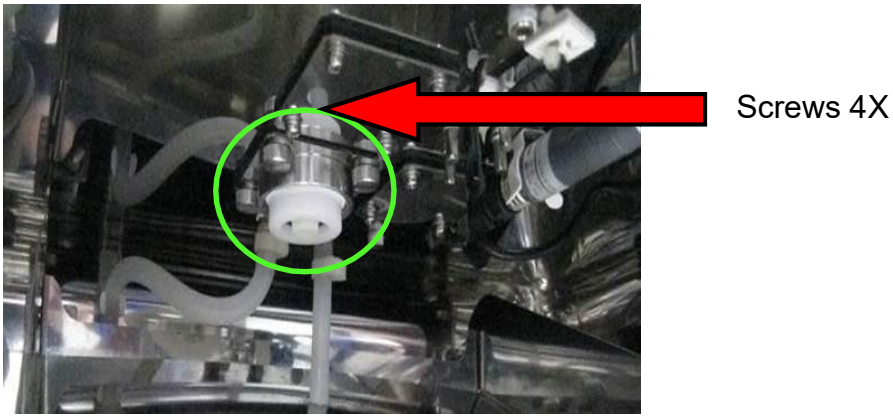
Disconnect the cable from the CO_2 sensor by rotating the connector counter clockwise and store the sensor in a safe place outside of the chamber until it can be replaced following the decon cycle.





New models have a different style of CO_2 sensor. The process to remove the CO_2 is the same for both styles of sensors.

If the incubator is equipped with an O_2 sensor (Model 6404) remove the four screws that hold the O_2 sensor in place.



Pull out O2 sensor gently (sensor as it appears when pulled from inside of incubator is circled in yellow below), as it is attached with a wiring harness internally. Then pull back black cover from O2 sensor (cover is item circled in green below.).

Disconnect the wiring by gently pulling the wiring harness from the small plastic rectangular, flat piece (item in blue square above). Black cover and wiring harness will get tucked back inside of incubator and can stay there during the decon cycle.

Replace O2 sensor with the blank sensor plate provided with the incubator, replace 4 screws

Replace the top air duct, install shelves, and close the inner and outer doors,

Turn power switch “ON”. To initiate the decon cycle press the DECON button on the control panel and follow the on screen prompts. (item circled in red below.).

When you are then prompted to remove the IR CO_2 and O2 sensor (model 6404) press ENTER button to advance to next prompt on screen.

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 CO_2 sensor reversing the process followed to remove it. Replace the O_2 sensor reversing the process followed to remove it. Press ENTER for the incubator to return to normal operation mode.

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
CO_2 SENSOR ERROR	Faulty CO_2 Sensor Detected	No Delay	Both	Yes	Display shows "---"; CO_2 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 CO_2 LEVEL	CO_2 reading greater than Overtemp Alarm	15 Minute Delay of Continuous High Reading	Both	Yes	CO_2 injection is disabled, display continues to show CO_2 reading
DOOR OPEN	Outer Door Open	Programmable 1-15 minutes	Both	Yes	CO_2 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 CO_2 LEVEL	CO_2 reading lower than Low CO_2 Alarm	Startup Delay** & 15 Minute Delay of Continuous Low Reading	Both	Yes	Display continues to show CO_2 reading
HIGH O_2 LEVEL	O_2 reading greater than High O_2 alarm	Startup Delay** & 15 Minute Delay of Continuous High Reading	Both	Yes	Display continues to show O_2 reading
LOW O_2 LEVEL	O_2 reading lower than Low O_2 Alarm	15 Minute Delay of Continuous Low Reading	Both	Yes	N2 injection is disabled, display continues to show O_2 reading
ALL CO_2 TANKS LOW (optional)	Optional Gas Guard indicates both CO_2 tanks are low	No Delay	Both	No	Display continues to show CO_2 reading
CO_2 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 CO_2 reading
CO_2 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 CO_2 reading
ALL N_2 TANKS LOW (optional)	Optional Gas Guard indicates both N_2 tanks are low	No Delay	Both	No	Display continues to show O_2 reading
N_2 TANK 1 LOW (optional)	Optional Gas Guard indicates N_2 tank 1 has low pressure	15 Minute Delay of Continuous Low Reading	Both	No	Solenoid switches to tank 2 inlet. Display continues to show O_2 reading
N_2 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 O_2 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.

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.

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 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 customer service department for details or visit us on the web at www.caronproducts.com.

Recommended Daily Maintenance Checks

- Check the Temperature and CO_2 displays versus set-points.
- Check for and correct any alarm condition.
- Check the CO_2 and N_2 gas tank levels
- Check the water level in the humidity pan

Recommended Annual Maintenance Checks

- Replace inline HEPA filters on both CO_2 and N_2 gas supplies
- Replace O_2 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 CO_2, and O_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.

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

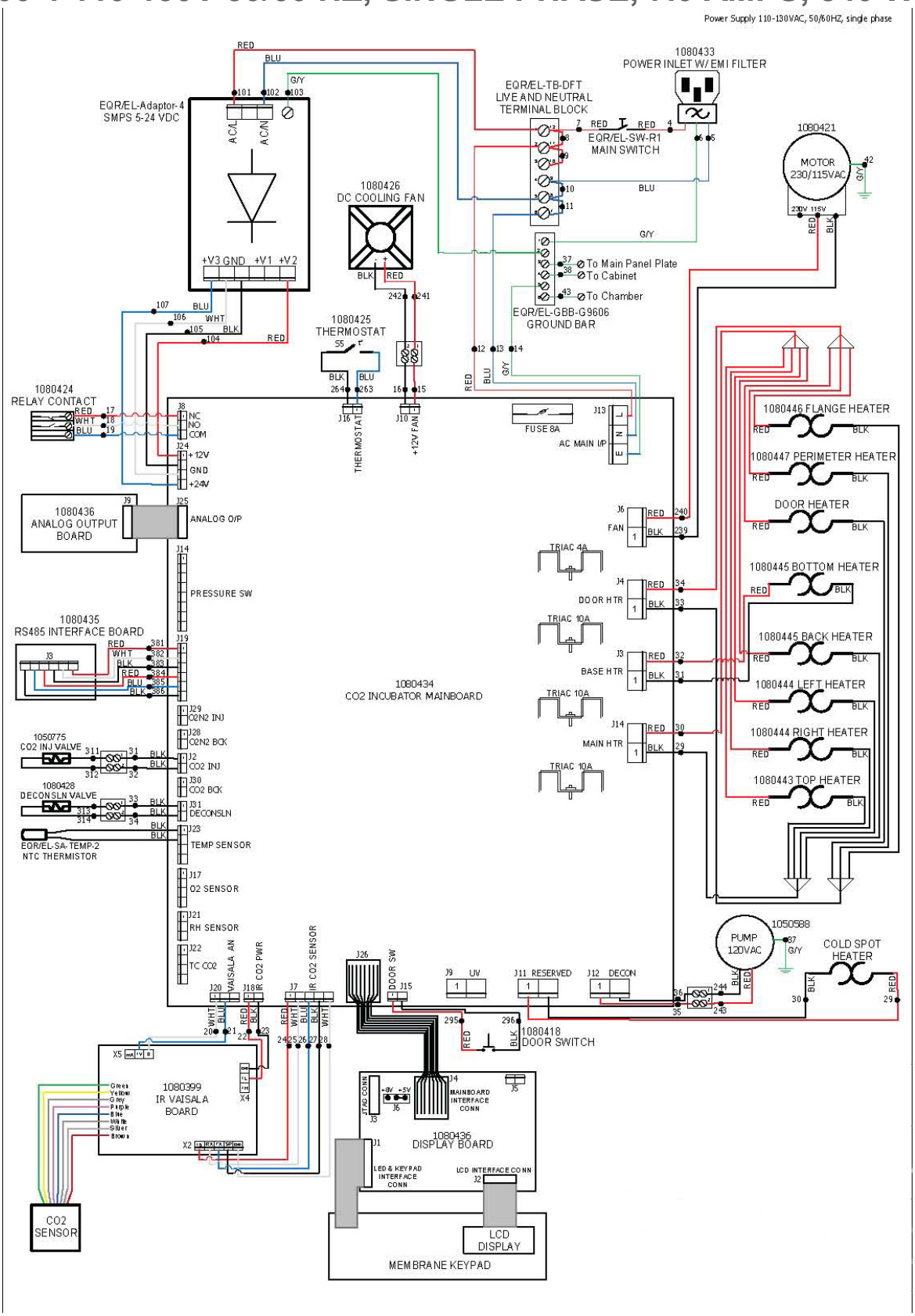
Model	PM Kit
6400	PM-6400
6404	PM-6404

Accessory	PM Kit
6404	PM-SENS301

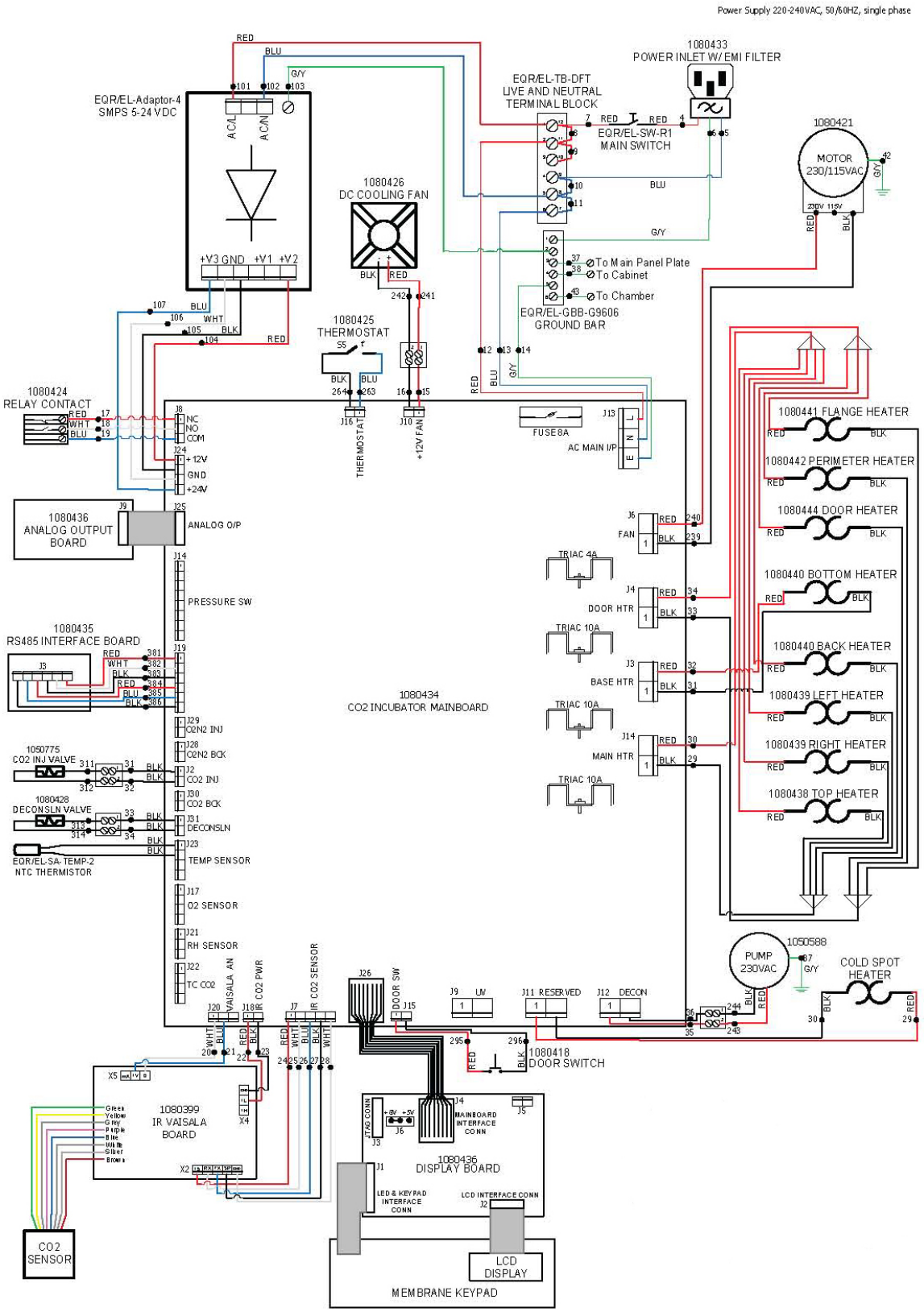
SPECIFICATIONS

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.		

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



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



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

CE

Declare that the product:

Equipment: Forced Convection CO_2 Incubator
Model: 6400 Oasis CO_2 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

David N. Figel

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