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

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<td>H</td>
<td>01-05-16</td>
<td>N₂ Sparger info added</td>
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<tr>
<td>J</td>
<td>08-01-17</td>
<td>Updated consistency between all manuals</td>
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<td>K</td>
<td>07-23-18</td>
<td>Added O₂ removal procedure</td>
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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.

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Ohio Law governs this warranty.

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.
EQUIPMENT OVERVIEW – CONTINUED

INCUBATOR CONTROL PANEL

- **Silence Key** – Press to Silence audible alarm
- **Alarm Indicator** – Illuminates on and off during an alarm condition
- **Heat Indicator** – Illuminates when any system heater is on
- **Inject Indicator** – Illuminates when gas is being injected
- **Temperature / Humidity Display**
- **CO₂ / O₂ Display**
- **CO₂ / O₂ Display**
- **Message Center** – Displays incubator setpoints and any alarm conditions
- **Menu Select** – Allows user to select programming menu
- **Enter** – Allows user to enter any adjusted system variable
- **Allows user to adjust system variables up and down**
- **Active Indicator** – Illuminates when incubator is in Decon Cycle
- **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 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.
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.

![Image of Installer with Port Stopper]

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 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 N\textsubscript{2} supply (for suppressed O\textsubscript{2} 6404 models)**

![Warning symbol]

Low levels of oxygen can cause suffocation. The use of O\textsubscript{2} monitors and alarms is recommended for areas where N\textsubscript{2} is used to suppress oxygen.

![Warning symbol]

The N\textsubscript{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\textsubscript{2} supply should be 99.5% and not have siphon tubes. Regulate N\textsubscript{2} pressure to 15 psi. N\textsubscript{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\textsubscript{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 N₂ sparger will need to be connected into the water pan as shown below.

![Image of water pan with N₂ sparger](image)

**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 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. Each of the inlets should be connected to an individual gas tank as described above in the Connecting a CO₂ Supply section.

Connecting the Stand Alone Gas Guard

Accessory GASG201 Stand Alone Gas Guard from CARON is designed to allow two tanks of either CO₂ or N₂ 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

<table>
<thead>
<tr>
<th></th>
<th>Controller Value</th>
<th>Output 0-5V</th>
<th>Output 4-20mA</th>
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<tr>
<td>Temperature Low</td>
<td>0 degrees C</td>
<td>0.0 VDC</td>
<td>4 mA</td>
</tr>
<tr>
<td>Temperature High</td>
<td>100 degrees C</td>
<td>5.0 VDC</td>
<td>20 mA</td>
</tr>
<tr>
<td>CO₂ Low</td>
<td>0.0% CO₂</td>
<td>0.0 VDC</td>
<td>4 mA</td>
</tr>
<tr>
<td>CO₂ High</td>
<td>20.0% CO₂</td>
<td>5.0 VDC</td>
<td>20 mA</td>
</tr>
<tr>
<td>Humidity Low</td>
<td>0% rH</td>
<td>0.0 VDC</td>
<td>4 mA</td>
</tr>
<tr>
<td>Humidity High</td>
<td>100% rH</td>
<td>5.0 VDC</td>
<td>20 mA</td>
</tr>
<tr>
<td>O₂ Low</td>
<td>0.0% O₂</td>
<td>0.0 VDC</td>
<td>4 mA</td>
</tr>
<tr>
<td>O₂ High</td>
<td>20.7% O₂</td>
<td>5.0 VDC</td>
<td>20 mA</td>
</tr>
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</table>
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
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 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 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 CO\textsubscript{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 key from the main menu
2) Press the to select Calibration
3) Press the key to enter Calibration
4) Press the to select CO\textsubscript{2} Sensor
5) Press the key to enter CO\textsubscript{2} Sensor
6) Press the to increase / decrease the CO\textsubscript{2} Sensor value (hold for scroll)
7) Press the key to save the CO\textsubscript{2} 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) 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 to acknowledge the ‘Sensor is Ready’
11) 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 ▼ 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
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 Temperature 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 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 key from the main menu

2) Press the to select Admin

3) Press the key to enter Admin

4) Press the to select High O$_2$ Alarm / Low O$_2$ Alarm

5) Press the key to enter High O$_2$ Alarm / Low O$_2$ 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
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 "Setup" key to enter Data Logging
4) Press the "" to select Data Log Period
5) Press the "Setup" key to enter Data Log Period
6) Press the "" to change the Data Log Period
7) Press the "Setup" 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 down arrow to select Data Logging
3) Press the enter key to enter Data Logging
4) Press the up arrow to select Parameter that you want to view
5) Press the enter key to enter view the data logs
6) Press the down arrow 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:

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

Failure to remove the IR CO₂ sensor or O₂ sensor (if equipped, Model 6404) during the moist heat decontamination cycle will damage the sensor(s).

Remove all of the shelves from the unit.

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 CO₂ 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 CO₂ sensor, this could result in inaccurate readings or failure of the sensor.
Disconnect the cable from the CO₂ 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 CO₂ sensor. The process to remove the CO₂ is the same for both styles of sensors.
If the incubator is equipped with an O₂ sensor (Model 6404) remove the four screws that hold the O₂ 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.).

![Control Panel Image]

When you are then prompted to remove the IR CO₂ 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 CO₂ 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.
**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:

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

* 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 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](http://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.

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

<table>
<thead>
<tr>
<th>Model</th>
<th>PM Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>6400</td>
<td>PM-6400</td>
</tr>
<tr>
<td>6404</td>
<td>PM-6401</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessory</th>
<th>PM Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>6404</td>
<td>PM-SENS301</td>
</tr>
</tbody>
</table>
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>6400-1</th>
<th>6400-4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature Range</strong></td>
<td>5°C above ambient to 60°C</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature Control</strong></td>
<td>±0.1°C at 37°C</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature Uniformity</strong></td>
<td>±0.3°C at 37°C</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature Sensor</strong></td>
<td>Precision Thermistor</td>
<td></td>
</tr>
<tr>
<td><strong>Humidity Range</strong></td>
<td>Elevated up to 95% @ 37°C</td>
<td></td>
</tr>
<tr>
<td><strong>CO₂ Range</strong></td>
<td>0-20% CO₂</td>
<td></td>
</tr>
<tr>
<td><strong>CO₂ Control</strong></td>
<td>±0.1% CO₂</td>
<td></td>
</tr>
<tr>
<td><strong>CO₂ Sensor</strong></td>
<td>Infrared CO₂ Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>O₂ Range</strong></td>
<td>20-1% O₂</td>
<td></td>
</tr>
<tr>
<td><strong>O₂ Control</strong></td>
<td>±0.1% O₂</td>
<td></td>
</tr>
<tr>
<td><strong>O₂ Sensor</strong></td>
<td>Fuel Cell</td>
<td></td>
</tr>
<tr>
<td><strong>Interior Dimensions</strong></td>
<td>20”W x 21”D x 25”H (50.8 cm x 53.3 cm x 63.5 cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Interior Construction</strong></td>
<td>Polished Stainless Steel</td>
<td></td>
</tr>
<tr>
<td><strong>Exterior Dimensions</strong></td>
<td>26”W x 26”D* x 36”H (66 cm x 66 cm x 91.4 cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Exterior Construction</strong></td>
<td>Powder Coated Cold Rolled Steel</td>
<td></td>
</tr>
<tr>
<td><strong>Work Space</strong></td>
<td>6 cu. ft. (170 liters)</td>
<td></td>
</tr>
<tr>
<td><strong># of Shelves</strong></td>
<td>4 Standard; 13 Maximum</td>
<td></td>
</tr>
<tr>
<td><strong>Shelf Construction</strong></td>
<td>Perforated Stainless Steel</td>
<td></td>
</tr>
<tr>
<td><strong>Shelf Dimensions</strong></td>
<td>18.5” x 18.3” (47 cm x 46.5 cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td>110-130 VAC, 50/60 HZ, Single Phase, 840 Watts</td>
<td>220-240 VAC, 50/60 HZ, Single Phase, 785 Watts</td>
</tr>
<tr>
<td><strong>Shipping Weight</strong></td>
<td>264 lbs. (120 kg.)</td>
<td></td>
</tr>
</tbody>
</table>

Specifications are subject to change without notice. *Add 2.75” for handle.*
ELECTRICAL SCHEMATICS
6400-4 220-240 VAC, 50/60 HZ, SINGLE PHASE, 3.4 A, 785 WATTS
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


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

- Low Voltage: EN 61010 (2001)

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