LARGE CAPACITY CO_2 INCUBATORS

SHEL LAB®

110 – 120 Volts

Installation - Operation Manual

SCO58 SCO40 SCO31

These models require a NEMA 5-20R wall power receptacle to plug into.

Pictured on the front cover left to right: SCO58, SCO40, SCO31

Warning: This product contains chemicals, including triglycidyl isocyanurate, known to the State of California to cause cancer as well as birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

¡Advertencia! Este producto contiene sustancias químicas, incluido el triglicidil isocianurato, que el estado de California sabe que causa cáncer, así como defectos de nacimiento u otros daños reproductivos. Para obtener más información, visite www.P65Warnings.ca.gov.

Avertissement! Ce produit peut vous exposer à des produits chimiques, dont l'isocyanurate de triglycidyle, reconnu par l'État de Californie pour provoquer le cancer, des anomalies congénitales ou d'autres problèmes de reproduction. Pour plus d'informations, visitez le site www.P65Warnings.ca.gov

CO_2 INCUBATORS, LARGE CAPACITY

110 – 120 Voltage

Part Number (Manual): 4861710

Revision: April 27, 2020

SHEL LAB is a brand of Sheldon Manufacturing, INC, an ISO 9001 certified manufacturer.

Safety Certifications

These units are CUE listed by TÜV SÜD as CO_2 incubators for professional, industrial, or educational use where the preparation or testing of materials is done at an ambient air pressure range of 22.14 – 31.3 inHg (75 – 106 kPa) and no flammable, volatile, or combustible materials are being heated.

These units have been tested to the following requirements:

CAN/CSA C22.2 No. 61010-1:2012
CAN/CSA C22.2 No. 61010-2-010:2015
UL 61010-1:2012
UL 61010A-2-010:2015
EN 61010-1:2010
EN 61010-2-010:2014

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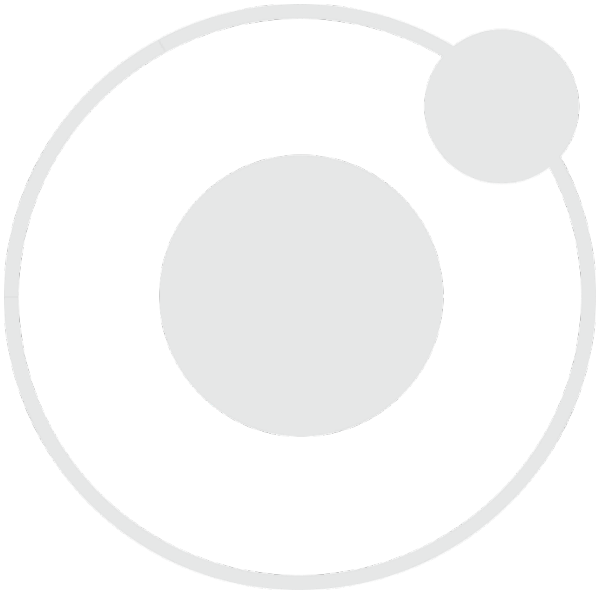


INTRODUCTION

Thank you for purchasing a SHEL LAB product. We know you have many choices in today's competitive marketplace when it comes to constant temperature equipment. We appreciate you choosing ours. We stand behind our products and will be here for you if you need us.

READ THIS MANUAL

Failure to follow the guidelines and instructions in this user manual may create a protection impairment by disabling or interfering with the unit safety features. This can result in injury or death.

Before using the unit, read the manual in its entirety to understand how to install, operate, and maintain the unit in a safe manner. Keep this manual available for use by all operators. Ensure all operators are given appropriate training before the unit begins service.

SAFETY CONSIDERATIONS AND REQUIREMENTS

Follow basic safety precautions, including all national laws, regulations, and local ordinances in your area regarding the use of this unit. If you have any questions about local requirements, please contact the appropriate agencies.

SOPs

Because of the range of potential applications, this unit can be used for, the operator or their supervisors must draw up a site-specific standard operating procedure (SOP) covering each application and associated safety guidelines. This SOP must be written and available to all operators in a language they understand.

Intended Applications and Locations

The incubators are intended for constant temperature, CO_2-enriched, non-humidified general incubation applications in professional, industrial, and educational environments. The units are not intended for use at hazardous or household locations.

Power

Your unit and its recommended accessories are designed and tested to meet strict safety requirements.

- The unit is designed to connect to a power source using the specific power cord type shipped with the unit.
- Always plug the unit power cord into a protective earth grounded electrical outlet conforming to national and local electrical codes. If the unit is not grounded properly, parts such as knobs and controls can conduct electricity and cause serious injury.
- Do not bend the power cord excessively, step on it, or place heavy objects on it.
- A damaged cord can be a shock or fire hazard. Never use a power cord if it is damaged or altered in any way.
- Use only approved accessories. Do not modify system components. Any alterations or modifications to your unit can be dangerous and void your warranty.

CONTACTING ASSISTANCE

Phone hours for Sheldon Customer Support are 6 am – 4:30 pm Pacific Coast Time (west coast of the United States, UTC -8). Please have the following information ready when calling or emailing Customer Support: the **model number** and the **serial number** (see page 15).

support@sheldonmfg.com
1-800-322-4897 extension 4
(503) 640-3000 extension 4
FAX: (503) 640-1366

Sheldon Manufacturing, INC.
P.O. Box 627
Cornelius, OR 97113
USA

ENGINEERING IMPROVEMENTS

Sheldon Manufacturing continually improves all of its products. As a result, engineering changes and improvements are made from time to time. Therefore, some changes, modifications, and improvements may not be covered in this manual. If your unit's operating characteristics or appearance differs from those described in this manual, please contact your SHEL LAB dealer or customer service representative for assistance.

Note: A CO_2 gas regulator must be purchased separately from the incubator.

CO_2 Gas Supply

Supply Required!

The incubator must be connected to a carbon dioxide gas supply system to establish and maintain a CO_2-enriched incubation chamber atmosphere. The supply can be a building CO_2 gas system or a supply cylinder (tank).

Supply Quality

Use medical or food-grade CO_2. The use of industrial CO_2 risks introducing contaminants into the chamber, may damage the incubator, and is not covered by the manufacturing defect warranty.

Supply Source and Pressure

The incubator requires 15 – 20 psi of CO_2 gas pressure at the incubator intake port (labeled CO_2 to Chamber).

Dual Stage Regulator

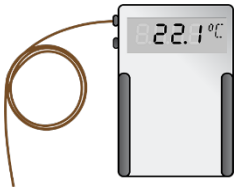
If connecting to a supply cylinder, **always use a two-stage CO_2 pressure regulator**. During normal operations, the incubator uses only small quantities of CO_2 to maintain the chamber gas concentration, and precise regulation of the gas input flow is vital for the incubator performance. Some single-stage regulators have two gauges. Make certain your regulator is a two-stage regulator.

Regulator Not Included

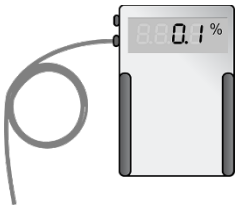
See page 55 for ordering information.

Reference Sensor Devices

Must be purchased separately



Temperature Reference



CO_2 Reference

Reference sensor devices or a combined device are required for calibrating the incubator temperature and CO_2 displays.

Reference devices must meet the following standards:

- Accurate to at least 0.1°C
- Accurate to at least 0.1% CO_2

The devices should be regularly calibrated, preferably by a third party.

Temperature Probes

For temperature, use a digital device with wire thermocouple probes that can be introduced into the incubation chamber through the unit access port. Select thermocouples suitable for the application temperature you will be calibrating at.

CO_2 Sampling

For best CO_2 accuracy, use a digital gas analyzer with sample tubing connecting to the incubator CO_2 sample port. The barbed adapter gas fitting on the port connects to **3/16-inch (4.76mm)** inner diameter (ID), 5/16-inch (7.94mm) outside diameter (OD) tubing.

Why Probes and Tubing?

Reference readings taken outside the chamber using wire temperature probes and CO_2 drawn through the sample port avoid chamber door openings. Openings disrupt the chamber temperature and CO_2 concentration level. Each disruption requires **a minimum 1-hour wait** to allow the atmosphere to re-stabilize before continuing.

No Alcohol or Mercury Thermometers

Alcohol thermometers do not have sufficient accuracy to conduct accurate temperature calibrations. **Never place a mercury thermometer in the incubation chamber!** Always use thermocouple probes.

RECEIVING YOUR UNIT

INSPECT THE SHIPMENT

- When a unit leaves the factory, **safe delivery becomes the responsibility of the carrier.**
- **Damage sustained during transit is not covered by the manufacturing defect warranty.**
- Save the shipping carton until you are certain that the unit and its accessories function properly.

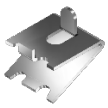
When you receive your unit, inspect it for concealed loss or damage to its interior and exterior. If you find any damage to the unit**, follow the carrier's procedure for claiming damage or loss**.

1. Carefully inspect the shipping carton for damage.
2. Report any damage to the carrier service that delivered the unit.
3. If the carton is not damaged, open the carton and remove the contents.
4. Inspect the unit for signs of damage. See the orientation depiction on the next page as a reference.
5. The unit should come with an Installation and Operation Manual.
6. Verify that the correct number of accessory items have been included.

Included Accessories

Model	Leveling Foot	CO_2 Tubing Kit	Shelves*	Shelf Clips	Power Cord
SCO58	4	1	6	36	1
SCO40	4	1	6	24	1
SCO31	4	1	6	24	1



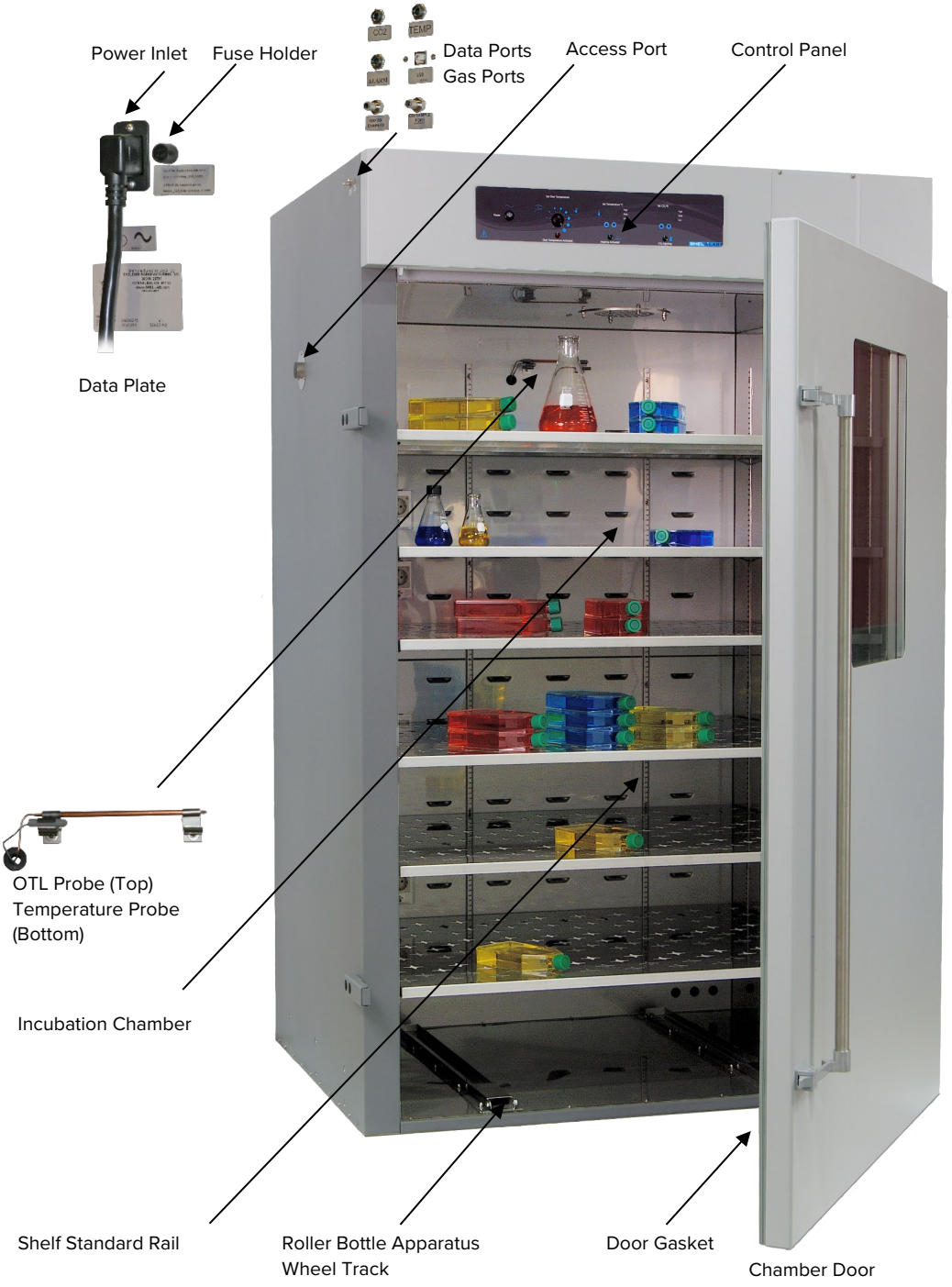

**Shelf size and configuration varies by unit model.*

7. A rubber stopper should come installed in the access port on the left side of the unit. Verify the presence of the stopper.

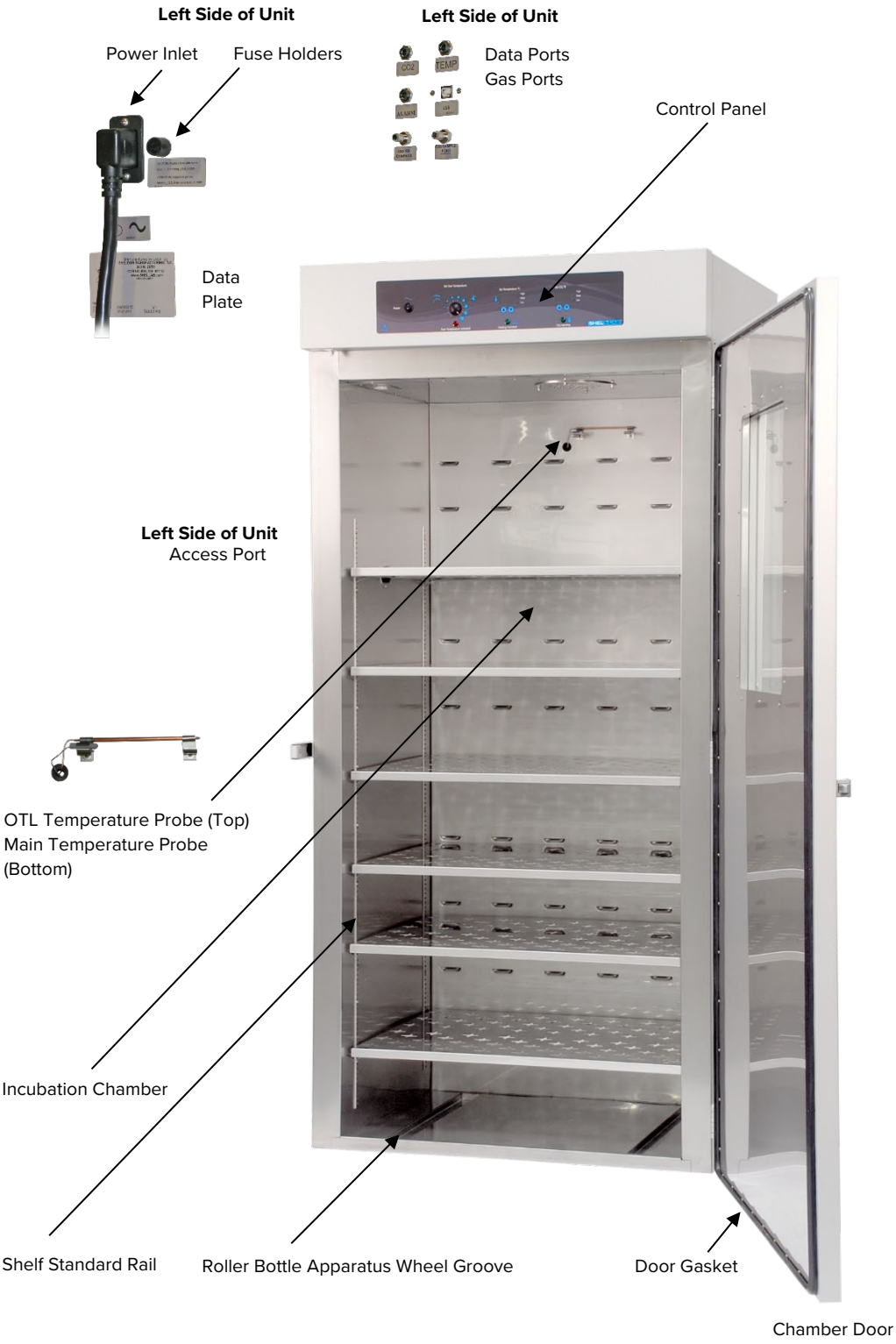
8. Carefully check all packaging for accessory items before discarding.

ORIENTATION PHOTOS

SCO58



SCO40



SHEL LAB®

SCO31


Power Inlet
Fuse Holder
Data Ports
Gas Ports
Control Panel
Access Port
OTL Temperature Probe (Top)
Controller Temperature Probe (Bottom)
Incubation Chamber
Roller Bottle Apparatus Wheel Groove
Door Gasket
Chamber Door

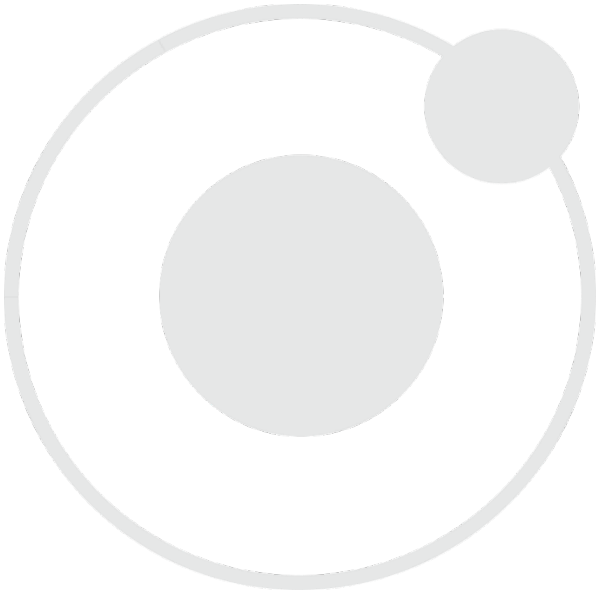
RECORDING DATA PLATE INFORMATION

The data plate contains the unit **model number** and **serial number**. Customer Support will need this information during any support call. Record it below for future reference.

- The data plate is located on the left exterior wall of the incubator, toward the back and just above the power cord inlet.

Model Number	
Serial Number	

RECEIVING YOUR UNIT



INSTALLATION CHECKLIST

For installing the incubator in a new workspace location

Pre-Installation

- ✓ Check that the required ambient conditions and ventilation spacing for the incubator are met, page 18.
  - Unit dimensions may be found on page 53.
- ✓ Check that a suitable electrical outlet and power supply is present, page 19.
- ✓ Procure a CO_2 gas supply for the incubator. See page 9.

Install the Incubator in a suitable location

- ✓ Review the lifting and handling instructions, page 20.
- ✓ Install the incubator in its workspace location, page 20.
- ✓ Make sure the incubator is level, page 20.

Set up the Incubator for use

- ✓ Clean and disinfect the incubator and shelving accessories that will be placed in the incubation chamber, page 21.
- ✓ Install the shelving in the incubation chamber, page 21.
- ✓ Connect the incubator to the CO_2 gas supply source, page 22.
- ✓ Verify that the rubber stopper is installed in the access port inside the incubation chamber, page 23.

Required Ambient Conditions

These units are built for use indoors, at room temperatures between **15°C and 30°C (59°F and 86°F)**, at no greater than **80% Relative Humidity** (at 25°C / 77°F). The ambient temperature should not change by 2°C (3.6°F) or more during operation.

Operating outside these conditions may affect the incubator temperature performance.

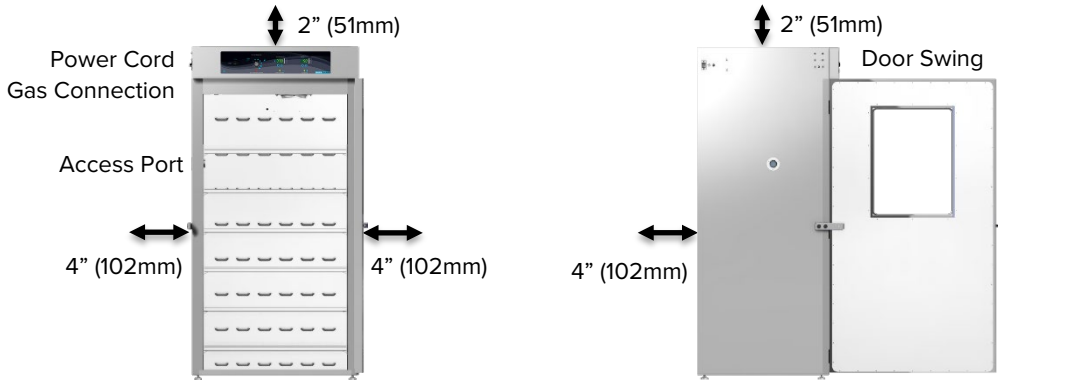
When selecting a location to install the unit, consider all environmental conditions that can adversely impact its temperature performance. These include:

- Proximity to ovens, autoclaves, or any other device producing significant radiant heat
- Heating and cooling vents or other sources of fast-moving air currents
- High-traffic areas
- Direct sunlight

conditions may adversely affect its incubator temperature stability and effective operating range.

Required Clearances

These clearances are required to provide air flows sufficient for ventilation and cooling.



SCO31 38” (966mm)
SCO40 41” (1042mm)
SCO58 49” (1245mm)

4 inches (102mm) of clearance is required on the sides and back.

2 inches (51mm) of headspace clearance between the top of the unit and any overhead partitions.

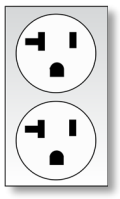
POWER SOURCE REQUIREMENTS

When selecting a location for the unit, verify each of the following requirements is satisfied.

Power Source

The power source for the unit must match the voltage and match or exceed the amperage requirements listed on the unit data plate. These units are intended for **110 - 120V 50/60 Hz** applications at the following amperages:

SCO31	SCO40	SCO58
14.5 Amps	15.0 Amps	15.0 Amps



NEMA 5-20R wall socket

- **Supplied voltage must not vary more than 10% from the data plate rating**. Damage to the unit may result if the supplied voltage varies more than 10%.
- The wall power source must be protective earth grounded.
- Use a separate circuit to prevent loss of the unit due to overloading or circuit failure.
- **The recommended wall circuit breakers for these units are 15 amps.**
- The wall power source must conform to all national and local electrical codes.

Power Cord

The unit must be positioned so that all users can quickly unplug the cord in the event of an emergency.

- Each unit comes provided with a **125 volt, 15 Amp, 8.2ft (2.5m) NEMA 5-20P** power cord.
- Always use this cord or an identical replacement.

Fuses

These units ship with a fuse installed in a fuse holder next to the power cord inlet.

- The fuse must be installed and intact for the unit to operate.
- Always find and fix the cause of a blown fuse before putting the unit back into operation.
- Fuse type
    - 250V, T20, 5X20mm

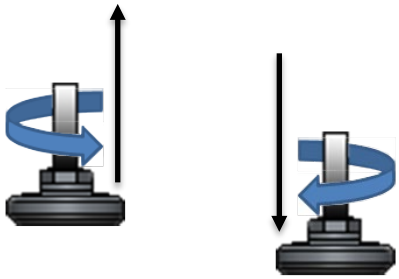
LIFTING AND HANDLING

The unit is heavy. Use appropriate lifting devices that are sufficiently rated for these loads. Follow these guidelines when lifting the unit.

- Lift the unit only from its bottom surface.
- Doors, handles, and knobs are not adequate for lifting or stabilization.
- Restrain the unit completely while lifting or transporting so it cannot tip.
- Remove all moving parts, such as shelves and trays, and lock doors in the closed position during transfers to prevent shifting and damage.

LEVELING

Install the leveling feet in the 4 corner holes on the bottom of the unit. The unit must be level and stable for safe operation.



Note: To prevent damage when moving the unit, turn all 4 leveling feet so that the leg of each foot sits inside the unit.

INSTALL THE INCUBATOR

Install the unit in a workspace location that meets the criteria discussed in the previous entries of the Installation section.

DEIONIZED AND DISTILLED WATER

Do not use deionized water to clean or humidify the incubator. The use of deionized water may corrode metal surfaces and voids the warranty. The manufacturer recommends the use of distilled water in the resistance range of 50K Ohm/cm to 1M Ohm/cm, or a conductivity range of 20.0 uS/cm to 1.0 uS/cm, for cleaning and humidifying applications.

INSTALLATION CLEANING

Cleaning and disinfecting the incubation chamber and shelving components now reduces the risk of contamination. The chamber and shelving were cleaned and disinfected at the factory, however, the unit may have been exposed to contaminants during shipping.

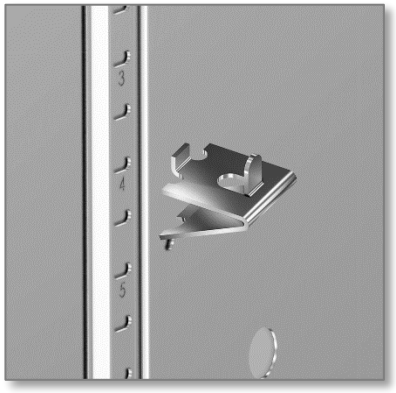
- Remove all protective wrappings from shelving components before cleaning.
- See the **Cleaning and Disinfecting** entry on page 41 for information on how to clean and disinfect without damaging the incubator or its components.

SHELVING INSTALLATION

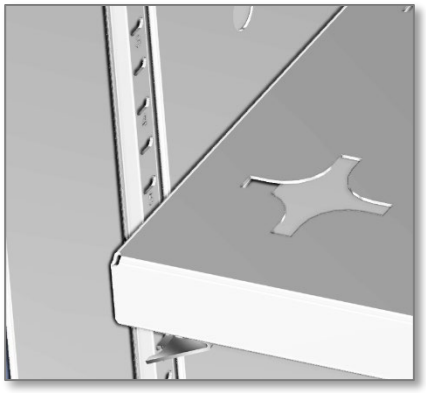
Note: For ease of installation, two people should lift and install each shelf in the SCO58 Incubator.

Shelves should be installed evenly spaced in the incubation chamber to obtain the best temperature uniformity.

1. Squeeze each shelf clip when installing. Insert the top tab first into shelf mounting standard, and then the bottom tab using a rocking motion.
    a. **SCO58**, install 6 clips for each shelf. 2 each on the left, right, and back walls of the incubation chamber.
    b. **SCO40, SCO31**, install 4 clips for each shelf. 2 on the left wall and two on the right wall of the incubation chamber.
2. Place the shelf on the clips with the shelf front facing the chamber door.



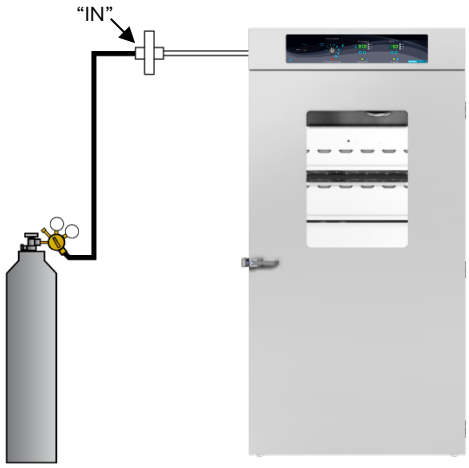
Installing Shelf Clips



Shelf Placed

Note: See page 9 for CO_2 supply requirements.

CONNECT TO THE CO_2 SUPPLY



CO_2 to Chamber
Connects to 3/16" (4.76mm) ID Tubing

1. Connect the gas tubing kit included with the incubator to the supply source and incubator.
    a. Connect the black tubing to the regulator or wall source.
    b. Connect the clear tubing to the "**CO_2 to Chamber**" port.

    The inline HEPA filter in the tubing kit helps protect your samples and the incubator from potential contaminants in the gas supply.
2. Do not initiate a flow of CO_2 to the incubator at this time.

The building supply system or cylinder regulator must deliver 15 – 20 psi flow pressure to the incubator.

- **Never exceed 20 psi** of delivery to the incubator at the CO_2 to Chamber in port!

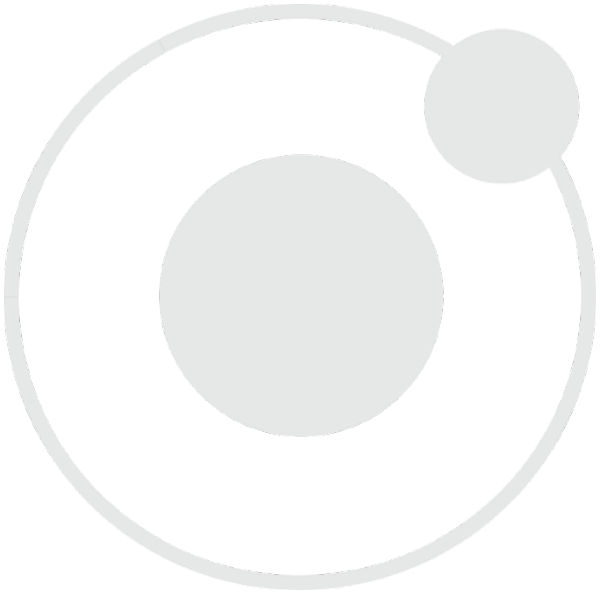
PSI	Megapascals	Kilopascals	Bar
15 – 20 psi	0.103 – 0.137 Mpa	103.42 – 137.89 Kpa	1.03 – 1.378 bar

End of procedure

Access Port Stopper

Each incubator ships with a rubber stopper installed in the access port located on the left side of the incubation chamber.

- The stopper should always be **installed inside the chamber** to obtain the best temperature uniformity and prevent condensation from forming inside the port.
    - Do not install the stopper on the outside of the incubator!
- Wires for thermocouples and other sensor probes may be introduced into the chamber through the access port. The stopper may be put in place over the wires.
- The unit will not meet its temperature or CO_2 specifications without the stopper installed.

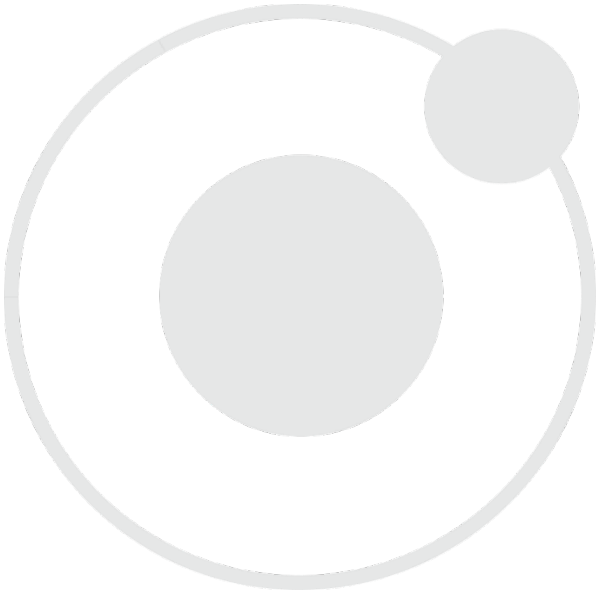


GRAPHIC SYMBOLS

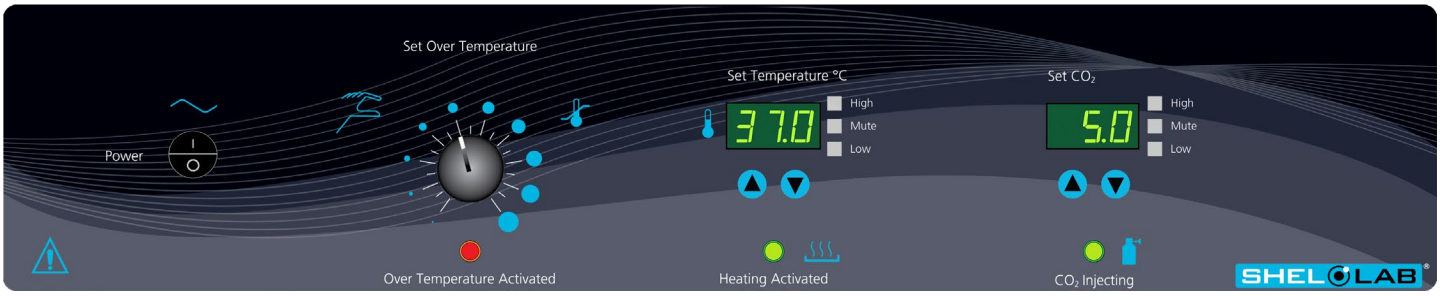
The unit is provided with graphic symbols on its exterior. These identify hazards and adjustable components as well as important notes in the user manual.

Symbol	Definition
	Consult the user manual. Consulter le manuel d'utilisation
	Temperature display Indique l'affichage de la température
	Over Temperature Limit system Thermostat température limite contrôle haute
	AC Power Repère le courant alternatif
	I/ON O/OFF I indique que l'interrupteur est en position marche. O indique que le commutateur est en position d'arrêt.
	Protective earth ground Terre électrique
	Adjusts UP and DOWN Ajuster le haut et vers le bas
	Manually adjustable Indique un réglage manuel
	Potential shock hazard Risque de choc électrique
	Recycle the unit. Do not dispose of in a landfill. Reycle l'unité. Ne jetez pas dans une décharge
	Indicates CO_2 Gas Indique gaz CO2

GRAPHIC SYMBOLS



CONTROL PANEL OVERVIEW



Control Panel

Power Switch

Power is supplied when the switch is in the (I) on position.

Set Over Temperature

This graduated dial sets the Over Temperature Limit system heating cut off point. The OTL system helps prevents unchecked heating of the incubation chamber in the event the main temperature control system fails. For more details, please see the **Over Temperature Limit System** description on page 30.

The red Over Temp Activated light illuminates when the Over Temperature Limit system cuts off heating to the incubation chamber by rerouting power away from the heating elements.

Temperature Control and Display

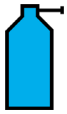
During normal operations, the Set Temperature display shows the current incubation chamber air temperature, accurate to 0.1°C. The Up and Down buttons are used to change display modes and then input either a new temperature setpoint or a calibration adjustment. The display blinks continually while in its setpoint or calibration adjustment modes, preceded by an “SP” for Setpoint or “C O” for calibration offset.

Red LED alarm indicators marked High and Low illuminate whenever the temperature deviates by ±1°C or greater from the current setpoint. The yellow LED marked Mute illuminates whenever an audible deviation alarm is being muted. See the **Muting the Audible Temperature Alarm** entry on page 34 for more information.

The green indicator labeled Heating Activated illuminates whenever the temperature control system is heating the incubation chamber.

SHELLAB®

CO_2 Display



Labeled Set CO_2, this display shows the concentration of CO_2 as a percentage of the incubation chamber atmosphere. The display has a range of OFF (0%) to 20% and an accuracy of 0.1%. The display shows “LO” until the CO_2 sensor registers a concentration in the chamber greater than 0%. A few minutes of CO_2 injections may be required when initially starting the unit.

The Up and Down buttons are used to change display modes and then input either a new gas concentration setpoint or a calibration adjustment. The display blinks continually while in its setpoint or calibration adjustment modes, preceded by an “SP” for Setpoint or “C O” for calibration offset.

Red LED alarm indicators marked High and Low illuminate whenever CO_2 deviations of ±1% or greater from the setpoint take place. The yellow LED marked Mute illuminates whenever an audible deviation alarm is being muted. See the **Muting the Audible CO_2 Alarm** entry on page 36 for more information.

Marked CO_2 Injecting, this green indicator illuminates while the incubator is injecting CO_2 into the incubation chamber. Injections are accompanied by a clicking sound that is the CO_2 solenoid opening and closing.

THEORY OF OPERATION

SCO incubators are engineered to provide constant temperature, CO_2-enriched incubation environments. The standard version of these units features a window in the incubation chamber door to allow visual inspections of samples without compromising the chamber CO_2 or temperature environment.

Heating

When powered, the incubator heats to and maintains the incubation chamber air temperature at the currently programmed temperature setpoint. The incubator microprocessor controller is wired to a solid-state temperature probe located in the chamber airstream on the chamber back wall. When the processor detects that the chamber temperature has dropped below the temperature setpoint, it pulses power to a heating element located in a recirculation duct immediately above the chamber. During normal operations with the doors closed, most heating pulses correct for deviations of less than 0.1°C.

The incubator uses Proportional – Integral – Derivative (PID) control to avoid significantly overshooting the setpoint. This means the rate of heating slows as the chamber temperature approaches the target temperature. If the chamber temperature is above the setpoint, the incubator uses minimum heating to control the rate of cooling and avoid dipping below the setpoint.

Additionally, the PID loops optimize heating rates for the temperature environment around the incubator. If the incubator is operating in a cool room, it will increase the length of heating pulses to compensate. Likewise, when operating in a warm room the incubator uses shorter pulses. If the ambient temperature conditions change significantly, there may be minor over or undershoots as the incubator adapts.

The incubator relies on natural heat radiation for cooling and can achieve a low-end temperature just above the ambient room temperature plus the internal waste heat of the unit.

CO_2 Atmosphere

The microprocessor also controls the gas concentration of CO_2 in the chamber atmosphere by operating an internal injection solenoid valve connected to a gas input port. The processor monitors the CO_2 concentration level in the incubator using an infrared sensor located in the recirculation duct. The sensor operates on the principle that a specific frequency set of infrared light is absorbed by CO_2. The more CO_2 present in the chamber, the more of that band of infrared is absorbed. The sensor is only sensitive to CO_2, so measurement accuracy is consistent, regardless of the presence of other gasses in the incubator.

The incubator uses Proportional – Integral – Derivative (PID) control to avoid significantly overshooting the CO_2 setpoint. This means the rate of injection slows as the chamber CO_2 concentration approaches the target CO_2 concentration. When the chamber concentration is stable CO_2 injections take place in small bursts to correct for deviations less than 0.1%. The incubator is not provided with a means to actively remove CO_2 from the chamber atmosphere.

Air Circulation

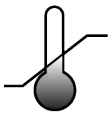
The incubator circulates air internally while powered. An air stream of heated and CO_2-enriched atmosphere is forced through vent slots on the back chamber wall and blows across the shelf space. At the front of the chamber, it is pulled upward by the action of a blower fan and drawn back into a recirculation duct. Air circulation plays a major role in maintaining the temperature uniformity and stability of the chamber.

The heating element is located in the recirculation duct. CO_2 is injected downstream of the heating element in the duct. An automatic cutoff switch located on the door frame disables air circulation, heating, and CO_2 injections whenever the chamber door is open.

Physical and Data Access

An access port on the left side of the unit allows sensors such as thermocouples probes to be inserted and left in the chamber without compromising the CO_2 atmosphere or chamber temperature. An atmosphere sample port for independently verifying the CO_2 concentration in the chamber is provided on the left side of the unit, adjacent to the control panel. A USB outputs CO_2 and temperature levels once per minute as a serial-protocol digital log line. A pair of jack ports outputs the CO_2 and temperature as 4 to 20 milliamp analog signals for use in building management systems. A dry contact port communicates alarm activation incidences. Please see the **Data Output** entry on page 39 for more details.

The Over Temperature Limit System (OTL)

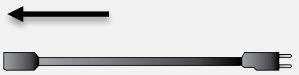


When set, the mechanical OTL heating cutoff system prevents runaway heating in the unit chamber. The OTL operates independently of the microprocessor controller and connects to a hydrostatic temperature sensor probe located in the incubation chamber. In the event the chamber air temperature exceeds the current OTL setting, the OTL routes power away from the heating element. The OTL will continue to prevent heating until the temperature drops below its limit setting. The Over Temperature Limit is set **by the user**, typically at approximately 1°C above the application temperature setpoint.

PUT THE INCUBATOR INTO OPERATION

Perform the following procedures and steps to put the unit into operation after installing it in a new workspace environment. **Reminder**: All procedures in the Installation chapter must be carried out before putting the unit into operation. This includes connecting to the gas supplies.

1.

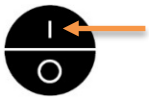


Attach the power cord that came with the unit to the power inlet receptacle on the side of the incubator.

2.

Plug the power cord into the workspace electrical supply outlet.

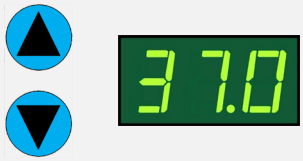
3.



Place the incubator **Power Switch** in the on (I) position.

- The Temperature and CO_2 displays will illuminate.

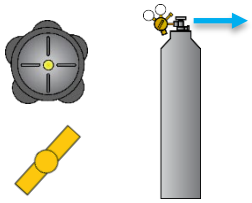
4.



Perform the **Set the Temperature Setpoint** procedure.

- See page 33.

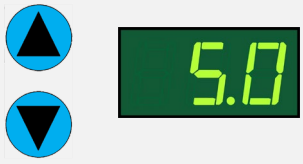
5.



Supply a CO_2 flow of 15 - 20 psi to the incubator.

- For most cylinder supply systems, open the cylinder supply valve first, then initiate a flow using the gas regulator valve control.

6.



Perform the **Set the CO_2 Setpoint** procedure.

- See page 35.

Continued on next page

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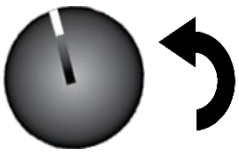
Put the Incubator into Operation (Continued)

7.

Allow the unit to run 8 hours to heat soak and achieve a stable temperature before loading samples.

- The manufacturer recommends allowing the unit to run overnight.

8.



Perform the **Set the Over Temperature Limit** procedure.

- See page 37.

The incubator must be heated **and stable** at your application temperature prior to performing this procedure.

9.

Place your samples in the incubation chamber.

- See **Loading the Incubator**, page 38

End of procedure

SET THE TEMPERATURE SETPOINT

1. Set OTL control to its maximum setting, if not already set to max.

- Turning the OTL all the way to the right (clockwise) prevents the heating cutoff system from interfering with this procedure.

2. Navigate to the Temperature Setpoint Adjustment mode

Press and hold either

Set Temperature °C

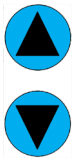
Setpoint Adjustment Mode

Set Temperature °C

Initial Set Poiint

Note: The display will automatically exit the adjustment mode after 5 seconds of inactivity on the arrow keys, saving the last shown setpoint value.

3. Set the Temperature Setpoint



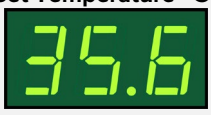
Adjust

New Setpoint

Note: Adjust the setpoint to its lowest setting (OFF) to turn off heating in the chamber.

4. Wait for 5 seconds after entering the Setpoint

Set Temperature °C



HEATING ACTIVATED

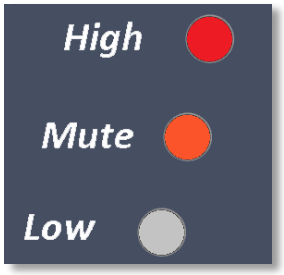
- The display will stop flashing. The setpoint is now saved in the controller.

See the **Set the OTL procedure** on page 37 for how to set the OTL system once the incubation chamber has stabilized at your application temperature setpoint and after you have performed any display verifications or calibrations.

End of Procedure

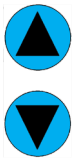
Muting the Audible Temperature Alarm

Audible and visual deviation alarms activate if the incubation chamber temperature deviates by 1°C above or below the temperature setpoint. The low deviation audible alarm has a delay of 15 minutes to prevent the low audible from sounding each time the doors are opened, causing a short-lived drop in temperature.



High Alarm Muted

To mute an audible high or low deviation alarm:



1. Press and hold either the **Up** or **Down** arrow on the Temperature Control until the amber Mute LED illuminates and the audible alarm shuts off.
    - The audible alarm will remain muted for the duration of the current temperature deviation.
    - The visual alarm indicator will remain illuminated.
    - Any **new** deviation of ±1°C or greater will reactivate the audible alarm.

Automatic Door Cutoff

Gas, heating, and air circulation pause.

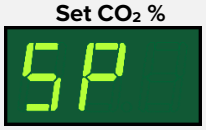
Whenever the incubation chamber door is opened, the incubator automatically stops the flow of CO_2 into the chamber, depowers the heater element, and ceases operation of the internal blower fan. This limits the amount of CO_2 released into the workspace around the incubator. It also prevents the heater from attempting to counteract the continual inflow of cooler air, which would cause a significant heat spike once the door is closed. Normal CO_2 injections, heating, and fan operation all resume automatically when the outer door is closed.

SET THE CO_2 SETPOINT

The incubator comes from the factory with the CO_2 setpoint set to Off. Set the setpoint percentage to the gas concentration required by your study or production protocol.

1. Navigate to the CO_2 Setpoint Adjustment mode

Press and hold either

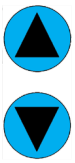


Setpoint Adjustment Mode

Initial Setpoint

Note: The display will automatically exit the adjustment mode after 5 seconds of inactivity on the arrow keys, saving the last shown setpoint value.

2. Set the CO_2 Setpoint

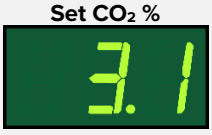


Adjust

New Setpoint

Note: To turn the CO_2 system off, set the setpoint to its lowest setting (OFF).

3. Wait for 5 seconds after entering the Setpoint



CO_2 Injecting

- The display will stop flashing. The setpoint is now saved in the controller.
- The display will revert to showing the current chamber CO_2 concentration.

LO - Low CO_2

When starting with no CO_2 in the chamber, the display will show “LO” until the incubator registers a concentration greater than 0%. A few minutes of CO_2 injections may be required to build up a sufficient gas concentration.

End of Procedure

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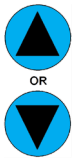
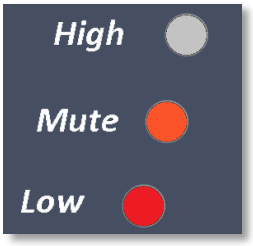
Muting the Audible CO_2 Alarm

A visual deviation indicator alarm illuminates if the chamber CO_2 level deviates 1% above or below the CO_2 setpoint. An audible alarm sounds immediately for a high deviation. The low deviation audible alarm sounds only after the visual low indicator light has been continually illuminated for 15 minutes. This delay prevents the alarm from sounding each time the chamber doors are opened.

To mute a CO_2 deviation alarm:



1. Press and hold the Set CO_2 **Up** or **Down** arrow button until the Mute light illuminates.
   - The alarm will stay muted for the duration of the current temperature deviation.
   - A new deviation of 1% or more will reactivate the audible alarm.



Low Gas Alarm Muted

Low and No Gas Alarms Timeline

No Gas Supply Alarm

A second alarm activates if the Low Gas deviation indicator light is illuminated for longer than 20 minutes.

- The letters “ngS” will appear in the CO_2 display indicating **No Gas Supply**.
- The alarm will remain active, even if the incubator is turned off and back on.
- The NGS alarm remains on until CO_2 is restored to the chamber. It may take 2 or more minutes of CO_2 injections to establish a concentration high enough to deactivate the alarm.

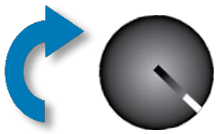
No Gas Supply

Note: Test the OTL system at least once per year for functionality.

Set the Over Temperature Limit

This procedure sets the OTL heating cutoff point to approximately 1ºC above the current incubation chamber temperature. **The unit must be operating stabilized at your application temperature for at least 1 hour prior to setting the OTL cutoff system.**

1. Set OTL control to its maximum setting, if not already set to max.



2. Turn the dial counterclockwise until the red Over Temperature Limit Light illuminates.

3. Slowly turn the dial clockwise until the OTL Activated light turns off.

- The Over Temperature Limit is now set approximately 1˚C above the current incubator air temperature.

4. Leave the OTL dial set just above the activation point.

Optional: Turn the dial slightly to the left.

- This sets the OTL cutoff threshold nearer to the current incubator air temperature.

If the OTL is sporadically activating, you may turn the dial very slightly to the right (clockwise).

If the OTL continues activating, check for ambient sources of heat or cold that may be adversely impacting the unit temperature stability. Check if any powered accessories in the chamber are generating heat. If you find no sources of external or internal temperature fluctuations, contact Customer Support or your distributor for assistance.

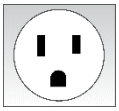
End of Procedure

LOAD THE INCUBATOR

Place items on the shelves inside the incubation chamber as evenly spaced as possible. Proper spacing allows for maximum air circulation and a high degree of temperature uniformity. Leave 1 inch (25mm) between sample containers and the chamber walls.

This completes the **Put the Incubator into Operation procedure**.

INTERIOR ACCESSORY OUTLET



5 Amp maximum draw

This unit is provided with an accessory power outlet located inside the incubation chamber on the left side of the chamber ceiling.

- The power switch on the control panel controls power to the outlet.
- The outlet is intended to power devices such as magnetic stirrers, rockers, etc. Do not attach a device drawing more than 5 amps to the outlet.

Heating in the Chamber

Powered accessory devices may produce heat. This heat can impact the temperature performance of the incubator. Check that the incubator operates within your protocol or application temperature range when accessory devices are active in the chamber.

ACCESSORY COMPATIBILITY

Make sure any accessory equipment used inside the incubation chamber can safely and effectively operate within your selected range of temperature and CO_2 levels.

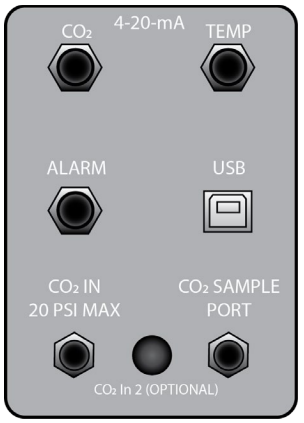
DATA OUTPUT CAPABILITIES

USB Outputs

The incubator generates data outputs describing the chamber temperature and CO_2 concentration percentage as a digital log line, once per minute. These outputs are transmitted through a USB port located on the top, left side of the unit using RS232 serial protocol.

Required Software

- Viewing and logging this output requires a terminal emulator program such as the open source (BSD license) emulator, Tera Term.



Data Ports

Digital Outputs

Parameter	Output Channel	
Temperature	C1	
CO_2	C3	

Example logline output: **C1=37.0 C3=5.0**

Dry Contact Alarm Port

This port communicates all alarm activations as On / Off outputs in which On indicates an alarm instance. The port connects to an audio jack and cable (male mono phono plug, ¼ inch (6.3 mm).

Jacks are **not** included with the incubator.

Optional Outputs

The unit may be ordered from the factory as a special quote (SQ) unit equipped with a pair of 4 to 20 milliamp analog outputs describing the current chamber temperature and CO_2 levels (direct current).

The outputs are transmitted through two jack ports on the right side of the incubator. The port connects to a standard audio jack and cable (male mono phono plug, ¼ inch (6.3 mm). Jacks are not included with the incubator.

Jack Port Outputs

Parameter	Parameter Value at 4mA	Parameter Value at 20mA
Temperature	0°C	60°C
CO_2	0% CO_2	20% CO_2

Data Monitoring Systems – Max Resistance

For building management and other data monitoring or logging systems, the maximum resistance of the current loop driven by either output from the 4-20mA module is 250 Ohms. At higher loop resistances, the current value will be erroneously low for parameter values near the top of the scale.

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CONDENSATION AND THE DEW POINT

Ambient humidity above 80% relative humidity or overloading the incubation chamber with open or breathable sample containers will likely result in condensation in the chamber and subsequent leakage from the incubator. This may cause corrosion damage if allowed to continue for any significant length of time.

Condensation takes place whenever the humidity level in the incubator chamber reaches the dew point. The dew point is the level of humidity at which the air cannot hold more water vapor. The warmer the air, the more water vapor it can hold.

As the level of humidity rises in an incubation chamber, condensate first appears on surfaces that are significantly cooler than the air temperature. Near the dew point, condensate forms on any item or exposed surface even slightly cooler than the air. When the dew point is reached, condensate forms on nearly all exposed surfaces.

Managing condensation primarily depends on either lowering the humidity level or increasing the air temperature in the incubator chamber.

Note: Rising or falling air pressure from the weather will adjust the dew point up and down in small increments. If the relative humidity in the incubation chamber is already near the dew point, barometric fluctuations may push it across the dew point threshold.

Note: The thin air at higher altitudes holds less humidity than the denser air found at or near sea level.

If excessive condensate has appeared in the incubation chamber, dry the chamber interior and check the following.

- Verify that the access port stopper is in place on the inside of the incubation chamber and not on the unit exterior.
- Make sure samples on any shelving in the chamber are evenly spaced to allow for good airflow.
- Ensure the chamber door is closing and latching properly.
- Are frequent or lengthy chamber door openings causing significant temperature disruptions and chilling the chamber surfaces? If so, reduce the number of openings.
- Are there are too many open or “breathable” containers of evaporating sample media in the chamber? If so, reduce the number of open sample containers.
- Does the ambient humidity in the room exceed the stated operating range of 80% relative environmental humidity? If so, lower the room humidity.
- Is the incubator exposed to an external flow of cold air such as an air-conditioning vent or a door to a cooler hallway or adjacent room? Block or divert the air, or reposition the unit.
- Check the door gaskets for damage, wear, or signs of brittleness or dryness. Arrange for replacement of the gaskets if damaged or excessively worn.

Warning: Disconnect the unit from its power supply prior to performing maintenance or services.

Avertissement: Débranchez cet appareil de son alimentation électrique avant d'effectuer la maintenance ou les services.

CLEANING AND DISINFECTING

If a hazardous material or substance has spilled in the unit chamber, immediately initiate your site Hazardous Material Spill Containment protocol. Contact your local Site Safety Officer and follow instructions per the site policy and procedures.

- Periodic cleaning and disinfection are required.
- Do not use spray-on cleaners or disinfectants. These can leak through openings and coat electrical components.
- Consult with the manufacturer or their agent if you have any doubts about the compatibility of decontamination or cleaning agents with the parts of the equipment or with the material contained in it.
- Do not use cleaners or disinfectants that contain solvents capable of harming paint coatings or stainless steel surfaces. **Do not use chlorine-based bleaches or abrasives; these will damage the chamber liner.**

Warning: Exercise caution if cleaning the unit with alcohol or flammable cleaners. Always allow the unit to cool down to room temperature prior to cleaning and make sure all cleaning agents have evaporated or otherwise been completely removed prior to putting the unit back into service.

Avertissement: Soyez prudent lorsque vous nettoyez l'appareil avec de l'alcool ou des produits de nettoyage inflammables. Laissez toujours refroidir l'appareil à la température ambiante avant le nettoyage et assurez-vous que tous les produits de nettoyage se sont évaporés ou ont été complètement enlevés avant de remettre l'appareil en service.

Cleaning

1. Disconnect the unit from its power supply.
2. Remove all removable interior components such as shelving and accessories.
3. Clean the unit with a mild soap and water solution, including all corners.
    - **Do not use an abrasive cleaner**, these will damage metal surfaces.
    - **Do not use deionized water to rinse or clean with.**
    - Take special care when cleaning around the temperature sensor probes in the chamber to prevent damage. Do not clean the probes.
4. Rinse with distilled water and wipe dry with a soft cloth.

Disinfecting

For maximum effectiveness, disinfection procedures are typically performed after cleaning. Keep the following points in mind when disinfecting the unit.

- Turn off and disconnect the unit to safeguard against electrical hazards.
- Disinfect the unit chamber using commercially available disinfectants that are non-corrosive, non-abrasive, and suitable for use on stainless steel and glass surfaces. Contact your local Site Safety Officer for detailed information on which disinfectants are compatible with your applications.
- If permitted by your protocol, remove all removable interior accessories (shelving and other non-attached items) from the chamber when disinfecting.
- Disinfect all surfaces in the chamber, making sure to thoroughly disinfect the corners. Exercise care to avoid damaging the sensor probes.
- Gas concentrations from evaporating disinfecting agents can inhibit growth or cause metabolic symptoms in microbiological sample populations. Make sure that chlorines, amphyls, quaternary ammonias, or any other overtly volatile disinfecting agents have been rinsed or otherwise removed from the chamber surfaces, prior to placing samples in the chamber.

When disinfecting external surfaces, use disinfectants that will not damage painted metal, glass, and plastic.

MINIMIZING CONTAMINATION EXPOSURE

The following are suggestions for minimizing exposure of the incubation chamber to potential contaminants.

- Maintain a high air quality in the laboratory workspaces around the incubator.
- Avoid placing the incubator near sources of air movement such as doors, air vents, or high traffic routes in the workspace.
- Minimize the number of times the chamber door is opened during normal operations.

GAS LINES AND HEPA FILTERS

The manufacturer recommends replacing in-line gas HEPA filters once per year or when a filter is noticeably discolored.

In-Line Gas Filter

- HEPA filters are directional and must be installed facing in the correct direction.
- The word "IN" is stamped on the rim of the filter assembly on the side that faces the gas supply. See page 22.

Gas lines should be replaced when cracking, brittleness, permanent kinking, or other signs of damage are present.

STORAGE OF THE INCUBATOR

Perform the following steps if the incubator will be out of use for more than 24 hours to prevent microbiological contamination such as fungus or mold.

1. Depower the incubator.
2. Disinfect and clean if required by your laboratory protocol, or if the chamber has been exposed to pathogenic microorganisms.
3. Use a soft cloth to dry the chamber surfaces.
    a. Do not place the incubator into storage while the chamber surfaces are damp.

MAINTAINING ATMOSPHERIC INTEGRITY

Periodically, inspect the door latch, trim, catch, and gaskets for signs of deterioration. Failure to maintain the integrity of the door system shortens the life span of the incubator.

ELECTRICAL COMPONENTS

Electrical components do not require maintenance. If the incubator fails to operate as specified, please contact Customer Support.

CALIBRATE THE TEMPERATURE DISPLAY

Note: This procedure requires a temperature reference device. Please see the **Reference Sensor Device entry** on page 10 for the device requirements.

Temperature calibrations are performed to match the unit temperature display to the actual air temperature inside the unit chamber. The actual air temperature is supplied by a calibrated reference device. Calibrations compensate for long-term drifts in the incubator microprocessor controller as well as those caused by the natural material evolution of the sensor probe in the heated incubator chamber. Calibrate as often as required by your laboratory or production protocol, or regulatory compliance schedule. Always calibrate to the standards and use the calibration setup required by your industry requirements or laboratory protocol.

A suggested calibration setup

1. Introduce the reference device thermocouple sensor probe through the access port on the right side of the incubator.

2. Position the probe in the chamber.

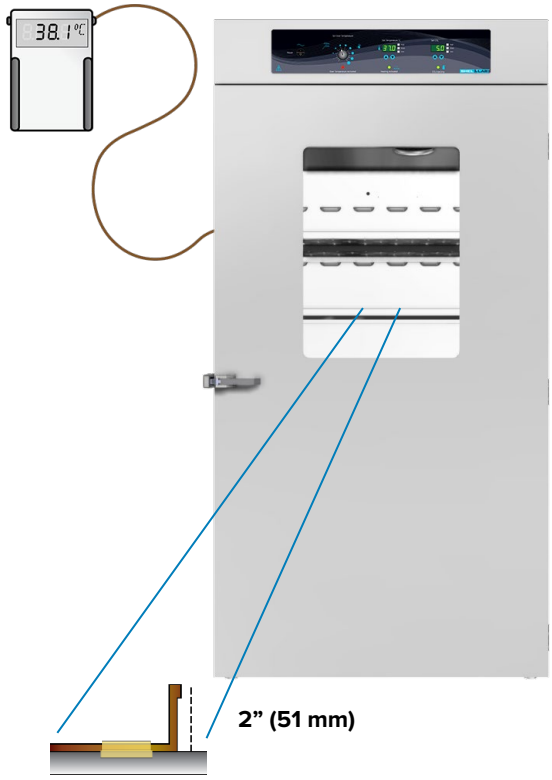
- Place the probe head as close as possible to the geometric center point of the chamber.
- The probe head must be at least **2 inches (51 mm)** from the surface of the shelving to prevent heatsinking.

3. Secure the probe head in position with the non-marking, heat-resistant tape.

4. Carefully place the access port stopper in the port over the probe wires. Use non-stick tape to seal any gaps created between the stopper and the port by the probe wires.

5. The incubator door must be closed and latched. Failure to do so will prevent an accurate calibration.

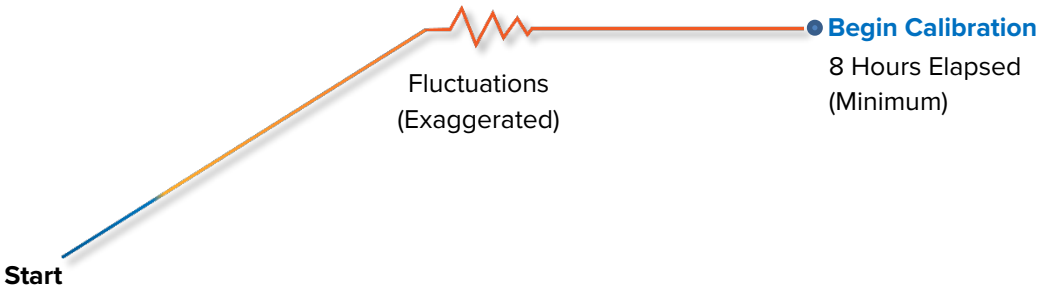
Use non-marking, heat-resistant polyamide tape to hold the thermocouple probe in place. The manufacturer recommends Kapton brand tape, 0.5 inches width (12.7 mm), 2 mil thickness.



Temperature Stabilization

The incubator air temperature must be stable to perform an accurate calibration.

- Allow the incubator to operate undisturbed with the chamber door shut for **at least 8 hours** when first putting the unit into operation in a new environment.
- To be considered stabilized, the incubator chamber must operate at your calibration temperature for **at least 1 hour with no fluctuations of ±0.1°C or greater.**



Required temperature stability period operating undisturbed with the incubator door closed.

Suggested Temperature Calibration

1

Once the incubator temperature has stabilized, compare the reference device and incubator temperature display readings.

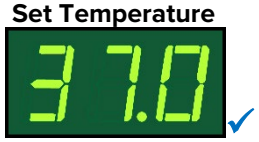
- If the readings are the same, or the difference between the two falls within the acceptable range of your protocol, the display is accurately showing the incubation chamber air temperature. **The Temperature Calibration procedure is now complete**.

-OR-

- If a difference falls outside of your protocol range, advance to Step 2.

Reference Device

Set Temperature



2

A display calibration adjustment must be entered to match the display to the reference device. See the next step.

Reference Device

Continued next page

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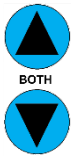
Temperature Calibration Continued

3

Place the display in its temperature calibration mode.



a. Press and hold both the **UP and DOWN** temperature arrow buttons simultaneously for approximately 5 seconds.

b. Release the buttons when the temperature display shows the letters “C O”. The display will begin flashing the **current temperature display value**.

Note: If an arrow key is not pressed for five seconds, the display will cease flashing, and store the last displayed number as the new current chamber temperature value.

4

Use the **Up** or **Down** arrows to adjust the current display temperature value until it matches the reference device temperature reading.

Reference Device

5

After matching the display to the reference device, wait 5 seconds.

- The temperature display will cease flashing and store the corrected chamber display value.
- The incubator will now begin heating or passively cooling to reach the setpoint with the corrected display value.

Heating to Setpoint

6

Allow the incubator to sit for at last one 1 hour undisturbed to stabilize **after the incubator has achieved the corrected temperature setpoint**.

- Failure to wait until the incubator is fully stabilized will result in an inaccurate reading.

Setpoint Achieved

Continued next page

7

Compare the reference device reading with the chamber temperature display again.

- If the reference device and the chamber temperature display readings are the same or the difference falls within the range of your protocol, **the incubator is now calibrated for temperature**.

-OR-

- See the next step if the readings fail to match or fall outside of your protocol range.

Reference Device

8

If the two readings are not the same, and the difference still falls outside the acceptable range of your protocol, repeat steps 3 - 7 up to two more times.

- Three attempts may be required to successfully calibrate units that are more than ±2°C out of calibration.

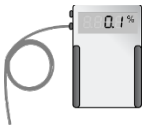
Reference Device

9

If the temperature readings of the incubator temperature display and the reference device still fall outside your protocol after three calibration attempts, contact your distributor or Customer Support for assistance.

End of procedure

CALIBRATE THE CO_2 DISPLAY



Note: This procedure requires a gas reference device. Please see the **Reference Sensor Devices entry** on page 10 for the device requirements.

Gas calibrations are performed to match the incubator CO_2 display to the actual CO_2 concentration inside the incubation chamber. The actual gas concentration is supplied by a calibrated reference device. Calibrations compensate for long-term drifts in the incubator microprocessor controller as well as those caused by the natural material evolution of the infrared sensor in the heated recirculation duct space. Calibrate as often as required by your laboratory or production protocol, or regulatory compliance schedule. Always calibrate to the standards and use the calibration setup required by your industry requirements or laboratory protocol.

A suggested calibration setup

1. Connect the reference device sample tubing to **CO_2 Sample Port** located on the top, left side of the incubator.

2. The incubation chamber door must be closed and latched. Failure to do so will prevent an accurate calibration.

3. CO_2 calibrations must be performed with the chamber **fully heated and stable at your application temperature setpoint**. Temperature helps drive gas diffusion in the chamber.

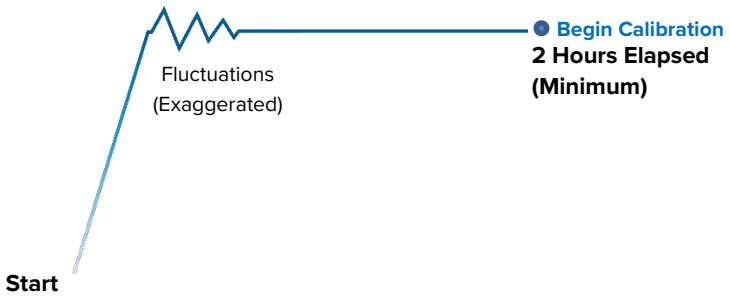
4. The incubator must be supplied with CO_2 during the entire calibration procedure.

A CO_2 calibration may be carried out concurrently with a temperature calibration to save time, so long as both the chamber door and access port remain closed and sealed.

Gas Stabilization

The CO_2 concentration in the incubation chamber must be given time to stabilize in order to perform an accurate calibration.

- The unit must be thermally stable, having operated at your application temperature for **at least 8 hours** prior to starting the gas calibration.
- After turning on a flow of CO_2 to the chamber and setting the CO_2 setpoint, allow the incubator to operate undisturbed with the chamber door shut for **at least 2 hours**.
- To be considered stabilized, the incubator chamber must operate at your calibration concentration for **at least 30 minutes with no fluctuations of ±0.1% or greater.**



Required stability period operating undisturbed with the incubator door closed and at temperature.

A Suggested CO_2 Calibration

1

Once the incubator CO_2 concentration has stabilized, compare the reference device and the CO_2 display readings.

- If the readings are the same, or the difference between the two falls within the acceptable range of your protocol, the display is accurately showing the incubation chamber CO_2 concentration. **The CO_2 Calibration procedure is now complete**.

-OR-

- If a difference falls outside of your protocol range, advance to Step 2.

Reference Device

Set CO_2 %

2

A display calibration adjustment must be entered to match the display to the reference device. See the next step.

Reference Device

Continued next page

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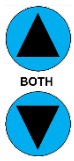
CO_2 Calibration Continued

3

Place the incubator CO_2 display in its calibration mode.



a. Press and hold both the **UP and DOWN** temperature arrow buttons simultaneously for approximately 5 seconds.

b. Release the buttons when the temperature display shows the letters “C O”. The display will then begin flashing the current CO_2 display value.

Note: If an arrow key is not pressed for five seconds, the display will cease flashing, and store the last displayed number as the CO_2 display value.

4

Use the **Up** or **Down** arrows to adjust the current display CO_2 % value until it matches the reference device concentration reading.

Reference Device

5

After matching the display to the reference device, wait 5 seconds.

- The gas display will cease flashing and store the corrected chamber display value.
- The incubator will now begin injecting CO_2 or allowing the current concentration to decay in order to achieve the setpoint with the corrected display value.

Decaying to Setpoint

6

Allow the incubator to sit for at last one 1 hour undisturbed to stabilize **after the incubator has achieved the corrected gas setpoint**.

- Failure to wait until the incubator is fully stabilized will result in an inaccurate reading.

Setpoint Achieved

Continued next page

CO_2 Calibration Continued

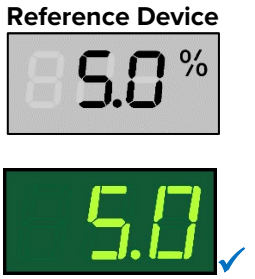
7

Compare the reference device reading with the incubator CO_2 display again.

- If the reference device and the incubator display readings are the same or the difference falls within the range of your protocol, **the incubator is now calibrated for CO_2.**

-OR-

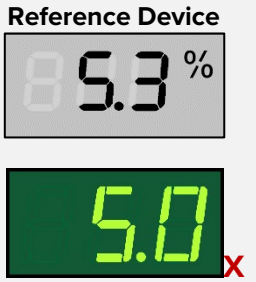
- See the next step if the readings fail to match or fall outside of your protocol range.



8

If the two readings are not the same, and the difference still falls outside the acceptable range of your protocol, repeat steps 3 – 7 up to two more times.

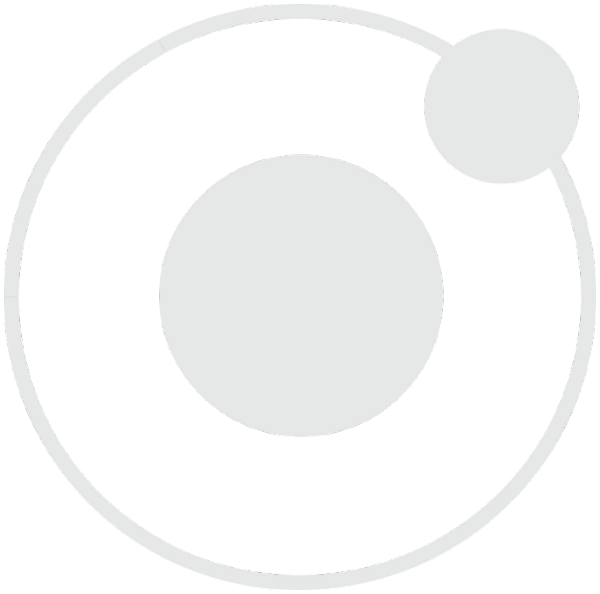
- Three calibration attempts may be required to successfully calibrate units that are more than ±2% out of calibration.



9

Contact your distributor or Customer Support for assistance, if the gas concentration readings of the incubator CO_2 display and the reference device still fall outside your protocol after three calibration attempts.

End of procedure



UNIT SPECIFICATIONS

The SCO Incubator is a 110 – 120 voltage unit. Please refer to the unit data plate for individual electrical specifications.

Technical data specified applies to units with standard equipment at an ambient temperature of 25°C and nominal voltage. The temperatures specified are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10% of the height, width, and depth of the inner chamber. All indications are average values, typical for units produced in the series. We reserve the right to alter technical specifications at all times.

WEIGHT

Model	Shipping	Unit Weight
SCO58	1113 lbs. / 506 kg	950.0 lbs. / 430.9 kg
SCO40	669 lbs. / 308 kg	574.0 lbs. / 260.4 kg
SCO31	579 lbs. / 263 kg	500.0 lbs. / 226.8 kg

DIMENSIONS

By inches

Model	Exterior W × D × H	Interior W × D × H
SCO58	51.0 x 44.8 x 81.0 inches	43.0 x 34.5 x 67.5 inches
SCO40	42.2 x 33.5 x 88.0 inches	34.7 x 25.8 x 76.2 inches
SCO31	39.6 x 33.7 x 76.2 inches	32.9 x 26.1 x 63.3 inches

By millimeters

Model	Exterior W × D × H	Interior W × D × H
SCO58	1295 x 1137 x 2057mm	1092 x 876 x 1715mm
SCO40	1071 x 851 x 2235mm	881 x 655 x 1935mm
SCO31	1005 x 856 x 1936mm	836 x 663 x 1608mm

CAPACITY

Model	Cubic Feet	Liters
SCO58	58.0	1641.0
SCO40	39.5	1118.0
SCO31	31.4	890.7

CO_2

Model	Range
All Models	0 – 20% Concentration

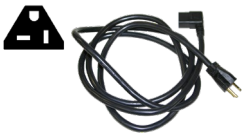
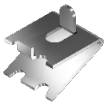
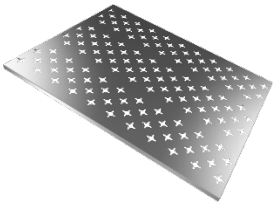
TEMPERATURE

Model	Range	Uniformity	Stability
SCO58	Ambient +8°C to 60°C	± 0.5° @ 37°C	± 0.2°C
SCO40	Ambient +8°C to 60°C	± 0.5° @ 37°C	± 0.1°C
SCO31	Ambient +8°C to 60°C	± 0.5° @ 37°C	± 0.1°C

POWER

Model	AC Voltage	Amperage	Frequency
SCO58	110 – 120	15.0	50/60 Hz
SCO40	110 – 120	15.0	50/60 Hz
SCO31	110 – 120	14.5	50/60 Hz

PARTS AND CONSUMABLES

Description	Part Number	Description	Part Number
Access Port Stopper	 7750570	Leveling Foot	 2700506
CO_2 Gas Tubing Kit with In-Line HEPA Filter	 9710500	Power Cord 125V, 20 Amp, NEMA 5-20P, 8ft (2.5m)	 1800564
CO_2 In-Line HEPA Filter	 2800525	Shelf Clips	 1250512
Door Gasket, Magnetic SCO58 48 X 68 Inches	 3450585	Shelf SCO58	 995-00014
Door Gasket SCO40 1-foot sections, requires 20 sections	 3450534	Shelf SCO40	 9750551
Door Gasket SCO31 1-foot sections, requires 17.25 sections	 3450534	Shelf SCO31	 995-00003
Fuse 250V, 20A, Time-Lag, 5x20mm	 3300538		

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Ordering

Accessories and replacement parts can be ordered online at **parts.sheldonmfg.com**.

If the required item is not listed online, or if you require assistance in determining which part or accessory you need contact SHEL LAB by emailing parts@sheldonmfg.com or by calling 1-800-322-4897 ext. 3 or (503) 640-3000 ext. 3.

Please have the **model, serial,** and **part** numbers and **Part ID** of the unit ready. Customer Support needs this information to match your unit to its correct part.

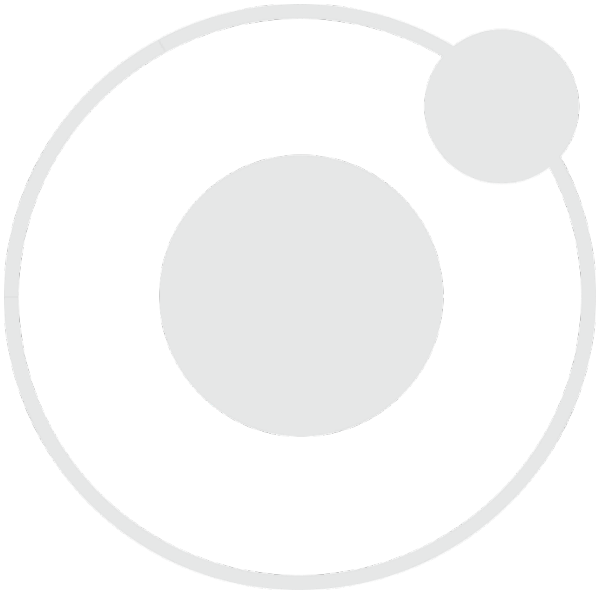
ACCESSORIES

The following accessories are available for large capacity SCO Incubators.

CO_2 Cylinder Regulator Kit

Includes CO_2 gas tubing with an inline HEPA filter.

Part Number 9740558



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SHELDON MANUFACTURING, INC

P.O. Box 627
Cornelius, OR 97113
USA

support@sheldonmfg.com
sheldonmanufacturing.com

1-800-322-4897
(503) 640-3000
FAX: 503 640-1366