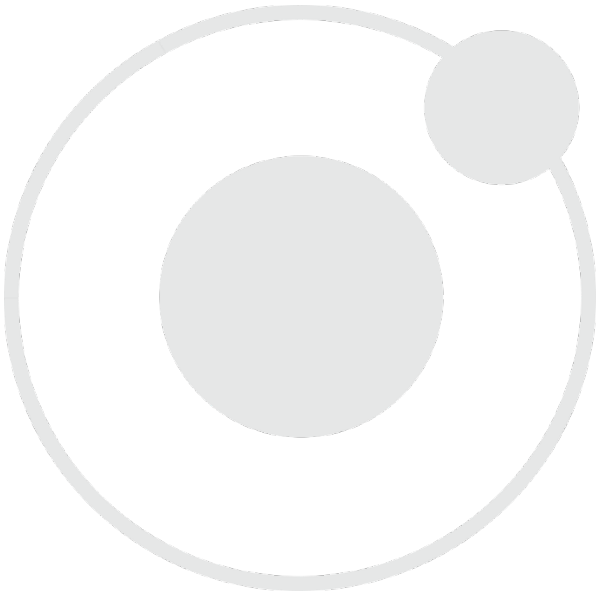
GRAVITY OVENS 110 – 120 Voltage

SHEL LAB®

Installation - Operation Manual

SGO1 SGO3 SGO5



SGO Gravity Ovens 110 – 120 Voltage

Part Number (Manual): 4861727

Revision: March 30, 2018

Pictured on Cover: Left to right SGO1, SGO3, SGO5

SLG122, SLG322, SLG522

SHEL LAB is a brand of Sheldon Manufacturing, INC.

Safety Certifications

These units are CUE listed by TÜV SÜD as gravity ovens 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.

The units have been tested to the following requirements:

CAN/CSA-22.2 No. 61010-1:2012/U2:2016-04
CAN/CSA-C22.2 No. 61010-2-010:2015
UL 61010-1:2012/R:2016-04
UL 61010-2-010:2015
EN 61010-1:2010
EN 61010-2-010:2014

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INTRODUCTION

Thank you for purchasing a SHEL LAB oven. 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 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

SGO gravity ovens are engineered for constant temperature drying, curing, and baking applications in professional, industrial, and educational environments. The ovens 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 not explicitly authorized by the manufacturer can be dangerous and will void your warranty.

CONTACTING ASSISTANCE

Phone hours for Sheldon Technical Support are 6 am – 4:30 pm Pacific Coast Time (west coast of the United States, UTC -8), Monday through Friday. Please have the following information ready when calling or emailing Technical Support: the **model number** and the **serial number** (see page 14).

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

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

ENGINEERING IMPROVEMENTS

Sheldon Manufacturing, Inc. 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.

REFERENCE SENSOR DEVICE

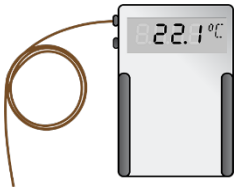
Must be purchased separately

A reference sensor device is required for calibrating the unit temperature display.

Reference devices must meet the following standards:

- Accurate to at least 1°C

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



Temperature Reference

Temperature Probes

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

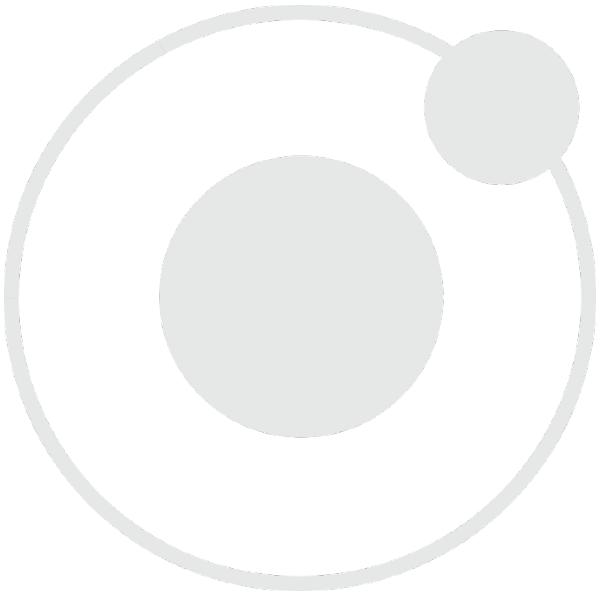
Why Probes?

Reference readings taken outside the chamber using wire temperature probes avoid chamber door openings. Openings disrupt the chamber temperature. 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 unit chamber.** Always use thermocouple probes.

INTRODUCTION



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 the unit and its accessories function properly.

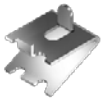
When you receive your unit, inspect it for concealed loss or damage to its interior and exterior. If you find any damage to the unit**, follow the carrier's procedure for claiming damage or loss**.

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 has been included.
7. A high-temperature access port stopper ships installed in the port located on the back of the oven. Verify the presence of the stopper.

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

Included Accessories

8 Shelf Clips

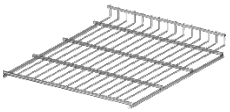


4 Leveling Feet

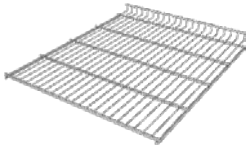
1 Power Cord

Shelves

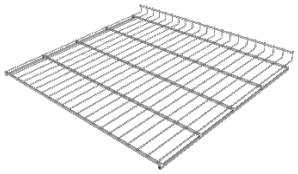
SGO1



SGO3



SGO5



ORIENTATION PHOTOS

Figure 1: SGO5

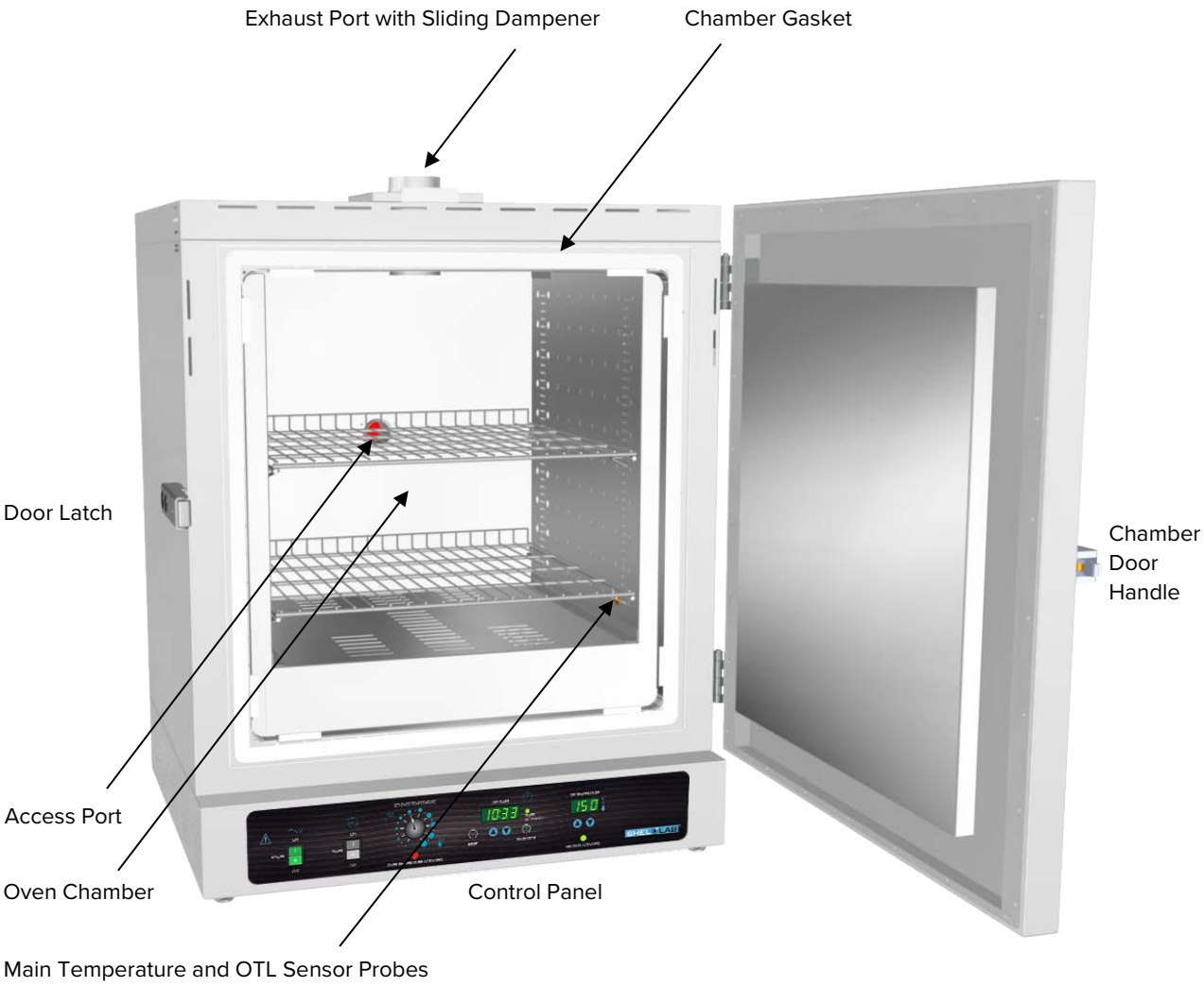


Figure 2: SGO3

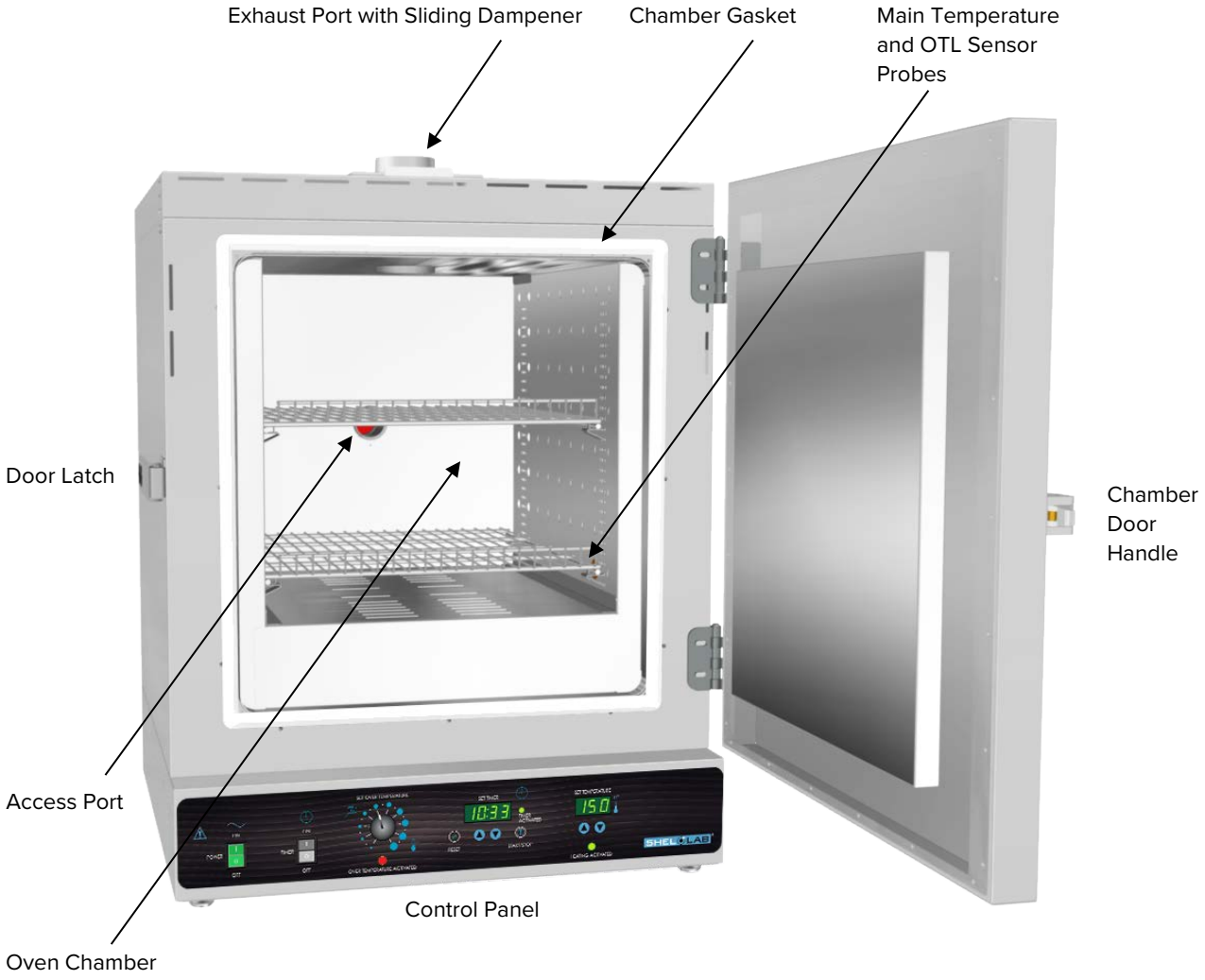


Figure 3: SGO1

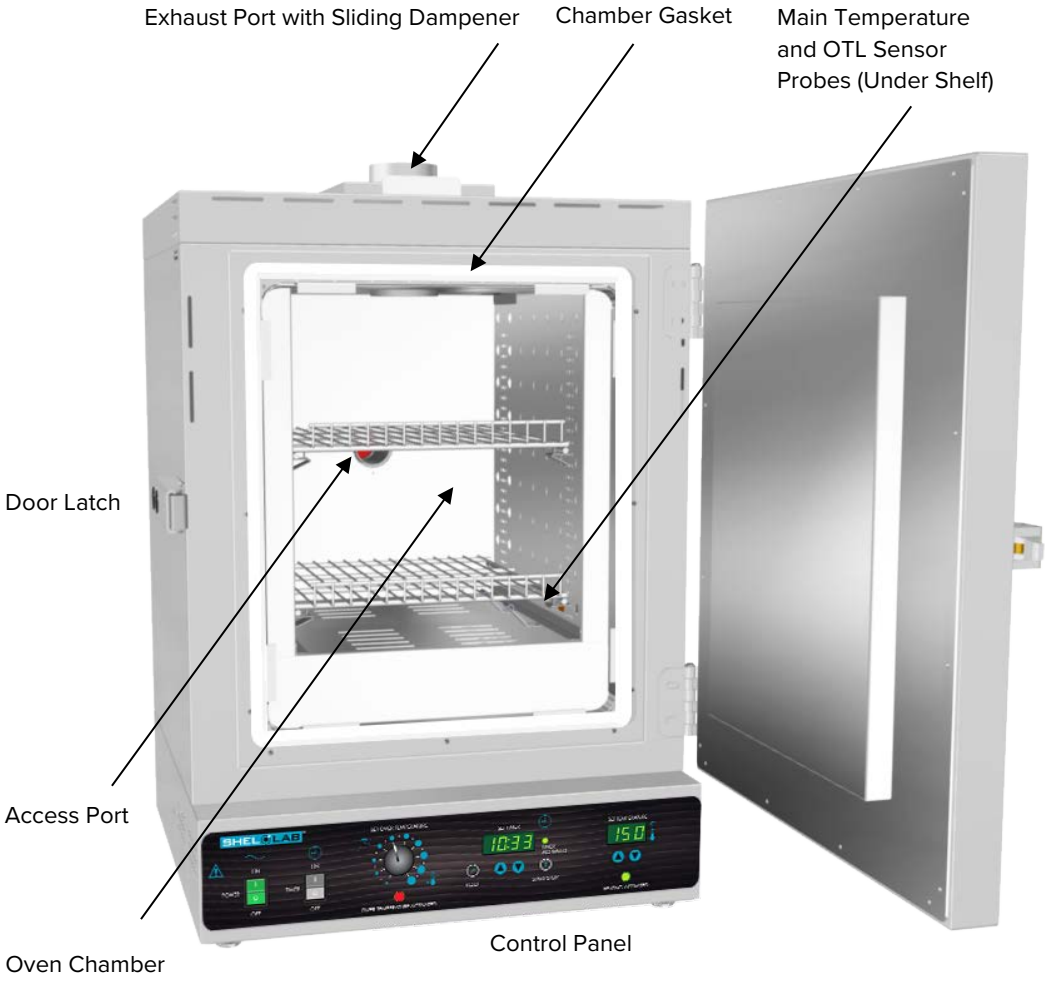
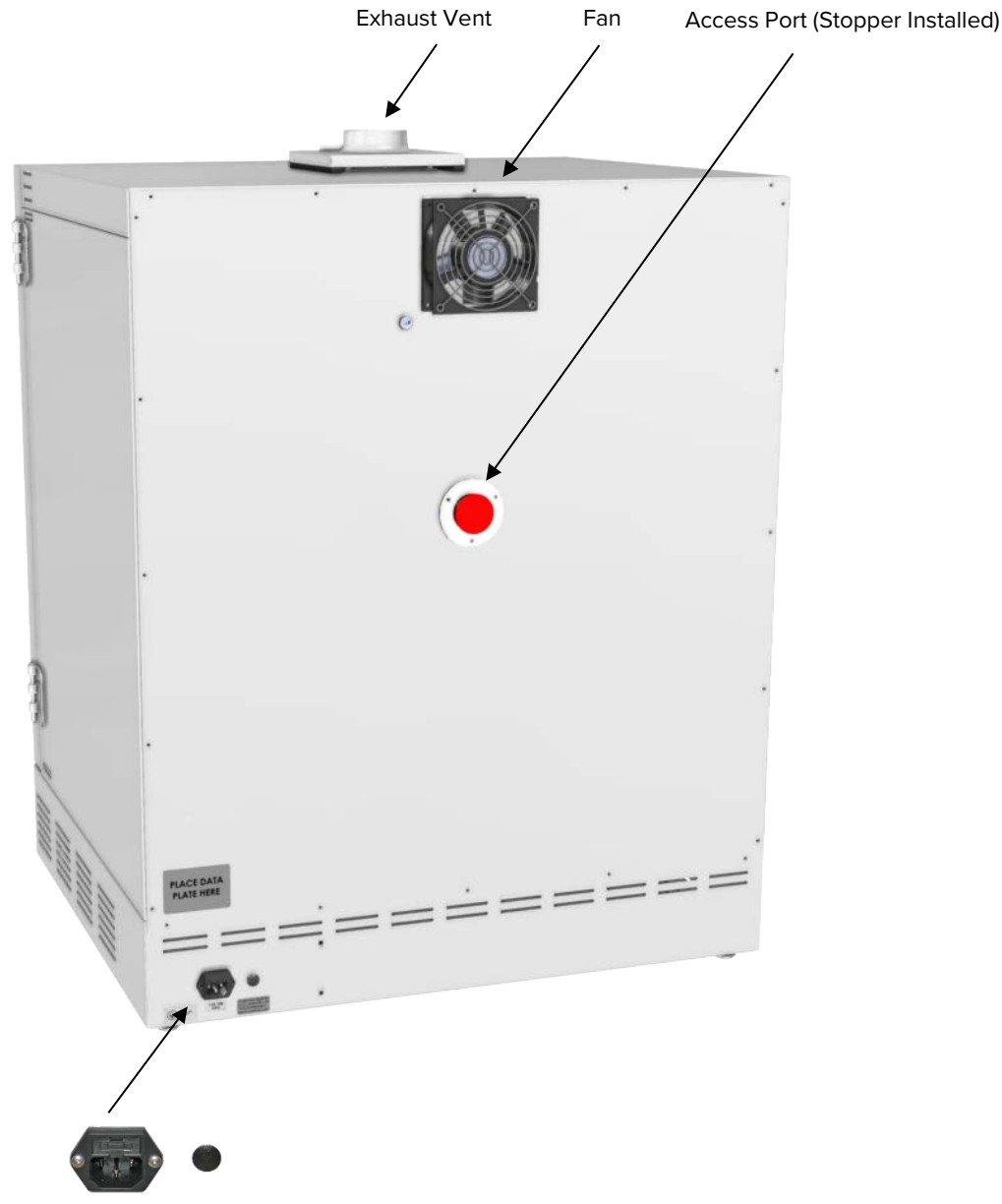


Figure 4: Unit Back



RECORDING DATA PLATE INFORMATION

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

- The data plate is located on the back of the oven above the power inlet.

Model Number	
Serial Number	

INSTALLATION PROCEDURE CHECKLIST

For installing the oven in a new workspace.

Pre-Installation

- ✓ Check that the required workspace ambient conditions for the unit are met, page 16.
    - Unit dimensions may be found on page 41
- ✓ Check that the required ventilation and spacing requirements are met, page 16.
- ✓ Check that a suitable electrical outlet and power supply is present, page 17.

Installing the oven in a suitable workspace location

- ✓ Review the lifting and handling instructions, page 18.
- ✓ Install the unit in its workspace location, page 18.
- ✓ Make sure the unit is level, page 18.

Set up the oven for use

- ✓ Clean the unit chamber and shelving if needed, page 19.
- ✓ Install the shelving in the unit chamber, page 20.
- ✓ Verify the stopper is installed in the access port on the outside of the oven, page 20.

Required Ambient Conditions

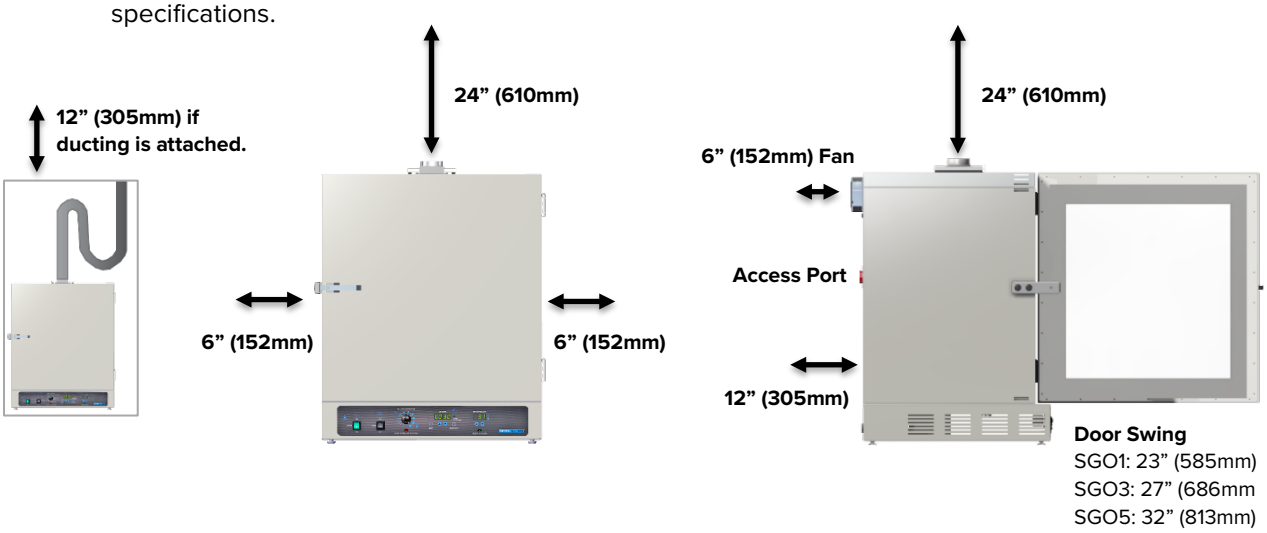
When selecting a location to install the unit, look for sources of heat, cold, and moving air that can affect the chamber temperature and atmospheric integrity:

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

This unit is intended for use indoors at room temperatures between **15°C and 40°C** (**59°F and 104°F)** and at no greater than **80% Relative Humidity** (at 25°C / 77°F). Operating the unit outside of these conditions may adversely affect its temperature range and stability.

Required Ventilation Clearances

These clearances are required for the oven to operate safely and meet its stated temperature specifications.



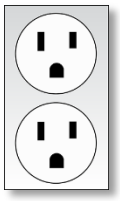
- **24 inches (610mm)** of headspace clearance is required between the exhaust vent and any overhead cover or partition.
    - **12 inches (305mm)** of vertical headspace clearance suffices if the oven exhaust is vented from the workspace through a duct or other channeling.
- Do not place objects on top of the oven.
- Allow at least **6 inches (152mm)** from the access port and fan vent on the back of the oven to the nearest wall or partition. Keep the fan unobstructed at all times.
- The chamber access port is located on the back of the oven. Leave sufficient room for easy access if oven operators will be using the port.

POWER SOURCE REQUIREMENTS

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

Power Source: The wall power outlet must meet the power requirements listed on the unit data plate. These units are intended for **110 – 120 VAC 50/60 Hz** applications at the following amperages:

SGO1	SGO3	SGO5
12.0 Amps	14.0 Amps	14.0 Amps



Standard NEMA 5-15R 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, 15Amp, 9ft 5 in (2.86m) NEMA 5-15P** 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 prior to putting the unit back into operation.
- Fuse type
    - 250V, T16, 5X20mm

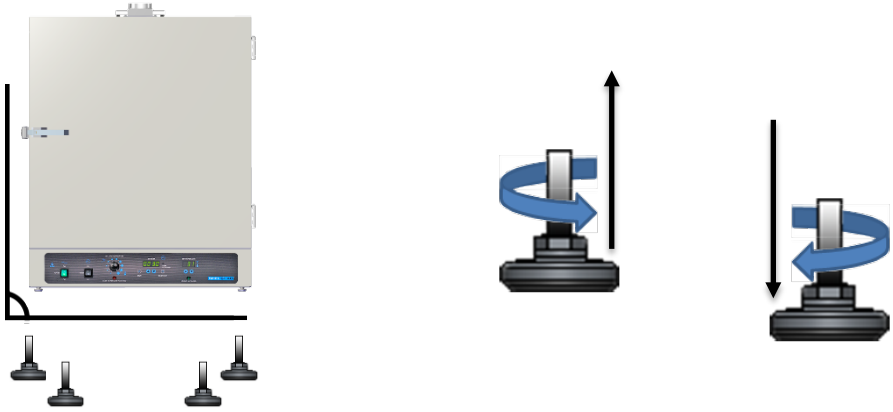
LIFTING AND HANDLING

The unit is heavy. Use appropriate lifting devices that are sufficiently rated for the unit weight. Follow the guidelines below 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 OVEN

Place 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 the unit. 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.

INSTALLATION - CLEAN AND DISINFECT

Cleaning and disinfecting the unit chamber, shelving components, and ceiling air duct 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 and the ceiling air duct prior to cleaning.
- See the **Cleaning and Disinfecting** entry on page 35 for information on how to clean and disinfect without damaging the unit or its components.

Shelving Installation

1. Install 4 clips for each shelf in the slots located on the sides of the chamber interior.
    a. Squeeze each clip.
    b. Insert the top tabs first, then the bottom tabs using a rocking motion.
2. Place the shelf on the clips.

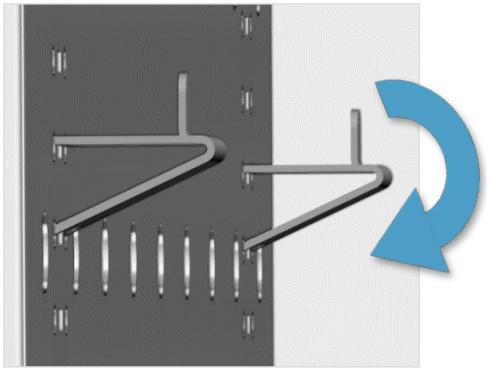


Figure 5: Install Clips

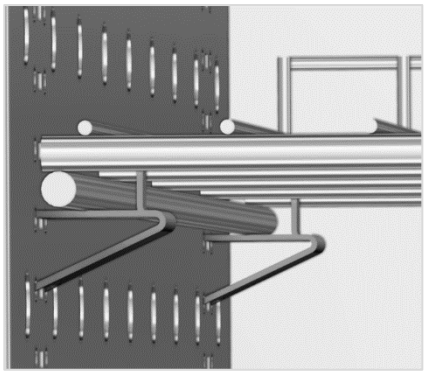


Figure 6: Place the Shelf

Access Port Stopper

Verify the port stopper is installed in the access port on the back of the unit. The oven will not meet its temperature performance specifications without the stopper installed.

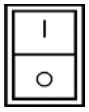
The stopper must always be installed on the outside of the oven. Installing the stopper on the inside of the oven risks damaging the stopper.

The intended use of the port is to introduce sensor probes into the oven chamber.

Figure 7: Port Stopper in Access Port

GRAPHIC SYMBOLS

The unit is provided with multiple graphic symbols on its exterior. The symbols identify hazards and the functions of the 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
	Indicates UP and DOWN respectively Touches de déplacements respectifs vers le HAUT et le BA
	Manually adjustable Indique un réglage manuel
	Recycle the unit. Do not dispose of in a landfill. Reycle l'unité. Ne jetez pas dans une décharge.
	Caution hot surface Attention surface chaude

GRAPHIC SYMBOLS

Symbol	Definition
	Indicates the timer Indique le minuterie
	Start or Stop the Timer Lancer ou arrêter le minuteur
	Reset the Timer Réinitialisation de la Minuterie

CONTROL PANEL OVERVIEW

Control Panel

Power Switch

When in the ON (I) position, the switch illuminates and the oven heats to the currently programmed temperature set point.

Timer Switch

The black Timer Switch controls power to the timer system. When this switch is in the ON position, the ovens ceases heating, the SET TIMER display illuminates, and the user may launch a timed, steady-state heating profile running at the current temperature set point. The oven **will not heat** while the Timer system is on unless a profile is launched.

Over Temperature Limit Control (OTL)

This graduated dial sets the temperature cutoff limit for the Over Temperature Limit system. The OTL is an independent mechanical heating cutoff that prevents unchecked heating of the oven in the event of a failure of the main temperature controller system. For more details, please see the explanation of the **Over Temperature Limit System** on page 27 in the Theory of Operation entry.

Over Temperature Activated Light

Illuminates whenever the OTL system is routing power away from the heating elements. Under normal operating conditions this light should remain off.

CONTROL PANEL OVERVIEW

Timer Display and Control Pad

The SET TIMER display shows the duration of the currently programmed heating profile, or a flashing duration adjustment mode, or the countdown of an active profile to 0.

The "//" RESET button is used to place the Timer display in its adjustable duration mode, and then to scroll through the duration time parameters.

The SET TIMER arrow buttons adjust the heating profile duration time parameters when the display is in its duration adjustment mode.

The "T" START/STOP timer button launches a heating profile or pauses an active profile.

Temperature Display and Control

Marked SET TEMPERATURE, this display shows the current oven chamber air temperature accurate to within 1.0°C. The display can also show an adjustable temperature set point as well as an adjustable chamber temperature value while in calibration mode.

The arrow buttons can be used to adjust the temperature set point or put the unit into its calibration mode, and then enter a calibration offset value.

Heating Activated Light

The green light located beneath the label HEATING ACTIVATED illuminates whenever the oven elements are powered and heating the oven chamber. The oven uses measured pulses to achieve and maintain the temperature set point.

Safe operation of the unit is dependent on the actions and behavior of the unit operators**. Operating personnel must read and understand the Operating Precautions in this section prior to operating the unit.** The operators must follow these instructions to prevent injuries and to safeguard their health, environment, and the materials being treated in the unit, as well as to prevent damage to the unit. Failure to adhere to the Safety Guidelines and Operating Cautions, deliberately or through error, is a hazardous behavior on the part of the operator.

Le fonctionnement sûr du four dépend des actions et du comportement des opérateurs du four. Le personnel d'exploitation doit lire et comprendre les consignes de sécurité et les précautions d'utilisation de cette section avant d'utiliser le four. Les opérateurs doivent suivre ces instructions pour prévenir les blessures et protéger leur santé, leur environnement et les matériaux traités dans le four, ainsi que pour éviter d'endommager le four. Le non-respect des consignes de sécurité et des précautions d'utilisation, délibérément ou par erreur, est un comportement dangereux de la part de l'opérateur.

OPERATING PRECAUTIONS

- Do not use this oven in unsafe improper applications that produce flammable or combustible gases, vapors, liquids, or fuel-air mixtures in quantities that can become potentially explosive.
- Outgassed byproducts may be hazardous to or noxious for operating personnel. Exhaust should be vented to a location outside the workspace in a safe manner in accordance with all applicable laws, ordinances, and regulations. Do not operate the oven in an unsafe area with noxious fumes.
- Do not use this oven for applications heating hazardous fibers or dust. These items can become airborne and come into contact with hot surfaces.
- Individual ovens are not rated to be explosion proof. Follow all building certification requirements and laws for Class I, II, or III locations as defined by the US National Electric Code.
- The bottom surface of the chamber should not be used as a work surface. It runs hotter than the shelf temperatures. Never place samples or product on the oven chamber floor.
- Do not place sealed or filled containers in the oven. These may burst open when heated.
- Do not place alcohol or mercury thermometers in the unit. These devices may rupture under heat or other improper uses.
- Do not move the oven until it has finished cooling.

Warning: The vent dampers may be hot to the touch. These areas are marked with Hot Surface labels. Proper PPE should be employed to minimize risk to burn.

Avertissement: Les clapets d'aération peuvent être chauds au toucher. Ces zones sont marqués avec des étiquettes de Surface chaude. Les EPI approprié devraient être employée pour réduire au minimum le risque de brûler.

THEORY OF OPERATION

Heating

When powered, the oven chamber heats to and then maintains the currently programmed temperature set point. The oven comes from the factory with a temperature set point of “OFF”. The set point may be adjusted by the end-user using the Set Temperature controls.

The oven controller senses the chamber air temperature via a solid-state probe located in the airstream on the right wall of the oven chamber. When the processor detects that the chamber temperature has dropped below the temperature set point, it pulses power to a heating element in a recirculation air duct space located above the oven chamber.

The processor employs proportional-integral-derivative analytical feedback-loop functions when measuring and controlling the chamber air temperature levels. PID-controlled heating pulse intensities and lengths are proportional to the difference between the measured chamber temperature and the current set point. The frequency of pulses is derived from the rate of change in the difference. The integral function slows the rate of pulses when the temperature nears the set point to avoid overshooting.

SGO ovens rely on natural heat radiation for cooling. When the oven is powered, the chamber air temperature cannot go below the ambient room temperature **plus** the internal waste heat of the oven.

Air Circulation and Venting

SGO ovens rely on natural gravity convection for air circulation. Warm air rises and cooler air sinks in the heated oven chamber.

The oven is provided with a dampener vent that may be opened or closed using a dampener slide located on the oven top. **SGO ovens must be run with the dampener 30% open in order to achieve the stated temperature performance specifications.**

Opening the vent all the way while the oven during a baking application may speed the rate of material drying, depending on the nature of your application. However, it also introduces excessive quantities of cool air into the chamber while allowing heated air to exit. This will likely impact the temperature performance of the oven. For most applications, fully opening the vent **after** the baking portion of the application will help to speed product or sample drying.

Timed Heating Profile

The oven is provided with a Timer subsystem. When set, it runs the oven in a steady-state heating profile at the current temperature set point for 1 minute up to 99 hours, 59 minutes. Allow the oven to heat to the profile temperature prior to launching a profile. Launching a profile with the temperature set point set to 150°C immediately after turning on the oven will result in the first several minutes of the profile spent with the chamber rising from room temperature to 150°C.

When the Timer system is on, **the oven will not heat** unless a profile of 1 minute or greater has been launched.

The Over Temperature Limit System (OTL)

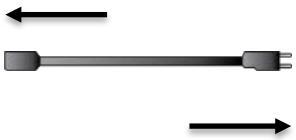
When set, the mechanical OTL heating cutoff system prevents runaway heating in the oven chamber. The OTL operates independently of the microprocessor and is provided with a separate, hydrostatic temperature sensor probe located in the oven chamber. In the event the chamber air temperature exceeds the current OTL setting, the OTL routes power away from the heating elements. The OTL will continue to prevent heating until the temperature drops below its limit setting. The Over Temperature Limit is set **by the end-user**, typically at approximately 5°C above the application temperature set point.

Note: The oven may produce light smoking during its first use above 150°C as the remnants of a protective oil coating burn off the heating element.

PUT THE OVEN INTO OPERATION

Carry out the following steps and procedures to put the oven into operation after installing it in a new workspace environment.

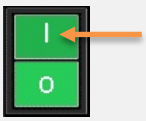
1. Plug in the power cord



Attach the power cord that came with the unit to the power inlet receptacle on the back of the oven.

Plug the power cord into the workspace electrical supply outlet.

2. Power the oven



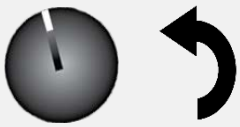
Place the oven **Power Switch** in the ON (I) position.

- The switch and Temperature display will both illuminate

3. Set the Temperature Set Point to your baking application

See the **Set the Temperature the Set Point** procedure on page 29.

4. Set the Over Temperature Limit Heating



See the **Set the Over Temperature Limit** on page 30.

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

Optional: Set the timer

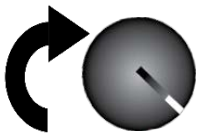
See the **Set the Timer procedure** on page 31.

End of procedure

SET THE TEMPERATURE SET POINT

Set the oven to your application temperature.

1. Turn the OTL dial clockwise to its maximum position, if not already set to max.

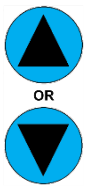


- This prevents the heating cutoff system from interfering with this procedure.

2. Open the vent (30% Open)

- The vent must be partly open to create convection in the oven chamber.
- The oven will not achieve its specified temperature uniformity **if the vent is left closed or if it is fully open**.

3. Navigate to the Temperature Set Point Adjustment mode



Press and hold either

Set Temperature

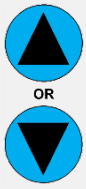
Set Point Adjustment Mode

Current Set Point

"SP" indicates set point.

Note: The display automatically exits the adjustment mode after 5 seconds of inactivity, saving the last shown set point value.

4. Adjust to your Temperature Set Point



Adjust

New Set Point

5. Wait 5 seconds after entering the Set Point

HEATING ACTIVATED

- The display stops flashing and reverts to showing the current chamber temperature.
- The adjusted set point is now saved in the controller.

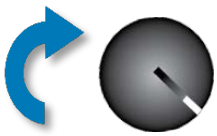
End of Procedure

Note: Test the OTL system at least once per year to verify its functionality

Set the Over Temperature Limit

This procedure sets the Over Temperature Limit heating cutoff to approximately 5˚C above the current chamber temperature. **Perform this procedure when the oven has been running with no temperature fluctuations at your application temperature for at least 30 minutes**.

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 5˚C above the current oven chamber 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 chamber air temperature.

If the OTL sporadically activates after setting the control, turn the dial very slightly to the right (clockwise).

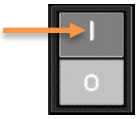
If the OTL continues activating, check for ambient sources of heat or cold that may be adversely impacting the unit temperature stability. If you find no sources of external or internal temperature fluctuations, contact Tech Support or your distributor for assistance.

End of procedure

SETTING THE TIMER

This procedure enters a heating profile duration in the Timer system. When launched, the profile runs the oven for the duration at the present temperature set point.

1. Turn on the Timer System



Push to On (I)

Set Timer

1 Minute Profile

- The oven will cease heating

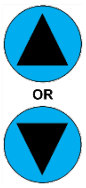
2. Place the Timer Display in its adjustable Set Timer mode

Press and hold RESET button

Hours Selected

Note: The Timer will exit the adjustment mode with the last entered time values saved if 5 seconds elapse with no activity on the Arrow Pad buttons.

3. Set the Hour parameter



Adjust

1 Hour, 1 Minute

4. Advance to Tens-of-Minutes parameter

Press

Tens of Minutes Selected

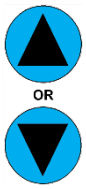
Note: Advancing saves the adjusted hour parameter.

Continued on next page

SHELLAB®

Set Timer (Continued)

5. **Set the Tens-of-Minute parameter**



Adjust

1 Hour, 51 Minutes

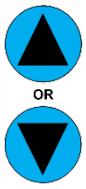
6. **Advance to the Minutes parameter**

Press

Minutes Selected

- The flashing decimal point advances to between the third and fourth numbers.
- This saves the new Tens-of-Minutes parameter setting.

7. **Set the Minutes parameter**



Adjust

1 Hour, 55 Minutes

8. **Wait for 5 seconds after entering the Minutes parameter**

5 Seconds

- The display exits adjustment mode.
- The minutes parameter is now saved.

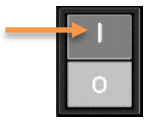
End of procedure

Launching a Heating Profile

Allow the oven to come up to temperature prior to launching a profile. See the **Setting the Timer procedure** on page 31 for how to set the length of the profile.

Note: While the Timer system is on, the oven will **not** heat unless a profile is running.

1. Turn on the Timer System



Push to On (I)

Set Timer

1 Hour, 55 Minute Profile

- The **Timer Display** will illuminate, showing the previously programmed profile duration.
- The oven will cease heating

2. Launch the current profile


Press and Hold

- The Timer Display will start counting down.
- The oven will resume heating.

Optional: Pausing a running profile


Push

- The oven will cease heating until the profile is restarted, reset, or the Timer system is turned off.
- To continue the profile where it left off, press the Start/Stop “T” button again.

3. The oven ceases heating upon reaching “00:00”

Profile Complete

To resume heating, place the Timer Switch in the OFF (O) position.

To launch another profile, press the “//” Reset button and enter a new profile, or allow the previous profile to reset automatically after 5 seconds.

End of procedure

High Exterior Temperatures

Note: Allow the oven to cool or use appropriate PPE and tools when adjusting the chamber gasket seating.

If the chamber gasket comes out of alignment, oven chamber air may be drawn into the insulating baffle spaces. This can result in heating of the oven exterior surfaces.

If the oven exterior is unusually warm or hot, push the chamber gasket inward along its entire length to restore the integrity of the seal.

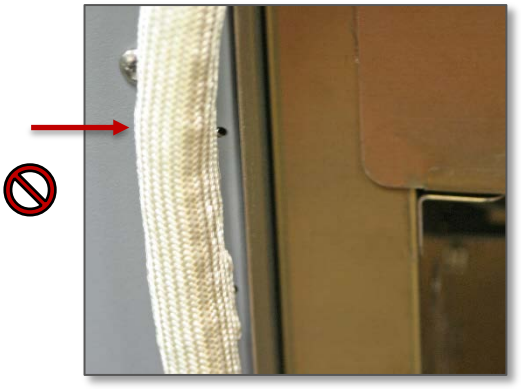


Figure 8: Chamber Gasket Misaligned

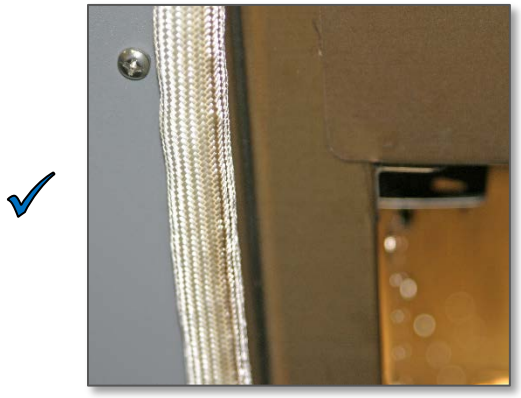


Figure 9: Chamber Gasket Aligned

Drying Racks and other Accessories

Make sure that any accessories used inside the oven chamber, such as drying racks, are suitable for your application and will not suffer damage when brought to temperature. Always set the OTL cutoff system to approximately 5°C above your application temperature set point in order to safeguard accessories against over temperature events. The manufacturing defect warranty does not cover damage caused by melted or otherwise overheated accessory items.

Warning: Prior to maintenance or service on this unit, disconnect the power feed from the power supply.

Avertissement: Avant d'effectuer toute maintenance ou entretien de cet appareil, débrancher le cordon secteur de la source d'alimentation.

CLEANING AND DISINFECTING

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

- The unit chamber should be cleaned prior to first use.
- Periodic cleaning is 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

Disinfect the oven if algae, mold, bacteria, or other biological contaminants are an issue. 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.
- When disinfecting external surfaces, use disinfectants that will not damage painted metal, glass, and plastic.

Gaskets and Chamber Integrity

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

These ovens use snap-in fiberglass chamber gaskets. The only tool required for swapping out these gaskets is a cutting implement for tailoring the length of the new gasket. Use proper PPE for handling exposed fiberglass when making the cuts.

Electrical Components

Electrical components do not require maintenance. If the unit fails to operate as specified, please contact your SHEL LAB distributor or Technical Support for assistance.

Calibrate the Temperature Display

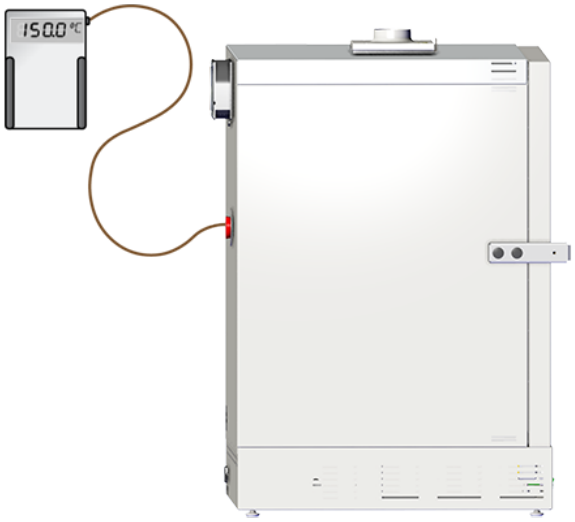
Note: Please see the **Reference Sensor Device entry** on page 7 for the device requirements.

Temperature calibrations match the temperature display to the actual air temperature inside the unit chamber. The actual air temperature is supplied by a reference sensor device. Calibrations compensate for software drifts in the controller as well as deviations caused by the natural material evolution of the sensor probe in the heated chamber space. Calibrate as often as required by your laboratory or production protocol, or regulatory compliance schedule. Always calibrate to the industry or regulatory standards required for your application.

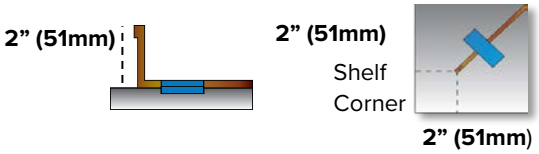
A Suggested Calibration Set Up

1. Introduce the reference device thermocouple sensor probes into the oven chamber through the access port.

- The probes may also be introduced through the chamber door space.



2. Position the sensor probes in the chamber.



- The probe heads must be at least 2 inches (51mm) in diagonally from the shelf corners and 2 inches (50mm) above the the shelving to prevent heatsinking.
- **Place 1 probe head as close as possible to the geometric center point of the chamber.**
    - If using a single thermocouple, place the probe head as close as possible to the geometric center of the oven chamber.
- Secure probes with non-stick, heat-resistant tape.

Heat-resistant non-stick tape recommended

3. Carefully place the port stopper over the probe wires. Use heat-resistant, nonmarking tape to secure the wires and seal any exterior gaps.

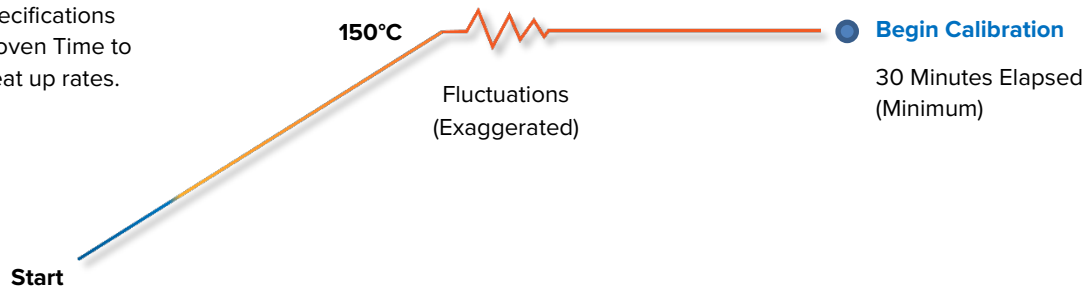
4. The exhaust vent should be opened to match your application position. The manuracturer recommmends a 30% opening to meet the stated oven uniformity specifications.

5. The oven chamber door must be fully closed and latched.

Heat up and stabilization period

- The oven chamber temperature must be stable to perform an accurate calibration.
- The temperature is considered stabilized when the oven chamber has operated at your calibration temperature for at least 1 hour with no fluctuations greater than the specified temperature stability of the oven (see the Unit Specifications chapter).
- The manufacturer recommends calibrating at your application temperature.

See the Unit Specifications chapter for the oven Time to Temperature heat up rates.



Heat Up and Stabilization Phases

Suggested Calibration Procedure

1

Once the chamber has stabilized, compare the reference temperature device and chamber 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 unit chamber air temperature. **The Temperature Calibration procedure is now complete**.

-OR-

- See the next step if a difference falls outside the acceptable range of your protocol.

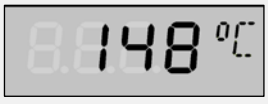
Reference Device

Set Temperature

2

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

Reference Device



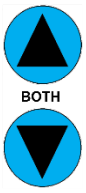
Set Temperature

Continued on next page

Calibration continued

3

Place the oven in temperature calibration mode.



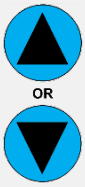
a. Press and hold **both** the **UP** and **DOWN** arrow buttons simultaneously for approximately 5 seconds.

- The Temperature Display will show the letters “C O”, then begin flashing the **current temperature value**.

Current Temp. Value

Note: If an arrow key is not pressed for 5 seconds, the Temperature Display will cease flashing and store the last displayed value as the new current chamber temperature.

4



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

Reference Device

Corrected

5

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

Wait 5 Seconds

- The temperature display will cease flashing and store the correction as an offset.
- The oven will now begin heating or passively cooling to reach the set point with the corrected display value.

Heating with Corrected Value

6

Wait30Minutes

Wait for 30 minutes for the oven to stabilize, **after the oven has achieved the set point** with the corrected display value.

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

Set Point Achieved

Continued on next page

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Calibration continued

7

Compare the reference device reading with the chamber 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 unit is now calibrated for temperature**.

-OR-

- See the next step if the readings still 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

If the temperature difference between the unit and reference device readings fall outside your protocol after three calibration attempts, contact Technical Support or your distributor for assistance.

End of procedure

UNIT SPECIFICATIONS

These ovens are 110 – 120 volt units. Please refer to the oven data plate for individual electrical specifications.

Technical data specified applies to units with standard equipment at an ambient temperature of 25°C and at nominal voltage. The temperatures specified are determined in accordance to 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	Net
SGO1	146 lb / 66 kg	126.5 lb / 57.4 kg
SGO3	203 lb / 92 kg	170.5 lb / 77.3 kg
SGO5	243 lb / 110 kg	208.0 lb / 94.3 kg

DIMENSIONS

By Inches

Model	Exterior W × D × H	Interior W × D × H
SGO1	22.7 x 23.5 x 31.5	12.1 x 13.7 x 14.5
SGO3	26.9 x 28.6 x 34.0	16.5 x 19.5 x 16.2
SGO5	31.4 x 28.1 x 38.8	21.0 x 19.4 x 20.7

By Millimeters

Model	Exterior W × D × H	Interior W × D × H
SGO1	577 x 596 x 800	307 x 349 x 368
SGO3	684 x 727 x 840	419 x 495 x 412
SGO5	798 x 714 x 986	533 x 494 x 527

CAPACITY

Model	Cubic Feet	Liters
SGO1	1.4	39.4
SGO3	3.0	85.0
SGO5	4.9	138.0

SHELF CAPACITY BY WEIGHT

Model	Per Shelf	Max Total Load	Max Shelves
SGO1	50.0 lb / 22.6 kg*	100.0 lb / 45.3 kg**	6 Shelves
SGO3	50.0 lb / 22.6 kg*	200.0 lb / 91.0 kg***	7 Shelves
SGO5	50.0 lb / 22.6 kg*	200.0 lb / 91.0 kg***	9 Shelves

*50 lb / 22.6 kg with weight evenly distributed across the shelf.

**100 lb / 45.3 kg total load for the SGO1 shelves. Exceeding this limit risks damaging the chamber liner.

***200 lb / 91.0 kg total load for the SGO3 and SGO5 shelves. Exceeding this limit risks damaging the chamber liner.

TEMPERATURE

Range

Model	Operating Range
SGO1	Ambient +20 to 306°C
SGO3	Ambient +20 to 306°C
SGO5	Ambient +20 to 306°C

Stability

Model	Stability @80°C	Stability @150°C	Stability @306°C
SGO1	± 0.2°C	± 0.3°C	± 4.0°C
SGO3	± 0.2°C	± 0.3°C	± 0.4°C
SGO5	± 0.2°C	± 0.3°C	± 0.4°C

Uniformity

Model	Uniformity @80°C	Uniformity @150°C	Uniformity @306°C
SGO1	± 2.5°C	± 3.5°C	± 4.0°C
SGO3	± 2.5°C	± 3.5°C	± 4.0°C
SGO5	± 2.5°C	± 3.5°C	± 4.5°C

Temperature continued on next page

Time to Temperature: From an ambient temperature of 20°C.

Model	Heat Up to 80°C	Heat Up to 150°C	Heat Up to 306°C
SGO1	5 Minutes	21 Minutes	68 Minutes
SGO3	7 Minutes	23 Minutes	95 Minutes
SGO5	18 Minutes	30 Minutes	120 Minutes

Recovery Time: From a 30-second door opening.

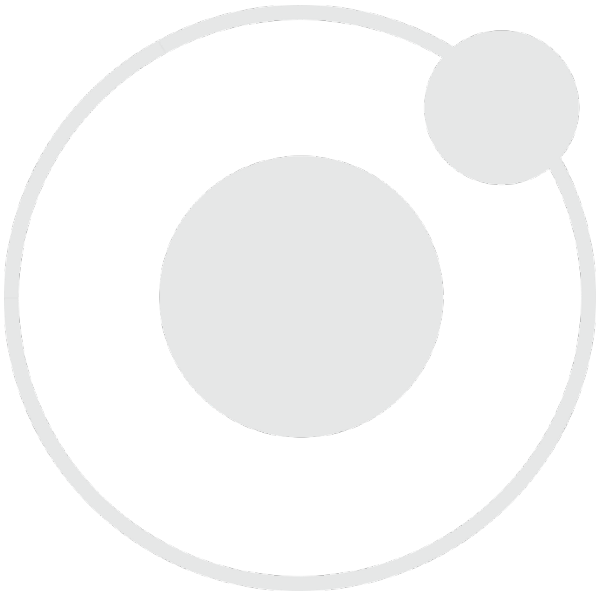
Model	Recovery to 80°C	Recovery to 150°	Recovery to 306°C
SGO1	2.5 Minutes	3.5 Minutes	18.0 Minutes
SGO3	3.0 Minutes	4.0 Minutes	24.0 Minutes
SGO5	4.0 Minutes	8.0 Minutes	35.0 Minutes

Recovery Time: From a 60-second door opening.

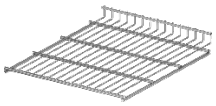
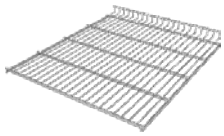
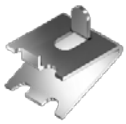
Model	Recovery to 80°C	Recovery to 150°	Recovery to 306°C
SGO1	3.0 Minutes	4.0 Minutes	22.0 Minutes
SGO3	5.0 Minutes	5.5 Minutes	37.0 Minutes
SGO5	5.0 Minutes	15.0 Minutes	68.0 Minutes

POWER

Model	AC Voltage	Amperage	Frequency
SGO1	110 – 120	12.0	50/60 Hz
SGO3	110 – 120	14.0	50/60 Hz
SGO5	110 – 120	14.0	50/60 Hz

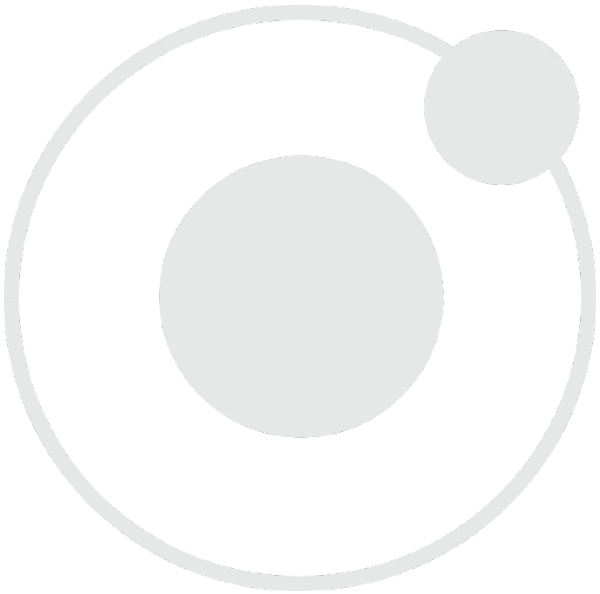


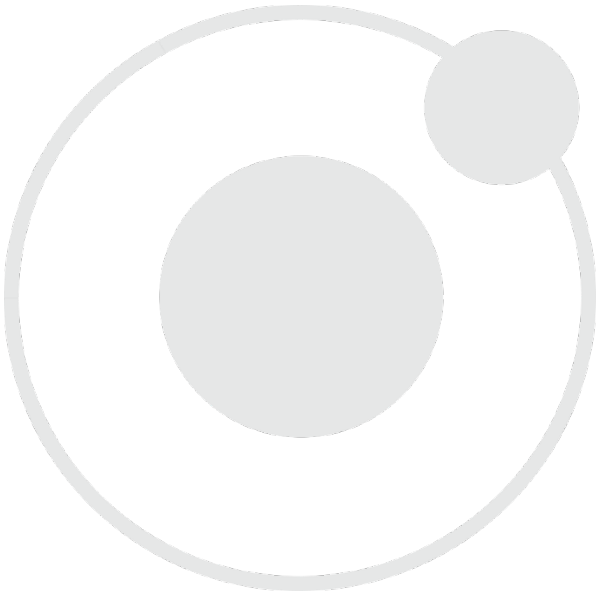
PARTS LIST

Description	Parts Number	Description	Parts Number
Adjustable Leveling Foot	 **2700512**	Port Stopper, High Temperature	 **7750572**
Chamber Gasket, SGO1, sold by 1.5 feet, requires 5.4ft (1.65 meters)	 **3450767 (1.5ft)**	Shelf, SGO1	 **6800543**
Chamber Gasket, SGO3, sold by 1.5 feet, requires 7.5ft (2.3 meters)	 **3450767 (1.5ft)**	Shelf, SGO3	 **6800544**
Chamber Gasket, SGO5, sold by 1.5 feet, requires 8.1ft (2.5) meters	 **3450767 (1.5ft)**	Shelf, SGO5	 **6800454**
Fuse, T16A 250V 5x20mm	 **3300513**	Shelf Clip, Individual (1)	 **1250512**
Power Cord 125 volt, 15Amp, 9ft 5 in (2.86m) NEMA 5-15P	 **1800510**		

Ordering

If you have the Part Number for an item, you may order it directly from Sheldon Manufacturing by calling 1-800-322-4897 extension 3. If you are uncertain that you have the correct Part Number, or if you need that specific item, please contact Sheldon Technical Support for help at 1-800-322-4897 extension 4 or (503) 640-3000. Please have the **model number** and **serial number** of the unit ready, as Tech Support will need this information to match your unit to its correct part.





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