Drying Ovens 220 - 240 Voltage

Cascade

CDO-28

Installation - Operation Manual
These ovens require permanent connect wiring (also known as a hardwiring) to a power source.
These units are TÜV CUE listed as forced air 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.

These units have been tested to the following requirements:

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CAN/CSA C22.2 No. 61010-1:2012
UL 61010-1:2012-05
UL 61010A-2-010:2002-03
EN 61010-1:2010
EN 61010-2-010:2014
Supplemented by: UL 61010-2-010:2015
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Locations and Applications Range

The ovens are not intended for use at hazardous or household locations. These ovens are intended for professional, industrial, and educational applications. CDO forced-air ovens are engineered for constant temperature forced-air drying applications.

User Manual

This manual contains instructions on how to receive, install, operate, and maintain the unit in a safe manner. Read the manual before using the unit. **Ensure all users are given appropriate training prior to operating the unit.** Keep the manual available for users to reference during operation.

GENERAL SAFETY CONSIDERATIONS

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

Your oven and its recommended accessories have been designed and tested to meet strict safety requirements. For continued safe operation of your oven, always follow basic safety precautions including:

- Follow any local or regional ordinances in your area regarding the use of this unit.
- Only use the oven for its intended range of applications.
- Use only approved accessories. Do not modify system components. Any alterations or modifications to your oven may be dangerous and will void your warranty.
- Always hardwire the units powerfeed to a protective earth-grounded electrical source that conforms to national and local electrical codes. If the unit is not grounded, parts such as knobs and controls may conduct electricity and cause serious injury.
- Avoid damaging the power feed. Do not bend it excessively, step on it, place heavy objects on it. A damaged power feed can easily become a shock or fire hazard. Never use a power feed after it has been damaged.
- Position the equipment so the end-user can quickly and easily disconnect or uncouple the power feed in the event of an emergency.
- Do not attempt to move the unit while in operation or before the unit has cooled.
CONTACTING ASSISTANCE

If you are unable to resolve a technical issue with your oven, please contact Cascade Sciences Technical Support. Phone hours for Technical Support are 6am – 4:30pm Pacific Coast Time (west coast of the United States, UTC -8). Please have the following information ready when calling or emailing Technical Support: the **model number** and the **serial number** (see page 9).

PHONE: 866-466-7511 or 503-847-9047

Cascade Sciences
5285 NE Elam Young Parkway
Unit B100
Hillsboro OR, 97124

TEMPERATURE REFERENCE SENSOR DEVICE

The oven does not come with a temperature reference device. A reference device must be purchased separately for performing in-house accuracy validations or calibration adjustments of the oven temperature display.

The device must be accurate to at least 0.1°F and should be regularly calibrated by a third party. For best results, use a digital device with one or more thermocouple probes. Remote readings eliminate chamber door openings and avoid subsequent waits for the chamber temperature to re-stabilize. Select probes suitable for the application temperature you will validate or correct the display accuracy at.

Alcohol thermometers are insufficient for conducting accurate validations and calibrations. Do not use a mercury thermometer. **Never place a mercury thermometer in the oven chamber.**
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. The unit should come with an Installation and Operation Manual.
5. Verify that the correct number of accessory items have been included. Carefully check all packaging for accessories before discarding.

Included Accessory Items:

<table>
<thead>
<tr>
<th>Shelves</th>
<th>Shelf Sliders Left</th>
<th>Shelf Sliders Right</th>
<th>Leveling Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>
ORIENTATION

**Fuse Holders for Accessory Outlet (2 amps each)**

**Accessory Outlet 6-20R**

**Power Supply Wiring Braid**

**Power Panel (Back of Oven)**

**Permanent Connect Wire Braid 6 gauge, 6 inches (15 cm)**

**Intake Vent**

**Control Panel**

**Exhaust Vent**

**Temperature Sensor Probes**

**Door Gasket**

**Access Port (Back of Oven)**

**Chamber Ceiling Liner**

**Shelf Standard Mounting Rail**

Figure 1: CDO-28
**RECORDING DATA PLATE INFORMATION**

Locate the data plate on the back of the oven below the power braid inlet. The data plate contains the oven model number and serial number. Technical support and your distributor will need these numbers in order to assist you in the future.

**Date Plate Information**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>


HARDWIRE REQUIREMENT

The oven requires permanent connect wiring (commonly known as hardwiring). Wiring to the power source must be performed by a qualified electrical technician. All other installation steps may be performed by the end user.

INSTALLATION CHECKLIST

Carry out the procedures and steps listed below to install the oven in a new workspace location and prepare it for use. All procedures are found in the Installation section of this manual.

Pre-Installation

✓ Check that the ambient condition, ventilation, and spacing requirements for the oven are met, page 13
  • Unit dimensions may be found on page 37
✓ Check for performance-disrupting heat and cold sources in the environment, page 13
✓ Check that a suitable permanent connect electrical power supply is present, page 13

Install the Oven in its Workspace Location

✓ Review the lifting and handling instructions, page 14
✓ Install the leveling feet, page 15
✓ Install the oven in its workspace location, page 15

Set up the Oven for Use

✓ Clean the oven chamber and shelving if needed, page 15
✓ Install the shelving in the oven chamber, page 16
**REQUIRED AMBIENT CONDITIONS**

This oven is intended for use indoors, at room temperatures between 59°F and 104°F (15°C and 40°C), at no greater than 80% Relative Humidity (at 77°F / 25°C).

**Required Clearances**

- Leave **24 inches (60cm)** between the top, sides, and back of the oven and any walls, partitions, or overhead cover. This is required for unobstructed airflow and cooling.

- **12 inches (30cm)** of vertical headspace clearance will suffice if the oven exhaust is vented from the workspace through a duct or other channeling. Make sure the exhaust vent remains unobstructed.

- **Do not place objects on top of the oven.** Exception: A power exhaust blower offered by Cascade Sciences may be mounted on the exhaust vent.

- Allow at least **12 inches (30cm)** 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.

**Operating the unit outside of these conditions may adversely affect its temperature range and stability.** For conditions outside of those listed above, please contact your distributor to explore other oven options suited to your laboratory or production environment.
**ENVIRONMENTAL DISRUPTION SOURCES**

When selecting a location to install the unit, consider all environmental conditions that can affect its temperature performance. For example:

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

**POWER SOURCE REQUIREMENTS**

When selecting a location for the oven, check that each of the following requirements is satisfied:

**Power supply.** The power supply must meet the power requirements listed on the oven data plate (located on the back of the unit, beneath the power feed inlet).

- These ovens are intended for a **220 – 240 volt, 50/60 Hz** applications at **26 amps**.
- The power source must be **single (1) phase** and **protective earth grounded**.
- The power source must conform to all national and local electrical codes.
- **Supplied voltage must not vary more than 10% from the data plate rating.** Damage to the oven may result if the supplied voltage varies more than 10%.
- Use a separate circuit to prevent loss of the unit due to overloading or circuit failure. The circuit must meet or exceed the amperage requirements listed on the oven data plate.

**Switch or circuit-breaker:** A switch or circuit-breaker must be used in the building installation to protect against overcurrent conditions.

- The required circuit-breaker is **30 amps**.

**Power feed disconnect.** The oven must be positioned so that all operators have access to the power feed disconnect in case of emergencies.

- The Disconnect must be in close proximity to the equipment and within easy reach of the operator.
- The Disconnect must be marked as the disconnecting device for the equipment.

Continued on next page
**INSTALLATION**

**Accessory Outlet fuses:** The oven is also provided with a pair (2) of 2-amp fuses installed adjacent to the external power receptacle used to power accessory blower fans.

- The fuses protect against overcurrent conditions related to the operation of any attached exhaust blower.
- If one fuse blows, the receptacle will depower. The cause of a blown fuse should be determined prior to replacing it.

These fuses do not provide protection against overcurrent events associated with major components of the oven. Overcurrent protection for the oven must be set up in the location power supply external to the unit. See the circuit breaker requirements above.

**POWER FEED WIRING**

The oven comes provided with an integral 6 inch (15 cm) wire braid consisting of two 6-gauge hot wires and a 6-gauge earth ground.

The wires for power source connection should be Green/Yellow – Earth; Black – Hot; Black – Hot.

The oven must be earth grounded using the protective conductor terminal (green with yellow stripe wire). Do not remove the protective conductor (earth connection). Removing the protective conductor will negate the oven protections against potentially dangerous electric shocks and create a possible fire hazard.

**LIFTING AND HANDLING**

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

- Lift the oven only from its bottom surface.
- Doors, handles, and knobs are not adequate for lifting or stabilization.
- Restrain the oven 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 4 leveling feet with the 4 corner holes on the bottom of the oven.

The oven must be level and stable for safe operation.

Note: To prevent damage when moving the unit, turn all four 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.

- Verify that the oven stands level and does not rock. Adjust the leveling feet as needed.

INSTALLATION CLEANING

The unit was cleaned at the factory, but not sterilized. It may have been exposed to contaminants en route during shipping.

- Remove all wrappings and coverings from shelving prior to cleaning and installation.
- Do not clean with deionized water.
- See the Cleaning and Disinfecting topic in the User Maintenance section (see page 31) for more information on how to clean the oven chamber prior to putting the unit into operation.
INSTALL THE SHELVING

The horizontal airflow within the chamber moves from the small duct holes on the right-hand side of the chamber to the large holes on the left side. Place the shelves as not to obstruct the duct holes on either side. This maximizes airflow across the shelf space.

Space the shelves evenly in the oven chamber to ensure the best possible air circulation and temperature uniformity.
The oven 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.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Exclamation Mark]</td>
<td>Indicates that you should consult your service manual for further instructions. Indique que l’opérateur doit consulter le manuel d’utilisation pour y trouver les instructions complémentaires.</td>
</tr>
<tr>
<td>![Temperature Symbol]</td>
<td>Indicates Temperature Repère température</td>
</tr>
<tr>
<td>![AC Power Symbol]</td>
<td>Indicates AC Power Repère le courant alternative</td>
</tr>
<tr>
<td>![ON and OFF Symbol]</td>
<td>Indicates (1) ON and (0) OFF I repère de la position MARCHE de l'interrupteur d'alimentation O repère de la position ARRET de l'interrupteur d'alimentation</td>
</tr>
<tr>
<td>![Grounding Symbol]</td>
<td>Indicates protective earth ground Repère terre électrique</td>
</tr>
<tr>
<td>![Up and Down Arrows]</td>
<td>Indicates UP and DOWN respectively Touches de déplacements respectifs vers le HAUT et le BÀ</td>
</tr>
<tr>
<td>![Potential Shock Symbol]</td>
<td>Indicates a Potential Shock Hazard Signale danger électrique</td>
</tr>
<tr>
<td>![Recycling Symbol]</td>
<td>Indicates the unit should be recycled (Not disposed of in land-fill) Indique l’appareil doit être recyclé (Ne pas jeter dans une décharge)</td>
</tr>
<tr>
<td>Symbol</td>
<td>Definition</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
</tr>
</tbody>
</table>
| ![Clock Icon] | Indicates the timer  
Indique le minuterie |
| ![Start or Stop Timer Icon] | Start or Stop the Timer  
Lancer ou arrêter le minuteur |
| ![Reset Timer Icon] | Reset the Timer  
Réinitialisation de la Minuterie |
| ![Triangle with Hot Surface Icon] | Indicates: Caution hot surface  
Indique: Avertissement symbole de surface chaude |
CONTROL PANEL OVERVIEW

Figure 2: Control Panel

Timer Switch
The black Timer Switch controls power to the timer system. When this switch is in the ON position the SET TIMER display will illuminate, and the oven can run a timed steady-state heating profile at the current temperature set point. The oven will not heat while the Timer system is on unless a profile is running.

Power Switch
The green Power Switch controls all power to the oven. When in the ON (1) position the switch illuminates.

Timer Display and Control Pad
When activated, the SET TIMER display shows the duration of the currently programmed heating profile, or a flashing duration adjustment mode, or the countdown of a running 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 blinking adjustment mode.

The “T” START/STOP timer button launches a heating profile or pauses a running profile.

Main Temperature Display and Control
Marked SET TEMPERATURE, this display shows the current oven chamber air temperature accurate to within ±0.1°F. The display can also show an adjustable temperature set point in the display’s set point mode, as well as an adjustable offset while in calibration mode.

The arrow buttons can be used to adjust the temperature set point or place the unit in its calibration mode, and then enter a calibration offset value.
Heating Activated Light
The green pilot light located beneath the label HEATING ACTIVATED illuminates whenever the workspace oven heating elements are powered and warming the oven. The oven uses measured pulses to achieve and maintain the temperature set point.

Over Temperature Limit Control (OTL)
This graduated dial sets the temperature 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 23 in the Theory of Operation entry.

OTL Light
Marked OVER TEMP ACTIVATED, this light illuminates whenever the OTL System is routing power away from the heating elements. Under normal operating conditions this light should never illuminate.

Humidity Display
The humidity display shows the current humidity inside the oven chamber as a relative percentage accurate to 0.1%. The display range is 0.0 – 99%.
**OPERATING PRECAUTIONS**

**Warning:** The oven is not an explosion proof unit!

**Avertissement**  Ce sont des fours pas résistants aux explosions

- This oven is not designed to safely contain flammable or combustible gasses, vapors, or liquids.
- Do not place combustible or flammable materials into the chamber, or items that have been processed with or tainted by combustible or flammable substances.
- The bottom surface of the chamber should **not** be used as a work surface.
- Do not place samples or product on the chamber floor.
- Do not operate the oven in an environment with noxious fumes.
- The oven is provided with dampered vent ports. For safe and efficient oven operation follow these precautions:
  - During normal operations, the dampers are closed.
  - Outgassed byproducts may be hazardous to or noxious for operating personal. If either is the case, oven exhaust should be positively ventilated to a location outside workspace in accordance with national and local regulations.
- Do not place sealed or filled containers in the oven.
- Do not place mercury thermometers in the oven.
- This oven is not designed for use in Class I, II, or III locations as defined by the US National Electric Code.

**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.
**Theoretical Operation**

**Heating**

When powered, the oven chamber heats to and then maintains the currently programmed temperature set point. The set point may be adjusted by the end-user using the Set Temperature controls.

Heating is controlled by a microprocessor controller board that stores the temperature set point. The microprocessor senses the chamber air temperature via a solid-state probe located in the airstream on the back wall of the 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.

These 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. Waste heat is generated primarily by the operation of the blower fan motor and the resulting air compression in the duct spaces. In practice, the temperature floor is ambient +26°F.

The oven depends on the operation of the blower fan to maintain temperature uniformity and stability in the chamber.

**Air Circulation**

The oven continually circulates air internally while powered in order to maintain temperature uniformity and stability in the oven chamber and to speed drying rates. Air is forced through vent holes on the right side of the chamber, blows across the shelf space, and is then pulled into a duct that makes up the left chamber wall. From there, the air is drawn upward into a heating duct by the action of the blower fan. The oven is intended to be run as a closed air-cycle system.

**Vents – Intake and Exhaust**

The oven is provided with an intake vent and exhaust vent that may be opened or closed using dampener slides located on the vents. The dampeners are intended to be opened after the heat treatment or bake out phases of an application are complete. Opening the dampener vents during the treatment or bake out may speed the rate of material drying, depending on the nature of the sample material, outgassed byproducts, and ambient conditions. However, running the oven with the dampeners open introduces a significant flow of cool air into the chamber while allowing heated air to exit. This will impact the temperature uniformity and stability of the chamber and lower the operational temperature ceiling.
**Timed Heating Profile**

The oven is provided with a timer system that can run the oven in a steady-state heating profile at the current temperature set point from 1 minute up to 99 hours, 59 minutes. Allow the oven to heat to temperature prior to launching the profile. Launching a profile with the temperature set point set to 240°F immediately after turning on the oven will result in the first 22 minutes of the profile being spent with the chamber rising from room temperature to 240°F.

When the timer system is on, the oven will not heat unless a profile is running.

**Accessory Power Exhaust Outlet**

CDO Forced-Air ovens come with an external accessory power outlet intended to supply electricity to a power exhaust blower attached to the oven exhaust vent. The outlet is always powered while the oven is on. The primary application of the power exhaust fan is to positively vent exhaust out of the workspace around the oven. The standard receptacle is a 240 volt, North American 6-20R.

The operation of the fan affects the oven chamber temperature, lowering it significantly by boosting the rate that cooler outside air is pulled in.

**The Over Temperature Limit System (OTL)**

When set, the OTL heating cutoff system prevents runaway heating in the event of a failure of the microprocessor controller or its thermometer probe. 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 temperature of the chamber exceeds the current OTL setting, the OTL routes power away from the heating elements. The Over Temperature Limit is set by the end-user, typically at approximately 10°F above the application temperature set point. Because of its nature as a mechanical cutoff system and its lack of PID analytics, the OTL cannot deliver the same degree of temperature stability and measurement precision as the digital display and microprocessor.
**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. Turn on the oven by placing the green main power switch in the (I) ON position.

2. Perform the following procedures:
   - **Set the Oven Temperature Set Point** page 25
   - **Set the Over Temperature Limit** page 29
   - **Optional** If you are required to validate or verify the accuracy of the temperature display for regulatory or industry standards compliance, see the Set Up and first step of the suggested **Calibrate the Temperature Display procedure** in the User Maintenance chapter. See page 33.
   - **Optional** Set the oven timer to run the oven for a set duration. Please see page 27.
SET THE TEMPERATURE SET POINT

Adjust the oven temperature set point to that of your application.

1

Turn the OTL dial clockwise to its max setting, if not already set at max.

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

2

Activate the temperature set point adjustment mode.

   a. Press and release either of the Set Temperature arrows

      - The display will briefly flash the letters “SP”, then show the flashing, adjustable temperature set point.

Note: The display will automatically exit the adjustment mode after 5 seconds of inactivity, with the last shown set point value saved.

3

Adjust the set point to your process temperature using the Up or Down arrow buttons.

4

Wait 5 seconds after entering the set point.

   - The display will stop flashing. The set point is now saved in the controller.
   - The oven will now automatically heat or passively cool to match the set point.
   - The display will revert to showing the current chamber air temperature.

See the Setting the Over Temperature Limit procedure on page 26 for how to set the OTL heating cutoff system once the oven has stabilized at your application temperature set point.

End of Procedure
SET THE OVER TEMPERATURE LIMIT

This procedure sets the Over Temperature Limit heating cutoff to approximately 10°F above the current temperature set point. Perform the steps below once the oven has been stabilized at your application temperature set point for at least a 30 minutes.

1. If you have not done so already, turn the Set Over Temperature Limit control dial clockwise to the maximum position.

2. Turn the Over Temperature Limit control dial counterclockwise until the red Over Temp Limit Activated light illuminates.

3. Slowly turn the dial clockwise until the Over Temperature Limit Activated light turns off. Stop turning the control.

4. Leave the OTL dial set slightly above the activation point.
   - The Over Temperature Limit is now set approximately 10°F above the current chamber 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. If you can 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.

   a. Place the black **Timer switch** in the On (1) position.

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

   - The oven will cease heating.

2

Place the Timer display in its adjustable set timer mode.

   a. Press and hold the **Reset** button until the Timer Display begins to blink.

   - The illuminated decimal point between the 2nd and 3rd numbers indicates that Hours parameter is selected.

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

3

Use the **Up** or the **Down arrow key** to adjust the Hour parameter to a setting from 0 to 99.

4

Advance to the Tens-of-Minutes parameter.

   a. Press and hold the **Reset** button.

   - The flashing decimal point will advance to between the third and fourth numbers, automatically saving the new Hour parameter setting.

Procedure continued on next page
5 Use the **Up** or the **Down arrow key** to set the Tens of Minutes parameter value.

6 Advance to the Minutes parameter.
   a. Press and hold the **Reset** button.
      - The flashing decimal point will advance to between the third and fourth numbers, automatically saving the new Tens-of-Minutes parameter setting.

7 Use the **Up** or the **Down arrow key** to adjust the Minutes parameter value.

8 Wait for 5 seconds after entering the new Minutes parameter value.
   - The display will exit adjustment mode.
   - The Minutes parameter, along with the previous two parameter values, are now saved.

   **End of procedure**
LAUNCH A HEATING PROFILE

The oven can be run in a timed steady-state heating profile at the current temperature set point. Allow the oven to come up to temperature prior to launching a profile. See the Setting the Timer procedure on page 27 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. The Timer switch must be in the ON (1) position just prior to launching the profile.

2. Press the Start/Stop T button to launch the current profile.
   - The profile will launch and the TIMER ACTIVATED indicator will illuminate.
   - The Timer Display will start counting down.
   - The oven will resume heating.

3. To pause a running profile, press the Start/Stop button.
   - The oven will cease heating until the profile is restarted, reset, or the Timer system is turned off.
   - To restart the profile where it left off, press the Start/Stop button again.

4. The oven will automatically cease heating upon reaching "00:00".
   - To resume manual heating place the Timer Switch in the OFF (O) position.
     - Or -
   - 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
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 10°F 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.
USER MAINTENANCE

**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.

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### 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:** Never clean the oven with alcohol or flammable cleaners.

**Avertissement:** Ne jamais nettoyer l’appareil à l’alcool ou avec des nettoyants inflammables.

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### Cleaning

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

1. Turn the unit off. Open all doors and carry out your laboratory or production space disinfection protocol.

2. Disinfect the oven chamber using commercially available disinfectants that are non-corrosive, non-abrasive, and suitable for use on stainless steel surfaces. If disinfecting external surfaces use disinfectants that will not damage painted metal or plastic.

3. Contact your local Site Safety Officer for detailed information on the disinfectants compatible with your application or process.

4. If permitted by your protocol, remove all interior accessories (shelving and other non-attached items) from the chamber when disinfecting.

5. Disinfect all surfaces in the chamber, making sure thoroughly disinfect the corners. Exercise care to avoid damaging the sensor probes.

Door Components

Periodically, inspect the door latch, trim, and catch for alignment. Check the two silicon rubber Periodically, inspect the door latch, trim, catch, and 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 door 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 electrical systems fail to operate as specified, please contact your distributor or Technical Support for assistance.
USER MAINTENANCE

CALIBRATING THE TEMPERATURE DISPLAY

**Note:** Please see the Reference Sensor Device entry on page 6 for the minimum device requirements.

Temperature calibrations match the temperature display to the actual air temperature inside the oven 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 through one of the vent ports. Carefully close dampener. Leaving a ¼ inch gap (6mm) is acceptable when wire probes are in the port and should not interfere with the verification accuracy. The chamber air pressure is close to neutral while the oven is in operation, limiting the exchange with cooler external atmosphere.

2. Place the sensor probes in the oven with the probe heads at least at least 2 inches (5cm) from the surface of the shelving or walls to prevent heatsinking. Secure with non-stick, heat-resistant tape.

3. The oven chamber door must be closed and latched.

4. The intake and exhaust vents should both be closed to ensure an accurate calibration.

If you are using only one thermocouple, place the sensor probe head as close to the geometric center of the oven chamber as possible.
5) Heat up and stabilization period.

- The oven chamber must be stable at temperature in order to perform an accurate calibration.
- The temperature is considered stabilized when the oven chamber has operated at your calibration temperature for at least **30 minutes** with no fluctuations of ±0.4°F or greater.

![Figure 3: Oven Chamber Heat Up and Stabilization Phases](image)

**Suggested Calibration Procedure**

1. Once the chamber has stabilized with no fluctuations, compare the reference temperature device and chamber temperature display readings.

   a. If the readings are the same, or the difference between the two (2) falls within the acceptable range of your protocol, the display is accurately showing the chamber temperature. **The Temperature Calibration procedure is now complete.**

   b. See Step 2 if a difference falls outside the acceptable range of your protocol.

2. The display requires calibration. Advance to Step 3.

   - If the door was opened to check a reference device temperature inside the chamber wait 15 minutes **after the reference device reading stops fluctuating** before proceeding.

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

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

4  Adjust the current temperature value to match the reference device.
   a. Use the UP and DOWN arrow buttons.

5  After entering the correction adjustment, wait 5 seconds.
   • The temperature display will cease flashing and store the correction as an offset.
   • The oven will now begin heating or allow itself to cool in order to reach your set point with the corrected display value.

6  Wait for 30 minutes for the oven to stabilize after the oven has achieved the set point with the corrected display adjustment.
   • Failure to wait until the unit is fully stabilized will result in an inaccurate oven display reading.

Procedure continued on next page
**Calibration continued**

7 Allow the oven to stabilize after achieving the temperature set point with corrected display value.

*Note:* The unit is stabilized when no fluctuations of ± 0.4°F or greater have been detected with the reference device for a minimum of 30 minutes.

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

   a. If the readings are the same, or the difference between the two falls within the acceptable range of your protocol, the oven is calibrated for temperature.

   b. **The Temperature Calibration procedure is complete.**

9 If the two readings still fall outside the acceptable range of your protocol, repeat steps 2 – 8 up to two more times.

   - Three calibrations attempts may be required to successfully calibrate ovens more than ± 3°F out of calibration.

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

End of procedure
UNIT SPECIFICATIONS

These ovens are 220 - 240 voltage single phase 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 a voltage fluctuation of ±10%. 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

<table>
<thead>
<tr>
<th></th>
<th>Shipping</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>694 lbs / 315 kgs</td>
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</table>

DIMENSIONS

By Inches

<table>
<thead>
<tr>
<th>Exterior W × D × H</th>
<th>Interior W × D × H</th>
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</thead>
<tbody>
<tr>
<td>43.0 x 34.3 x 85.5</td>
<td>31.5 x 26.0 x 60.5</td>
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</tbody>
</table>

By Millimeters

<table>
<thead>
<tr>
<th>Exterior W × D × H</th>
<th>Interior W × D × H</th>
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</thead>
<tbody>
<tr>
<td>1090 x 870 x 2170</td>
<td>800 x 660 x 1536</td>
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</table>

CAPACITY

Volume

<table>
<thead>
<tr>
<th>Cubic Feet</th>
<th>Liters</th>
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</thead>
<tbody>
<tr>
<td>28.0</td>
<td>792</td>
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</table>

Shelf Capacity by Weight

<table>
<thead>
<tr>
<th>Per Shelf</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>75 lbs / 34 kg</td>
<td>450 lbs / 204 kg</td>
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</table>
UNIT SPECIFICATIONS

AIR FLOW PERFORMANCE

Air Exchanges

<table>
<thead>
<tr>
<th>Cubic Feet</th>
<th>Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 per Minute</td>
<td>3560 per Minute</td>
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</table>

Air Flow Across the Shelf Space

<table>
<thead>
<tr>
<th>Cubic Feet</th>
<th>Liters</th>
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</thead>
<tbody>
<tr>
<td>17.3 per Minute</td>
<td>490 per Minute</td>
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</table>

TEMPERATURE PERFORMANCE

<table>
<thead>
<tr>
<th>Range</th>
<th>Uniformity @240°F</th>
<th>Stability @ All Temps.</th>
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</thead>
<tbody>
<tr>
<td>Ambient +26° to 350°F</td>
<td>3.6°F</td>
<td>± 0.4°F</td>
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</table>

Heat Up Times from Ambient (77°F)

<table>
<thead>
<tr>
<th>To 240°F</th>
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</thead>
<tbody>
<tr>
<td>22 Minutes</td>
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POWER

<table>
<thead>
<tr>
<th>AC Voltage</th>
<th>Amperage</th>
<th>Frequency</th>
<th>Phase</th>
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<tbody>
<tr>
<td>220-240</td>
<td>26</td>
<td>50/60 Hz</td>
<td>1</td>
</tr>
<tr>
<td>Description</td>
<td>Parts Number</td>
<td>Description</td>
<td>Parts Number</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>--------------</td>
<td>----------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Adjustable Leveling Feet</td>
<td>270506</td>
<td>Shelf Slider Right</td>
<td>5121845</td>
</tr>
<tr>
<td>Door Gasket Fiberglass with clips, 1 ft section</td>
<td>3450642</td>
<td>Shelf Slider Left</td>
<td>5121844</td>
</tr>
<tr>
<td>Requires 17 feet for a complete replacement.</td>
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<td></td>
<td></td>
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<tr>
<td>Shelf Assembly, 23 x 31&quot;</td>
<td>995-00005</td>
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