Installation, Operation and Maintenance Instructions

400 °C Annealing Ovens - TLD Model: 3 Litres
No Controller

TLD 3 + No Controller
Contents

This manual is for guidance on the use of the Carbolite Gero product specified on the front cover. This manual should be read thoroughly before unpacking and using the furnace or oven. The model details and serial number are shown on the back of this manual. Use the product for the purpose for which it is intended.

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1.0 Symbols and Warnings

1.1 Switches and Lights

Instrument switch: when the instrument switch is operated the temperature control circuit is energised.

Solenoid valve (if fitted): see section 5.4 for full details

1.2 General Warnings

DANGER – Electric shock. Read any warning printed next to this symbol.
WARNING: Risk of fatal injury.

DANGER – Hot surface. Read any warning printed next to this symbol.
WARNING: All surfaces of a product may be hot.

DANGER – Read any warning printed next to this symbol.

Caution – Double Pole/Neutral Fusing
2.0 Installation

2.1 Unpacking and Handling

When unpacking and handling the product, always lift it by its base. Do not use the door or any other projecting cover or component to support the equipment when moving it. Use two or more people to carry the product where possible.

Carefully remove any packing material from inside and around the product before use. Avoid damaging the surrounding insulation when removing packing materials.

Locate the shelves as required.

NOTE: This product contains Refractory Ceramic Fibre (also known as Alumino Silicate Wool - ASW). For precautions and advice on handling this material see section 7.2.

2.2 Siting and Setting Up

Place the product on a level surface in a well ventilated area.

Site away from other sources of heat and on a non-flammable surface that is resistant to accidental spillage or hot materials.

The surface on which the equipment is mounted should be stable and not subject to movement or vibrations.

The height of the mounting surface is important to avoid operator strain when loading and unloading samples.

Unless otherwise stated elsewhere in this manual, ensure that there is at least 150 mm of free space around the back and sides of the product. Clear space is required above the product to dissipate heat.
2.0 Installation

Ensure that the product is placed in such a way that it can be quickly switched off or disconnected from the electrical supply. During the operation of the product, hot air is exhausted from the vent on the top of the product while the cooling blower is in operation; there must be clearance of at least 500 mm between the top of the product and any surface which must be made of non-combustible material.

Under no circumstances should any objects be placed on top of the product. Always ensure that any vents on the top of the product are clear of any obstruction. Always ensure all cooling vents and cooling fans (if fitted) are clear of any obstruction.

2.3 Electrical Connections

Connection by a qualified electrician is recommended.

This product requires a single-phase A.C. supply with earth (ground), which may be Live to Neutral non-reversible (polarised), Live to Neutral reversible (non-polarised), or Live to Live.
Check the product rating label before connection. The supply voltage should agree with the voltage on the label and the supply capacity should be sufficient for the current on the label.

The supply should be fused at the next size equal to, or higher than the current on the label. A table of the most common fuse ratings is also given towards the back of this manual. When the mains cable is factory fitted, internal fuses are also fitted. It is essential that the operator ensures that the product is correctly fused.

Products with a factory fitted supply cable are designed to be wired directly to an isolator or fitted with a line plug.

Products without a factory fitted supply cable require a permanent connection to a fused and isolated supply. The product’s electrical access panel should be temporarily removed, and connections made to the internal terminals.

If the product is to be connected by line plug. The plug should be within reach of the operator and should be easy to remove.

When connecting the product to an isolating switch ensure that both conductors (single phase) or on all live conductors (three phase), and should be within reach of the operator.

The supply MUST incorporate an earth (ground).

### Electrical Connection Details:

<table>
<thead>
<tr>
<th>Supply</th>
<th>Terminal Label</th>
<th>Cable Colour</th>
<th>Live - Neutral</th>
<th>Reversible or Live-Live</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-phase</td>
<td>L</td>
<td>Brown</td>
<td>to live</td>
<td>to either power conductor (For USA 200-240V, connect L1)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Blue</td>
<td>to neutral</td>
<td>to the other power conductor (For USA 200-240V, connect L2)</td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td>Green/Yellow</td>
<td>to earth (ground)</td>
<td>to earth (ground)</td>
</tr>
</tbody>
</table>
3.0 Temperature Controller

If this product is fitted with a temperature controller, instructions are provided separately.
4.0 2132 Over-Temperature Controller Description (if fitted)

4.1 Description

This over-temperature controller is fitted and supplied ready to use by Carbolite Gero. It is a digital instrument with a latching alarm, requiring no additional panel controls. The controller features easy setting of over-temperature setpoint and reading of current temperature by the over-temperature sensor.

4.2 Operation

4.2.1 Controls

Most Carbolite Gero products are fitted with an instrument switch which cuts off power to the controller and other parts of the control circuit.

To operate the controller, power must be supplied to the product and the instrument switch must be on. If a time switch is included in the product circuit, this must be in the 'ON' position.

When an over-temperature condition occurs, the controller cuts the power to a contactor, which in turn cuts power to the heating elements. Power is not restored until the controller is 'reset'.

Some components will operate after the over-temperature feature isolates the power supply e.g. cooling fans will continue to operate, provided that there is a power supply to the product. In some cases the product may not do so, if other options (such as a door switch) are fitted.
4.2.2 Operation

When switched on, the controller lights up, goes through a short test routine and then displays the measured temperature or the over-temperature setpoint.

The page key allows access to parameter lists within the controller.

A single press of the page key displays the temperature units, normally set to °C; further presses reveal the lists indicated in the navigation diagram. See section 4.4.

The scroll key allows access to the parameters within a list. Some parameters are display-only; others may be altered by the operator.

A single press of the scroll key in the 'Home' list displays the temperature units; further presses reveal the parameters in the current list indicated in the navigation diagram.

To return to the 'Home' list at any time, press page and scroll together, or wait for 45 seconds.

The down and up keys are used to alter the setpoint or other parameter values.

4.2.3 Over-Temperature Operation

Use down and up to alter the over-temperature setpoint. This should normally be set a little above the working temperature (for example 15 °C above). The product is supplied with the over-temperature set at 15 °C above the furnace or oven maximum working temperature.

Press scroll twice view the present temperature as measured by the over-temperature controller. Press it twice, the first press shows the temperature units (°C).

4.2.4 Over-Temperature Alarm

If an over-temperature condition occurs, the OP2 indicator flashes and an alarm message 2FSH also flashes, alternating with the setpoint. Power to the heating elements is disconnected.

4.2.5 Resetting the Over-Temperature Alarm

To acknowledge the alarm press scroll and page together.

If the alarm is acknowledged while there is still an over-temperature condition, the OP2 indicator stops flashing but continues to glow. The 2FSH alarm continues to flash until the over-temperature condition is cleared (by the temperature falling), when normal operation resumes.

If the alarm is acknowledged when the temperature has dropped (or after the over-temperature setpoint has been raised) so that the over-temperature condition no longer exists, then the furnace or oven immediately resumes normal operation.

4.2.6 Sensor Break

The over-temperature cut-out system also operates if the over-temperature control thermocouple breaks or becomes disconnected. The message S.br flashes where the measured temperature is normally displayed.
4.3 Audible Alarm

If an audible alarm is supplied for use with the over-temperature controller, it is normally configured to sound on over-temperature condition and to stop sounding when the alarm is acknowledged as given in section 4.2.

Note: the alarm may sound during controller start-up.

4.4 Navigation Diagram

<table>
<thead>
<tr>
<th>HL</th>
<th>Home List</th>
<th>Page Key</th>
<th>Black = Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTSP</td>
<td>Over-Temperature Setpoint</td>
<td>Scroll Key</td>
<td>Dashed = Through to other options</td>
</tr>
<tr>
<td>AL</td>
<td>Access List</td>
<td></td>
<td>For factory access to list and parameters not available to the operator.</td>
</tr>
</tbody>
</table>
5.0 Operation

5.1 Operating Cycle

The product has fan-assisted circulation which operates when the instrument switch is switched on.

Turn on the instrument switch to activate the temperature controllers. The controllers illuminate and go through a short test cycle.

**Over-Temperature option only.** If the digital over-temperature option has not yet been set as required, set and activate it according to the over-temperature controller instructions.

The product will heat up according to the controller setpoint or program, unless a time switch is fitted and switched off.

DO NOT switch off if the temperature is above 100 °C - damage could be caused to the fan and motor. Adjust the controller to allow the temperature to fall.

5.2 Operating Program

The program consists of the stages shown in the graph below. The rates of temperature rise, dwell temperature and dwell times are all adjustable by the operator. The general format of the program is installed at the manufacturing stage, with initial values as shown in the table below.

<table>
<thead>
<tr>
<th>Function</th>
<th>Initial Setting</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Start</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Heat at a controlled rate</td>
<td>heat up at 480 °C/ hour to 300 °C</td>
<td>SEG n 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rmP.r</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tGt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rAtE</td>
</tr>
<tr>
<td>3 Dwell for a pre-set period</td>
<td>dwell at 300 °C for 1 hour</td>
<td>SEG N 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dweLL 1 hour</td>
</tr>
<tr>
<td>4 Cool at a controlled rate</td>
<td>Cool to 80 °C assisted by inlet blower</td>
<td>SEG n 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rmP.r</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tGt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rAtE</td>
</tr>
<tr>
<td>5 Dwell for a pre-set period</td>
<td>80 °C for 12 hours</td>
<td>SEG n 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dweLL 12 hours</td>
</tr>
<tr>
<td>6 Cool naturally to room temperature</td>
<td></td>
<td>SEG n 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SteP 0 °C</td>
</tr>
<tr>
<td>7 Finish</td>
<td></td>
<td>SEG n 6</td>
</tr>
</tbody>
</table>

This program causes the chamber to heat up at 480 °C per hour to a temperature of 300 °C. The temperature remains at 300 °C for 1 hour. At the end of the 1 hour dwell the setpoint changes to 80 °C and the product cools down as quickly as possible to this
temperature. The rate of cooling is quite fast because of the air inlet blower which is incorporated in the oven. When the chamber temperature reaches 80 °C the second dwell period starts and the product remains at 80 °C for 12 hours. At the end of 12 hours the heaters are switched off and the product cools naturally to room temperature.

5.3 Over-Temperature Control (if fitted)

The over-temperature controller should typically be set at 15 °C above the main controller. If an over-temperature condition occurs, check the main controller is functioning correctly.

An over-temperature condition cuts off power to the heating elements. A light in the over-temperature controller flashes. To reset this, refer to the over-temperature control section of this manual.

5.4 Solenoid Valve with Manual Switch (if fitted)

If ordered the solenoid valve is operated using the panel mounted switch. When the switch is in the 'ON' position the solenoid valve will allow gas to flow. Ensure the installation and use of the product does not create a hazardous atmosphere. The workspace must have sufficient ventilation.
6.0 Maintenance

6.1 General Maintenance

Preventive rather than reactive maintenance is recommended. The type and frequency depends on the product use; the following are recommended.

6.2 Maintenance Schedule

CUSTOMER QUALIFIED PERSONNEL

DANGER! ELECTRIC SHOCK. Risk of fatal injury. Only electrically qualified personnel should attempt these maintenance procedures.

<table>
<thead>
<tr>
<th>Maintenance Procedure</th>
<th>Method</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-Temperature Safety Circuit (if fitted)</td>
<td>Set an over-temperature setpoint lower than the displayed temperature and check for an over-temperature alarm as detailed in the relevant controller manual</td>
<td>Daily Weekly Monthly Bi-Annually Annually</td>
</tr>
<tr>
<td>Over-Temperature Safety Circuit (if fitted)</td>
<td>Electrical measurement</td>
<td></td>
</tr>
<tr>
<td>Door Seals</td>
<td>Visual inspection, check for splits or fraying</td>
<td></td>
</tr>
<tr>
<td>Door Seals</td>
<td>Replacement</td>
<td></td>
</tr>
<tr>
<td>Air Vent</td>
<td>Check and clean if necessary</td>
<td></td>
</tr>
<tr>
<td>Electrical Safety (external)</td>
<td>Visual check of external cables and plugs</td>
<td></td>
</tr>
<tr>
<td>Electrical Safety (internal)</td>
<td>Physically check all connections and cleaning of the power plate area</td>
<td></td>
</tr>
</tbody>
</table>

Function

<table>
<thead>
<tr>
<th>Temperature Calibration</th>
<th>Tested using certified equipment, frequency dependent on the standard required</th>
<th>Daily Weekly Monthly Bi-Annually Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Check</td>
<td>Check that all functions are working normally</td>
<td>Daily</td>
</tr>
<tr>
<td>Operational Check</td>
<td>Thorough inspection and report incorporating a test of all functions</td>
<td>Daily</td>
</tr>
</tbody>
</table>

Performance
<table>
<thead>
<tr>
<th>Component</th>
<th>Task Description</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Fans (if fitted)</td>
<td>Check whether the cooling fans are working</td>
<td></td>
</tr>
<tr>
<td>Circulating Fan (if fitted)</td>
<td>Visual check to see if it is running</td>
<td>✔️</td>
</tr>
<tr>
<td>Circulating Fan (if fitted)</td>
<td>Check bearings and replace if necessary</td>
<td></td>
</tr>
<tr>
<td>Element Circuit</td>
<td>Electrical measurement</td>
<td>✔️</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Measure the current drawn on each phase / circuit</td>
<td>✔️</td>
</tr>
<tr>
<td>Shelves</td>
<td>Visual check for fit and damage</td>
<td></td>
</tr>
</tbody>
</table>
6.0 Maintenance

6.2.1 Cleaning
Soot deposits may form inside the furnace, depending on the process. At appropriate intervals remove these by heating as indicated in the General Operation Notes.

The product's outer surface may be cleaned with a damp cloth. Do not allow water to enter the interior of the case or chamber. Do not clean with organic solvents.

6.3 Calibration
After prolonged use, the controller and/or thermocouple may require recalibration. This is important for processes that require accurate temperature readings or for those that use the product close to its maximum temperature. A quick check using an independent thermocouple and temperature indicator should be made from time to time to determine whether full calibration is required. Carbolite Gero can supply these items. Depending on the controller fitted, the controller instructions may contain calibration instructions.

6.4 After-Sales Service
Carbolite Gero Service has a team of Service Engineers who can offer repair, calibration and preventive maintenance of furnace and oven products both at the Carbolite Gero factory and at customers’ premises throughout the world. A telephone call or email often enables a fault to be diagnosed and the necessary parts to be despatched.

In all correspondence please quote the serial number and model type given on the rating label of the product. The serial number and model type are also given on the back of this manual when supplied with the product.

Carbolite Gero Service and Carbolite Gero contact information can be found on the back page of this manual.

6.5 Recommended Spare Parts and Spare Parts Kit
Carbolite Gero can supply individual spare parts or a kit of the items most likely to be required. Ordering a kit in advance can save time in the event of a breakdown.

Please consult Carbolite Gero's Sales Department for details of recommended spare parts.

6.6 Power Adjustment
The control system incorporates electronic power limiting, but for the model listed in this manual the power limit is set to 100%. The power limit parameter OP.Hi may be accessible to the operator, but should not generally be altered.

In some cases the supply voltage may be outside the range 220-240 V or the 3-phase equivalent, the power limit parameter may be set to a value other than 100%. Do not increase the value to 100%, see section 10.0 for details of power limit settings.
7.0 Repairs and Replacements

7.1 Safety Warning - Disconnection from Power Supply

Immediately switch the product off in the event of unforeseen circumstances (e.g. large amount of smoke). Allow the product to return to room temperature before inspection.

Always ensure that the product is disconnected from the electrical supply before repair work is carried out.

Caution: Double pole/neutral fusing may be used in this product.

7.2 Safety Warning - Refractory Fibre Insulation

Insulation made from High Temperature Insulation Wool

Refractory Ceramic Fibre, better known as (Alumina silicate wool - ASW).

This product contains alumino silicate wool products in its thermal insulation. These materials may be in the form of blanket or felt, formed board or shapes, slab or loose fill wool.

Typical use does not result in any significant level of airborne dust from these materials, but much higher levels may be encountered during maintenance or repair.

Whilst there is no evidence of any long term health hazards, it is strongly recommended that safety precautions are taken whenever the materials are handled.

Exposure to fibre dust may cause respiratory disease.

When handling the material, always use approved respiratory protection equipment (RPE-eg. FFP3), eye protection, gloves and long sleeved clothing.

Avoid breaking up waste material. Dispose of waste in sealed containers.

After handling, rinse exposed skin with water before washing gently with soap (not detergent). Wash work clothing separately.

Before commencing any major repairs it is recommended to make reference to the European Association representing the High Temperature Insulation Wool industry (www.ecfia.eu).

Further information can be provided on request. Alternatively, Carbolite Gero Service can quote for any repairs to be carried out either on site or at the Carbolite Gero factory.

7.3 Panel Removal

Disconnect the product from the electrical supply.
7.0 Repairs and Replacements

To replace components (except controller), remove the front panel. Depending on the component, it may be necessary to remove an internal panel. If in doubt, please consult Carbolite Gero’s technical department.

7.4 Temperature Controller Replacement

Refer to the controller instructions for more information on how to replace the temperature controller.

7.5 Thermocouple Replacement

Disconnect the product from the power supply. Remove terminal cover to gain access to the thermocouple connections. Make a note of the thermocouple connections.

Thermocouple cable colour codings are:

<table>
<thead>
<tr>
<th>Thermocouple leg</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>positive (type K)</td>
<td>green</td>
</tr>
<tr>
<td>negative</td>
<td>white</td>
</tr>
</tbody>
</table>

Disconnect the thermocouple from its terminal block and withdraw the thermocouple from its sheath by bending the metal tag or releasing the screw to release. It is also advisable to remove the sheath and shake out any broken pieces of thermocouple.

Re-assemble with a new thermocouple, observing the colour coding, ensuring that the thermocouple is not twisted as it is being inserted and that the metal tag is bent back to grip the sheath.

Refit the element access panel.

7.6 Element Replacement

Remove front panel and the internal cover as necessary and locate the element terminals.

Disconnect the wires from the element terminals. Remove any starlock washers - these may need to be cut with wire cutters. Remove any clips holding the element inside the chamber and withdraw the element.

Reverse the procedure with the new element.

To find out whether the element failure was caused by a fault in the control circuit, operate the product at a low temperature and check that it is functioning correctly.

7.7 Fuse Replacement

Fuses are accessed by removal of the panel as explained in 'Panel Removal' section. Depending on the model, supply fuses and control circuit fuses may be mounted in their own holders, or may be on a circuit board that contains an EMC filter. The fuses are marked with their ratings.
Take care not to disconnect the wires leading from the EMC filter without first recording their positions: they must be reconnected to the correct terminals.

7.8 Solid-State Relay Replacement

Disconnect the product from the power supply and remove the appropriate cover as given above.

Make a note of the wire connections to the solid state relay and disconnect them. Remove the solid state relay from the base panel or aluminium plate. Replace and reconnect the solid state relay ensuring that the bottom of it has good thermal contact with the base panel or aluminium plate. Replace the access panel.
## 8.0 Fault Analysis

### A. Oven Does Not Heat Up

<table>
<thead>
<tr>
<th></th>
<th>The temperature controller is OFF</th>
<th>The temperature controller is ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No power from supply</td>
<td>The controller shows a very high temperature or a code such as EEE or --- or S.br</td>
</tr>
<tr>
<td>2.</td>
<td>Check the fuses in the supply line</td>
<td>The temperature sensor has broken or has a wiring fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The SSR could be failing to switch on due to internal failure, faulty logic wiring from the controller, or faulty controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The controller may be faulty or not receiving a supply due to a faulty switch or a wiring fault</td>
</tr>
<tr>
<td></td>
<td>There are no lights glowing on the controller</td>
<td></td>
</tr>
</tbody>
</table>

### B. Oven Overheats

<table>
<thead>
<tr>
<th></th>
<th>Oven only heats up when the instrument switch is ON</th>
<th>The controller shows a very high temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The controller shows a low temperature</td>
<td>The thermocouple may have been shorted out or may have been moved out of the oven</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The thermocouple may be connected the wrong way round</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The controller may be faulty</td>
</tr>
<tr>
<td>2.</td>
<td>Oven heats up when the instrument switch is OFF</td>
<td>Replace the SSR. Check for an accidental wiring fault which could have overloaded the SSR</td>
</tr>
</tbody>
</table>
9.0 Wiring Diagrams

9.1 WV-11-00

Key

<table>
<thead>
<tr>
<th>F1, F2</th>
<th>Fuses</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIL</td>
<td>Filter</td>
</tr>
<tr>
<td>SW</td>
<td>Instrument Switch</td>
</tr>
<tr>
<td>FM</td>
<td>Fan Motor</td>
</tr>
<tr>
<td>*</td>
<td>Fan Models Only</td>
</tr>
<tr>
<td>C</td>
<td>Temperature Controller</td>
</tr>
<tr>
<td>TC</td>
<td>Thermocouple</td>
</tr>
<tr>
<td>SSR</td>
<td>Solid State Relay</td>
</tr>
<tr>
<td>EL</td>
<td>Element(s)</td>
</tr>
<tr>
<td>L</td>
<td>Live</td>
</tr>
<tr>
<td>N</td>
<td>Neutral</td>
</tr>
<tr>
<td>PE</td>
<td>Earth (Green+Yellow)</td>
</tr>
<tr>
<td>GR/Y</td>
<td></td>
</tr>
</tbody>
</table>
9.2 WS-02-04 - Alarm-Operated Fan

The fan is operated by an alarm relay in the controller. The cooling fan does not operate if the instrument switch is switched off.

*example alarm contacts*
2A, 2B configured as program segment output
10.0 Fuses and Power Settings

10.1 Fuses

F1- F2: Refer to the circuit diagrams.

<table>
<thead>
<tr>
<th>F1</th>
<th>Internal Supply Fuses</th>
<th>Fitted if supply cable fitted. Fitted on board to some types of EMC filter.</th>
<th>GEC Safeclip of the type shown (glass type F up to 16 A) 38 mm x 10 mm type F fitted on EMC filter circuit board(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2</td>
<td>Auxiliary Circuit Fuses</td>
<td>Fitted on board to some types of EMC filter. May be omitted up to 25 Amp/phase supply rating. 2 Amps glass type F On board: 20 mm x 5 mm Other: 32 mm x 6 mm</td>
<td></td>
</tr>
<tr>
<td>Customer Fuses</td>
<td>Required if no supply cable fitted. Recommended if cable fitted.</td>
<td>See rating label for current; See table below for fuse rating.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Phases</th>
<th>Volts</th>
<th>Supply Fuse</th>
<th>Control Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLD 3</td>
<td>1-phase +N</td>
<td>220-240 V</td>
<td>5 A</td>
<td>2 A</td>
</tr>
</tbody>
</table>

10.2 Power Settings

The power limit settings (parameter OP.Hi) for this model are voltage dependant. The figures represent the maximum percentage of time that controlled power is supplied to the elements. Do not attempt to “improve performance” by setting a value higher than the recommended values. To adjust the parameter refer to the "Changing the Maximum Output Power" of the control section of the manual.

<table>
<thead>
<tr>
<th>Volts</th>
<th>200 V</th>
<th>220 V</th>
<th>230 V</th>
<th>240 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (%)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Please refer to the rating label for product specific information.
## 11.0 Specifications

*Carbolite Gero reserves the right to change the specification without notice.*

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Temp (°C)</th>
<th>Max Power (kW)</th>
<th>Chamber Size (mm)</th>
<th>Approx Capacity (l)</th>
<th>Net Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>H</td>
<td>W</td>
<td>D</td>
</tr>
<tr>
<td>Ovens for thermoluminescent dosimeters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLD 3</td>
<td>400</td>
<td>1</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

### 11.1 Environment

The models listed in this manual contains electrical parts and should be stored and used in indoor conditions as follows:

- **Temperature:** 5 °C - 40 °C
- **Relative humidity:** Maximum 80 % up to 31 °C decreasing linearly to 50 % at 40 °C
### Service Record

<table>
<thead>
<tr>
<th>Engineer Name</th>
<th>Date</th>
<th>Record of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
The products covered in this manual are only a small part of the wide range of ovens, chamber furnaces and tube furnaces manufactured by Carbolite Gero for laboratory and industrial use. For further details of our standard or custom built products please contact us at the address below, or ask your nearest stockist.

For preventive maintenance, repair and calibration of all furnace and oven products, please contact:

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