

Agilent G2545A Hybridization Oven

Installation, Operation, and Maintenance Guide



Agilent Technologies

Notices

© Agilent Technologies, Inc. 2004 - 2010

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Agilent Technologies, Inc. as governed by United States and international copyright laws.

Manual Part Number

G2545-90001

Edition

Fourth Edition, January 2010

Printed in USA

Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051

Warranty

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

U.S. Government Restricted Rights. Software and technical data rights granted to the federal government include only those rights customarily provided to end user customers. Agilent provides this customary commercial license in Software and technical data pursuant to FAR 12.211 (Technical Data) and 12.212 (Computer Software) and, for the Department of Defense, DFARS

252.227-7015 (Technical Data - Commercial Items) and DFARS 227.7202-3 (Rights in Commercial Computer Software or Computer Software Documentation).

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

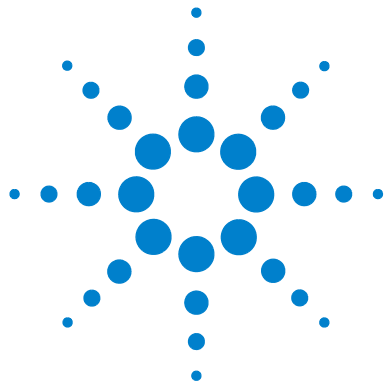
A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

Content

1	Safety and Regulatory Information	5
	Intended Use	6
	Important Safety Warnings	6
	Safety and Regulatory Certifications	7
	Technical and Environmental Specifications	8
	Symbols	9
	Fuses and Battery	9
	Cleaning	9
	Recycling the Product	9
2	Installation	11
	Step 1. Prepare the site	12
	Step 2. Inspect the shipment	13
	Step 3. Unpack and set on the bench	15
	Step 4. Install the Oven	16
3	Operation	19
	Control Panel Interface	20
	Operating the Hybridization Oven	22
	To set a temperature	22
	To load or unload the hybridization chamber	22
	To calibrate the oven	24

Contents

4	Maintenance and Troubleshooting	25
	Maintenance	26
	Cleaning	26
	Storage	26
	Electrical components	27
	Replacing the inline power fuse	28
	Troubleshooting	29



1 Safety and Regulatory Information

- Intended Use 6
- Important Safety Warnings 6
- Safety and Regulatory Certifications 7
 - European Declaration of Conformity 7
 - Canadian EMC Statement 7
 - Sound Emission Certification for Federal Republic of Germany 8
- Technical and Environmental Specifications 8
- Symbols 9
- Fuses and Battery 9
- Cleaning 9
- Recycling the Product 9

This chapter provides important safety and regulatory information about the Agilent G2545A Hybridization Oven.



Intended Use

This unit is for professional, industrial, or educational use, where the preparation or testing of materials is done at approximately atmospheric pressure and no flammable, volatile, or combustible materials are being heated. This unit is not intended for hazardous or household use.

Important Safety Warnings

There are several important safety notices that you must always keep in mind when you use the Hybridization Oven.

Many internal parts of the instrument carry dangerous voltages

If the oven is connected to a power source, even if the power switch is off, potentially dangerous voltages exist on:

- the wiring between the oven power cord and the AC power supply
- the AC power supply itself
- the wiring from the AC power supply to the power switch

With the power switch on, potentially dangerous voltages also exist on:

- all electronics boards in the oven
- the internal wires and cables connected to these boards

WARNING


All these parts are shielded by covers. With the covers in place, it should be difficult to accidentally make contact with dangerous voltages. Unless specifically instructed to, never remove a cover.

WARNING

If the power cord insulation is frayed or worn, the cord must be replaced. Contact your Agilent service representative.

Safety and Regulatory Certifications

European Declaration of Conformity

DECLARATION OF CONFORMITY According to ISO/IEC Guide 22 and CEN/CENELEC EN 45014	
<p>Manufacturer's Name: Sheldon Manufacturing, Inc.</p> <p>Manufacturer's Address: 300 N. 26th Avenue Cornelius, OR 97113, USA</p> <p>Declares that the product as originally delivered:</p> <p>Product Name: Hybridization Oven</p> <p>Part Number: 1013AG, 1013AG-2 (as Agilent model G2545A)</p> <p>complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:</p> <ul style="list-style-type: none"> • The Low Voltage Directive 2006/95/EC • The EMC Directive 2004/108/EC 	

Canadian EMC Statement

ICES/NMB-001:2004

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme a la norme NMB-001 du Canada.

Sound Emission Certification for Federal Republic of Germany

Sound pressure LpA < 70 dB at operator and bystander positions, normal operation, according to EN27779 (Type Test). This statement is given to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

Technical and Environmental Specifications

Below are the oven's technical and environmental specifications.

- Class 1 equipment
- Pollution degree 2
- Installation Category II
- Indoor use only in ordinary atmospheres
- Operating ambient temperatures between 15 °C and 35 °C
- Relative humidity between 15 % to 85 %
- Altitude not to exceed 2000 m operating
- G2545A is rated for mains connection to 100–120 VAC or 220–240 VAC, 50/60 Hz, 6A, with main supply voltage fluctuations up to ±10% of the nominal voltage

Below are the unit specifications:

Net weight	Unloaded unit weight, without rotator: 34.0 kg (75.0 lbs)
Interior dimensions	31.8 cm x 30.5 cm x 36.8 cm (12.5 in wide x 12 in deep x 14.5 in high)
Temperature	Operating temperature range: Amb. +5 °C to 70 °C Precision: 0.1 °C
Rotation Speed	8.94 meters/sec (20 mph)

Symbols

Warnings in the manual or on the oven must be observed during all phases of operation, service, and repair of this oven. Failure to comply with these precautions violates safety standards of design and the intended use of the oven. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

See accompanying instructions for further description or discussion of a control or user item.



Indicates a hot surface.



Indicates earth (ground) terminal.



Indicates potential shock hazard behind this partition.



Fuses and Battery

The oven uses one 5 × 20 mm fuse, 6.3 A, 250 V, type T. This fuse is located at the rear of the oven, above the power cord receptacle.

Cleaning

See “Cleaning” on page 26.

Recycling the Product

For recycling, contact your local Agilent sales office.

1 Safety and Regulatory Information



2 Installation

- Step 1. Prepare the site 12
- Step 2. Inspect the shipment 13
- Step 3. Unpack and set on the bench 15
- Step 4. Install the Oven 16

This chapter describes the steps to prepare your work site for the G2545A Hybridization Oven and to set up the unit for use.



Step 1. Prepare the site

Local city, county or other ordinances may govern the use of this equipment. If you have questions about local requirements, please contact the appropriate local agency. The end user may perform installation, as it is unnecessary for this unit to be installed by a technician.

NOTE

Please read this manual before attempting to install the oven.

- 1 Make sure the electrical supply circuit to the oven conforms to all national and local electrical codes.

Consult the oven's serial data plate (located on the top back panel of the oven) for the voltage, cycle wattage, and ampere requirements before connecting to power. A separate circuit is recommended to prevent possible loss of product due to overloading or failure of other equipment on the same circuit. The supply voltage should not vary by more than 10%.

- 2 Check that the environment is proper for the oven:

- Room temperature: Between 15°C and 35°C.
- Relative humidity: Between 15% to 85%.

Contact the Agilent Customer Care Center if conditions are outside of these limits.

- 3 Select a location that:

- Is not affected by heat from radiators, ovens, autoclaves, or other heat sources.
- Is not in direct sun, fast moving air currents, heating/cooling ducts, and high-traffic areas.
- Allows a minimum of 5 cm (2.0 inches) between the unit and walls or partitions, as they may obstruct free air flow.

Step 2. Inspect the shipment

Your satisfaction and safety require a complete understanding of this unit. Read the instructions thoroughly and be sure all operators are given adequate training before attempting to put the unit in service.

NOTE

This equipment must be used only for its intended application; any alterations or modifications will void your warranty.

- 1 Check the shipment for visible exterior damage. Inspect for concealed loss or damage on the unit, both interior and exterior.
Make a note and describe on the freight bill any damage found, and enter your claim on the form supplied by the carrier. If needed, the carrier will arrange for official inspection to substantiate your claim.
- 2 Check that all of the equipment indicated on the packing slip is included with the unit. Carefully check all packaging before discarding.
Each oven unit comes with the following items that need to be installed (see [Figure 1](#)):
 - A power cord set (depending on the voltage at the country of origin)
 - Drip tray
 - Four adjustable feet
 - Brass locking pin

The rotator (also called the “rotisserie,” p/n G2530-60029) is not included with the G2545A model and needs to be ordered separately.

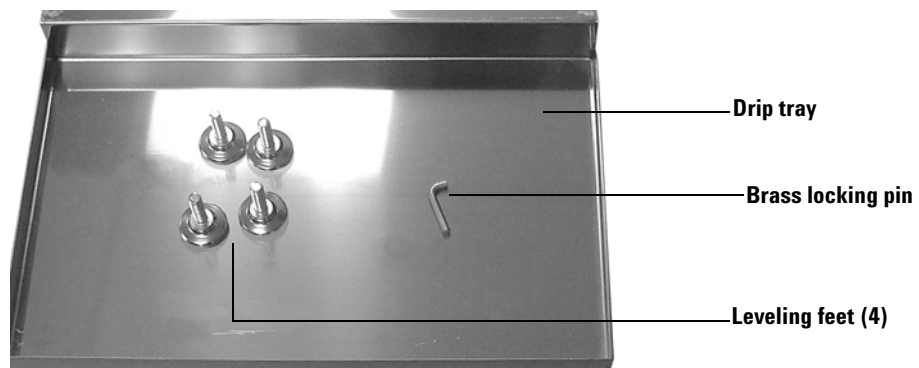


Figure 1 Ship kit

Return shipment process

Save the shipping crate for future use. The shipping crate will be used to ship the oven back to the factory for repair, if needed. If you must return the unit, please contact your Agilent Customer Care Center representative for authorization.

- In North America, call 1-800-227-9770.
- In Europe, call +31 20 5472720.
- In Asia Pacific or Japan, call +81 426 609920.

Please have the model number and serial number available when you call the Customer Care Center.

Fill out the Environment Health and Safety (EH&S) form completely and attach it to the oven before shipping.

Step 3. Unpack and set on the bench

- Unpack and set the oven on the bench. Make sure you:
 - Use two or more people or an appropriate lifting device to lift the oven from the ground to the bench. This unit weighs 34.0 kg (75.0 pounds).
 - Lift the oven from the bottom surface. Do not use doors, handles and knobs for lifting or stabilization.
 - Completely restrain the oven from tipping during lifting or transport.
 - Remove loose parts, such as drip trays. Positively lock doors in the closed position during transfer to prevent shifting and damage.

Step 4. Install the Oven

- 1 Install the leveling feet:
 - a Insert and turn the supplied leveling feet in the four holes located in the bottom corners of the unit to install.
 - b Adjust the foot at each corner until the unit stands level and solid and does not rock.

For the Agilent G2545A Hybridization Oven to operate properly, the unit must sit level and on a solid foundation.

CAUTION

If the unit must be moved, turn the leveling feet all the way clockwise to prevent damage while moving.

- 2 Install the drip tray

Install the drip tray on the bottom of the oven. Make sure the oven door can close once the tray is installed.

- 3 Install the rotator:

- a Set the AC power switch to **OFF**.
- b Open the oven. Locate the rotator drive shaft coupling on the left side oven wall and the rotator shaft support bushing on the right side oven wall. See [Figure 2](#).

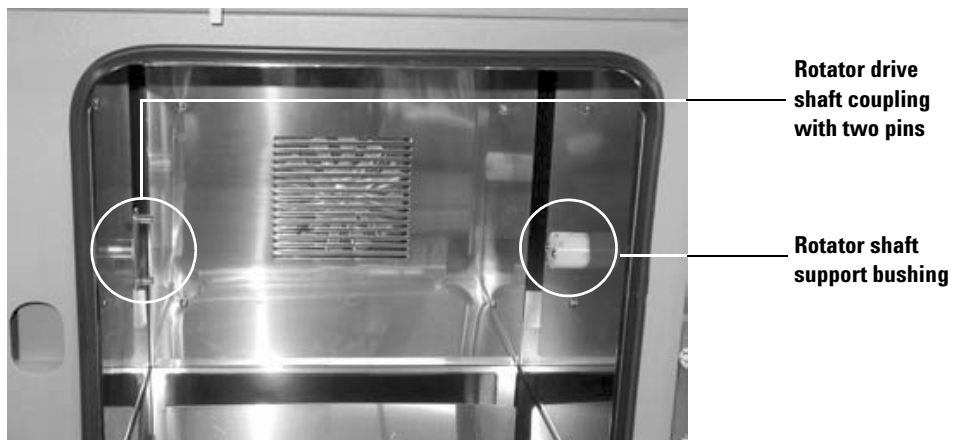


Figure 2 Rotator shaft attachment locations

- c Move the rotator into the oven and insert the two pins on the rotator drive shaft coupling into the two holes on the rotator coupling. See [Figure 3](#).



Figure 3 Attaching the rotator to the drive shaft coupling

- d While you hold the rotator to keep the drive coupling attached, lower the rotator shaft into the slot in the rotator shaft support bushing. See [Figure 4](#).

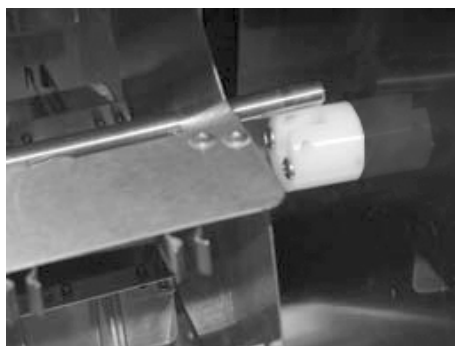


Figure 4 Inserting the rotator shaft into the rotator shaft support bushing.

2 Installation

- e Complete rotator installation by inserting the brass locking pin through the two holes in the shaft support bushing. See [Figure 5](#).



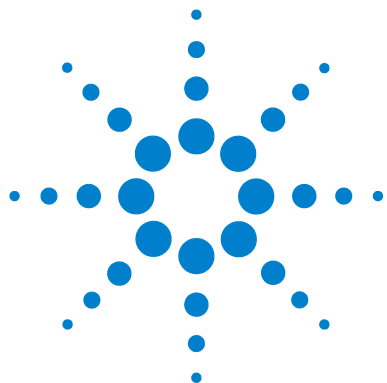
Figure 5 Rotator correctly installed

- 4 Clean the oven as described in “[Cleaning](#)” on page 26.

WARNING

Make sure you use a power cord designed for your country. Use of an inappropriate power cord may damage your oven or pose a safety hazard.

- 5 Install the power cord.



3 Operation

Control Panel Interface	20
Operating the Hybridization Oven	22
To set a temperature	22
To load or unload the hybridization chamber	22
To calibrate the oven	24

This chapter gives a detailed explanation of how to operate the G2545A Hybridization Oven.



Control Panel Interface

The G2545A Hybridization Oven is operated using the control panel interface (see [Figure 6](#)), which is located on the front of the oven.

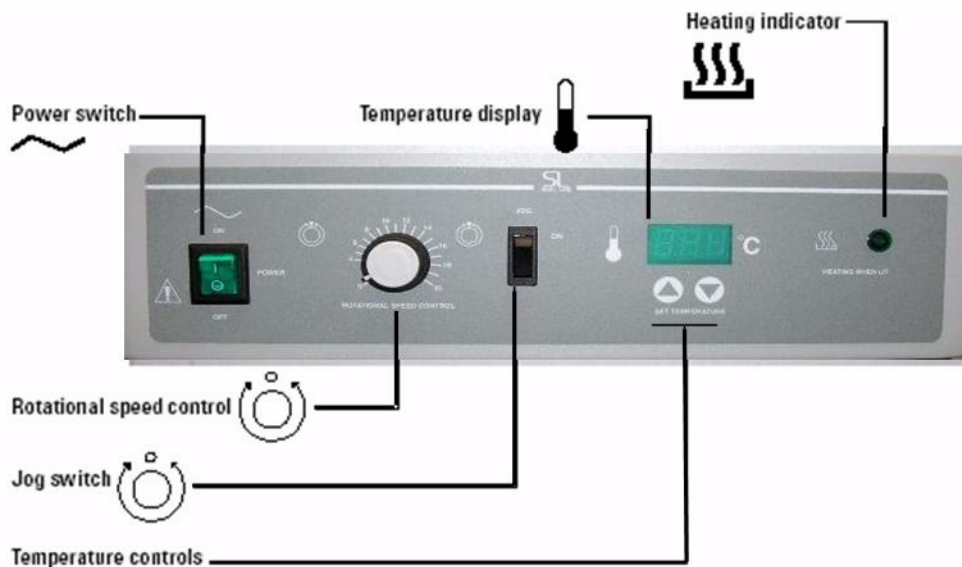


Figure 6 Control panel interface

Rotational speed control Use to set the rotator speed from 2 to 20 rpm. Turning the knob clockwise increases the rotator speed. Set to 0 (zero) to turn off the rotator.

Heating indicator Lights continuously when the oven is heating. Blinks when the oven is at or near its set point.

Temperature display Displays the current oven temperature in degrees centigrade ($^{\circ}\text{C}$).

Temperature controls Use the up and down arrow keys to adjust the oven temperature set point.

JOG switch Press and hold **ON** to turn the rotator, for example, when loading the oven. When released, the rotator stops. The rotational speed control knob **cannot** be set at zero for the **JOG** switch to operate properly.

Operating the Hybridization Oven

To set a temperature

- 1 Enter set point mode by pressing **either ▲ or ▼**.
The digital display will start to blink. While blinking, the digital display shows the current **set point**.
- 2 Press ▲ or ▼ to enter the desired set point temperature.

NOTE

For stable control, the set point must be a minimum of 5 degrees above ambient.

If the arrow pads are not pressed for five (5) seconds, the display will stop blinking and will read the temperature in the chamber.

To load or unload the hybridization chamber

WARNING

The oven and rotator may be hot. Before handling, lower the oven temperature to <35 °C and allow it to cool, or wear heat-resistant gloves.

-
- 1 Open the oven door. If the rotator is in motion, it will stop moving once the oven door is opened.
 - 2 Use the **JOG** switch to move the rotator to the desired chamber load/unload position. The rotator speed should be at least **2**.

- 3 Load or unload the hybridization chambers. To load the chambers into the rotator, press the chamber into the upper and lower clips until locked in place. See [Figure 7](#).

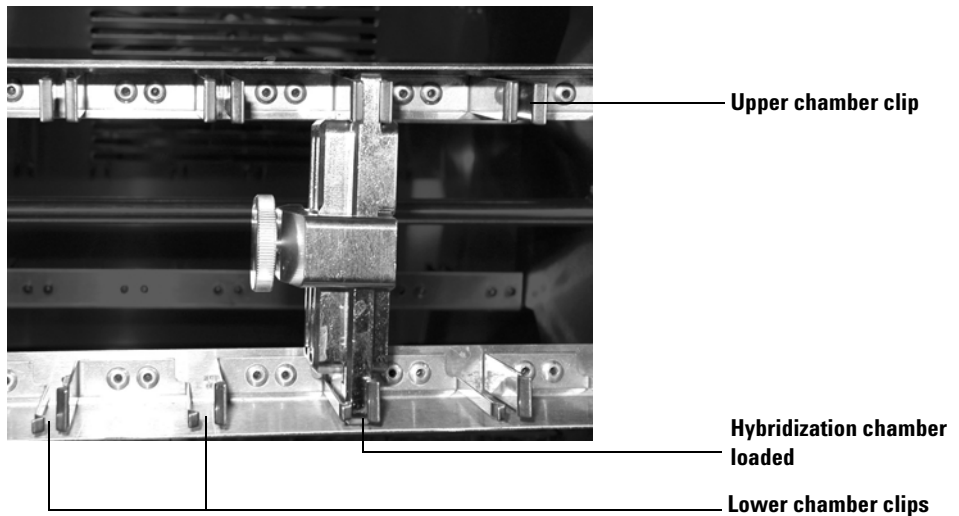


Figure 7 Correct loading of Hybridization chamber

CAUTION

When loading samples onto the rotator, be sure to balance the load between the racks. Also take care in balancing the loads horizontally on the racks themselves.

- 4 Use the **JOG** switch to move the rotator to the next rack, and continue loading/unloading the chambers. After loading/unloading all chambers, close the oven door.

To calibrate the oven

Calibrate the oven:

- After first installation in a working environment.
- After each 3 months of use.

NOTE

Agilent highly recommends recalibrating the oven temperature every three (3) months. To ensure correctness of temperature calibration, the rotator needs to be installed and loaded.

To calibrate the oven:

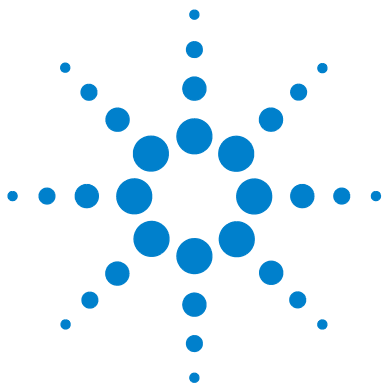
- 1 Install the rotator and load it with a typical number of chambers.
- 2 Turn on the oven and set to a typical operating temperature.
- 3 Allow the oven to stabilize for at least 1 hour.
- 4 Place a certified reference thermometer in the chamber near the sample area.

NOTE

Agilent recommends using a digital thermometer for calibration.

- 5 Let the temperature stabilize again until the thermometer reads a constant value for one hour.
- 6 Compare the digital display on the control panel with the reference thermometer.
- 7 If there is a difference of more than 0.2 °C, put the display into calibration mode by pressing **both ▲ and ▼** at the same time until the temperature display's two outside decimal points begin to flash.
- 8 While the decimal points are flashing, press the ▲ or ▼ arrow pad until the display reads the correct value.

Allow the oven to stabilize, then recheck the temperature. Repeat [step 5](#) through [step 8](#), if needed.



4 Maintenance and Troubleshooting

Maintenance	26
Cleaning	26
Storage	26
Electrical components	27
Replacing the inline power fuse	28
Troubleshooting	29

The information in this chapter will assist you in keeping the oven running smoothly. Use this chapter to determine the probable cause and, in many cases, the cure for the problem.

If you cannot correct the problem, obtain Agilent service.



Maintenance

WARNING

Prior to any maintenance or service on this unit, disconnect the power cord from the oven. The oven interior surface should be cleaned once a month.

Cleaning

To clean the unit:

- 1 Remove the rotator and drip tray.

CAUTION

Do not use chlorine-based bleach or abrasives, as this will damage the chamber interior.

- 2 Clean the oven using mild detergent.
- 3 Clean the rotator and drip tray using either the same solution used for the chamber, or an autoclave.

Storage

If the unit is to be turned off for any length of time, **assure that the chamber and drip tray are dry and store at room temperature.** Failure to do this may cause the interior to become contaminated. No adjustment to controls should be required when restarting the unit.

If the unit is shut down for transport, be sure to disconnect the power cord and turn the leveling feet in all the way. See “[Step 3. Unpack and set on the bench](#)” on page 15” for further instruction on preparing the oven for transportation.

Electrical components

There is no maintenance necessary on electrical components. If the unit fails to operate as specified, review [“Troubleshooting”](#) on page 29 before calling for service.

Replacing the inline power fuse

The unit is protected by an inline fuse located behind the power cord. If needed, replace the fuse as described below:

WARNING

If the inline power fuse blows repeatedly, check for the reason why. Check that the oven is the correct voltage type, check the power cord, and check the power supply.

- 1 Turn off the oven and rotator, then disconnect from the power source.
- 2 Remove the power cord from the back of the oven.
- 3 Using a small, flat-bladed screwdriver, pry the fuse holder from the back of the unit. See [Figure 8](#).

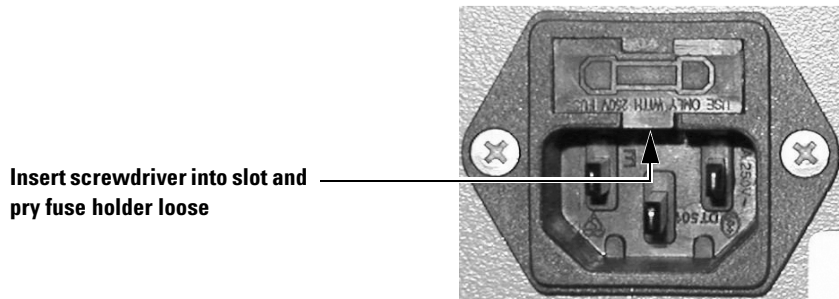


Figure 8 Removing the fuse holder

- 4 Inspect the fuse in service. See [Figure 9](#). Replace if blown with a 6.3 A, 250 V type T fuse.

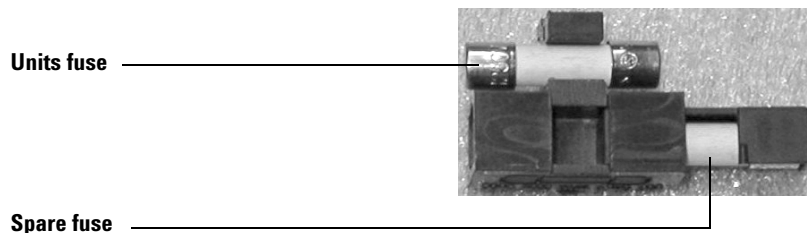


Figure 9 Inline fuse and spare

Troubleshooting

The following table shows a list of problems and their corresponding solutions. If these instructions do not correct the problem, call Customer Service for further assistance.

Table 1 Problems and solutions

Problem	Action
The unit will not turn on.	<ol style="list-style-type: none"> 1 Verify that the power cord is plugged into the oven and power source. 2 Verify that the power switch is ON. 3 Check the fuse as described in “Replacing the inline power fuse” on page 28 and replace if blown.
Temperature is too high.	<ol style="list-style-type: none"> 1 The controller might be set too high. To set the oven temperature, see “To set a temperature” on page 22.
Display reads “HI”.	<ol style="list-style-type: none"> 1 Check if the set temperature is below the room temperature. 2 Turn the unit OFF. Wait for five seconds and then turn it on to see if the error message disappears.
Chamber temperature overshoots the set point and then settles to the set point.	For hybridization units, ± 1 ° of set point may be normal. To recalibrate the oven, see “To calibrate the oven” on page 24.
Temperature is too low.	<ol style="list-style-type: none"> 1 The controller might be set too low. To set the oven temperature, see “To set a temperature” on page 22 for information on setting the oven temperature. 2 The unit may not have recovered from opening the door; wait for the display to stabilize. 3 The unit may not have recovered from a power failure or from being turned off. Ovens usually will need two hours to warm up and stabilize.
Display reads “LO”.	The ambient temperature might be below the temperature range of the unit. Refer to “Technical and Environmental Specifications” on page 8.

Table 1 Problems and solutions (continued)

Problem	Action
The unit will not heat over a temperature that is below the set point.	<ol style="list-style-type: none"> 1 Confirm that the fan is moving. Check fan motor motion and feel for air movement in chamber. 2 Confirm that the supply amperage and voltage match the data plate. 3 To calibrate the oven, see “To calibrate the oven” on page 24.
The unit will not heat up at all.	Make sure that the circuit breaker and fuse have not blown and are still operating correctly.
The indicated chamber temperature is unstable.	<p>Temperature range ± 1 °C is normal.</p> <ol style="list-style-type: none"> 1 Check to make sure the fan is working by checking the fan motor motion and feeling for air movement in the chamber. Verify movement of the cooling fan in the back of chamber. 2 Doors opening, air flow from heaters, and air flow from air conditioner units may radically change the ambient room temperature. Stabilize ambient conditions. Assure that the oven set point is at least 5 °C above the ambient room temperature. 3 See if the ambient room temperature is fluctuating. 4 Verify that the unit is not affected by another temperature source, such as direct sunlight or direct air conditioning to the unit.
Display and reference thermometer do not match.	There may be a calibration error. To recalibrate the oven, see “To calibrate the oven” on page 24. Allow two hours for the temperature to stabilize.
The set point or calibration cannot be adjusted.	Turn the entire unit OFF and then ON to reset.
The oven is calibrated at one temperature, but not at another.	This can be a normal condition when the operating temperature varies widely. For maximum accuracy, calibration should be done at or as close as possible to the operating temperature in use.
Black soot might appear on the oven floor and walls.	Clean the interior oven as specified on page 26 .

www.agilent.com

In This Book

This book contains information to install, operate and maintain your Agilent G2545A Hybridization Oven.

© Agilent Technologies, Inc. 2004 - 2010

Fourth Edition, January 2010



G2545-90001
Revision A



Agilent Technologies