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Overview

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Introduction

The Illumina Hybridization Oven Model 5521 is a high-capacity hybridization (hyb) oven that is customized for Illumina assays. Forced air circulation coupled with microprocessor-controlled temperature control combine to provide unsurpassed temperature performance and the most consistent conditions from procedure to procedure. It has the following features:

- ▶ Platform rocker
- ▶ Universal applicability to any Illumina BeadChip format
- ▶ Platform space for up to six Hyb Chambers, each holding up to four BeadChips
- ▶ Ability to be used in either genotyping or gene expression assays

Only assays that use the same oven temperature can be run concurrently. Please note that the convection fan operates continuously whenever the unit is turned on.

Figure 1 Illumina Hybridization Oven Model 5521



Safety Precautions

This section describes the safety precautions that must be followed when installing, operating, or maintaining the Illumina Hybridization Oven.

Symbols on the Hyb Oven



Read this user guide fully before using the Hybridization Oven. Pay particular attention to sections containing this symbol.



Surfaces can become hot during use.

General Cautions



Only use the Hybridization Oven as instructed in this guide. Any unauthorized use may impede the protections designed into the unit for your safety.



To avoid trapping or tangling your body or clothing in the hot unit, always wait until the motor has fully stopped before adding or removing anything from the Hybridization Oven.






Power Cautions








If the Hybridization Oven is transported or stored in humid conditions, dry out the unit thoroughly before connecting it to the power supply. When damp the safety protections designed into the unit may be impaired, so if the unit is not dry when you plug it in, you may receive an electric shock.



Connect the Hybridization Oven only to a power supply with a voltage that corresponds to the voltage indicated on the serial number label.

-  Connect the Hybridization Oven only to a power supply that provides a safety ground terminal.
-  Ensure that the power switch is easily accessible at all times, especially during use.
-  Do not position the unit in a way that obstructs the power cord and power supply, or makes it difficult to disconnect the unit.
-  Before moving the Hybridization Oven for any reason, disconnect the power cord from the power supply. Do not remove the plug from the rear of the unit. The power cord supplied with the unit is the only means of disconnecting the unit.
-  Only use this product with a UL/CSA Certified power supply cord set rated for a minimum temperature of 90°C.

Temperature Cautions

-  To check the temperature, refer to the temperature display or use a thermometer. Never touch the unit to check the temperature, as this may cause personal injury.
-  Do not touch surfaces that become hot during high temperature operation, as this may cause personal injury.
-  To reduce the risk of eye injury during high temperature operation, wear safety goggles or spectacles.
-  Ensure that the operating temperature is lower than the maximum operating temperature of your sample material.
-  Never block or restrict the ventilation slots.

Cleaning Cautions



If liquid is spilled inside the unit, immediately disconnect the unit from the power supply and use clean up procedures appropriate for the substance spilled.



Carry out appropriate decontamination procedures if hazardous material is spilled on or inside the unit.



Use the cleaning and decontamination methods recommended by the manufacturer.

Product Information

This section lists the equipment and accessories for the Illumina Hybridization Oven.

Equipment

Table 1 Illumina-Supplied Equipment

Item	Boekel Scientific Part #	Illumina Part #
Illumina Hybridization Oven with Rocker, 115 VAC	230402-ILL	11277582
Illumina Hybridization Oven with Rocker, 230 VAC	230402-2ILL	11277591

Accessories

Table 2 Boekel-Supplied Accessories

Item	Boekel Scientific Part #
Platform Rocker	47746-108

Technical Specifications

This table lists the technical specifications for the Illumina Hybridization Oven.

Table 3 Illumina Hybridization Oven Technical Specifications

Specification	Illumina Hybridization Oven Rating
Temperature Range	(Ambient + 10°C) to 100°C
Temperature Setting Range	0°C to 100°C
Temperature Stability	± 0.2°C

Table 3 Illumina Hybridization Oven Technical Specifications (Continued)

Specification	Illumina Hybridization Oven Rating
Overall Temperature Accuracy	± 0.3°C at 65°C
Temperature Display Resolution	0.1°C
Supply Ratings	115V Hyb Oven: ± 10%, 2.8A, 60 Hz 230V Hyb Oven: ± 10%, 1.6A, 50/60 Hz
Power Ratings	115V Hyb Oven: 360W 230V Hyb Oven: 350W
Heating Rate	Ambient to 65°C within 30 minutes
Rotation Speed	5–60 rpm
Installation Category	Installation Category II (transient voltages)

Environmental Requirements

The Illumina Hybridization Oven will meet its performance figures when operated within the environmental constraints described in this table.

Table 4 Illumina Hybridization Oven Environmental Requirements

Requirement	Acceptable Value or Range
Location	Indoor use only
Ambient Temperature	0°C to 35°C
Maximum Relative Humidity	80% non-condensing
Altitude	Up to 2000 meters (6500 feet)
Pollution	Pollution degree 2 in accordance with IEC 664

Warranty

When the Illumina Hybridization Oven is used in laboratory conditions and according to these operating instructions, Boekel Scientific warrants this product to be free of defective material and workmanship for a period of two years from the date of manufacture. The liability of Boekel Scientific for any defective equipment during the warranty period shall be limited to the repair of such equipment or replacement thereof without charge for parts or labor.

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Unpacking

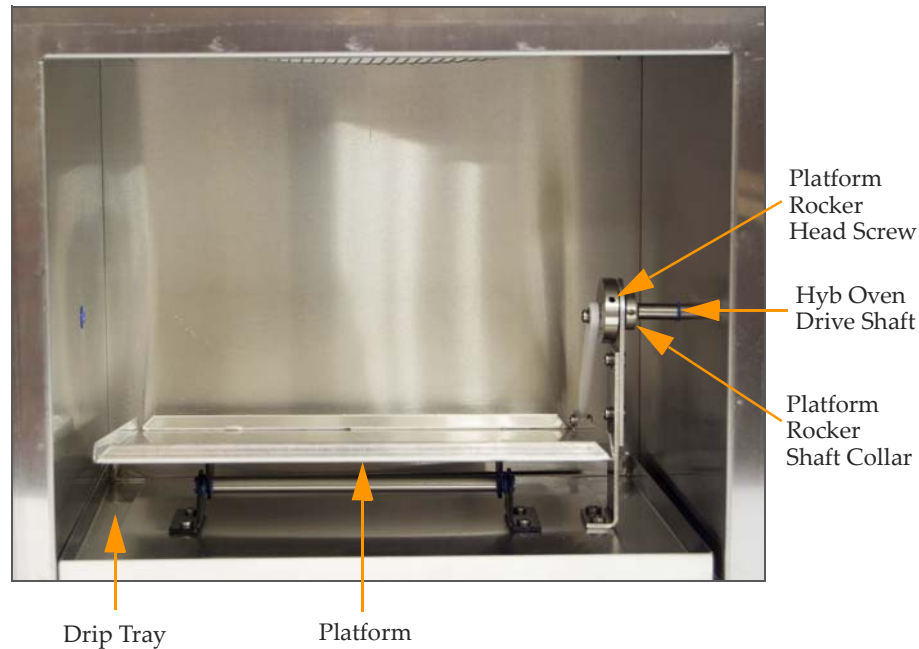
Perform the following steps to unpack the Illumina Hybridization Oven:

- 1 Position the box on the floor so that the opening is on the side.
- 2 Slide the Hybridization Oven out of the box.
- 3 Carefully remove all packaging materials from around the Hybridization Oven.
- 4 Retain all of the packaging materials so that you can safely repackage the unit for shipping or storage if necessary.
- 5 Verify that you have all of the following components:
 - Illumina Hybridization Oven
 - Power cord
 - Operating instructions
 - Hex keys (2)
 - Stainless steel drip tray
 - Platform rocker
- 6 If there is any shipping damage, report it to the carrier immediately. The carrier covers shipping damage, and repairs or replacements for shipping damages must be coordinated through the carrier.
- 7 Fill out and return the warranty registration card.

Setting up the Platform Rocker

To set up the Illumina Hybridization Oven with the platform rocker, perform the following steps (Figure 2):

Figure 2 Illumina Hybridization Oven with Platform Rocker



- 1 Place the hyb oven on the post-PCR lab benchtop, preferably away from drafts.
- 2 Open the hyb oven door and adjust the hyb oven drive shaft so that the flat side is facing forward.
- 3 Position the socket head screw on the platform rocker shaft collar so that it faces forward.
- 4 Remove the drip tray from the hyb oven packaging.

Installing the Platform Rocker

- 1 Remove the platform rocker from the hyb oven packaging.
- 2 Ensure that the platform rocker head screw is facing forward.
- 3 Place the platform rocker on the drip tray and slide the drip tray into the hyb oven as far left as possible.
- 4 Push the platform rocker all the way to the right and insert the hyb oven drive shaft into the platform rocker shaft collar.
- 5 Secure the platform rocker head screw to the drive shaft, using the large hex key provided, making sure that the screw meets the flat portion of the drive shaft at a 90° angle.
- 6 Manually move the platform to ensure it moves without restrictions.
- 7 Proceed to *Turning-on the Hyb Oven* on page 14.

Removing the Platform Rocker

To remove the platform rocker from the hyb oven, follow these steps (Figure 2):



To avoid trapping or tangling your body or clothing in the hot unit, always wait until the motor has fully stopped before adding or removing anything from the Hybridization Oven.



Disconnect the power cord from the socket. Do not remove the plug from the rear of the unit.



Use caution when removing the platform rocker since it may be very hot.

- 1 Remove any Hyb Chambers from the platform rocker (see *Loading the Platform Rocker* on page 18).
- 2 Position the platform rocker so the platform rocker head screw is facing forward and turn the power off.
- 3 Loosen the platform rocker head screw using the large hex key provided.
- 4 Slide the platform rocker to the left and off of the drive shaft.

- 5 Slide the platform rocker and the drip tray out of the oven.
- 6 Place the drip tray back into the hyb oven.

Turning-on the Hyb Oven

To turn-on the Illumina Hybridization Oven, perform the following steps:

- 1 Insert the socketed end of the power cord into the plug on the back of the hyb oven.
- 2 Connect the power cord plug to a power supply outlet on the wall.

Figure 3 Illumina Hybridization Oven Rear View



- 3 Turn on the hyb oven power switch. The current temperature appears on the control panel display. (See *Controls & Displays*.)

Reversing the Door

The door hinge on the Illumina Hybridization Oven is reversible to allow the door to be opened from the left or right side. To change the door opening position, perform the following steps:

Figure 4 Reversing the Illumina Hybridization Oven Door



- 1 Remove the door by removing the three screws and three caps from the door hinge mountings shown in Figure 4.
- 2 Rotate the door 180° so the holes on the door hinge align with the holes on the opposite side of the hybrid oven front.
- 3 Secure the door hinge using the three screws. Be sure that all screws are secured properly.
- 4 Place the caps in the unused holes that the door hinge previously was mounted to.

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Loading the Platform Rocker

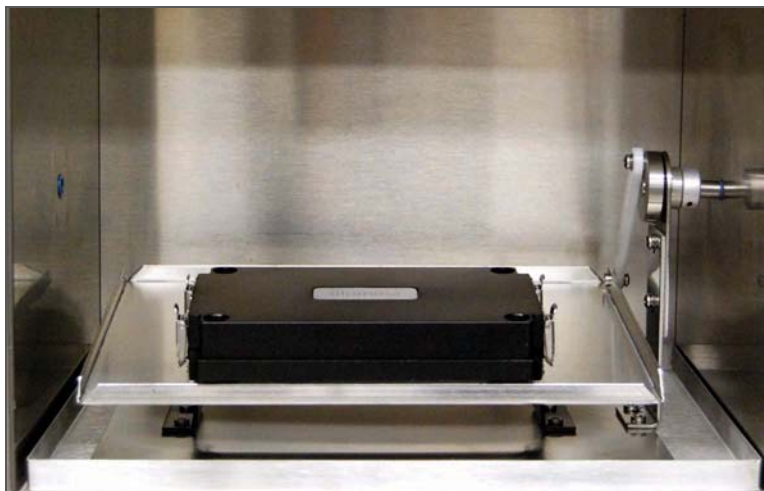
To load the Hyb Chambers onto the platform rocker, follow these steps (Figure 5). It is important to evenly distributed the load for user safety and to ensure a long product life.



To avoid trapping or tangling your body or clothing in the hot unit, always wait until the motor has fully stopped before adding or removing anything from the Hybridization Oven.

- 1 Prepare the Hyb Chambers as directed in the lab protocols of the appropriate assay guide.
- 2 Place the Hyb Chambers on the platform, as shown.

Figure 5 Hyb Chamber on the Platform Rocker



NOTE

If you are not performing the optional rocking step in the assay, make sure the platform is flat when you load the Hyb Chambers.

- 3 Continue with the lab protocols of the appropriate assay guide.

Controls & Displays

This section describes how to operate the Illumina Hybridization Oven controls and the display function.

Figure 6 Illumina Hybridization Oven Controls and Display

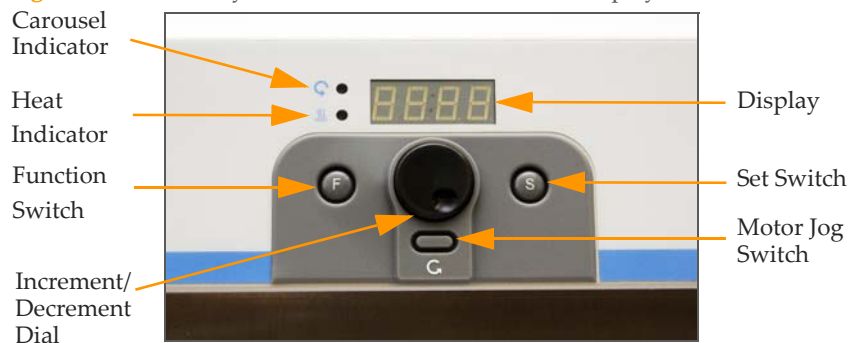


Table 5 Controls

Item	Description
Function Switch (F)	Press to enter the function select mode.
Carousel Indicator	Indicates whether the rocker is turned on.
Heat Indicator	Represents when the hyb oven is turning the heat on. This will turn on when you increase the set point to a higher temperature.
Display	Shows the chamber temperature in °C during normal operations.
Set Switch (S)	Press to enter the set mode to set temperatures or accept menu changes.
Motor Jog Switch	Press to turn on the platform rocker inside the hyb oven.
Increment/Decrement Dial	Rotate to increase or decrease the displayed value of the current mode.

Changing the Set Temperature

To change the set temperature:

- 1 Press the **F** button once to change the display to **TSET**. The display alternates between **TSET** and the set-temperature value.
- 2 Press the **S** button to enter the set-temperature mode.
- 3 Turn the **Increment/Decrement** dial to adjust the set temperature to the required temperature. The setting appears on the display.
- 4 When the desired set temperature appears, press the **S** button to accept the value. The value is then stored in memory.

Using the High Temperature Alarm

The hybrid oven is equipped with a high-temperature alarm. The default setting for the alarm is off. To turn on this alarm follow these steps:

- 1 Press the **F** button four times until **ALAr** appears on the display. The display alternates between **ALAr** and the high-temperature alarm value.
- 2 Press the **S** button to enter the alarm mode.
- 3 Turn the **Increment/Decrement** dial clockwise to turn on the high-temperature alarm.
- 4 Press the **S** button to enter alarm adjust mode.
The current high temperature alarm value appears. The default value is 5°C above the set temperature.
- 5 To adjust the value setting, turn the **Increment/Decrement** dial until the display indicates to the desired high temperature alarm value.
- 6 When the desired alarm value appears, press the **S** button. This turns the high temperature alarm on.
- 7 If a high-temperature alarm condition is encountered, the display indicates **ALAr** and a buzzer sounds. The buzzer continues until the unit is turned off or until the unit returns to a non-alarm condition.

Setting the Motor Speed

To set the motor speed follow these steps:

- 1 Press the **F** button twice until **SPd** appears on the display. The display alternates between **SPd** and the current motor speed value.
- 2 Press the **S** button to enter the motor speed mode.
- 3 Turn the **Increment/Decrement** dial to set the required motor speed. The setting appears on the display. The display flashes when in the set motor speed mode.
- 4 When the desired motor speed appears, press the **S** button to accept the value. The value is then stored in memory and retained after the unit is switched off.

Using the Timer

The timer can be programmed up to 99 hours and 59 minutes. The default setting for the timer is off.

To turn the timer on and set the timer duration, follow these steps:

- 1 Press the **F** button three times until **CLOC** appears on the display.
- 2 Press the **S** button to enter the clock mode.
- 3 Turn the **Increment/Decrement** dial clockwise to turn on the timer.
- 4 Press the **S** button to enter the clock adjust mode.
- 5 Turn the **Increment/Decrement** dial to set the required timer value. The display indicates the current clock setting (HH.MM).
- 6 When the desired time appears, press the **S** button to accept the value. This starts the timer and stores the value in memory. The display alternates between the chamber temperature and the time remaining.

At the end of the timer operation a buzzer sounds and the display displays **End**. The heater shuts off, but the platform rocker continues to operate for 2 hours.

Turning the Timer Off During Operation

To turn the timer off when unit is operating in a timed operation, follow these steps:

- 1 Press the **F** button three times until **CLOC** appears on the display.
- 2 Press the **S** button to enter the clock mode.
- 3 Turn the **Increment/Decrement** dial counterclockwise to turn off the timer.
- 4 Press the **S** button to accept the timer off setting.

Cancelling the Timer

To cancel the timer press the **F** and **S** buttons simultaneously. The unit will resume normal operations.

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Introduction

The Illumina Hybridization Oven has been factory calibrated and routine maintenance is not required.

Calibration should be performed annually. The specifications for the oven are $\pm 2^{\circ}$ C at 40° C and 60° C.

Intermittent cleaning may be necessary if spills occur and fuse replacement may be required. Information on these maintenance operations are described in this section.

Calibrating

The Illumina Hybridization Oven has been factory calibrated for optimum performance. A pedigreed, individually serialized thermistor is used to monitor and control the temperature in each unit. These thermistors are +/- 0.1°C absolute accurate, and +/- 0.01°C reproducible over time.

If there is a specific need to recalibrate or add a temperature offset, please contact Illumina Technical Support.

Cleaning

It may be necessary to occasionally clean or decontaminate the Illumina Hybridization Oven. When doing so, take the following precautions:

- ▶ Remove the power cord from the power cord plug on the back of the hyb oven prior to cleaning.
- ▶ Do not submerge or immerse the hyb oven in water.
- ▶ Do not clean the plastic on the front door with any abrasive cleaning agent. This will severely scratch this material.
- ▶ If a spill occurs, use clean up procedures appropriate for the substance spilled.
- ▶ The floor of the chamber is protected with a removable stainless steel drip tray. You can slide out the drip tray for cleaning without removing the platform rocker.



Use caution when removing the drip tray because it may be very hot.

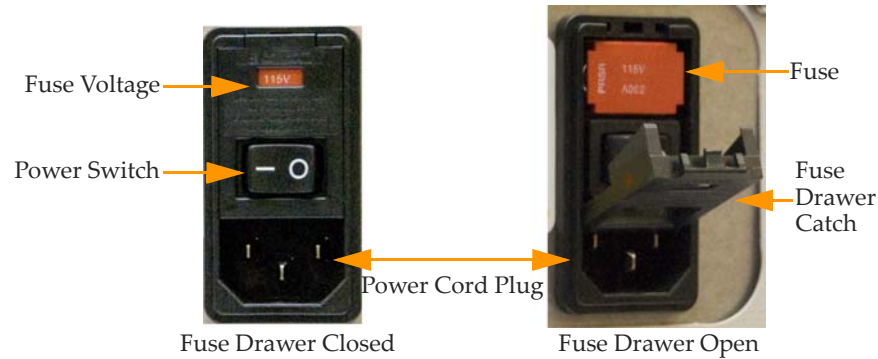
- ▶ Clean the outer casing of the hyb oven with a cloth dampened with water.

Replacing a Fuse

It may be necessary to replace a fuse in the Illumina Hybridization Oven (see *Troubleshooting*). To replace a fuse perform the following steps (Figure 7):

- 1 Disconnect the hyb oven from the power supply outlet.
- 2 Remove the power cord from the power cord plug on the back of the hyb oven.
- 3 Push down on the fuse drawer catch and pull it away from the hyb oven.
- 4 Pull open the fuse drawer.

Figure 7 Illumina Hybridization Oven Fuse Drawer



- 5 Check the fuses and replace them with the correct fuses. Be sure the proper voltage appears in the entry window when reinstalling.



The fuses should be 5mm x 20mm, rated 250V.

- 115V Hyb Oven: 4.0AF Slo-Blo
- 230V Hyb Oven: 4.0AF Slo-Blo

- 6 Push the fuse drawer back in and close the fuse drawer catch.
- 7 Reinsert the socketed end of the power cord into the plug on the back of the hyb oven.
- 8 Reconnect the power cord plug to a power supply outlet on the wall.
- 9 Turn on the hyb oven power switch.

Troubleshooting

This chapter describes issues that may appear while operating the Illumina Hybridization Oven and provides solutions.

Symptom	Probable Cause	Resolution
The unit does not operate.	The unit is not turned on.	Turn on the unit.
	The unit is not plugged into the power supply.	Plug in the unit and turn it on.
	The fuses are blown.	Replace the fuses.
	The power supply has failed.	Check to see that other electrical appliances on the same circuit are working.



Symptom	Probable Cause	Resolution
The chamber temperature does not rise when expected to.	The actual temperature is higher than the set temperature.	Check the set temperature.
	The temperature control circuit faulted.	Have the unit checked by a person trained to maintain the hyb oven.
	The timer cycle has ended.	Turn the timer off.
The temperature continues to rise when it is not expected to.	The actual temperature is lower than the set temperature.	Check the set temperature.
	The temperature control circuit failed.	Have the unit checked by a person trained to maintain the hyb oven.
There is no platform rocker movement, but the display is illuminated.	The motor jog switch is not on.	Turn motor jog switch on.
	An obstruction is preventing the rocker movement.	Remove the obstruction.
	The platform rocker is loose.	Tighten the set screws with the hex key.
	The belt is slipping or off.	Have the unit checked by a person trained to maintain the hyb oven.

Technical Assistance

For technical assistance, contact Illumina Customer Support.

Table 6 Illumina General Contact Information

Illumina Website	http://www.illumina.com
Email	techsupport@illumina.com

Table 7 Illumina Customer Support Telephone Numbers

Region	Contact Number	Region	Contact Number
North America	1.800.809.4566	Italy	800.874909
Austria	0800.296575	Netherlands	0800.0223859
Belgium	0800.81102	Norway	800.16836
Denmark	80882346	Spain	900.812168
Finland	0800.918363	Sweden	020790181
France	0800.911850	Switzerland	0800.563118
Germany	0800.180.8994	United Kingdom	0800.917.0041
Ireland	1.800.812949	Other countries	+44.1799.534000

MSDSs

Material safety data sheets (MSDSs) are available on the Illumina website at <http://www.illumina.com/msds>.

Product Documentation

Additional product documentation in PDF is available for download from the Illumina website. Go to <http://www.illumina.com/support> and select a product. A MyIllumina login is required. To register for a MyIllumina account, please visit <https://my.illumina.com/Account/Register>.

