

BOD INCUBATOR 100 - 120 Voltage



Installation and Operation Manual

HRI3P

Hach® BOD Peltier Incubators

100 – 120 Voltage

Installation and Operation Manual

Revision: July 16, 2014

Printed in the USA

These units are TÜV CUE listed as incubators and radiant warmers 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.

These units have been tested to the following requirements:

CAN/CSA C22.2 No. 61010-1:2012

CAN/CSA C22.2 No. 61010-2-010 + R:2009

UL 61010A-2-010:2002

UL 61010-1:2012

EN 61010-1:2010

EN 61010-2-010:2003

IEC 61010-1:2010

IEC 61010-2-010:2003

TABLE OF CONTENTS

INTRODUCTION	4
<i>General Safety Considerations.....</i>	<i>4</i>
<i>Engineering Improvements</i>	<i>5</i>
<i>Contacting Assistance.....</i>	<i>5</i>
RECEIVING YOUR INCUBATOR.....	6
<i>Inspecting the Shipment.....</i>	<i>6</i>
<i>Returning the Shipment</i>	<i>6</i>
<i>Recording Data Plate Information.....</i>	<i>7</i>
GRAPHIC SYMBOLS.....	8
CONTROL PANEL OVERVIEW	11
INSTALLATION.....	12
<i>Location</i>	<i>12</i>
<i>Lifting and Handling</i>	<i>12</i>
<i>Leveling.....</i>	<i>14</i>
<i>Shelving Installation.....</i>	<i>14</i>
<i>Power Source.....</i>	<i>15</i>
<i>Cleaning.....</i>	<i>15</i>
OPERATION.....	16
<i>Theory of Operation.....</i>	<i>16</i>
<i>Turning On the Incubator</i>	<i>16</i>
<i>Adjusting the Temperature Set Point</i>	<i>16</i>
<i>Calibrating the Temperature display</i>	<i>17</i>
<i>Setting the Over Temperature Limit.....</i>	<i>17</i>
<i>Door Ajar Alarm.....</i>	<i>18</i>
<i>Loading the Incubator</i>	<i>18</i>
<i>Attaching equipment to the Interior Accessory Outlets.....</i>	<i>18</i>
USER MAINTENANCE	19
<i>Cleaning.....</i>	<i>19</i>
<i>Disinfecting.....</i>	<i>19</i>
UNIT SPECIFICATIONS.....	22
<i>Weight.....</i>	<i>22</i>
<i>Dimensions.....</i>	<i>22</i>
<i>Volume.....</i>	<i>22</i>
<i>Bottle Capacity</i>	<i>23</i>
<i>Shelf Capacity by Weight.....</i>	<i>23</i>
<i>Temperature.....</i>	<i>23</i>
<i>Power.....</i>	<i>23</i>
PARTS LIST.....	24

INTRODUCTION

This incubator is not intended for use at hazardous or household locations.

Before you use the incubator read this entire manual carefully to understand how to install, operate, and maintain the incubator in a safe manner.

Keep this manual available for use by all incubator operators. Ensure that all operators are given appropriate training before the incubator begins service.

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

GENERAL SAFETY CONSIDERATIONS

Your incubator and its recommended accessories are designed and tested to meet strict safety requirements. Only use this equipment for its intended application; any alterations or modifications void the warranty.

For continued safe operation of your incubator, always follow basic safety precautions including:

- Read this entire manual before using the incubator.
- Obey any local ordinances in your area regarding the use of this incubator.
- Use only approved accessories. Do not modify system components. Any alterations or modifications to your incubator can be dangerous and void your warranty.
- Always plug the incubator power cord into an earth grounded electrical outlet that conforms to national and local electrical codes. If the incubator is not grounded properly, parts such as knobs and controls can conduct electricity and cause serious injury.
- Avoid damaging the power cord. Do not bend it excessively, step on it, or place heavy objects on it. A damaged cord can be a shock or fire hazard. Never use a power cord if it is damaged.
- Do not position the incubator in such a manner as to make it difficult to unplug the unit in the event of an emergency.
- Do not attempt to move the incubator while in operation.

INTRODUCTION (CONTINUED)

ENGINEERING IMPROVEMENTS

Hach continually improves all of its products. As a result, engineering changes and improvements are made from time to time. Therefore, some changes, modifications, and improvements may not be covered in this manual. If your unit's operating characteristics or appearance differs from those described in this manual, please contact Hach for assistance.

CONTACTING ASSISTANCE

If you are unable to resolve a technical issue with the incubator, please contact Hach Technical support.

Phone: Industrial Customers Phone: (866) 450-4248 | Municipal Customers Call Phone: (800) 227-4224

E-mail: techhelp@hach.com

Mail

Hach Company
P.O. Box 389
Loveland, Colorado
80539-0389
Phone: 800-227-4224
Fax: 970-669-2932

RECEIVING YOUR INCUBATOR

Before leaving the factory, all incubators are packaged in high-quality shipping materials to provide protection from transportation-related damage.

When an incubator leaves the factory, safe delivery becomes the responsibility of the carrier. Damage sustained during transit is not covered by the warranty.

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

INSPECTING THE SHIPMENT

Carefully inspect the shipping carton for damage. Report any damage to the carrier service that delivered the incubator. If the carton is not damaged, open the carton and remove the contents.

Verify that the correct number of shelves, shelf slides, and leveling feet have been included (see the following table for quantities).

Included accessories

Model	Standard Shelves	Sliding Shelves	Leveling Feet
HRI3P	2	0	4

Carefully check all packaging before discarding. Save the shipping carton until you are sure everything works properly.

RETURNING THE SHIPMENT

If you must return the incubator for any reason, first contact your service representative for a Return of Material Authorization (RMA). You must provide the data plate information. See Recording Data Plate Information below.

RECEIVING (CONTINUED)

RECORDING DATA PLATE INFORMATION

Locate the data plate on the back of the incubator on the top right. The data plate contains the incubator model number and serial number. Enter this information below for future reference.

Date Plate Information

Model Number	
Serial Number	
Part Number	
Voltage	

Note: This unit is not intended for the growth, cultivation, incubation, or storage of **fruit flies** (*Drosophila melanogaster*). This unit is not designed for use with **fruit flies**. Improper use of this unit, including use with **fruit flies**, will void any warranty.

GRAPHIC SYMBOLS

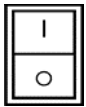
The incubator is provided with multiple graphic symbols on the control panel and adjacent to the power inlet. The symbols identify hazards and the functions of the adjustable components, as well as important notes in the user manual.

Symbol	Definition
	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.
	Indicates Temperature Repère température
	Indicates the Over Temperature Limit system Indique le système de dépassement de température
	Indicates AC Power Repère le courant alternatif
	Indicates I/ON and O/OFF I repère de la position MARCHE de l'interrupteur d'alimentation O repère de la position ARRÊT de l'interrupteur d'alimentation
	Indicates protective earth ground Repère terre électrique
	Indicates UP and DOWN respectively Touches de déplacements respectifs vers le HAUT et le BA
	Indicates Manually Adjustable Indique un bouton réglable manuellement
	Indicates Potential Shock Hazard Signale danger électrique

GRAPHIC SYMBOLS (CONTINUED)

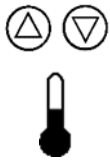
Symbol	Definition
	WEEE Directive compliant logo Indicates the unit should be recycled (Not disposed of in land-fill) Indique l'appareil doit être recyclé (Ne pas jeter dans une décharge)

CONTROL PANEL OVERVIEW



Power Switch

The main power switch on the control panel (green lighted I/O) controls all power to the unit and must be in the I/ON position before any systems are operational. The switch will be lighted when in the I/ON position.



Main Temperature Control and Green Digital Display

The HRI3P incubator control panels comes with a green digital display that shows the temperature within the incubator unit's chamber accurate to 0.1°C, and the user-selected temperature set point. The control is marked SET TEMPERATURE and consists of an UP/DOWN arrow pad for inputting set point temperatures, adjusting the time, and performing calibrations.



Heating and Cooling Light

The green pilot light located beneath the label TEC ACTIVATED should be ON whenever the Peltier TEC device is actively heating or cooling the chamber. This light should be ON nearly all of the time.



Over Temperature Limit Thermostat (OTL)

This control is marked SET OVER TEMPERATURE and is equipped with a graduated dial. It is independent of the Main Controller and guards against any failure which would allow the temperature to rise past the Main Controller's set point. This allows continued operation of the incubator in the event of a Main Controller failure until the problem can be corrected or service can be arranged. Operating the incubator for extended periods of time using only the Over Temperature Limit feature is not recommended, as the chamber's temperature stability and uniformity will suffer.



OTL Light

The red pilot light marked OVER TEMPERATURE ACTIVATED will illuminate when the Over Temperature Limit Thermostat has taken control of the incubator. Under normal operating conditions this pilot lamp should never turn on.

Fuse

Located on the top back of the unit inside the cord inlet, the 10 amp fuse protects against over current conditions. If the fuse blows, the unit will shut down. For your safety and the safety of laboratory personnel the cause of a blown fuse should be determined prior to replacing it.

INSTALLATION

The end user can perform the installation.

Only use this equipment for its intended application; any alterations or modifications void the warranty. Local city, county, or other ordinances may govern the use of this equipment. If you have any questions about local requirements, please contact the appropriate local agency.

This incubator is intended for use indoors, at room temperatures between 15°C and 30°C (59°F and 86°F), at no greater than 80% Relative Humidity at 25°C (77°F), and with a supply voltage that does not vary by more than 10%. Contact customer service for operating conditions outside these limits (refer to the back cover for contact information).

LOCATION

When selecting a location to install the incubator, consider all conditions that can affect performance, for example:

- Heating/cooling ducts
- Ovens
- Stoves
- Autoclaves
- Direct sun
- Fast moving air currents
- High-traffic areas

Allow a minimum of 4 inches (10cm) between the incubator and walls or partitions and 2 inches (5cm) of clearance above the top of the incubator for unobstructed airflow. Position the unit so the end-user has access to the power plug.

LIFTING AND HANDLING

The incubator is heavy and care should be taken to use appropriate lifting devices that are sufficiently rated for these loads. Follow these guidelines when lifting and handling the incubator.

- Lift the incubator only from its bottom surface.
- Doors, handles, and knobs are not adequate for lifting or stabilization.
- Restrain the incubator completely while lifting or transporting so it cannot tip.

- Remove all moving parts, such as shelves and trays. Secure the doors in the closed position during transfer.

INSTALLATION (CONTINUED)

LEVELING

You must make sure that the incubator is level and stable. Each incubator ships with four leveling feet. Insert one leveling foot into each of the four holes in the bottom corners of the incubator. Stand the incubator upright. Then, adjust the foot at each corner until the incubator stands level and solid without rocking. To raise a foot, turn it in a counterclockwise direction; to lower a foot, turn it in a clockwise direction.

Note: To prevent damage when moving the incubator, turn each of the four leveling feet completely clockwise.

SHELVING INSTALLATION

HRI3P Shelf Installation

Perform the following steps to install the HRI3P's incubator's wire basket shelves:

1. Install the shelf clips in the slots located on the sides of the chamber interior, front and back.
2. Squeeze each clip, insert the top tab first, and then the bottom tab using a rocking motion.
3. Hang the wire shelves from the clips.

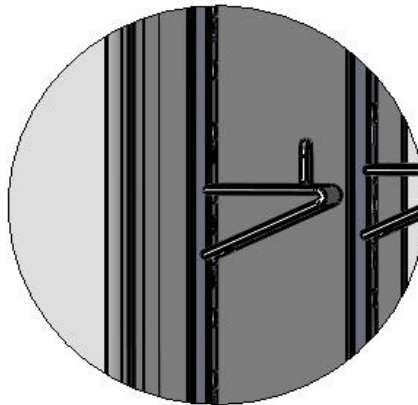


Figure 1: HRI3P Shelf Clips

INSTALLATION (CONTINUED)

POWER SOURCE

Check the data plate for voltage and ampere requirements before making a connection. If the requirements match your power source, plug the power cord into an earth grounded outlet. These units are provided with a 100 – 120V 9ft, 5 in (2.86m), Nema 5-15P power cord. **Supplied voltage must not vary more than 10% from the data plate rating. Damage to the incubator may result if supplied voltage varies more than 10%.**

These incubators are intended for a 50/60 Hz application. Use a separate circuit to prevent loss of product due to overloading or circuit failure.

Note: Electrical supply to the incubator must conform to all national and local electrical codes.

CLEANING

The incubator interior was cleaned at the factory but not sterilized. See the [Cleaning](#) topic in the User Maintenance section for more information

OPERATION

THEORY OF OPERATION

A Peltier thermoelectric cooling and heating device and an air circulating fan are used in conjunction with the temperature control circuit to achieve accurate temperature control. The temperature sensor located in the air stream senses any temperature deviation from the control point. Heating or cooling is provided to maintain the desired temperature. The circulating fan provides even air distribution throughout the chamber and assures temperature uniformity around the incubator shelf space.

TURNING ON THE INCUBATOR

1. Verify the power supply and incubator data plate match.
2. Check that the fuse is installed in the power inlet of the incubator.
3. Plug the power cord into an earth grounded electrical outlet.
4. Place the **Power** switch in the ON position.
5. If the incubator was just installed in a new location, complete the [Adjusting the Temperature Set Point](#) procedure and then the [Calibrating the Temperature Display](#) procedure. Then, to set the Over Temperature Limit, complete the [Setting the Over Temperature Limit Control](#) procedure. When you finish configuring the incubator temperatures, load the chamber.

ADJUSTING THE TEMPERATURE SET POINT

Perform the below steps to adjust the Set Temperature Control. This allows the Set Temperature control to be set and calibrated without interruption from the Set Over Temperature Limit setting:

1. Turn the **Set Over Temperature Limit** control dial clockwise to the maximum position indicated by the largest dot.
2. Press either the **Up** or **Down** key one time to enter set point mode. The Set Temperature digital display will start to blink, going from bright to dim. While blinking, the Set Temperature display shows the adjustable set point. Some models may first display "SP"
3. To change the set point, press either the **Up** or the **Down key**. If neither key is pressed within 5 seconds, the Set Temperature display stops blinking and displays the temperature of the incubator.
4. Adjust the set point to the temperature you will use during normal operations.
5. Allow the incubator at least 24 hours to stabilize at the desired set point before performing calibration.

OPERATION (CONTINUED)

CALIBRATING THE TEMPERATURE DISPLAY

Only calibrate the incubator after it has been installed in its working environment and is stable at its temperature set point for 24 hours. Perform the below steps to calibrate your incubator to the set point you will use in daily operations:

1. Place a certified reference thermometer or the thermocouple probe of a remote reading reference thermometer in the chamber, as close as possible to the geometric center. Check that the thermometer or thermocouple does not touch any shelving. If you place a thermometer directly inside the chamber, tape the thermometer to a Petri dish to elevate it off the shelf and keep the scale in view. A thermocouple probe's sleeve may be taped to the shelving, as long as the exposed copper end is 2 inches (5cm) above the shelf. A thermometer or exposed thermocouple probe in direct contact with the shelving may experience heat sinking, which can result in an inaccurate temperature reading.
2. Allow the reference thermometer's temperature to stabilize (wait until the thermometer measurement does not change for one hour).
3. Compare the Incubator's temperature display with the measurement of the reference thermometer.
4. If there is a difference, place the **Set Temperature Control** into calibration mode by pressing both the **Up** and **Down keys** at the same time for approximately 5 seconds until 2 decimals are flashing. The display will show the letters CO first, and then flash the current temperature reading.
5. While blinking, calibrate the incubator's temperature display by pressing the **Up** or **Down key** until it displays the correct value. After you set the temperature value, wait approximately 5 seconds for the calibration to complete and the display to stop blinking.
6. Allow the incubator's and the reference thermometer's temperatures to stabilize again (wait until the thermometer measurements do not change for one hour), and recalibrate if necessary.

Note: Always use an independently certified thermometer that is regularly calibrated to 0.1°C by a third party to conduct temperature verifications or calibrations.

SETTING THE OVER TEMPERATURE LIMIT

Perform the below steps to adjust the Set Over Temperature Limit safety control:

1. Turn the **Set Over Temperature Limit** control dial clockwise to the maximum position (this allows the Set Temperature control to stabilize).
2. Turn the **Set Over Temperature Limit** control dial counterclockwise until the Over Temp Limit Activated light illuminates.
3. Then, slowly turn the **Set Over Temperature Limit** control dial clockwise until the light turns off.
4. This adjusts the **Set Over Temperature Limit** control to approximately 1°C over the temperature configured by the Set Temperature control. If using the Over Temperature feature, test it annually.

OPERATION (CONTINUED)

DOOR AJAR ALARM

If the door is left open for more than 60 seconds the audible door alarm will be sound, and the display will flash. If the alarm needs to be silenced, close the door, which will reset the timer. For prolonged periods with the door open, the unit should be switched to the OFF position. If the door alarm continues to sound when the door is fully closed, the position of the black tab-like door alarm sensor, mounted on the front left side of the door frame overhang, can be adjusted using a screwdriver. Loosen the screws just enough to slide the sensor and adjust. Do not remove the screws.

LOADING THE INCUBATOR

Place items on the shelves inside the incubator chamber as evenly spaced as possible. Good spacing allows for maximum air circulation and a higher degree of temperature uniformity.

ATTACHING EQUIPMENT TO THE INTERIOR ACCESSORY OUTLETS

The incubator has two, 2 amp maximum accessory outlet located inside the chamber. The power switch on the front panel controls power to the accessory outlets. These outlets can power equipment such as magnetic stirrers, rockers, etc. Do not attach any equipment drawing more than 2 amps to these outlets.

Accessory equipment may produce additional heat. This heat could affect the temperature range and uniformity of this incubator. If you are using the interior accessory outlets, you should check that the incubator operates within required temperatures when the accessory equipment is installed and operating.

USER MAINTENANCE



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

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

If a hazardous material/substance has spilled in the incubator 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.

CLEANING

Note: The incubator chamber should be cleaned and disinfected prior to use.

Periodic cleaning is required. Perform the below steps to clean the incubator:

1. Remove all of the interior parts (shelves, racks, and any additional items), if assembled.
2. Clean the incubator with a mild soap and water solution, including all corners.
3. Rinse with distilled water and wipe dry with a soft cloth. **Do not use deionized water.**
4. Take special care when cleaning around the door alarm and temperature sensor heads, and the chamber electrical outlets to prevent damage.



Warning: Never clean the unit with alcohol or flammable cleaners.

Avertissement: Ne jamais nettoyer l'appareil à l'alcool ou avec des nettoyeurs inflammables.

Note: Do not use spray cleaners or disinfectants that might leak through openings and cracks and coat electrical components, or that contain solvents that will harm coatings. Do not use chlorine-based bleaches or abrasives; they will damage the chamber liner.

DISINFECTING

Disinfect the incubator on a regular basis. Perform the below steps to disinfect the incubator:

1. Remove all of the interior parts (shelves, racks, and any additional items), if assembled. Disinfect the Incubator, including all corners and the access port, using a suitable disinfectant. Take special care when cleaning around sensing heads to prevent damage and around the door gasket so as not to impair the positive seal.
2. Disinfect shelves and shelf clips in an autoclave.
3. If a hazardous material/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 policy and procedures established for your site.

4. Disinfect the incubator using commercially available disinfectants that are non-corrosive, non-abrasive, and suitable for use on stainless steel, aluminum, painted steel surfaces. Contact your local Site Safety Officer for detailed information for the proper disinfectants suitable for your operation.

MAINTENANCE (CONTINUED)

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 incubator.

Electrical components do not require maintenance. If the incubator fails to operate as specified, please contact Hach for assistance.

UNIT SPECIFICATIONS

These incubators are 100 - 120 voltage units. Please refer to the incubator's 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 $\pm 10\%$. 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

Model	Shipping	Net Weight
HRI3P	145lbs / 65.8kg	105lbs / 47.6kg

DIMENSIONS

In inches

Model	Exterior W × D × H	Interior W × D × H
HRI3P	18.5 x 20 x 38.5 in	14 x 15.5 x 24 in

In Centimeters

Model	Exterior W × D × H	Interior W × D × H
HRI3P	47 x 50.8 x 97.8 cm	35.6 x 39.3 x 60.9 cm

VOLUME

Model	Cubic Feet	Liter
HRI3P	3.0	84.9

UNIT SPECIFICATIONS (CONTINUED)

BOTTLE CAPACITY

Model	Per Shelf	Total
HRI3P	30 BOD Bottles	90 BOD Bottles

SHELF CAPACITY BY WEIGHT

Model	Per Shelf	Total
HRI3P	35lbs / 15.9kg	70lbs / 31.7kg

TEMPERATURE

Model	Temp Range	Uniformity	Stability
HRI3P	15° to 45°C	+/-0.5° @ 20°C	+/-0.1°C @ 20°C

POWER

Model	Voltage	Amperage	Frequency
HRI3P	100 - 120V	7	50/60 Hz

PARTS LIST

Description	Part Number
Peltier Thermoelectric Heater and Cooler (TEC) Assembly	9990763
EMI Filtered Fused Inlet	4200523
Cooling Fan 89510-738	2600563
Convenience Outlets	6100525
Power Supply	6750517
Feet, Adjustable Glide	2700506
I/O (on/off) Switch	7850570
Main Temperature Controller	1751017
Over Temperature Thermostat (OTL)	1750813
Pilot Light, Green	4650554
Pilot Light, Red	4650553
Power Cord, USA	1800510
Shelves (2)	6800529
Shelf Clip (4 needed per shelf)	1250512
Fuse 10A	3300516
Knob for OTL	4450506
Door Actuator Magnet	7850588
Door Sensor	7850589
Lab Stopper	7750517
Gasket, Magnetic Door (28.25 inches X 22.25 Inches)	3450758