



Innova[®] 3100 Digital Water Bath Shaker

Operating manual

Copyright

Copyright © 2014 Eppendorf AG, Germany. No part of this publication may be reproduced without the prior permission of the copyright owner.

The company reserves the right to change information in this document without notice. Updates to information in this document reflect our commitment to continuing product development and improvement.

Trademarks

Eppendorf® and the Eppendorf logo are registered trademarks of Eppendorf AG, Germany.

New Brunswick™ is a trademark of Eppendorf AG, Germany.

Innova® is a registered trademark of Eppendorf, Inc., USA.

Trademarks are not marked in all cases with ™ or ® in this manual.

Eppendorf has attempted to identify the ownership of all trademarks from public records. Any omissions or errors are unintentional.

Table of contents

1	Operating instructions	5
1.1	Using this manual	5
1.2	Danger symbols and danger levels	5
1.2.1	Hazard symbols	5
1.2.2	Degrees of danger	5
1.3	Symbols used	5
2	Product description	7
2.1	Main illustration	7
2.2	Features	8
2.2.1	General	8
2.2.2	Universal Power Capability	9
2.2.3	Platform Assemblies	9
2.2.4	Cooling Coil Option	9
2.2.5	Triple Eccentric Drive	10
2.2.6	Bearings	10
2.2.7	Motor	10
2.2.8	Electronic Boards	11
2.2.9	Accessories and Options	11
3	Safety	13
3.1	Intended use	13
3.2	Application limits	13
3.2.1	Description of ATEX Guideline (94/9EC)	13
3.3	Information on Product Liability	13
4	Installation	15
4.1	Inspection of Boxes	15
4.2	Unpacking	15
4.3	Utilities Requirements	15
4.4	Space Requirements	16
4.5	Hose Connections	17
4.6	Platform Assemblies	19
4.7	Installation of Platform	19
4.8	Electrical Connections	20
5	Operation	21
5.1	Starting Shaker	21
5.2	Continuous (Unlimited) Run	21
5.3	Checking Setpoint	21
5.4	Timed Functions	22
5.4.1	Setting Timer	22
5.4.2	Cancelling Timer	22
5.5	Alarm Functions	22
5.6	Temperature	23
5.6.1	Setting Temperature	23
5.6.2	Deactivating Temperature Control	23
5.7	Temperature Offset Calibration	23

Table of contents

Innova® 3100 Digital Water Bath Shaker
English (EN)

5.8	Total Running Time	24
5.9	MAINT Indicator Light	24
5.10	Water Level Control	25
5.11	Low Water Level Alarm	26
5.12	Draining Bath	26
6	Operating controls and function	27
6.1	Control Panel	27
6.2	LED Display	27
6.3	User Interface	28
6.3.1	Status Indicator Lights	29
6.3.2	Function Indicator Lights	29
7	Maintenance	31
7.1	Maintenance	31
7.2	Cleaning	31
8	Transport, storage and disposal	33
8.1	Disposal	33
9	Technical data	35
9.1	Weight/dimensions	35
9.1.1	Device Dimensions	35
9.1.2	Platform dimensions	35
9.1.3	Weight	35
9.2	Application Parameters	35
9.2.1	Speed	35
9.2.2	Temperature	36
9.2.3	Altitude Limit	36
9.2.4	Timer (Shaker)	36
9.2.5	Self-diagnostic Status	36
9.2.6	Remote Monitoring	36
9.2.7	Automatic Restart	37
9.2.8	Construction	37
9.3	Power supply	37
9.3.1	Electrical Protection	37
10	Ordering information	39
10.1	Accessories	39
10.1.1	Interchangeable Platforms	39
10.1.2	Interchangeable Half-size Platforms	39
10.1.3	Test Tube Racks for Subplatform	39
10.1.4	Accessories	40
10.1.5	Accessory Flask Clamps	40
	Index	41
	Certificates	43




1 Operating instructions

1.1 Using this manual

- ▶ Carefully read this operating manual before using the device for the first time.
- ▶ Also observe the operating manual enclosed with the accessories.
- ▶ The operating manual should be considered as part of the product and stored in a location that is easily accessible.
- ▶ When passing the device on to third parties, be sure to include this operating manual.
- ▶ If this manual is lost, please request another one. The current version can be found on our website www.eppendorf.com.

1.2 Danger symbols and danger levels

1.2.1 Hazard symbols


	Electric shock		Material damage
	Explosion		

1.2.2 Degrees of danger

The following degree levels are used in safety messages throughout this manual. Acquaint yourself with each item and the potential risk if you disregard the safety message.

DANGER	<i>Will</i> lead to severe injuries or death.
WARNING	<i>May</i> lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 Symbols used

Example	Meaning
▶	You are requested to perform an action.
1. 2.	Perform these actions in the sequence described.
•	List.
	References useful information.

Operating instructions

Innova® 3100 Digital Water Bath Shaker
English (EN)

2 Product description
2.1 Main illustration

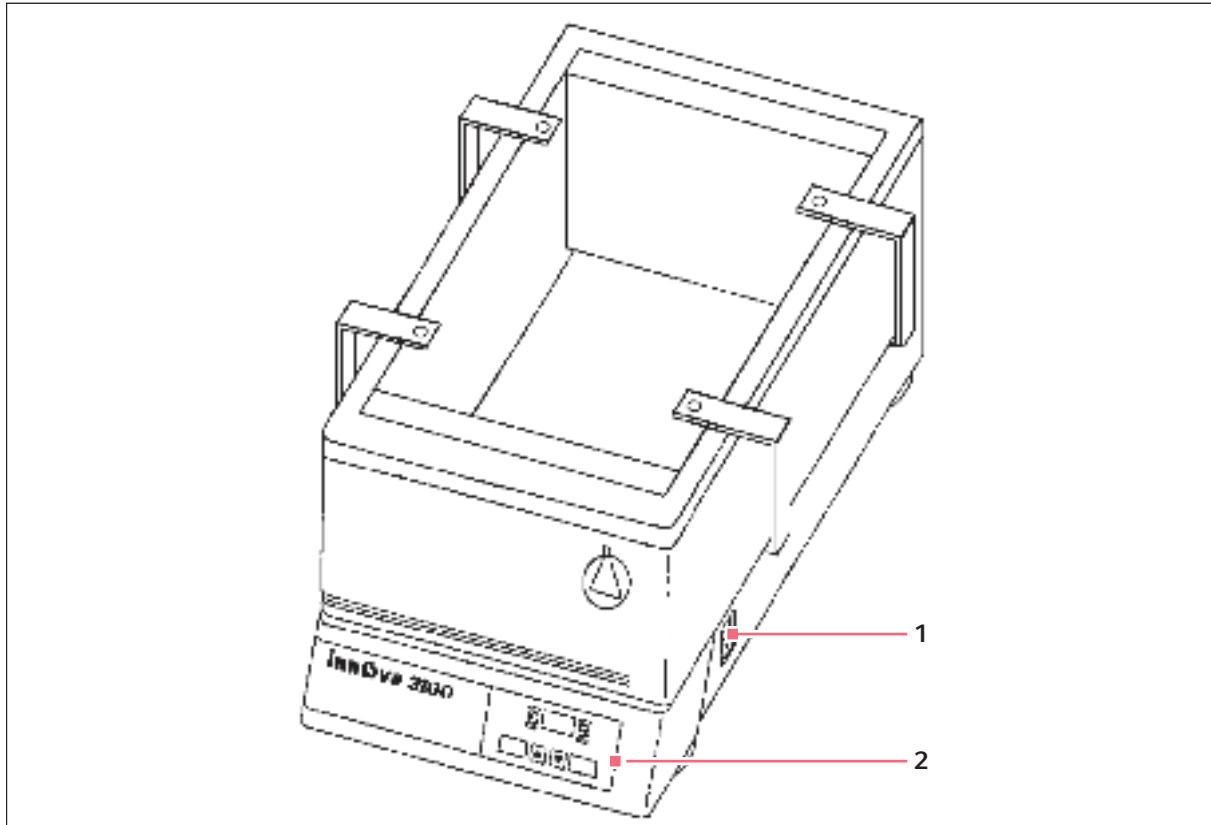


Fig. 2-1: Front View

1 On/Off Circuit Breaker

2 Control Panel

Product description

Innova® 3100 Digital Water Bath Shaker
English (EN)

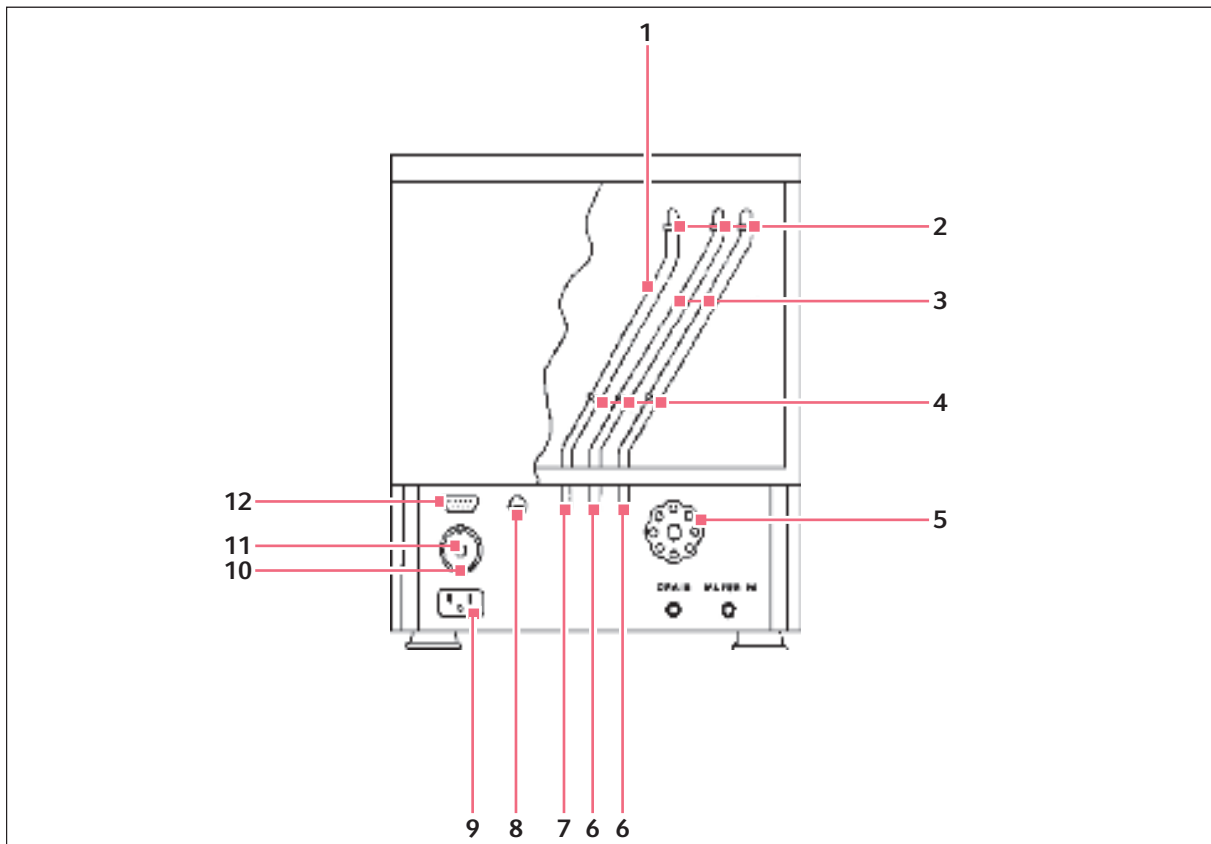


Fig. 2-2: Rear View

- | | |
|-----------------------------------|-------------------------------------|
| 1 Overflow Hose | 7 Overflow Connection |
| 2 Hose Clamps | 8 Fuse Control Circuit |
| 3 (2) Short Rubber Hose | 9 Power Cord Connection |
| 4 Hose Clamps | 10 Selector Switch |
| 5 Drain Valve | 11 Fuse Voltage |
| 6 Cooling Coil Connections | 12 Chart Recorder Connection |

2.2 Features

2.2.1 General

The Innova 3100 is a shaker that incorporates a triple eccentric counterbalanced drive to provide horizontal plane rotary motion in a ½ inch (12.7 mm) circular orbit. A Proportional/Integral (PI) microprocessor controller with instantaneous digital feedback controls the speed over a range of 25-400 RPM. It also provides temperature control over a range of 5 °C above ambient to 80 °C. For lower temperatures an optional water bath cooling coil is available.

The shaker may be operated either continuously or in a timed mode via a programmable timer for shaking periods of 0.1 hour to 99.9 hours.

The Innova 3100 is equipped with audible and visible alarms which are activated when an alarm condition exists as follows:

- The end of a timed run
- Deviations of shaking speed or temperature outside of tolerance limits
- Low water level
- Water overflow

A wide variety of platforms can be used with the Innova 3100. Dedicated platforms are available for a variety of flask sizes. A Universal platform and test tube racks are also available.

The Innova 3100 has a built-in water level control system which is infinitely adjustable over a wide range. To compensate for evaporation, water is automatically replenished to the preset level.

Additionally, the Innova 3100 has analog outputs for a chart recorder that will record speed and/or temperature. See Chapter 5 for recorder adaptation.

2.2.2 Universal Power Capability

A voltage selector switch is used to select the appropriate voltage. This universal system adapts to worldwide power requirements. Voltage has been set prior to shipment. Innova shakers are available in 100 V, 120 V, 220 V and 240 V versions, and accommodate both 50 Hz and 60 Hz frequencies.



WARNING! Risk of injury to personnel

- ▶ It is critical that you check the voltage settings before you plug the device into a power source (see *Utilities Requirements on p. 15*).
-

2.2.3 Platform Assemblies

The Innova 3100 can be used with a wide variety of Eppendorf 12 inch x 16.5 inch platforms which will accept a variety of clamps for flasks and test tubes. Additionally, a subplatform is available to adapt half platforms for flasks and test tubes used on the Eppendorf Model G86 Aqua Therm Water Bath Shaker.

2.2.4 Cooling Coil Option

The Innova 3100 can be ordered with a cooling coil factory-installed. The cooling coil provides the ability to operate at temperatures below ambient.

Product description

Innova® 3100 Digital Water Bath Shaker
English (EN)

2.2.5 Triple Eccentric Drive

The Triple Eccentric Drive (see Fig. 2-3 on p. 10) used in the Innova 3100 employs the same proven technology which has driven Eppendorf shakers for over 30 years.

This drive mechanism utilizes a counterweight system to stabilize the rotary motion produced during operation. When the workload moves in one direction, opposing forces are generated to stabilize the shaker. This action will help eliminate the problem of “walking” which may occur with less precisely balanced instruments. Vibration is minimized and the life of the device is extended.

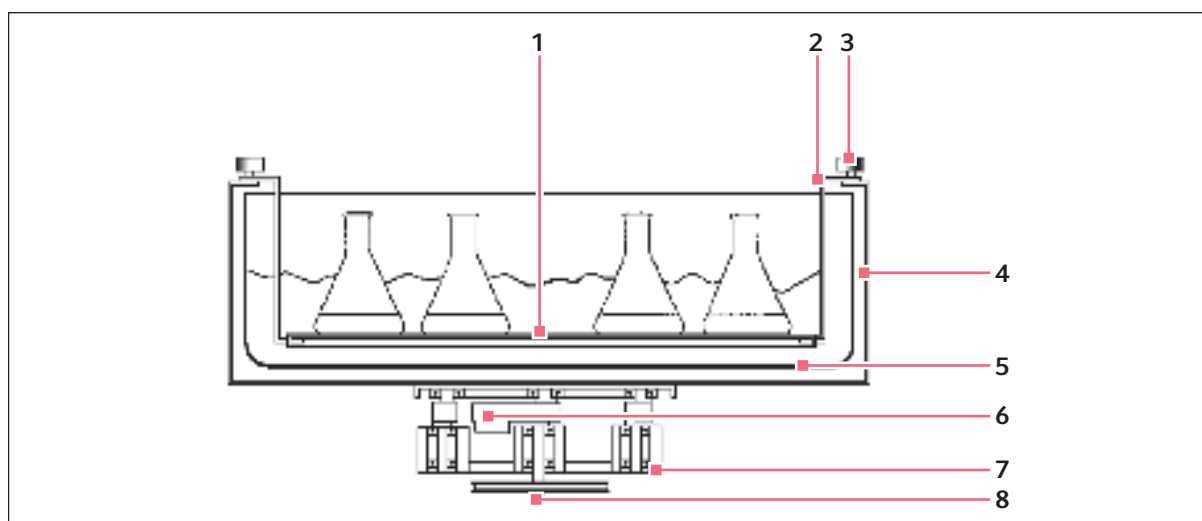


Fig. 2-3: Counterbalanced Drive Mechanism

- | | |
|--------------------------|---------------------------------------|
| 1 Shaker Platform | 5 Water Bath |
| 2 Supporting Arm | 6 Counterweight |
| 3 Locking Knob | 7 Eccentric Drive Assembly |
| 4 Drive Arm | 8 Eccentric Drive Shaft Pulley |

2.2.6 Bearings

Innova shakers employ shielded lubricated ball bearings of the highest quality. Shielded bearings minimize the generation of airborne particulates which may be disadvantageous in clean rooms or controlled environment areas. These bearings require no maintenance.

2.2.7 Motor

The Innova 3100 shaker uses a 3-phase brushless ball bearing DC motor. This low profile motor provides high torque along with quiet, efficient operation and low maintenance. This motor has a rating of 1/15 horsepower.

2.2.8 Electronic Boards

The main control board for the Innova shaker has the following functions:

- Non-volatile memory for storage of key parameters during power interruption
- Speed sensing, electronic commutation, and power control for the brushless DC drive motor
- Maintains an elapsed running time clock
- Contains firmware for shaker control as well as recognition of an expansion connector for option modules
- Provides an operator interface via displays, audible alarm, and connection to the keypad module (keypad buttons and display graphics).

The temperature control module for the Innova 3100 has the following functions:

- Control of analog power supplies
- Rectification and regulation for analog power supplies
- Provides signal conditioning circuitry and A/D conversion for the RTD-based temperature measurement
- Provides remote monitoring capabilities by supplying analog output for speed and temperature which are compatible with chart recorders and analog data acquisition system
- Controls the heater.

2.2.9 Accessories and Options

The following accessories are available for use with your Innova 3100:

- Gable cover (plexiglass or stainless steel)
- Portable cart or space saving dolly

For operation below ambient temperature, the following kits are available for retrofit (by an Eppendorf authorized service technician only):

- Cooling coil kit
- Coolant circulating system

Product description

Innova® 3100 Digital Water Bath Shaker
English (EN)

3 Safety

3.1 Intended use

The Innova 3100 Digital Water Bath Shaker will provide you with reliable and maintenance-free operation which is characteristic of all Eppendorf shakers. The Innova 3100 is among the newest generation of Eppendorf shakers and incorporates a variety of state-of-the-art components and features to permit the precision operation necessary for your exacting scientific experiments.

3.2 Application limits

3.2.1 Description of ATEX Guideline (94/9EC)



DANGER! Explosion hazard

- ▶ Do not operate the device in areas where work is completed with explosive substances.
 - ▶ Do not use this device to process any explosive or highly reactive substances.
 - ▶ Do not use this device to process any substances which could create an explosive atmosphere.
-

Due to its design and the ambient conditions in its interior, the device is not suitable for use in potentially explosive atmospheres.

The device may only be used in a safe environment, e.g., the open atmosphere of a ventilated lab.

The use of substances which may contribute to a potentially explosive atmosphere is not permitted.

The final decision regarding the risks associated with using these types of substances is the user's responsibility.

3.3 Information on Product Liability

In the following cases, the designated protection of the device may be compromised.

The liability for the function of the device passes to the operator if:

- The device is not used in accordance with this operating manual.
- The device is used outside of the range of application described in the succeeding chapters.
- The device is used with accessories or consumables that were not approved by Eppendorf.
- Service or maintenance is completed on the device by people who are not authorized by Eppendorf.
- The owner has made unauthorized modifications to the device.

Safety

Innova® 3100 Digital Water Bath Shaker
English (EN)

4 Installation

4.1 Inspection of Boxes

After you have received your order, inspect the boxes carefully for any damage that may have occurred during shipping. Report any damage to the carrier and to your local Eppendorf distributor immediately.

4.2 Unpacking

- ▶ Save the packing materials for possible future use, and be sure to save this Operating Manual for instruction and reference. User manuals can also be found online, in PDF format, at newbrunswick.eppendorf.com.
- ▶ If any part of your order was damaged during shipping, is missing, or fails to operate, please contact your Eppendorf distributor.
- ▶ Using your packing list, verify that you have received the correct materials, and that nothing is missing.

4.3 Utilities Requirements



WARNING! Risk of injury to personnel

- ▶ It is critical that you check the voltage settings before you plug the device into a power source.
- ▶ Confirm that the voltage setting is correct by checking the voltage setting on the Voltage Selector Switch and the CAUTION label located over the power cord connection.

Determine the voltage of your device by checking the voltage selector and label on the rear of the device. Confirm that the correct electrical service package is included with the device by comparing the part number on the electrical service package to the following table.

Tab. 4-1: Voltage Configuration Table

Innova 3100	Voltage	Electrical Service Package
M1231-0001	100 V 50 / 60 Hz	M1195-0350
M1231-0000	120 V 50 / 60 Hz	M1195-0350
M1231-0002	220 - 230 V 50 / 60 Hz	M1195-0360
M1231-0003	240 V 50 / 60 Hz	M1195-0360

Installation

Innova® 3100 Digital Water Bath Shaker
English (EN)

4.4 Space Requirements



Position the shaker, allowing enough space around the mains/power connections to unplug the device.

Care should be taken to avoid placing the shaker in a position that may affect its performance, such as those listed below.

DO NOT place the shaker:

- Directly under, beside or within the air flow of heating or air-conditioning ducts, or other drafts
- Directly beside heat-generating equipment such as a heater, an autoclave or an oven
- Near the exhaust of heat- or cold-generating equipment (like an ultra-low temperature freezer)
- Near a window exposed to direct sunlight
- Directly on top of any heat-generating apparatus

► Place the device in an area where there is sufficient space for the shaker and service lines.

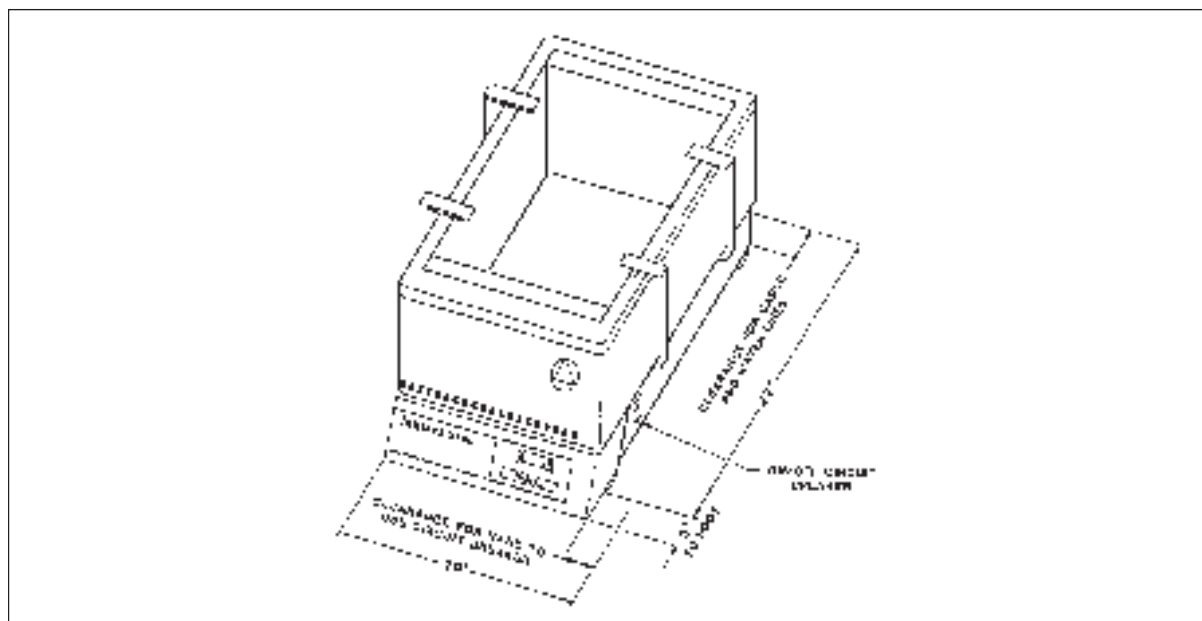


Fig. 4-1: Space Requirements

The outside dimensions of the Innova 3100 are:

Width	43.2 cm (19.5 in)
Height	36.8 cm (17 in)
Depth	69.9 cm (27.5 in)

The effective surface area required for operation is:

Width	48.3 cm (21.5 in)
Depth	76.2 cm (30 in)

4.5 Hose Connections

A ½ inch diameter reinforced hose is provided for water addition and drainage. Cut the hose into two lengths, to suit the distances from the water source to the machine.

Install the hosing as follows:

1. Connect one length of ½ inch hose to the WATER IN FITTING.
2. Connect the other length of ½ inch hose to the DRAIN FITTING.
3. Clamp the hoses with the clamps provided.
4. Connect the "WATER IN" hose to a water supply with a maximum water pressure of 100 psi. The drain hose must go to an OPEN drain.
5. Attach the smaller diameter (3/8 inch) hose to the overflow tube, and run it to an OPEN drain.

Installation

Innova® 3100 Digital Water Bath Shaker
English (EN)

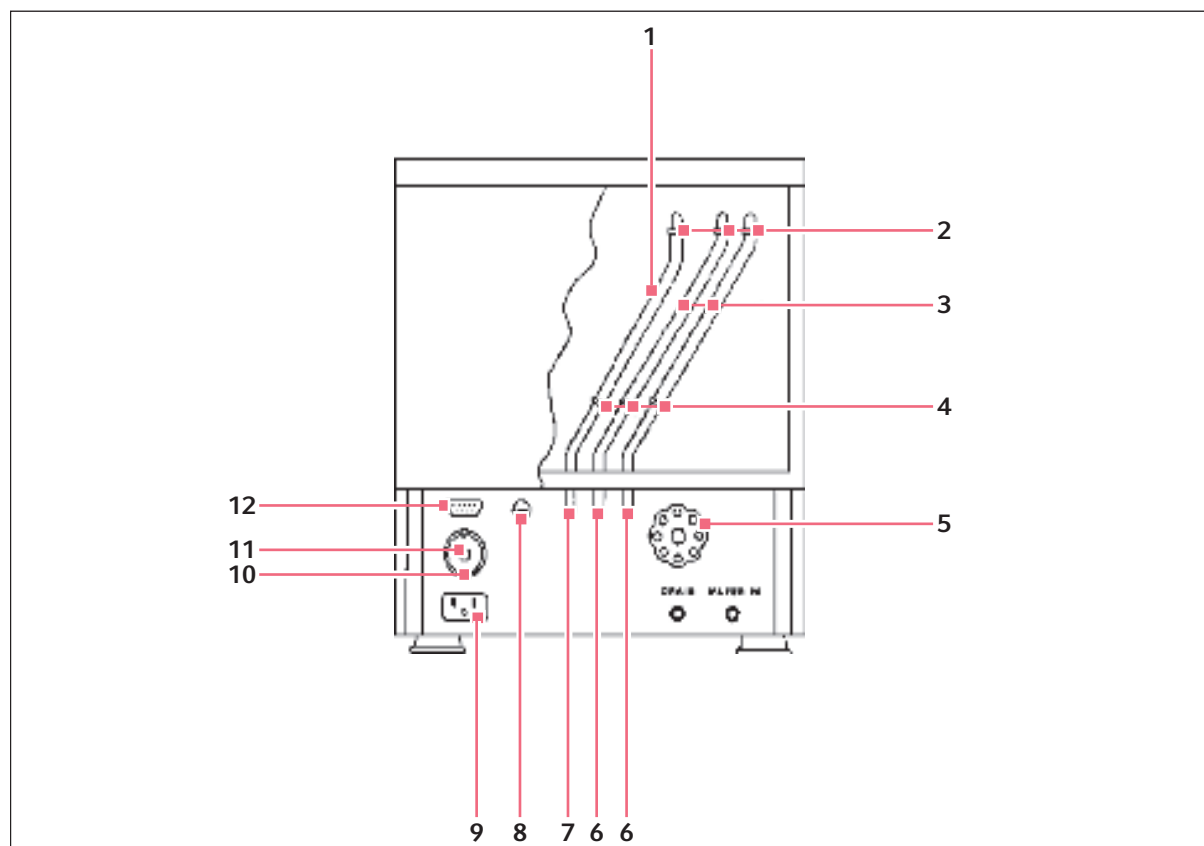


Fig. 4-2: Hose Connections

- | | |
|-----------------------------------|-------------------------------------|
| 1 Overflow Hose | 7 Overflow Connection |
| 2 Hose Clamps | 8 Fuse Control Circuit |
| 3 (2) Short Rubber Hose | 9 Power Cord Connection |
| 4 Hose Clamps | 10 Selector Switch |
| 5 Drain Valve | 11 Fuse Voltage |
| 6 Cooling Coil Connections | 12 Chart Recorder Connection |

The overflow tube is the farthest left of the three tubes that project down from the back of the bath. The other two tubes are used only when the cooling coil option is installed.




To minimize the development of rust inside the waterbath:

- If you are using tap water in the bath, make sure the water has a low iron content.
- If you are using distilled water, mix it with a small amount of tap water and/or add dissolved salts. Any ultra-pure (distilled, de-ionized or reverse osmosis) water tends to leach the iron from the stainless steel, encouraging oxidation.

If the cooling coil option is factory-installed in your device, an additional 16-foot reinforced rubber hose is provided, with corresponding clamps, for connection to the coolant or water supply. To install the hose:

1. Cut the hose into two pieces to suit a water supply and drain length requirement.
2. Attach each of the two hoses to the cooling coil connection tubes with clamps, allowing 1/8 - 3/16 inch of hose to extend beyond the clamps.
 One line must go to an open drain or return to a coolant supply; the other line must be connected to a water or coolant supply.

 If you are using tap water as coolant for the device, it is preferable that the supply hose be attached to a supply valve, to minimize water use.

4.6 Platform Assemblies


A platform, which is required for operation, is a separate item, not included with the shaker assembly. The Innova 3100 platform will accept a wide range of clamps for flasks, test tubes, etc.

4.7 Installation of Platform



WARNING! Risk of injury to personnel

- ▶ Make sure shaker is unplugged from the mains/power before installing platform.
-

 Prior to use, a platform must be installed on the shaker.

To install the platform:

1. Make sure the circuit breaker on the right side of the device is set to the OFF position.
2. Make sure the mains/power cord is unplugged.
3. Place platform assembly on top of the drive arms.
4. Install each of the four locking knobs, through the support, into drive arms.
5. Tighten all four locking knobs.

Installation

Innova® 3100 Digital Water Bath Shaker
English (EN)

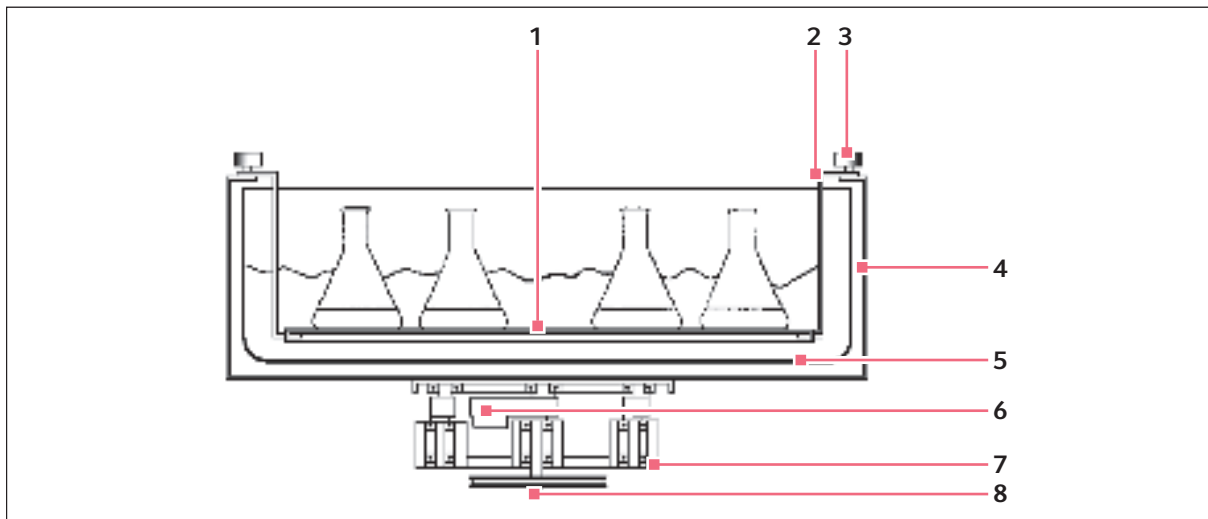


Fig. 4-3: Platform Installation

- | | |
|--------------------------|---------------------------------------|
| 1 Shaker Platform | 5 Water Bath |
| 2 Supporting Arm | 6 Counterweight |
| 3 Locking Knob | 7 Eccentric Drive Assembly |
| 4 Drive Arm | 8 Eccentric Drive Shaft Pulley |

4.8 Electrical Connections



CAUTION! Risk of electrical hazard

- ▶ Before making electrical connections, be sure to check the following list.

1. If you have not already done so, check the voltage selector switch at the rear of the device to be sure that it is set to the appropriate voltage.
2. Remove the caution label from the rear of the device.
3. Set the circuit breaker on the right side of the device to the OFF position.
4. Make sure there is enough space around the mains/power connections to unplug the device.

ONLY THEN:



NOTICE! Risk of material damage

- ▶ An earthed/grounded electrical outlet is necessary for the safe operation of this instrument.

5. Connect the adequately rated power cord to the power cord connection and to a earthed/grounded electrical outlet.

5 Operation

5.1 Starting Shaker

To initially start the shaker:

1. Press ON/OFF switch (located on the right side of the shaker) to ON position.
The LED display will flash to indicate that the shaker has been off or the power to the shaker has been interrupted. To stop the flashing display, press any key.
2. Press SELECT key until the RPM indicator lights flash.
If the shaker is running, the LED display will track the speed as it accelerates to the last entered speed setpoint.



The shaking action may be stopped or started by pressing the START/STOP key.

5.2 Continuous (Unlimited) Run

To setup a continuous run:

1. If the LED displays "Off", press START/STOP key.
2. Press SELECT until RPM is lit.
3. Press ▲ or ▼ key to enter SET mode (SET indicator will light).
4. Set speed by using ▲ or ▼ key until the desired setpoint is displayed.



Holding the ▲ or ▼ key down will cause the setting to change more rapidly.

The setpoint may be changed during a run without stopping the shaker by following steps 2 - 4 above. During speed changes, the alarm may sound until the speed returns to within 5 RPM of the setpoint.

5.3 Checking Setpoint

To check any setpoint:

1. Press SELECT until the desired indicator is lit.
2. Press ▲ or ▼ to enter SET mode.

The current setpoint will display.



Holding ▲ or ▼ key down for more than 0.5 second will cause the speed, time or temperature setpoint to change. Should this occur, resetting will be necessary.

Operation

Innova® 3100 Digital Water Bath Shaker
English (EN)

5.4 Timed Functions

The shaker may be programmed to automatically stop after a preset time period of 0.1 hour to 99.9 hours. There must be power to the shaker in order to set the timer. However, a timed run can be initiated while the device is either shaking or stopped.

5.4.1 Setting Timer

To set the timer:

1. Press SELECT key to light HRS.
2. Set the time by pressing ▲ or ▼ key until the desired setpoint is displayed (0.1 - 99.9 hours).
3. To start the timer operation, press ▲ or ▼ key once. The SET indicator should light. While the SET indicator is on, press the START/STOP key. The timer indicator will light and remain lit for the duration of the run. At the end of the timed run the display will read "Off", the time indicator will flash, and the audible alarm will sound (if it is enabled).
4. The setpoint may be changed during a run without stopping the shaker by following steps 1 and 2 above.
5. To stop the alarm, press SELECT key and change to any other function.

5.4.2 Cancelling Timer

To cancel the timer WITHOUT stopping the shaker:

1. Press SELECT key to light HRS.
2. Set time by pressing ▲ or ▼ key until the desired setpoint is displayed (0.1 - 99.9 hours).
3. While the SET LED is lit, press START/STOP key.
The TIME indicator will go out and the display will read "Off".

5.5 Alarm Functions

Innova 3100 shakers have an audible alarm which is activated at predetermined times. It may be deactivated in the following way:

1. Press SELECT to light HRS.
2. Simultaneously press the ▲ and ▼ keys.
The SET and MAINT indicators will flash.
3. While the SET and MAINT indicators are flashing, press the START/STOP key.
The MUTE indicator will light to advise that the audible alarm is deactivated.

To reactivate the alarm, repeat steps 1-3. The MUTE indicator will be extinguished when the alarm has been reactivated.

5.6 Temperature

This control consists of an internal electrical interface, an RTD temperature probe, and an analog output for chart recorder or computer. The temperature probe is in the water bath. The temperature can be set from 5.0 °C above ambient to 80 °C.

5.6.1 Setting Temperature

To set the temperature setpoint:

1. Press SELECT key until the function indicator lights on the °C mode.



For temperatures above 50 °C, the stainless steel gable cover is required to minimize heat loss.

2. Increase or decrease the setpoint by pressing ▲ or ▼ key. The temperature alarms, both audible and flashing light, are activated if the temperature is more than 1.0 °C higher or lower than the temperature setpoint. The alarm will automatically deactivate as the device achieves the set temperature.

5.6.2 Deactivating Temperature Control

The temperature control system may be shut off during set-up for special investigations.

To deactivate the temperature control system:

1. Press and hold ▼ key until the setpoint is at 4.0 °C.
2. While holding ▼ key, simultaneously press START/STOP key.

The temperature setpoint display shows "Off" and the heater (and the cooling coil, if present) will be deactivated.

To reactivate the temperature control:

- ▶ Press ▲ key until the desired temperature setpoint is displayed.



The shaker may be started or stopped by pressing START/STOP key. When starting, the device will automatically return to the last function and setting. The alarms will be activated until the speed is within 5 rpm or the temperature is within 1.0 °C of the setpoint. The alarm will not sound when the shaker is accelerating or the temperature is changing to satisfy the setpoint immediately following turning on the power.

5.7 Temperature Offset Calibration

The temperature probe and the temperature controller are calibrated together at the factory. The temperature probe measures the temperature of the air at the probe's location, near the heat exchanger return vent. The controller uses the probe input to adjust air temperature, up or down, to match the temperature setpoint.

Operation

Innova® 3100 Digital Water Bath Shaker
English (EN)

Depending on various conditions within the chamber, such as flask placement and size, the heat produced by growing organisms, heat losses due to liquid evaporation from flasks, etc., the display temperature may differ from temperatures within the flasks themselves.

If you wish to have the temperature display ("Indicated Temperature") match the temperature at a given point, or match the average of a series of points within the chamber ("Actual Temperature"), proceed as follows:

1. Let the unit equilibrate at or near the desired temperature. Record the Indicated Temperature.
2. Record the Actual Temperature.
3. Calculate the temperature correction value: Actual Temperature – Indicated Temperature = Temperature Correction Value.
4. Press the SELECT key until the °C function indicator illuminates.
5. Simultaneously press ▲ and ▼ keys. The SET and MAINT indicators will light.
6. While the SET and MAINT indicators are illuminated, use ▲ or ▼ key to set the display to the calculated Temperature Correction Value.



The °C light will pulse rapidly for a short duration to indicate it is not operating in the factory default mode. It will pulse for a longer duration and less rapidly (with a frequency of approximately one second) to indicate temperature is more than one degree above or below setpoint.

To return to the factory calibration:

1. Press SELECT key until the °C function indicator illuminates.
2. Simultaneously press ▲ and ▼ keys. The SET and MAINT indicators will light.
While the SET and MAINT indicators are illuminated, press START/STOP key.

5.8 Total Running Time

The control module of the Innova 3100 totals the time the shaker has been "ON" to track hours of usage.

To display the accumulated running time:

1. Select HRS using SELECT key.
2. Simultaneously press ▲ and ▼ keys.

The SET and MAINT indicators will flash and the accumulated running time will be displayed in hundreds of hours (i.e., "02" equals 200 hours; "102" equals 10,200 hours). This display will continue for 10 seconds and then default to the previous mode readout.

5.9 MAINT Indicator Light

After 10,000 hours of operation, the MAINT indicator will light. Preventive maintenance is recommended at this point. The light can be deactivated by an Eppendorf service personnel. Alteration of the internal clock by unauthorized personnel will void the warranty.

5.10 Water Level Control

The device is equipped with an automatic water level control that is infinitely variable from approximately 1/2 inch to 2 1/2 inches above the platform level. For proper operation of the water level control system, the drain valve on the rear panel (see Fig. 4-2 on p. 18) must be closed and the external water supply must be on. Naturally, the power must also be on.

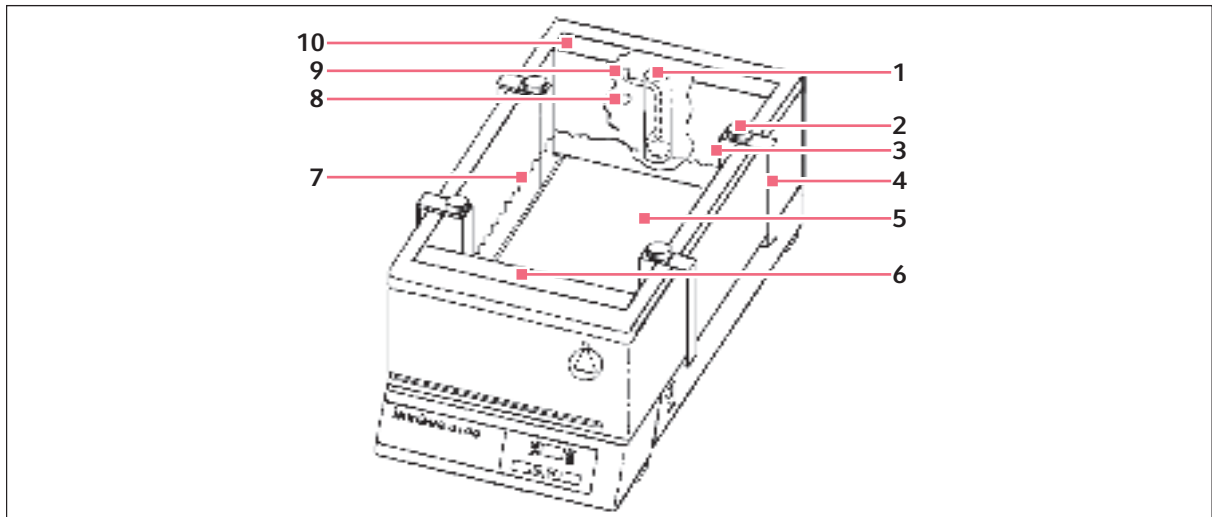


Fig. 5-1: Water Level Control

- | | |
|-----------------|--|
| 1 Vertical Tube | 6 Front Baffle |
| 2 Locking Knob | 7 Adjustment approximately 1/2 - 2 1/2 in above the platform |
| 3 Support Arm | 8 Overflow Tube |
| 4 Drive Arm | 9 Flexible Tube |
| 5 Platform | 10 Rear Baffle |

Operation

Innova® 3100 Digital Water Bath Shaker
English (EN)

The level control maintains a water level slightly above the platform. To adjust the water level:

1. Ensure power is ON.
2. Remove rear baffle by lifting it straight up and away.
The level control is exposed.
3. Note the position of the water level and decide whether the desired level is higher or lower.
4. To raise the water level, note the position of the flexible tube graduations (these graduations and markings are for reference only).
5. Lift the tube up and push the excess tubing through the rear wall of the tank. As you raise the control, the solenoid will open and water will fill the bath until the new water level is established.
6. To lower the water level, feed the flexible tube back into the vertical stainless steel tube. The drain valve should then be opened. Close the drain valve when you hear the solenoid valve operating.
7. When the water level set is satisfactory, replace rear baffle.

5.11 Low Water Level Alarm

To prevent heating when there is no water in the bath, the device is provided with a safety circuit to ensure that the heater will not activate if no water is present. The * (Low Water Level) indicator will flash and the audible alarm will sound. The * indicator will also light if the water level is below the minimum setting.

When the water level alarms are activated, check to be sure that:

- the "Water In" hose is properly in place
- the supply valve is open
- the drain is closed

When the condition is corrected, the alarms deactivate in approximately 10 seconds.

5.12 Draining Bath

To drain the water bath, turn off the external water supply and open the device drain valve on the rear panel (see Fig. 4-2 on p. 18), after verifying that the drain hose is properly connected to the device and empties into an open drain.

6 Operating controls and function

6.1 Control Panel

The control panel (see Fig. 6-1 on p. 28) is located on the front of the instrument. It serves as the operator interface. The keypad has four keys marked START/STOP, ▲, ▼, and SELECT. A three-digit LED display provides numeric values as well as some letter codes. There are four function indicator lights and four status indicator lights.

6.2 LED Display

The Innova 3100 control panel has a 3-digit LED display. During normal shaker operation, the display will indicate:

- Shaker status (on/off)
- Shaking speed
- Setpoints
- Hours remaining (timed run)
- Measured temperature
- Low water level

6.3 User Interface

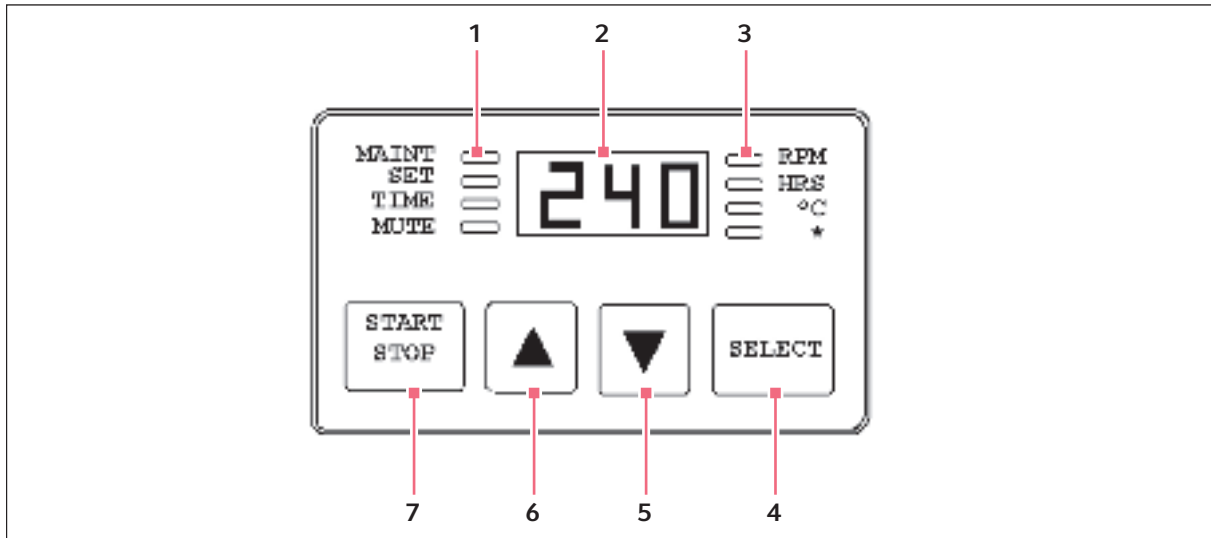


Fig. 6-1: Control Panel

- | | |
|--|---|
| <p>1 Status Indicator Lights</p> <p>2 LED Display</p> <p>3 Function Indicator Lights</p> <p>4 SELECT
Used to change the displayed parameter.</p> | <p>5 DOWN arrow
Used to adjust the setpoint of a displayed parameter down. Also allow the user to enter the SET mode for setpoint changes.</p> <p>6 UP arrow
Used to adjust the setpoint of a displayed parameter up. Also allow the user to enter the SET mode for setpoint changes.</p> <p>7 START/STOP
Used to start or stop the shaking motion. Also activate or stop the timer when a timed run is desired.</p> |
|--|---|

6.3.1 Status Indicator Lights

There are four status indicator lights located to the left of the LED display:

MAINT	Lights to indicate that 10,000 hours have elapsed since the device was last serviced. Accumulated running time is internally monitored and may be displayed as a guideline.
SET	Indicates that the shaker is in the SET mode, that setpoints are being displayed and that they can be altered.
TIME	Indicates that the timer is in operation. Innova shakers can be programmed to run for a preset time from 0.1 hour to 99.9 hours. The timer can be disengaged to reset without stopping an ongoing run.
MUTE	Indicates the status of the audible alarm. When the MUTE indicator is illuminated the audible alarm device is disabled.

6.3.2 Function Indicator Lights

There are four function indicator lights located to the right of the LED display. They indicate the current parameter being displayed:

RPM	Revolutions per minute
HRS	Time remaining
°C	Current temperature
*	Low water level

Operating controls and function

Innova® 3100 Digital Water Bath Shaker
English (EN)

7 Maintenance

7.1 Maintenance



NOTICE!

- ▶ Before cleaning the device, and before a qualified service engineer performs any maintenance or service procedures, be sure to turn the power off (using the ON/OFF switch on the side). Also disconnect the mains/power cord.
-

The Innova 3100 requires no routine mechanical maintenance on the part of the user. The MAINT indicator light goes 10,000 operating hours after the device was last serviced. At that time, contact your local Eppendorf for service.

7.2 Cleaning

plastic

As most water contains minerals that will deposit on the inside surfaces of the water bath, the device should be drained and flushed on a weekly basis. Mild household or laboratory detergents can be used in the tank. To remove any caked buildups on the stainless steel surfaces, a scouring pad (such as Scotchbrite) may be used. This can be used also to remove scratches from the stainless steel.

The outside painted surface can normally be cleaned with a damp cloth; if necessary, standard household or laboratory cleaners may be used. Do not use other abrasive or corrosive compounds to clean this instrument, as they may damage the device and void the warranty.



NOTICE! Risk of damage to equipment

- ▶ To minimize the development of rust inside the waterbath, do not use steel wool or other abrasive pads to clean the stainless steel bath.
-

Maintenance

Innova® 3100 Digital Water Bath Shaker
English (EN)

8 Transport, storage and disposal

8.1 Disposal

In case the product is to be disposed of, the relevant legal regulations are to be observed.

Information on the disposal of electrical and electronic devices in the European Community:

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2012/19/EU pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. To document this, they have been marked with the following identification:



Because disposal regulations may differ from one country to another within the EU, please contact your supplier if necessary.

In Germany, this is mandatory from March 23, 2006. From this date, the manufacturer has to offer a suitable method of return for all devices supplied after August 13, 2005. For all devices supplied before August 13, 2005, the last user is responsible for the correct disposal.

Transport, storage and disposal

Innova® 3100 Digital Water Bath Shaker
English (EN)

9 Technical data

9.1 Weight/dimensions

9.1.1 Device Dimensions

Height	36.8 cm (17 in)
Width	43.2 cm (19.5 in)
Depth	69.9 cm (27.5 in)

9.1.2 Platform dimensions

Platform dimensions	30.5 cm (12 in)x 42.4 cm (16.5 in)
---------------------	------------------------------------

9.1.3 Weight

Net weight	47.6 kg (105 lb)
Gross weight	63.5 kg (140 lb)

9.2 Application Parameters

9.2.1 Speed

Speed	25-400 rpm
Motion	12.7 mm (0.5 in) diameter circular orbit
Indication	LED digital electric display, 1 rpm increments
Setpoint and control	Digital adjustment with PI microprocessor control and instantaneous visual feedback
Accuracy	± 1 rpm
Drive	Triple eccentric counterbalanced ball bearing drive
Motor	1 / 15 HP, 3-phase brushless ball bearing DC motor

Technical data

Innova® 3100 Digital Water Bath Shaker
English (EN)

9.2.2 Temperature

Range	5 °C above ambient temperature to 80 °C
Range with cooling option	5 °C above coolant temperature to 80 °C
Accuracy	± 0.1 at 30 - 40 °C ± 0.5 °C for remaining range
Control stability	± 0.1 °C by use of PI microprocessor controller and pulse width modulation of heater
Uniformity	Better than 0.5 °C
Setpoint	Digital adjustment increments (0.1 °C increments) with instantaneous visual feedback
Safety	Heater shuts off if temperature exceeds operating range. Two safeties provided
Heater	Low watt density resistance mat heater
Ambient operating environment	0 - 40 °C, 90 % humidity, non-condensing

9.2.3 Altitude Limit

Altitude limit	2000 m (2187.23 yd)
----------------	---------------------

9.2.4 Timer (Shaker)

Programmable shaking periods from 0.1 hour to 99.9 hours by a digital timer that shuts off at the end of period and energizes status light
Timer counts down and digital display indicates remaining time. Can be deactivated for continuous operation
Additionally, the device will display total accumulated running time for service information

9.2.5 Self-diagnostic Status

Warning signal (audible and visible) indicates when shaking speed deviates more than 5 rpm or the temperature deviates more than 1.0 °C from setpoint and when timer operation has expired. The audible alarm can be deactivated/activated by the operator
--

9.2.6 Remote Monitoring

Chart recorder outputs for speed and temperature (0 - 5 V)
1 V per 100 rpm; 1 V per 20 °C, accuracy ± 25 mV

9.2.7 Automatic Restart

Device will automatically restart after undesired power interruption
Setpoints are maintained by non-volatile memory
Interruption is indicated by a flashing display

9.2.8 Construction

Heavy gauge steel, phosphate-coated and texture-painted cabinet
Seamless stainless steel water bath
All metal parts in contact with water are stainless steel

9.3 Power supply

Innova 3100	100 V, 50 / 60 Hz 120 V, 50 / 60 Hz 220 - 230 V, 50 / 60 Hz 240 V, 50 / 60 Hz
	1100 VA Universal power entry system adapts to U.S. or International requirements

9.3.1 Electrical Protection

Circuit breaker for main power
Control circuits provided with separate fuse

Technical data

Innova® 3100 Digital Water Bath Shaker
English (EN)

10 Ordering information

10.1 Accessories

10.1.1 Interchangeable Platforms

The following are 30.5 cm (12 in) x 42.4 cm (16.5 in) stainless steel platforms:

Glassware size	Part number
Universal platform*	M1231-9930
50 ml Erlenmeyer flask	M1231-9933
125 ml Erlenmeyer flask	M1231-9934
250 ml Erlenmeyer flask	M1231-9935
500 ml Erlenmeyer flask	M1231-9936
1 L Erlenmeyer flask	M1231-9937
2 L Erlenmeyer flask	M1231-9938
Subplatform**	M1231-9939

*Flask clamps must be ordered separately.

** This subplatform allows existing half-size platforms for flasks and test tubes (from the AquaTherm Model G86 Water Bath Shaker) listed below to be used with the Innova 3100.

10.1.2 Interchangeable Half-size Platforms

Glassware size	Part number
50 ml Erlenmeyer	AG7-50
125 ml Erlenmeyer	AG7-125
250 / 300 ml Erlenmeyer	AG7-250

10.1.3 Test Tube Racks for Subplatform

The following racks must be mounted on the subplatform (M1231-9939):

Description	Part number
Rack for 13 mm tubes	AG7-TT13
Racks for 16 mm tubes	AG7-TT16
Racks for 20 mm tubes	AG7-TT20
Racks for 25 mm tubes	AG7-TT25

Ordering information

Innova® 3100 Digital Water Bath Shaker
English (EN)

10.1.4 Accessories

The following accessories are available for Innova 3100:

Description	Part number
Gable Cover, Plexiglass	M1231-2010
Gable Cover, Stainless Steel	M1231-2000
Portable Cart	M1020-1220
Cooling Coil Kit*	M1231-9920
Coolant Circulating System 120 V, 60 Hz	P0620-2190
Coolant Circulating System 220 V, 50 Hz	P0620-2191
Space Saving Dolly (Under Desk Operation)	M1195-1020

*Allows cooling to below ambient temperatures. Permits temperature control to 5 °C above coolant temperature. Can be field installed by a qualified service technician.

10.1.5 Accessory Flask Clamps

The following flask clamps are constructed of stainless steel:

Clamp type	Part number
10 ml Erlenmeyer clamp	ACE-10S
25 ml Erlenmeyer clamp	ACE-25S
50 ml Erlenmeyer clamp	ACE-50S
125 ml Erlenmeyer clamp	ACE-125S
250 ml Erlenmeyer clamp	ACE-250S
500 ml Erlenmeyer clamp	ACE-500S
1 L Erlenmeyer clamp	ACE-1000S
2 L Erlenmeyer clamp	ACE-2000S
4 L Erlenmeyer clamp	ACE-4000S
6 L Erlenmeyer clamp	ACE-6000S
2800 ml Fernbach flask clamp	ACE-2800S
500 ml Media bottle clamp	ACSB-500S
1 L Media bottle clamp	ACSB-1000S

Index

A

Accessories.....40
 Accessory flask clamps.....40
 Alarm functions22
 Altitude limit.....36
 Ambient operating environment36
 ATEX Guideline 13

C

Cancelling timer22
 Caution, explanation of5
 Checking setpoint.....21
 Continuous (unlimited) run21
 Copyright.....2

D

Danger, explanation of5
 Deactivating temperature control.....23
 Dimensions.....35
 Disposal33
 Draining bath.....26
 Drive35

E

Electrical protection37

F

Function indicator lights29

H

Hazard symbols5

I

Interchangeable half-size platforms.....39

Interchangeable platforms..... 39

L

Low water level alarm..... 26

M

Manual conventions..... 5
 Motor 35

N

Notice, explanation of..... 5

O

Operation speed..... 35

P

Platform assemblies..... 19
 Power supply 37
 Product liability..... 13

R

Reactivating temperature control 23
 Remote monitoring 36
 Return offset calibration to factory calibration..... 24

S

Setting temperature..... 23
 Setting timer 22
 Space requirements..... 16
 Starting the shaker 21
 Status indicator lights..... 29
 Symbols used..... 5

T

Temperature 36
 Temperature offset calibration..... 23

Index

Innova® 3100 Digital Water Bath Shaker
English (EN)

Test tube racks for subplatform.....	39
Timed functions.....	22
Total running time	24
Trademarks.....	2

U

User interface.....	28
Using this manual	5
Utilities requirements.....	15

V

Voltage configuration	15
-----------------------------	----

W

Warning, explanation of.....	5
Water level control	25
Weight	35



New Brunswick
an eppendorf company

CE

CE

DECLARATION OF CONFORMITY

New Brunswick Scientific hereby declares that the product(s) listed below conform to the European Union directive and standards identified in this declaration.

Product(s)

Innova 3100, Model Number(s)

M1231-0000
M1231-0001
M1231-0002
M1231-0003

EU Directive(s)

Low Voltage (2006/95/EEC)
Electromagnetic Compatibility (2004/10/EC)
Machinery (2006/42/EC)
CE Marking Directive (93/68/EEC)

Standard(s)

EN50081-2
EN50082-1

The conformity assessment procedures were performed at the following:

- **New Brunswick Scientific, 44 Talmadge RD, Edison, NJ 08818.**

The technical documentation relevant to the above equipment will be held at:
New Brunswick Scientific
175 Freshwater Blvd.
Enfield, CT 06082 U.S.A.
Tel. (860) 253-3400
Fax. (860) 741-0859


Henry Couture
Director of QA RA

21 MAY 12
Date

Evaluate your manual

Give us your feedback.

www.eppendorf.com/manualfeedback

Your local distributor: www.eppendorf.com/contact

Eppendorf AG · 22331 Hamburg · Germany

eppendorf@eppendorf.com · www.eppendorf.com