Guide to Operations

innOva™ 43/43R

Incubator Shakers

MANUAL NO: M1320-0050
Revision E
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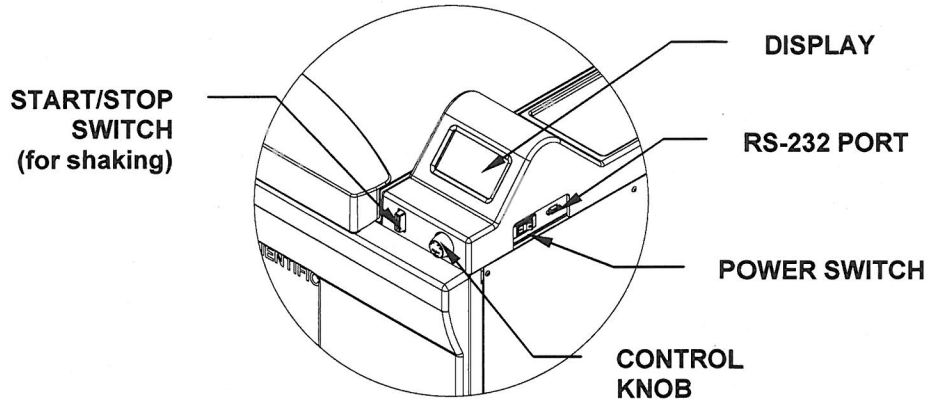
5 FEATURES

5.1 Controls

Figure 3: Front Panel (detail)



- **START/STOP SWITCH** — This switch is used to start or stop the shaker. It will also activate the timer when a timed run is desired. If the unit is stopped and restarted, the timer automatically returns to the beginning of a run.
- **CONTROL KNOB** — This knob is multifunctional. It is used to change screens, and to select and change operating conditions. See Section 5.8 for details.
- **RS-232 PORT**
- **POWER SWITCH** — This rocker switch is a circuit breaker that turns power on and off to the entire Innova 43/43R.

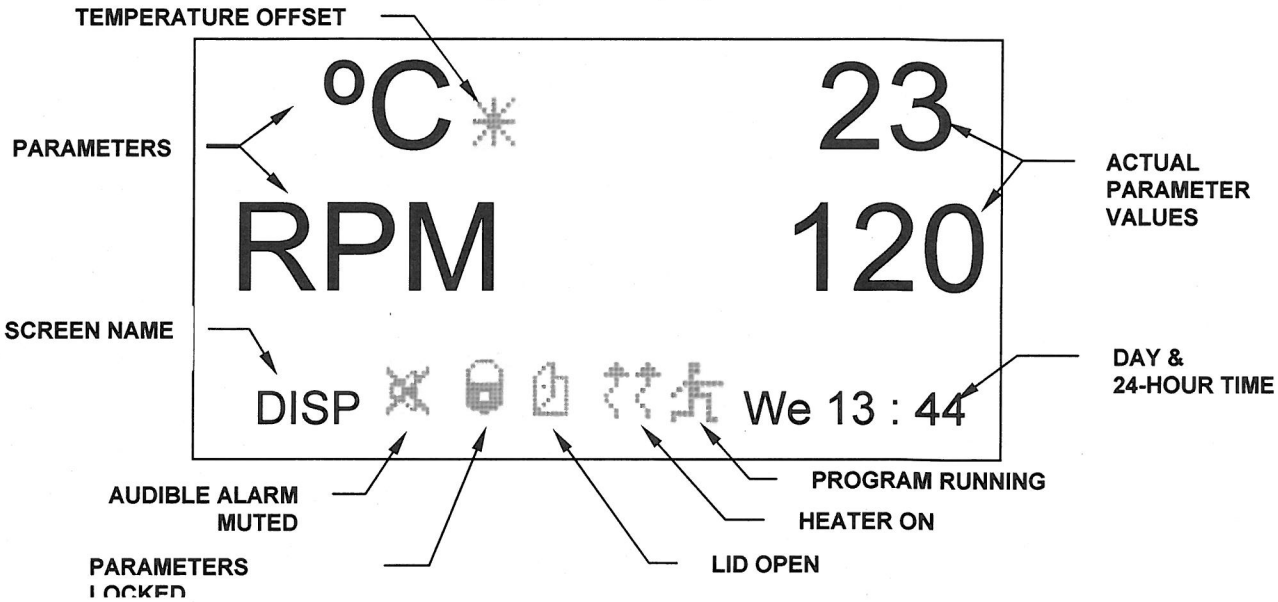
NOTE:

In addition to the power switch, the power cord is also used to conduct power or to break the power circuit to the shaker. Whenever power to the shaker may be a hazard (during cleaning, maintenance or service work), be sure to disconnect the power cord from the electrical outlet.

5.2 LCD Display

When the unit is powered up, using the Power Switch located on the right side of the machine (*see Figure 3*), the initial display screen will remain for a short time while the system boots up. Then the main screen, called **DISP** for Display, appears (*see Figure 4*). This screen will indicate the same parameters that were in effect when the power was turned off.

Figure 4: Display Screen



- For an explanation of the icons on the display screen, see Section 5.4.
- Turning the Control Knob will highlight functions and/or values that can be changed.
- Whenever you turn the Control Knob, the chamber light will go on (for details, see Section 5.9).

For more information on working in the Display Screen, see Section 7.4.1.

5.3 Changing Screens

You can change screens displayed by highlighting the screen name field in the lower left corner, pressing the Control Knob in until it clicks, rotating the Knob left or right (which also makes clicking sounds) to the desired screen and clicking the Control Knob in again. Table 1 describes the various screens:

Table 1: Screens

Screen Name	*Meaning*	*Features/Modes*
DISP	Display	Shows two user-selectable parameters* and actual values.
SUMM	Summary	Shows all parameters*, setpoints and actual values.
SET	Set-Up	Set day of week, set time, enable or mute alarm, lock or unlock operating parameters
LAMP	Lamps	**Internal chamber light:** ON (always on); OFF (always off); AUTO (default mode), light goes on and stays on when lid is open, shuts off 15 seconds after lid is closed, and goes on for 15 seconds when Control Knob is moved. ¤ **Photosynthetic lights (GRO)**: ON, OFF, [1]NONE ¤ **UV Light (UV)**: ON, OFF, [1]NONE
COMM	Communication (RS-232)	SET: set baud rate OFF disables RS-232 MONITOR: PC commands shaker to read setpoints and actual values on a schedule determined by PC software. Parameters are unlocked and can be changed by program or manually. SLAVE: PC controls shaker and logs data. TALK: Shaker sends setpoint and actual data to PC at one-minute intervals.
CAL	Calibration	Allows user to enter a temperature offset. Self-calibrates the speed sensor.
PROG	Program	Allows user to set up 1- 4 programs, each with 1-15 steps.

* see Table 2, Display Screen Parameters ¤ Optional [1]Not installed

Table 2: Display Screen Parameters

Parameter Name	*Meaning*
RPM	Shaking speed, in revolutions/minute
°C	Chamber temperature, in degrees Celsius
HRS	Programmed time remaining, in hours
¤ %RH	Relative Humidity, in percent.
¤ UV	Status of Ultraviolet germicidal lamp
¤ GRO	Status of Photosynthetic growth lamps

¤ Optional

5.4 Display Icons

There are six icons that help identify operating conditions. Five of these icons are located at the bottom of the display, and they are visible, when applicable, in any screen you are viewing, except the Program subscreens. The sixth appears, when applicable, next to °C whenever the temperature is onscreen.

Table 3: Display Icons

Icon	*Explanation*
	This icon appears when audible alarms are muted.
	This icon appears when the possibility to make manual or programmed parameter changes is disabled (locked). This is controlled by settings on the SET screen. See Section 7.4.3
	This icon appears when the shaker lid is open.
	This icon appears when the Heater is on. See Section 5.10.
	This icon appears when a user-defined Program is running. See Section 7.5.5.
	This icon appears to the right of °C if the Temperature Offset feature is being used. See Section 7.7.

5.5 Alarms

If an alarm condition exists, the field in the lower right corner will alternate the Day and Time with characters indicating the nature of the alarm condition, accompanied by an audible alarm (unless muted):

Table 4: Alarms

Indication	*Description*
TEMP	The temperature deviates more than ± 1°C from setpoint after achieving control temperature range. After lid is opened, alarm will be disabled for 5 minutes while chamber recovers to setpoint.
SPEED	The speed deviates more than ± 5 RPM from setpoint after achieving operating speed setpoint. After lid is opened, alarm will be disabled for 5 minutes while chamber recovers to setpoint.
POWER	Indicates unit is powering up (both at normal power-up and after power interruption); will flash until the Control Knob is moved.
HRS	Indicates when timed run is completed.

5.6 Lid

Access to the chamber of the Innova 43/43R is through the top-opening hinged lid. To open the lid, firmly press the pedal or lift up on the front handle (*see Figure 1*). The lid stands on its hinges until you choose to close it.

When the lid opens, the following will happen:

- Heater turns off
- Shaker stops
- Interior light goes on and, when it is in **AUTO** mode, will remain on for 15 seconds after the lid is closed
- UV germicidal lamp (if so equipped) turns off

5.7 Spill Pan/Water Reservoir

The Innova 43/43R is equipped with a spill pan and spill cover to protect the drive mechanism in the case of accidental spills and/or broken glassware. This pan can also be used as a water reservoir to humidify the chamber and to reduce evaporation. An optional factory-installed humidity monitor is also available.

The reservoir can be drained through the quick-connect valve on the front of the unit.

5.8 Software Interfaces

The RS-232 port is next to the Power Switch on the right side of the control panel (*see Figure 3*). It can be used to interface a computer to the shaker for control of operating conditions or data logging applications (*see Section 12*).

The customer is responsible for securing the proper driver to interface with the RS-232.

5.9 Interior Light(s)

When the **LAMP** screen is in its default **AUTO** mode, the interior ("chamber") light is activated for 15 seconds whenever you turn the Control Knob. It will automatically shut off after 15 seconds of Control Knob inactivity.

The chamber light will also go on when the lid is open.

In addition, you can set the chamber light to be continuously **ON** or **OFF** by selecting either mode in the **LAMP** screen.

There are two additional light options for refrigerated units only: interior photosynthetic growth lamps (*see Section 6.7*) and a germicidal UV lamp located outside the chamber but in the airflow path *(see Section 6.6*).

5.10 Heater

The chamber temperature is sensed by a 1000 ohm platinum RTD. A 650W heater is controlled using pulse width modulation on a 2.5-second duty cycle. This cycle time is fast enough to prevent noticeable changes in air temperature due to the cycling.

Whenever the heater is on, the Heater On icon will appear in the display. The heater automatically stops running when the lid is opened.

NOTE:

Operating the shaker for sustained periods at temperatures above 60°C may result in a shorter fan lifespan.

5.11 Refrigeration (43R Only)

The refrigeration system in the Innova 43R is a variable-capacity system carefully designed with self-checks to maintain the setpoint, to balance pressure within the system, and to prevent freezing on the evaporator surface.

When the shaker is powered up, there is a four-minute time delay prior to compressor start-up.

5.12 Service Accessibility

In the unlikely event that your Innova 43/43R should need service, all electronic boards, refrigeration, heating components are easily accessed, **by an authorized service technician**, behind the right side panel of the shaker.

7 OPERATION

7.1 Safety Precautions

Before operating the shaker, verify that anyone involved with its operation has been instructed in both general safety practices for laboratories and specific safety practices for this apparatus.

The user is also responsible for following local guidelines for handling hazardous waste and biohazardous materials that may be generated from the use of this equipment.

If service should be required on a unit that is going to be returned to an NBS facility, it must be completely decontaminated and cleaned prior to its return, and a Returned Material Safety Sheet must be filled out to certify that you have complied. See Section 13, *Product Returns*.

It is the responsibility of the user to carry out appropriate decontamination procedures if hazardous material is spilled on or inside the equipment. Before using any cleaning or decontamination method other than those suggested by the manufacturer, users should check with New Brunswick Scientific that the proposed method would not damage the equipment.

This equipment is **not** "explosion-proof" and should never be used with flammable substances or used to grow organisms that produce flammable by-products.

CAUTION!

To prevent damage to the shaker and its contents, never run the shaker without a platform.

7.2 Opening the Lid

Open the lid by firmly pressing the foot pedal or lifting up on the front handle. The lid will stand open on its hinges until you swing it down to the closed position.

7.3 Starting the Shaker

To initially start the shaker, close the lid and turn the power switch (located on the righthand side of the control panel) to the **ON** position. The display will come on (first showing only **New Brunswick Scientific**, then briefly displaying the model number, **43** or 43R, and the stroke, **1 inch** or **2 inch**, and then quickly moving into the Display screen), and the audible alarm will sound. To mute it, see Section 7.6.

When the shaker begins to operate, the LCD display will track the speed as it accelerates to the last entered setpoint. The shaking action may be started or stopped by pressing the Start/Stop button on the front panel.

NOTE:

The shaker will not operate if the lid is open. This is indicated by the "lid open" symbol appearing in the bottom line of the display (see Figure 4 or Table 3).

7.4 Using the LCD Screens

7.4.1 Display Screen

When you turn the power on, this is the first screen to appear after the company title screen. The default display parameters are temperature (**°C**) and shaking speed (**RPM**).

You can change the displayed parameters. **To replace a parameter**:

1. Using the Control Knob, highlight the parameter that you wish to replace. For this example, we will replace **RPM** (*see Figure 13*).

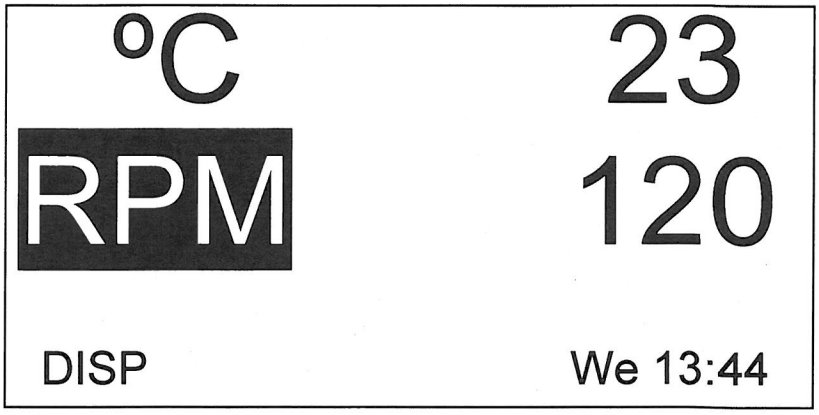
NOTE:

If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

NOTE:

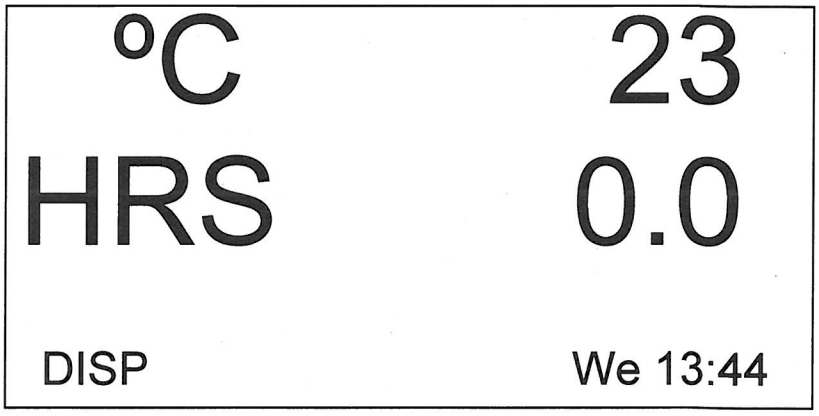
"UV" (UV Germicidal lamp) and "GRO" (photosynthetic growth lamps) will appear in this screen with the word "NONE" if your shaker is not equipped with these optional features.

Figure 13: Changing Display Parameter



2. Click the Control Knob in. **RPM** will flash.
3. Turn the Knob until the desired parameter appears in the highlighted field. For this example, we will select **HRS**.
4. Click the Knob in, to set and save the parameter (*see Figure 14*).

Figure 14: Changed Display Parameter



You can also use this screen to verify a setpoint, even though the values displayed here are actual (current) values. **To view a setpoint**:

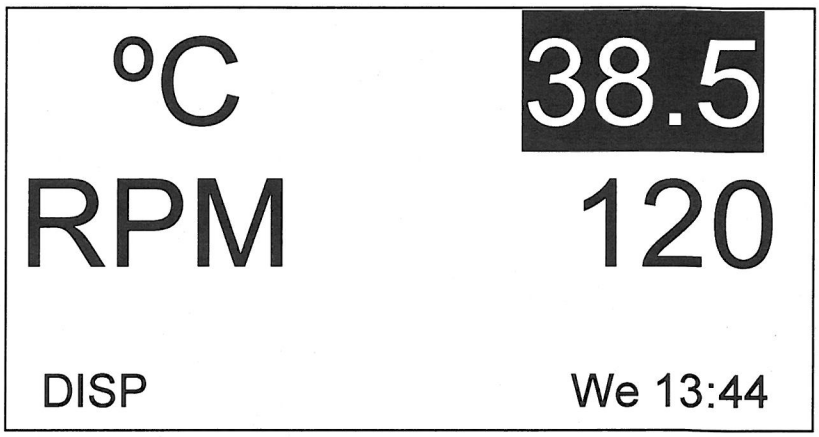
1. Use the Control Knob to highlight the value (in this example, we will view the temperature setpoint, so we will highlight the current **°C**, which is **23**).
2. Click the Knob in to display the current setpoint, which will flash.

At this point you can modify the setpoint or click the Knob in again to return to the normal display, which will be the actual temperature.

To modify a setpoint in this screen:

1. Use the Control Knob to highlight the current value (we will continue to use the temperature as our example, so we will select **23**).
2. Click the Knob in to display the current setpoint (in this example, **38.5**—*see Figure 15*), which will flash.

Figure 15: Changing Setpoint



3. Turn or spin the Knob to reset the setpoint (in this example, turn the Knob left to decrease the setpoint to **37.0**).

NOTE:

If you turn the Control Knob slowly, one click left or right will change the setpoint by an increment of one tenth of a degree Celsius (0.1°C). If you spin the Knob, the value will change by larger increments.

4. Click the Knob in to set and save this new setpoint.

NOTE:

If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

5. The display will automatically return to the actual value.

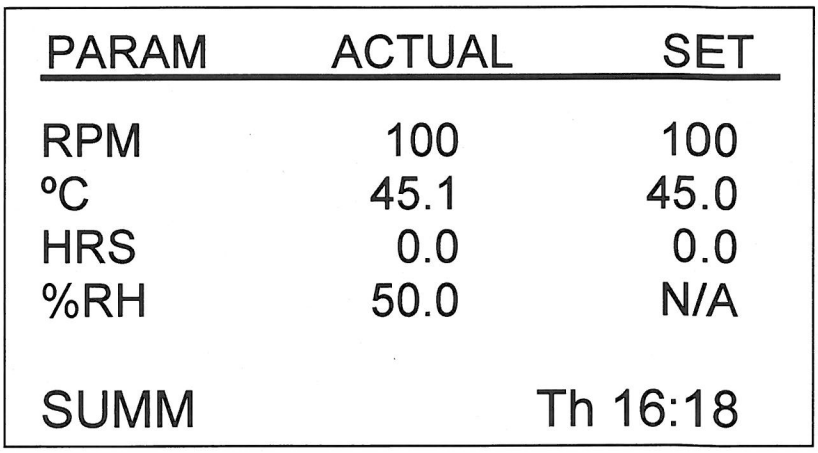
To move out of this screen and into the next:

1. Use the Control Knob to highlight **DISP**, then click the Knob in. **DISP** begins to flash.
2. Turn the Knob to the right until the next screen, Summary (**SUMM**), appears. If you turn too far and enter another screen, just turn the Knob back to the left to recapture the **SUMM** screen.
3. Click the Knob in to select the screen and to work in it.

7.4.2 Summary Screen

In this screen (*see Figure 16*), you can see both the current **ACTUAL** readings and the **SET**points for shaking speed (**RPM**), chamber temperature (**°C**), elapsed time in a programmed run (**HRS**) and, if you are using the optional Humidity Monitor (*see Section* 9.11.8), the percentage of relative humidity (**%RH**).

Figure 16: Summary Screen



NOTE:

The current day (Su, Mo, Tu, We, Th, Fr or Sa) and time always remains visible in the lower righthand corner.

The only elements you can modify in this screen are setpoints. **To change setpoints in this screen:**

1. Turn the Knob until the desired setpoint is highlighted, then click the Knob in. The setpoint will begin to flash.
2. Turn the Knob to the right to increase the number, or to the left to decrease it. One click left or right will increase the setpoint by an increment of one (one whole unit or one tenth unit, depending on the parameter). Move the Knob more rapidly (you can spin it) to change the value by larger increments.
3. Click the Knob in to set and save the new value.

NOTE:

If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

4. Repeat the above steps to change any or all of the other setpoints.

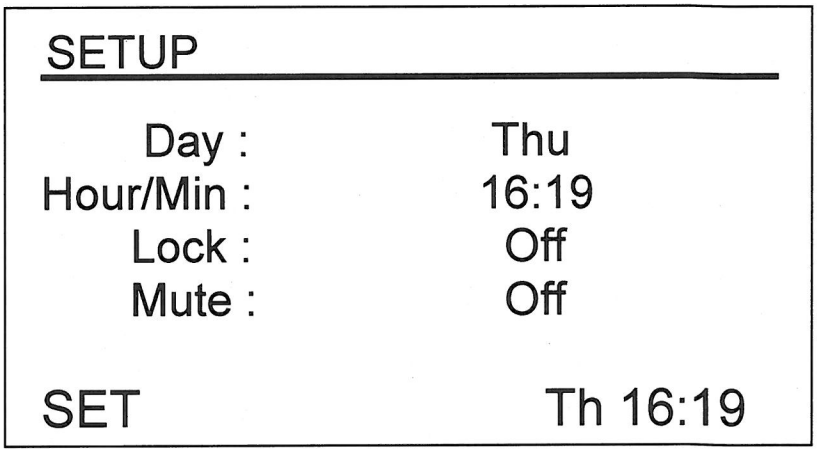
To move out of this screen and into the next:

1. Use the Control Knob to highlight **SUMM**, then click the Knob in. **SUMM** begins to flash.
2. Turn the Knob to the right until the next screen, Setup (**SET**), appears. If you turn too far and enter another screen, just turn the Knob back to the left to recapture the **SET** screen.
3. Click the Knob in to select the screen and to work in it.

7.4.3 Setup Screen

Here you can set the day of the week and the time (on a 24-hour clock). This screen also allows you to lock all of your settings from further changes, and to mute or enable the audible alarm.

Figure 17: Setup Screen



To change the day:

1. Turn the knob to highlight the day (**Thu** in the sample screen above), then click inward once. The day will flash.
2. Turn the knob left or right to select the day of choice: Sun, Mon, Tue, Wed, Thu, Fri or Sat.
3. Click the knob in to set and save your choice.

NOTE:

If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

To change the time (Hour/Min):

1. Turn the knob to highlight the time (**16:19** in the sample screen above), then click inward once. The time will flash.
2. Turn the knob left or right to change the time. Left moves backward, right moves forward in time. One click right or left changes by one minute; spin the knob to move more rapidly.
3. Click the knob once inward to set and save your choice.

To lock the settings:

1. Turn the knob to highlight **Lock**, then click inward once. The current status (**Off** in the sample screen above) will flash.
2. Turn the knob in either direction; the only other choice is **On**. Click once inward to select and save **On**, or continue turning to return to **Off**.
3. When you set **Lock** to **On**, a padlock icon (*see Section 5.4*) will appear at the bottom of the screen. This icon will remain on display through all main display screens until you turn the locking function off.

To mute the audible alarm:

1. Turn the knob to highlight **Mute**, then click inward once. The current status (**Off** in the sample screen above) will flash.
2. Turn the knob in either direction; the only other choice is **On**. Click once inward to select and save **On**, or continue turning to return to **Off**.
3. When you set **Mute** to **On**, the icon will appear at the bottom of the screen. This icon will remain on display through all screens until you turn the muting function off.

To move out of this screen and into the next:

1. Use the Control Knob to highlight **SET**, then click the Knob in. **SET** begins to flash.
2. Turn the Knob to the right until the next screen, Lamps (**LAMP**), appears. If you turn too far and enter another screen, just turn the Knob back to the left to recapture the **LAMP** screen.
3. Click the Knob in to select the screen and to work in it.

7.4.4 Lamps Screen

In this screen (*see Figure 18*), you can turn the chamber light (**Chamber**), the optional UV germicidal ("decontamination") lamp (**UV Decont**) and the optional photosynthetic growth lamps (**Growth**) on and off.

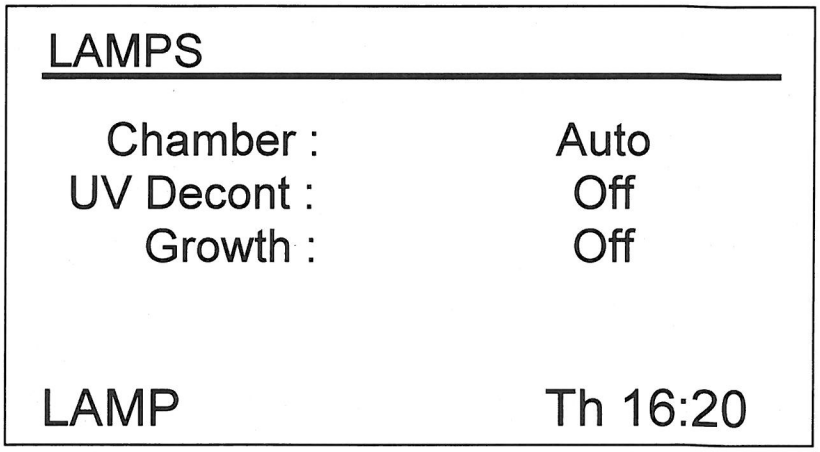
On means the light is always on, and **Off** means the light is always off, unless you add additional programming.

There is an additional mode for the chamber light: **Auto**. In **Auto** mode, the light will go on every time you activate the control knob or open the lid. This is the default mode.

NOTE:

The Lamps screen, shown below, will always indicate Chamber **light mode. If the shaker is not equipped with the optional UV germicidal lamp and/or photosynthetic growth lamps,** UV Decont **and/or** Growth **will say** None.

Figure 18: Lamps Screen



To change the mode setting for any of the lamps:

1. Turn the Control Knob to highlight the setting for the lamp of choice, then click the knob in. The current setting will flash (in the sample screen, we will use the **Chamber** light as an example.
2. Turn the Knob left or right until the desired mode setting appears (**Auto** in this example).
3. Click the Knob in to save the new setting.

NOTE:

If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

To move out of this screen and into the next:

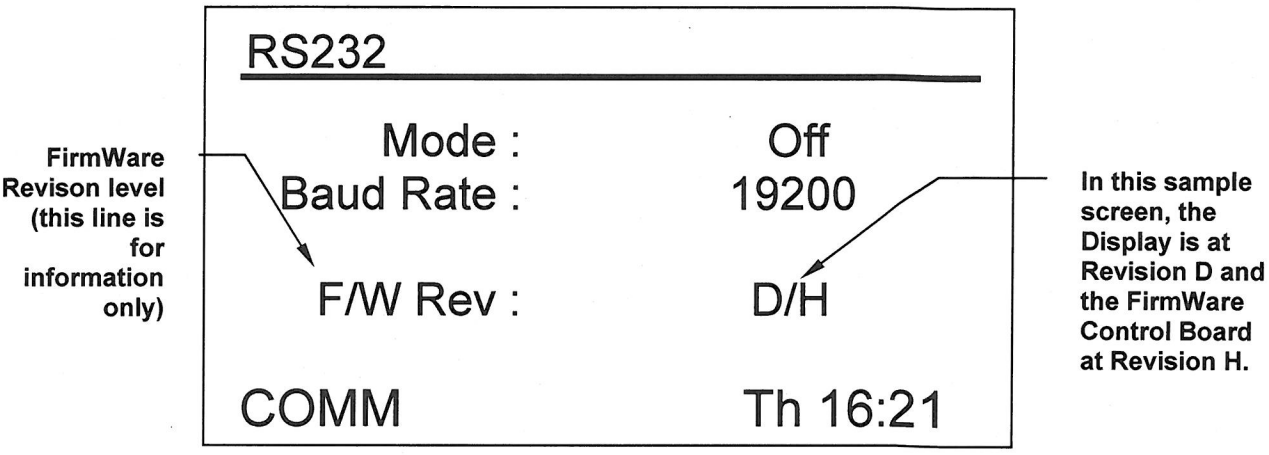
1. Use the Control Knob to highlight **LAMP**, then click the Knob in. **LAMP** begins to flash.

2. Turn the Knob to the right until the next screen, RS232 (**COMM**), appears. If you turn too far and enter another screen, just turn the Knob back to the left to recapture the **COMM** screen.
3. Click the Knob in to select the screen and to work in it.

7.4.5 RS232 Screen

This screen (*see Figure 19*) is used only if you have connected a personal computer to the RS-232 port (*see Section 5.8*). Here you can select the RS-232 port's **Mode** and the **Baud Rate** appropriate to your PC.

Figure 19: RS232 Screen



To change the Communication Mode:

1. Turn the Control Knob to highlight the current setting (**Off** in the sample screen above), then click the Knob in. The current setting will flash.
2. Turn the Control Knob left or right until the desired mode setting appears (*see Table 5: Communication Mode, on the following page*).

9 SERVICE & ACCESSORIES

9.1 *Troubleshooting*

If any problems occur with your shaker, do not attempt to perform any service on the unit other than specified in this manual. Unauthorized servicing may void the warranty. Please contact your local NBS Customer Service Department

In any correspondence with NBS, please refer to the model number and serial number of your unit. This information is on the electrical specification plate, located on the rear panel of the unit, above the power connector.

There are some problems, however, that you can investigate and correct yourself. Refer to the following Troubleshooting Guide:

Symptom(s)	Probable Cause(s) & Solution(s)
Shaker does not run.	No power; display is not on; power cord is not plugged in and/or power switch is off: plug in power cord (to working electric outlet), and turn on power switch.
	Lid is open—look for Open Lid icon on display: close the lid firmly.
	Lid is closed but Open Lid icon is on display: lid switch is broken; call for service.
	On/Off switch is not working: call for service.
	Fuse(s) burned out: check and replace as needed.
	Shaking speed has been set to Zero by program running (look for Run icon in display) or by computer interface: reset shaking speed.
	Defective main board: call for service
	Defective display controller board: call for service.
	Jammed shaking mechanism: call for service
	Defective motor: call for service
	Drive belt out of alignment or worn: call for service.
Shaker runs slowly and/or no speed indication.	Fuse(s) burned out: check and replace as needed.
	Incorrect speed calibration: recalibrate shaking speed.
	Defective main board: call for service.
	Defective motor: call for service.
	Drive belt out of alignment or worn: call for service.

...continued...

Symptom(s)	Probable Cause(s) & Solution(s)
Shaker does not run at set speed.	Shaker is running in Program mode (look for Run icon in display).
	Shaker speed has been changed by RS-232 command/ computer interface.
	Shaker is overloaded: remove some contents & balance load.
	Defective motor: call for service.
	Drive belt out of alignment or worn: call for service.
Operating noise	Load out of balance: unload all contents from platform, then reload.
	Loose component(s) in Platform, subplatform, and/or drive assembly: call for service.
Incubator does not reach set temperature.	Shaker running in Program mode: Run icon in display.
	Temperature setpoint changed by RS-232/computer interface command.
	Heater fuse blown: replace.
	Compressor fuse blown: replace.
	Compressor over-pressure switch activated: call for service.
	Chamber fans not working: call for service
	Ambient temperature too high or too low: cool or heat the room as needed.
	Lid is not completely closed (even though Open Lid icon may not be on display): open it and reclose it firmly.
	Line voltage is too low.
	Frequency on line voltage if set incorrectly: reset.
	Defective heater: call for service.
	Defective refrigeration system: call for service.
	Incorrect temperature indication (*see below*).
Incorrect temperature indication.	Temperature Offset has been programmed (look for [adjacent to C on display).
	Defective RTD assembly: call for service.
	Defective main board: call for service.
Incorrect relative humidity %	Defective humidity probe or broken contact: call for service.

...continued...

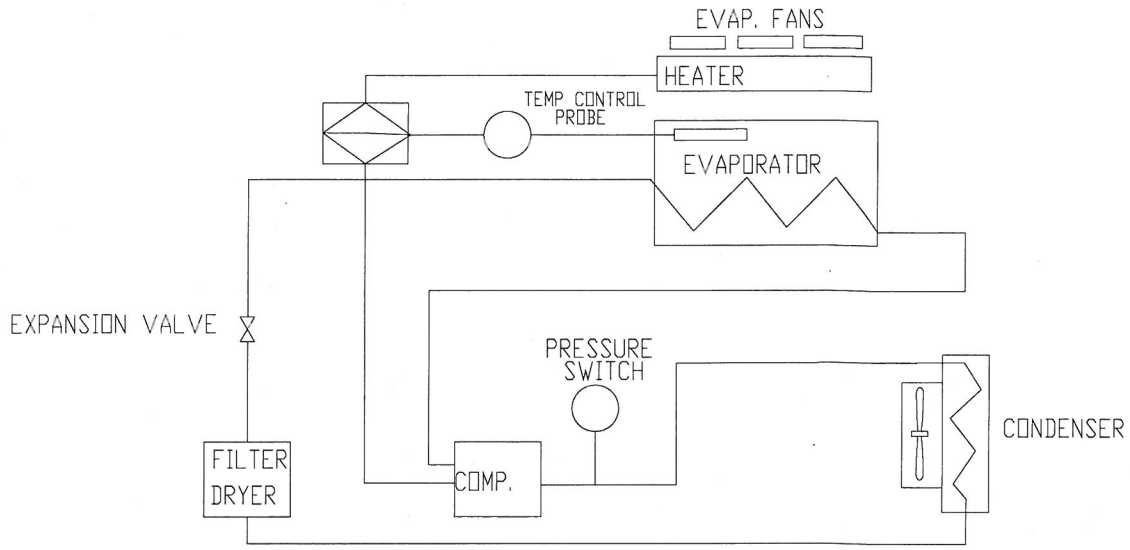
Symptom(s)	Probable Cause(s) & Solution(s)
Photosynthetic GRO lamp does not work.	Shaker is running in Program mode (look for Run icon in display), and program calls for GRO lamp to be off.
	GRO lamp mode has been changed by RS-232 command/ computer interface.
	Bulb is burned out; replace (*see Section 9.6*).
	Fuse is burned out: replace (*see Section 9.4*)
	Check ballast voltage.
	Check cable connections.
	Check switch settings.
	GRO lamp mode has been changed by RS-232 command/computer interface.
UV germicidal lamp does not work.	Shaker is running in Program mode (look for Run icon in display), and program calls for UV lamp to be off.
	UV lamp is burned out; replace (*see Section 9.8*)
	Fuse is burned out: replace (*see Section 9.4*)
	Check ballast voltage.
	Check cable connections.
	Check switch settings.
	UV lamp mode has been changed by RS-232 command/ computer interface.

9.2 Product Returns

Should you need to return your Innova 43/43R to NBS for any reason, first contact Customer Service to obtain a Returned Material Authorization (RMA) number. This number must appear on the outside of the shipping container, otherwise NBS Receiving will refuse to accept the shipment.

In addition, you must also certify that the instrument being returned has been thoroughly cleaned and decontaminated. **A form for this purpose is provided in Section 13** of this manual; it can also be downloaded from our website (www.nbsc.com). A copy of this completed Return Authorization and Decontamination Certificate must be attached to the outside of the container, with a second copy packed inside with the instrument.

Figure 34: Refrigeration Schematic



10.2 Load & Speed Graphs

The following graphs explain the maximum recommended shaking speed according to the load you put on your shaker's platform and the diameter of the shaker's orbit (1-inch or 2-inch).

Figure 35: Load & Speed for 1-Inch Orbit Shakers (20% Full)

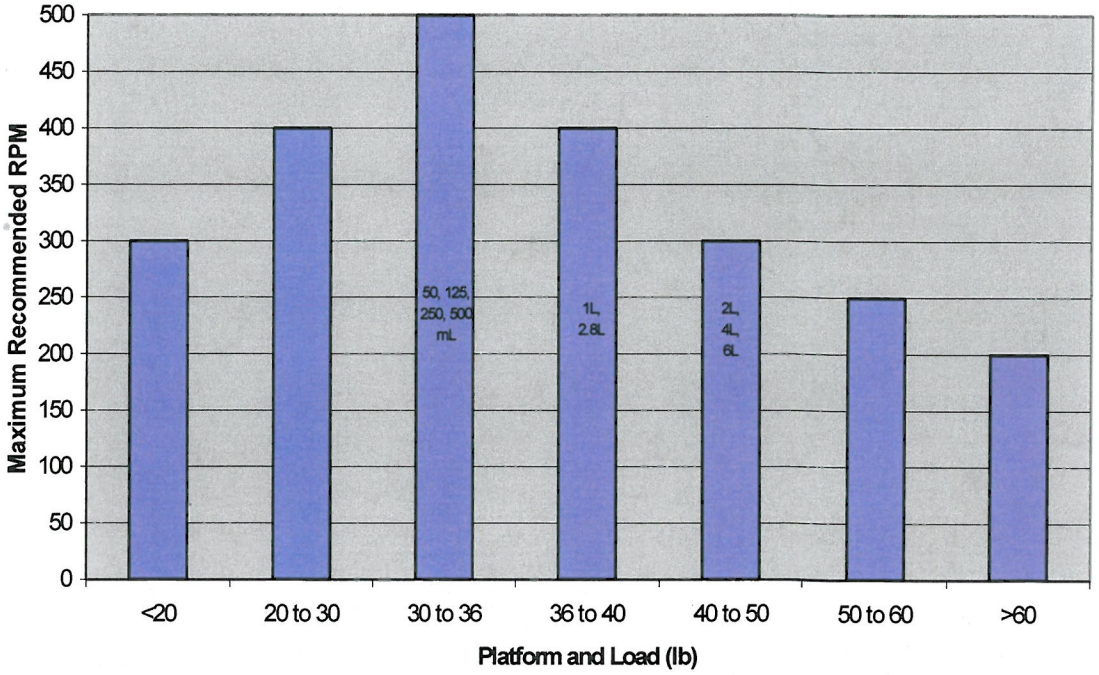
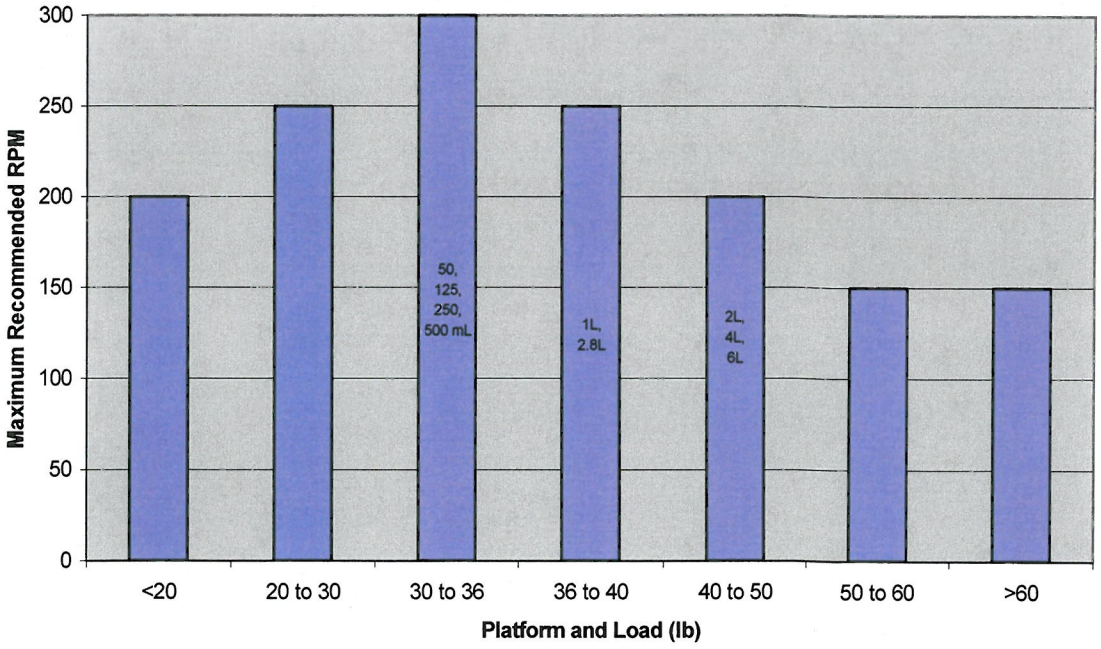


Figure 36: Load & Speed for 2-Inch Orbit Shakers (20% Full)



11 SPECIFICATIONS

These specifications assume a **maximum load of 34 pounds (15.5 kg)**, including platforms, clamps, glassware and contents.

Innova 43 & 43R Incubator Shaker		
SHAKING		
Speed[1]	20-500 rpm with 1-inch (2.5 cm) stroke or 20-300 rpm with 2-inch (5.1 cm) stroke	
Control Accuracy	± 1 rpm	
Indication	Displayed in 1 rpm increments	
Stroke/Orbit	1-inch (2.5 cm) or 2-inch (5.1 cm)	
TEMPERATURE		
Range (43)	5°C above ambient temperature to 80°C[2]	
Range (43R)	20°C below ambient temperature (minimum 4°C) to 80°C[2]	
Control Accuracy	± 0.1°C from 30-40 °C, ± 0.5°C over the remaining range.	
Uniformity	± 0.25°C in flask across platform at 37°C, and ± 0. 5°C (or less) at 60°C	
Indication	Displayed in 0.1°C increments	
Heater	Long-life, low-watt density resistance-type heater with high temperature thermostat	
ALARMS	Visible and audible warning indication when speed deviates more than 5 rpm or temperature more than 1°C from setpoints, and when timer has expired. Audible alarm can be muted.	
LCD DISPLAY	240 x 128 backlit	
RS-232	Remote control, remote monitoring, remote data logging	
SETPOINT RETENTION	All setpoints and operating status are retained in non-volatile memory	
AUTOMATIC RESTART	Automatic restart after power is restored, indicated by flashing display	
DRIVE	Triple-eccentric counterbalanced drive with nine permanently lubricated ball bearings and poly-V belt. Self-calibrating.	
DRIVE MOTOR	Solid-state brushless DC motor.	
SAFETY	Drive Interrupt shuts off power to Shaker when lid opens. Acceleration/deceleration circuit prevents sudden starts and stops, minimizing both splashing and mechanical damage.	
ELECTRICAL REQUIREMENTS	▪ 100V, 50Hz ▪ 100V, 60 Hz ▪ 120 Volts, 60 Hz ▪ 230 Volts, 50 Hz	43: 800 VA per shaker 43R: 1500 VA per shaker
ETL REGULATORY STANDARDS	UL 61010A-1 UL 61010A-2-010	CAN/CSA-C22.2 No. 1010.1 CAN/CSA-C22.2 No. 1010.2.010
CE REGULATORY STANDARDS	IEC 61010-1: 2001 2nd ed. EN 61010-1: 2001 2nd ed. EN 61000-3-3 : 1995	EN 61010-2-081 (2002) EN 61326 : 1997 + A1 : 1998 EN 61010-2-010 (1992) + A1: 1996
		EN 61000-3-2 : 1995
DIMENSIONS[3]		
Width	53 inches (135 cm)	
Depth (Front to Back)	32 inches (81 cm)	
Height	40.6 inches (103 cm)	

[1] see first NOTE on following page

[2] depending on ambient factors, such as relative humidity, and options installed

[3] see second NOTE on following page

Innova 43 & 43R Incubator Shaker	
CHAMBER DIMENSIONS	24 inches deep X 34.5 inches wide X 19 inches high from top of platform (61 cm deep X 87.6 cm wide X 48 cm high from top of platform)
CHAMBER LID	Foot-activated lid opening.
PLATFORM	Aluminum, 18" X 30" (46 X 76 cm). Select universal or dedicated styles
WEIGHT **43** **43R**	 460 lbs (209 kg) 510 lbs (231 kg)

NOTE:

Use of baffled flasks will significantly reduce maximum speed for any shaker. We may be able to improve this maximum speed by using an alternative motor pulley. Contact your NBS representative for more information.

11.1 Certifications

The Innova 43 and 43R have been tested to ETL standards, to comply with UL and CAN/CSA electrical safety standards (see "ETL Regulatory Standards" in the specifications table).

As attested in the *CE Declaration of Conformity* reproduced on the following page, the Innova 43 and 43R also conform to the appropriate CE standards (see also "CE Regulatory Standards" in the specifications table).