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Find the *Eppendorf / New Brunswick Scientific Innova 4230* at our website: ***Click HERE***

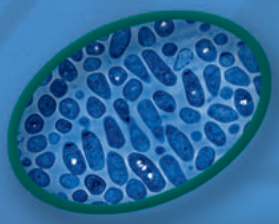
innova

BIOLOGICAL SHAKERS

Benchtop, Floor Standing and Stackable
Models for All of Your Culture Needs











New Brunswick Scientific
Innovative Equipment for Culture Growth, Detection and Storage

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Innova®

Quality. Selection.



Benchtop Innova 40/40R, page 8



Large-capacity Innova 43, page 10



Water Bath Innova 3100, page 16



Space-saving, stackable Innova 44 incubator shakers with programmable controls, page 6.









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Shakers

Reliability. Convenience.

Why Choose a "New Brunswick Shaker" for Your Lab?

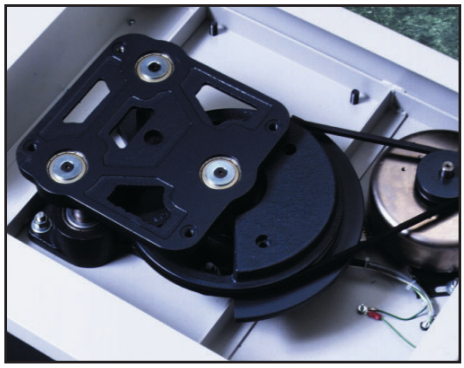
New Brunswick Shakers are used in more laboratories, the world over, than any other biological shaker; and our top-of-the-line Innova models are the best-selling in the industry. Here are just a few of the many reasons why:

- Innovative designs and unparalleled fabrication provide you with day-in and day-out worry-free operation, often for decades of continuous use.
- Advanced microprocessor controls ensure reproducible results and operator convenience.
- "Set it and forget it" programming in our newest models enable you to store and recall multiple parameter - multi-step programs for convenient, automated operation.
- Numerous safety features are built in to protect you, your cultures and your shaker.
- We offer the most comprehensive warranty in the industry — 3 years on parts and 2 years on labor for the entire machine! (Accessories, like light banks, carry a one year warranty.)
- We offer the largest selection of shakers in the industry — over 20 models in our Innova line alone, to meet virtually any culturing or molecular biology application.

What Makes Innova Shakers So Reliable?

Dependable operation is due in large part to the NBS **Triple-Eccentric Counterbalanced Drive.** Other shaker manufacturers may offer triple-eccentric drives in their shakers. But only NBS offers a broad-based cast-iron support mechanism — the most stable in the industry — **properly sized to each shaker, and specifically designed to support high-speed applications and heavy workloads.**

- Components are fabricated to exacting specifications. Drive shafts, for example, are machined to tolerances of .0002", ensuring stable, vibration-free operation, even when operated at speeds up to 500 rpm.
- With the highest-quality materials, superior design and precision fabrication, we guarantee our shakers will provide worry-free operation for many years to come.



NBS' often-imitated but never duplicated heavy-duty, counterbalanced **Triple-Eccentric Drive** ensures uniform motion is imparted to every flask, regardless of position on the platform. Heavy-duty construction allows us to guarantee that our shakers will perform to our specifications, even when fully loaded and operating at top speed.

Innova® Design Advantages

- **Precise Regulation of Speed, Running Time, Incubation, Refrigeration and Humidity** is provided by microprocessor control with self-correcting PI feedback.
- **Additionally, Innova 40, 43 & 44 Series Models Feature Programmable Changes to Multiple Parameters on a Timed Basis.** Programs may be stored for repeat usage. An RS-232 interface allows remote changes to setpoints using standard laboratory software.
- **NBS Shakers Are the Quietest Running In the Industry,** providing a more favorable work environment.
- **Temperature is Precisely Regulated ± 0.1°C** from 30° - 40°C in incubated models.
- **Wide Speed Range Provides Versatility for Culturing Shear-Sensitive Mammalian Cells as well as Robust Bacterial Cultures.** Speed controlled within ± 1 rpm.
- **Timed Studies Can Be Programmed for Automatic Agitation Shut-Off.** End-of-study alarm and status light can be deactivated for continuous operation.
- **A Wide Range of Interchangeable Accessory Platforms** accommodate all your glassware. When using a single flask size, **Dedicated Platforms** provide maximum capacity, and come with clamps installed. **Universal Platforms** let you mix different-sized clamps and test tube racks for added versatility.
- **User-Friendly Controls** simplify entering setpoints and viewing current status. Display is clearly visible from all angles, across the room, and in the dark.
- **Audible and Visible Alarms** indicate setpoint deviations. Audible alarm can be muted.
- **Output Signal for Data Logging.** RS-232 port in Innova 40, 43 & 44 Series models allows data logging using standard laboratory software. 0 - 5 V output signal in Innova 4200, 4230 and 3100 is provided for recording temperature and speed.
- **Cool-Running Brushless Motors Never Require Lubrication,** and provide years of long life.
- **Electronics & Mechanical Components Are Enclosed, Protected From Accidental Spills.**
- **Comprehensive Warranty** — Three years on parts and two years on labor for the entire machine. **

** Glassware and their contents are not covered. Accessories, such as photosynthetic light banks, carry a one year warranty. See actual warranty for details.

Safety Features

- **Acceleration - Deceleration Circuit Prevents Sudden Starts and Stops.** Minimizes mechanical damage for longer shaker life; and eliminates wetting of flask closures which can interfere with oxygen transfer.
- **Unique Out-of-Balance Sensor Stops Agitation** when excess vibration is detected. Models 44, 44R and 4900.
- **Open Door/Lid Cutout Switch Stops Agitation** when chamber is open. †
- **Thermostat Fail-Safe Shuts Off Heaters** if high limit is exceeded. †
- **Automatic Restart After Power Interrupt with Non-Volatile Memory** keeps studies running smoothly.

† Temperature-controlled models only.

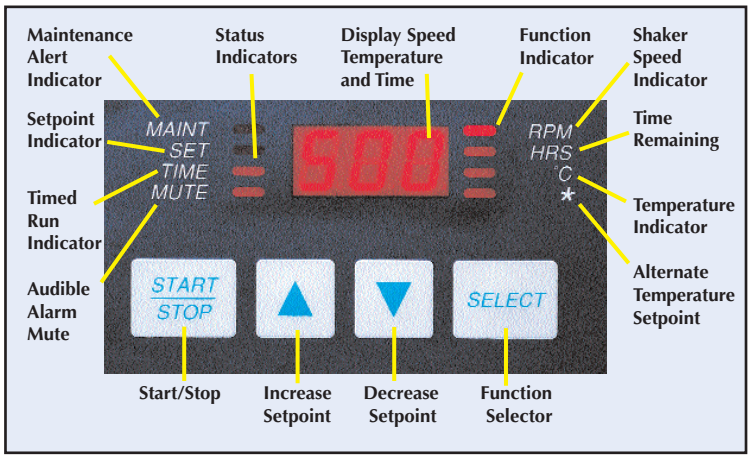
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Shaker Selector Guide

Innova Model	Benchtop (B), Console (C) or Floor Stackable (S)	Platform Size in Inches	Max. Capacity 250 mL Flasks on a Dedicated Platform §	Max. Capacity 250 mL Flasks on a Universal Platform §	Max. Capacity Largest Flask Size on a Universal Platform §	Orbit Diameter in Inches	RPM Range ◊	Temperature Range °C † (A = Ambient)	Refrigeration	Multi-Step Programming	Photosynthetic Lighting	Gassing Manifold	UV Germicidal Lamp	Humidity Control	Humidity Monitor	Page
2000	B	13 x 11	8	6	4 x 500mL	3/4	25 to 500	N/A								18 - 19
2050	B	16 x 12	12	10	8 x 500mL	3/4	25 to 500	N/A								18 - 19
2100	B	18 x 18	25	18	2 x 6L	3/4	25 to 500	N/A								18 - 19
2150	B	24 x 18	35	24	3 x 6L	3/4	25 to 500	N/A								18 - 19
2300	B	30 x 18	40	30	4 x 6L	1 or 2	25 to 500	N/A								18 - 19
2350	B	36 x 24	70	50	8 x 6L	1 or 2	25 to 500	N/A								18 - 19
3100	B	12 x 16.5	13	8	2 x 2L	1/2	25 to 400	A +5 to 100								16 - 17
40	B	18 x 18	25	18	4 x 3L	3/4 or 1	25 to 500	A +5 to 80	✓*	✓						8 - 9
40R	B	18 x 18	25	18	4 x 3L	3/4 or 1	25 to 500	A -15 to 80	✓	✓						8 - 9
4200	B or S	18 x 18	25	18	2 x 6L	3/4 or 1	25 to 400	A +5 to 80				✓*				12 - 13
4230	B or S	18 x 18	25	18	2 x 6L	3/4 or 1	25 to 400	A -20 to 80	✓	✓*	✓*	✓*				12 - 13
43	C	30 x 18	40	30	4 x 6L	1 or 2	25 to 500	A +5 to 80		✓		✓*			✓*	10 - 11
43R	C	30 x 18	40	30	4 x 6L	1 or 2	25 to 500	A -20 to 80	✓	✓	✓*	✓*	✓*		✓*	10 - 11
44	C or S	30 x 18	40	30	6 x 5L	1 or 2	25 to 400	A +5 to 80		✓		✓*			✓*	6 - 7
44R	C or S	30 x 18	40	30	6 x 5L	1 or 2	25 to 400	A -20 to 80	✓	✓	✓*	✓*	✓*		✓*	6 - 7
4900	C	Up to 4 18 x 24	140	96	6 x 6L	1 or 2	25 to 400	A-20 to 60	✓	✓*	✓*			✓		14 - 15
5000	C	6 Platforms 32.5 x 26.8	384	252	16 x 6L	2	25 to 350	N/A								20 - 21

* Optional feature. † A = Ambient temperature as measured 1 meter from shaker. ◊ Baffled flasks can significantly reduce maximum speed. § Quantity flasks shown for Innova 4900 assumes use of 4 shakers. Quantity shown for Innova 5000 assumes use of 6 platforms.



Membrane keypad sets and displays operating parameters, current status, running time and alarm conditions. Wipes down for easy cleanup in case of spills. Used on all models except Innova 40, 43 & 44 Series.



New Innova 40, 43 & 44 Series models feature a single knob to easily select and set all operating conditions and multi-parameter programs. The display screen is exceptionally large and easy-to-read, measuring 5" wide x 2¾" high (12.7 x 6.98 cm). Displayed parameters are user-selectable.

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Stackable Incubator Shakers: Innova® 44 & 44R with

Space-saving Innova 44 Series Shakers can be stacked up to three units high, providing three times the culture capacity in about the same space normally occupied by a single shaker. A programmable controller provides unmatched convenience and reproducible results by letting you create programs to automate changes to operating parameters. Innova 44 provides incubation, while Innova Model 44R adds refrigeration.

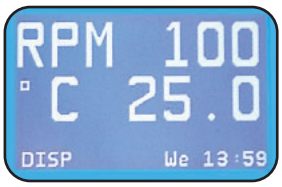
- **Intuitive Programming** allows multiple parameter changes to temperature, speed, photosynthetic lights* and UV light decontamination* on a timed basis. Ideal for heat inductions as well as temperature reductions to slow growth, eliminating unnecessary trips back to the lab. (* Optional accessories.)
- **Expanded Temperature Range Eliminates Need to Order a More Expensive High-Temperature Model.**
  Innova 44: 5°C above ambient to 80°C.
  Innova 44R: 20°C below ambient to 80°C, min. 4°C.
- **Agitation:** 25 to 400 rpm with 1" (2.54 cm) orbit and to 300 rpm with 2" (5.1 cm) orbit; ±1 rpm.
- **Space-Saving Door** glides up and out of your way.
- **Slide-Out Platform** provides easy access to all samples.
- **Double-Pane, Thermal Glass** provides excellent insulation and clear observation of cultures.
- **Extra-Large Chamber** holds flasks up to 5 liters.
- **Interior Chamber Light** enhances observation.
- **Multi-Function Reservoir** humidifies chamber to reduce sample evaporation and protect unit from spills. Built-in drain facilitates cleanup.
- **Superior Air Circulation System Provides Rapid Temperature Equilibration & Excellent Uniformity** using low watt-density, resistance heaters.
- **Heavy-Duty Door Gasket** maintains a leak-free seal and ensures excellent temperature uniformity.
- **RS-232 Computer Interface** allows remote data logging and control using standard lab management software.
- **Pull-Out Service Module** allows convenient access to all electronic and heating/cooling components without the need to unstack units.



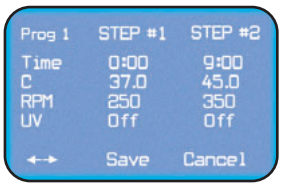
Stackable Innova 44 Series Shakers accommodate up to 5 liter flasks on interchangeable 30" x 18" (76 x 46 cm) accessory platforms. As shown, two shakers on a medium base.

Options

- **Orbit:** 1" (2.54 cm) or 2" (5.1 cm) diameter orbits.
- **Humidity Probe** monitors humidity levels.
- **12-Port Gassing Manifold** permits direct gassing into flasks or other vessels.
- **Ultraviolet Germicidal Light** in the airflow path outside the chamber reduces the bio-burden of circulated air. Innova 44R only.
- **Programmable Photosynthetic Light Bank:** Innova 44R only.
- **Remote Alarm Output** provides communication to external user-supplied building alarm/monitor system.
- **Validation Packages Available.**



Large, easy-to-read display screen clearly shows operating parameters and actual value. Displayed parameters can be selected by user. A single knob selects all operating conditions easily and quickly. Screen size: 5" x 2¾" (12.7 x 6.98 cm).



Programmable controller automates parameter changes on a timed basis. Holds up to 4 programs, 15 steps each. Can eliminate unnecessary return trips to the lab, automates heat inductions and more.

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Added Refrigeration

Specifications *		Innova 44	Innova 44R
Temperature	Range †	Ambient +5°C to 80°C	Ambient -20°C to 80°C. Min. setpoint 4°C
	Accuracy & Control	± 0.1°C at 37°C with a nominal uniformity of ± 0.25°C	
	Refrigeration	Innova 44R only. Hermetically-sealed compressor uses CFC-free refrigerant	
	Heaters	Low watt-density, resistance heaters with high-temperature safety thermostat cut-out	
Shaking	Range §	25 to 400 rpm with 1" (2.54 cm) orbit 25 to 300 rpm with 2" (5.1 cm) orbit or with any 2 stacked units 25 to 250 rpm with 3 stacked units	
	Control	± 1 rpm	
	Drive Mechanism	Triple-eccentric counterbalanced drive in cast iron housing with 9 permanently lubricated ball bearings. Driven by solid-state brushless DC motor	
Timer and Parameter Control	4 Modes	➢ Speed and temperature continuous ➢ Shaker can be set to run from 0.1 to 99.9 hours ➢ On-board firmware can program multiple parameter changes to temperature and speed. On 44R can program optional photosynthetic lighting and UV decontamination ➢ Shaker control and data logging via RS-232 and remote computer running conventional laboratory management software or HyperTerminal	
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm or temperature more than 1°C from setpoint, and when program or time has finished. Alarm may be muted	
Safety	Mechanical and electronic	Sensors limit speed of shaker when unbalanced, stops shaker when excess vibration is detected and shuts off temperature when high-temperature limit is exceeded	
Computer Interface	RS-232	For data logging and control using laboratory management software or HyperTerminal	
Setpoint Retention	Setpoints and operating status retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)		
Electric	Service	120V 60Hz; 230V 50Hz; 100V 60Hz; 100V 50Hz	
	Power	800 VA	1,400 VA
Dimensions	Platform **	30" Wide x 18" Deep (76 x 46 cm)	
	Chamber	36" Wide x 26" Deep (91 x 66 cm). 18" (46 cm) high from top of platform	
	Overall	**Single unit**	**Two stacked** / **Three stacked**
	Wide	53" (135 cm)	53" (135 cm) / 53" (135 cm)
	Deep	33" (84 cm)	33" (84 cm) / 33" (84 cm)
	High	26" (66 cm)	52" (132 cm) / 78" (198 cm)
Weight	Net	525 lbs (238 kg).	570 lbs (259 kg)
Ambient Conditions	10°C to 35°C. 20 to 80% RH (non-condensing)		
Service	All mechanical and electronic components are easily accessed from the front of the machine		
Certification	Meets CSA, UL & CE standards		
Warranty	Comprehensive warranty – two years on labor, three years on parts		

* Specifications subject to change without notice. † Max. temperature is ambient plus 55°C. With optional Humidity Monitor max. temperature is 60°C. In Model 44R, attaining 20°C below ambient depends on RH and other ambient conditions. For 230V 44R, temperature range is 17°C below ambient to 80°C, with a min. setpoint 4°C. § Baffled flasks can significantly reduce maximum speed. ** Platforms sold separately - see platform capacity chart below, and platform ordering info on page 22. Note: Innova 44 and 44R platforms are not interchangeable with platforms from other NBS Shakers. ◊ Door open adds 21" (53 cm) to height of top of unit. Height shown does not include optional base — see below.

Shaker Capacity **		
Flask Size	**Dedicated Platform**	**Universal Platform**
50 mL	N/A	91
125 mL	60	39
250 mL	40	30
500 mL	24	24
1 L	15	14
2 L	12	8
2.8 L	6	6
4 L	6	6
5 L	N/A	6 ††

** Shaker platforms sold separately. See page 22.

†† Using Sticky Tape – less with clamps. When using Photosynthetic Lighting, maximum flask size is 4L.

Ordering Information **		Catalog No.	Catalog No.
Innova 44 Shaker	120 V 60 Hz	1" orbit: M1282-0000	2" orbit: M1282-0010
Innova 44 Shaker	100 V 60 Hz	1" orbit: M1282-0001	2" orbit: M1282-0011
Innova 44 Shaker	230 V 50 Hz	1" orbit: M1282-0002	2" orbit: M1282-0012
Innova 44 Shaker	100 V 50 Hz	1" orbit: M1282-0003	2" orbit: M1282-0013
Innova 44R Shaker	120 V 60 Hz	1" orbit: M1282-0004	2" orbit: M1282-0014
Innova 44R Shaker	100 V 60 Hz	1" orbit: M1282-0005	2" orbit: M1282-0015
Innova 44R Shaker	230 V 50 Hz	1" orbit: M1282-0006	2" orbit: M1282-0016
Innova 44R Shaker	100 V 50 Hz	1" orbit: M1282-0007	2" orbit: M1282-0017
Short Base raises shaker by 4" or 10.2 cm			M1282-0600
Medium Base raises shaker by 12" or 30.5 cm			M1282-0800
Tall Base raises shaker by 16" or 40.6 cm			M1282-0700
Stacking Kit, Order 1 kit for 2 units/ 2 kits for 3 units			M1282-0500
Photosynthetic Light Bank - 44R only, factory installed			M1282-9922
12-Port Gassing Manifold factory installed			M1282-0291
Humidity Monitor factory installed			M1282-5011
UV Germicidal Light - 44R only, factory installed			M1282-9921
Spare Parts Kit			M1282-6000

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Benchtop Incubator Shakers: Innova® 40 & 40R with

Precise control, automated operation and high-temperature capability! Innova 40 Series Benchtop Incubator Shakers have it all. These versatile machines provide "set it and forget it" programming, automatically changing operating conditions on your pre-programmed command. Innova 40R models come with added refrigeration factory-installed; or add a refrigeration module in the field, at any time!

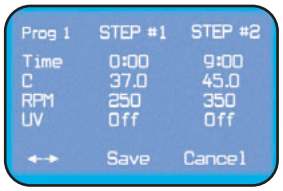
- **Ready When You Are.** Automatically ramp temperature up, so your study can get started when you arrive in the lab. Speed up, slow down or stop agitation on a timed basis. Or let your shaker place your cultures in metabolic stasis until you're ready to attend to them. It's all possible with our easy-to-use programmable controller.
- **Expanded Temperature Range Eliminates Need to Order a More Expensive High-Temperature Model.**
  Innova 40: 5°C above ambient to 80°C.
  Innova 40R: 15°C below ambient to 80°C, min. 4°C.
- **Accurate and Uniform Temperature Control:** ± 0.1°C with uniformity of ± 0.25°C at 37°C.
- **Modular Refrigeration System** lets you easily add refrigeration option at any time, even in the field.
- **Agitation:** 25 - 500 rpm, ± 1 rpm.
- **Controls for Entering & Viewing Setpoints are Exceptionally Easy-to-Use.** Display is clearly visible from all angles, across the room, and in the dark.
- **Output Signal to RS-232 Enables Data Logging and Computer Control.**
- **Crystal Clear Lid Provides Excellent Visibility** minimizing the need to open the chamber; lifts out of the way for easy accessibility to samples. Hydraulic arms make it easy to raise and keep the lid open.



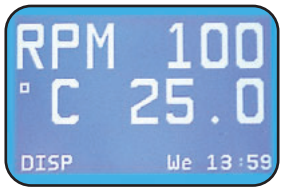
Benchtop Innova 40 and refrigerated Innova 40R handle flasks up to 3 Liters and feature a see-through lid for easy visibility. Interchangeable platforms, sized 18" x 18" (46 x 46 cm), and choice of ¾" (1.9 cm) or 1" (2.54 cm) orbits are offered.

Options

- **Refrigeration:** Factory-installed, select Model Innova 40R. Or upgrade Innova 40 at any time using Refrigeration Module M1299-0060.
- **Orbit:** ¾" (1.9 cm) or 1" (2.54 cm) diameter orbits.
- **Remote Alarm Contact** provides communication to external user-supplied building alarm/monitor system.
- **Validation Packages Available.**



Programmable controller automates parameter changes on a timed basis. Holds up to 4 programs, 15 steps each. Can eliminate unnecessary return trips to the lab, automates heat inductions and more.



Large, easy-to-read display screen clearly shows operating parameter and actual value. Displayed parameters can be selected by user. A single knob selects all operating conditions easily and quickly. Screen size: 5" x 2¾" (12.7 x 6.98 cm).

Added Refrigeration

Specifications *		Innova 40	Innova 40R
Temperature	Range †	Ambient +5°C to 80°C	Ambient -15°C to 80°C. Min. setpoint 4°C
	Accuracy & Control	± 0.1°C at 37°C with a nominal uniformity of ± 0.25°C	
	Refrigeration	Innova 40R only. Hermetically-sealed compressor uses CFC-free refrigerant	
	Heaters	Low watt-density, resistance heaters with high-temperature safety thermostat cut-out	
Shaking	Range	25 - 500 rpm with 3/4" (1.9 cm) or 1" (2.54 cm) orbit	
	Control §	± 1 rpm	
	Drive Mechanism	Triple-eccentric counterbalanced drive in cast iron housing with 9 permanently lubricated ball bearings. Driven by solid-state brushless DC motor	
Timer and Parameter Control	4 Modes	➢ Speed and temperature continuous ➢ Shaker can be set to run from 0.1 to 99.9 hours ➢ On-board firmware can program multiple parameter changes to temperature and speed ➢ Shaker control and data logging via RS-232 and remote computer running conventional laboratory management software or HyperTerminal	
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm or temperature more than 1°C from setpoint, and when program or time has finished. Alarm may be muted	
Safety	Mechanical and electronic	Acceleration circuit prevents sudden starts and stops. Sensor shuts off temperature when high-temperature limit is exceeded	
Computer Interface	RS-232	For data logging and control using laboratory management software or HyperTerminal	
Setpoint Retention	Setpoints and operating status retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)		
Electric	Service	120V 60Hz; 230V 50Hz; 100V 60Hz; 100V 50Hz	
	Power	800 VA	1,500 VA
Dimensions	Platform**	18" Wide x 18" Deep (46 x 46 cm)	
	Chamber ††	20¼" Wide x 21½" Deep x 14" High (51.43 x 54.61 x 35.56 cm)	
	Overall ◊	22" Wide x 30" Deep x 24" High (55.88 x 76.2 x 60.96 cm)	
Weight	Net	138 lbs (62.7 kg)	184 (83.6 kg)
Ambient Conditions	10°C to 35°C. 20 to 80% RH (non-condensing)		
Certifications	Meets CSA, UL & CE standards		
Warranty	Comprehensive warranty – two years on labor, three years on parts		

* Specifications subject to change without notice.
† Attaining temperatures of 15°C below ambient depends on RH and other ambient conditions. Ambient temperature is measured 1 meter from the shaker.
§ Baffled flasks will significantly reduce maximum speed.
** Platforms sold separately - see platform capacity chart below and ordering info on page 22.
†† Height is clearance above platform.
◊ With open lid, total height is 40" (102 cm).

Shaker Capacity ** Models 40/40R & 4200/4230

Flask Size	Dedicated Platform	Universal Platform
10 mL	N/A	109
25 mL	N/A	64
50 mL	64	45
125 mL	34	21
250 mL	25	18
500 mL	16	14
1 L	9	8
2 L	5	5
2.8 L	4	4
4 L ◊◊	4	4
5 L ◊◊	N/A	4
6 L ◊◊	2	2

Ordering Information **		Catalog No.	Catalog No.
Innova 40 Shaker	120 V 60 Hz	3/4" orbit: M1299-0000	1" orbit: M1299-0010
Innova 40 Shaker	100 V 60 Hz	3/4" orbit: M1299-0001	1" orbit: M1299-0011
Innova 40 Shaker	230 V 50 Hz	3/4" orbit: M1299-0002	1" orbit: M1299-0012
Innova 40 Shaker	100 V 50 Hz	3/4" orbit: M1299-0003	1" orbit: M1299-0013
Innova 40R Shaker	120 V 60 Hz	3/4" orbit: M1299-0004	1" orbit: M1299-0014
Innova 40R Shaker	100 V 60 Hz	3/4" orbit: M1299-0005	1" orbit: M1299-0015
Innova 40R Shaker	230 V 50 Hz	3/4" orbit: M1299-0006	1" orbit: M1299-0016
Innova 40R Shaker	100 V 50 Hz	3/4" orbit: M1299-0007	1" orbit: M1299-0017
Refrigeration Module to convert Innova 40 to Innova 40R		M1299-0060	
Validation Packages ask your sales rep for details			
Spare Parts Kit	M1299-6000		

** Shaker platforms sold separately. See page 22.
◊◊ Available for Models 4200 & 4230 only.

Large-Capacity Incubator Shakers: Innova® 43 & 43R

Innova 43 Series Shakers are sleek, dependable and offer the convenience of automated programming capability for "set it and forget it" operation. With built-in high-temperature capability, and options for refrigeration, photosynthetic lighting, gassing, and UV decontamination, these shakers can handle virtually any culturing task.

- **Ready When You Are.** Programmable controller can automatically ramp temperature up or down, and speed, slow or stop agitation on a timed basis. On Model 43R only, optional photosynthetic lighting & UV decontamination are also programmable.
- **Temperature Range:**
  Innova 43: 5°C above ambient to 80°C.
  Innova 43R: 20°C below ambient to 80°C, min. 4°C.
- **Accurate and Uniform Temperature Control:** ± 0.1°C with uniformity of ± 0.25°C at 37°C.
- **Agitation: 25 - 500 rpm, ± 1 rpm.**
- **Controls for Entering & Viewing Setpoints** are Exceptionally Easy-to-Use. Display is clearly visible from all angles, across the room, and in the dark.
- **RS-232 for Data Logging & Computer Control.**
- **Multi-Function Reservoir** humidifies chamber to reduce sample evaporation and protect unit from spills. Built-in drain facilitates cleanup.
- **Easy-Open Lid** assisted by a foot pedal release provides hands-free operation.
- **Casters Facilitate Mobility.**

Options

- **Orbit:** 1″ (2.54 cm) or 2″ (5.1 cm) diameter orbits.
- **Humidity Probe** monitors humidity levels.
- **12-Port Gassing Manifold** permits direct gassing into flasks or other vessels.
- **Ultraviolet Germicidal Light** in the airflow path outside the chamber reduces the bio-burden of circulated air. Model Innova 43R only.

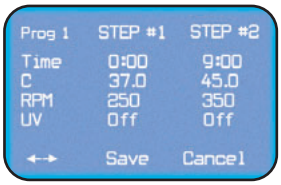


Innova 43 and refrigerated Innova 43R accommodate flasks up to 6 Liters. Interchangeable platforms, sized 30″ x 18″ (76 x 46 cm) and choice of 1″ (2.54 cm) or 2″ (5.1 cm) orbits are offered.

- **Remote Alarm Contact** provides communication to external user-supplied building alarm/monitor system.
- **Programmable Photosynthetic Light Bank:** Innova 43R only.
- **Stationary Accessory Basket** clips to the side wall for incubating or refrigerating plates or other glassware.
- **Validation Packages Available.**



Large, easy-to-read display screen clearly shows operating parameter and actual value. Displayed parameters can be selected by user. A single knob selects all operating conditions easily and quickly. Screen size: 5″ x 2¾″ (12.7 x 6.98 cm)



Programmable controller automates parameter changes on a timed basis. Holds up to 4 programs, 15 steps each. Can eliminate unnecessary return trips to the lab, automates heat inductions and more.

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Specifications *		Innova 43	Innova 43R
Temperature	Range †	Ambient +5°C to 80°C	Ambient -20°C to 80°C. Min. setpoint 4°C
	Accuracy & Control	± 0.1°C with a nominal uniformity of ± 0.25°C at 37°C	
	Refrigeration	Innova 43R only. Hermetically-sealed compressor uses CFC-free refrigerant	
	Heaters	Low watt-density, resistance heaters with high-temperature safety thermostat cut-out	
Shaking	Range §	25 - 500 rpm with 1" (2.54 cm) orbit or 25 - 300 rpm with 2" (5.1 cm) orbit	
	Control	± 1 rpm	
	Drive Mechanism	Triple-eccentric counter-balanced drive in cast iron housing with 9 permanently lubricated ball bearings. Driven by solid-state brushless DC motor	
Timer and Parameter Control	4 Modes	➢ Speed and temperature continuous ➢ Shaker can be set to run from 0.1 to 99.9 hours ➢ On-board firmware can program multiple parameter changes to temperature and speed. On 43R can program optional photosynthetic lighting and UV decontamination ➢ Shaker control and data logging via RS-232 and remote computer running conventional laboratory management software or HyperTerminal	
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm or temperature more than 1°C from setpoint, and when program or time has finished. Alarm may be muted	
Safety	Mechanical and electronic	Acceleration circuit prevents sudden starts and stops. Sensor shuts off temperature when high-temperature limit is exceeded	
Computer Interface	RS-232	For data logging and control using laboratory management software or HyperTerminal	
Setpoint Retention	Setpoints and operating status retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)		
Electric	Service	120V 60Hz; 230V 50Hz; 100V 60Hz; 100V 50Hz	
	Power	800 VA	1,500 VA
Dimensions	Platform**	30" Wide x 18" Deep (76 x 46 cm)	
	Chamber ††	34¾" Wide x 22¼" Deep x 19¼" High (88.26 x 56.15 x 48.8 cm)	
	Overall ◊	45.5" Wide x 32" Deep x 40.6" High. (115.6 x 81.3 x 103.1 cm)	
Weight	Net	420 lbs (191 kg)	450 lbs (204 kg)
Ambient Conditions	10°C to 35°C. 20 to 80% RH (non-condensing)		
Certifications	Meets CSA, UL & CE standards		
Warranty	Comprehensive warranty – two years on labor, three years on parts		

* Specifications subject to change without notice. † Maximum temperature is ambient + 55°C. Maximum temperature is 60°C with optional Humidity Monitor. Attaining temperatures of 20°C below ambient depends on RH and other ambient conditions. Ambient temperature is measured 1 meter from the shaker. § Baffled flasks will significantly reduce maximum speed. ** Platforms sold separately - see platform capacity chart below and ordering info on page 22. †† Height is clearance above platform. ◊ With open lid, total height is 63.5" (161 cm).

Shaker Capacity Innova 43 & 43R **		
Flask Size	**Dedicated Platform**	**Universal Platform**
10 mL	N/A	183
25 mL	N/A	92
50 mL	108	92
125 mL	60	39
250 mL	40	30
500 mL	24	18
1 L	15	12
2 L	12	8
3 L	6	6
4L	6	6
5L	N/A	6 §§
6L	4	4§§

Ordering Information **		Catalog No.	Catalog No.
Innova 43 Shaker	120 V 60 Hz	1" orbit: M1320-0000	2" orbit: M1320-0010
Innova 43 Shaker	100 V 60 Hz	1" orbit: M1320-0001	2" orbit: M1320-0011
Innova 43 Shaker	230 V 50 Hz	1" orbit: M1320-0002	2" orbit: M1320-0012
Innova 43 Shaker	100 V 50 Hz	1" orbit: M1320-0003	2" orbit: M1320-0013
Innova 43R Shaker	120 V 60 Hz	1" orbit: M1320-0004	2" orbit: M1320-0014
Innova 43R Shaker	100 V 60 Hz	1" orbit: M1320-0005	2" orbit: M1320-0015
Innova 43R Shaker	230 V 50 Hz	1" orbit: M1320-0006	2" orbit: M1320-0016
Innova 43R Shaker	100 V 50 Hz	1" orbit: M1320-0007	2" orbit: M1320-0017
Photosynthetic Light Bank 43R only, factory installed			M1320-0300
UV Germicidal Light 43R only, factory installed			M1320-0400
12-Port Gassing Manifold factory installed			M1320-0500
Humidity Monitor factory installed			M1320-0600
Spare Parts Kit includes drive belts and fuses			M1282-6000
Spare Parts Kit includes drive belts, fuses, chamber bulbs and hinge assemblies			M1320-6000

** Shaker platforms sold separately. See page 22.

§§ When using optional photosynthetic lighting, max. flask size is 4L. A white, reflective platform for photosynthetic work is available. See page 22.

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Benchtop or Stackable Incubator Shakers: Innova®

Our most versatile benchtop incubator shaker, Model 4230 includes refrigeration for near- and sub-ambient work. Optional photosynthetic light bank is also available. When refrigeration is not needed, Model 4200 does the job. These multi-purpose instruments have the same size shaker platform as Innova 40/40R, but accept flasks to 6 Liters, and have two stationary shelves for added incubating or storing capability. With a front-opening door, they can be used on the bench, or floor-stacked two high for space savings.



Front-loading Innova 4200 & 4230 shakers accept a wide variety of interchangeable 18" x 18" (46 x 46 cm) accessory platforms for glassware up to 6 liters. Two stationary shelves are included for incubating or refrigerating added samples.

- **Temperature Range:**
  Innova 4200: 5°C above ambient to 80°C.
  Innova 4230: 20°C below ambient to 80°C.
  (75°C max. in 50 Hz. models. Min. setpoint 4°C.)
- **Agitation:** 25 - 400 rpm, ± 1 rpm.
- **Two Adjustable-Height, Stationary Shelves** add storage for incubating plates and other samples.
- **Use On the Bench or Stacked* Two High** on the floor for space savings. (* Requires stacking kit.)
- **Large Viewing Window & Internal Light Provide Clear Chamber Visibility,** minimizing the need to open the door. Rapid air circulation produces quick temperature equilibration and recovery.
- **In-Chamber, Moisture-Proof Receptacle Provides Power for an Accessory Instrument** such as rocker, roller, or second shaker.
- **Keyed Door Lock** adds security.
- **Interchangeable Accessory Platforms Accept Glassware Up to 6 L.**

Options

- **Orbit:** ¾" (1.9 cm) or 1" (2.54 cm) diameter orbit.
- **5-Port Gassing Manifold** permits direct gassing into flasks for anaerobic cultures.
- **Programmable Timer Automates Switching Between Two Temperatures, and Cycling Agitation On or Off.** Limits metabolic activity in studies that end overnight, saving a return trip to the lab. Facilitates heat inductions. Model 4230 only.
- **Photosynthetic Light Bank** with external manual on-off switch enables culturing plant cells. Model 4230 only.



Space saving, stackable design.

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4200 & 4230 with Added Refrigeration

Specifications *		Innova 4200	Innova 4230
Temperature	Range ∞	5°C above ambient to 80°C	20°C below ambient to 80°C. Min. setpoint is 4°C
	Accuracy	± 0.1°C with a nominal uniformity of ± 0.25°C at 37°C	
	Refrigeration	Model 4230 only: Hermetically-sealed compressor uses CFC-free refrigerant	
	Heaters	Low watt-density, resistance-type heaters with high-temperature safety thermostat cut off	
	Optional Programming	Model 4230 only, optional programmable timer can switch between two temperatures and turn agitation on or off. Enables incubating and agitating samples at one temperature for a period of time and then switching to a lower temperature and shutting agitation off to limit metabolic activity. 7-day 24 hr clock timer, programs up to 24 events	
Shaking	Range§	25 to 400 rpm or 25 - 300 when stacking two units, with 3/4" (1.9 cm) or 1" (2.54) orbit	
	Control		
	Drive Mechanism	Triple-eccentric counterbalanced drive in cast-iron housing with 9 permanently lubricated ball bearings. Solid-state brushless D.C. motor	
	Timer	Programmable shaking periods from 0.1 hr. to 99.9 hrs. Triggers audible alarm and energizes status light at end of period. Can be deactivated for continuous operation	
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm or temperature more than 1°C from setpoints, and when timer operation has expired. Alarm may be muted	
LED Display		Indicates speed, temperature, running time and alarm conditions. Character height: 9/16" (1.4 cm)	
Safety		Safety stops shaker when door is opened; and shuts off temperature when high-temperature limit is exceeded	
Recorder Output		0 - 5 volt output for tracking temperature and speed with external recorder	
Setpoint Retention		Setpoints and operating status retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)	
Electric	Service	120V 50/60 Hz; 220/230V 50/60 Hz; 240V 50/60 Hz; 100V 50/60 Hz	
	Power	600VA	1,000VA
Internal Electric Receptacle		200 Watt moisture-proof internal electric outlet installed in chamber for optional magnetic stirrers, rocker, roller, portable shaker, etc.	
Illumination	Chamber	13 Watt fluorescent light illuminates chamber with external on-off switch	
	Photosynthetic	Optional for Model 4230 only. Photosynthetic Light Bank with (6) 15-Watt Gro-Lux lights and an external on-off switch	
Dimensions	Platform **	18" Wide x 18" Deep (46 x 46 cm)	
	Overall	24.4" Wide x 28.7" Deep x 36.4" High (62 x 73 x 92.5 cm) With door open: 51.2" [130 cm] Deep. Height stacked: 71" High (180 cm) †	
	Chamber	20.5" Wide x 20.5" Deep x 24.8" High from shaker platform (52 x 52 x 63 cm)	
	Viewing Window	11.4" Wide x 19.25" High (29 x 49 cm) double-pane insulated window	
Weight	Net	270 lbs. (123 kg)	300 lbs (137 kg)
Ambient Conditions		Temperature: 0°C - 40°C for Model 4200 and 15°C - 35°C for Model 4230 Humidity: 20% to 80% non-condensing.	
Warranty		Comprehensive warranty – two years on labor, three years on parts	

* Specifications subject to change without notice. ∞ 50 Hz models to 75°C.
§ Speed range based on shaking a typical workload. Baffled flasks can significantly reduce maximum speed.
† Requires a stacking kit.
** Platforms ordered separately. See page 22.

Ordering Information **	Catalog No.	Catalog No.
Innova 4200 Shaker 120 V 60 Hz	3/4" orbit: M1233-0004	1" orbit: M1233-0014
Innova 4200 Shaker 100 V 60 Hz	3/4" orbit: M1233-0005	1" orbit: M1233-0015
Innova 4200 Shaker 230 V 50 Hz	3/4" orbit: M1233-0006	1" orbit: M1233-0016
Innova 4200 Shaker 100 V 50 Hz	3/4" orbit: M1233-0007	1" orbit: M1233-0017
Innova 4230 Shaker 120 V 60 Hz	3/4" orbit: M1233-0000	1" orbit: M1233-0010
Innova 4230 Shaker 100 V 60 Hz	3/4" orbit: M1233-0001	1" orbit: M1233-0011
Innova 4230 Shaker 230 V 50 Hz	3/4" orbit: M1233-0002	1" orbit: M1233-0012
Innova 4230 Shaker 100 V 50 Hz	3/4" orbit: M1233-0003	1" orbit: M1233-0013
5-Port Gas Manifold, factory installed M1233-0291		
Programmable Temp./Agitation Controller, Model 4230 only, factory-installed M1233-6011		

** Shaker platforms sold separately. See page 22. For capacity information, see page 9.

More Options		
Photosyn. Lights	120 V 60 Hz	M1233-9940
Photosyn. Lights	100 V 60 Hz	M1233-9941
Photosyn. Lights	220 V 60 Hz	M1233-9942
Photosyn. Lights	100 V 50 Hz	M1233-9944
Photosyn. Lights	220 V 50 Hz	M1233-9945
Photosyn. Lights	240 V 50 Hz	M1233-9946
Stacking Kit		M1233-9992
Additional Shelf & Brackets		M1233-9996
Spare Parts Kit 120 V 50/60Hz		M233-6002

Photosynthetic Lighting available for Model 4230 only.

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Space-Saving Multi-Shaker Environmental Chamber:

This environmentally-controlled chamber is designed to culture dozens, and even hundreds, of samples on up to four independently-controlled shakers. Heavy-duty shakers are ordered separately to accommodate your specific needs. The system includes programmable regulation of heat, refrigeration and humidification as standard; photosynthetic operation is optional.

- **Operates One to Four Shakers, Simultaneously. Agitation is Individually Controlled on Each Shaker;** and each can be individually programmed to run continuously or shut off after a set interval. Accessory shakers sold separately.
- **Temperature Range:** 20°C below ambient to 60°C. Minimum setpoint is 4°C.
- **Humidity Controller Minimizes Evaporation** of cultures by injecting vapor into the chamber atmosphere.
- **Powerful Heater and Fan Provide Rapid Heat-Up Capability and Temperature Uniformity** throughout the chamber.
- **Computer-Compatible For Automated Setpoint Changes** using optional software package*. Program agitation on-off cycling, humidity control, multiple-temperature changes and photosynthetic lighting sequences on the basis of time.
- **Thermally-Insulated, Electrically-Heated Glass Door†** with double-pane tempered glass minimizes heat loss and condensation; permits clear observation, minimizing the need to open the chamber.
- **Choice of Lift-Out or Slide-Out Accessory Platforms** for easy access to all size flasks from 10 mL to 6 L. Slide-out platforms (shown) glide in place and lock down without tools. Lift-out platform recommended for high humidity applications.



Innova 4900, accessorized with four shakers with slide-out platforms. The large glass door and illuminated chamber (with on-off switch) make it easy to view all cultures in this space-saving multi-tiered system.

Options

- **Accommodates Up to Two Optional High-Intensity Photosynthetic Light Manifolds with Programmable Temperature and Light Controller.** Dual-channel, 24-event per channel timer switches lamps on/off automatically and switches between two temperatures (without the aid of an external computer.) Multiple light programs may be established for each day of the week, each with a different cycle length (1 min. to 24 hrs.) and each operating at a choice of two temperatures.
- **Orbit:** 1" (2.54 cm) or 2" (5.1 cm) diameter orbit.
- **Chart Recorder and/or BioCommand data logging software and control packages available.**

* Requires computer and BioCommand® Plus or BioCommand Lite software. For photosynthetic work, additionally requires light manifolds.
† Standard door is hinged on left side; but is reversible to fit any room layout.

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Innova® 4900

Specifications *		Innova 4900
Temperature	Range	20°C below ambient to 60°C (minimum setpoint is 4°C)
	Accuracy & Control	± 0.1°C in 30°C to 40°C range, and ± 0.25°C for the remaining range. Capable of dual-temperature programming with photosynthetic lighting option. Capable of multi-temperature programming with optional BioCommand® software
	Heaters	Low watt-density, resistance-type heaters with high-temperature safety thermostat cut off
	Circulation	
	Refrigeration	Fully accessible from front of console. CFC-free refrigerant
Accessory Shakers	Range §	25 to 400 rpm with 1" (2.5 cm) orbit or 25 to 300 rpm with 2" (5.1 cm) stroke. Chamber accepts up to four shakers - see capacity chart below. (Chamber, shakers & platforms ordered separately)
	Control	± 1 rpm
	Drive	Triple-eccentric counterbalanced drive in cast-iron housing with 9 permanently lubricated ball bearings. Solid-state brushless D.C. motor
	Timer	Programmable shaking periods from 0.1 hr. to 99.9 hrs. Triggers audible alarm and energizes status light at end of period. Can be deactivated for continuous operation
Humidity †	Range & Control	To 90% relative humidity (RH) with temperatures between 37°C and 45°C., ±10% To 85% relative humidity (RH) with temperatures between 25°C and 36°C, ±10%
	Humidifier	Electric heat flash vaporizer (130°C)
Illumination	Interior	Two 40-watt fluorescent lamps with on-off control switch located outside the chamber
	Photo-synthetic Light Option	Chamber accommodates up to two photosynthetic light banks. Each bank contains six 20-watt Gro-Lux® fluorescent lamps. Includes Programmable Temperature & Light Timer to automate turning lights on in the morning while incubating at a higher temperature, then turning lights off and lowering temperature in the evening, mimicking diurnal conditions. 7-day 24 hr clock timer programs up to 24 events. Only one timer needed for up to two light banks. Usage reduces chamber capacity. See chart below
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm, temperature more than1°C, or RH more than 5% from setpoint, and when timer operation has expired. Audible alarm may be muted
Chamber		Maximum chamber capacity with one optional light bank is 3 shakers; with two light banks is 2 shakers. Chamber constructed of heavy-gauge stainless steel, mirror finished
Door		32" x 70" (81.3 x 177.8 cm) full view double-pane tempered glass, heated to inhibit condensation and enhance chamber visibility
Safety		Acceleration circuit prevents sudden starts/stops. Unique sensors limit speed of shaker when overloaded or unbalanced; stops shaker when excess vibration is detected or when door is opened; and shuts off temperature when high-temperature limit is exceeded
Computer Control		Optional BioCommand® Plus or BioCommand Lite software for PC control and data logging. Contact your NBS sales representative for details
Setpoint Retention		Setpoints and operating status retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)
Electric	Service	208V 60 Hz; 220/230V 60 Hz; 220/230V 50 Hz; 240V 60 Hz; 240V 50 Hz
	Power	2,350 VA maximum, typical 1,925 VA. Main circuit breaker plus each individual circuit fused or protected by circuit breaker
Chart Recorder		Optional factory-installed, front-mounted, 6 channel analog and digital recorder for tracking speed of 4 shakers, chamber temperature and RH
Dimensions	**Platform** **	**Slide-Out:** 24" Wide x 18" Deep (61 x 46 cm) has integral rollers and locking mechanism to extend platform beyond the front of the chamber, facilitating handling glassware
		Lift-Out: 24" Wide x 18" Deep (61 x 46 cm) has handles for easy removal; Recommended for high-humidity applications
	Chamber	30" Wide x 22" Deep x 66" High (76 x 56 x 168 cm)
	Overall	55" Wide x 30.5" Deep x 78.5" High (140 x 77.5 x 199 cm)
Weight		Chamber with 4 shakers: Gross: 1,400 lbs. (635 Kg). Net: 1,200 lbs. (544 Kg). Shakers alone: 90 lbs. (41 kg) each
Ambient Conditions		Temperature: 15°C - 35°C. Humidity: 80% non-condensing
Warranty		Comprehensive warranty – two years on labor, three years on parts. See warranty for details.

* Specifications subject to change without notice. § Based on shaking a typical workload. Baffled flasks may significantly reduce maximum speed.
† Requires connection to a deionized water supply regulated to 20 psi to provide a flow rate of approximately 50 mL/hr. ** Platforms sold separately. See capacity chart below and ordering info on page 22.

Shaker & Chamber Capacity **

Flask Size	Flasks per Ded. Slide-Out Platform	Flasks per Ded. Lift-Out Platform	Flasks per Universal Platform	Chamber Capacity		
				Shakers per Chamber	Shakers using 1 Light Bank	Shakers using 2 Light Banks
50 mL	80	80	63	4	3	2
125 mL	48	52	35	4	3	2
250 mL	35	35	24	4	3	2
500 mL	20	20	20	4	3	2
1 L	12	12	12	4	3	2
2 L	8	8	8	3	3	2
2.8 L	5	5	5	3	3	2
4 L	4	4	5	2	2	2
5 L	N/A	N/A	4	2	2	2
6 L	4	4	3	2	2	2

** Lift out platforms are recommended for high-humidity applications. Chamber, shaker, platforms and accessories sold separately. For platform ordering info, see page 22.

Ordering Information **		Catalog No.
Environmental Chamber	208V 60 Hz	M1197-0001
Environmental Chamber	220/230V 50 Hz	M1197-0002
Environmental Chamber	220/230V 60 Hz	M1197-0003
Environmental Chamber	240V 60 Hz	M1197-0004
Environmental Chamber	240V 50 Hz	M1197-0005
Shaker, 1"orbit for Slide Out Platforms		M1197-9901
Shaker, 2" orbit for Slide Out Platforms		M1197-9902
Shaker, 1"orbit for Lift Out Platforms		M1197-9933
Shaker, 2" orbit for Lift Out Platforms		M1197-9934
Photosynthetic Light Bank w/ timer		M1197-9910
2nd Photosynthetic Light Bank		M1197-9911
Six-Channel Strip-Chart Recorder		M1197-9912

High-Temperature Water Bath Shakers: Innova® 3100

Superior temperature control and uniformity is assured using the Innova Model 3100. This water bath shaker is ideal for culturing a wide range of cell types at temperatures up to 100°C, as well as for staining, destaining and hybridization protocols.

- **Adjustable Level Control Automatically Replenishes Evaporated Water,** maintaining desired level without monitoring or refilling. Water-in and drain lines are each fitted with control valves to simplify cleaning, filling and complete draining.
- **Temperature Range:** 5°C above ambient to 100°C* provides for a wide range of molecular and cell biology work.
- **Temperature Precisely Controlled** within ± 0.1°C from 30 - 40°C.
- **Agitation:** 25 - 400 rpm, ± 1 rpm.
- **Orbit:** ½" (1.3 cm) diameter orbit.

* Elevated temperatures attained with aid of an optional gable cover and with a bath liquid with a high boiling point to minimize evaporation.



Larger-capacity than many water bath shakers, the Innova 3100 easily accommodates gel trays, tubes and flasks.



Innova 3100 high-temperature water bath shaker.

- **Acceleration Circuit Builds Up Speed Gradually,** avoiding sudden starts and unwanted splashing.
- **Deep Bath with Rounded Corners and Baffles Allows Elevated Speeds** with minimal turbulence or splashing.
- **One-Piece Seamless Bath** is crevice-free, easy to keep clean; rust-resistant stainless steel.
- **Heat Loss and Evaporation Minimized** with use of optional Plexiglas or stainless-steel gable covers.

Options

- **Cooling Coil** extends the range of applications to near and below ambient conditions.
- **Gable Covers** are available to speed heat-up in high-temperature applications and to minimize evaporation.
- **Space-Saving Dolly (fits under benches and desks) and Optional Mobile Cart** are available for use where bench space is limited.

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Specifications *		Innova 3100
Temperature	Range	5°C above ambient (or coolant temperatures using optional cooling coil), to 100°C †
	Accuracy &	
	Heaters	Low watt-density, silicone rubber mat heater with high-temperature safety thermostat cut off
Shaking	Range	25 to 400 rpm with 1/2" (1.3 cm) diameter circular orbit
	Control	± 1 rpm
	Drive Mechanism	Triple-eccentric counterbalanced drive in cast-iron housing with 9 permanently lubricated ball bearings. Solid-state brushless D.C. motor
	Timer	Programmable shaking periods from 0.1 hr. to 99.9 hrs. Triggers audible alarm and energizes status light at end of period. Can be deactivated for continuous operation
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm or temperature more than 1°C from setpoint, and when timer operation has expired. Also signals low-water level condition. Audible alarm may be muted
LED Display		Indicates speed in increments of 1 rpm, temperature in 0.1°C, running time in 0.1 hrs., and alarm conditions. Character height: 9/16" (1.4 cm)
Recorder Output		0 - 5 volt output for tracking temperature and speed with external recorder or computer
Safety		Acceleration circuit prevents sudden starts/stops, minimizing both splashing & mechanical damage. Safety shuts off temperature when high-temperature limit is exceeded
Bath		Deep-drawn, stainless-steel, seamless bath with radius corners. Adjustable level control from 0.5" to 3" above shaker platform. Water-in and drain lines with shut-off valves and overflow line provided. (17.5" L x 13.25" W x 8" H [43 x 35 x 20 cm])
Automatic FIlling		Bath automatically refillable to a volume of 15 L; requires connection to water inlet line
Setpoint Retention		All setpoints and operating status are retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)
Electric	Service	120V 50/60 Hz; 220/230V 50/60 Hz; 240V 50/60 Hz; 100V 50/60 Hz
	Power	1,100VA
Dimensions	Platform **	12" Wide x 16.5" Deep (30.5 x 42 cm)
	Overall	17" Wide x 27.5" Deep x 14.5" High (43 x 70 x 37 cm)
Weight		105 lbs. (47.6 kg) Net; 140 lbs (63 kg) Gross
Ambient Conditions		Temperature: 0 - 60°C. Humidity: 90% non-condensing
Certifications		Meets CSA and CE standards
Warranty		Comprehensive warranty – two years on labor, three years on parts

* Specifications subject to change without notice.

† Gable Cover, (stainless steel or Plexiglas), recommended. See optional accessories chart below. Temperatures as low as -20°C attained with portable refrigeration system, cooling coil and gable cover.

§ Based on shaking a typical workload. Baffled flasks may significantly reduce maximum speed.

** Shaker platforms sold separately. See page 22.

Shaker Capacity **			
Flask Size	**Ded. Platform**	**Univ. Platform**	**Half Size Platforms #**
50 mL	31	18	13/ platform
125 mL	22	18	8/ platform
250 mL	13	8	5/ platform
500 mL	8	6	—
1L	6	4	—
2L	2	2	—

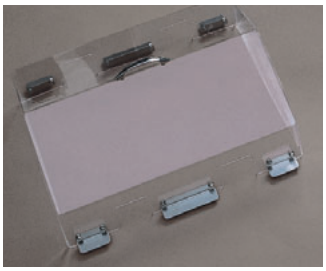
Test Tube Rack Capacity & Ordering Info (Requires a sub-platform, M1231-9999)			
Tube Size	**Racks Per Bath**	**Tubes Per Rack**	**Catalog No.**
13 mm Tubes	4	60	AG7-TT13
16 mm Tubes	4	36	AG7-TT16
20 mm Tubes	4	29	AG7-TT20
25 mm Tubes	4	18	AG7-TT25

** Shaker platforms sold separately. See page 22.

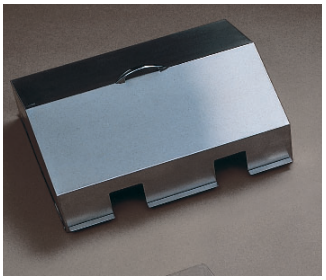
Half-size platforms require a sub-platform, M1231-9999.

Ordering Information **		Catalog No.
Innova 3100 Shaker	120 V 50/60 Hz	M1231-0000
Innova 3100 Shaker	100 V 50/60 Hz	M1231-0001
Innova 3100 Shaker	220/230 V 50/60 Hz	M1231-0002
Innova 3100 Shaker	240 V 50/60 Hz	M1231-0003
Gable Cover, Plexiglas		M1231-2010
Gable Cover, stainless steel		M1231-2000
Cooling Coil, factory-installed		M1231-9920
Spare Set of Suspension Arms		M1231-0730
Space-Saving Dolly for under lab bench operation 18" W x 28.25" L (46 x 72 cm). Height, shaker on cart: 20" (51 cm)		M1195-1020
Portable Cart 22.5" W x 32.25" L (57 x 87 cm). Height, shaker on cart:42.5" (108 cm)		M1020-1220
Sub-Platform, one accommodates two half-size platforms or 4 racks		M1231-9999

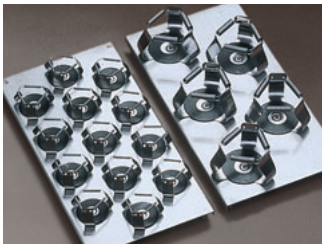
OPTIONAL ACCESSORIES



Plexiglas Gable Cover minimizes evaporation and speeds heat-up in applications up to 60ºC.



For high-temperature applications up to 100ºC, choose the stainless-steel Gable Cover.



Half-size platforms, with clamps already mounted, provide maximum capacity for shaking different sized flasks on a single water bath shaker. Requires a sub-platform. (See charts below and page 22 for other platform options.)

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Open Air Shakers: Innova® 2000, 2100 & 2300 Series

For shaking in ambient conditions: on the bench, in an incubator, or in a warm or cold room, Innova Open Air Shakers are the instruments of choice. Six ruggedly-constructed models provide reliable, continuous-duty shaking of test tubes and flasks to 6 liters.

- **Low Profile — less than 6" (15 cm) Tall** enables use of multiple shakers in an incubator or environmental chamber.
- **Space-Efficient, Four-Tier Racking System** is available to house up to eight Model 2300 shakers.

Options

- **Optional, Oversize Platforms and Stabilizer Kits Increase Benchtop Shaker Capacity by 45%.** For field conversion kit to upgrade your Model 2000 to a 2050, order catalog no. M1190-9910. Convert 2100 to a 2150: M1194-9926. Convert 2300 to a 2350: M1191-9905. Or select our factory-ready models 2050, 2150 and 2350 from the chart on page 19.
- **Temperature/Speed Monitoring Kit** with RTD sensor displays and records process values. Innova 2100 & 2300 Series only. Catalog No. M1190-9909.



Increase capacity quickly and easily with our oversized platforms and capacity upgrade kits. Model 2150 shown.



Left to right, Innova 2100, 2300 and 2000 Open Air Shakers.



Innova 5050 racking system saves valuable floor space by stacking up to four Model 2300 shakers on sturdy stainless-steel shelves. Shown with additional extension rack, Model 5051, for housing a total of eight shakers. Built-in electric outlet provides convenient power source for shakers, which are sold separately.

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& 5050 Racking System

Specifications *		Innova 2000/2050	Innova 2100/2150	Innova 2300/2350
Shaking	Range §	25 to 500 rpm with 3/4" (1.9 cm) orbit		25 to 500 rpm with 1" (2.54 cm) orbit 25 to 300 rpm with 2" (5.1 cm) orbit
	Control	± 1 rpm		
	Drive Mechanism	Triple-eccentric counter-balanced drive in cast iron housing with 9 permanently lubricated ball bearings. Driven by solid-state brushless DC motor		
	Timer	Digital LED electronic display in 1 rpm increments. Character height: 9/16" (1.4 cm)		
Timer		Programmable shaking periods from 0.1 hr. to 99.9 hrs. Triggers audible alarm and energizes status light at end of period. Can be deactivated for continuous operation		
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm from setpoint and when timer operation has expired. Audible alarm may be muted		
Setpoint Retention		All setpoints and operating status are retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)		
LED Display		Indicates speed in increments of 1 rpm, running time in 0.1 hrs., and alarm conditions. Character height: 9/16" (1.4 cm)		
Power	Service	120V 50/60 Hz; 220/230V 50/60 Hz; 240V 50/60Hz; 100V 50/60 Hz		
	Power	35 VA	80 VA	150 VA
Ambient Conditions		Temperature: 0 - 60°C. Humidity: 90% non-condensing		
Certifications		Meets CSA and CE standards		
Warranty		Comprehensive warranty – two years on labor, three years on parts		

Model No.	Platform Size **		Orbit	Overall Dimensions		Gross Weight	
	Inches	cm		Inches (W x D x H)	cm (W x D x H)	lbs.	kg.
Innova 2000	13 x 11	33 x 28	3/4"	14 x 14.5 x 5.75	35.5 x 37 x 14.6	33	15
Innova 2050	16 x 12	40.6 x 30.5	3/4"	17 x 14.5 x 5.75	43 x 37 x 14.6	43	19.1
Innova 2100	18 x 18	45.7 x 45.7	3/4"	19 x 21.9 x 6.4	48 x 55 x 16	120	54.4
Innova 2150	24 x 18	60.9 x 45.7	3/4"	24 x 23.3 x 6.4	60.1 x 59.1 x 16.2	125	57
Innova 2300	30 x 18	76.2 x 45.7	1" or 2"	30 x 22.3 x 6.4	76.2 x 45.7 x 16	45	66
Innova 2350	36 x 24	91.4 x 60.9	1" or 2"	36 x 24 x 6.4	91.4 x 61 x 16	150	68

* Specifications subject to change without notice. § Based on shaking a typical workload. Baffled flasks may significantly reduce maximum speed.

** Shaker platforms sold separately. See page 22.

Shaker Capacity for 2000, 2100 & 2300 Series & 5050/5051 Racking **

Flask Size	Innova 2000		Innova 2050		Innova 2100		Innova 2150		Innova 2300		Innova 2350		5050 Racking		With Added 5051 Rack	
	Flasks/Platform		Flasks/Platform		Flasks/Platform		Flasks/Platform		Flasks/Platform		Flasks/Platform		Flasks/Rack		Flasks/Rack	
	Ded.	Univ.	Ded.	Univ.	Ded.	Univ.	Ded.	Univ.	Ded.	Univ.	Ded.	Univ.	Ded.	Univ.	Ded.	Univ.
10 mL	60	60	86	86	N/A	109	N/A	N/A	N/A	183	N/A	N/A	N/A	732	N/A	1,464
25 mL	32	20	48	32	N/A	64	N/A	N/A	N/A	92	N/A	N/A	N/A	368	N/A	736
50 mL	20	15	35	32	64	45	80	63	108	92	N/A	N/A	432	368	864	736
125 mL	12	11	20	16	34	21	48	35	60	39	96	75	240	156	480	312
250 mL	8	6	12	10	25	18	35	24	40	30	70	50	160	120	320	240
500 mL	6	4	8	8	16	14	20	20	24	18	40	30	96	72	12	144
1 L	N/A	N/A	6	N/A	9	8	12	12	15	12	24	24	45	48	90	96
2 L	N/A	N/A	3	N/A	5	5	8	8	12	8	15	15	36	32	72	64
2.8 L	N/A	N/A	N/A	N/A	4	4	N/A	5	6	6	12	12	N/A	N/A	N/A	N/A
4 L	N/A	N/A	N/A	N/A	4	4	N/A	5	6	6	12	10	N/A	N/A	N/A	N/A
5 L	N/A	N/A	N/A	N/A	N/A	4	N/A	4	N/A	6	N/A	10	N/A	N/A	N/A	N/A
6 L	N/A	N/A	N/A	N/A	N/A	2	N/A	3	4	4	6	8	N/A	N/A	N/A	N/A

Electric	Ordering Information ** — Catalog No.							
	Innova 2000	Innova 2050	Innova 2100	Innova 2150	Innova 2300		Innova 2350	
	3/4" 1.9 cm orbit	3/4" 1.9 cm orbit	3/4" 1.9 cm orbit	3/4" 1.9 cm orbit	1" 2.54 cm orbit	2" 5.08 cm orbit	1" 2.54 cm orbit	2" 5.08 cm orbit
120V 50/60 Hz	M1190-0000	M1190-0010	M1194-0000	M1194-0010	M1191-0000	M1191-0020	M1191-0010	M1191-0030
100V 50/60 Hz	M1190-0001	M1190-0011	M1194-0001	M1194-0011	M1191-0001	M1191-0021	M1191-0011	M1191-0031
230V 50/60 Hz	M1190-0002	M1190-0012	M1194-0002	M1194-0012	M1191-0002	M1191-0022	M1191-0012	M1191-0032
240V 50/60 Hz	M1190-0003	M1190-0013	M1194-0003	M1194-0013	M1191-0003	M1191-0023	M1191-0013	M1191-0033

** Shaker platforms sold separately. See page 22.

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Space-Saving, Multi-Tier Open Air Shakers: Innova®

This industrial workhorse is designed to uniformly shake hundreds of samples, day-in and day-out, under the extreme conditions of an environmental room. Designed for minimum stress or vibration, even when fully loaded and running at the maximum speed of 350 rpm.

- **Agitation:** 25 - 350 rpm, precisely maintained ± 1 rpm even with line voltage fluctuations as high as ± 10%.
- **Orbit:** 2" (5.1 cm) diameter orbit, the most commonly used in screening studies.
- **Cantilevered Platforms Provide Unobstructed Access to All Flasks.** Platforms lock in place without tools.
- **Removable Control Module Can Be Panel Mounted or Positioned Remotely Outside the Chamber.** Fiber-optic link provides remote monitoring and control up to 32.8 ft. (10 m) away; eliminates electrical "noise" as well as the need for bulky electrical wires.
- **Precisely Balanced, Extremely Stable Shaker Mechanism on a Cast-Iron Base Need Not be Bolted to the Floor.**
- **Four Cushioned Idlers Mounted to the Corners of the Base Stabilize the Shaker and Ensure Uniform Motion** without undue strain or structure fatigue.
- **Designed with the Aid of Computer Stress Analysis Tests,** the structure has been built to withstand a lifetime of continuous shaking regardless of the workload.



Three-tiered Innova 5000 simultaneously agitates hundreds of samples on up to six accessory platforms. Accepts 10 mL to 4 L flasks on lower two tiers; and flasks up to 6 L on the top tier.

- **Cool-Running Brushless DC Motor** has no appreciable effect on chamber temperature, making it well-suited to environmental rooms; minimizes wear and maintenance.
- **Elimination of Commutators and Motor Brushes Minimize Wear and Maintenance.**

Options

- **Output Signal Can Be Provided for Recording Speed** on an external chart recorder.

Specifications *		Innova 5000
Shaking	Range §	25 to 350 rpm with 2" (5.1 cm) diameter circular orbit
	Control	± 1 rpm
	Drive Mechanism	Dynamically-balanced, ball-bearing drive with 4 idler shafts mounted on each corner in a cast-iron housing with 16 permanently lubricated ball bearings. Solid-state brushless D.C. motor. 3/8 hp
	Timer	Programmable shaking periods from 0.1 hr. to 99.9 hrs. Triggers audible alarm and energizes status light at end of period. Can be deactivated for continuous operation
Alarms	Audible & Visible	Indicate when speed deviates more than 5 rpm from setpoint and when timer operation has expired. Audible alarm may be muted
Safety		Acceleration circuit prevents sudden starts/stops, minimizing both splashing & mechanical damage. Vibration sensor limits speed of shaker when overloaded or unbalanced and shuts off shaker when excess vibration is detected
LED Display		Indicates speed in increments of 1 rpm, running time in 0.1 hrs., and alarm conditions. Character height: 9/16" (1.4 cm)
Setpoint Retention		All setpoints and operating status are retained by non-volatile memory. Automatic restart after power is restored (indicated by flashing display)
Power	Service	120V 50/60 Hz; 220V 50/60 Hz; 240V 50/60 Hz; 100V 50/60 Hz
	Power	3,010VA. Fuse protected via main line circuit breaker
Dimensions	Platform	32.5" x 26.75" (82.5 x 68 cm), each. Maximum capacity: 6 platforms per shaker
	Overall	62" Wide x 38" Deep x 53" High ◊ (157.5 x 96.5 x 135 cm)
Weight		2,000 lbs. (907 kg) Net 2,200 lbs (998 kg) Gross
Ambient Conditions		Temperature: 0 - 60°C. Humidity: 90% non-condensing
Certifications		Meets CE standards
Warranty		Comprehensive warranty – two years on labor, three years on parts

* Specifications subject to change without notice.
§ Based on shaking a typical workload. Baffled flasks may significantly reduce maximum speed.
◊ Allowances should be made for added height occupied by flasks on top tier and for motion of shaker in determining actual overall dimensions.
** Platforms sold separately. See page 22.

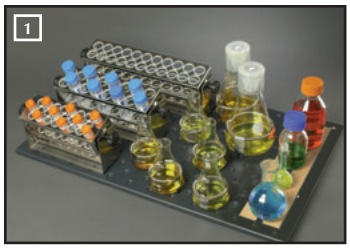
Shaker Capacity (Accepts up to 6 platforms per machine)				
Flask Size	Dedicated Platform	Max. Per Shaker	Universal Platform**	Max. Per Shaker
10 mL	300	1,800	264	1,584
25 mL	248	1,488	143	858
50 mL	161	966	143	858
125 mL	99	594	72	432
250 mL	64	384	42	252
500 mL	42	252	33	198
1 L	23	138	17	102
2 L ◊	14	70	12	72
2.8 L ◊	9	42	8	48
4 L †	9	16	8	16
5 L †	N/A	N/A	6	12
6 L †	8	16	6	12

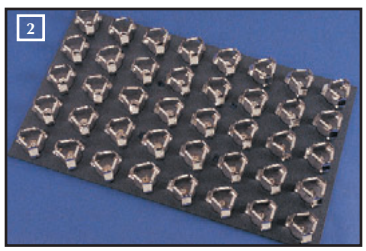
Ordering Information **		Catalog No.
Innova 5000 Shaker	120 V 50/60 Hz	M1196-0000
Innova 5000 Shaker	100 V 50/60 Hz	M1196-0001
Innova 5000 Shaker	220 V 50/60 Hz	M1196-0002
Innova 5000 Shaker	240 V 50/60 Hz	M1196-0003

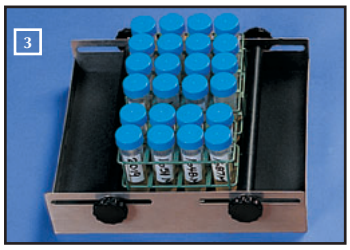
** Platforms ordered separately. See page 22.
◊ When used on bottom tier, can only use front half of platform.
† For use on top tier only. Maximum 16 flasks on top two tiers.

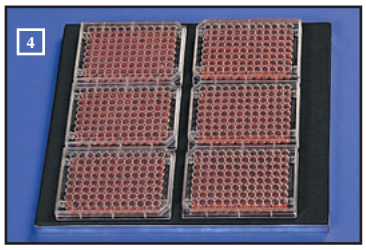
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Accessory Platforms









1. The Universal Platform provides the flexibility for using a mix of different size tubes or glassware on a single platform. It comes with numerous mounting holes to allow you to add and interchange clamps and racks at your discretion. Capacity listed throughout this catalog represents the maximum number of flasks that will fit on the shaker platform in a balanced pattern. When an assortment of clamps or test-tube racks are mounted on that platform, the capacity of a given size will be reduced. Flask clamps, 10 mL to 6 L, and test tube racks are sold separately — see page 23.

2. If using a single flask size only, our **Dedicated Platforms** provide maximum capacity, and come with clamps installed.

3. The Utility Carrier has two adjustable clamping bars to quickly secure a variety of glassware or tubes on the non-skid rubber mat.

4. The Utility Tray, designed for low-speed applications, allows for quick addition or removal of flasks, plates or tubes. A non-skid rubber mat is provided.

Ordering Information	Platform Catalog Number					
	Innova 3100	Inn. 40/40R & 4200/4230	Innova 43/43R ◊	Innova 44/44R	4900 Slide Out	4900 Lift Out
Universal Platform **	M1231-9930	M1250-9902	M1250-9920	M1282-9904††	M1197-9909	M1197-9923
Dedicated Platforms:						
50 mL Erlenmeyer Flask Platform	M1231-9933	M1194-9903	M1191-9908	N/A	N/A	N/A
125 mL Erlenmeyer Flask Platform	M1231-9934	M1194-9904	M1191-9909	M1282-9905	M1197-9904	M1197-9925
250 mL Erlenmeyer Flask Platform	M1231-9935	M1194-9905	M1191-9910	M1282-9906	M1197-9905	M1197-9926
500 mL Erlenmeyer Flask Platform	M1231-9936	M1194-9906	M1191-9911	M1282-9907	M1197-9906	M1197-9927
1 L Erlenmeyer Flask Platform	M1231-9937	M1194-9907	AG-1	M1282-9908	M1197-9907	M1197-9928
2 L Erlenmeyer Flask Platform	M1231-9938	M1194-9908	AG-2	M1282-9909	M1197-9908	M1197-9929
4 L Erlenmeyer Flask Platform	N/A	M1233-9930	AG-4	M1282-9911	M1197-9915	M1197-9931
6 L Erlenmeyer Flask Platform	N/A	N/A	AG-6	N/A	M1197-9916	M1197-9932
2.8 L Fernbach Flask Platform	N/A	M1233-9932	AG-28§	M1282-9910	M1197-9914	M1197-9930
Drip Pan for Universal Platform	N/A	M1250-9906	N/A	N/A	N/A	N/A
Utility Carrier	N/A	M1194-9909	N/A	N/A	N/A	N/A
Sticky Pad Platform **	N/A	M1250-9903	M1250-9904	M1282-9913	N/A	N/A
MicroPlate Platform	N/A	N/A	M1243-2500	N/A	M1197-2500 †	M1197-2500 †

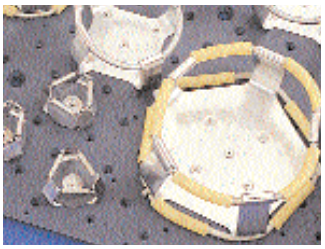
** Clamps and test tube racks for Universal Platform, and Sticky Pad for Sticky Pad Platform are each sold separately.
◊ A white reflective Universal Platform for photosynthetic work is available for Innova 43R only. Order PTL-391.
† Innova 43/43R & 4900 aluminum Microplate Platform bolt down by removing the sub-platform included with the shaker.

Ordering Information	Platform Catalog Number continued					
	Innova 2000	Innova 2050	Innova 2100	Innova 2150	Innova 2300	Innova 2350
Universal Platform **	M1001-0240	M1190-9900	M1250-9902	M1194-9912	M1250-9920	PTL-386
Dedicated Platforms:						
10 mL Erlenmeyer Flask Platform	AG2-10	M1190-9901	N/A	N/A	N/A	N/A
25 mL Erlenmeyer Flask Platform	M1190-9919	M1190-9902	N/A	N/A	N/A	N/A
50 mL Erlenmeyer Flask Platform	M1190-9915	M1190-9903	M1194-9903	M1194-9915	M1191-9908	N/A
125 mL Erlenmeyer Flask Platform	M1190-9916	M1190-9904	M1194-9904	M1194-9916	M1191-9909	M1191-9912
250 mL Erlenmeyer Flask Platform	M1190-9917	M1190-9905	M1194-9905	M1194-9917	M1191-9910	M1191-9913
500 mL Erlenmeyer Flask Platform	M1190-9918	M1190-9906	M1194-9906	M1194-9918	M1191-9911	M1191-9914
1 L Erlenmeyer Flask Platform	N/A	M1190-9911	M1194-9907	M1194-9919	AG-1	N/A
2 L Erlenmeyer Flask Platform	N/A	M1190-9912	M1194-9908	M1194-9920	AG-2	N/A
4 L Erlenmeyer Flask Platform	N/A	N/A	N/A	N/A	AG-4	N/A
6 L Erlenmeyer Flask Platform	N/A	N/A	N/A	N/A	AG-6	N/A
2.8 L Fernbach Flask Platform	N/A	N/A	N/A	N/A	AG-28	N/A
Drip Pan for Universal Platform	N/A	N/A	M1250-9906	N/A	M1250-9921	N/A
Utility Carrier	AG2-UT	M1190-9907	M1194-9909	M1194-9921	N/A	N/A
Utility Tray	AG2-00	M1190-9908	M1194-9910	M1194-9922	AG-00	AG-21-00
Sticky Pad Platform **	N/A	N/A	M1250-9903	N/A	M1250-9904	N/A

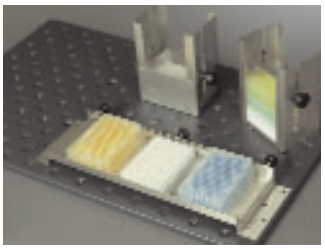
** Clamps and test tube racks for Universal Platform, and Sticky Pad for Sticky Pad Platform are each sold separately.

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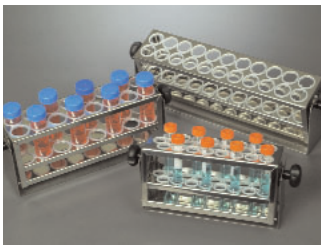
Clamps & Racks



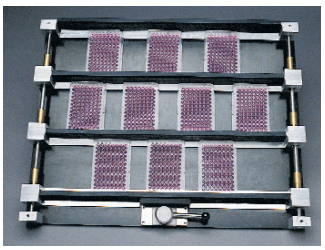
Flask Clamps are of a single piece stainless-steel construction (not spot welded or riveted) for added strength and safety. Clamps two Liters and larger come with an extra girdle for added security when agitating flasks at high speeds. Includes mounting screws.



Microplate Racks are available in two styles. The single layer style will hold five standard or deep well plates. The stacked plate style will hold up to nine standard or three deep well plates. Both holders are used with Universal Platforms.



NBS Test Tube Racks have an adjustable angle and tube height support. Made from stainless-steel with inserts to help retain tubes and prevent them from spinning in rack. Finger-tight knobs let you quickly adjust angle or release rack from base plate for easy transport to the bench.



Microplate Platforms hold dozens of microplates — no additional platform required. Available for Innova 43/43R and 4900 only.



Sticky Tape and Sticky Pad are an alternative to flask clamps for securing vessels to a shaker platform. Both are ideal for containers such as bottles and dishes that cannot be held with conventional flask clamps. They can be used at speeds up to 200 to 300 RPM depending on orbit diameter, flask size and load. Sticky Tape is supplied as a roll 23 m (75 feet) x 3.8 cm (1.5 inches) and can be used several times before losing its adhesive properties. Sticky Pad is 20 cm x 20 cm (8 inches square) and can be re-generated to like-new condition by washing with mild detergent and water. Neither can be used in water baths. For best performance, Sticky Pad should be used on an anodized aluminum substrate. NBS offers three such platforms in the most popular sizes and an Adapter Kit which can be used on most existing painted platforms.

A variety of other accessories, including mobile carts, dollies, spare parts kits and more are also available. Ask your NBS representative for details.

Clamps, Microplate Racks & Sticky Tape/Pad

Ordering Information			
Catalog No.	**Description**	**Catalog No.**	**Description**
ACE-10S	10 mL Erlenmeyer Clamp	TTR-210	Angled Tube Rack Holder for user-supplied test tube racks
M1190-9004	25 mL Erlenmeyer Clamp	TTR-215	Spacer Bar for TTR-210
M1190-9000	50 mL Erlenmeyer Clamp with spring retainer	M1289-0700	Microplate rack, stack 3 deep well or 9 standard plates
M1190-9001	125 mL Erlenmeyer Clamp with spring retainer	TTR-221	Microplate rack, for single layer of 5 plates
M1190-9002	250 mL Erlenmeyer Clamp with spring retainer	M1250-9600ø	Sticky Tape, 75' x 1.5" (23 m x 3.8 cm)
M1190-9003	500 mL Erlenmeyer Clamp with spring retainer	M1250-9700**	Sticky Pad, 8" x 8" (20 x 20 cm)
ACE-1000S	1 L Erlenmeyer Clamp with spring retainer	M1250-9504◊	Sticky Pad Adapter Kit
ACE-2000S	2 L Erlenmeyer Clamp with spring retainer	M1192-9000	Temperature Validation Kit. Battery-operated digital thermometer (calibrated to NIST standard) & flask
ACFE-2800S	2.8 L Fernbach Flask Clamp with spring retainer	S2116-3051P	Flat Phillips Head Screw, 10–24 x 5/16 , Pack of 25, for aluminum & phenolic platforms
ACE-4000S	4 L Erlenmeyer Clamp with spring retainer	S2116-3101P	Flat Phillips Head Screw, 10–24 x 5/8 , Pack of 25 , for model 2350 (plywood) platform only
ACE-6000S	6 L Erlenmeyer Clamp with spring retainer		
ACSB-500S	500 mL Media Bottle Clamp with spring retainer		
ACSB-1000S	1 L Media Bottle Clamp with spring retainer		

ø Replaces the need for clamps when shaking at speeds up to 250 rpm. Not for use with water bath shakers, or at speeds above 250 rpm.

** Sticky Pad should be used on an anodized aluminum substrate. Select from M1250-9504, M1250-9903, M1250-9904 or M1282-9913.

◊ Two anodized aluminum sheets each 6" x 18" (15.2 x 45.7 cm). Used with Sticky Pad on painted platforms.

Test Tube Racks

Large Racks			Medium Racks			Small Racks		
Catalog No.	**Tubes/Rack**	**Diameter**	**Catalog No.**	**Tubes/Rack**	**Diameter**	**Catalog No.**	**Tubes/Rack**	**Diameter**
M1289-0100	80	8 - 11 mm	**M1289-0010**	60	8 - 11 mm	**M1289-0001**	48	8 - 11 mm
M1289-0200	60	12 - 15 mm	**M1289-0020**	44	12 - 15 mm	**M1289-0002**	34	12 - 15 mm
M1289-0300	42	15 - 18 mm	**M1289-0030**	31	15 - 18 mm	**M1289-0003**	24	15 - 18 mm
M1289-0400	30	18 - 21 mm	**M1289-0040**	23	18 - 21 mm	**M1289-0004**	18	18 - 21 mm
M1289-0500	22	22 - 26 mm	**M1289-0050**	16	22 - 26 mm	**M1289-0005**	13	22 - 26 mm
M1289-0600	20	26 - 30 mm	**M1289-0060**	16	26 - 30 mm	**M1289-0006**	12	26 - 30 mm

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