
Benchtop Shaking Incubator

Instruction Manual

Catalog # 17002944
17002945
17002946
17002947



BIO-RAD

Bio-Rad Technical Support Department

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Warranty

The Benchtop Shaking Incubator and associated accessories are covered by a standard Bio-Rad warranty. Contact your local Bio-Rad Laboratories office for details of the warranty.

Safety Warnings



A **Warning!** symbol in this manual warns you about potential sources of injury or harm, including risk of electrical shock.



Warning! Do not attempt to repair or remove the outer case of the Benchtop Shaking Incubator or other accessories. If you open this instrument, you put yourself at risk for harm to body or equipment from electrical shock.

WEEE Disposal Requirements



The Benchtop Shaking Incubator contains electrical or electronic materials and is marked with the crossed-out wheeled bin. It should not be disposed of as unsorted waste and must be collected separately, according to European Union Directive 2012/19/EU on waste and electronic equipment — WEEE Directive.

Before disposal, contact your local Bio-Rad representative for country-specific instructions.

Ordering Information

Catalog#	Description
17002944EDU	Benchtop Shaking Incubator Starter Set
17002945EDU	Benchtop Shaking Incubator Expanded Set
17002946EDU	Benchtop Shaking Incubator Starter Set, 230 V EU/UK
17002947EDU	Benchtop Shaking Incubator Expanded Set, 230 V EU/UK
12005512EDU	Flask Clamp for Shaking Incubator, 1,000 ml
12005511EDU	Flask Clamp for Shaking Incubator, 500 ml
12005490EDU	Flask Clamp for Shaking Incubator, 250 ml
12005514EDU	Flask Clamp for Shaking Incubator, 125 ml
12005504EDU	Petri Dish Shelf for Shaking Incubator

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1 Introduction

The Benchtop Shaking Incubator is a combination shaker and temperature-controlled chamber instrument. This instrument is ideal for applications that require shaking agitation and controlled temperatures, such as microbial culture work in life science, microbiology, and medical laboratories. With its small footprint this Benchtop Shaking Incubator takes up minimal space and is suitable for laboratories that require its use both routinely and occasionally.

Key Features

- Up to 4 L media capacity in a small footprint
- Wide range of incubator chamber temperatures (5°C above room temperature to 70°C) and environmental temperatures (4 to 65°C), allowing instrument to be used in coldrooms
- Digital readout of all parameters — temperature, shaker speed, and time
- Temperature in instrument chamber precisely maintained to within 0.5°C of set temperature
- Lid interlock sensor that automatically stops the shaker when the lid is opened

Specifications

The Benchtop Shaking Incubator casing of is made of steel plate, varnished with a polyurethane lacquer. The temperature chamber lid is made of acrylic that is resistant to temperatures up to 90°C. Other specifications for the Benchtop Shaking Incubator are shown in Table 1.

Table 1. Benchtop Shaking Incubator Specifications.

Description	Specification
Power supply	230 V \pm 10%, 50/60 Hz; 115 V \pm 10%, 50/60 Hz
Heater power	700 W
Fan power	17 W
Shaking motor power	35 W
Fuse	2 x 5 A, 250 V; 2 x 10 A, 115 V
Environment temperature	4–65°C
Relative humidity	Up to 85%, noncondensing
Speed regulation	Digital, load independent, 20–300 RPM in 1 RPM increments
Shaking orbit	19 mm
Temperature operating range	5°C above room temperature to 70°C
Temperature sensor	PT100
Temperature accuracy	\pm 0.5°C
Temperature stability	\pm 0.5°C
Timer	1 min–99 hours, timer HOLD function
Capacity	16 x 125 ml, 9 x 250 ml, 5 x 500 ml, 4 x 1,000 ml
Dimensions W x D x H	370 x 530 x 400 mm
Weight	21 kg
Overvoltage category	Installation category I

General Safety Recommendations

- Read this instruction manual thoroughly before any installation. Improper installation and use may result in injury and/or damage to the instrument
- Disconnect the device from main power supply before cleaning. Failure to do so may result in damage to the instrument and/or injury, including electrocution
- Do not use the instrument near any water sources. Take care that water does not get into the instrument especially during cleaning. Failure to do so may result in damage to the instrument and/or injury, including electrocution
- Use the Benchtop Shaking Incubator only as described in this instruction manual. If the instrument is used in a manner not specified by the instruction manual, the safety features of the instrument may be compromised and the warranty will be void



Warning! Do not place flammable or explosive materials inside the Benchtop Shaking Incubator.

Startup Checklist

- Read instruction manual for Benchtop Shaking Incubator
- Unpack and install instrument, lid, and platform as specified in following sections
- Install Benchtop Shaking Incubator attachments (for example, flask clamps or petri dish shelf) to platform. See Section 7 for further instruction
- Close lid and turn instrument on
- Set parameters and test instrument before adding samples. Set new parameter values if necessary

2 Instrument Installation

Instrument Components

- Benchtop Shaking Incubator basic unit
- Benchtop Shaking Incubator lid
- Benchtop Shaking Incubator lid guides (2) and attachment knobs (2)
- Benchtop Shaking Incubator platform
- Spare screws for platform accessories
- Power cord(s)
- Instruction manual

Unpacking the Instrument

1. Unpack the Benchtop Shaking Incubator carefully. Open the box and lift the instrument, together with the foam shock absorbers, out of the box. Remove the shock absorbers and store all packaging materials for future use.
2. Examine the instrument carefully for any damage. Ensure that all parts of the instrument listed above are included with the product. If any item is missing or damaged, contact your local Bio-Rad office.
3. Check the information on the instrument label on the rear of the machine for the model type and serial number.
4. Check that the power cord has a prong configuration that is compatible with the local standard.

Instrument Placement

When selecting a location for the Benchtop Shaking Incubator, consider the following:

- The instrument should be placed on a smooth, stable, and horizontal surface
- This instrument is heavy, do not store or operate it at the edge of a surface
- The instrument must be in an upright position during operation
- Ensure that there is sufficient clearance along the back of the instrument for air circulation
- Ensure that there is sufficient clearance around and above the instrument to allow for easy access to the instrument and opening of the lid
- Avoid locations that are subject to temperature and humidity changes, such as areas that are under direct sunlight or near instruments that produce heat and/or steam
- Avoid locations that are subject to vibrations



Warning! Do not store or operate this instrument near a sink or water source as contact with water could cause electrical shock.



Warning! Do not use this instrument near flammable or explosive materials.

Note: Place the instrument so that the power cord is readily accessible and can be pulled out of the electrical outlet easily.

Connecting Power

1. Plug the supplied power cord into the back of the instrument.
2. Plug the power cord into the appropriate grounded electrical outlet.



Warning! Do not store or operate this instrument near a sink or water source as contact with water could cause electrical shock.



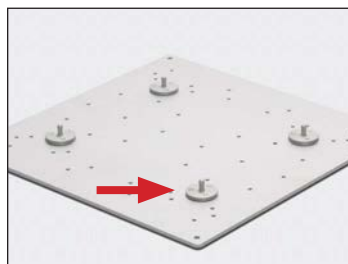
Warning! The outlet voltage must match the voltage listed on the instrument label. Failure to supply appropriate power may damage the instrument and void the warranty.

Installing the Platform

1. Locate the bag of screws included with the Benchtop Shaking Incubator. These are spare screws for use with the flask clamp accessories. Keep them in a safe place if not using immediately.
2. Mount the Benchtop Shaking Incubator platform to the four rubber mounting points of the Benchtop Shaking Incubator.



Warning! Improper installation of the Benchtop Shaking Incubator platform can result in injury and damage to the instrument.



Installing Accessories

Flask clamps

1. Each plastic flask clamp comes with a small bag of screws and washers. Additionally, a bag of spare screws is provided with the Benchtop Shaking Incubator. These can be used to attach accessories such as flask clamps onto the platform.
2. You will need a crosshead (Phillips-type) screwdriver. To secure a plastic clamp for a 1,000, 500, or 250 ml flask, use two of the three holes available at each position and screw the clamp tightly to the platform. Only one hole is necessary for securing the clamp for a 125 ml flask. See section 7 on Attachment Positions for suggestions on placement of plastic flask clamps.



Petri dish shelf

1. Arrange the petri dish shelf so that the edges of the shelf face upward, creating a barrier to prevent plates or dishes from sliding off.
2. The petri dish shelf has two metal extensions that fit into the back wall of the Benchtop Shaking Incubator. Open the lid of the Benchtop Shaking Incubator and install the petri dish shelf. The shelf should now be parallel to the surface upon which the instrument is placed.



Note that when using the petri dish shelf and shaker function simultaneously, 1,000 and 500 ml flasks can be used in the front positions but only 250 and 125 ml flasks can be positioned in the middle and rear positions of the shaking incubator platform.



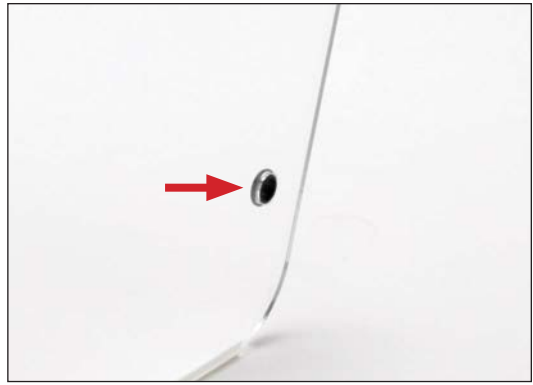
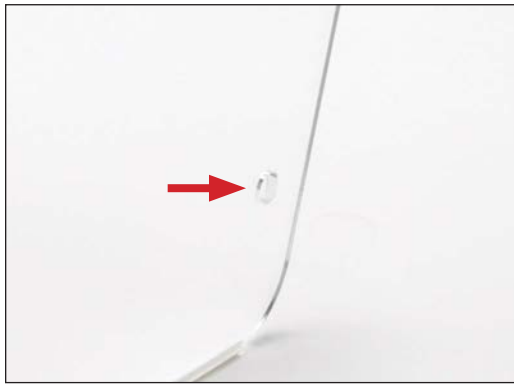
Warning! Improper installation of the Benchtop Shaking Incubator accessories can result in injury and damage to the instrument.

Attaching Lid

1. Locate the supplied lid guides and knobs (two of each) for the Benchtop Shaking Incubator lid.



2. Insert the lid guide into the holes on the lid. Be sure to insert the lid guide from the inside out so the flange lies flush to the holes on the inside of the lid.



3. Line up the the hole of the lid and lid guide with the housing on the Benchtop Shaking Incubator and tighten the knobs into the housing from the outside in.



4. Make sure the knobs are tight enough to secure the lid but not so tight as to strip the threads of the housing.



Warning! Improper installation of the Benchtop Shaking Incubator lid can result in injury and damage to the instrument.

3 Operating the Benchtop Shaking Incubator

Introduction

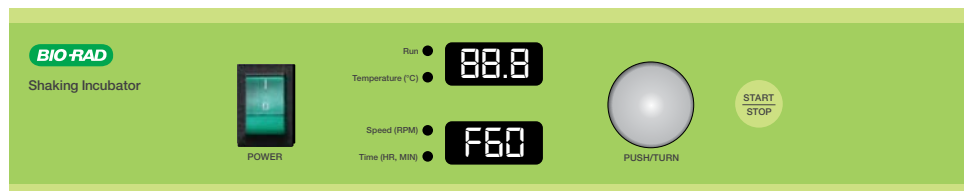


1. **POWER (I/O) switch** — illuminates when set to ON (I) position.
2. **Run signal light** — illuminates green when the shaking incubator is running a program.
3. **Temperature indicator light** — flashes yellow when the incubator temperature is being set.
4. **Speed indicator light** — illuminates yellow when the shaker speed is selected for display and flashes when shaker speed is being set.
5. **Time indicator light** — illuminates yellow when the shaking incubator timer is selected for display and flashes when time is being set.
6. **Setting dial (PUSH/TURN)** — enables user to set temperature, speed, and time. Push and hold the setting dial to enter the set mode (flashing indicator lights), then toggle between temperature, speed, and time settings by pressing the dial. Rotate clockwise or counterclockwise to change temperature, speed, and time. To exit set mode, press Start/Stop or wait 8 seconds until the indicator light stops flashing.
7. **START/STOP button** — starts and stops shaking incubator operations.
8. **Temperature display** — indicates temperature setting in °C.
9. **Speed/Time display** — indicates speed in RPM and time setting in hours and minutes.

Basic Operations

Turn power on/off

1. Press **POWER switch** to the ON (I) position. Shaking incubator automatically detects power supply frequency and displays F50 or F60 on the lower display, depending on the power cord used. The shaking incubator then recalls the last saved parameters.



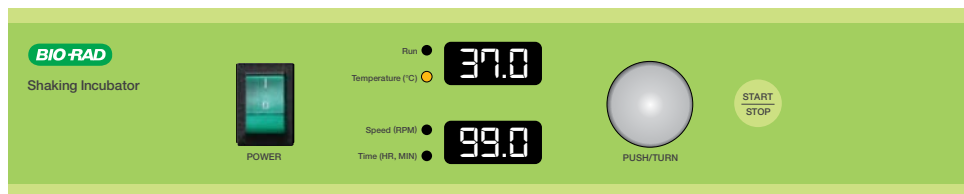
Set temperature

1. Press the setting dial until the **Temperature** indicator light flashes.
2. Rotate the setting dial clockwise to increase or counterclockwise to decrease temperature to desired setting. The temperature is displayed in Celsius with a minimum of 0.0°C and maximum of 70.0°C.



Warning! When operating at temperatures above 60°C, do not touch the platform; it can be very hot and result in bodily injury, including burns.

3. Press **Start/Stop** to accept the temperature setting and exit the setting mode, or wait 8 seconds. The **Temperature** indicator light will stop flashing.



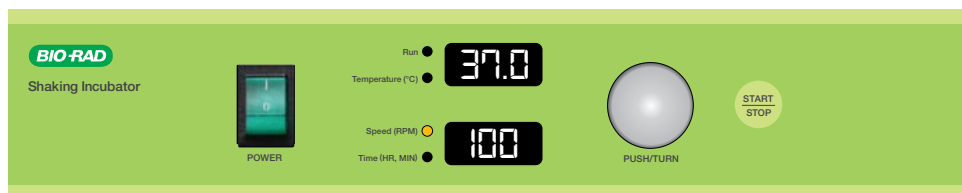
Set shaking without heat

1. To use the shaking platform function without temperature regulation, set the temperature to OFF on the display. Do this by setting the temperature below 0.0°C or above 70.0°C.

Set shaking speed

1. Press and hold setting dial until the **Temperature** indicator light flashes. Press the setting dial to toggle through setting options until the **Speed** indicator light flashes.
2. Rotate the setting dial clockwise to increase or counterclockwise to decrease shaker speed to desired setting. The shaker speed is displayed in RPM with a minimum of 20 RPM and a maximum of 300 RPM.

3. Press **Start/Stop** to accept the shaker speed setting and exit set mode, or wait 8 seconds. The **Speed** indicator light will stop flashing.

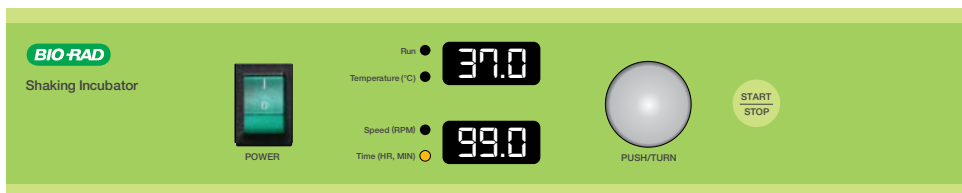


Heat without shaking

1. To use the incubator without shaking, set the speed to **OFF** on the display. Do this by setting the shaker speed under 20 RPM or above 300 RPM.

Set the timer

1. Press and hold the setting dial until the **Temperature** light indicator flashes. Press the setting dial to toggle through setting options until the **Time** indicator light flashes.
2. Rotate the setting dial clockwise to increase or counterclockwise to decrease time to desired setting. The time setting displays in hours and minutes (hours.minutes) with a minimum of 1 minute and a maximum of 99 hours. For example, a timer display of 70.3 is 70 hours and 30 minutes and a timer display of 1.55 is 1 hour and 55 minutes.
3. Press **Start/Stop** to accept the timer setting and exit setting mode, or wait 8 seconds. The **Time** indicator light will stop flashing.



Continual use without timer

1. To use the shaking incubator continuously with no end time, set the time to **HLd** on the display. Do this by setting the timer to less than 1 minute (0.01) or more than 99 hours (99.0).

Start operation

1. Press **Start/Stop** once to exit the setting mode. You are now in operation mode. The only signal light illuminated will be that of the last changed parameter.
2. Press **Start/Stop** to start the shaking incubator program. The **Run** indicator light will illuminate. The shaking incubator timer will count down from the set time.
3. View the timer and shaker speed values by pressing the setting dial. These two values are shown alternately on the bottom display (**Speed/Time**).

End operation

1. When the set time elapses or **Start/Stop** is pressed, an **End** message appears on the display and the **Run** indicator light turns off.
2. When the shaking incubator completely stops, it defaults to the last used values for temperature, speed, and time parameters.

Opening lid during operation

1. Lifting the lid during operation will engage the auto shut-off function.
2. When the lid is lifted during operation, the shaking incubator will immediately stop heating and the platform will slow to a stop. The temperature display will read **Opn** and the **Speed/Time** display will read **Lid**. When the lid is closed again, the shaking incubator resumes operation.
3. If there is loss of power during operation, the shaking incubator will restart and resume function automatically when power returns. The display will flash to indicate that there was a disruption in power. The flashing can be turned off by pressing the setting dial.

Changing Parameters during Operation

Note: The time parameter cannot be changed during operation.

Change temperature parameter during operation

1. To change the temperature during operation, press and hold the setting dial until the **Temperature** indicator light flashes.
2. Rotate the setting dial clockwise to increase or counterclockwise to decrease temperature to desired setting.
3. Press **Start/Stop** once to accept the new temperature setting. The shaking incubator will resume operation at the new setting.

Change shaking speed parameter during operation

1. To change the shaking speed during operation, press and hold the setting dial until the **Temperature** indicator light flashes. Press the setting dial to toggle through setting options until the **Speed** indicator light flashes.
2. Rotate the setting dial clockwise to increase or counterclockwise to decrease shaking speed to desired setting.
3. Press **Start/Stop** once to accept the new shaking speed setting. The shaking incubator will resume operation at the new setting.

4 Troubleshooting

Measuring Temperature

Use a reliable external thermometer to verify that the internal temperature of the unit has reached the set temperature. The external thermometer can be placed anywhere that is stable and will not obstruct the platform during shaking.

The unit's temperature sensor is located in the back wall at the upper right of the chamber. Placing the external thermometer near, but not touching, this temperature sensor will best represent the unit's temperature readout. The thermometer could also be placed on the surface beneath the shaking platform, representing the lower portion of the internal area of the unit.

Error Display

The Benchtop Shaking Incubator automatically monitors the instrument's function to ensure safe and reliable operation. If an error message appears, stop operation and call Bio-Rad Laboratories Technical Support.

Sample of error display:



Description of Errors

- E11:** An error in the motor regulation (PWM regulator, pulse generator, motor) has been detected. Shaking incubator will automatically stop.
- E12:** The motor did not reach set speed in 30 seconds. Shaking incubator will automatically stop.
- E13:** The set speed oscillated by more than 100 RPM in 2 seconds. Shaking incubator will automatically stop.
- E21:** The heater temperature sensor has malfunctioned. Shaking incubator will automatically stop.
- E22:** The temperature sensor measures 5°C warmer than the temperature set point. Shaking incubator will automatically stop.
- E23:** Set temperature was not reached in 2 hours. Shaking incubator will automatically stop.

5 Temperature Calibration

The Benchtop Shaking Incubator has a temperature readjustment function that can be used to calibrate the chamber temperature in the event that the displayed temperature no longer matches the sample temperature. Please note that proper temperature readjustment will require a calibrated digital thermometer with precision to at least 0.1°C.

Procedure for Temperature Calibration

1. Set the Benchtop Shaking Incubator to the desired calibration temperature and a speed of 0 RPM, and then press **Start/Stop** to begin heating.
2. Place a liquid sample in the middle of the incubator platform. Allow at least 2 hours for the unit and the sample to reach the set temperature.
3. After at least 2 hours, take a temperature measurement of the liquid sample with the calibrated digital thermometer. The difference between the thermometer reading and the temperature displayed on the Benchtop Shaking Incubator will be the calibration value.

Example 1. If the temperature on the thermometer is 37.9°C and the temperature on the shaking incubator display is 37°C, the calibration value is 0.9 ($37.9 - 37 = 0.9$).

Example 2. If the temperature on the thermometer is 36.2°C and the temperature on the shaking incubator display is 37°C, the calibration value is -0.8 ($36.2 - 37 = -0.8$).

4. Press **Start/Stop** to end the run. Press and hold the setting dial for more than 5 seconds. The temperature indicator light will flash, the top display will show **0.0**, and the lower display will show **COr**.
5. Set the calibration value by rotating the setting dial clockwise or counterclockwise. Pay attention to the sign of the calibration value (plus or minus).
6. Press **Start/Stop** to finish the temperature calibration

6 Maintenance and Cleaning Instructions

Cleaning the Incubation Chamber

The floor of the incubation chamber (painted steel) should be maintained regularly. Any spills inside the chamber should be cleaned immediately. Use only mild cleaning solutions with neutral pH. Using strong or abrasive cleaners will damage the instrument.

The stainless steel platform can be removed, cleaned, and decontaminated by autoclaving at 120°C.

Cleaning the Acrylic Lid

Acrylic is easily scratched. To clean, use gentle nonabrasive liquid detergent and a soft cloth. For best results, use 2% aqueous solution of gentle liquid cleaners such as dish detergent. Wipe the lid surface with a damp soft cloth. Dust and dirt can be removed with a dry soft cloth.

Cleaning don'ts

- Do not use cleaners that could damage the lid surface
- Do not use acetone, benzene, paint thinner, carbon tetrachloride, or other corrosive liquids because they can damage the acrylic lid
- Do not use detergents containing ketones, esters, or aromatics
- Do not use cleaners with solid and abrasive particles
- Do not use polishes
- Do not use hard sponges
- Do not use detergents with high levels of alcohol



Warning! When operating at temperatures above 60°C, allow the unit to cool down prior to cleaning the instrument. At these high temperatures, do not touch the platform; it can be very hot and result in bodily injury, including burns.

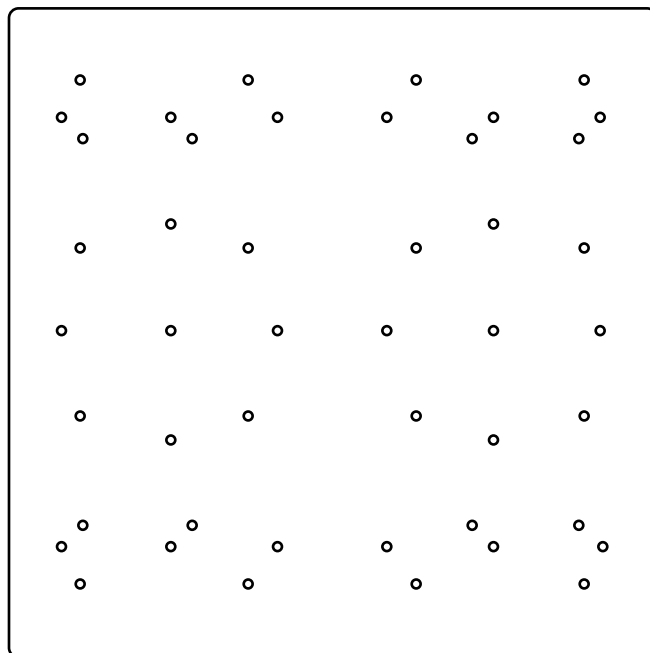


Warning! Unplug power cord before cleaning the Benchtop Shaking Incubator. Failure to do so may result in damage to the instrument and personal injury, including electrocution.

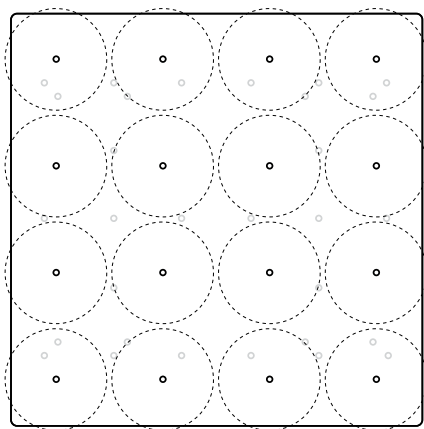
7 Attachment Positioning on Shaking Platform

Various configurations of attachments can be mounted on the shaking platform. Use the following diagrams as guidelines for positioning different flask clamps and accessories.

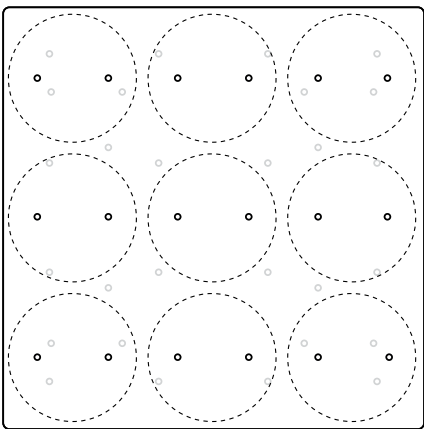
Shaking platform with threaded holes shown:



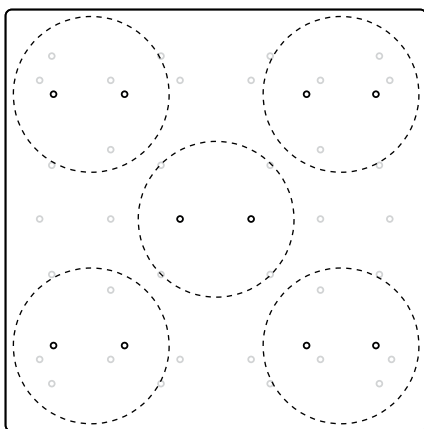
125 ml attachment guide:



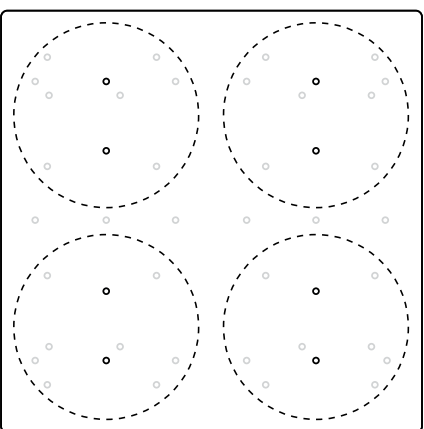
250 ml attachment guide:



500 ml attachment guide:



1,000 ml attachment guide:





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