

# Bead Ruptor 4 User Manual



Patent Pending



**OMNI**  
INTERNATIONAL

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# TABLE OF CONTENTS

<b>WARRANTY INFORMATION</b> .....	3
<b>SECTION 1 IMPORTANT SAFEGUARDS</b> .....	4
<b>SECTION 2 UNPACKING THE BEAD RUPTOR 4</b> .....	5-8
2.1 Unpacking The Bead Ruptor 4.....	5
2.2 Unit Overview.....	7
2.3 Components .....	8
2.4 Additional Accessories .....	8
<b>SECTION 3 BEAD RUPTOR SAMPLE TUBES</b> .....	9-14
3.1 Tubes & Tube Carriage .....	9
3.2 Ordering Information.....	10-12
3.3 Important Sample Tube Information .....	13
<b>SECTION 4 SET-UP &amp; OPERATION</b> .....	14-17
4.1 Loading Sample Tubes .....	14-15
4.2 Keypad Layout.....	16
4.3 Start Up of the Equipment.....	16
4.4 Speed Setting .....	16
<b>SECTION 5 PROGRAMMING</b> .....	17
5.1 Programming.....	17
<b>SECTION 6 MAINTENANCE</b> .....	18
6.1 Cleaning The Bead Ruptor 4.....	18
<b>SECTION 7 TROUBLESHOOTING</b> .....	19-21
7.1 Error Messages .....	19
7.2 Troubleshooting .....	19
7.3 Changing the Tube Holder.....	20
7.4 Changing the neck gasket.....	21
<b>SECTION 8 TRANSPORT, STORAGE &amp; SERVICE</b> .....	22-23
8.1 Transporting The Bead Ruptor 4.....	22
8.2 Storage .....	23
8.3 Service.....	23
8.4 Decontamination Requirement.....	23

## WARRANTY INFORMATION

This manual is a guide for the use of the Bead Ruptor 4 Bead Mill Homogenizing System and accessories.

Data herein has been verified and validated. It is believed adequate for the intended use of the instrument. If the instrument or procedures are used for purposes over and above the capabilities specified herein, confirmation of the validity and suitability should be obtained, otherwise Omni International does not guarantee results and assumes no obligation or liability. This publication is not a license to operate under, or a recommendation to infringe upon, any process patents.

Notes, cautions, and warnings within the text of this manual are used to emphasize important and critical instructions.

This Omni International product is warranted to be free from defects in material and workmanship for a period of ONE YEAR from the date of delivery. Omni International will repair or replace and return free of charge any part which is returned to its factory within said period, transportation prepaid by user, and which is found upon inspection to have been defective in materials or workmanship. For the first 90 days, both parts and service are without charge. For the balance of the period, parts will be provided but service will be charged at established labor rates. This warranty does not include normal wear from use; it does not apply to any instrument or parts which have been altered by anyone other than an employee of Omni International nor to any instrument which has been damaged through accident, negligence, failure to follow operating instructions, the use of electric currents or circuits other than those specified on the plate affixed to the instrument, misuse, or abuse. Omni International reserves the right to change, alter, modify, or improve any of its instruments without any obligation whatever to make corresponding changes to any instrument previously sold or shipped.

THE FORGOING OBLIGATION IS IN LIEU OF ALL OBLIGATIONS AND LIABILITIES INCLUDING NEGLIGENCE AND ALL WARRANTIES OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE OUR ENTIRE AND EXCLUSIVE LIABILITY AND BUYERS EXCLUSIVE REMEDY FOR ANY CLAIM OF DAMAGES IN CONNECTION WITH THE SALE OR FURNISHING OF GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION, OR OPERATION. OMNI INTERNATIONAL WILL IN NO EVENT BE LIABLE FOR ANY SPECIAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND THEIR LIABILITY UNDER NO CIRCUMSTANCES WILL EXCEED THE CONTRACT PRICE FOR THE GOODS FOR WHICH LIABILITY IS CLAIMED.

## SECTION 1 — IMPORTANT SAFEGUARDS

### READ ALL INSTRUCTIONS BEFORE USING

### SAVE THIS USER MANUAL

The Bead Ruptor 4 has been engineered for maximum functionality as well as safety; however, basic safety precautions and common sense must always be demonstrated when using any electrical product. Do not attempt to modify any part of the Bead Ruptor 4. If you experience problems with or have questions about your Bead Ruptor 4, contact your authorized dealer or call Omni at 1-800-776-4431 or 770-421-0058.

#### WARNING!

- **DO NOT** allow the machine to be submerged in any liquid.
- **DO NOT** use in any setting other than an indoor laboratory.
- **DO NOT** plug power cord into an incorrect outlet.
- Keep this product away from heated surfaces.

#### To reduce the risk of burns, electrocution, fire, or injury:

- Use this product only for its intended purpose as described in this booklet. Do not use attachments not recommended by the manufacturer.
- **DO NOT** operate the product if it is damaged in any way.

#### RISK OF ELECTRIC SHOCK:

Although this equipment is fully insulated and grounded, it is important for all users to be aware of the potential hazard of using liquids close to a power supply. If any liquids are spilled, immediately disconnect the instrument from the main power supply (remove the power cord from the AC power input on the rear panel) and clean the equipment and the surrounding area. DO NOT reconnect the equipment until it has been fully inspected.

## SECTION 2 — UNPACKING THE BEAD RUPTOR 4

### 2.1 UNPACKING THE Bead Ruptor 4

**CAUTION:** DO NOT lift the Bead Ruptor 4 by holding the lid. It must be lifted by gripping the sides of the unit and holding it from the bottom.

1. Remove the unit from the packaging and set it on its side.
2. Remove the 2 thumbscrews from the bottom as shown in figure **1**. Place these screws in a safe location, **DO NOT DISCARD**. They will be needed if the Bead Ruptor needs to be shipped.
3. Place the Bead Ruptor on a clean, horizontal and stable surface.



**PLEASE NOTE:** Do not discard the box & packaging foam. This packaging must be used in the event the Omni Bead Ruptor 4 needs to be returned to Omni for any reason.

**SHIPPING THE BEAD RUPTOR 4 IN ANY OTHER PACKAGING WILL VOID ALL WARRANTIES.**

## SECTION 2 — UNPACKING THE BEAD RUPTOR 4

**CAUTION: DO NOT** connect the unit to the main power supply until installation is complete and the correct voltage is selected.

Plug the Bead Ruptor 4 into the power supply using the supplied power cord.

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This instrument is equipped with an electric cord which is grounded to the chassis housing. The plug must be plugged in to an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

**WARNING: DO NOT** modify the plug or cord that is provided. Damaged or worn power cords should be repaired or replaced immediately by a qualified electrician.

- **DO NOT** operate the unit when the housing is removed; potentially lethal voltage exists within the instrument.
- **DO NOT** operate the unit with the safety ground disconnected.

**CAUTION:** Use only accessories and consumables recommended by the manufacturer. Accuracy and operating lifetime may be affected if alternative products are used. Any damages caused by non-recommended parts are not covered by the manufacturer's warranties.

## SECTION 2 — UNPACKING THE BEAD RUPTOR 4

### 2.2 UNIT OVERVIEW



120V/220V  
Switch & Fuse

ON/Off Switch

AC Power  
Input



## SECTION 2 — UNPACKING THE BEAD RUPTOR 4

### 2.3 COMPONENTS

Prior to operation, please remove all parts from the shipping container and inspect for damaged or missing parts. If any parts are found to be damaged or missing, please contact Omni International at 800.776.4431.

DESCRIPTION	QUANTITY	P/N
Bead Ruptor 4 Assembly	1	25-100-00
Power Cable	1	LT710 (115V) or LT712 (220V)
Spare Fuse	1	00-193
7 mL Tube Holder Assembly	1	25-122-00
2 mL Tube Holder Assembly	1	25-123-00
Instruction Manual	1	03-225-01

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**PLEASE NOTE:** 2ml Tube Holder Assembly comes installed on the unit.

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## SECTION 3 — BEAD RUPTOR SAMPLE TUBES

### 3.1 TUBES & TUBE CARRIAGES

#### 4 x 1.5 mL microtubes

##### 1.5 mL Tube Volume and Tissue Size:

Minimum: 20  $\mu$ L, 1 mg

Maximum: 1 mL, 1 g

#### 4 x 2 mL or 0.5 mL screw cap tubes (included with BR 12)

##### 2 mL Tube Volume and Tissue Size:

Minimum: 300  $\mu$ L, 1 mg

Maximum: 1.8 mL, 1 g

#### 1 x 7 mL screw cap tubes (included with BR 12)

##### 7 mL Tube Volume and Tissue Size:

Minimum: 1 mL, 1 g

Maximum: 5 mL, 4 g

View a selection of Bead Ruptor specific applications visit [www.omni-inc.com](http://www.omni-inc.com)

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**CAUTION:** Use only Omni sample tubes. Accuracy and operating lifetime may be affected if alternate tubes are used.

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## SECTION 3 — BEAD RUPTOR SAMPLE TUBES

### 3.2 ORDERING INFORMATION

#### 1.5 mL PRE-FILLED BEAD MILL MICROTUBES

BEAD MEDIA	TUBE SIZE	BEAD SIZE	DESCRIPTION	QUANTITY	DNase/RNase FREE PART#
Metal	1.5 mL	2.38 mm	Hard Tissue Grinding Bead Mix	50	19-610
Glass	1.5 mL	0.5 mm	Tough Micro-organism Lysing Mix	50	19-612
Ceramic	1.5 mL	1.4 mm	Soft Tissue Homogenizing Mix	50	19-617
	1.5 mL	2.8 mm	Hard Tissue Homogenizing Mix	50	19-618

#### Bulk Sample Microtubes (No Beads)

*Empty 1.5 mL microtubes. Beads are not included.*

TUBE SIZE	DESCRIPTION	QUANTITY	ORDER NUMBER
1.5 mL	Polypropylene microtube; RNase, DNase free	500	19-661
1.5 mL	Polypropylene microtube; RNase, DNase free	1000	19-661-1000

*It is Strongly recommended that only Omni Tubes be used with the Bead Ruptor 4. Other tubes might not be capable of withstanding the forces generated by the Bead Ruptor 4.*

## SECTION 3 — BEAD RUPTOR SAMPLE TUBES

### 3.2 ORDERING INFORMATION

#### 2 mL & 0.5 mL SCREW CAP PRE-FILLED BEAD MILL SAMPLE TUBES

BEAD MEDIA	TUBE SIZE	BEAD SIZE	DESCRIPTION	QUANTITY	DNase/RNase FREE PART#
Glass	2 mL	0.1 mm	Micro-Organism Lysing Mix	50	19-621
	2 mL	0.5 mm	Tough Micro-Organism Lysing Mix	50	19-622
Garnet	0.5 mL	0.15 mm	Small Volume Micro-Organism Lysing Mix	50	19-623
	2 mL	0.7 mm	Hard & Fibrous Tissue Homogenizing Mix	50	19-624
Carbide	0.5 mL	0.25 mm	RNA Extractions, Micro-Organism & Soil Homogenizing Mix	50	19-625
Ceramic	2 mL	1.4 mm	Soft Tissue Homogenizing Mix	50	19-627
	2 mL	2.8 mm	Hard Tissue Homogenizing Mix	50	19-628
Metal	2 mL	2.38 mm	Hard Tissue Grinding Mix	50	19-620

#### Bulk 2 mL & 0.5 mL Screw Cap Sample Tubes (No Beads)

*Empty sample tubes with caps and O-Rings. Beads are not included.*

TUBE SIZE	DESCRIPTION	QUANTITY	ORDER NUMBER
2 mL	Nonreinforced Polypropylene screw cap tube with caps. RNase & DNase free.	500	19-647
2 mL	Reinforced polypropylene screw cap tube with caps. RNase & DNase free.	500	19-648
2 mL	Reinforced polypropylene screw cap tube with caps. RNase & DNase free.	1000	19-649
0.5 mL	Nonreinforced Polypropylene screw cap tube with caps. RNase & DNase free.	500	19-650

*It is Strongly recommended that only Omni Tubes be used with the Bead Ruptor 4. Other tubes might not be capable of withstanding the forces generated by the Bead Ruptor 4.*

## SECTION 3 — BEAD RUPTOR SAMPLE TUBES

### 3.2 ORDERING INFORMATION

#### 7 ML PRE-FILLED BEAD MILL SAMPLE TUBES

BEAD MEDIA	TUBE SIZE	BEAD SIZE	DESCRIPTION	QUANTITY	ORDER NUMBER
Metal	7 mL	2.38 mm	Hard Tissue Grinding Mix	50	19-670
Ceramic	7 mL	1.4 mm	Soft Tissue Homogenizing Bead Mix	50	19-677
	7 mL	2.8 mm	Hard Tissue Homogenizing Bead Mix	50	19-678

*It is strongly recommended that Omni 7 mL Tubes be used in conjunction with the Bead Ruptor 4. Our tests have shown that Omni Tubes are the only tubes available that are capable of withstanding the forces generated by the Bead Ruptor.*

#### 7 ML BEAD MILL TUBES AND BULK BEAD MEDIA *(These tubes are not pre-filled with beads)*

BEAD MEDIA	TUBE SIZE	BEAD SIZE	BEAD QUANTITY	DESCRIPTION	QUANTITY	ORDER NUMBER
Glass	7 mL	0.1 mm	400 g	Empty Sample Tubes with Bulk Micro-Organism Lysing Bead Mix	50	19-654
	7 mL	0.5 mm	400 g	Empty Sample Tubes with Bulk Tough Micro-Organism Lysing Bead Mix	50	19-656
Ceramic	7 mL	1.4 mm	325 g	Empty Sample Tubes with Bulk Soft Tissue Homogenizing Bead Mix	50	19-652
	7 mL	2.8 mm	325 g	Empty Sample Tubes with Bulk Hard Tissue Homogenizing Bead Mix	50	19-653
Metal	7 mL	2.38 mm	500 g	Empty Sample Tubes with Bulk Hard Tissue Grinding Bead Mix	50	19-655
None	7 mL	-		Empty Sample Tubes	1,000	19-651

*7 mL Bead Tubes are not certified RNase/DNase Free*

### 3.3 IMPORTANT SAMPLE TUBE INFORMATION

Dry, fresh or frozen samples can be homogenized with or without buffer using the Bead Ruptor 4 and Bead Ruptor sample tubes.

**In the event of tube leakage or tube breakage, Omni recommends the following solutions:**

- Use the Tubes as single-use or disposable
- Do not submerge the tubes in liquid nitrogen
- Add more buffer to decrease the force applied by the beads to the tube walls
- Ensure tube caps are tightened completely
- If using bulk beads and tubes, add the recommended amount of beads to the tube

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## SECTION 4 — BEAD RUPTOR OPERATION

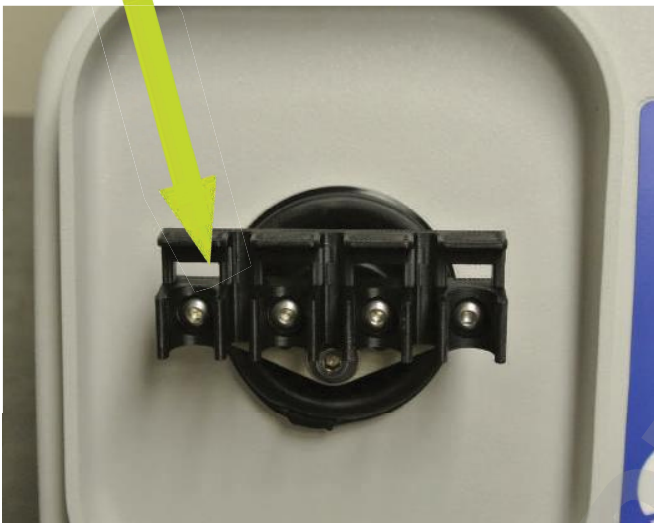
### 4.1 LOADING SAMPLE TUBES

Users can simultaneously homogenize 1 to 4 samples per run. The user may load tubes in any position for processing.

#### IDENTIFICATION OF PARTS:

**NOTE:** 1.5ml & 2ml tubes use the same Tube Holder.

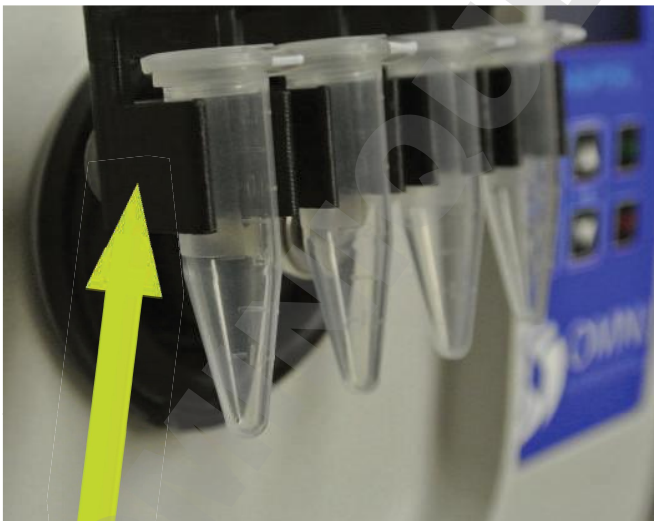
2 mL Tube Holder



2 mL Tubes



1. Place Bead Ruptor Tubes into the Tube Holders.
2. Close the lid.
3. Ensure tubes are fully seated



1.5 mL Tube Holder



1.5 mL Tubes

**CAUTION:** The drive shaft can become hot during operation. Use caution when removing tubes from the Tube Carriage / Tube Holders.

## SECTION 4 — BEAD RUPTOR OPERATION

### 4.1 LOADING SAMPLE TUBES (cont.)

#### LOADING THE 7 mL ADAPTOR.



7 mL Tubes

## SECTION 4 — BEAD RUPTOR OPERATION

### 4.2 KEYPAD LAYOUT

The keypad of the Bead Ruptor 4 (see diagram at right) consists of an LCD screen, 4 arrow buttons, and a “START” and “STOP” button.

The user can adjust two different homogenization settings with this interface. The UP arrow and DOWN arrow buttons are used to adjust the speed and time parameters.



### 4.3 START UP OF THE EQUIPMENT

Turn the Bead Ruptor 4 on by pressing the ON/OFF switch located on the rear panel near the AC power input.

A Menu displays the programming mode. Programming mode displays the last program run before power was removed. Example:

```
SPEED : 5
TIME : 300s
```

• Speed denotes energy imparted to the samples and can be set at 1 to 5. Processing power is listed in the following table:

SPEED SETTING	PROCESSING POWER IN G'S	SPEED IN M/S
1	30	1.5
2	60	2.5
3	90	3.7
4	120	4.4
5	150	5.0

• Time denotes the processing time in seconds. Time can be set from 0:01 seconds to 300 seconds in 1 second increments.

### 4.4 SPEED SETTING

Homogenization with the Bead Ruptor 4 is the result of the collision of the bead matrix and sample within the Bead Ruptor tubes. The frequency of collision and energy of impact determine the effectiveness of the disruption process and are controlled by the Bead Ruptor 4 speed setting, the motion of the tube carriage, the bead media, and the tube fill volume.



## SECTION 5 — PROGRAMMING

### 5.1 PROGRAMMING

The Bead Ruptor memory will store the last program settings used.

After powering on, the LCD screen will display the last used speed and time settings. The UP and DOWN arrow keys respectively increase or decrease the value of the active variable (speed or time) by holding down the arrow button.



#### Active Variable

Speed  
Time

#### System Status Display

SPEED  
CYCLE TIME (sec)

PARAMETER	OPERATING RANGE
Speed	1 to 5
Time	From 1 second to 300 seconds
Storable Programs	1

- If run is stopped or paused system status will read **“RUN CANCELED”**
- At the end of the program **“RUN COMPLETE”** will be displayed

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**CAUTION:** Wait until the unit stops completely and displays “RUN COMPLETE” before opening the lid.

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#### **PLEASE NOTE:**

- Homogenization settings cannot be changed once the run is in progress
- The Bead Ruptor 4 is designed for non-stop use and does not require a cool down period between runs.

The user can pause or stop a run by pressing the “STOP” button at any time.

## SECTION 6 — MAINTENANCE

### 6.1 CLEANING THE Bead Ruptor 4

The housing of the unit can be cleaned with a sponge or damp cloth moistened with water or alcohol.

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**WARNING:** For safety purposes and to prevent any damage of the unit, the recommendations listed below should be strictly followed:

- **ALWAYS** disconnect the power cord before cleaning
  - **DO NOT** spray water directly on the unit
  - **DO NOT** use any type of scrapers
  - **DO NOT** use caustic solvents or acetone. Harsh solvents can damage the finish of the housing and lid
- 

#### Example of Decontamination Procedure

If a tube breaks when a run is in progress, decontaminate parts that may have been contaminated with an appropriate disinfectant. The decontamination procedure is the sole responsibility of the user. Parts that may have been contaminated can be cleaned with a sponge or a damp cloth moistened with a non-abrasive cleaner.

In case another decontamination procedure is to be applied, please first contact technical support to ensure the compatibility of the new procedure with the instrument.

## SECTION 7 — TROUBLESHOOTING

**DO NOT** attempt to service the Bead Ruptor 4 in a manner other than those discussed in this manual. For any issue that is unsuccessfully corrected using this guide, please contact your authorized dealer or call Omni International at: 800.776.4431.

### 7.1 ERROR MESSAGES

ERROR MESSAGE	POSSIBLE CAUSES	ACTION(S)
Close Door	The lid is not seated properly	1. Check that nothing prevents the lid from closing. 2. Press lid and ensure the handle is closing properly.
	Detection system is faulty	1. Turn off the unit. 2. Contact Omni International for assistance.

### 7.2 TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	ACTION(S)
Display screen shows incomplete or unusual characters	CPU needs to be reset	1. Turn off the unit. Wait a few seconds. Turn the unit back on.
No display on the screen	No Power	1. Check main voltage. 2. Check that the voltage of the unit matches that being delivered by the main power supply. 3. Make sure the unit is plugged in properly. 4. Check and replace fuses if blown.
	Faulty display screen	1. Turn off the unit. 2. Contact Omni International for assistance.
One or several tubes are not sealed tightly	The cap is not properly sealed or the tube is faulty	If dangerous or potentially dangerous sample is contained in the tube, apply the proper decontamination procedure.
Unit powers on but motor does not turn	Faulty motor	Contact Omni International for assistance.

## SECTION 7 — TROUBLESHOOTING

### 7.3 CHANGING THE TUBE HOLDER

1. Ensure the unit is powered down and unplugged. (Figure 1)
2. Use the supplied 3 mm allen wrench to loosen the central screw (shown in arrow in figure 2) securing the tube holder to the pivot shaft (figure 2). Use caution as the pivot shaft may get hot during extending operation.
3. Remove the central screw and washer (the 2 mL attachment uses this washer, the 7 mL attachment does not) from the pivot shaft. (Figure 3)
4. Remove the tube holder from the pivot shaft. If it is difficult to remove, gently pry it off from alternating directions.
5. Wipe any residue or contamination from the pivot shaft, tube holder and screw. If the screw shows excessive wear on the threads or hex socket, replace it (P/N 00-751H47).
6. Place the desired tube holder on the pivot shaft, aligning the flat on the shaft with the flat on the tube holder.
7. Install the washer (if needed) and screw. Tighten the screw with the supplied 3 mm allen wrench. (Figure 3)



## SECTION 7 — TROUBLESHOOTING

### 7.4 CHANGING THE NECK GASKET

In the event of damage the neck gasket can be removed and replaced.

#### REQUIRED TOOLS:

- 3mm allen wrench
- BR 4 neck gasket (P/N 25-130-60)
- BR 4 neck gasket restriction ring (P/N 00-725-36)

1. Ensure the unit is powered down and unplugged.
2. Use the supplied 3 mm allen wrench to loosen the central screw securing the tube holder to the pivot shaft.
3. Remove the central screw and washer from the pivot shaft.
4. Remove the tube holder from the pivot shaft. If it is difficult to remove, gently pry it off from alternating directions.
5. Pull the restriction tie forward to remove it from the BR 4 housing. The restriction tie should slide off from the neck gasket.
6. Remove the neck gasket by pulling it forward across the pivot shaft.
7. Clean any residue from the BR 4 housing and pivot shaft.
8. Slide the new neck gasket onto the pivot shaft and housing. (Figure 1)
9. Secure the neck gasket using the restriction tie with the clamp positioned toward the bottom of the instrument. (Figure 2)
10. Place the tube holder on the pivot shaft, aligning the flat on the shaft with the flat on the tube holder.
11. Install the washer and screw. Tighten the screw with the supplied 3 mm allen wrench.



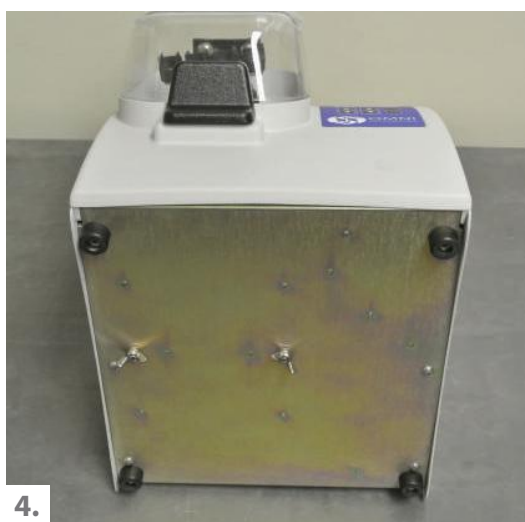
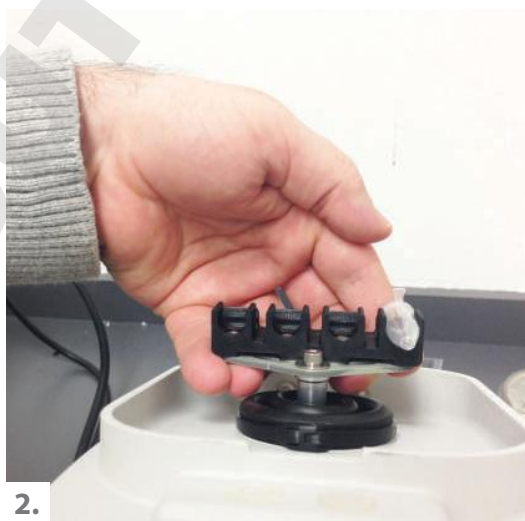
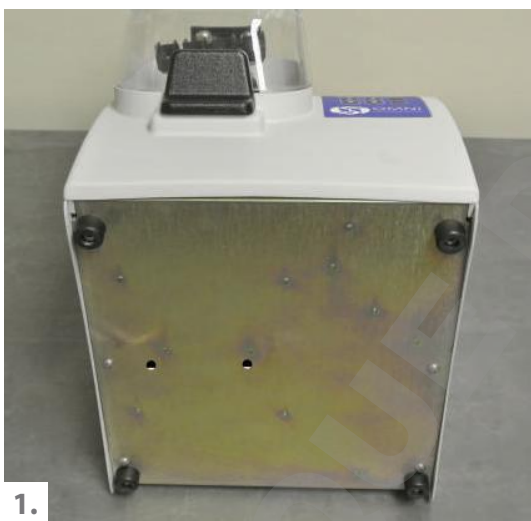
## SECTION 8 — TRANSPORT, STORAGE & SERVICE

### 8.1 TRANSPORTING THE Bead Ruptor 4

The Bead Ruptor 4 must be shipped in its original packaging.

**Before transporting the equipment, it is necessary to:**

1. Remove all tubes, cover the unit in its plastic bag.
2. Place the unit on its backplate. (Figure 1) The tube carriage will slide back. Lift the tube carriage to align the motor mount holes to the holes in the base plate. (Figure 2)
3. Insert screws until you feel them engage (It may take some finesse to get them aligned with the internals of the unit). (Figure 3) Insert screws until completely seated. The motor and tube carriage should be completely immobilized prior to shipment. (Figure 4)
3. Place the unit in its original foam packaging and box.



## SECTION 8 — TRANSPORT, STORAGE & SERVICE

**PLEASE NOTE:** The Bead Ruptor 4 MUST be shipped in its original packaging. Failure to do so can result in serious damage to the unit and will void all warranties.

### 8.2 STORAGE

The unit can be used in a cold room, but it must be stored in a dry area at a temperature ranging from 0°C/32°F to 50°C/122°F

### 8.3 SERVICE

The Bead Ruptor 4 contains an internal run-time clock. When this clock reaches 120 hours of running time, it is recommended to send the unit to Omni International for preventative service. The unit will display a service interval reminder when this time is reached.

### 8.4 DECONTAMINATION REQUIREMENT

Should an instrument or component that has been used with radioactive or pathogenic material require factory or field service, comply with the following procedure to ensure the safety of service personnel:

Clean the parts to be serviced of all encrusted material and decontaminate them. There must be no radioactivity detectable by survey equipment. Obtain a decontamination Certificate from Omni International. Complete the certificate and attach to the instrument or parts being returned.

If no Decontamination Certificate is attached, and a potential radioactive or biological hazard is detected or suspected by Omni International, the equipment will not be serviced until proper decontamination and certification is complete. The sender will be contacted for instructions as to the disposition of the equipment. Disposition costs will be borne by the sender.

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**WARNING:** It is a violation of federal law to transport biologically hazardous or radioactive materials without proper packaging, labeling, and appropriate warnings.

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