

OMNI MIXER & MACRO

HOMOGENIZER

USER MANUAL



OMNI
INTERNATIONAL

The Homogenizer Company™

REV. A
17258

WARRANTY INFORMATION

This manual is a guide for the use of the Omni Mixer and Omni Macro Homogenizers 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 THREE YEARS 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 whatsoever 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.

IMPORTANT SAFEGUARDS

- READ ALL INSTRUCTIONS BEFORE USING.
- SAVE THIS OWNER'S MANUAL.

The Omni Mixer and Omni Macro has been engineered for economical 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 Omni Mixer or Omni Macro. If you experience problems with or have questions about your Omni Mixer or Omni Macro, contact your authorized dealer or call Omni International at 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.

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.

- Keep this product away from heated surfaces.

WARNING: Keep all housings in place and in working order. **DO NOT** use the motor in a dangerous environment. **DO NOT** force the unit to do a job that it was not designed to do.

NOTE: If you experience excessive vibration, heat, or bearing wear, please contact technical support.

WARNING: **DO NOT** process pathogenic material in an open container, since aerosols created during normal processing could be inhaled by the operator.

WARNING CONTINUED

CAUTION: To prevent damage to the drive mechanism, *never* operate the motor without a sealed chamber assembly or generator probe installed.

CAUTION: Never operate the motor with the generator probe (or sealed chamber assembly) partially attached to the coupling adapter.

NOTE: If you experience excessive vibration, heat, or bearing wear, please contact technical support.

WARNING: The Omni Mixer or Omni Macro must be operated with the chamber assembly resting on a table top or on the bottom of a cooling container to prevent rotating blades from being exposed if the chamber assembly becomes disengaged from the motor, and to minimize the possibility of a broken seal.

CAUTION: To prevent damage to the drive mechanism, never operate the motor without a sealed chamber assembly or generator probe installed, or the flex rubber coupling removed from the motor.

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.

WARNING: Keep all housings in place and in working order. **DO NOT** use the motor in a dangerous environment. **DO NOT** force the unit to do a job it was not designed to do.

WARNING: Reduce the risk of unintentional starting. Make sure that the switch is in the "OFF" position before plugging in the motor.

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SECTION 1 — OMNI MIXER & MACRO HOMOGENIZERS

The Omni Mixer and Omni Macro Homogenizers are variable speed, post-mounted homogenizers. The Omni Mixer is powered by a 600 watt, 18,000 rpm motor, and the Omni Macro by an 1,800 watt, 20,000 rpm motor. Both utilize a broad range of sealed chamber assemblies, high shear knife assemblies, as well as a choice of seven different diameter autoclavable rotor-stator generator probes. The versatility of these units is unparalleled and makes them the ideal choice for general purpose laboratory homogenizing.

1.1 SPECIFICATIONS

	<u>Omni Mixer</u>	<u>Omni Macro</u>
Variable Motor Speed:	500-18,000 rpm	1,000- 20,000 rpm
Height (with Stand):	24.5 in.	25 in
Weight (with Stand):	16.3 lbs. (7.4 kg.)	21 lbs. (9.5 kg.)
Electrical Requirements:	115 volts, 60Hz or 220 volts, 50HZ	
Standards Approval/ Compliance:		
115V:	none	none
220V:	CE certified	none


1.2 PARTS AND ACCESSORIES







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. The Omni Mixer or Omni Macro consists of the following:

Description	Mixer	Macro	Quantity
Motor Drive Unit (115 V)	17-600-01	17-1800-01	1
OR			
Motor Drive Unit (220 V)	17-600-02	17-1800-02	1
Clamping Knob Assembly	17164	17164	1
Support Post	17026	17026	1
Finished Base Assembly	17234	17234	1
Generator Probe Adapter	15001	15001	1
Tool Kit (see Section 1.2)	17104	17104	1
Instruction Manual	17258	17258	1

1.2 PARTS AND ACCESSORIES (cont.)

The following components are supplied as part of the Omni Mixer and Omni Macro tool kit (P/N 17104):



	Description	Part Number	Quantity
	Gen Probe Multi Tool	00-402	2
	20, 32, 35, 45, 55 mm Knife Tool	15100K	1
	1/16" Allen Wrench	00-416	1
	5/64" Allen Wrench	60027	1
	3/32" Allen Wrench	60128	1
	1/8" Allen Wrench	60241	1
	5/32" Allen Wrench	737	1
	5/16" x 5/8" Combo Wrench	60033	1
	5mm Lower Bearing Press	59105	1
	7mm Lower Bearing Press	59107	1
	Lubricant	61971	1

1.3 ASSEMBLY OF THE OMNI MIXER OR OMNI MACRO

To assemble the Omni Mixer or Omni Macro Homogenizer please refer to the figure, and:

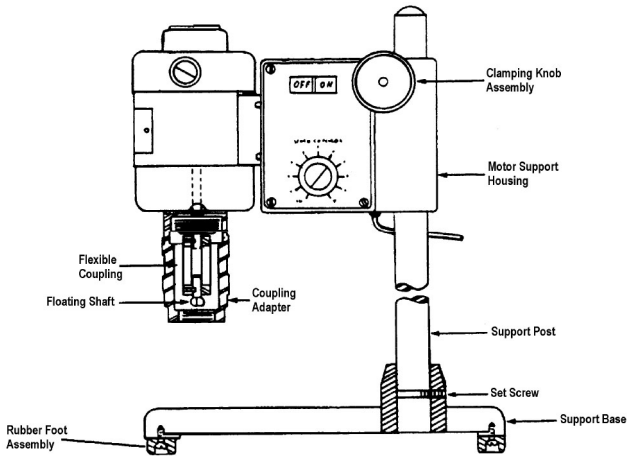
- Insert the support post into the support base. Secure the set screw through the back of the support base into the groove in the support post, using wrench P/N 60241 (1/8 in. Allen) provided.
- Place the clamping knob assembly in the motor support housing with the two flat surfaces on the clamping mechanism facing the support post hole. The clamping knob assembly may be used either on the left or the right side of the Omni Mixer or Omni Macro.
- Slide the motor support housing onto the support post and clamp it into place with the clamping knob assembly. The motor support housing should be positioned over the two longer legs of the support base.

SECTION 1 — OMNI MIXER & MACRO HOMOGENIZERS

NOTE: To prevent damage to the drive mechanism, never operate the motor without a complete chamber assembly or generator probe in position.

NOTE: Never operate the motor with the generator probe (or sealed chamber assembly) partially threaded onto the motor. To prevent damage to the motor and attachments, follow the instructions in Section 2.2 to assure the generator probe (or sealed chamber assembly, Section 3.4) is fully threaded into the coupling adapter.

NOTE: If you experience excessive vibration, heat, or bearing wear, please contact technical support.

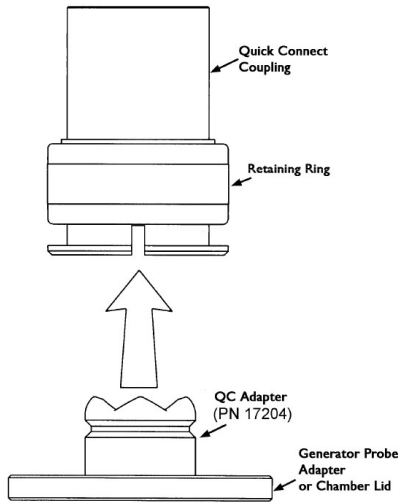


1.4 GENERAL OPERATING PROCEDURE

The speed of the Omni Mixer or Omni Macro may be regulated to achieve optimum results when working with different materials. A speed selection knob is located at the side of the unit, as is a separate "OFF" or "ON" switch. When in the "ON" position the motor speed can be varied from 0 rpm to maximum speed. Select the optimal speed for each different combination of sample and accessory for best processing results.

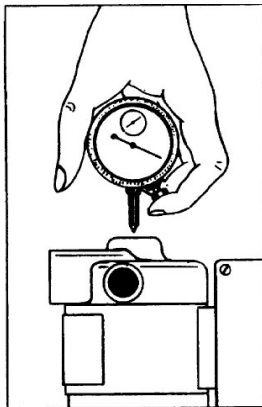
1.5 QUICK CONNECT COUPLING ASSEMBLY (optional)

The Quick Connect Coupling Assembly is an optional accessory for the Omni Mixer and Macro. To use, attach a Quick Connect Adapter to your chamber assembly or generator probe. Next, slide the Adapter into the Quick Connect Coupling and a retaining ring positions into place for a secure hold. To disconnect, simply slide the ring upward and the processing accessory is conveniently released.



1.6 DETERMINING MOTOR SPEED

To determine motor speed during operation, a tachometer (not included) may be inserted into the Omni Mixer or Omni Macro through the top of the motor as shown by removing the protective snap cap.



2.1 GENERATOR PROBE OPERATION

Rotor-stator generator probes are available for use with the Omni Mixer and Macro but are not supplied with the instruments. These probes can be used in a sealed chamber, or for added convenience, in an open vessel environment when aerosols or sample contamination are not a concern.



2.2 INSTALLING GENERATOR PROBES

All generator probes are easily installed to the motor unit by following these steps:

1. Screw the generator probe adapter P/N 15001 into the coupling adapter
2. Screw the generator probe into the generator probe adapter until the O-ring is completely inside the generator probe adapter.
3. If the generator probe does not thread fully into the generator probe adapter, then unscrew the generator probe from the generator probe adapter. Slightly rotate the rotor shaft collar on the generator probe. Then return to step 2.
4. Tighten the generator probe by hand with moderate force.
5. Remove the blue protective cap from the tip of the generator probe and the homogenizer is ready to operate.



Generator Probe Adapter

NOTE: The tip of the generator probe, especially on the saw tooth generator probes, is sharp. For safety purposes it is advisable that the protective cap be replaced on the generator probe when not in use.

NOTE: The bottom of the generator probe is extremely fragile and care should be taken to protect it. Replace the blue protective cap on the end of the generator probe when the generator probe is not being used.

2.3 OPERATION

Generator probes can be used in open containers or in sealed chamber assemblies. Sample processing efficiency is effected by:

- Amount of material processed vs. size and speed of the generator probe.
- Container geometry and size (round vessels encourage swirling, while fluted or cornered vessels disrupt flow patterns for more effective mixing/processing).
- Processing speed vs. optimal speed.
- Size and type of material and flow characteristics (material particles must be small enough to be carried into the generator head for optimal processing).

To operate the generator probe simply remove the blue protective cap from the end of the generator probe. Keep the blue protective cap on the tip of the generator probe when the generator probe is not being used.

NOTE: When using PTFE lower bearings, immerse the bottom of the generator probe in liquid or in the sample to avoid premature failure of the lower bearing.

NOTE: Liquid circulates through the two holes in the generator probe. DO NOT block the upper hole, although the lower hole may be completely submerged during processing.

NOTE: For optimal sample recovery during processing, completely remove the generator probe from the sample prior to turning off the motor drive unit.

2.4 VESSEL RESTRAINT DISK (Optional)

The Vessel Restraint Disk (Part # LT-750) can be used with the Omni Mixer and Macro to help reduce splashing and contain aerosols during homogenization. This accessory is compatible with 20mm and larger diameter rotor-stator generator probes and with containers up to six inches in diameter. The Vessel Restraint Disk also helps secure the container during processing.



NOTE: The Vessel Restraint Disk is not necessary when processing with sealed chamber assemblies.

3.1 SEALED CHAMBER ASSEMBLIES

Sealed chamber assemblies are available as separately ordered items for use with the Omni Mixer and Macro. They consist of chambers, many of which are fluted to facilitate mixing by inhibiting swirling, gasket screw on cover seals to inhibit aerosol release, a shaft assembly, and a sharpened stainless steel blade, or generator probe. Chamber materials include stainless steel, glass, polycarbonate, and polypropylene. A full range of titanium chamber assemblies is also available for applications requiring protection from leached elemental components, or where additional strength is a factor. Please contact your nearest Omni International representative, or Omni International for complete details.



3.2 USING BLADE CHAMBER ASSEMBLIES

Stainless Steel or Titanium - These chamber assemblies are intended for liquid and semi-solid materials. Homogenization and mixing will normally be completed within 30 seconds to one minute. For processing solid materials, first reduce particle size diameter to 1cm or less. Load the material to be processed in the chamber. Do not fill the chamber to full capacity. Processing of too much volume could force liquid up through the rotor shaft.

Glass and Plastic - These chamber assemblies are intended primarily for low-viscosity liquids or for light duty homogenization at speeds below 5,000 rpm. At speeds greater than 5,000 rpm, place glass jar into a secondary container for added protection.

NOTE: The maximum recommended speed when using any of the blade chamber assemblies is 10,000 rpm. Speeds in excess of 10,000 rpm can cause excessive bearing wear or part failure.

NOTE: Inspect glass or plastic chambers for any scratches or cracks, and do not use if any are found. Eye protection and utilization of a secondary container is recommended to prevent damage or injury in case of glass breakage.

SECTION 3 — SEALED CHAMBER ASSEMBLIES

Centrifugable - These assemblies are available in plastic or stainless steel, and should be used in the same manner as described for glass, plastic, and stainless steel above.

Breaking Down Specimen Particles - At speeds below 5,000 rpm, specimen particles may be broken down in the Omni Mixer by using hard materials, such as glass beads. The Omni Mixer will act as a “bead mill”, agitating the chamber while the hard materials do the work. Since sharpness is not essential, a dull blade should be used.

Adding a Grinding Medium - To attain the desired effect (cell breakdown) a combination of procedures may be useful. First homogenize the specimen in solution at maximum recommended speed with a sharp knife blade. Then change to a dull knife blade, add a grinding medium and run the homogenizer at 5,000 rpm for ten to fifteen minutes.

CAUTION: It is recommended that “bead mill” processing should not be undertaken in a glass vessel.

Using Generator Probes - To facilitate homogenization of some materials, it may be useful to pre-process the sample by using one of the techniques described above, and then completing the process by using a generator probe. Generator probes can achieve particle size reduction to less than 2 microns.

WARNING: When processing pathogenic material in a sealed container, carefully check seals and connections to be certain that they are not worn or leaking. A fume hood is recommended for processing pathogens, even with a sealed container. Our chambers are not aerosol sealed.

CAUTION: Knife blades are sharp. Handle carefully to avoid injury.

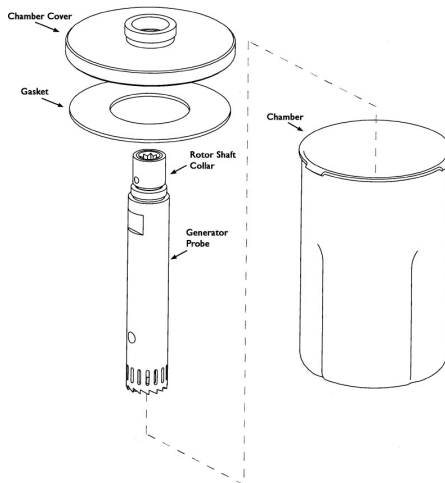
3.3 SEALED GENERATOR PROBE ASSEMBLIES

Sealed chamber generator probe assemblies are available for use with the Omni Mixer and Macro but are not supplied with the instrument. They consist of chambers, many of which are fluted to facilitate mixing by inhibiting swirling, gasket screw on cover seals to inhibit aerosol release, and a generator assembly. Chamber materials include stainless steel, glass, polycarbonate, and polypropylene. A full range of titanium chamber assemblies is also available for applications requiring protection from leached elemental components, or where additional strength is a factor. Please contact Omni International for complete details.

3.4 INSTALLING SEALED CHAMBER ASSEMBLIES

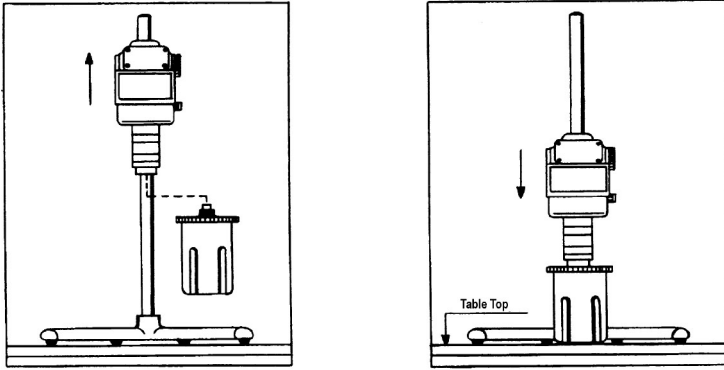
All chamber assemblies are easily installed to the motor unit by following these steps:

1. Attach the chamber (with adapter if required) to the cover/generator probe assembly. Method of attachment is a left-handed screw thread. Tighten the assembly securely.
2. Attach the chamber assembly to the motor by screwing the chamber cover into the coupling adapter.
3. If the chamber assembly does not thread fully into the coupling adapter, then unscrew the chamber assembly from the coupling adapter. Slightly rotate the rotor shaft collar on the generator probe. Then return to Step 2.
4. Before operating, make sure that the chamber assembly rests securely on the tabletop.



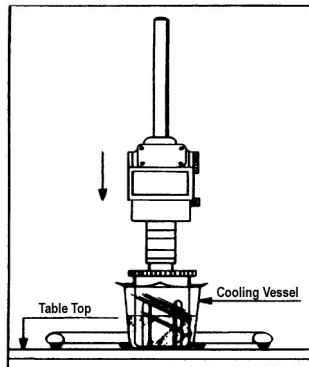
3.5 POSITIONING THE CHAMBER ASSEMBLY

For safe operation, all sealed chamber assemblies attached to the Omni Mixer or Omni Macro must be lowered to the table surface as shown below.



3.6 USING A COOLING VESSEL

At speeds above 5,000 rpm relatively high chamber temperatures may be caused from friction during processing. Immersion of the chamber in an ice bath or cooling chamber is recommended.



4.1 DISPERSATING PROBE ACCESSORIES

Dispersating probes are available for use with the Omni Mixer product line but are not supplied with the instrument. They are specifically designed for high speed and high shear mixing, dispersion and emulsifying. These probes provide less particle size reduction, but greater mixing options than the generator probes described in Section 2. They can be configured to draw material from either the top or the bottom of the processing vessel. They can be used in sealed chambers, or for added convenience, in an open vessel environment when aerosols or sample contamination are not a concern. Below is a list of standard available dispersating probes. An adapter, P/N 15001 is required to operate probes outside of a sealed chamber. *Standard material is 316 stainless steel, however, all dispersating probes can be constructed from titanium in custom lengths or diameters as special order items.*

<u>Description</u>	<u>Process</u>
25mm Dispersating Probe (195mm length)	Bottom Drawing
25mm Dispersating Probe (195mm length)	Top Drawing

4.2 DISPERSION IMPELLER ACCESSORIES

Two inch diameter dispersion impeller blade accessories are available for the Omni Mixer product line but are not supplied with the instrument. They are specifically designed for dispersion, mixing and blending. These accessories can be used in sealed chambers, or for added convenience, in an open vessel environment when aerosols or sample contamination are not a concern. Below is a list of standard available dispersating probes. An adapter, P/N 15001 is required to operate probes outside of a sealed chamber. *Standard material is 316 stainless steel, however, all dispersating probes can be constructed from titanium in custom lengths or diameters as special order items.*

<u>Description</u>	<u>Process</u>
Clay Impeller	High Shear Impeller
Rectangular Tooth Impeller	High Speed Dispersing
High Vane Impeller	High Pumping/Mixing
High Turbulence Impeller	High Viscosity

Impellers must be matched to the following Impeller Drive Assemblies:

<u>Description</u>
4" long drive assembly
6" long drive assembly
8" long drive assembly

5.1 MOTOR DRIVE UNIT

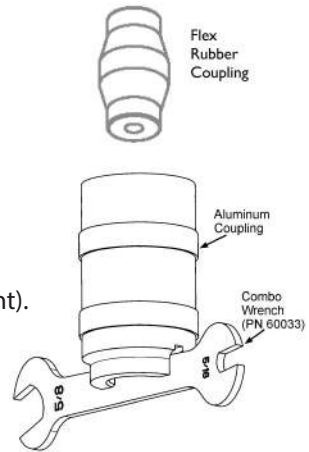
The motor drive housing can be cleaned periodically with a mild detergent. Never use solvents to clean the unit or accessories. While resistant to most laboratory chemicals, care should be taken to wipe off any concentrated and potentially damaging liquids.

Once per month the aluminum coupling adapter (see diagram in Section 1.3) of the homogenizer should be removed and cleaned. After cleaning, a good lubricant should be applied to the threads.

5.2 REMOVAL OF ALUMINUM COUPLING

In the event that the motor drive connect and/or the flexible rubber coupling needs to be serviced or replaced, the aluminum coupling can be removed using the following procedure;

1. Unplug motor unit from the wall.
2. Insert flat edge of combination wrench (included in motor tool kit) into the slots of the aluminum coupling (see figure to right).
3. Using wrench for leverage, loosen aluminum coupling by twisting it counter-clockwise.



Installation of the coupling is the reverse of these steps.

5.3 MOTOR BRUSH MAINTENANCE

To a large measure, how well your homogenizer performs its job is determined by the condition of the carbon contact brushes (P/N 61810). If brushes require replacement, the unit may run at a reduced speed and make unusual noises, or it may run sporadically and lose power. If this occurs with your Omni Mixer or Omni Macro, unplug the cord, loosen the brush caps one at a time and check each brush. If the brushes are less than 1/8" long and the ends of the brushes (which contact the commutator) are rough and/or pitted, the brushes no longer make adequate contact with the commutator and should be replaced (check both brushes since both brushes generally do not wear at the same rate). If one brush is worn replace both brushes. Make sure that the brushes are installed properly. The brushes have a curved surface at the end which must match the curvature of the commutator. The curvature of the commutator is the same as the curvature of the motor housing.

(continued)

If the brushes are not installed properly they will not contact the commutator and the motor will not run. After replacing the brushes, make sure to remove the flexible rubber coupling, place the motor on a clean surface, and run it freely (no-load, without a generator or chamber assembly attached) for 15 to 30 minutes before using the unit to process samples. This will allow the brushes to “seat” properly and will extend the life of each set of brushes. This will also extend the total life of your motor since the commutator surface will wear evenly.

5.4 BEARINGS AND LUBRICATION

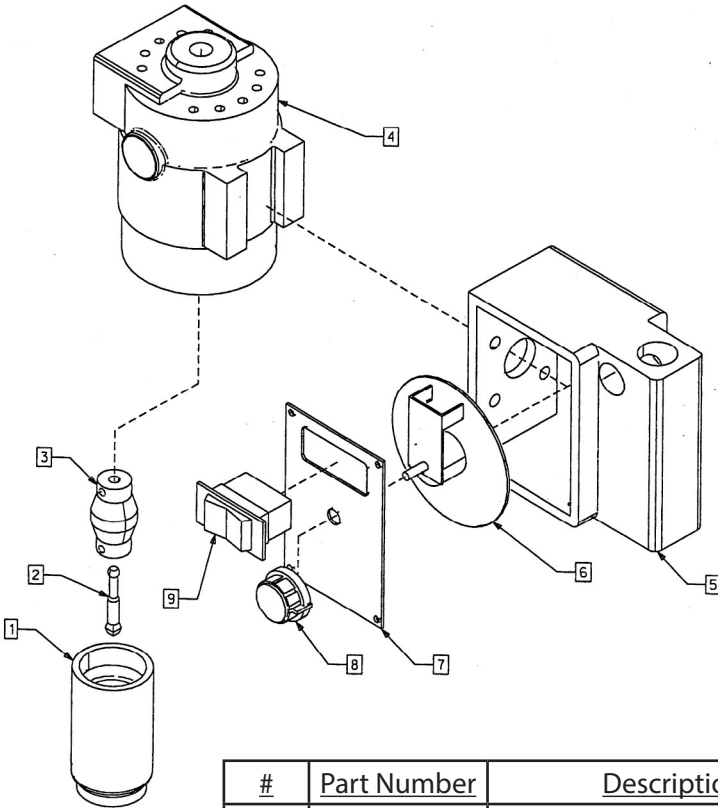
Motors are equipped with sealed ball bearings. Under normal use they require no additional lubrication. A tube of lubricant (P/N 61971) is included with every drive unit and should be used to lubricate the threads of all connecting threaded parts, as well as the drive pin at the tip of the floating shaft (see Section 1.3). Lubricant should not be used to lubricate moving parts or bearings.

5.5 GROUNDING INSTRUCTIONS

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.

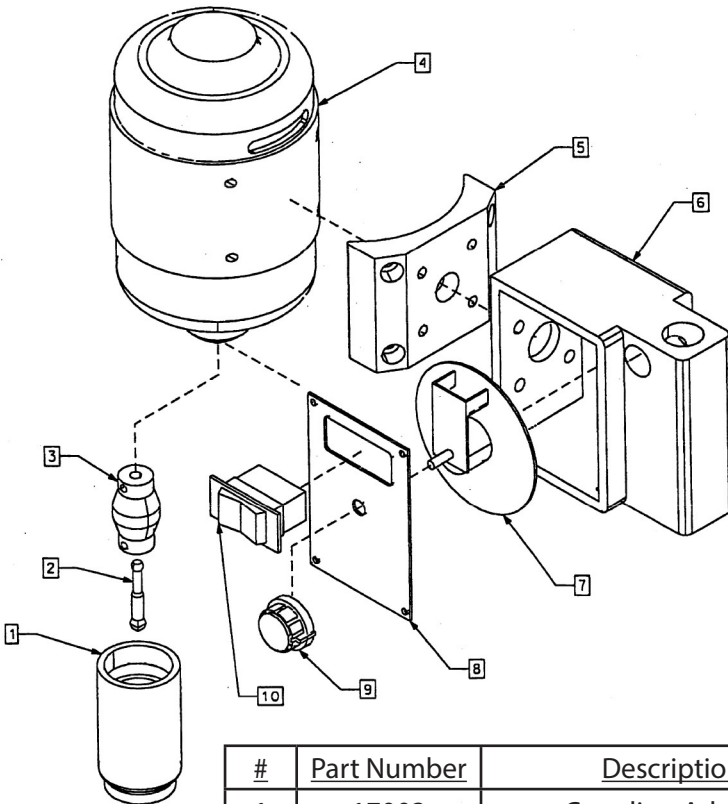
SECTION 6 — EXPLOSION DRAWINGS AND PART LISTS

6.1 OMNI MIXER 115V/220V



#	Part Number	Description
1	17003	Coupling Adapter
2	17005	Floating Drive Shaft
3	60028	Flex Rubber Coupling
4	61672 61707	115V Mixer Motor 220V Mixer Motor
5	17154	Motor Support Housing
6	175511 17321-1	Motor Speed Control (115V) Motor Speed Control (220V)
7	17156	Speed Control Faceplate
8	61681	Speed Control Knob
9	00-109-05 00-109-03	5A Rocker Switch (115V) 3A Rocker Switch (220V)

6.2 OMNI MACRO 115V/220V



#	Part Number	Description
1	17003	Coupling Adapter
2	17005	Floating Drive Shaft
3	60028	Flex Rubber Coupling
4	61572-1 61507-1	115V Macro Motor 220V Macro Motor
5	17571-1	Macro Adapter Plate
6	17154	Motor Support Housing
7	175511 17321-1	Motor Speed Control (115V) Motor Speed Control (220V)
8	17156	Speed Control Faceplate
9	61681	Speed Control Knob
10	00-109-15 00-109-08	8A Rocker Switch (115V) 5A Rocker Switch (220V)

SECTION 7 — TROUBLESHOOTING

Do not attempt to service the Omni Mixer or Macro 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.

PROBLEM	CORRECTIVE ACTION
The Omni Mixer/Macro is plugged in and turned on but is not functioning.	<ul style="list-style-type: none">- Check power cord connectors- Check wall socket for power to the outlet
Motor is turned ON and makes a "buzzing" sound, but is not working.	<ul style="list-style-type: none">- Brushes may need to be replaced. Contact Omni International or distributor.
Motor unit operating speed declines, stalls intermittently, or stops completely	<ul style="list-style-type: none">- Brushes may need to be replaced. Contact Omni International or distributor.
PTFE bearing wears quickly	<ul style="list-style-type: none">- Fluid level may be too low in the tube.- Immerse the probe deeper into the fluid.
Excessive splashing in sample tube	<ul style="list-style-type: none">- Fluid level too low for tube size



8.1 CONTACT US

Should this product ever require service, please contact Omni International at 1-800-776-4431 or online at www.omni-inc.com

8.2 DECONTAMINATION

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.

NOTE: 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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