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Bio-Gen PRO200 / PRO250 Homogenizer Operating Manual

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Warranty

PRO Scientific Inc. warrants this Homogenizer to be free from defects in materials or workmanship under normal use for a period not to exceed twenty-four (24) months from receipt. This warranty does not include normal wear from use; it doesn't apply to any instrument or part which has been altered nor any instrument which has been damaged through accident, negligence, misuse, abuse, or failure to follow operating instructions, as well as the use of electric currents or circuits other than those specified on the plate affixed to the instrument.

Liability is limited to repair or replacement of the unit at PRO Scientific's discretion. This warranty is in lieu of all other warranties either expressed or implied.

Claims against this warranty must be made by first contacting the PRO Scientific Service Department at phone# 203-267-4600, toll-free 800-5-THE-PRO (800-584-3776) or email sales@proscientific.com. At that time the method for remedy and service will be determined. Under no circumstances shall a unit be returned to PRO Scientific without first obtaining a Return Authorization (RA) Number. The RA number must be clearly visible on the return-shipping label. The RA number serves as identification of this unit once it arrives at the PRO Scientific Service Department.

Claims for part shortages or shipping damage in transit must be reported within ten (10) working days from receipt of unit. Such claims made after this time will not be honored. PRO Scientific reserves the right to change, alter, modify or improve any of its instruments without any obligation to make corresponding changes to any instrument previously sold or shipped. The foregoing obligations are in lieu of all other 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 buyer's exclusive remedy for any claim or damages in connection with the sale or furnishing of goods or parts.

Repair Policy/Instructions

NOTE: Please follow the below instructions when in need of returning a unit/item for repair to the PRO Scientific Service Department. The unit/item will not be accepted by the PRO Scientific Service Department without first following these instructions.

- 1) Call or email the PRO Scientific Service Department to obtain a Return Authorization Number (RA#), decontamination form and additional instructions. Phone number: 203-267-4600, toll-free: 800-5-THE-PRO (800-584-3776), email: sales@proscientific.com
- 2) Package unit/item in an approved shipping container.
- 3) Complete and sign both Return Authorization form and decontamination form. Place copies of both inside shipping box.
- 4) Write the RA# on the outside of the shipping box.
- 5) Ship the unit/item to the following address:

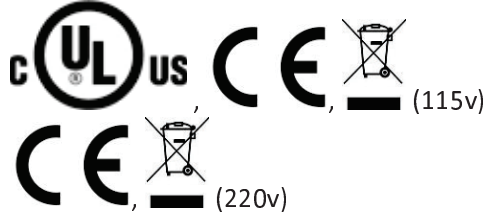
PRO Scientific Inc.
Service Department
Attn: RA#
99 Willenbrock Road
Oxford, CT 06478 USA

- 6) PRO Scientific will repair the unit/item in most cases within 48 hours after receiving.

Bio-Gen PRO200 Homogenizer Motor Unit

Specifications:

Dimensions:	2.15"W x 7.875"H x 1.98"D (5.4 x 20.0 x 5.03cm)
Weight:	1.4lb (0.6kg)
Speed Range:	5,000 to 35,000 rpm (115v) 5,000 to 33,000 rpm (220v)
Wattage:	144W
Voltage:	120v/ 220v, 50/60hz
Current:	1.2 amps (115v) 0.6 amps (220v)
Sample Volume Range:	0.03ml to 1L
Noise Rating:	68dB
Speed Control:	Analog, variable speed, separate on/off switch
Certification:	



Description:

The Bio-Gen PRO200 Homogenizer is a high-speed dispersing and emulsifying apparatus for processing flowable or liquid media. The PRO200 is available in either 120v or 220v with a variable speed range from 5,000 to 35,000 rpm or 5,000 to 33,000 rpm respectively. A separate ON/OFF switch conveniently allows for the slide switch speed control to remain at your ideal homogenizing speed. The optional PRO200 stand assembly consists of a 8 1/4" x 7" support base with a matted surface plate, a 23 1/2" support post, and a motor support holder and a post stop to set homogenizing height as well as prevent accidental dropping of the motor unit during use.

Bio-Gen PRO200 Motor Unit Contents:

- Motor unit with built-in speed control and separate on/off switch.
- Instruction manual.
- Tool kit. (Includes: safety clip, 1/4" hex key, screw driver)

Accessories:

Item No.	Description
80-20000	Bio-Gen PRO200 Homogenizer Stand Assembly: 8 ¼" x 7" vinyl padded base, 23 ½" post, and motor holder

Bio-Gen PRO200 Operating Instructions:

- 1) Assembly of the optional motor unit and stand p/n 80-20000 (If using without stand assembly begin with step #2)

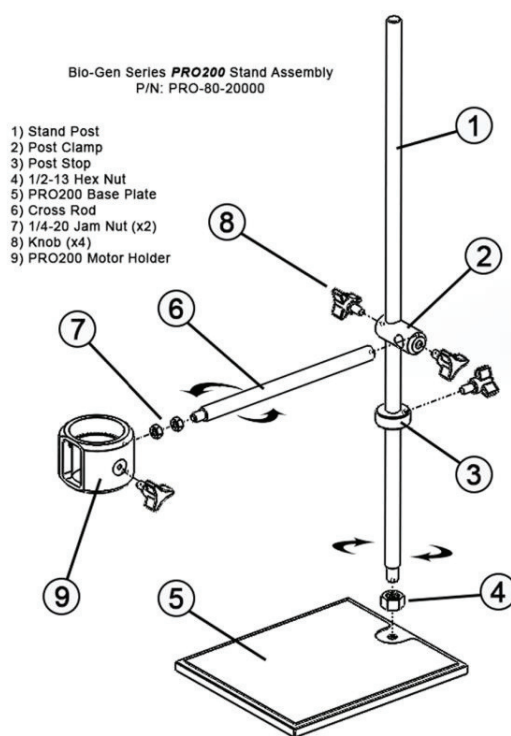


Figure 2: L-R, explosion drawing of p/n 80-20000 & p/n 80-20000

- 2) Check that the voltage quoted on the motor unit's type plate agrees with the available main voltage. Variations of +/- 10% are permissible.
- 3) After all of the above assembly operations have been completed and the electrical connections checked, a test run of the motor unit can be made. Do not use any generators /attachments at this time.

****CAUTION****

RUNNING A GENERATOR OR CHAMBER ASSEMBLY WITHOUT LIQUID MEDIA CAN CAUSE DAMAGE TO THE BEARINGS, UNLESS THE LOWER BEARING OF THE GENERATOR HAS BEEN REPLACED WITH A SEALED AND SHIELDED STAINLESS STEEL BEARING.

- 4) Turn the On/Off switch to the ON position.
- 5) The speed is controlled by the slide switch on the face of the motor unit. The PRO200 has five (5) marked positions which relate approximately to the following:
 - 1.5,000 to 8,000 rpm
 - 2.9,000 to 11,000 rpm
 - 3.12,000 to 17,000 rpm
 - 4.18,000 to 24,000 rpm
 - 5.25,000 to 35,000 rpm (115v) or 25,000 to 33,000 rpm (220v)

Care and Handling:

Please unpack the apparatus carefully and check that it is not damaged. It is important that any damage that occurred in transport is detected at the time of unpacking. If you do find such damage, the carrier must be notified immediately.

Maintenance & Service:

1. The homogenizer should be given the care normally required for any electrical appliance.
2. Avoid wetting or unnecessary exposure to fumes.
3. The finish can be washed with water and soap or detergents, using a cloth or sponge.
 - a. Do not allow water to get inside the unit.
 - b. Allow drying before using.
4. When necessary to replace motor unit brushes;
 - a. Remove pair of black caps from either side of Bio-Gen PRO200 motor unit
 - b. Remove brush assembly
 - c. Replace with p/n 01-31292 (must replace entire pair)
 - d. Replace black caps
 - e. Run in brushes
 - i. Let the Bio-Gen PRO200 run at lowest speed for five minutes

Environmental Conditions:

Non-Operating Storage:

Temperature: -20 to 65 deg. C (-4 to 149 deg. F)

Humidity: 20% to 85% RH, non-condensing

Operating Conditions:

Temperature: 18 to 33 deg. C (64 to 91 deg. F)

Humidity: 20% to 85 % RH, non-condensing

Altitude: 0 to 6,562 ft. (2000 M) above sea level





Installation Category II and Pollution Degree 2 in accordance with IEC 664.

Safety

- 1) Never attempt to hold the lower end of the generator while the generator is attached to the motor.
- 2) Over tightening the rotor knife onto the rotor shaft can result in breaking the shaft and/or distortion of the rotor knife.

- 3) Any servicing of the homogenizer motor unit, except brush replacement, should be performed by the PRO Scientific Service Department.
- 4) Use of any accessories or attachments other than those supplied by the manufacturer may be hazardous and voids all warranties.
- 5) The motor unit is supplied with sealed ball bearings and requires no additional lubrication. Any additional lubrication to the motor can result in bearing and/or motor failure.
- 6) Running a generator or chamber assembly without liquid media can cause damage to the bearings and consequently damage the generator.

Generators/Sealed Chambers Recommended for use on Bio-Gen PRO200:

GENERATOR		DIAMETER x LENGTH	TYPE	COMPATIBLE MODELS	TUBE, BEAKER, CONTAINER SIZE
5mm		5mm x 75mm	Flat bottom	All models	0.5ml, 1.5ml, 2.0ml tubes (5mm generator for sample vols. <0.4ml)
		7mm x 75mm	Saw Tooth	All models	1.5ml, 2.0ml, 5.0ml tubes
7mm		7mm x 95mm	Saw Tooth	All models	1.5ml, 2.0ml, 5.0ml, 10ml tubes
		7mm x 120mm	Saw Tooth	All models	10ml, 15ml tubes
		10mm x 105mm	Saw Tooth	All models	10ml, 50ml tubes
10mm		10mm x 115mm	Saw Tooth	All models	10ml, 15ml, 50ml tubes
		10mm x 150mm	Saw Tooth	All models	15ml tubes
		20mm x 105mm	Saw Tooth	All models	50ml tubes, small beakers
20mm		20mm x 115mm	Saw Tooth	All models	50ml tubes, small beakers

PRO ST (Sealed Tube) Series

ST	Item No.	Description	Treatable Vol. (ml)
ST-2	15-32002	1.5ml/2ml Assembly w/ 5mm Generator	0.2 - 1.0
ST-5	15-32005	5ml Assembly w/ 5mm Generator	0.5 - 3.0
ST-10	15-32010	16ml Assembly w/ 7mm Generator	2.0 - 10
ST-15	15-32015	19ml Assembly w/ 7mm Generator	5.0 - 11
ST-50-10	15-32050-10	50ml Assembly w/ 10mm Generator	5.0 - 40
ST-50-20	15-32050-20	50ml Assembly w/ 20mm Generator	5.0 - 25

PRO Glass Chamber Assemblies

Item No.	Description	Treatable Vol. (ml)
15-19473	473ml Chamber Assembly w/ 2" Dia. Blade	50 - 150
15-19946	946ml Chamber Assembly w/ 2" Dia. Blade	100 - 800
15-12473-20	473ml Chamber Assembly w/ 20mm Generator	150 - 300

PRO Stainless Steel Chamber Assemblies

Item No.	Description	Treatable Vol. (ml)
15-09070	70ml Chamber Assembly w/ 1" Dia. Blade	10 - 60
15-09600	600ml Chamber Assembly w/ 2" Dia. Blade	100 - 500
15-02070-10	70ml Chamber Assembly w/ 10mm Generator	20 - 60
15-02070-20	70ml Chamber Assembly w/ 20mm Generator	20 - 60

PRO Stainless Multi-Gen 7 Generators

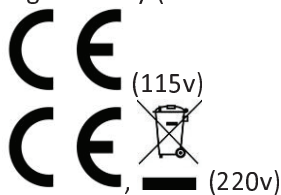
Item No.	Description
07-07200	Multi-Gen Motor Unit Adapter
02-070MG-12	Multi-Gen 7 Homogenizer Generators (12/package)
02-070MG-24	Multi-Gen 7 Homogenizer Generators (24/package)
02-070MGXL-12	Multi-Gen 7 XL Homogenizer Generators (12/package)

(See Generators section, page 13, for installation and usage instructions)

PRO250/PRO250C Homogenizer Motor Unit

Specifications:

Dimensions:	2.75"W x 9"H x 2.75"D (6.9 x 22.8 x 6.9cm)
Weight:	3.2lb (1.4kg)
Speed range:	10,000 to 30,000 rpm
Wattage:	576W
Voltage:	120v/220v, 50/60hz
Current:	4.8 amps (115v) 2.6 amps (220v)
Sample volume range:	0.03ml to 5L
Noise rating:	72dB
Speed control:	Variable speed, separate on/off switch Digital ready (models 01-01250C and 01-02250C only)
Certification:	



Description:

The PRO250/PRO250C homogenizer is a hand-held or optional post-mounted 576 watt homogenizer with variable speed from 10,000 to 30,000 rpm. A separate ON/OFF switch conveniently allows for the speed control dial to remain at your ideal homogenizing speed. The PRO250 Homogenizer is designed to homogenize, emulsify, blend and mix organic and inorganic materials in a liquid/liquid, liquid/solid, or solid/solid state. PRO250C model units are compatible with external digital control speed control boxes.

There are two optional stand assemblies available for use with the PRO250 Homogenizer an U-shaped base or a small footprint base. Both stands include a 24" (61cm) vertical support post, heavy duty clamp, and cross rod.

PRO250 Motor Unit Contents:

- Motor unit with built-in speed control, separate on/off switch
- Instruction manual
- Tool kit (Includes: safety clip, 1/4" hex key, screw driver)

Accessories:

- 80-25000 PRO250 Homogenizer Small Footprint Stand Assembly** Includes 8 ¼" x 7" vinyl padded base, 23 ½" post, motor cross rod, post clamp
- 80-00250 PRO250 Homogenizer Stand Assembly** Includes 24 in. post, 10 in u shape base, motor cross rod, post clamp (larger footprint)
- 80-00100 Homogenizer Vessel Holder Assembly with Separate Support Post** Includes: 80-00101 Vessel Holder Assembly with separate support post (for use with p/n 80-25000 only)
- 80-00101 Homogenizer Vessel Holder Assembly** Includes: Cross rod, post clamp, vessel holder with strap
- 91-01270 Digital Speed Control Box**, Variable speed: 0 - 30,000 RPM with digital display, 120 V, 50/60 Hz, Compatible with 01-01250C only
- 91-02270 Digital Speed Control Box**, Variable speed: 0 - 30,000 RPM with digital display, 220 V, 50/60 Hz, Compatible with 01-02250C only
- 91-01250 Analog Speed Control Box**, Analog variable speed: 0 - 30,000 RPM, 120 V, 50/60 Hz
- 91-02250 Analog Speed Control Box**, Analog variable speed: 0 - 30,000 RPM, 220 V, 50/60 Hz

PRO250/250C Operating Instructions:

- 1) Assembly of the optional stand assembly (If using without stand assembly begin with step #2)

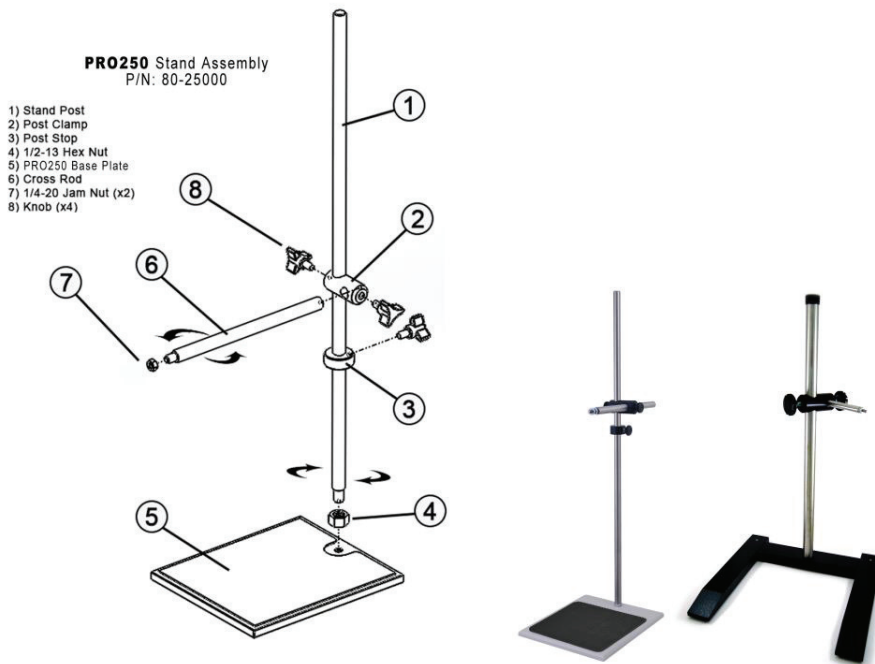


Figure 2: L-R, explosion drawing of p/n 80-25000, p/n 80-25000 & p/n 80-01250

- 2) Check that the voltage noted on the back of the motor agrees with the available voltage. Variations of +/- 10% are permissible.
- 3) Insert the power cord into the proper voltage outlet.
- 4) After all of the above assembly operations have been completed and the electrical connections checked, a test run on the motor unit can be made. Do not use any generators / attachments at this time.

****CAUTION****

RUNNING A GENERATOR OR CHAMBER ASSEMBLY WITHOUT LIQUID MEDIA CAN CAUSE DAMAGE TO THE BEARINGS, UNLESS THE LOWER BEARING OF THE GENERATOR HAS BEEN REPLACED WITH A SEALED AND SHIELDED STAINLESS STEEL BEARING.

- 5) Turn the on/off switch (I / O) to the on position.
- 6) The speed is controlled by the speed control dial located on the top of the motor unit. The PRO250 has six (6) marked positions which approximately relate to the following:
 1. 10,000 rpm
 2. 14,000 rpm
 3. 18,000 rpm
 4. 22,000 rpm
 5. 26,000 rpm
 6. 30,000 rpm

Assembly of the PRO250/PRO250C Motor unit with the Optional Analog Speed Control

Box:

- 1) Check that the voltage noted on the back of both the motor and the analog speed control box agrees with the available voltage. Variations of +/- 10% are permissible.
- 2) Insert the power cord coming off the motor into the back of the analog speed control box.
- 3) Make sure that the "ON/OFF" switch on the analog speed control box is in the "OFF" position.
- 4) Turn the speed control knob on the analog speed control box to the minimum position.
- 5) Turn the speed control dial on the top of the motor unit to position 6. If the speed control dial is not in the maximum position (position 6) the motor will not run properly with the analog speed control box.
- 6) Turn the motor unit's on/off switch (I / O) to the on position.
- 7) Insert the female end of the power cord set into the back of the analog speed control box.
- 8) Insert the male end of the power cord into the proper voltage outlet.
- 9) After all of the assembly operations have been completed and the electrical connections checked, a test run of the motor and analog speed control box can be made. Do not use any attachments at this time.

****CAUTION****

RUNNING A GENERATOR OR CHAMBER ASSEMBLY WITHOUT LIQUID MEDIA CAN CAUSE DAMAGE TO THE BEARINGS, UNLESS THE LOWER BEARING OF THE GENERATOR HAS BEEN REPLACED WITH A SEALED AND SHIELDED STAINLESS STEEL BEARING.

- 10) Turn the power switches on both the rear and face of the analog speed control box to the "ON" position.
- 11) Turn the speed control knob clockwise and the motor will start to turn.

Assembly of the PRO250C Motor Unit with the Optional Digital Speed Control Box:

- 1) Check that the voltage noted on the back of both the motor and the digital speed control box agrees with the available voltage. Variations of +/- 10% are permissible.
- 2) Insert the end of the power cord coming off the motor into the back of the digital speed control box.
- 3) Attach one end of the encoder pickup cable to the top of the motor unit and the other end to the digital speed control box.
- 4) Make sure that the "ON/OFF" switch on the digital speed control box is in the "OFF" position.
- 5) Turn the speed control knob on the digital speed control box to the minimum position.
- 6) Turn the speed control dial on the top of the motor unit to position 6. If the speed control dial is not in the maximum position (position 6) the motor will not run properly with the digital speed control box.
- 7) Turn the motor unit's on/off switch (I / O) to the on position.
- 8) Insert the female end of the power cord set into the back of the digital speed control box.
- 9) Insert the male end of the power cord into the proper voltage outlet.
- 10) After all of the assembly operations have been completed and the electrical connections checked, a test run of the motor and digital speed control box can be made.

****CAUTION****

RUNNING A GENERATOR OR CHAMBER ASSEMBLY WITHOUT LIQUID MEDIA CAN CAUSE DAMAGE TO THE BEARINGS, UNLESS THE LOWER BEARING OF THE GENERATOR HAS BEEN REPLACED WITH A SEALED AND SHIELDED STAINLESS STEEL BEARING

- 11) Turn the power switches on both the rear and face of the digital speed control box to the "ON" position.
- 12) Turn the speed control knob clockwise and the motor will start to turn and the motor speed will be displayed on the digital display located on the face of the speed control.
 - a. Please note, display shows real time motor speed.

****CAUTION****

NEVER ATTACH OR DETACH ENCODER PICKUP CABLE FROM THE MOTOR OR SPEED CONTROL BOX WHILE EITHER ON/OFF SWITCH IS IN THE "ON" POSITION

Care and Handling:

Please unpack the apparatus carefully and check that it is not damaged. It is important that any damage that occurred in transport is detected at the time of unpacking. If you do find such damage, the carrier must be notified immediately.

Maintenance & Service:

1. The homogenizer should be given the care normally required for any electrical appliance.
2. Avoid wetting or unnecessary exposure to fumes.
3. The finish can be washed with water and soap or detergents, using a cloth or sponge.
 - a. Do not allow water to get inside the unit.
 - b. Allow drying before using.
4. When necessary to replace motor unit brushes please contact a PRO Scientific Service technician (P#203-267-4600, sales@proscientific.com) or an authorized distributor.

Environmental Conditions:

Non-Operating Storage:

Temperature: -20 to 65 deg. C (-4 to 149 deg. F)

Humidity: 20% to 85% RH, non-condensing

Operating Conditions:

Temperature: 18 to 33 deg. C (64 to 91 deg. F)

Humidity: 20% to 85 % RH, non-condensing







Altitude: 0 to 6,562 ft. (2000 M) above sea level

Installation Category II and Pollution Degree 2 in accordance with IEC 664.

Safety

- 1) Never attempt to hold the lower end of the generator while the generator is attached to the motor.
- 2) Over tightening the rotor knife onto the rotor shaft can result in breaking the shaft and/or distortion of the rotor knife.
- 3) Any servicing of the homogenizer motor unit, except brush replacement, should be performed by the PRO Scientific Service Department.
- 4) Use of any accessories or attachments other than those supplied by the manufacturer may be hazardous and voids all warranties.
- 5) The motor unit is supplied with sealed ball bearings and requires no additional lubrication. Any additional lubrication to the motor can result in bearing and/or motor failure.
- 6) Running a generator or chamber assembly without liquid media can cause damage to the bearings and consequently damage the generator.

Generators/Sealed Chambers Recommended for use on PRO250/250C:

GENERATOR	DIAMETER x LENGTH	TYPE	COMPATIBLE MODELS	TUBE, BEAKER, CONTAINER SIZE
5mm	 5mm x 75mm	Flat bottom	All models	0.5ml, 1.5ml, 2.0ml tubes (5mm generator for sample vols. <0.4ml)
7mm	 7mm x 75mm	Saw Tooth	All models	1.5ml, 2.0ml, 5.0ml tubes
	7mm x 95mm	Saw Tooth	All models	1.5ml, 2.0ml, 5.0ml, 10ml tubes
	7mm x 120mm	Saw Tooth	All models	10ml, 15ml tubes
10mm	 10mm x 105mm	Saw Tooth	All models	10ml, 50ml tubes
	10mm x 115mm	Saw Tooth	All models	10ml, 15ml, 50ml tubes
	10mm x 150mm	Saw Tooth	All models	15ml tubes
20mm	 20mm x 105mm	Saw Tooth	All models	50ml tubes, small beakers
	20mm x 115mm	Saw Tooth	All models	50ml tubes, small beakers
	20mm x 150mm	Saw Tooth	PRO250 and larger models	Small/medium beakers
	20mm x 200mm	Saw Tooth	PRO250 and larger models	Large Beakers and Containers
30mm	 30mm x 115mm	Open Slotted	PRO250 and larger models	Small Beakers
	30mm x 150mm	Open Slotted	PRO250 and larger models	Small/medium beakers
	30mm x 200mm	Open Slotted	PRO250 and larger models	Large Beakers and Containers
	30mm x 200mm	Open Slotted	PRO250 and larger models	Large Beakers and Containers
Cryo	 50mm x 150mm	Cryogenic	PRO250 and larger models	Small, medium beakers
	70mm x 150mm	Cryogenic	PRO250 and larger models	Small, medium beakers

PRO ST (Sealed Tube) Series

ST	Item No.	Description	Treatable Vol. (ml)
ST-2	15-32002	1.5ml/2ml Assembly w/ 5mm Generator	0.2 - 1.0
ST-5	15-32005	5ml Assembly w/ 5mm Generator	0.5 - 3.0
ST-10	15-32010	16ml Assembly w/ 7mm Generator	2.0 - 10
ST-15	15-32015	19ml Assembly w/ 7mm Generator	5.0 - 11
ST-50-10	15-32050-10	50ml Assembly w/ 10mm Generator	5.0 - 40
ST-50-20	15-32050-20	50ml Assembly w/ 20mm Generator	5.0 - 25

PRO Glass Chamber Assemblies

Item No.	Description	Treatable Vol. (ml)
15-19473	473ml Chamber Assembly w/ 2" Dia. Blade	50 - 150
15-19946	946ml Chamber Assembly w/ 2" Dia. Blade	100 - 800
15-12473-20	473ml Chamber Assembly w/ 20mm Generator	150 - 300
15-12473-30	473ml Chamber Assembly w/ 30mm Generator	150 - 350
15-12946-20	946ml Chamber Assembly w/ 20mm Generator	350 - 800
15-12946-30	946ml Chamber Assembly w/ 30mm Generator	350 - 800

PRO Stainless Steel Chamber Assemblies

Item No.	Description	Treatable Vol. (ml)
15-09070	70ml Chamber Assembly w/ 1" Dia. Blade	10 - 60
15-09600	600ml Chamber Assembly w/ 2" Dia. Blade	100 - 500
15-02070-10	70ml Chamber Assembly w/ 10mm Generator	20 - 60
15-02070-20	70ml Chamber Assembly w/ 20mm Generator	20 - 60
15-02600-20	600ml Chamber Assembly w/ 20mm Generator	250 - 500
15-02600-30	600ml Chamber Assembly w/ 30mm Generator	250 - 500
15-081200	1.2L Chamber Assembly w/ 70mm Generator	100 - 1L

PRO Stainless Multi-Gen 7 Generators

Item No.	Description
07-07200	Multi-Gen Motor Unit Adapter
02-070MG-12	Multi-Gen 7 Homogenizer Generators (12/package)
02-070MG-24	Multi-Gen 7 Homogenizer Generators (24/package)
02-070MGXL-12	Multi-Gen 7 XL Homogenizer Generators (12/package)

PRO Homogenizer Accessories

PRO Quick Connect Generator Introduction

Description:

PRO Quick Connect Generators are manufactured out of 316 stainless steel for the utmost in chemical compatibility. They are precision crafted with a very narrow clearance between the inner rotating knife (rotor) and the outer tube (stator), which allows for quick, effective and repetitive processing, meaning you will get the results you want each and every time. PRO Quick Connect Generators are designed to be anti-foaming in design and are very easy to take apart and clean between samples. Appropriate cleaning procedures include chemically cleaning, autoclaving and flaming.

Complete replacement parts for the generator are available, thereby extending the life of this valuable piece of equipment.

PRO Scientific believes that as homogenizing requirements increase from hand held units to bench top laboratory units, interchangeability of generators is a necessity. All of the PRO generators will fit any of the PRO homogenizers. The ability to scale-up in size is important, therefore, all of the generators are designed with this in mind. The choice of a generator depends on the end result desired and the material being treated. One of the most important items to consider in choosing a generator is the peripheral speed, which is critical for particle size reduction. The following shows the peripheral speeds that the individual units can reach in the medium:

5mm diameter generators	= 6 meters per second
7mm diameter generators	= 9 meters per second
10mm diameter generators	= 13 meters per second
20mm diameter generators	= 26 meters per second
30mm diameter generators	= 39 meters per second

The generators all work on the same principal. The medium to be processed is pulled into the bottom of the tube by the rotor and forced out through the slots in the stator. The stator acts as an ideal flow breaker and prevents, to a large extent, the rotation of the medium and allows the introduction of large mechanical energies in a very small space. The vortex formation known in stirring is greatly reduced but cannot be avoided altogether. In the shearing gap between the rotor and the stator, about 1,000 times more energy is introduced into the medium than in stirring. The particles are pulled into the center of the rotor and then forced radially outward. In this process, the particles are reduced in size by hitting sharp edges, shearing between the edge of the rotor knife and the stator slots as well as cavitation. It usually takes only a few minutes to obtain a fine particle size reduction. Longer processing times achieve only a minor improvement in particle size reduction while increasing the temperature of the medium through the energy input.

Attaching the PRO Quick Connect Generator to the Motor Unit:

- 1) All generators are fitted to the motor unit by inserting the upper end of the generator into the collar end of the motor.
- 2) Align the vertical slots in the generator with the locating pins in the motor collar by rotating the generator.
- 3) Once aligned, push the generator inward as far as possible and turn the generator left. The collar is spring loaded so you will feel some resistance as you push the generator inward and turn it.

****CAUTION****

AT NO POINT SHOULD EXCESSIVE FORCE BE NECESSARY TO CONNECT THE GENERATOR TO MOTOR UNIT

- 4) Once you have turned the generator $\frac{1}{4}$ turn, release the generator and you will hear a distinct click which is the generator dropping into its locked position.
- 5) To prevent the generator from disengaging while being used, insert the safety clip between the upper collar of the generator and the bottom of the motor collar.
- 6) To disconnect the generator from the motor unit, remove the safety clip, push the generator up into the motor collar as far as possible and turn the generator clockwise $\frac{1}{4}$ turn. The generator will be pushed out of the motor collar by the force of the internal spring.

****CAUTION****

DO NOT REMOVE THE MOTOR COLLAR FROM THE MOTOR UNIT.

Operating Procedures:

- 1) The generator may be used with either an open chamber or within a sealed chamber assembly.
- 2) The ideal situation is when the diameter of the generator is as large as the container will allow.
- 3) Insert the generator into the medium that is to be homogenized. The depth to which the generator is inserted should be 1/3 of the liquid's height measured from the bottom of the container. According to the properties of the material, it may not be necessary to insert the generator to this depth. In case of heavy sediments, the generator may have to be positioned lower, but the generator must never come in contact with the bottom of the vessel.
- 4) **MID-BEARING NOTE:** All generators that are 120mm in length and longer contain a mid-bearing, which is located inside the generator approximately half way up the shaft. The mid-bearing must be lubricated by the sample/liquid during processing, therefore the sample volume should cover about half the length of the generator.
- 5) Start the drive unit at the lowest possible speed and then slowly increase the speed to the desired level.
- 6) It is advisable that the generator be immersed within the container off-center. This off-center location will help minimize vortexing.
- 7) The generators have two (2) sets of venting holes. One set is located approximately 1" from the bottom of the generator and the second set is approximately 1" below the bottom of the generator collar. The lower hole aids in keeping the lower bearing lubricated, while the top hole allows venting of any liquid that might be forced up into the tube. There is no need to avoid liquid from entering the lower set of holes.
- 8) Once you have reached the level of processing that is required, reduce the motor speed and start to slowly remove the generator from the container while the motor is still running. It is important that this be done slowly as you want to spin all medium from the generator back into the container and not outside of the container.
- 9) After spinning the medium off the generator, the motor can be turned off and the generator totally removed from the container.

Dismantling the PRO Quick Connect Generator:

Dismantling 5mm generators

The following instructions are for the dismantling of only 5mm generators ONLY.

1. Unscrew the rotor knife from the bottom of the rotor shaft. Insert the 1/4" hex key (supplied in the tool kit) into the end of the rotor shaft collar and insert the screwdriver (supplied in the tool kit) into the rotor knife and turn the hex wrench counter clockwise.
2. Remove the rotor knife from the bottom of the generator tube and collar assembly.
3. Draw the rotor shaft and rotor shaft collar assembly upwards out of the tube and collar assembly. The PTFE (polytetrafluoroethylene) washer can be removed from the rotor shaft.
4. Remove the lower bearing from the bottom of the tube and collar assembly. The lower bearing should be replaced when worn before the rotor knife starts to rub against the side of the stator.
5. The rotor shaft collar assembly can be removed from the rotor shaft by loosening the set screw located at the side of the rotor shaft collar using the hex wrench end of the screw driver (supplied in the tool kit).

Dismantling 7mm, 10mm, 20mm and 30mm generators

The following instructions are for the dismantling of all other generators except 5mm.

1. Unscrew the rotor knife from the bottom of the rotor shaft. Insert the 1/4" hex key (supplied in the tool kit) into the end of the rotor shaft collar and insert the screwdriver end into the rotor knife and turn the hex wrench counter clockwise.

2. Remove the rotor knife from the bottom of the generator tube and collar assembly
3. Remove the rotor shaft collar assembly by loosening the setscrew located in the side of the rotor shaft collar from the rotor shaft using the hex wrench end of the screwdriver tool (For convenience, do not fully remove the setscrew from within the rotor shaft collar assembly).
4. Remove the PTFE washer from the rotor shaft. Draw the rotor shaft downwards out of the tube and collar assembly. (If rotor shaft does not slide out, press down on the rotor shaft from the top of the generator tube and collar assembly using the hex wrench end of the screwdriver tool).
5. Remove the lower bearing from the end of the tube and collar assembly using the screwdriver. The screwdriver should be inserted high enough to reach the inner side of the lower bearing. Put the flat side of the screwdriver against the lower bearing, and then pull the handle of the screwdriver against the saw-teeth or open-slotted end of the generator probe. The lower bearing should come out. The lower bearing should be replaced when it shows signs of wear and before the rotor shaft collar starts to come in contact with the inside wall of the motor collar or starts to rub on the top of the tube and collar assembly.

Assembly of the PRO Quick Connect Generator:

Assembling 5mm generators

The following instructions are for the assembly of only 5mm generators.

1. Insert the lower bearing into the bottom of the tube and collar assembly. Take the rotor knife and place it into the bottom of the tube and collar assembly and push the lower bearing into its proper location. The proper location is when the end of the rotor knife is flush with the bottom of the tube and collar assembly.
2. Attach the rotor shaft collar to the end of the rotor shaft. Make sure that the setscrew in the rotor shaft collar lines up with the flat on the end of the rotor shaft. The rotor shaft collar should be located as close to the end of the rotor shaft as possible. Slide the PTFE washer up the rotor shaft until it contacts the rotor shaft collar.
3. Insert the rotor shaft with the rotor shaft collar and PTFE washer attached into the upper end of the tube and collar assembly.
4. The rotor shaft should rotate freely within the tube and collar assembly. If the rotor shaft does not rotate freely, remove the rotor shaft from the tube and collar assembly and inspect both the upper and lower bearings for any possible damage. Replace any damaged bearings.
5. Insert the rotor knife into the end of the tube and collar assembly and rotate the knife clockwise while holding the rotor shaft collar.
6. Once the rotor knife is threaded onto the end of the rotor shaft, insert the ¼" hex wrench into the end of the rotor shaft collar and the screwdriver into the end of the rotor knife and lightly tighten.
7. With the rotor knife attached, place the generator with the blade end downward onto a flat surface. Loosen the setscrew located on the side of the rotor shaft collar. Push the rotor shaft collar downward until the nylon washer is in contact with both the bottom of the rotor shaft collar and the top of the upper bearing. Tighten the set screw and check that the generator rotates freely.

Assembling 7mm, 10mm, 20mm and 30mm generators

The following instructions are for the assembly of all other generators except 5mm.

1. Slide the lower bearing onto the rotor shaft.
2. Attach the rotor knife to the rotor shaft by screwing it together until tight (hand tighten).
3. Insert the Rotor Shaft into the end of the tube and collar assembly. Then push the rotor knife up into the end of the tube and collar assembly until it cannot go any further. This will put the lower bearing into its proper place. The rotor shaft should stick out through the upper bearing located in the top of the tube and collar assembly.
4. While pushing against the rotor knife, place the PTFE washer over the end of the rotor shaft and put the rotor collar assembly onto the rotor shaft.

5. While holding the rotor knife, align the setscrew on the side of the rotor shaft collar and the flat end on the rotor shaft so they are facing each other. Once lined up with one another, tighten the setscrew against the flat end of the rotor shaft using the hex wrench end of the screwdriver tool (supplied in the tool kit).
6. Insert the ¼" hex key (supplied in the tool kit) into the end of the rotor shaft collar and insert the screwdriver end into the rotor knife and turn the hex wrench clockwise to confirm its tight (Over tightening of the rotor knife onto the rotor shaft can result in breaking of the rotor shaft and/or distorting of the rotor knife).

PRO Quick Connect Generator Maintenance:

Regular maintenance and inspection / replacement of wearing generator parts is recommended and will thereby extend the life of this valuable piece of equipment.

****CAUTION****

RUNNING THE GENERATOR WITH MISSING OR WORN COMPONENTS CAN CAUSE DAMAGE TO THE GENERATOR AND/OR HOMOGENIZER MOTOR UNIT.

Perform an upper washer check:

1. Is the upper white Polytetrafluoroethylene (PTFE) washer missing? These tend to get misplaced when cleaning and often the generator is reassembled without the PTFE washer.
2. Is the white PTFE washer worn?
3. If you answered yes to either of these questions, then you will need to order replacement upper PTFE washers. This item is the same for all PRO Quick Connect Generators. You will need to order part number PRO-99-03302P (5 pack of upper PTFE washers).

Perform a lower bearing maintenance check:

1. It is time to replace your lower Polytetrafluoroethylene (PTFE) bearing if...
 - a. The inside diameter of the lower PTFE bearing fits loosely on the outside diameter of the shaft
 - b. And/or you are able to wiggle and tilt the PTFE bearing
2. Find the correct lower bearing part number for your generator.
 - a. Refer to the Generator Spare Parts Section of this manual
 - b. Visit our generator replacement parts page on our website.
 - c. Speak with a sales consultant at PRO Scientific, P#203-267-4600, sales@proscientific.com, and they will be happy to assist you in finding the correct replacement part for your generator.

Upper SS bearing maintenance check:

1. Replacement of upper stainless steel bearing should be performed by PRO Scientific Service technician or authorized distributor.
2. Contact PRO Scientific service department, at P#203-267-4600, sales@proscientific.com, and request a return authorization for generator.

Mid-Bearing maintenance check:

1. All generators that are 120mm in length and longer contain a mid-bearing, which is located inside the generator approximately half way up the shaft.
 - a. The mid-bearing must be lubricated by the sample/liquid during processing, therefore the sample volume should cover about half the length of the generator.
2. Replacement of mid-bearing should be performed by PRO Scientific Service technician or authorized distributor.
3. Contact PRO Scientific service department, at P#203-267-4600, sales@proscientific.com, and request a return authorization for generator.

Tips to maximize your generator's performance.

1. Never run the generator assembly dry. The generator requires liquid sample/medium to lubricate the bearings during processing.
2. Without the liquid, the bearings can burn out and cause damage to the generator itself.
3. Make sure you are processing the recommended sample volume for the generator/generator assembly you are using. If you are unsure if this is the correct generator for your application, please contact a sales representative before using the generator.
4. Always begin homogenizing at a low rpm, and then gradually increase the speed to your target level.
5. Please follow the instructions in the manual to ensure that you attach the generator/generator assembly properly to the motor unit.
6. We recommend taking apart and cleaning generators on a regular basis.

PRO MULTI-GEN 7 and MULTI-GEN 7XL Introduction

Description:

Both MULTI-GEN 7 and MULTI-GEN 7XL generators are manufactured from 316 stainless steel and PTFE and consists of a generator tube, rotor shaft and knife assembly, drive collar and a set of PTFE bearings. MULTI-GEN generators require use of the Multi-Gen Generator adapter attached to a motor unit in order to operate.



Attachment of the Adapter to the Drive Motor:

- 1) Align the grooves in the side of the adapter's upper collar with the two (2) pins in the bottom of the motor collar.
- 2) Push the adapter into the motor collar.
- 3) Once inserted as far as it will go, turn the adapter left until you feel the adapter lock into place. This should be approximately ¼ turn. The collar is spring loaded so you will feel some light resistance as you push the generator inward and turn.
- 4) Once the adapter is attached to the motor collar, it is important that the safety clip supplied with the adapter be inserted between the bottom of the motor collar and the shoulder of the adapter. Proper insertion of the safety clip will prevent the adapter from disengaging from the motor collar when ejecting the used generator.

Attachment of the Multi-Gen Generator to the Adapter:

- 1) Remove one generator from the box.
- 2) Push the sleeve on the adapter upward.
- 3) While the sleeve is pulled back, insert the grooved end of the generator into the bottom of the adapter.
- 4) Once the generator has been inserted as far as possible into the bottom of the adapter, the bottom sleeve of the adapter can be released. Releasing the bottom sleeve will lock the generator in place. Pulling gently on the generator will ensure that the generator is locked securely in place.

Removal of the Multi-Gen Generator from the Adapter:

- 1) With the motor in an upward position, (generator pointing downward), slide the bottom sleeve of the adapter upward. Sliding the bottom sleeve of the adapter upward will allow the generator to drop out of the adapter.
****CAUTION: CARE SHOULD BE TAKEN WHEN HANDLING THE MULTI-GEN 7XL, ESPECIALLY WHEN REMOVING THE MULTI-GEN 7XL FROM THE ADAPTER. DO NOT LET THE GENERATOR DROP AS THIS COULD DAMAGE THE TEETH OF THE GENERATOR.****

Operating the Multi-Gen Generator:

Once attached to the motor and the adapter, the Multi-Gen generators can be used like any other PRO Scientific generator.

****CAUTION SHOULD BE TAKEN NOT TO RUN THE GENERATOR DRY, WHICH CAN RESULT IN THE FAILURE OF THE PTFE BEARINGS AND SUBSEQUENT DAMAGE TO THE GENERATOR. DURING OPERATION OF THE UNIT, PLEASE ENSURE THAT THE LOWER BEARING IS WITHIN THE LIQUID OF THE SAMPLE BEING PROCESSED.****

*****WARNING*****

PLEASE NOTE THE SEPARATE AND DIFFERENT STEPS FOR ASSEMBLING AND DISASSEMBLING THE MULTI-GEN 7 AND THE MULTI-GEN 7XL

Dismantling of MULTI-GEN 7 ONLY

1. Insert the blade end of the screwdriver (supplied in the motor unit tool kit) into the bottom of the generator, locking the knife in place.
2. Continue with step 3.

Dismantling of MULTI-GEN 7XL ONLY

1. Insert the allen wrench end of the screwdriver (supplied in the motor unit tool kit) across and through the open slot of the XL generator tube
2. Continue with step 3.
3. While firmly holding the drive collar at the upper end of the generator (opposite end of the screwdriver) turn the screwdriver counter clockwise. If the drive collar is not held securely it will spin with the screwdriver, thereby not allowing the knife assembly and rotor shaft to be unscrewed from the drive collar.
4. With the drive collar removed, the rotor shaft knife assembly will slide out the bottom of the generator tube.
5. The upper PTFE bearing can now be removed from the upper end of the generator tube.
6. The lower PTFE bearing can now be removed from the lower end of the generator tube.
7. Multi-Gen parts can now be placed on a tray and autoclaved as necessary.

Assembling MULTI-GEN Generator

1. Insert upper PTFE bearing (bearings are interchangeable) into the upper end of the generator tube-bearing, flange out.
2. Place the lower PTFE bearing into the lower end of the generator tube- bearing flange out.
3. Slide shaft into the lower end of the generator tube until knife is flush with tube, making sure threaded end of shaft comes through the upper PTFE bearing.
4. With finger keeping knife flush with bottom of tube, hand tighten drive collar.
5. **FINAL ASSEMBLY STEP FOR MULTI-GEN 7 ONLY:** Place the screwdriver into bottom of the generator and holding the drive collar turn the screwdriver clockwise.
6. **FINAL ASSEMBLY STEP FOR MULTI-GEN 7XL ONLY:** Place allen wrench across and through the open slot of the XL generator to ensure tightness of assembly and holding drive collar turn screwdriver clockwise.

MULTI-GEN Generator Maintenance:

Regular maintenance and inspection / replacement of lower bearings is recommended and will thereby extend the life of this valuable piece of equipment.

Perform a lower bearing maintenance check:

1. It is time to replace your lower Polytetrafluoroethylene (PTFE) bearing if...
 - c. The inside diameter of the lower PTFE bearing fits loosely on the outside diameter of the shaft
 - d. And/or you are able to wiggle and tilt the PTFE bearing

2. This item is the same for all PRO MULTI-GEN Generators. You will need to order part number PRO-03-11703P (6 pack of MULTI-GEN lower PTFE bearings).

Tips to maximize your generator's performance:

1. Never run the generator assembly dry. The generator requires liquid sample/medium to lubricate the bearings during processing.
2. Without the liquid, the bearings can burn out and cause damage to the generator itself.
3. Make sure you are processing the recommended sample volume for the generator/generator assembly you are using. If you are unsure if this is the correct generator for your application, please contact a sales representative before using the generator.
4. Always begin homogenizing at a low rpm, and then gradually increase the speed to your target level.
5. Please follow the instructions in the manual to ensure that you attach the generator/generator assembly properly to the motor unit.
6. We recommend taking apart and cleaning generators after each use.

Homogenizer Accessory Cleaning

- 1) Immediately after you have finished working with the generator, the generator must be cleaned so that the substance residues do not stick to the rotor and stator and allow small bacterial cultures to form in undesirable places.
- 2) For this purpose, the generator should be run in a solvent, which dissolves the substance residue and does not harm the components. The rotor and stator are cleaned as the solvent is pumped through the generator.
- 3) Please ensure that all cleaning processes are compatible with 316SS and PTFE.
- 4) For a more thorough cleaning it is recommended that your generator be disassembled and cleaned via one of the following processes;
 - a. Chemical process - Germicidal solutions (formalin, phenol, alcohol etc.) can disinfect in most cases.
 - i. Residues of the germicide must subsequently be removed with sterilized water.
 - ii. Please ensure that all chemical processes are compatible with 316SS and PTFE.
 - b. Sterilizing by humid heat – This means sterilizing with steam at a pressure of 2 bar above atmosphere and a temperature of 120°C.
 - i. PRO Generators are heat resistant up to 390° F / 198° C.
 - c. Sterilizing by hot air - Hot air sterilization is normally carried out at 160 to 190°C.
 - i. PRO Generators are heat resistant up to 390° F / 198° C
 - d. Flaming - This method can be used, however, it is only effective on external surfaces.
 - i. PRO Generators are heat resistant up to 390° F / 198° C

PRO Sealed Chamber Assembly

Description:

With PRO Safety Sealed Chamber Assemblies, various chamber assemblies (stainless steel, glass and plastic) are used for homogenization of materials in the liquid/liquid, liquid/solid, and solid/solid states. Homogenization and mixing will normally be completed within 30 seconds to one minute. At revolutions higher than 8,000 rpm the time of mixing should be limited to three minutes with dry mixtures and ten minutes for liquids. To homogenize solid materials it is advisable to chop up pieces larger than 1.0 cm in diameter before putting them into the chamber. All homogenizing occurs in safety-sealed, tubes, glass chambers or stainless steel chambers. This allows for multiple levels of protection, the design provides a two way barrier, protecting the operator from hazardous aerosols generated during processing while it isolates the sample from external contaminants.

Safety Sealed Assemblies with PRO Quick Connect Generator

Assembly of the Safety Sealed Assemblies with PRO Quick Connect Generator:

- 1) Assemble the cover/cover plug and rotor shaft assembly. Load the material to be processed into the chamber.
- 2) Make certain that the chamber is filled only to the recommended volume level for that specific chamber.
- 3) Attach the filled chamber to the cover and cover plug/rotor shaft assembly.
- 4) Screw the chamber cover onto the chamber. Note that the threads on the chamber and cover are left hand threads and are screwed together by turning the cover counter clockwise. These two parts should be tightened securely.

Attachment of the Safety Sealed Assemblies with PRO Quick Connect Generator to the Homogenizer:

- 1) All PRO Safety Sealed Assemblies are fitted to the motor unit by inserting the upper end of the generator into the collar end of the motor.
- 2) Align the vertical slots in the PRO Safety Sealed Assembly with the locating pins in the motor collar by rotating the PRO Safety Sealed Assembly.
- 3) Once aligned, push the PRO Safety Sealed Assembly inward as far as possible and turn the PRO Safety Sealed Assembly left. The collar is spring loaded so you will feel some resistance as you push the generator inward and turn it.

****CAUTION****

AT NO POINT SHOULD EXCESSIVE FORCE BE NECESSARY TO CONNECT THE PRO SAFETY SEALED ASSEMBLY TO MOTOR UNIT

- 4) Once you have turned the PRO Safety Sealed Assembly $\frac{1}{4}$ turn, release the PRO Safety Sealed Assembly and you will hear a distinct click which is the PRO Safety Sealed Assembly dropping into its locked position.
- 5) To prevent the PRO Safety Sealed Assembly from disengaging while being used, insert the safety clip between the upper collar of the PRO Safety Sealed Assembly and the bottom of the motor collar.
- 6) To disconnect the PRO Safety Sealed Assembly from the motor unit, remove the safety clip, push the PRO Safety Sealed Assembly up into the motor collar as far as possible and turn the PRO Safety Sealed Assembly clockwise $\frac{1}{4}$ turn. The PRO Safety Sealed Assembly will be pushed out of the motor collar by the force of the internal spring.

****CAUTION****

DO NOT REMOVE THE MOTOR COLLAR FROM THE MOTOR UNIT.

****CAUTION****

THE HOMOGENIZER SHOULD ONLY BE OPERATED WITH THE BOTTOM OF THE CHAMBER ASSEMBLY RESTING ON THE TABLETOP, THE BOTTOM OF THE COOLING OR HEATING VESSEL OR THE TOP OF A HEIGHT BLOCK.

- 7) Rotate the appropriate speed control dial until the desired speed is reached.
- 8) When the desired time period has elapsed, turn the "ON/OFF" switch position.

- 9) Remove the PRO Safety Sealed Assembly from the motor unit before attempting to open the chamber assembly.

Operating Techniques:

To use the homogenizer effectively, the following techniques are recommended:

****CAUTION****

WHEN IT IS NECESSARY TO USE VOLATILE, FLAMMABLE, TOXIC, PATHOGENIC, RADIOACTIVE OR OTHER HAZARDOUS MATERIALS, STANDARD LABORATORY PRECAUTIONS SHOULD BE FOLLOWED, SUCH AS VENTING, OPERATING IN A FUME HOOD, ETC. THE HOMOGENIZER IS NOT MADE OF AN EXPLOSION-PROOF CONSTRUCTION.

- 1) Cooling - At revolutions above 5,000 rpm, relatively high temperatures are generated. Therefore, the chamber should be cooled whenever operating at speeds above 5,000 rpm by immersing the chamber in an ice bath or similar cooling vessel.

Safety Sealed Assemblies with a Blade:

Description:

The sealed chambers are by far the industry's safest method of homogenizing with either a blade or a rotor stator generator. The unique design of the sealed chamber assembly does not allow the user to operate the system with the blade exposed. The blade assembly cannot be engaged to the drive motor unless the chamber is attached. In addition to preventing the operator from being exposed to a rotating blade, the sealed chamber assembly protects the operator from hazardous aerosols generated during homogenizing.

Assembly:

- 1) Screw the rotor shaft assembly into the cover plug. Tighten snugly using the multi-wrench (supplied in the tool kit).
- 2) With the sharpened side of the blade up, mount the blade on the rotor shaft engaging the tabs in the knife collar with the cutout in the center of the blade and secure with the acorn nut.

****CAUTION****

THE KNIFE BLADES ARE SURGICALLY SHARPENED AND SHOULD BE HANDLED CAREFULLY TO AVOID INJURY.

- 3) Tighten snugly with the multi wrench, while holding the rotor shaft steady with the 1/4" hex wrench.
- 4) Insert the rotor shaft assembly and cover plug with the blade attached into the chamber.
- 5) Screw the chamber cover onto the chamber. Note that the threads on the chamber and cover are left hand threads and are screwed together by turning the cover counter clockwise. These two parts should be tightened securely. There is no way in which the blade can be attached to the motor unit without the chamber being attached. This is to ensure that the operator is never exposed to a rotating blade.
- 6) Attach the filled chamber to the cover and cover plug/rotor shaft assembly.

Attachment of the Safety Sealed Assemblies with Blade Assembly to the Homogenizer:

- 1) All PRO Safety Sealed Assemblies are fitted to the motor unit by inserting the upper end of the generator into the collar end of the motor.

- 2) Align the vertical slots in the PRO Safety Sealed Assembly with the locating pins in the motor collar by rotating the PRO Safety Sealed Assembly.
- 3) Once aligned, push the PRO Safety Sealed Assembly inward as far as possible and turn the PRO Safety Sealed Assembly left. The collar is spring loaded so you will feel some resistance as you push the generator inward and turn it.

****CAUTION****

AT NO POINT SHOULD EXCESSIVE FORCE BE NECESSARY TO CONNECT THE PRO SAFETY SEALED ASSEMBLY TO MOTOR UNIT

- 4) Once you have turned the PRO Safety Sealed Assembly $\frac{1}{4}$ turn, release the PRO Safety Sealed Assembly and you will hear a distinct click which is the PRO Safety Sealed Assembly dropping into its locked position.
- 5) To prevent the PRO Safety Sealed Assembly from disengaging while being used, insert the safety clip between the upper collar of the PRO Safety Sealed Assembly and the bottom of the motor collar.
- 6) To disconnect the PRO Safety Sealed Assembly from the motor unit, remove the safety clip, push the PRO Safety Sealed Assembly up into the motor collar as far as possible and turn the PRO Safety Sealed Assembly clockwise $\frac{1}{4}$ turn. The PRO Safety Sealed Assembly will be pushed out of the motor collar by the force of the internal spring.

****CAUTION****

DO NOT REMOVE THE MOTOR COLLAR FROM THE MOTOR UNIT.

****CAUTION****

THE HOMOGENIZER SHOULD ONLY BE OPERATED WITH THE BOTTOM OF THE CHAMBER ASSEMBLY RESTING ON THE TABLETOP, THE BOTTOM OF THE COOLING OR HEATING VESSEL OR THE TOP OF A HEIGHT BLOCK.

- 7) Rotate the appropriate speed control dial until the desired speed is reached.
- 8) When the desired time period has elapsed, turn the "ON/OFF" switch position.
- 9) Remove the PRO Safety Sealed Assembly from the motor unit before attempting to open the chamber assembly.

Operation Techniques:

To use the homogenizer effectively, the following techniques are recommended:

****CAUTION****

WHEN IT IS NECESSARY TO USE VOLATILE, FLAMMABLE, TOXIC, PATHOGENIC, RADIOACTIVE OR OTHER HAZARDOUS MATERIALS, STANDARD LABORATORY PRECAUTIONS SHOULD BE FOLLOWED, SUCH AS VENTING, OPERATING IN A FUME HOOD, ETC. THE HOMOGENIZER IS NOT MADE OF AN EXPLOSION-PROOF CONSTRUCTION.

- 1) Cooling - At revolutions above 5,000 rpm, relatively high temperatures are generated. Therefore, the chamber should be cooled whenever operating at speeds above 5,000 rpm by immersing the chamber in an ice bath or similar cooling vessel.

- 2) Ball Milling - At revolutions below 5,000 rpm, particles may be broken down by using hard materials, such as glass beads. The homogenizer will act as a “ball mill” agitating the chamber while the hard materials do the work. Since sharpness is not essential, a dull knife blade should be used.
- 3) Homogenizing - For more complete homogenization of some materials, it is helpful to rock the motor unit slightly to churn up the specimen within the chamber.
- 2) Adding a grinding medium - To attain the desired effect (cell breakdown), a combination of procedures may be necessary. First, homogenize the specimen in solution using speed and a sharp knife blade. Then change the knife blade, add a grinding medium and run the homogenizer at maximum speed of 5,000 rpm for ten to fifteen minutes.

PRO Safety Sealed Chamber Assembly Maintenance:

Regular maintenance and inspection / replacement of wearing generator parts is recommended and will thereby extend the life of this valuable piece of equipment.

Please refer to the PRO Quick Connect Generator Maintenance Section for specific maintenance instructions for maintaining the PRO Quick Connect Generator in your PRO Safety Sealed Chamber Assembly.

PRO Carrying Case and Quick Connect Generator Probe Protective Cases:



Homogenizing Cases are available to make storing and sharing your homogenizing equipment safe, easy and convenient. The protective egg foam top with sponge foam bottom securely holds equipment in place and sturdy locking hinges keeps the case closed during transport and storage.

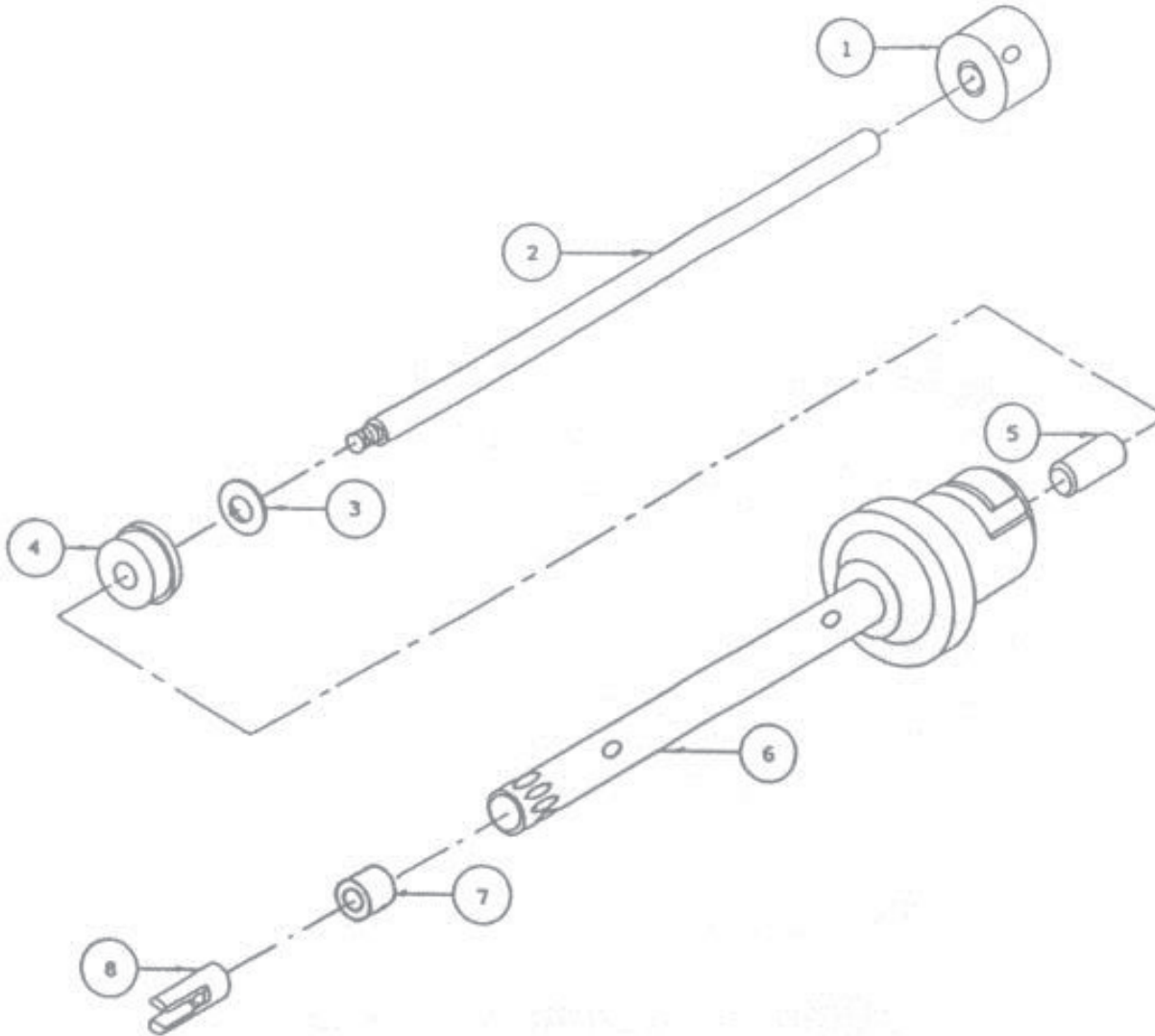
Clear rectangular prism cases are also available to safely store generator probes from 5mmx75mm up to 20mmx200mm. Up to two generator prism cases can be stored in the carrying case.

P/N	Description
92-00210	PRO200 / PRO250 Homogenizer PP Latching Case – Gray, outer dimensions 340x280x80mm with egg foam PE cushioning
92-00026	Clear Plastic Prism Case for PRO Quick Connect Generator Probes 5mm-20mm in diameter, up to 150mm in length
92-00027	Clear Plastic Prism Case for PRO Quick Connect Generator Probes 5mm-20mm in diameter, up to 200mm in length

PRO Generator Index: Drawings and Spare Parts List

5mm, 7mm, and 10mm Generators:

Use the drawing below to assist with the generators listed.

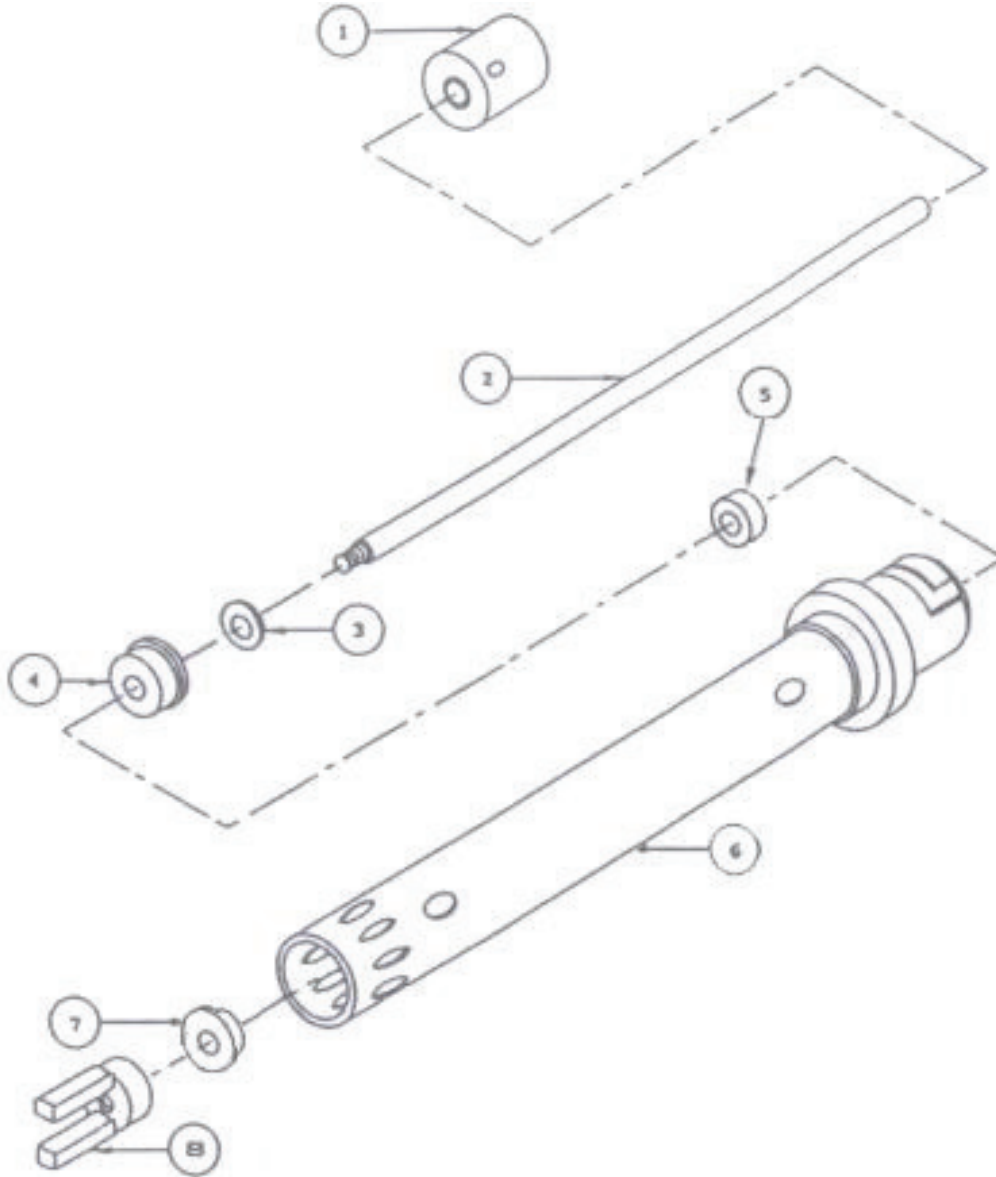


Homogenizer Generator Replacement Parts

GENERATOR 6 Part No.	Tube and Collar	Rotor Head	2 Rotor Shaft	1 Rotor Collar	8 Rotor Knife	3 Washer	4 Upper Bearing	5 Mid Bearing	7 Lower Bearing
02-05075	08-05075	N/A	05-05075	07-00150	04-05150	99-03302	03-10001	N/A	03-21002
02-07075	08-07075	N/A	05-07075	07-00150	04-07150	99-03302	03-10001	N/A	03-21003
02-07095	08-07095	N/A	05-07095	07-00150	04-07150	99-03302	03-10001	N/A	03-21003
02-07120	08-07120	N/A	05-07120	07-00150	04-07150	99-03302	03-10001	03-21103	03-21003
02-10105	08-10105	N/A	05-10105	07-00150	04-10150	99-03302	03-10001	N/A	03-11004
02-10115	08-10115	N/A	05-10115	07-00150	04-10150	99-03302	03-10001	N/A	03-11004
02-10150	08-10150	N/A	05-10150	07-00150	04-10150	99-03302	03-10001	03-21104	03-11004

20mm Generators:

Use the drawing below to assist with the generators listed.

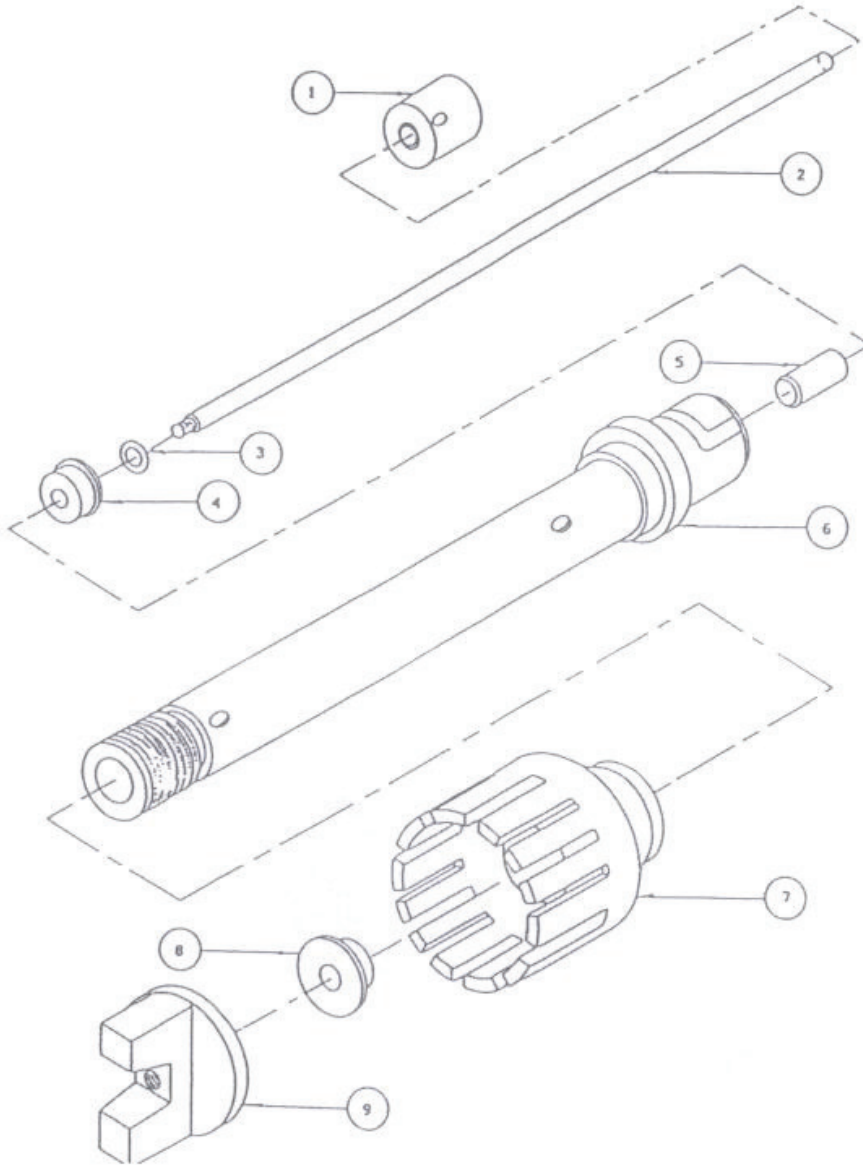


Homogenizer Generator Replacement Parts

GENERATOR 6 Part No.	Tube and Rotor Collar	2 Rotor Head	2 Rotor Shaft	1 Rotor Collar	8 Rotor Knife	3 Washer	4 Upper Bearing	5 Mid Bearing	7 Lower Bearing
02-20105	08-20105	N/A	05-20105	07-00150	04-20150	99-00302	03-10001	N/A	03-11005
02-20115	08-20115	N/A	05-20115	07-00150	04-20150	99-00302	03-10001	N/A	03-11005
02-20150	08-20150	N/A	05-20150	07-00150	04-20150	99-00302	03-10001	03-21104	03-11005
02-20200	08-20200	N/A	05-20200	07-00150	04-20150	99-00302	03-10001	03-21104	03-11005

30mm Generators:

Use the drawing below to assist with the generators listed.

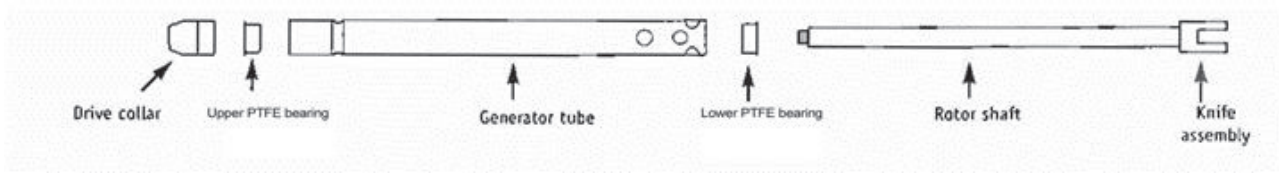


GENERATOR Part No.	6 Tube and Collar	7 Rotor Head	2 Rotor Shaft	1 Rotor Collar	9 Rotor Knife	3 Washer	4 Upper Bearing	5 Mid Bearing	8 Lower Bearing
02-30115	08-30115	16-30150	05-20115	07-00150	04-30150	99-03302	03-10001	03-N/A	03-11037
02-30150	08-30150	16-30150	05-20150	07-00150	04-37150	99-03302	03-10001	03-21104	03-11037
02-30200	08-30200	16-30150	05-20200	07-00150	04-30150	99-03302	03-10001	03-21104	03-11037
02-30200HD	08-01200HD	16-30150	05-25200P	07-00150	04-30200	99-03302	03-10001	N/A	03-11250

PRO MULTI-GEN Generator Index: Drawings and Spare Parts List

MULTI-GEN 7 and MULTI-GEN 7XL Generators:

Use the drawing below to assist with the generators listed.



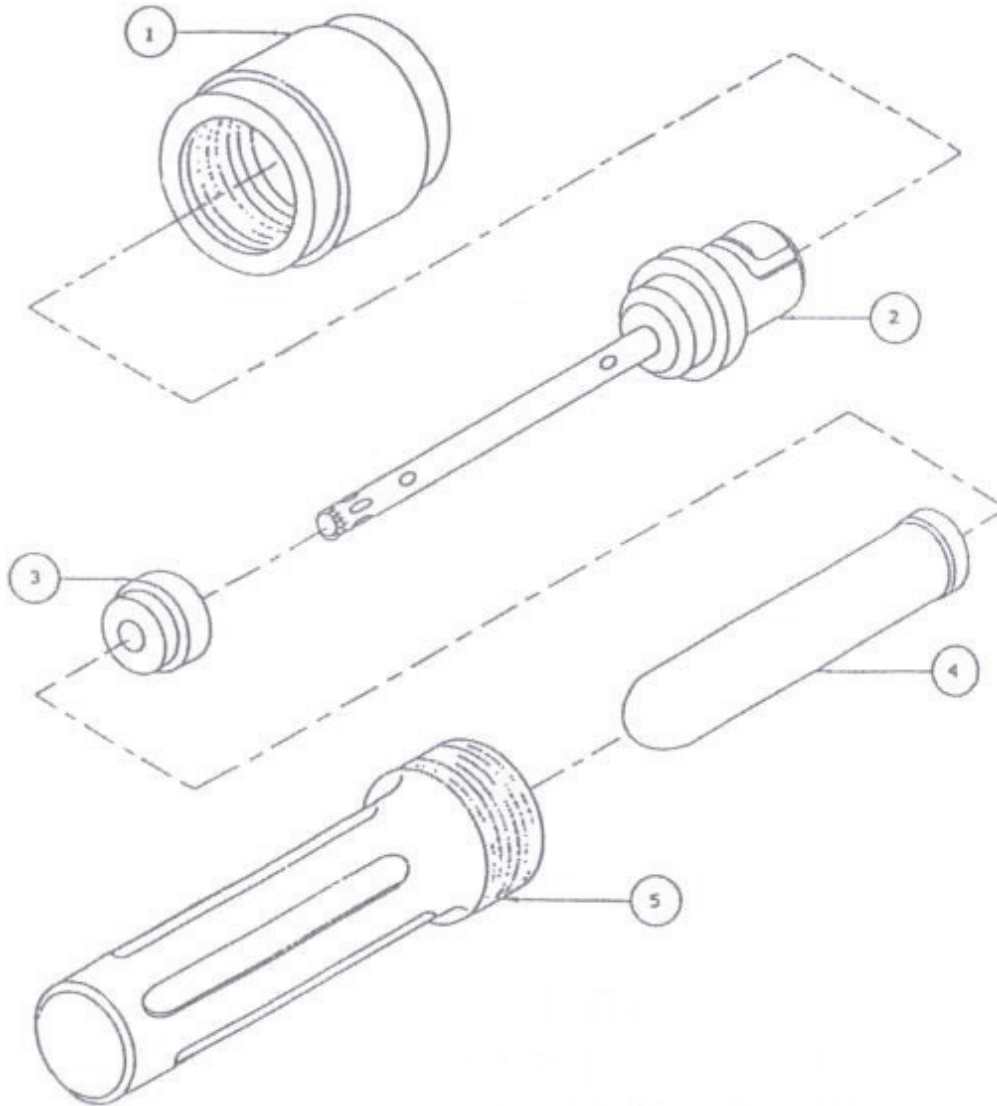
Item No.	Description
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03-11073P	PTFE Bearings - Replacement PTFE bearings.
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PRO Sealed Chamber Index: Drawings and Part list

ST Series:

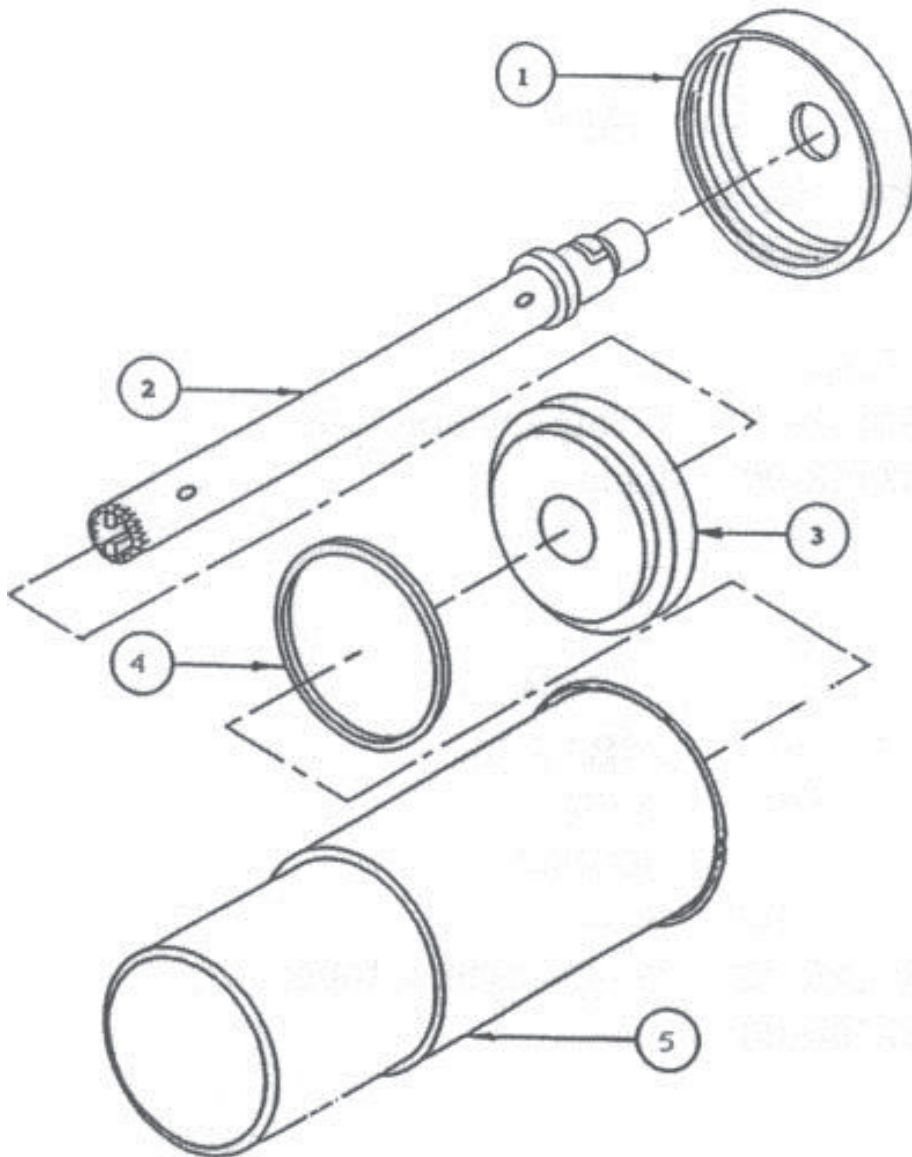
Use the drawing below to assist with the sealed chambers listed.



Part Number	Size ml	Vol. ml	PRO 200	PRO 250	Cover (1)	Shaft Assembly (2)	Polypropylene tube (3)	Cage (4)	Seal (5)	(5ml, 16ml, 19ml, and 50ml)
15-32005	5	0.2-3	X	X	14-01150	02-05075	11-03050	11-02053	14-21051	
15-32010	16	0.5-11	X	X	14-01150	02-07095	11-03100	11-02103	14-21151	
15-32015	19	0.5-13	X	X	14-01150	02-07120	11-03150	11-02153	14-21151	
15-32050	50	5-40	X	X	14-01500	02-10105	11-03500	11-02503	14-21501	

Stainless Steel:

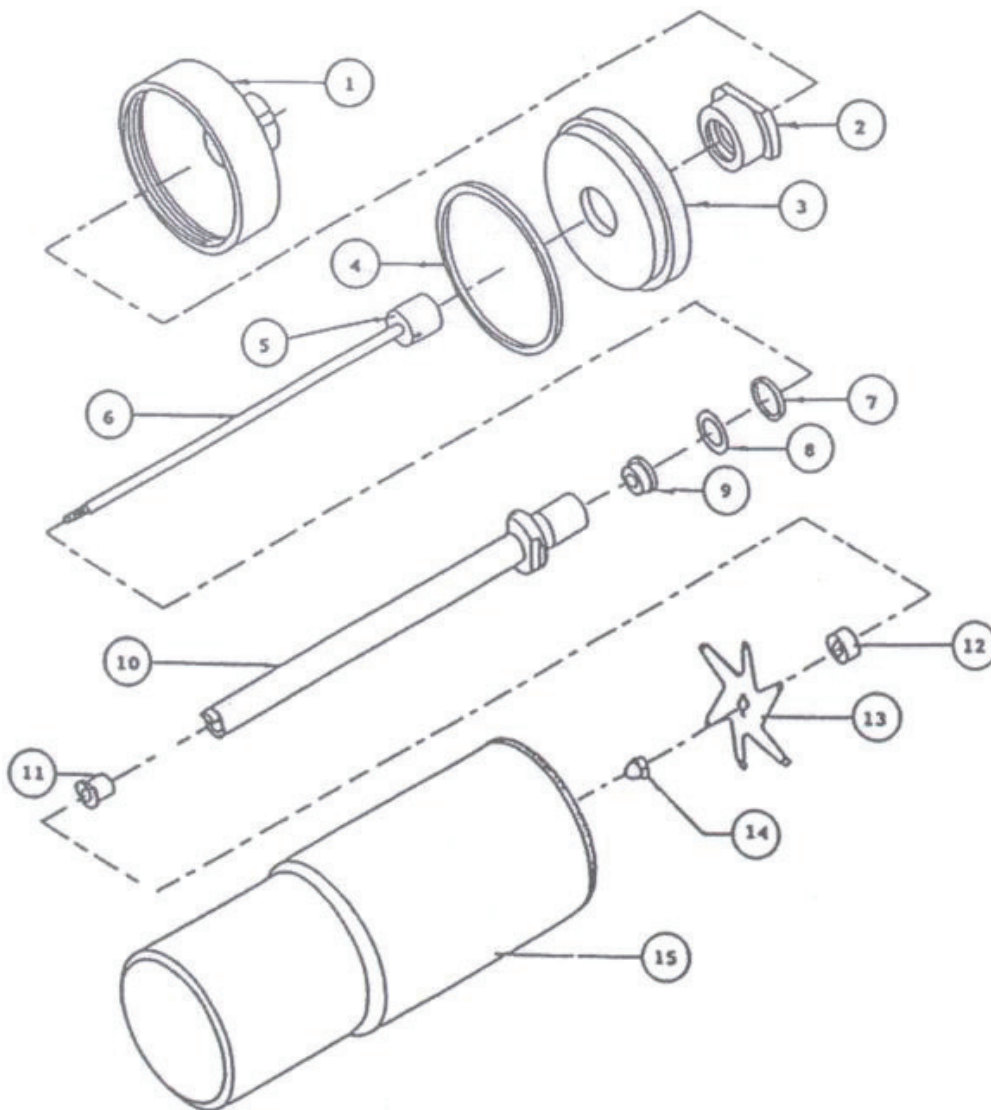
Use the drawing below to assist with the sealed chambers listed



Part Number	Size ml	Vol. ml	PRO 200	PRO 250	Cover	Shaft Assembly	Plug	Gasket	S.S. Chamber	(600 ml)
					(1)	(2)	(3)	(4)	(5)	
15-02070-10	70	10-65	X	X	14-01500	02-10115	14-11701	99-00022	11-00700	
15-02600-20	600	40-500		X	14-01600	02-20150	14-11601	99-00021	11-00600	
15-02600-30	600	40-500		X	14-01600	02-30150	14-11601	99-00021	11-00600	
15-081200	1.2L	100-1L		X	14-33120	02-70150	N/A	N/A	11-00120	

Stainless Steel with Blade:

Use the drawing below to assist with the sealed chambers listed.

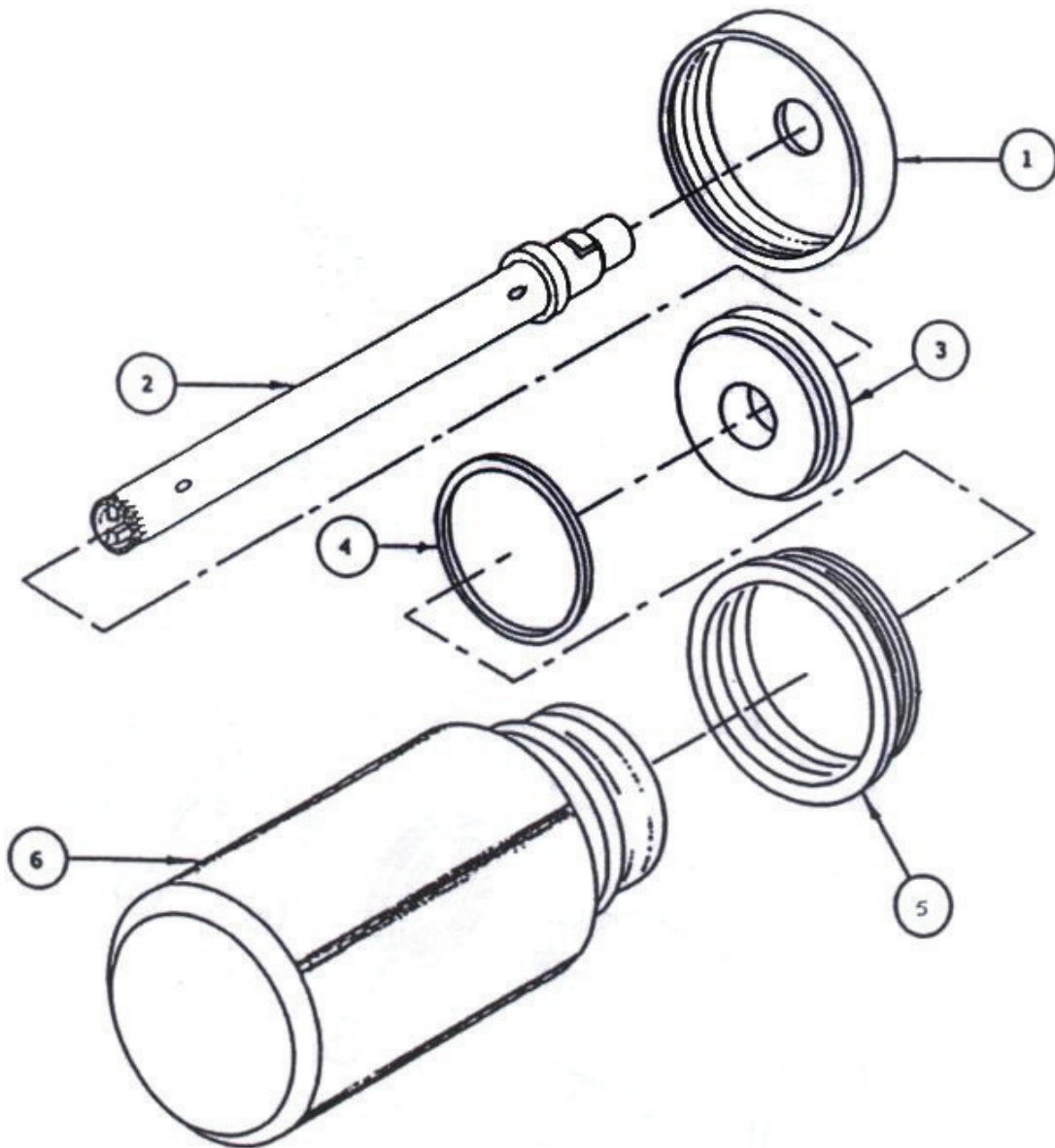


Part Number	Size ml	Vol. ml	PRO 200	PRO 250	Cover (1)	Insert (2)	Plug (3)	Gasket (4)	Rotor Collar (5)	Rotor Shaft (6)	"O" Ring (7)	Washer (8)
15-09070	70	10-65	X	X	14-02700	N/A	14-02701	99-00022	07-00150	05-02115	99-05016	99-03302
15-09600	600	40-500		X	14-02600	14-00003	14-12601	99-00021	07-00150	05-02150	99-05016	99-03302
					Upper Bearing (9)	Tube and Collar (10)	Rulon Bearing (11)	Blade Collar (12)	Rotor Blade (13)	Acorn Nut (14)	S.S. Chamber (15)	
					03-10001	08-02115	03-12187	07-00003	04-02001	99-22049	11-00700	
					03-10001	08-02150	03-12187	07-00003	04-02002	99-22049	11-00600	

(600ml)

Glass:

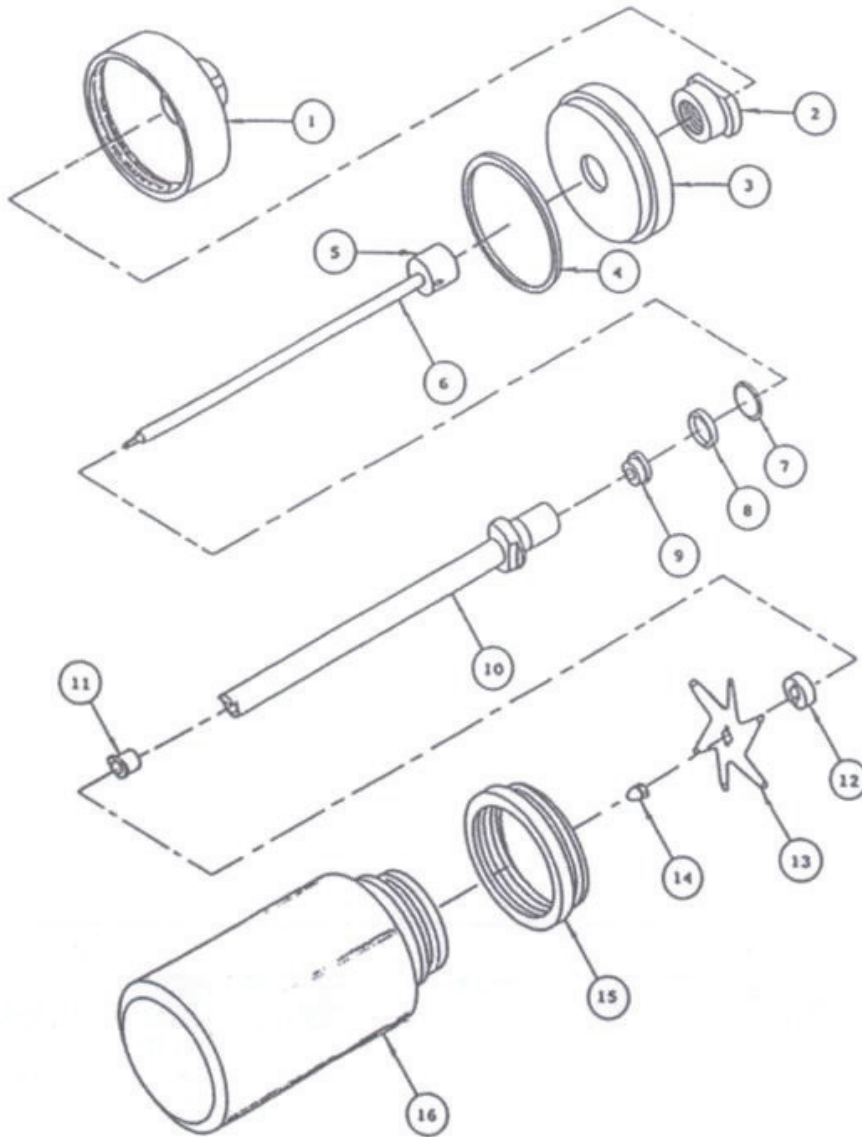
Use the drawing below to assist with the sealed chambers listed.



Part Number	Size ml	Vol. ml	PR O 250	Cover	Shaft Assembly	Plug	Gasket	Adapter	Glass Chamber	(473ml and 946ml)
				(1)	(2)	(3)	(4)	(5)	(6)	
15-12473-20	473	30-450	X	14-01600	02-20115	14-11001	99-00021	14-00002	11-01470	
15-12473-30	473	30-450	X	14-01600	02-30115	14-11001	99-00021	14-00002	11-01470	
15-12946-20	946	50-800	X	14-01600	02-20150	14-11001	99-00021	14-00002	11-01940	
15-12946-30	946	50-800	X	14-01600	02-30150	14-11001	99-00021	14-00002	11-01940	

Glass Blade:

Use the drawing below to assist with the sealed chambers listed.



Part Number	Size ml	Vol. ml	PRO 250	Cover (1)	Insert (2)	Plug (3)	Gasket (4)	Rotor Collar -(5)-	Rotor Shaft -(6)-	"O" Ring (7)	Washer (8)
15-19473	473	50-450	X	14-02600	14-00003	14-12001	99-00021	07-00150	05-02150	99-05016	99-03302
15-19946	946	100-800	X	14-02600	14-00003	14-12001	99-00021	07-00150	05-02150	99-05016	99-03302
				Upper Bearing (9)	Tube and Collar -(10)-	Rulon Bearing (11)	Blade Collar (12)	Rotor Blade (13)	Acorn Nut (14)	Adapter (15)	Glass Chamber (16)
				03-10001	08-02150	03-12187	07-00003	04-02002	99-22049	14-00002	11-01470
				03-10001	08-02150	03-12187	07-00003	04-02002	99-22049	14-00002	11-01940

(473ml and 946ml)