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# PRO Scientific Generator Probe Quick Care Guide



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## What size generator probe do I have?

The generator probe is the stainless-steel component that attaches to the homogenizer motor unit and is the component that comes into contact with your sample.

To find the correct replacement parts, you will need to know the diameter and the length of the probe.

Diameter is measured at the bottom of the probe, and the length is the shaft length so from the bottom of the probe to the knurled collar.



Often it is also necessary to know the serial number of your probe. If your probe has a serial number, it is found either under the knurled collar or on outer tube and collar.



## How do I know my generator is in tip-top shape?

PRO Generators probes are precision designed and often when homogenization results change, or efficiency decreases a key factor that impacted this was the maintenance and/or cleaning of the generator probe.

It is imperative that the probe be regularly taken apart and cleaned and wearing components like the lower bearing inspected. Please refer to your operating manual for full details on the assembly and disassembly of the probe.

Missing your manual? Visit our website to request a copy: <https://proscientific.com/service-request>

## 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).

## What happens if I don't replace a worn or missing upper washer?

- **Never run the generator without that part. It would lead to metal-on-metal spinning and will start to create heat plus damage the rotor shaft collar and stainless-steel bearing.**
- 

## Perform a simple lower bearing maintenance check.

The lower bearing is the wear factor in the generator. It will wear over time based on usage and what you are processing. The lower bearing sits on the rotor shaft just above the rotor knife. It is important to change the lower bearing as the lower bearing seat in the tube and collar where the bearing sits will wear over time if use is continued with the damaged lower bearing. If that bearing seat is worn out of tolerance most likely the generator is not repairable.

*(Depending upon your generator diameter the lower bearing may not look like image picture).*



## It is time to replace your lower Polytetrafluoroethylene (PTFE) bearing if...

1. ...the inside diameter of the lower PTFE bearing fits loosely on the outside diameter of the shaft.
2. ...you are able to wiggle and tilt the PTFE bearing.
3. Checking the I.D. of the bearing after use during your disassembly and cleaning process is critical.
  - a. With probes 20mm and larger, the normal I.D. of that bearing is .187". It is recommended to replace the bearing at .192". When taking the generator apart to clean, if a .192" pin gauge can be pushed through the I.D. of the bearing it is time to throw it away and replace. Pin gauges may be purchased from PRO Scientific.
4. Lower bearings can prematurely wear out if;
  - a. The generator probe is run dry.
  - b. If the generator probe speed is too fast and the volume of material is too low (this may make a whooshing noise)
  - c. The rotor shaft is damaged (see important note below)

## What happens if I don't replace a worn lower bearing?

- **Failure to replace a worn lower bearing can lead to damage of the entire generator probe and put a strain on the motor unit.**
- **Continued use of a worn lower bearing will ultimately lead to wearing a groove in the rotor-shaft.**
- **The rotor knife will then start to hit the inside of the rotor head at the bottom thus creating metal scraping on metal.**

- **This would all lead to metal-on-metal and produce heat.**

*Important note:*

Replacing the lower bearing if the rotor shaft is already damaged will start to damage the bearing during your first use and wear it out faster. The rotor shaft is replaceable if it becomes damaged. Replacement parts for the generator are available for purchase and are usually always in stock.

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### Perform a mid-bearing maintenance check.

Mid-bearings are press fit into each end of the tube and collar. Their purpose is to support the rotor shaft as it spins.



Generators 120mm and longer have one mid-bearing approximately halfway up the shaft.

Generators 340mm and longer have two mid-bearings approximately a third of the way down the shaft from either end.

For shorter generator probes and HD probes they do not have a mid-bearing and this step can be skipped.

### Inspect for normal marks on shaft.

1. There should naturally be wear marks on the shaft from use.
  - a. 120mm & 200mm length probes will have one mark halfway up the shaft.
  - b. 340mm and longer probes will have two marks approximately a third of the way down the shaft from either end.
2. If during disassembly you see these marks and they have moved closer to the end of the rotor shaft it's time to replace them.
3. Mid-bearings can prematurely wear out if;
  - a. There is insufficient volume of material.
    - i. Make sure your sample height is high enough to cover mid-bearing location with liquid medium during homogenization.
  - b. The lower bearing is not maintained and has worn allowing excessive flex of the shaft.

### What happens if I don't replace a worn mid-bearing?

- **The rotor shaft will begin to flex at high speed and will start scraping the inside of the generator tube.**
- **This will produce heat and damage your generator.**
- **This will also cause the sample to become discolored.**

*Important note:*

If mid-bearings need replacement, the generator probe would need to be sent back for service. Special tooling is required for removal.

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## Inspect the rotor shaft collar assembly.

The rotor shaft collar assembly is the cylinder-shaped component at the top of the generator probe, it inserts into the motor unit during homogenizing and contains a set screw on the side of it.



- The rotor shaft collar assembly does not come into contact with your sample during homogenizing.
- The inside of the rotor shaft collar assembly features a hardened star shape assembly.
  - This is a non-wetted surface. If you get it wet, it will discolor and corrode.
  - To remedy any discoloration that might occur if you did accidentally get it wet;
    - Apply a small bit (just to lightly coat) of Vaseline or silicone spray on the surface to maintain lubrication.
- If the star shaped pattern has worn or become damaged, it may need to be replaced.
- Make sure the setscrew is present to secure the rotor shaft collar assembly onto the flat of the shaft during assembly.
  - If the set screw is missing or damaged, it needs to be replaced.

## What happens if my rotor shaft collar assembly is worn, and I don't replace it?

**Continued use of a worn rotor shaft collar assembly can cause distortion of the homogenizer drive shaft.**

### *Important note:*

When reassembling the generator probe, the set screw should always be tightened onto the flattened portion of the shaft, NOT THE ROUNDED PORTION. Failure to do so may cause the set screw to back out during operation and the generator probe can become stuck connected to the motor unit. If this occurs, both the homogenizer and the connected generator probe will need to be sent back for service.

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## Inspect the stainless-steel bearing.

The stainless-steel bearing is press fit into the upper end of the tube.

1. If there is worn grooving or discoloration, it may need to be replaced.
2. If you are having difficulty pushing the rotor shaft through the stainless steel bearing you may have created a burr at the upper end of the shaft.
  - a. You have displaced generator material and that is causing interference between the shaft and bearing.
3. The stainless-steel bearing can wear out if;
  - a. The upper PTFE washer is not in place during homogenization.
  - b. The upper vent hole of the probe was covered during homogenization and liquid was pumped up into the homogenizer.
  - c. Other generator probes parts have already worn and caused stress on this component during homogenization.

## What happens if my stainless-steel bearing is damaged, and I don't replace it?

Depending upon what led to the damage, a significant amount of heat can be produced that can impact the homogenization as well as potentially damage the motor unit. Also, continuously trying to force the shaft through a damaged stainless-steel bearing will damage the shaft and bearing.

*Important note:*

*If the stainless-steel bearing need replacement, the generator probe would need to be sent back for service. Special tooling is required for removal.*

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## Replacing generator probe parts.

"Now that I have performed a routine generator maintenance check, I need to order parts."

1. Visit our generator replacement parts page on our website.
2. Speak with a sales consultant at PRO, 203-267-4600, and they will be happy to assist you in finding the correct replacement part for your generator.

## I have questions about maintaining my homogenizing equipment and/or I want to have my generator probe and/or homogenizer serviced.

- Speak with a service consultant at PRO, 203-267-4600, and they will be happy to send you return authorization paperwork to have your items sent in for evaluation.
    - Generally, our turnaround time for all repairs is 1-2 days.
  - Visit our website and request a follow up and/or return authorization.
    - <https://proscientific.com/service-request>
- 

## Here are a few reminders and tips to maximize your generator's performance.

1. Please follow the instructions in the manual to review all operating instructions for the homogenizer and generator probes.
2. Never run the generator assembly dry.
  - a. The generator requires liquid sample/medium to lubricate the bearings during processing. Without the liquid, the bearings can burn out and cause damage to the generator itself.
3. Faster isn't always better.
  - a. Always begin homogenizing at a low rpm, and then gradually increase the speed to your target level.
  - b. Running too fast can cause two things to happen:
    - i. A quick increase in speed will push the sample away from the probe and inhibit homogenization.
    - ii. If you are processing a small volume of sample and running at max speed, be careful that you aren't pumping the sample through the probe quicker than it can recover. If the samples are moving through the probe quicker than it can recover the probe will begin in essence to homogenize pockets of air and this dry homogenizing can damage the probe.
    - iii. Running the homogenizer too fast can introduce air into the sample and you may hear a "whooshing" noise.
4. Bigger isn't always better. Make sure you are using the correct diameter probe for your particular application. Too small a probe or too large a probe can both lead to inefficient homogenization and/or damaging your equipment.

- a. Consult with a PRO Scientific application specialist if you have any concerns.  
<https://proscientific.com/service-request>
5. Make sure you are processing the recommended sample size and/or volume for the generator/generator assembly you are using.
  - a. Too small a sample volume and too fast of a homogenizing speed could damage your generator probe. If you are unsure if this is the correct generator for your application, please contact a sales representative before using the generator.
  - b. The sample, if solid, should be no larger than half the diameter of the generator.
6. Properly locate the generator within the sample
  - a. Place the generator off-center in the tube or container for the best results.
    - i. This will prevent material from getting "stuck" on the walls of the tube and not being homogenized.
  - b. Place the generator 1/3 of the sample height off the bottom of the tube or container.
  - c. When using a generator 120mm or greater in length, it is important to remember that these generators have a mid-bearing. This "bearing" helps prevent bending or movement of the rotor within the tube.
    - i. This mid-bearing still needs to be kept lubricated during homogenizing and therefore should be kept covered by the substance being homogenized, not doing this will burn out the bearing, produce excessive amounts of heat and damage your generator. This will also cause the sample to become dingy and blackened.
7. Regular maintenance and inspection/replacement of generator parts is recommended and will thereby extend the life of this valuable piece of equipment.
8. **\*\*CAUTION\*\*RUNNING THE GENERATOR WITH MISSING OR WORN COMPONENTS CAN CAUSE DAMAGE TO THE GENERATOR AND/OR HOMOGENIZER MOTOR UNIT.\*\***
  - a. Using a generator with worn components will increase the likelihood of eventual damage to the motor unit. Do not mix and match generator parts or use a damaged/worn generator probe on a new homogenizer motor unit.
9. The outer tube portion of the generator probe has two vent holes on the side of it. One on the bottom and one on the top. Never cover the top vent hole during processing.
  - a. Covering that vent hole while processing your sample will cause a vacuum and could cause material to be sucked up into your motor unit.
10. Follow all assembly instructions from the operating manual.
  - a. Pay attention to your rotor shaft collar assembly when reassembling the probe!
    - i. The rotor shaft collar is the part with the set screw in it. It attaches to the top of the rotor shaft.
    - ii. Always align the set screw to the flat of the shaft when tightening and never the round. If you tighten the set screw incorrectly on the round, it can back out during use and may cause the entire generator to be jammed in the motor collar. The unit would have to come back for service.
11. After assembling the generator, before use, make sure it spins free with no resistance. If you find that there is resistance and it feels tight and compressed, just loosen the set screw in the collar slightly and retighten it.
12. Clean your generator probe after each use.



- a. 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.
- b. This is especially important if you are homogenizing heated and/or viscous material.
- c. 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.
- d. Please ensure that all cleaning processes are compatible with 316SS and PTFE.

### Additional generator cleaning guidelines.

For a more thorough cleaning it is recommended that your generator be disassembled and cleaned via one of the following processes;

- **Chemical process**  
Germicidal solutions (formalin, phenol, alcohol, etc.) can disinfect in most cases.  
Residues of the germicide must subsequently be removed with sterilized water.  
Please ensure that all chemical processes are compatible with 316SS and PTFE.
- **Sterilizing by humid heat**  
This means sterilizing with steam at a pressure of 2 bar above the atmosphere and a temperature of 120°C.  
PRO Generators are heat resistant up to 390° F / 198° C.
- **Sterilizing by hot air**  
Hot air sterilization is normally carried out at 160 to 190°C.  
PRO Generators are heat resistant up to 390° F/198° C.
- **Flaming**  
This method can be used; however, it is only effective on external surfaces only.  
PRO Generators are heat resistant up to 390° F / 198° C

# 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 counterclockwise.
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 come in contact with the inside 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 5/64 hex wrench (supplied in the tool kit). For convenience, do not fully remove the set screw from within the rotor shaft collar assembly.



Figure 1: 5mm probe dismantling <https://youtu.be/kFxTIV70Xrg>

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

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

1. Remove the rotor shaft collar assembly by loosening the sets crew 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.
2. Remove the upper 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 5/64 hex wrench).
3. Re-attach the rotor shaft collar assembly to the flat portion of the upper shaft.
4. Unscrew the rotor knife from the bottom of the rotor shaft.
  - a. Insert the 1/4" hex key (supplied in the tool kit) into the end of the rotor shaft collar and hold stationary
  - b. Unscrew the blade in a counter-clockwise direction.

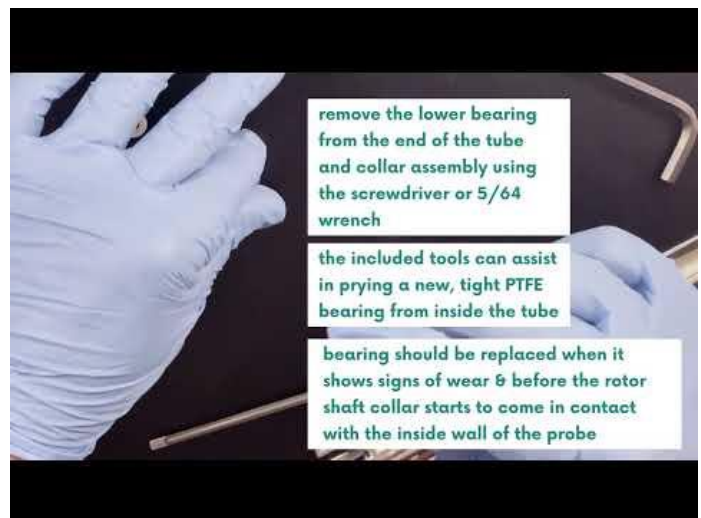


Figure 2: 7-59mm probe dismantling, <https://youtu.be/xVrxZj-BgJM>

5. Remove the lower bearing from the rotor shaft
  - a. The lower bearing should be replaced when it shows signs of wear and before the rotor knife starts to come in contact with the inside of the stator.
  - b. "HD" generator probes have a press-fit, keyed in PTFE Heavy-Duty lower bearing that may not slide out of the chamber until it begins to wear.

## 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. Insert the rotor shaft into the upper end of the tube and collar assembly.
3. 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.
4. Insert the rotor knife into the end of the tube and collar assembly and rotate the knife clockwise with the screwdriver tool while holding the rotor shaft. Rotor knife should be hand tight. NOTE: 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.
5. With the rotor knife attached, place the generator with the blade end downward onto a flat surface. Place the PTFE washer onto the shaft. Then place the rotor shaft collar assembly on top of that. Align the set screw from the rotor shaft collar with the flat end of the rotor shaft and tighten with the 5/64 hex head wrench (provided in the tool kit). Check that the generator rotates freely.



Figure 3: Assembling 5mm probe <https://youtu.be/-eZtPvKhIN8>

### 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 tightened). NOTE: 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.



Figure 4: Assembling 7-59mm probes <https://youtu.be/xVrxZj-BgJM>

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 at 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 set screw 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 set screw 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 it's 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).

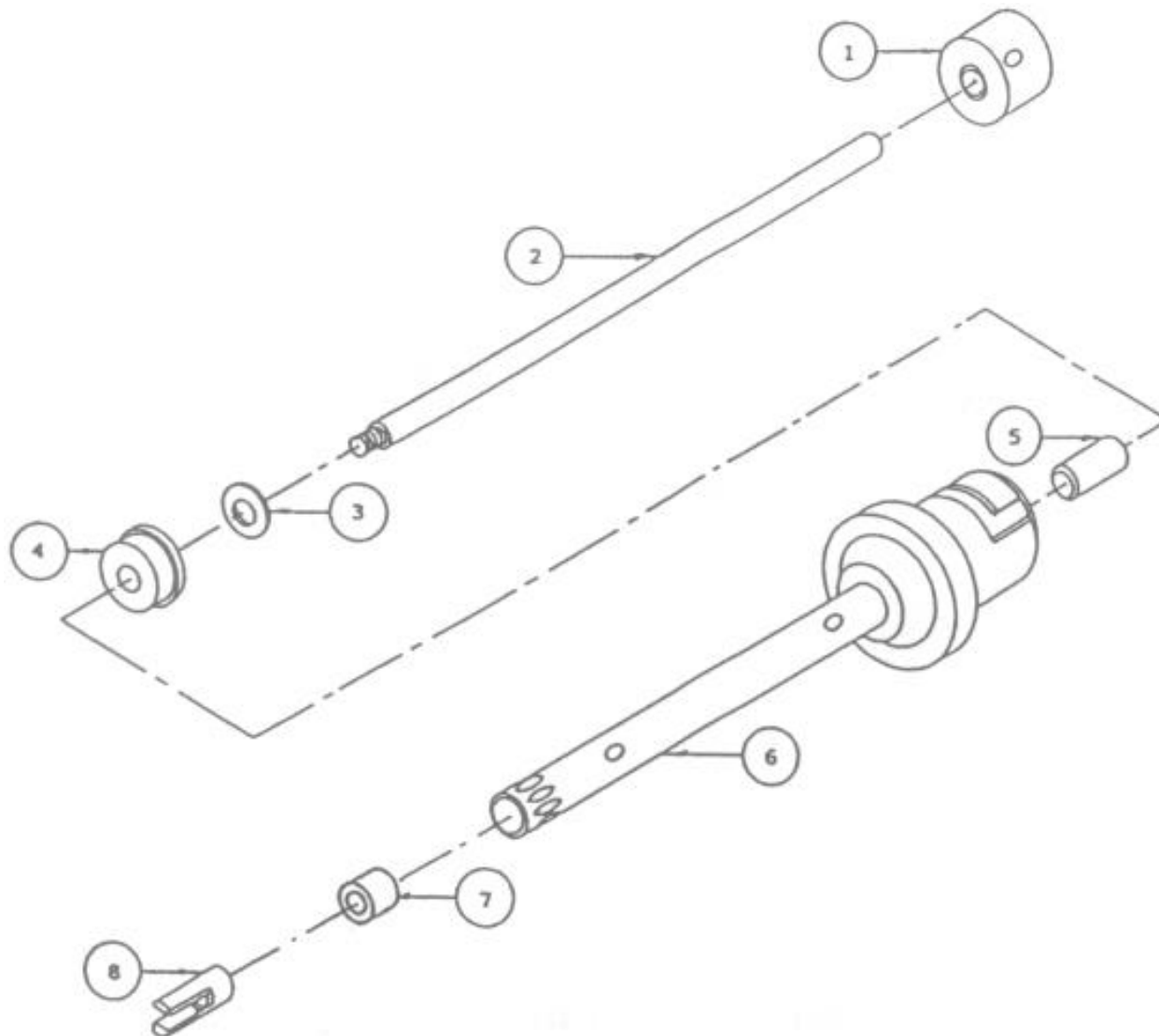
**\*\*CAUTION\*\***

**UPPER SET SCREW MUST BE TIGHTENED AGAINST THE FLAT PORTION OF THE SHAFT! FAILURE TO DO SO, OR TIGHTENING AGAINST THE ROUNDED PORTION WILL RESULT IN THE GENERATOR PROBE BECOMING STUCK IN THE MOTOR UNIT.**

# Generator Probe Drawings

## 5mm, 7mm, and 10mm Generators:

Use the drawing below to assist with the generators listed.

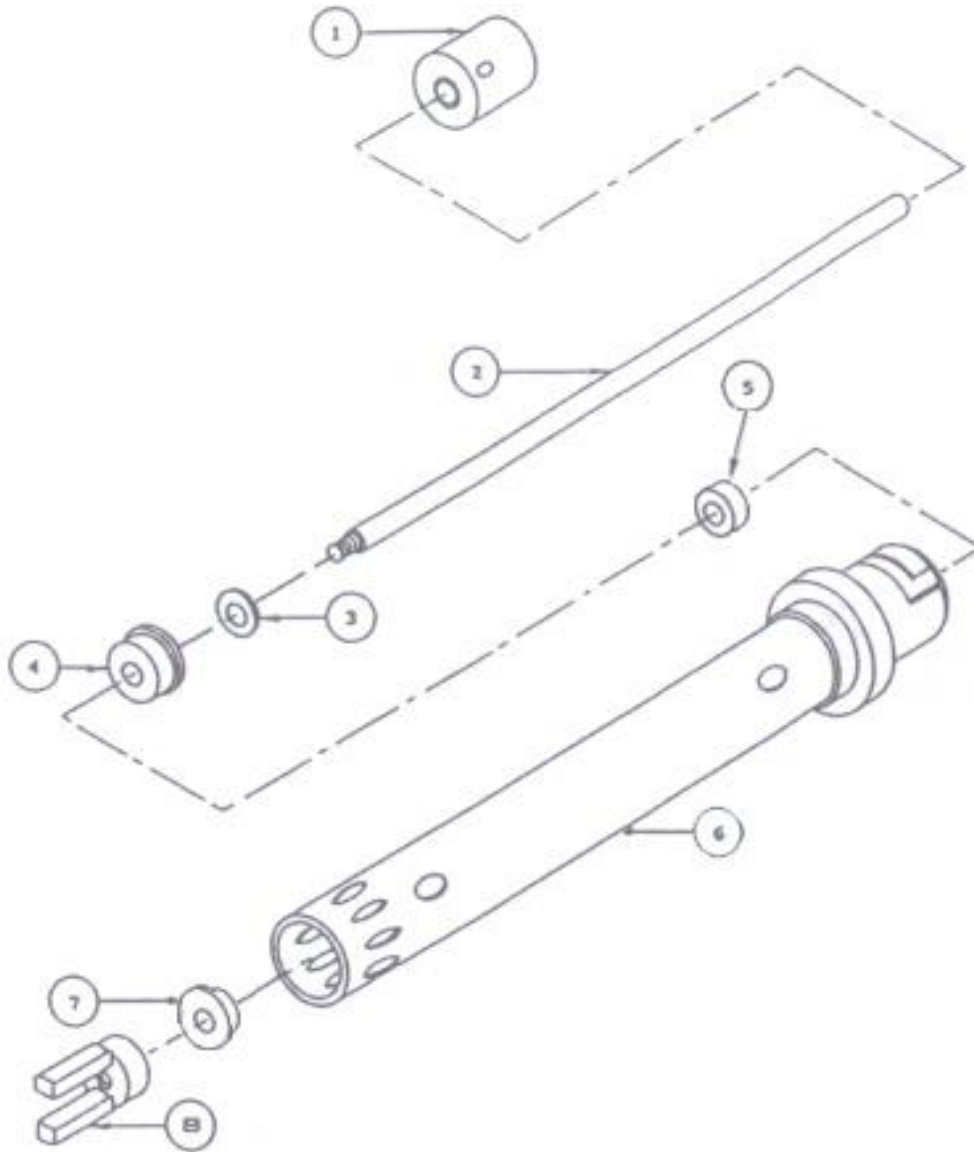


### (10mm X 150mm)

Part Number	Size mmXmm	Rotor Collar (1)	Rotor Shaft (2)	PTFE Washer (3)	Upper Bearing (4)	Middle Bearing (5)	Tube and Collar (6)	Lower Bearing (7)	Rotor Knife (8)
02-05075	5 X 75	07-00150	05-05075	99-03302	03-10001	N/A	08-05075	03-21002	04-05150
02-05150	5 X 150	07-00150	05-05150	99-03302	03-10001	03-21102	08-05150	03-21002	04-05150
02-07075	7 X 75	07-00150	05-07075	99-03302	03-10001	N/A	08-07075	03-21003	04-07150
02-07095	7 X 95	07-00150	05-07095	99-03302	03-10001	N/A	08-07095	03-21003	04-07150
02-07120	7 X 120	07-00150	05-07120	99-03302	03-10001	03-21103	08-07120	03-21003	04-07150
02-07150	7 X 150	07-00150	05-07150	99-03302	03-10001	03-21103	08-07150	03-21003	04-07150
02-10105	10 X 105	07-00150	05-10105	99-03302	03-10001	N/A	08-10105	03-21004	04-10150
02-10115	10 X 115	07-00150	05-10115	99-03302	03-10001	N/A	08-10115	03-21004	04-10150
02-10150	10 X 150	07-00150	05-10150	99-03302	03-10001	03-21104	08-10150	03-21004	04-10150

## 20mm Generators:

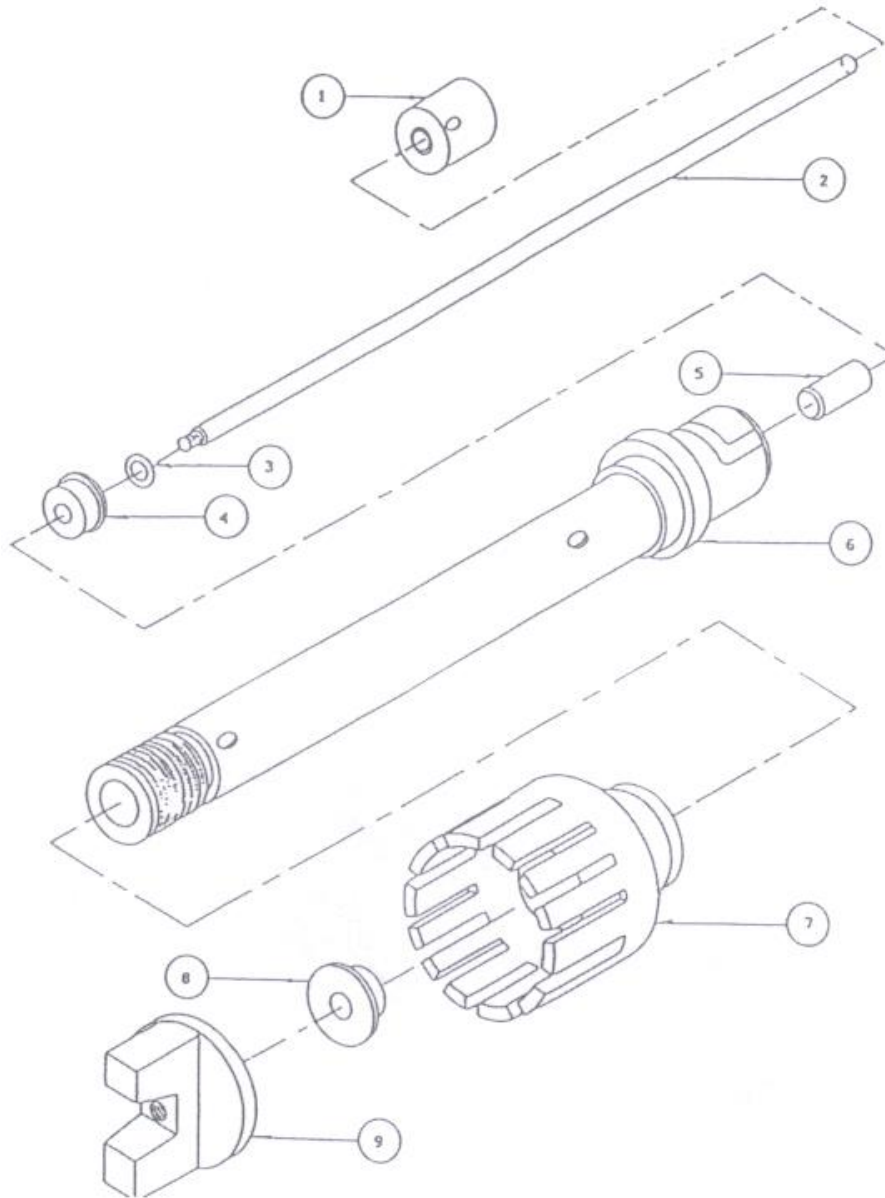
Use the drawing below to assist with the generators listed.



Part Number	Size mmXmm	Rotor Collar (1)	Rotor Shaft (2)	PTFE Washer (3)	Upper Bearing (4)	Middle Bearing (5)	Tube and Collar (6)	Lower Bearing (7)	Rotor Knife (8)
02-20105	20 X 105	07-00150	05-20105	99-03302	03-10001	N/A	08-20105	03-11005	04-20150
02-20115	20 X 115	07-00150	05-20115	99-03302	03-10001	N/A	08-20115	03-11005	04-20150
02-20150	20 X 150	07-00150	05-20150	99-03302	03-10001	03-21104	08-20150	03-11005	04-20150
02-20200	20 X 200	07-00150	05-20200	99-03302	03-10001	03-21104	08-20200	03-11005	04-20150
02-20340	20 X 340	07-00150	05-20340	99-03302	03-10001	03-21104	08-20340	03-11005	04-20150

### 30mm, 37mm, 43mm & 59mm Generators:

Use the drawing below to assist with the generators listed.



**(30mm X 200mm)**

Part Number	Size mmXmm	Rotor Collar (1)	Rotor Shaft (2)	PTFE Washer (3)	Upper Bearing (4)	Middle Bearing (5)	Tube and Collar (6)	Rotor Head (7)	Lower Bearing (8)	Rotor Knife (9)
02-30115	30 X 115	07-00150	05-20115	99-03302	03-10001	N/A	08-01115	16-30150	03-11037	04-30150
02-30150	30 X 150	07-00150	05-20150	99-03302	03-10001	03-21104	08-01150	16-30150	03-11037	04-30150
02-30200	30 X 200	07-00150	05-20200	99-03302	03-10001	03-21104	08-01200	16-30150	03-11037	04-30150
02-30340	30 X 340	07-00150	05-20340	99-03302	03-10001	03-21104	08-01340	16-30150	03-11037	04-30150
02-37115	37 X 115	07-00150	05-20115	99-03302	03-10001	N/A	08-01115	16-37150	03-11037	04-37150
02-37150	37 x 150	07-00150	05-20150	99-03302	03-10001	03-21104	08-01150	16-37150	03-11037	04-37150
02-37200	37 x 200	07-00150	05-20200	99-03302	03-10001	03-21104	08-01200	16-37150	03-11037	04-37150
02-37340	37 x 340	07-00150	05-20340	99-03302	03-10001	03-21104	08-01340	16-37150	03-11037	04-37150
02-43115	43 x 115	07-00150	05-20115	99-03302	03-10001	N/A	08-01115	16-43150	03-11037	04-43150
02-43150	43 x 150	07-00150	05-20150	99-03302	03-10001	03-21104	08-01150	16-43150	03-11037	04-43150
02-43200	43 x 200	07-00150	05-20200	99-03302	03-10001	03-21104	08-01200	16-43150	03-11037	04-43150
02-43340	43 x 340	07-00150	05-20340	99-03302	03-10001	03-21104	08-01340	16-43150	03-11037	04-43150
02-59115	59 x 115	07-00150	05-20115	99-03302	03-10001	N/A	08-01115	16-59150	03-11037	04-59150
02-59150	59 x 150	07-00150	05-20150	99-03302	03-10001	03-21104	08-01150	16-59150	03-11037	04-59150
02-59200	59 x 200	07-00150	05-20200	99-03302	03-10001	03-21104	08-01200	16-59150	03-11037	04-59150
02-59340	59 x 340	07-00150	05-20340	99-03302	03-10001	03-21104	08-01340	16-59150	03-11037	04-59150

## Notes.

Use this blank space to write your own additional notes.